

ENCYCLOPEDIA OF EXPLORATION

VOLUME I
The Explorers

CARL WALDMAN AND ALAN WEXLER



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ENCYCLOPEDIA OF
EXPLORATION

VOLUME I



The Explorers

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EXPLORATION
VOLUME I



The Explorers

CARL WALDMAN
AND
ALAN WEXLER

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For John Waldman and Frances LeFevre Waldman
—Carl Waldman

For Nathan Wexler and Minnie Wexler
—Alan Wexler

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Preface



The term *exploration* comprises the concepts of traveling and seeking. *Discovery*, a term associated with exploration, refers to “finding.” But the latter term has often been misused. One cannot “find” or “discover” a land that is already inhabited. But one can “discover” knowledge of that land and take it back to one’s place of origin and pass on that knowledge. The history of exploration can therefore be characterized as the record of the diffusion of knowledge. The knowledge most relevant to exploration is geographic; how the world came to be mapped is thus central to chronicling exploration. In exploratory expeditions, information passes back and forth between continents and between cultures, affecting the realities both of the exploring and of the explored.

People have participated in exploration for a variety of reasons over the ages. Two basic human traits—curiosity and the desire for personal accomplishment—must be taken into account in all types of exploration. More specific motives include geographic and scientific inquiry, seeking a new homeland, conquest and/or colonization, commerce and profit, religious zeal, finding others who have gone missing, and searching for new literary or artistic themes. Those who explore come from diverse social and vocational backgrounds, among them, navigators, sailors, soldiers, officials, diplomats, colonists, missionaries, religious scholars, merchants, hunters, fur trappers, whalers, sealers, pirates, guides, interpreters, tribal leaders, cartographers, writers, painters, naturalists, geologists, historians, archaeologists, oceanographers, astronomers, aviators, astronauts, and mountain climbers. Some individuals contributed to exploration by promoting, organizing, and financing expeditions or by making technological breakthroughs, although they themselves may not have ventured far from their homelands.

Explorers lead fascinating, driven lives, and the stories of their expeditions are filled with adventure and danger. Many individuals have died in the pursuit of their dreams. Some have inflicted death, either directly or indirectly, on fellow explorers and especially on indigenous peoples. It can be said that explorers are at the head of the historical curve, the forerunners of good or bad. It also can be said that exploration is the starting point of many historical and cultural themes.

The explorers and the particular expeditions discussed in this work are only part of the story of exploration. Many more individuals have a role in the exploring and charting of the Earth and, in recent decades, outer space.



Map of the world by John Speed (1626) (Library of Congress)

The general topics examined and the terms defined offer some context to the field of exploration, but it is important to remember that the scope of the story of exploration includes the entire historical record, and its sphere of action encompasses the entire world and the solar system. So, in chronicling exploration, particular time periods, cultures, activities, and technologies are given great weight. But one should perceive exploration as a single window into humankind's larger journey through time.

Volume I of the *Encyclopedia of Exploration* presents biographical entries about explorers, organized alphabetically. Volume II, also organized alphabetically, presents various subjects related to exploration: types of exploration, activities relating to exploration, groupings of peoples known for exploration, historical periods, organizations, legends, places, routes, natural phenomena, cartographic terms, oceanographic equipment, navigational tools, and crafts used in transportation.

In the biographical entries of Volume I, expeditions are more likely to be described in detail than in Volume II's entries. At the beginning of each biographical entry can be found the following: alternate names and spellings of names, birth and death dates (when known), nationality (and, if different, the country for whom explorations were carried out), occupations, places of the

world explored, and familial relationships to other explorers with entries. After an opening discussion of the individual's background, there follows a description of his or her career in exploration and, if applicable, voyages and routes. Each entry closes with a summary of the person's accomplishments and his or her broader relevance to the history of exploration.

Some of the entries in Volume II provide overviews of historical or geographic information; others are definitions of terms relating to exploration. Geographic terms include continents, regions, islands, capes, oceans, straits, mountain ranges, mountains, mountain passes, deserts, rivers, cities, and routes. In addition to the obvious choices for geographic entries on continents and oceans, which provide overviews, some places have been selected as entries because they generated many expeditions or are central to periods of exploratory history. It should be kept in mind that other such places without their own entries have fascinating stories of exploration attached to them; many such stories can be found in Volume I (see the cumulative index).

Cross-references, indicated by a term set in SMALL CAPITAL letters the first time it appears in an entry, are meant to guide a reader/researcher through the complex material in both volumes. The cross-references run across both volumes; the reader should remember to look for entries on people in Volume I and all other entries in Volume II. A reader should understand that for the sake of convenience, not all terms that are discussed in entries in Volume II are presented as cross-references. For example, the terms *Africa* and *Atlantic Ocean* are mentioned in passing throughout the book, yet their entries appear as "Africa, exploration of" or "Atlantic Ocean, exploration of the" and are not necessarily cross-referenced. It is unlikely that a reader will choose to look up Africa for a general discussion of its geography and exploration every time the term relates peripherally to an entry. But the reader should know that Volume II includes overview entries of every continent, as well as the Arctic region and the Atlantic, Pacific, and Indian Oceans. More-specific places that have their own entries, such as the Himalayas and the Mississippi River, are cross-referenced. Certain terms, such as *colonization*, are not cross-referenced since the heading might appear as "colonization and exploration." A glance at the appendices organized by categories or the List of Entries for Volume II will help clarify questions of organization. Each volume also lists all the entries in both volumes in the "List of Entries" in the front matter.

Appendices in Volume I include a list of explorers with entries organized by region explored (with some names listed more than once, plus a section on cartographers, geographers, and sponsors where relevant); a list of explorers with entries organized chronologically by birth date; a list of explorers with entries organized by sponsoring country, or, when no sponsoring nation can be cited, by nationality or native land; and a list of explorers with entries organized by most relevant occupation. Appendices in Volume II include a chronology based on the explorations of all the individuals in Volume I, a general bibliography, and the already mentioned list of the entries organized by categories. Each volume contains a general index of the material in that volume.

Maps are essential tools in studies of exploration. The photographs of period maps that accompany some of the entries in both volumes offer a glimpse of the evolving cartographic view of the world. Original maps in an appendix in Volume II serve to illustrate the subject matter. A bibliography, in which books are listed by geographic and other general groupings, is provided to encourage and facilitate additional study of the vast and fascinating subject matter.

A to Z
Entries





Abbott, Henry Larcom (1831–1927) *U.S. Army officer in Oregon and Washington*

Henry L. Abbott, born in Beverly, Massachusetts, was educated at the Boston Latin School, then at West Point, graduating in 1854.

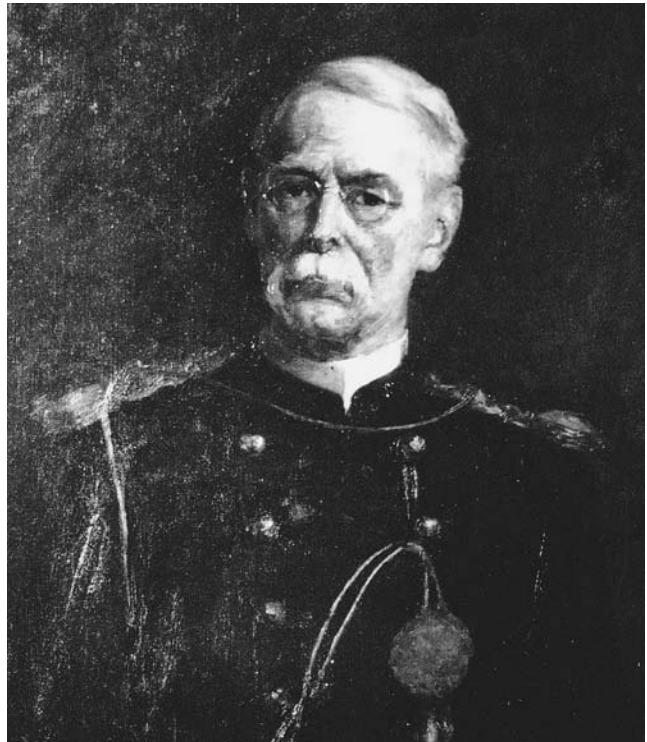
As a lieutenant with the U.S. Army Corps of Topographical Engineers, Abbott took part in the Pacific Railroad Surveys conducted under the auspices of Secretary of War Jefferson Davis. In spring 1855, he took command of the final phase of a U.S. Army expedition exploring the region between the Sacramento Valley, California, and Fort Walla Walla, Washington.

With a large military escort, Abbott and his command proceeded northward from the Sacramento Valley to Pit River Canyon in northeastern California, then into the Klamath River Valley. At this point, Abbott led part of the expedition north and east of the Cascade Range, along the Deschutes River to its confluence with the COLUMBIA RIVER. The rest of his command, under Lieutenant R. S. Williamson, continued northward along the western slopes of the Cascades, through the Willamette Valley, to Fort Vancouver on the Columbia River.

Abbott returned to San Francisco south along the west side of the Cascades, through the Willamette, Umpqua, and Rogue River Valleys, a region embroiled in an Indian uprising involving Tututni and Takelma bands under Chief John.

Abbott went on to take part in an engineering survey of the lower MISSISSIPPI RIVER that greatly influenced flood control measures. He served in the Civil War, during which

he was brevetted a major-general of volunteers. He retired from the army in 1895 and became a leading consulting engineer in the planning of the Panama Canal 10 years later.



Henry L. Abbott (*Library of Congress*)

Henry L. Abbott's 1855 expedition from the Sacramento Valley into Oregon and Washington succeeded in finding two possible railroad routes from northern California into the Pacific Northwest, one east and one west of the Cascades. His official account of the expedition, *Report upon Explorations for a Railroad Route from the Sacramento Valley to the Columbia River*, was included in the U.S. government's publication *Pacific Railroad Reports*, published in 1855–60. The routes he surveyed were ultimately adopted by railroads connecting California with the Snake and Columbia River Valleys. Abbott also commented on the great agricultural potential of the region he surveyed.

Abert, James William (1820–1871) *U.S. Army officer, cartographer, artist in the American West*

Raised in the Washington, D.C., area, James W. Abert was the son of John James Abert, who organized and was the first commander of the U.S. Army's Corps of Topographical Engineers in 1838. Like his father, the younger Abert attended West Point. Soon after his commission of second lieutenant in 1842, James Abert was assigned to the Corps of Topographical Engineers.

While serving, Abert was part of Colonel STEPHEN WATTS KEARNY's expedition, in the spring and summer of 1845, from Fort Leavenworth in what is now northeastern Kansas, south and west to the Santa Fe Trail and New Mexico. Abert led a party of soldiers and topographical engineers westward across present-day Kansas, then followed the Arkansas River into present-day eastern Colorado, reaching Bent's Fort (named for WILLIAM BENT), along the Arkansas River at present-day La Junta, Colorado, on August 2, 1845.

From Bent's Fort, Abert and his men explored southward into what is now western Oklahoma and the Texas Panhandle, the domain of the Kiowa and Comanche Indians. Abert's assignment was to produce charts of the region and provide the government with a report on these tribes. The group then headed westward along the Santa Fe Trail into New Mexico.

While Abert was exploring and charting the Southwest, another detachment of topographical engineers under Kearny's command, led by JOHN CHARLES FRÉMONT, headed westward to explore the central ROCKY MOUNTAINS and the Great Salt Lake Basin.

In 1846–47, Abert undertook several expeditions into central New Mexico, until that time rarely visited by Americans or Europeans. In October 1846, he came upon the Acoma Pueblo of the Keres Indians, located near the headwaters of the Rio de San Jose, west of present-day Albuquerque, New Mexico.

In 1848, the U.S. Congress published Abert's account of his expeditions, entitled *Report of Lieutenant James W. Abert of the Examination of New Mexico in the Years 1846–47*. Abert, an artist as well as cartographer, provided

original sketches of early New Mexico scenes along with the text, including life in Kiowa, Comanche, and Pueblo Indian settlements throughout present-day Oklahoma, northern Texas, and New Mexico.

James W. Abert's explorations south and west of the Arkansas River provided some of the earliest accurate maps of the Santa Fe Trail region and proved extremely useful to Kearny and his command the following year, 1846, when Kearny led U.S. troops into New Mexico, soon after the onset of the U.S.-Mexican War of 1846–48.

Abruzzi, Luigi Amedeo di Savoia d' (duca d'Abruzzi, Luigi Amedeo de Savoia, duke of Abruzzi, prince of Savoy) (1873–1933) *Italian mountain climber, explorer in Alaska, the Arctic, Africa, and Asia*

Luigi Amedeo di Savoia d'Abruzzi, was born in Madrid during the last year of the short reign of his father, King Amadeus of Spain. Raised in the rugged Abruzzi region of south-central Italy, near the Gran Sasso d'Italia range of the Apennine Mountains, Abruzzi embarked on a career of MOUNTAIN CLIMBING and exploration.

In 1897, Abruzzi made the first successful ascent of Mount Saint Elias in southeastern Alaska, which, at 18,008 feet above sea level, is one of the highest peaks in North America.

In 1899, Abruzzi commanded an Italian expedition attempting to reach the NORTH POLE. He sailed on the ship *Stella Polare* (polar star) to Franz Josef Land, the icebound archipelago off the Arctic coast of European Russia. From a point north of these islands, his chief assistant, Captain Umberto Cagni, set off across the frozen Arctic Ocean by sledge, and, in April 1900, he reached 86°34' north latitude, slightly farther north than the point reached by Arctic explorer FRIDTJOF NANSEN in 1895 and, up to that time, the closest anyone had been to the North Pole.

In 1906, Abruzzi traveled to East Africa, where he led mountaineering expeditions in the first ascents of the highest peaks in the Ruwenzori Range, associated with the fabled MOUNTAINS OF THE MOON.

In 1909, Abruzzi attempted to climb the 28,251-foot K2, then known as Mount Godwin Austen, in the Karakoram Range of the western HIMALAYAS, the second highest mountain in the world. Although Abruzzi's party did not reach its peak, at 24,600 feet they set a new record for the highest altitude attained to that time.

During World War I, Abruzzi, a high-ranking naval officer, commanded the Italian fleet in the Adriatic Sea. Afterward, in 1919, he returned to East Africa, where he spent the next 10 years exploring and colonizing the Shebeli River (Webi Shebeli) region of what is now Somalia.

Duca d' Abruzzi's accomplishments as a mountaineer and explorer encompassed four continents, from the Arctic

Ocean to the Horn of Africa. His account of his 1899–1900 attempt to reach the North Pole, *On the “Polar Star” in the Arctic Sea*, was published in 1903. Abruzzi’s 1909 expedition in the western Himalayas employed photographic mapping techniques to survey a route to the top of K2. His early efforts aided the Italian mountaineering party that made the first successful ascent of K2 in 1954.

Aco, Michel (Michel Accault, Michel Accou)

(fl. 1680s–1690s) *French fur trader, interpreter on the Illinois, Wisconsin, and Mississippi Rivers*

Little is known of Michel Aco’s life before he joined the initial phase of RENÉ-ROBERT CAVELIER DE LA SALLE’s exploration of the MISSISSIPPI RIVER region in 1679–80. One of the French VOYAGEURS with a wide knowledge of the languages of the Illinois Indians, he became one of La Salle’s most trusted lieutenants. In spring 1680, Aco accompanied La Salle from Lake Michigan to Lake Peoria and helped establish Fort Crèvecoeur on the Illinois River.

That same spring, while La Salle returned to Fort Frontenac on the eastern end of Lake Ontario, Aco, Father LOUIS HENNEPIN, and another voyageur were sent to explore the upper Mississippi River and establish a trading post at the mouth of the Wisconsin River. They descended the Illinois River to its outlet into the Mississippi, then followed that river northward to the Wisconsin. According to some sources, Aco and Hennepin were captured by the Sioux (Dakota, Lakota, Nakota) Indians near the Falls of St. Anthony, in the vicinity of what is now St. Paul, Minnesota, which they probably visited in captivity. The Indians held them as prisoners until fall 1680, when they were rescued by DANIEL GREYSOLON DULUTH at Mille Lacs Lake in present-day eastern Minnesota.

Aco settled in the Illinois River region, where he engaged in fur trading with the Indians. In 1693, he reportedly married the daughter of an Illinois chief, but there are no known details of his later life.

Michel Aco’s travels with Hennepin northward up the Mississippi River to the Wisconsin River and into Minnesota complemented La Salle’s explorations to the south, providing the French with greater understanding of the entire Mississippi Valley.

Acosta, José de (1539–1600) *Spanish missionary, naturalist in Peru and Mexico*

José de Acosta was probably born in Spain. In 1551, he entered the Jesuit order, and, 20 years later, he embarked for the Americas as a missionary priest to Native Americans. Starting in 1571, he spent 15 years ministering to the Inca in Peru and, for one year, to the Aztec in Mexico.

Acosta’s academic background included the study of natural history. Throughout his career as a missionary in

the Americas, he studied the customs and languages of Indians and made a detailed examination of the wide variety of newly discovered plants and animals.

In 1587, Acosta returned to Europe, and three years later he produced one of the earliest detailed accounts of the natural history of the Western Hemisphere, entitled *The Natural and Moral History of the Indies*. The work provides some of the first accounts of native use of coca leaf, as well as a description of the experience of altitude sickness in the high peaks of the ANDES MOUNTAINS.

José de Acosta was one of the first naturalists to note that many animal species of the Americas were unknown in Europe. His writings sparked interest in the Americas among subsequent European naturalists.

Acuña, Cristóbal de (1597–ca. 1676)

Spanish missionary on the Amazon River

Cristóbal de Acuña was a Spanish Jesuit missionary in the ANDES MOUNTAINS of Ecuador during the first half of the 17th century, serving for a time as the rector of the Jesuit college at Cuenca. When PEDRO DE TEIXEIRA arrived in Quito in 1638, after leading an expedition up the AMAZON RIVER, the Spanish viceroy assigned Acuña and another Jesuit to accompany the Portuguese explorer on his return journey downriver the following February 1639.

With Teixeira’s party, Acuña crossed the Andes Mountains to the upper Amazon, then descended the river to its mouth at Para on the northeast coast of Brazil.

Cristóbal de Acuña undertook surveys and kept a record of his journey down the Amazon. His account, *New Discovery of the Great River of the Amazons*, first printed in 1639, was the earliest published description of the Amazon region.

Adair, James (ca. 1720–1783) *British trader, writer in the American Southeast*

Originally from Ireland, James Adair arrived in the North American colonies early in the 1740s. He settled on the South Carolina frontier, where he established himself as a trader to the Cherokee Indians.

In the next years, the South Carolina colonial government sponsored several of Adair’s expeditions to the lands of the Choctaw and Chickasaw Indians. He was soon able to establish regular trade routes to these tribes.

Just prior to the outbreak of the American Revolution, Adair returned to London, where he wrote of his travels and experiences. *The History of the American Indians*, first published in 1775, contains observations on the life and customs of Southeast Indians. Adair was particularly impressed by the wide variety and quality of foods that Native Americans gathered from the woodlands and cultivated in their fields.

Unlike most other traders in the region, Adair was well educated, versed in Latin, Greek, and Hebrew, with a wide knowledge of ancient history. In his 1775 book, he presented the fanciful theory that North American Indians were descended from the Ten Lost Tribes of Israel as described in the Bible.

James Adair's descriptions of the South Carolina frontier and the region's tribes were among the earliest to reach British readers, informing them about the largely unexplored region inland from the seaboard settlements.

Adams, Harriet Chalmers (1875–1937)

American traveler in South America

Harriet Chalmers was born in Stockton, California. Her father was an engineer who had emigrated from Scotland and crossed the Great Plains to California in a covered wagon. Her mother was a descendant of a California pioneer family.

Although Chalmers had little in the way of formal schooling, she received a good education from her parents and from private tutors. Her desire to travel was sparked at the age of eight, when she accompanied her father on a tour through the Sierra Nevada on horseback.

In 1899, Chalmers married Franklin Pierce Adams, an electrical engineer from Stockton, who shared his new wife's interest in visiting distant places. They traveled to Mexico in 1900, where Franklin undertook an engineering survey.

In 1903, Adams and her husband began a three-year tour of South America. They visited rubber plantations in the Amazon Basin. In the Bolivian ANDES MOUNTAINS, they visited the ruins of Tiahuanaco, thought to be the oldest native settlement in the Americas. While in Bolivia, they also sailed on Lake Titicaca. In Cuzco, Peru, they visited ancient stone buildings left behind by the Inca civilization. Adams developed a great empathy for Indians of the Andes region, seeing how they had descended into poverty as a result of the Spanish conquest.

In the course of their South American sojourn, Adams and her husband traveled more than 40,000 miles in South America and made four crossings of the Andes.

In the years that followed, Adams lectured on her travels in South America, and produced articles on that region for *National Geographic* and other magazines. She made subsequent journeys to Latin America and also retraced FERDINAND MAGELLAN's epic voyage from Spain to the Philippines. Her observations and studies of Indians of the Americas led her to become one of the earliest proponents of the theory that they had originally come from Asia. In her later travels, she retraced the explorations of the Spanish CONQUISTADORES in the WEST INDIES and in South America, and in so doing visited almost every country in Latin America. She also visited central Asia, including the GOBI DESERT. In 1913, she was elected as a Fellow of the ROYAL

GEOGRAPHICAL SOCIETY; in 1925, she became the first president of the Society of Women Geographers.

In a *New York Times* article of 1912, when Harriet Chalmers Adams was questioned on why men had dominated the field of exploration, she commented that in her own travels into uncharted lands she had never faced a difficulty or a danger that she could not surmount just because she was a woman.

Adams, William (Will Adams, Anjin Sama, "Mr. Pilot") (ca. 1564–1620) *English mariner in Japan, in service to Dutch and Japanese*

William Adams was born in Gillingham, Kent, a small seaport on the southeast coast of England. At the age of 12, he embarked on a seafaring career, serving with British merchant ships on voyages to the BARBARY COAST, and later with the Royal Navy.

By 1598, Adams had acquired a substantial knowledge of shipbuilding, mathematics, and navigation. That year, he was engaged as a pilot major by Dutch admiral James Mahu for a trading expedition to the EAST INDIES, the islands that now compose Indonesia and the Moluccas. Adams sailed from Rotterdam with the Dutch fleet of five ships in June 1599. The expedition was beset with hardship. Admiral Mahu died in the Cape Verde Islands off the west coast of Africa. Then the ships were separated in a storm while attempting to reach the Pacific Ocean through the STRAIT OF MAGELLAN at the tip of South America. Adams's ship and two others reached the Mocha Islands off the coast of Chile, where Simon de Cordes, the surviving commander of the expedition, was killed in a clash with local people. Adams and the three remaining ships then headed westward across the Pacific for Japan, intending to trade their cargo there.

Only Adams and his ship, the *Liefde*, managed to reach Japan, arriving in 1600 at Oita on the northeast coast of Kyushu, the southernmost of Japan's main islands. Adams was taken into custody by Japanese military leader Iyeyasu, who compelled him to work for the Japanese in directing maritime affairs, including the construction of ships. Three years later, in 1603, aided by Adams, Iyeyasu became shogun, the military ruler of Japan.

Adams remained in the service of the Japanese for the next 17 years. Although at first not permitted to leave Japan, he eventually rose to prominence as a trusted naval adviser to the shogun. He took part in trading expeditions to the Ryukyu Islands south of Okinawa and traveled to ports in Southeast Asia in present-day Thailand and Vietnam.

In 1613, Adams succeeded in winning a trade concession for the BRITISH EAST INDIA COMPANY, represented by JOHN SARIS. He was subsequently granted a royal title, Anjin Sama (Mr. Pilot), and was rewarded with an estate near Yokosuka. Adams married a Japanese woman and spent

the rest of his life in Japan. His logbook was first published in 1850, and his letters in 1916. A street was named after him in Tokyo, where a festival is held in his honor each year.

William Adams was the first Englishman to visit Japan. With his Western expertise as a mariner and shipbuilder, he contributed significantly to the rise of Iyeyasu as shogun and the establishment of a dynasty that ruled Japan for 250 years. Through his influence, the DUTCH EAST INDIA COMPANY was able to maintain a trading foothold in Japan after all other foreign traders were expelled in 1640.

Africanus, Leo See LEO AFRICANUS.

Agricola, Gnaeus Julius (Cneius Julius Agricola) (ca. 37–93) *Roman general in Britain*

Gnaeus Julius Agricola was born in Forum Julii, a port of the ROMANS on the MEDITERRANEAN SEA, near present-day Frejus and St. Tropez, France. In A.D. 59–61, he served in Britain under SÜETONIUS PAULINUS. Agricola returned to the European continent and continued his military career in campaigns in Europe and the Middle East. He rose to the rank of general and served as a magistrate in Roman provinces in Asia Minor. In 74, Agricola was appointed governor of Aquitania in what is now southwestern France. Three years later, he was named governor of Britain.

In 80, Agricola launched a military campaign that pushed Roman conquests northward into Scotland. Under his leadership, the Great North Road—the Romans' main military highway that originated at Ermine Street in present-day London—was extended north of York across the river Tyne to the Tweed in what is now southeastern Scotland.

Beyond the Tweed, troops under Agricola's command built smaller military roads penetrating Scotland above Edinburgh and the Firth of Forth, as far as the Roman outpost at Inchtuthil. From there, Agricola staged his campaign against the Caledonians, culminating in his victory in the Battle of Mons Graupius in 83.

Agricola also directed Roman naval operations in Britain in 77–84. Under his command, the Roman fleet sailed along the east coast of Britain as far north as the Orkney Islands. According to some accounts, the Roman GALLEY ships then proceeded south along the west coast, completing the first recorded circumnavigation of Britain. In 84, Agricola was preparing for a military expedition to Ireland, when he was recalled by Emperor Domitian.

Gnaeus Julius Agricola was immortalized in a biography by his son-in-law, the Roman historian Tacitus. As a military leader and governor, Agricola carried Roman civilization to Britain and pacified most of what is now England, northern Wales, and southern Scotland. He extended the Great North Road well into Scotland. This vital transportation

link helped maintain Roman domination of Britain for more than 350 years. Great Britain's present-day north-south highway, the A-1, closely follows the route established by Agricola's army.

Aguirre, Lope de (ca. 1510–1561)

Spanish conquistador in Peru and Venezuela

Lope de Aguirre was probably born in Spain. Arriving in Peru in about 1544, he worked as a horse trainer and later became involved in warfare between rival factions of CONQUISTADORES, during which he developed a reputation for cruelty and unbridled violence.

In 1560, Aguirre joined an expedition led by PEDRO DE URSÚA in search of EL DORADO, a fabled native kingdom of great wealth, which the Spaniards believed lay somewhere in the Amazon Basin. He left Lima with Ursúa's contingent of 300 men in July 1560. After crossing the ANDES MOUNTAINS and following the Huallaga and Marañón Rivers, the expedition reached the AMAZON RIVER. In December 1560, along the Amazon, near the mouth of the Putumayo River, Aguirre incited a mutiny and murdered Ursúa, as well as his second in command, an officer named Don Fernando de Guzmán.

Aguirre led the mutineers down the Amazon, probably crossing to the ORINOCO RIVER by way of the Negro River. They laid waste to several Indian villages along the way. The party eventually reached the Caribbean coast of present-day Venezuela. They captured the island of Margarita above the mouth of the Orinoco, from which Aguirre planned to lead an attack against royal Spanish forces in Panama. Crossing to the mainland, his men were besieged in the northwestern Venezuelan city of Barquisimeto. Before surrendering, Aguirre murdered his own daughter. He was beheaded, and his body was cut in quarters and displayed as a warning to all would-be rebels.

Lope de Aguirre had one of the bloodiest careers of all the conquistadores in South America. His advance in 1561 from the Andes to the Caribbean Sea amounted to the second-known successful crossing of the South American continent, 20 years after FRANCISCO DE ORELLANA's expedition.

Akeley, Carl Ethan (1864–1926)

American naturalist, taxidermist, photographer in East and central Africa, founder of modern taxidermy, husband of Delia Denning Akeley and Mary Kobe Akeley

Born in Clarendon, western New York, south of Lake Ontario, Carl Akeley spent time as a youth in the neighboring woods and was introduced to taxidermy methods. At the age of 19, he became an assistant at Ward's Natural Science Establishment, working there for three years. In 1886–88, he was a self-employed taxidermist in Milwaukee, Wisconsin,

then was hired as the taxidermist for the Milwaukee Public Museum in 1888. In 1895, he switched his focus to natural science, first at the Field Museum of Natural History in Chicago, then at the American Museum of Natural History in New York City in 1909. He also worked in sculpture and photography.

Akeley traveled to Kenya with his first wife, DELIA JULIA DENNING AKELEY, in 1905–06, hunting specimens for the Field Museum. They returned to Africa again in 1909–11, going on safaris in the Belgian Congo (present-day Democratic Republic of the Congo) for the American Museum of Natural History. Akeley designed displays with realistic backdrops, which later became part of the latter museum's Akeley Hall of African Mammals. He returned to Africa in 1921–22. In 1923, he published *In Brightest Africa*. Akeley again traveled to the Belgian Congo with his second wife, MARY LEONORE JOBE AKELEY, in 1926.

In 1926, along with the support of King Albert I of Belgium, Akeley helped found Africa's first wild game preserve, named the Parc National Albert (now the Virunga National Park), as a sanctuary for the area's mountain gorillas and other fauna. Akeley died of tropical fever on this expedition and was buried on Mount Mikenko in the preserve.

Carl Akeley was one of the first Americans to travel extensively in wilderness areas of East Africa and central Africa. He devised new methods of taxidermy—sculpting lifelike bodies around skeletal mounts that consisted of bone, wood, paper, wire, and specially formulated cement—and new types of museum displays depicting habitat based on photography. In addition to 38 tools for taxidermists, he designed a lightweight motion-picture camera for shooting wildlife. Akeley's accomplishments led to a big-game hunting expedition with U.S. president Theodore Roosevelt.

Akeley, Delia Julia Denning (Mickie Akeley)

(1875–1970) *American naturalist in East Africa, wife of Carl Ethan Akeley*

Delia Akeley, née Denning, also known by her nickname, Mickie, grew up in Beaver Dam, Wisconsin. At the age of 13, she ran away from home and never saw her parents again. An aspiring naturalist, she worked as an assistant to the naturalist and taxidermist CARL ETHAN AKELEY, first in Milwaukee, then at the Field Museum of Natural History in Chicago. She married him in 1902.

Three years later, in 1905, the Akeleys set out to Kenya for the purpose of collecting specimens and stayed 18 months. On the safaris, Delia participated in the hunt, becoming skillful with a rifle and shooting an elephant now on display at the Field Museum. Returning to Africa in 1909–11, the Akeleys explored the Belgian Congo (present-day Democratic Republic of the Congo), her husband in the employ of the American Museum of Natural History in

New York at that time. Because Carl was sick for much of this second visit, Akeley oversaw many of the day-to-day responsibilities.

The couple was divorced in 1923. Akeley continued her career in natural science and returned to Africa in 1924–25, collecting for the Brooklyn Museum of Arts and Sciences. She departed from Lamu, Kenya, on the Indian Ocean, crossed Uganda and the Belgian Congo, then traveled along the CONGO RIVER (Zaire River) to Boma, eventually reaching the Atlantic coast. She journeyed by CANOE as well as camel. In the Belgian Congo, she lived among the peoples of the Ituri Forest and studied their hunting and fishing techniques. She visited Africa again in 1929–30.

Delia Akeley, in 1924–25, became the first known non-African woman to cross Africa coast to coast. Her writings about her African experiences include the book *Jungle Por-*



Delia Akeley (Library of Congress)

traits (1928). Her study of baboon colonies on her second trip to Africa with Carl Akeley set a precedent among women naturalists of working with primates. She kept a pet monkey late in life.

Akeley, Mary Leonore Jobe (1886–1966)

American naturalist, photographer, geographer in the Canadian Northwest and Africa, wife of Carl Ethan Akeley

Mary Akeley, née Jobe, was born and raised on her parents' farm in Tappan, Ohio. She studied at Bryn Mawr College and Columbia University, then taught history at Hunter College. In 1916, she bought property in Mystic, Connecticut, where she ran a camp for girls, ages eight to 18, which operated from 1916 to 1930.

When in her 20s, Jobe was commissioned by the Canadian government to study the native peoples of the Canadian Northwest. She also charted the headwaters of the Fraser River and parts of the Canadian ROCKY MOUNTAINS and climbed Mount Sir Alexander. For her work in British Columbia, she was elected to the ROYAL GEOGRAPHICAL SOCIETY in 1915.

In 1924, she married the naturalist and taxidermist CARL ETHAN AKELEY after his divorce the year before from DELIA JULIA DENNING AKELEY. With him, in 1926, she traveled to the Belgian Congo (present-day Democratic Republic of the Congo) and helped him hunt specimens and photograph animals and their habitat for the American Museum of Natural History in New York City. Her husband died on this expedition, and Akeley continued their work, exploring in Kenya and Tanganyika (present-day Tanzania). On her return to the United States, she became an adviser for the Akeley Hall of African Mammals, in New York's natural history museum, which opened 10 years later.

Akeley received from King Albert of Belgium the Cross of the Knight, Order of the Crown, for her work in Africa on behalf of the wildlife preserve her husband had helped found. Her books include *Carl Akeley's Africa* (1929); *Lions, Gorillas and Their Neighbors* (1932); and *Congo Eden* (1950). She returned to Africa in 1952, visiting her husband's grave on Mount Mikeno. She died in Mystic, Connecticut, in 1966.

Mary Akeley was one of the earliest women explorers in the Canadian Northwest and parts of Africa. She oversaw some of the last museum taxidermy. In subsequent years after the completion of Akeley Hall, observation of mammals in the field and recording their behavior on film and videotape became the chosen ways of documenting them. The Geographical Board of Canada named Mount Jobe in the Rockies in her honor.

Akkad, Sargon of See SARGON.

Alarcón, Hernando de (1500–unknown)

Spanish conquistador in the Gulf of California and on the lower Colorado River

In 1540, Hernando de Alarcón was given command of three ships to carry supplies to FRANCISCO VÁSQUEZ DE CORONADO's expedition in the present-day American Southwest. The expedition's organizer, Spanish viceroy ANTONIO DE MENDOZA, also instructed Alarcón to sail northward along the coast in search of the Seven Cities of CIBOLA, the fabled civilization believed to lie north of Mexico at the edge of Asia.

In summer 1540, Alarcón and his fleet sailed from the mouth of the Río Grande de Santiago, near the port city of San Blas on Mexico's Pacific coast, and proceeded into the Gulf of California. At the head of the gulf, he noted the outflow of a river. In 1539, FRANCISCO DE ULLOA had observed the same currents but had not positively identified their source nor explored more than a short distance upstream. Skillfully piloting his ships through the sand bars and shallows, Alarcón entered the stream and recognized that the flow came from a river, which he called the Río de la Buena Guía, meaning "river of the good guide." He navigated what became known as the COLORADO RIVER about 50 miles up river to a point where it became impassable for his ships. From there, he continued his explorations in small boats.

Alarcón soon made contact with the Yuma (Quechan) Indians, with whom he established friendly relations. He made two journeys up the Colorado. On the second one, he reached a point near the mouth of the Gila River. By then, news of Coronado's conquest of Pueblo Indians in western New Mexico had reached Alarcón and the Indians on the lower Colorado. Alarcón attempted to lead his men overland to join Coronado, but they refused to cross the region because of reports of hostile tribes.

Alarcón, believing he would be unable to rendezvous with the main body of Coronado's forces, left a message beneath a stone monument below the mouth of the Gila, at a point where the main Indian trail from the east crossed the Colorado. He then returned to his ships and sailed back to Mexico. Several weeks later, MELCHOR DÍAZ, one of Coronado's lieutenants, reached the Colorado and found Alarcón's message.

Hernando de Alarcón is credited with being the first non-Indian to explore above the mouth of the Colorado River. He traveled 200 miles up the river; the territory beyond would remain unexplored by Europeans for the next 300 years. His expedition in 1540 was one of the first to report that Baja California was not an island, as was commonly thought, but a long peninsula. Yet his finding would not be confirmed until the explorations of Father EUSEBIO FRANCISCO KINO in the early 18th century.

Albanel, Charles (ca. 1613–1696) *French missionary in French Canada*

Charles Albanel was born in Auvergne, France, in either 1613 or 1616. He studied to be a Jesuit priest, entering the order's novitiate in Toulouse in 1633, after which he served in a number of different French villages.

When in his 30s, Albanel traveled to New France. Starting in 1649, he began working with fellow Jesuit Jean de Quen at the Tadoussac mission to Indians (mostly Montagnais) on the Saguenay River north of Quebec City. It is thought that in 1659–60, Albanel accompanied PIERRE-ESPRIIT RADISSON and MÉDARD CHOUART DES GROSEILLIERS on an expedition to Lake Superior and the headwaters of the MISSISSIPPI RIVER; after returning to Montreal, he set out with the Indians once again to their homeland. In the mid-1660s, Albanel served as a chaplain to French troops, traveling with them in actions against the Iroquois (Haudenosaunee) Indians around Lake Champlain and helping negotiate peace agreements.

On learning of an English presence in HUDSON BAY, following the founding of the HUDSON'S BAY COMPANY in 1670, French officials dispatched Albanel and fellow Frenchmen Paul Denis de Saint-Simon and Sébastien Provencher to the region. They traveled from Tadoussac westward to Lac Saint Jean in August 1671, where they spent the winter. The following June, by CANOE, with 16 Montagnais Indian guides, they set out northwestward to Lake Mistassini, then westward along Lake Nemiskau and down the Rupert River to James Bay, the southeastern extent of Hudson Bay. At the mouth of the Rupert, they spotted an English ship and two empty buildings—the English presumably on a hunting expedition—and met with Indians living nearby in the hope of preventing their trade with the English. Albanel returned to Tadoussac in August 1672.

In 1673, Albanel, about 60 years old, endured the hardships of another trip to Hudson Bay in response to continuing reports of English presence. On this trip, he was taken prisoner by the English on James Bay and sent to England. After agreeing not to attempt to undermine English trade relations with the Indians of Hudson Bay, Albanel was allowed to return to France. By 1676, he was back in Quebec and was appointed superior of the St. Francis Xavier mission (at present-day De Pere, Wisconsin). He died in 1696 at Sault Sainte Marie in present-day Michigan.

Charles Albanel was among the earliest Europeans to travel the overland route to Hudson Bay. This was the first such expedition, unless Radisson's claimed trip of 1660 to James Bay from Lake Superior did in fact take place.

al-Biruni, Abu ar-Rayhan Muhammad ibn Ahmad See BIRUNI, ABU AR-RAYHAN MUHAMMAD IBN AHMAD AL-.

Albuquerque, Afonso de (Alphonso d'Albuquerque, Afonso do Albuquerque, Alfonso the Great) (1453–1515) *Portuguese naval officer in the Indian Ocean, India, and Indonesia*

Afonso de Albuquerque was born near Lisbon, Portugal, into a noble Portuguese family. After spending his early years at the court of King Alfonso V the African, he embarked on a naval career, taking part in the Portuguese conflicts with Muslim powers in the MEDITERRANEAN SEA and off the coast of Morocco.

Albuquerque became a leading officer in the Portuguese navy, eventually achieving the rank of admiral. In 1503, he made his first trip around the CAPE OF GOOD HOPE to India, under the sponsorship of the Portuguese monarch Manuel II.

In 1506, with Tristão da Cunha, Albuquerque sailed again for the EAST INDIES. He explored the east coast of Africa, visiting the island of Madagascar, plus the port of Mombasa on the coast of what is now Kenya. Albuquerque assumed command of part of the Portuguese fleet as it approached the Persian Gulf, then launched a military campaign against the Muslim-held island of Hormuz, as well as against the island of Socotra in the Gulf of Aden. In 1507, Albuquerque established the first Portuguese outpost in Asia, on Hormuz. Although forced to abandon Hormuz soon afterward, he ultimately succeeded in retaking this important trading center along the SPICE ROUTE to the Far East by 1515.

In 1509, Albuquerque replaced FRANCISCO DE ALMEIDA as Portuguese viceroy in India, and, in 1510, he led a successful military expedition against Goa and other ports on southwestern India's Malabar Coast. A map provided by a Javanese pilot, detailing the Indian Ocean and the islands of present-day Indonesia, aided Albuquerque in his 1511 conquest of Malacca at the southern end of the Malay Peninsula. This victory wrested from the Muslim powers control of the Strait of Malacca, the main sea route between the Indian Ocean and the South China Sea, providing the Portuguese with direct access to the SPICE ISLANDS (the Moluccas) and the ports of Japan and China.

Portuguese court intrigues led to Albuquerque's removal as viceroy of India in 1515. Although he was restored to this office before long, Albuquerque died of dysentery off the coast of Goa on his way back from his final victory at Hormuz, before he could resume command.

Afonso de Albuquerque's exploits in the Indian Ocean, the Persian Gulf, and the Strait of Malacca expanded Portuguese domination of the sea route from Europe, around the tip of Africa, to China, Japan, and the Spice Islands. His victory at Goa in 1510–11 secured Portuguese control of this Malabar Coast port for the next 450 years. Among the early Portuguese seafarers who ventured around the Cape of Good

Hope to India and Southeast Asia, he was known as “Afonso the Great.” In recognition of his military successes, Albuquerque was also dubbed the “Portuguese Mars.”

Alexander the Great (Alexander III of Macedonia) (356–323 B.C.) *king of Macedonia, military leader in Asia and North Africa*

Alexander, the son of the Macedonian king Philip II, was born in Pella, the ancient capital of Macedonia (Macedon). His early years were spent under the tutelage of the Greek philosopher Aristotle.

In 336 B.C., Philip was assassinated, and Alexander, then 20 years old, assumed the throne. After consolidating his rule over the Greek states, he undertook, in 334, a military campaign against the Persian Empire to the east.

Alexander’s army, about 35,000 strong (although some sources say 65,000), crossed the Hellespont (the Dardanelles) from Greece into what is now Turkey and defeated a Persian force under Darius III at the Granicus River. He proceeded along the east shore of the MEDITERRANEAN SEA, then inland into Asia Minor, conquering all the territory as far as present-day Ankara, Turkey.

Alexander and his army continued southward into present-day Lebanon where he captured the Phoenician city of Tyre. Then, in 332, he headed west along the northern coast of the Sinai Peninsula into Egypt, which he conquered with little resistance. That same year, he established Alexandria on Egypt’s northern Mediterranean shore.

In 331, Alexander’s army crossed into Syria and soon reached the Tigris and Euphrates Rivers. At the battle of Gaugamela in what is now northern Iraq, he decisively defeated the Persians. Alexander pushed northeastward across present-day Iran in pursuit of the Persian army. South of the Caspian Sea, he crossed the Elburz Mountains by way of a pass known as the Caspian Gates, or the Sirdar Pass. Following the south coast of the Caspian Sea, he led his army across northern Iran to the Gurgan River. From there he headed south and east, entering what is now Afghanistan. En route, he established Alexandria in Ariis (modern Herat, Afghanistan) and Alexandria Arachosia (near modern Kandahar, Afghanistan).

Turning northeast in 329, Alexander and his victorious army entered the Kabul Valley. At the foot of the Hindu Kush range, which he believed to be part of the Caucasus Mountains, he founded the city of Alexandria ad Caucasum. Still in pursuit of the Persians, he crossed the Hindu Kush, probably by way of 11,650-foot-high Khawak Pass, and entered what is now Uzbekistan.

In the southern Russian steppes, Alexander crossed north and east to the Amu Darya, then known as the Oxus River, and conquered the ancient cities of Balkh and Samarkand. He continued northeastward as far as the Syr



Alexander the Great (Library of Congress)

Darya River (known in ancient times as the Jaxartes), where he established Alexandria Eschate, the site of what became Leninabad. This settlement was the farthest eastern reach of Alexander’s travels.

From Alexandria Eschate, Alexander and his forces moved south across Afghanistan and, in 327, recrossed the Hindu Kush into India, reaching the INDUS RIVER. He led his army across the Indus to the Jhelum River (the ancient Hydaspes) and reached the Beas River (the ancient Hyphasis). Although his army defeated the Indian forces on the Jhelum, his men refused to proceed, fearing the unknown lands to the east. Alexander had planned to conquer the rest of India, as far as the GANGES RIVER, but with his troops on the verge of mutiny, he decided to return west.

After having a fleet of 200 ships built on the Jhelum, Alexander led his army down the river in autumn 325. They reached the Indus and descended to its mouth in the Arabian Sea near present-day Karachi, Pakistan. Alexander sent part of his army aboard 150 ships, under the command of NEARCHUS, on an expedition westward along the coast of the Arabian Sea as far as the mouths of the Tigris and Euphrates Rivers at the head of the Persian Gulf. He led the rest of his army through the desert region of southern Baluchistan back to the Mesopotamian cities of Susa and Babylon. The overland journey was fraught with

hardship; it is estimated that Alexander lost thousands of his men to thirst. Moreover, thousands of the camp followers were drowned in desert flash floods.

By 324, Alexander had returned to Persia and undertook explorations of the Tigris River into what is now Iraq. He planned to undertake a seaward exploration around the Arabian Peninsula and may have intended a circumnavigation of Africa. Before he could embark, however, he contracted a fever, probably resulting from malaria, following a 10-day drinking bout, and died in June 323 B.C. Soon afterward, his empire fell into disarray.

Alexander the Great, as he was known after his unprecedented conquest of the Middle East and central Asia, extended European geographic knowledge as far as India. His army traversed 20,000 miles of territory in Europe, Africa, and Asia, including many regions unknown to the Greeks and other Mediterranean civilizations. Traveling with his army were scientists, who sent back to Greece samples of newly discovered plants and animals. In addition, his forces were accompanied by *bematists*, early surveyors who measured his route. Subsequent accounts of Alexander's conquests provided the Hellenistic world with a knowledge of Asia and led to increased contact with India and China. His route across modern Iran, south of the Caspian Sea, became a vital link in the Silk Road, an important trade route in ancient times between China and the eastern Mediterranean.

Alfingger, Ambrosius (Ambrose Alfingger, Ambrosius Dalfingger, Ambrosio Ehinger)
(unknown–1533) *German colonial leader in northern South America*

Ambrosius Alfingger was from the German duchy of Swabia. In 1528, the German banking family of Welser sponsored a colonizing expedition of some 300 settlers to what is now Venezuela in South America, following a land grant to them by Charles I, king of Spain (Holy Roman Emperor Charles V).

It was hoped that expeditions launched from the colony might locate a short route to the Pacific Ocean. Reports about EL DORADO, a fabled land of great riches, provided additional incentive for explorations. After establishing the coastal settlement of Coro in 1529, Alfingger explored the country around Lake Maracaibo. In 1531, he set out from Coro and reached Tamalameque on the Magdalena River in present-day Colombia. He also explored the Sagamoso River. On the return journey in 1533, he was killed in a skirmish with Indians in the Chinácota Valley.

Ambrosius Alfingger, together with fellow Germans NIKOLAUS FEDERMANN and GEORG HOHERMUTH VON SPEYER, who also explored the plains of Venezuela and

Colombia, was one of the few northern Europeans to play a part in the exploration of South America.

al-Idrisi, Abu Abd Allah Muhammad ash-Sharif See IDRISI, ABU ABD ALLAH MUHAMMED ASH-SHARIF AL-.

Allen, Henry Tureman (1859–1930) *U.S. Army officer in Alaska*

Originally from Sharpsburg, Kentucky, Henry T. Allen graduated from West Point in 1882 and was assigned to the Washington Territory under the command of General Nelson A. Miles. Three years later, he was sent on a mission to explore the interior of Alaska. In spring 1885, with a small party of enlisted men and civilian prospectors, Lieutenant Allen undertook an expedition into Alaska's Copper River region. Traveling overland and by CANOE, Allen and his group explored the Copper, Koyukuk, and Yukon Rivers in eastern Alaska, plus their tributaries the Tanana and Chitina Rivers. While exploring the Copper River Basin, the expedition traveled through the Wrangell Mountains northeast of present-day Cordova, Alaska, the site of the present-day Wrangell-St. Elias National Park.

Allen went on to become commander of U.S. forces occupying Germany from 1919 to 1923.

In addition to providing important topographic information and an early survey of the region's natural resources, Henry T. Allen's 1885 expedition resulted in some of the earliest official U.S. government contact with eastern Alaska's natives. The expedition also led to the establishment of a railroad link between Cordova on the Gulf of Alaska and the mineral-rich Copper River Basin.

Allouez, Claude-Jean (1622–1689)
French missionary in the Great Lakes region and the upper Mississippi River

A native of St. Didier, France, Claude-Jean Allouez became a Jesuit at the age of 17. In 1658, he arrived in North America as a missionary priest to Native Americans of the St. Lawrence River region. He spent the next seven years at Trois Rivières and Montreal, and then, as the Jesuit vicar general of the Northwest, he traveled westward to establish a mission to the Algonquian tribes of the western Great Lakes. On the southwestern end of Lake Superior, near present-day Ashland, Wisconsin, he founded the Chequamegon Bay Mission.

In 1665–67, Allouez explored, by CANOE, the south shore of Lake Superior and produced for the Jesuits an early map of this lake, the largest freshwater body of water

in the world. From Illinois and Miami Indians, he learned of a large river that ran to the sea. Allouez incorrectly believed that this river's outlet was somewhere on the Virginia coast.

In 1669, Allouez founded the De Père Jesuit mission near present-day Green Bay, Wisconsin where JEAN NICOLET had established a fur-trading post 35 years earlier. That year, Allouez also explored the Fox and Wisconsin Rivers, later speculating they were tributaries of the "Messipi," the great river he had heard about from the Indians. He was the first European to refer to this river by this name, later known as the MISSISSIPPI RIVER.

In 1677, Allouez became head of the Jesuit mission in the Illinois River Indian settlement at Kaskaskia, near Starved Rock, formerly headed by Father JACQUES MARQUETTE. He remained in the upper Mississippi Valley, ministering to area Indians for the remainder of his life. He died on the St. Joseph River, near present-day South Bend, Indiana.

Claude-Jean Allouez's explorations in the western Great Lakes and upper Mississippi River Valley provided a basis for the 1673 Mississippi expedition of LOUIS JOLLIET and Marquette. Allouez is said to have preached to 22 tribes and to have baptized some 10,000 Indians, and has been referred to historically as the "Founder of Christianity in the West." The Wisconsin city of Allouez on the Fox River, at the south end of Green Bay on the west shore of Lake Michigan, was named in his honor.

Almagro, Diego de (ca. 1478–1538)

Spanish conquistador in Peru and Chile

Diego de Almagro was born in the town of Almagro in central Spain. He was of humble origins, having been abandoned as an infant on the steps of a local church.

Little else is known of his life before 1514, the year he accompanied PEDRO ARIAS DE ÁVILA on an expedition to Panama. Almagro became associated with FRANCISCO PIZARRO, with whom he entered into a partnership for the exploration and conquest of what is now Peru. From 1524 to 1528, he explored the northwest coast of South America in conjunction with Pizarro, taking part in military campaigns against Indians. In one encounter in 1525, he was wounded and lost an eye as well as some fingers.

Almagro provided financial support for Pizarro's 1531 expedition against the Inca Indians. In 1533, he took part in the campaign that secured Quito in present-day Ecuador. Later that year, Almagro arrived at Cajamarca, Peru, where he joined Pizarro with a force of 200 men and played an important role in the conquest of the Inca. Although he received no gold for his participation, he was granted governorship of the lands south of Cuzco.

A conflict between Almagro and Pizarro was averted when, in December 1534, Almagro was appointed governor

of the newly organized Peruvian province of New Toledo and given permission to lead an expedition of conquest southward.

Almagro, with a force of about 750 Spaniards and thousands of allied Indians, left Cuzco, northwest of Lake Titicaca, in July 1535. Inspired by reports of a civilization rich in gold and other valuables, Almagro led his men southward along the central ANDES MOUNTAINS into what is now Bolivia and northern Argentina. Having set out in the midst of the South American winter season, the Spanish suffered great hardships in the severe cold of the high Andes. At the San Francisco Pass, the expedition turned westward and reached the coastal Copiapó Valley. Almagro and his men continued southward along the coastal plain of present-day Chile into the Central Valley. Along the way, they were repeatedly attacked by Araucanian Indians. One of his lieutenants, Gómez de Alvarado, explored southward to the Itata River, north of what is now the city of Concepción. Failing to locate an advanced civilization comparable to the Inca, Almagro decided to head back northward to Peru. The return journey took the Spanish through the Atacama Desert, along the north coast of Chile, where many died of thirst.

By early 1537, Almagro had reached Arequipa in southern Peru, and from there he recrossed the Andes to



Diego de Almagro (Library of Congress)

Cuzco. At Cuzco, he found the Inca, under Manco, in open revolt against the Spanish. Almagro succeeded in suppressing the uprising but became embroiled in a conflict with Francisco Pizarro and his brother HERNANDO PIZARRO over who had the right to rule Cuzco and the northern provinces of Peru. Forces under Hernando Pizarro captured Almagro at Cuzco in April 1538. He was put to death by the garrote; his body was then publicly beheaded in the town square. In 1541, Almagro's half-Indian son, Diego, known as "the Lad," led a campaign against the Pizarros and, in revenge for his father's death, killed Francisco Pizarro.

Diego de Almagro's exploration south of Peru into Chile extended Spanish domination along the west coast of South America. On his return journey, he led his men on the first European crossing of the Atacama Desert.

al-Masudi, Abu al-Husan Ali See MASUDI, ABU AL-HUSAN ALI AL-.

Almeida, Francisco de (1450–1510) *Portuguese admiral in East Africa and India, Portugal's first viceroy of India, father of Lourenço de Almeida*

Born in Lisbon, Portugal, Francisco de Almeida was related to Portuguese royalty. Under Afonso V the African, he served as a soldier and diplomat. In 1492, in conjunction with Spanish forces, he took part in the conquest of the Moorish-held city of Granada.

By 1493, Almeida was a leading admiral in the Portuguese navy. That year, before reaching Spain, CHRISTOPHER COLUMBUS stopped in Lisbon for ship repairs and reported his discoveries to Portugal's King John II. King John, believing that Columbus had reached the outlying islands of Asia, organized his own expedition, under Almeida's command, intended to thwart Spanish encroachment upon Portugal's rich trade with India. Almeida's proposed voyage was canceled, however, when the 1494 Treaty of Tordesillas secured Portugal's interests in Africa and India.

In 1503, Almeida commanded a Portuguese fleet sailing around Africa to India, where he succeeded in gaining a Portuguese trade foothold on the southwest coast, known as the Malabar Coast, by defeating the naval forces of the ruler of Calicut.

Almeida's second voyage to India began in 1505. Under King Manuel I, he commanded a Portuguese fleet of 22 ships that sailed around the CAPE OF GOOD HOPE into the Indian Ocean. His son LOURENÇO DE ALMEIDA accompanied him. Along the east coast of Africa, Almeida established Portuguese forts and trading bases at Sofala, Moçambique, and Kilwa. He then attacked

Mombasa, destroying most of that city and establishing Portuguese domination of the route around the Cape of Good Hope from Europe to India. Almeida, who had been appointed Portugal's first viceroy of India, reached Cochin on India's Malabar coast, where he established trade relations.

Over the next years, Almeida defended Arab and Egyptian challenges to the Portuguese presence in India, culminating in a decisive victory in the naval battle at Diu in 1509, off the northwest coast of India, during which Almeida's 19 ships, aided by superior firepower, defeated a combined Muslim fleet of more than 100 vessels.

Later in 1509, Almeida was replaced as viceroy in India by AFONSO DE ALBUQUERQUE. On his return voyage to Portugal, Almeida stopped at Saldanha, just north of the Cape of Good Hope, where he was killed in a clash with native peoples.

Francisco de Almeida established the first Portuguese ports along the Indian Ocean coast of East Africa, thus ensuring his country's control of the Cape of Good Hope route to India. As the first Portuguese viceroy in India, his naval victories ended Arab and Egyptian domination of the sea routes from the Gulf of Aden to the Far East.

Almeida, Lourenço de (unknown–1508) *Portuguese naval commander in the Indian Ocean, son of Francisco de Almeida*

Lourenço de Almeida was the son of Portuguese admiral and viceroy to India FRANCISCO DE ALMEIDA. In 1505, he sailed to India with his father's fleet and took part in naval engagements along the Malabar Coast of southwestern India. He subsequently undertook an expedition to CEYLON (present-day Sri Lanka), where he established a Portuguese trading base at Colombo. From there, he explored southwestward into the Indian Ocean to the Maldiv Islands.

In 1506, the younger Almeida defeated naval forces of the king of Calicut, and two years later he was sent by his father to attack MUSLIMS in the RED SEA. In 1508, he was killed in a naval battle with ships under the command of Egyptian admiral Mir Hossein.

Lourenço de Almeida helped Portugal achieve dominance over the important sea route from the Red Sea to the west coast of India. He also expanded Portugal's control over the SPICE TRADE by establishing a base at Colombo, Ceylon, an important source of cinnamon.

al-Rumi, Shihab al-Din Abu Abd Allah Yaqut
See YAQUT AL-RUMI, SHIHAB AL-DIN ABU ABD ALLAH.

Alvarado, Hernando de (fl. 1540s)*Spanish conquistador in the American Southwest*

Spanish conquistador Hernando de Alvarado was a lieutenant under FRANCISCO VÁSQUEZ DE CORONADO in his 1540 expedition from Mexico into the American Southwest and took part in the conquest of the Zuni pueblo of Hawikuh near present-day Zuni, New Mexico. From there, in summer 1540, Coronado dispatched exploring parties to the west, north, and east, still hoping to locate an advanced Indian civilization, rich in gold.

On August 29, 1540, Alvarado, in command of a small company of men, led the expedition eastward from Hawikuh across what is now north-central New Mexico. He soon came upon the Keres Indians' Acoma Pueblo, known as "Sky City," perched atop a 350-foot sandstone mesa. Guided by Indians, he headed northeastward from Acoma into the Rio Grande Valley, locating yet another pueblo at Tiguex, just north of present-day Albuquerque, New Mexico.

Alvarado and his men proceeded northward along the upper Rio Grande as far as Taos Pueblo, then headed east and south along the Pecos River. At Cicuye Pueblo, near present-day Pecos, New Mexico, he encountered two Plains Indians, one known as the TURK and the other called



Hernando de Alvarado (Library of Congress)

Ysopete. They guided Alvarado and his men eastward along the Canadian and Pecos Rivers into the western edge of the southern plains, where they became some of the earliest Europeans to observe vast herds of buffalo.

From the Turk, Alvarado heard news of a fabulously rich Indian kingdom known as QUIVIRA, supposedly situated far to the east and north. He took the Turk back to Coronado, who by then had made his headquarters at Tiguex. In spring 1541, the Turk guided Coronado and his men from Tiguex through present-day Texas and Oklahoma into present-day Kansas, on what proved to be yet another fruitless quest for Indian riches.

Hernando de Alvarado played a significant role in the first major European penetration of the American Southwest. He and his men were the first non-Indians to see Acoma Pueblo, the oldest continuously inhabited site in North America. His introduction of the Turk to Coronado led to one of the most extensive explorations of the southern plains undertaken by the Spanish.

Alvarado, Pedro de (ca. 1485–1541)*Spanish conquistador in Mexico, Guatemala, and Ecuador*

Pedro de Alvarado was a native of Badajoz in western Spain's Estremadura region. In 1510, he arrived in Santo Domingo on the Caribbean island of Hispaniola (present-day Haiti and the Dominican Republic). Eight years later, he sailed from Cuba in command of a ship in JUAN DE GRIJALVA's expedition along the coast of the Yucatán Peninsula and the Bay of Campeche, off what is now Mexico.

In April 1519, as a lieutenant under HERNÁN CORTÉS, Alvarado landed near present-day Veracruz, Mexico, and took part in the first Spanish expedition into Aztec Indian territory. By spring 1520, Cortés and his men had established themselves in the Aztec capital at Tenochtitlán. When Cortés left to confront an opposing Spanish force under PÁNFILO DE NARVÁEZ on the Gulf coast, Alvarado was placed in command at Tenochtitlán.

Alvarado soon led the Spaniards in an attack against the Indians, in which thousands of Aztec were slaughtered. Cortés returned to Tenochtitlán to find the Aztec about to rise up against the Spanish. On the night of June 30, 1520 (the "Sorrowful Night"), the Spaniards were forced to flee from Tenochtitlán. At that time, the city was surrounded by the waters of Lake Texcoco and connected to the shore by causeways. The Aztec, in an attempt to trap the Spaniards, had destroyed these bridges. Alvarado reportedly made a daring leap (known later as the "Salto de Alvarado") from the edge of a causeway to safety on the shore of the lake.

In 1521, Alvarado took part in Cortés's counterattack, which resulted in the conquest of the Aztec. In 1523, Cortés sent Alvarado on an expedition southward along the Sierra Madre del Sur range into Mexico's Oaxaca Valley. From

there, he continued southward into what is now Guatemala and El Salvador of CENTRAL AMERICA and established Spanish dominion over the region.

In 1527, Alvarado returned to Spain, where he was appointed captain general and governor of Guatemala. Returning to the Americas, he founded new Spanish settlements.

In 1533–34, inspired by FRANCISCO PIZARRO's reports of the great wealth of the Inca Indian civilization, Alvarado undertook an expedition to conquer the Inca province of Quito in present-day Ecuador. He sailed to the northwest coast of South America in command of a force of 500 men. Upon reaching Quito, he found himself opposed by Pizarro's forces under DIEGO DE ALMAGRO and SEBASTIÁN DE BENALCÁZAR, which had already brought Quito under Spanish domination. An open conflict between the CONQUISTADORES was averted when Alvarado, recognizing Pizarro's supremacy, agreed to leave his army and equipment to Pizarro in return for a large payment in gold. He then returned to Guatemala and consolidated his rule.

In 1540, Alvarado organized a seaward expedition to the SPICE ISLANDS (the Moluccas) near present-day Indonesia, which was never realized. His fleet of 13 ships sailed first to the west coast of Mexico. There, the Spanish viceroy ANTONIO DE MENDOZA convinced Alvarado to take part in FRANCISCO VÁSQUEZ DE CORONADO's planned expedition in search of the fabled Seven Cities of CIBOLA, which the Spaniards believed lay somewhere north of Mexico in the American Southwest. Yet the outbreak of an Indian uprising in central Mexico, known as the Mixtón War, delayed his departure. Alvarado led an abortive attack against the Indians at Nochistlán. During the ensuing retreat, he was killed when his horse fell on him.

Following Alvarado's death in the Mixtón War, his widow, Doña Beatriz de la Cueva, succeeded him briefly as governor of Guatemala, the only woman known to have held such a high office during the Spanish colonial period in the Western Hemisphere.

Pedro de Alvarado's career as a conquistador brought him into contact with two advanced Indian civilizations of the Americas, the Aztec and the Inca. He was instrumental in establishing Spanish domination in Central America. After Alvarado's death, the fleet with which he intended to sail to the Spice Islands was placed under the command of JUAN RODRÍGUEZ CABRILLO, who used it in his exploration of the California coast.

Álvares, Francisco (ca. 1490–1540)

Portuguese priest in Ethiopia

Francisco Álvares grew up in the village of Coimbra in central Portugal. In 1515, he was assigned to the Portuguese embassy in Ethiopia under Duarte Galvão. Rui da Lima replaced Galvão as ambassador in 1520.

That same year, Álvares and the new ambassador traveled from Massawa on the RED SEA southward about 500 miles into central Abyssinia (present-day Ethiopia). They visited Mandelely, a Moorish town subject to the negus, the Christian ruler of the region.

In 1527, Álvares left Africa for Italy and reported his travels to the pope. He later wrote an account of his African experiences entitled *The Prester John of the Indies*. It was published the year he died, 1540; in it, he compared Negus Claudius to the legendary Christian ruler PRESTER JOHN. His writing helped bring about a 1541 Portuguese military expedition to Abyssinia headed by Christovão da Gama that defended the negus against an Islamic force.

Francisco Álvares's work is the earliest known written description of Ethiopia. In it, he describes the earlier voyages of the Portuguese diplomat PERO DA COVILHÃ.

Álvarez, Manuel (1794–1856) *American fur trader, trapper in the American West, politician*

Born in Spain's province of León, Manuel Álvarez arrived in the United States in 1823, embarking on a career in the FUR TRADE out of St. Louis. He worked the region between the upper MISSOURI RIVER and the Green and Yellowstone Rivers in what is now western Wyoming. He was also active in the fur trade in the southern ROCKY MOUNTAINS, based at Taos and Santa Fe, New Mexico. He worked as a trapper first for P. D. Papin and Company (also known as the French Company) and later for the AMERICAN FUR COMPANY.

While trapping and trading for furs in 1832–33, Álvarez came upon the geysers of the present-day Yellowstone National Park, becoming one of the earliest non-Indians to see them. At the rendezvous of mountain men on the Green River in summer 1833, he provided an account of these natural wonders.

Álvarez reportedly had three sons by an Indian woman. One of them died while young; the other two were educated in Spain.

After the decline of the Rocky Mountain fur trade in the early 1830s, Álvarez settled in Santa Fe, New Mexico, where he operated a store and trading post. He prospered in the lucrative trade between Missouri and New Mexico during the 1830s. Between 1834 and 1839, he undertook several hazardous trips through Indian country on the southern plains between St. Louis and Santa Fe.

By 1839, Álvarez had achieved considerable stature in New Mexico politics, and, as a result, he was appointed as consul in Santa Fe by the U.S. government, even though he was not at that time an American citizen.

At the outbreak of the U.S.-Mexican War in 1846, Álvarez assisted General STEPHEN WATTS KEARNY in the U.S. military occupation of New Mexico. He subsequently served in the newly organized New Mexico territorial government.

Manuel Álvarez's early travels as a trapper in the Yellowstone region of present-day western Wyoming led to an increased awareness of this unique scenic area, which became America's first national park in 1872. Additionally, his trade expeditions across the southern plains helped open up the Southwest to commercial interests in St. Louis and Independence in present-day Missouri.

Álvarez de Pineda, Alonso (Alonso Álvarez de Pineda, Alonso de Pineda) (unknown–ca. 1519)

Spanish mariner in the Gulf of Mexico

In late 1518, Alonso Álvarez de Pineda, a Spanish sea captain, was commissioned by Francisco de Garay, the Spanish governor of Jamaica, to explore the shores of the Gulf of Mexico, from Florida to the mouth of the Pánuco River on the east coast of Mexico, in search of a possible strait linking the Gulf of Mexico with the Pacific Ocean.

Álvarez de Pineda was equipped with a fleet of three or four ships and, with the pilot Anton de Alaminos, sailed from Jamaica northward to the southwest coast of Florida. When the Spaniards landed somewhere between what is now Fort Myers and Naples, they were attacked repeatedly by Indians and withdrew to their ships.

Álvarez de Pineda's fleet then followed the Gulf Coast north and west and came upon the mouth of a great river, which they explored upstream for about 20 miles, passing as many as 40 Indian villages along the way. Since it was by then the season of Pentecost, Álvarez de Pineda named the river Río del Espíritu Santo, in honor of the Holy Spirit. On returning to the Gulf of Mexico, the expedition continued westward along the Texas coast, encountering more hostile tribes.

At the Pánuco River's mouth, near present-day Tampico, Mexico, Álvarez de Pineda and his men suffered a decisive defeat by the Aztec Indians. Many of the Spaniards were killed, and all but one of the ships were burned. Álvarez de Pineda, according to one account, was among those killed in battle. The survivors, under the command of Diego de Camargo, escaped on the remaining vessel and sailed southward to Veracruz, where they joined up with HERNÁN CORTÉS and his forces. Back in Jamaica, Francisco de Garay received a grant for the lands explored by Álvarez de Pineda, naming the region Amichel, although his claim on the region was short-lived.

Some sources suggest that the river Alonso Álvarez de Pineda explored may have been the MISSISSIPPI RIVER, making him and not HERNANDO DE SOTO its first European discoverer. Others speculate that Álvarez de Pineda had actually explored the Mobile River and Mobile Bay. According to one account, Álvarez de Pineda survived and returned to Jamaica, where he reportedly told Garay of having located a land rich in gold and inhabited by giants. In any event, as a result of his voyage, the Spanish learned that Florida was not

an island, as many had thought, but an extension of the unbroken coastline of a huge continental landmass that lay to the northwest of the known islands of the Caribbean Sea.

Amundsen, Roald Engelbregt Gravning

(1872–1928) *Norwegian polar explorer*

Roald Amundsen was born in Borge, near Oslo, Norway, the son of a shipowner. Inspired by the exploits of SIR JOHN FRANKLIN and FRIDTJOF NANSEN, he decided on a career in polar exploration while still in his teens. At the age of 20, after two years of studying medicine, he went to sea, taking part in Norwegian seal-hunting expeditions in Arctic waters.

In 1897, Amundsen joined Belgian explorer ADRIEN-VICTOR-JOSEPH DE GERLACHE DE GOMERY as first mate on the *Belgica* in an expedition to Antarctica. Following the exploration of Graham's Land, the ship became trapped in ice. Lacking sufficient supplies of fresh food, the crew developed SCURVY. When Gerlache and the ship's captain were stricken, Amundsen was put in command. Aided by the expedition's medical officer, FREDERICK ALBERT COOK, Amundsen managed to save the crew by providing them with fresh meat obtained from frozen seal carcasses found in snowbanks near the ship. He then supervised efforts to break up the ice with dynamite charges and eventually succeeded in clearing a channel. The *Belgica*, icebound for 13 months, was the first vessel to winter in the Antarctic.

Amundsen returned to Norway in 1899. The next year, he was licensed as a sea captain. He soon organized an expedition to locate the NORTH MAGNETIC POLE and negotiate the NORTHWEST PASSAGE from the Atlantic Ocean to the Pacific Ocean. He obtained a small Norwegian fishing boat, the *Gjoa*, and, with a crew of seven, departed Norway in June 1903. He sailed first to Melville Bay on the west coast of GREENLAND, then entered Baffin Bay and Lancaster Sound, threading his way through the islands and straits of the Canadian Arctic. He spent two winters iced in at King William Island, where, in 1904, he discovered the skeletons of two members of the Franklin expedition who had perished a half-century earlier. Also, in 1904, he succeeded in determining the exact location of the North Magnetic Pole at 70°30' north latitude and 95°30' west longitude.

In summer 1905, Amundsen managed to sail the *Gjoa* to the mouth of the Mackenzie River on the western end of Canada's Arctic coast but was once again trapped by ice. Accompanied by the captain of a nearby whaling ship, also icebound, he undertook an overland journey more than 250 miles into the interior of the Yukon and northern Alaska. In February 1906, he reached Fort Egbert, Alaska, then the northernmost U.S. military outpost. He returned to the *Gjoa*, which was freed from the ice in July 1906. Amundsen proceeded along the Arctic mainland of Canada, through the gulf that now bears his name, and reached Point Barrow, Alaska, and the BERING STRAIT, completing the first



Roald Amundsen (Library of Congress)

successful navigation of the Northwest Passage. After exploring the coast of the Seward Peninsula and stopping at Nome, Alaska, he sailed down the west coast of North America, reaching San Francisco, California, by October 1906. The *Gjoa*, which Amundsen presented to the city of San Francisco, was subsequently displayed in that city's Golden Gate Park.

Back in Norway in 1908, Amundsen purchased the *Fram*, Fridtjof Nansen's former ship, which he planned to use in an expedition to the Arctic. By mid-1909, news of ROBERT EDWIN PEARY's success in attaining the NORTH POLE had reached Amundsen. He then decided to sail the *Fram* to the Antarctic and make an attempt on the SOUTH POLE. At this time, the British polar explorer, ROBERT FALCON SCOTT, was already en route to the Antarctic on the same mission.

Leaving Norway in June 1910, Amundsen sailed by way of CAPE HORN. He landed on the Antarctic mainland at the Bay of Whales, on the edge of the Ross Ice Shelf, 65 miles closer to the South Pole than Scott's base at McMurdo Sound. There, Amundsen established a base camp known as Framheim, and spent the rest of the Antarctic winter preparing for a trip to the South Pole. During the next year, he and his men made three trips into the interior, establishing food depots.

Amundsen's first attempt to reach the South Pole from Framheim occurred in early September 1911, but severe

storms and temperatures of minus 70° F forced him to return to the base camp. He set out again on October 19, 1911, with four men, using four sledges and 52 dogs. By mid-November, they reached the Polar Plateau via the Axel Heiberg Glacier. By early December, he and his companions were at an elevation of over 10,000 feet. Along the way, Amundsen discovered Devil's Glacier.

On December 14, 1911, Amundsen reached the South Pole. His party established an encampment known as Poleheim, then explored within a five-mile radius of the South Pole to confirm navigational findings. After three days, Amundsen and his companions began their return trip to the Bay of Whales, sighting en route the 14,000-foot-high Queen Maud Mountains, which he named after the queen of Norway. At the Pole, Amundsen had left a marker flag, a letter to the king of Norway, a SEXTANT, a spirit level, articles of clothing, a plate with his crew's names, and an envelope addressed to Scott. Scott's party, to their extreme disappointment, found these items on reaching the Pole in mid-January 1912.

After his return to Norway, Amundsen entered the shipping business and wrote and lectured on his experiences in the Arctic and Antarctic. Although most polar exploration had come to a halt with the outbreak of World War I, Amundsen planned another expedition into Arctic waters. On his ship, the *Maud*, he left Norway in July 1918. Despite the danger of German submarines then operating off Norway, he proceeded along the Arctic coasts of Europe and Asia, through the NORTHEAST PASSAGE, finally reaching Nome, Alaska, in spring 1920.

Over the next several years, Amundsen experimented with airplanes as a means for polar exploration. In 1925, with the support of American aviator LINCOLN ELLSWORTH, he obtained two amphibious aircraft. In May of that year, he and Ellsworth took off from Spitsbergen (part of present-day Svalbard), near the Arctic coast of European Russia, in an attempt to fly over the North Pole. One of their planes was forced down just 135 miles from the pole. The other plane made a landing to rescue the rest of the party, but was unable to take off for three weeks until an airstrip could be improvised on the PACK ICE.

In 1926, Amundsen and Ellsworth obtained an AIRSHIP, the *Norge*, from the Italian government. They also engaged the airship's designer, UMBERTO NOBILE, as pilot. They left Spitsbergen on the *Norge* on May 11, 1926, and flew 600 miles, crossing over the North Pole early the next morning. Two days later, they landed at Teller, Alaska. Although RICHARD EVELYN BYRD and Floyd Bennett had reportedly succeeded in making a flight over the North Pole just a few days earlier, Amundsen's dirigible expedition was the first to cross from Europe to North America by that route. (It has been theorized, based on Byrd's diary, that he and Bennett missed the mark.)

In 1928, Amundsen disappeared when his plane was lost in the Arctic during a search for Nobile, whose dirigible the *Italia* had crashed while attempting a second flight over the North Pole.

Roald Amundsen is credited with many significant “firsts” in polar exploration. With the Belgian expedition of 1897–99, he was among the first to winter in the Antarctic. His 1903–06 expedition along the Arctic coasts of Canada and Alaska was the first successful seaward crossing of the Northwest Passage, a feat that European mariners had been attempting for 400 years. Most notably, in 1910–12, he led the first successful expedition to the South Pole. In his subsequent Arctic explorations, he became the first man to negotiate successfully both the Northwest and Northeast Passages, and with his overland and aerial expeditions he became the first man to attain both the Poles: the South Pole by dogsled and the North Pole by airship. His exploits also resulted in such scientific findings as the exact location of the North Magnetic Pole, as well as the discovery that the South Pole was located on a landmass. Amundsen’s base at Framheim on the Bay of Whales was later the site of Little America, the first permanent settlement in the Antarctic.

Anabara, Semyon (fl. 1710s) *Russian Cossack fur trader in Siberia*

In 1713–14, Semyon Anabara, a Russian Cossack fur trader, traveling with Ivan Bykov, explored eastern SIBERIA from Yakutsk on the Lena River, to the southeast shore of the Sea of Okhotsk. From there, he crossed to the Shantar Islands. Although sketchy reports of this archipelago had reached Europe as early as 1645, Anabara’s trip was the first confirmed visit to these islands. He explored three of them before returning to Yakutsk with furs.

In the years following Semyon Anabara’s rediscovery of the Shantar Islands, they became an important fishing base as well as a valuable source of furs and lumber.

Andagoya, Pascual de (ca. 1495–1548) *Spanish naval commander along the Pacific coast of South America*
Basque-born Pascual de Andagoya traveled to what is now Panama with PEDRO ARIAS DE AVILA in 1514. In 1522, soon after HERNÁN CORTÉS’s conquest of the Aztec of Mexico, Andagoya commanded the first Spanish maritime exploration of the Pacific coast of South America below Panama. He sailed as far south as Cape Corrientes on the central Pacific shore of present-day Colombia, then returned to Panama with reports of a highly advanced and wealthy Indian kingdom called “Birú,” later known as Peru. This civilization turned out to be that of the Inca Indians, and their land was later known to the Spanish as Peru.

Inspired by Pascual de Andagoya’s account, FRANCISCO PIZARRO and DIEGO DE ALMAGRO embarked from Panama in 1524 on an expedition that would lead to the Spanish conquest of the Inca Empire 10 years later.

Andrade, Antonio de (Antonio de Andrada)

(ca. 1580–1634) *Portuguese or Spanish missionary in Tibet*
Antonio de Andrade, of Portuguese or Spanish origin, was a Jesuit priest in India. In 1624, he set out from Agra in north-central India to investigate reports of Christians living in Tibet. He went northward from Agra to Delhi, then proceeded to the upper GANGES RIVER and reached Srinagar in northern India’s Kashmir region. He continued into the HIMALAYAS, crossing that range by way of the 18,000-foot-high Mana Pass.

Andrade entered the kingdom of Tibet, reaching the city of Tsaparang on the upper Sutlej River. Although he found no Christians, he received a friendly reception from the kingdom’s Buddhist leaders. Encouraged, he returned to India.

In 1625, Andrade made a second journey to Tibet, during which he established a mission at Tsaparang. He remained there until 1630, when his Jesuit superiors ordered him to the Portuguese colony at Goa on the west coast of India.

Antonio de Andrade was one of the first Europeans to visit Tibet since the journeys of Friar ODORIC OF PORDENONE in the early 1300s. His explorations into the central Himalayas revealed one of the sources of the Ganges River.

Andrée, Salomon August (1854–1897)

Swedish engineer, aviator in the Arctic

Salomon Andrée was born in Granna, Sweden. Trained in engineering, he went on to become the chief engineer of the Swedish Patent Office. In 1882–83, he took part in Swedish polar expeditions from Spitsbergen, off the Arctic coast of Norway.

Andrée began to experiment with aerial exploration of the Arctic by BALLOON in 1893. He made nine ascents and developed a steering device that enabled him to follow a course not entirely limited by wind direction.

In 1896, with the financial support of the Swedish inventor and industrialist Alfred Nobel and the Swedish monarch Oscar II, Andrée planned an airborne expedition by balloon from Spitsbergen (part of present-day Svalbard) to the NORTH POLE. His first attempt was in June 1896, but unfavorable wind conditions caused him to postpone his expedition until the following summer.

On July 11, 1897, Andrée ascended from Danes Island, Spitsbergen, in his balloon, the *Ornen* (eagle), accompanied by Knut Fraenkel, an engineer, and Nils Strindberg, nephew

of Swedish dramatist August Strindberg. The expedition was equipped with sledges, hunting gear, and a collapsible boat. On takeoff, the balloon's steering mechanism failed, causing the *Ornen* to drift uncontrollably northward. After about 400 miles, at about 83° north latitude, an ice sheet formed on the balloon, forcing it down on the frozen polar sea. After a three-month trek across the ice, Andrée and his companions reached White Island near Franz Josef Land, where they survived until mid-October 1897.

Thirty-three years later, in 1930, a Norwegian scientific expedition stopping at White Island discovered the remains of Andrée and his companions. Andrée's written account was found with the final journal entry dated October 17, 1897. A roll of undeveloped film was also recovered, which, upon processing in Sweden, revealed images of the ill-fated expedition's final days. Andrée and the other two men are believed to have died from trichinosis, contracted from eating contaminated polar bear meat. Other scientists have speculated that they died from carbon monoxide fumes given off by their cooking apparatus.

Salomon Andrée was the first to recognize the advantages of aerial exploration in the Arctic. By 1926, with advances in aviation technology, the first successful flights over the North Pole had been accomplished by RICHARD EVELYN BYRD, ROALD ENGELBREGT GRAVNING AMUNDSEN, and UMBERTO NOBILE.

Andreyev, Stepan (fl. 1760s) *Russian army officer on the Arctic coast of eastern Siberia*

Stepan Andreyev was a Russian army officer who explored the Arctic coastal regions of extreme eastern SIBERIA in the early 1760s.

In March 1763, Andreyev set out from Fort Anadyr, the Russian outpost on the Bering Sea coast of the Chukchi Peninsula and headed northwestward to the Arctic coast of eastern Siberia. While exploring the Bear Islands, opposite the mouth of the Kolyma River, he sighted what appeared to be land to the north. Upon his return to Fort Anadyr, his reports led his commanding officer to speculate that Andreyev may have located a new landmass of continental proportions.

In 1764, Andreyev returned to the region to reexamine his earlier finding. In the course of his second investigation of the area, he came upon sledge tracks left by a large unidentified group of people (probably natives). Since he had only a small party under his command, he decided to withdraw without exploring further.

The landmass that Andreyev reported seeing became known as "Andreyev Land." Subsequent attempts to locate it were fruitless, although in 1773, Russian merchant Ivan Lyakhov located the New Siberian Islands in the same general area.

Not until 1951 did a Soviet polar geographic survey determine that what Stepan Andreyev had actually seen from the Arctic coast was New Siberia Island, one of the larger of the New Siberian Islands. As a result, Andreyev is credited with the island group's European discovery.

Anson, George (Baron Anson) (1697–1762)

British admiral in South America and the South Pacific

George Anson was born in Shrugborough Park, Staffordshire, England. He entered the Royal Navy in 1712, becoming a captain 11 years later. From 1724 to 1725, he commanded three expeditions to the coast of South Carolina. During the mid-1730s, he undertook several naval expeditions to America and the west coast of Africa.

In 1740, with the onset of war between Great Britain and Spain, Anson set out on a punitive naval expedition against Spanish possessions on the west coast of South America. His fleet of six ships sailed from England in September 1740, heading for CAPE HORN and the coast of Chile. At Cape Horn, several of the ships were wrecked in rough weather. Anson, aboard the flagship *Centurion*, rounded the tip of South America and explored the Chonos Archipelago, Chiloé Island, and the Juan Fernández Islands along the Pacific coast of Chile. After raiding the Spanish settlement at Paita, Peru, and inflicting damage on the Spanish fleet, he sailed across the Pacific Ocean to China. His was the first British warship to enter Chinese waters. From there, he continued across the Indian Ocean to the CAPE OF GOOD HOPE and back to England, arriving in 1744, having circumnavigated the world.

Anson returned with only one ship of his original fleet of six. About half of the 2,000 men in his expedition died of SCURVY. Nevertheless, with his capture in the Philippines in 1741 of the Spanish galleon *Nuestra Señora de Cobadonga*, laden with a cargo of gold coins and ingots worth £400,000, his expedition was heralded as a great naval triumph.

Upon his return, Anson was promoted to vice admiral. As first lord of the Admiralty in the 1750s, he went on to command the Royal Navy in victorious actions against the French.

George Anson's exploits on his 1740–44 voyage brought back new knowledge about the little-known regions around the southern tip of South America. In addition, the expedition's loss of life from scurvy led the Royal Navy to control this problem by introducing citrus fruits as a dietary supplement for sailors (a measure used with great success during the three voyages of JAMES COOK).

Anville, Jean-Baptiste Bourguignon d'

(1697–1782) *French geographer, cartographer*

Born in Paris, Jean-Baptiste d'Anville engraved his first map at the age of 15. He went on to publish many written works

and more than 200 maps. Although he reportedly never left Paris, he used the latest accounts of explorers as source materials and accumulated a library of more than 100,000 maps.

In 1735, d'Anville produced the first relatively accurate map of China. He was also known for his maps of North America, including the 1732 *Carte de la Louisiane*. His widely read *Géographie Ancienne*, originally published in 1768, included a historical atlas.

Jean-Baptiste d'Anville became the most influential cartographer of his age. U.S. president Thomas Jefferson owned several of his maps.

Anza, Juan Bautista de (1735–1788) *Spanish soldier, governor of New Mexico, founder of San Francisco*

Juan Bautista de Anza was born in northern New Spain, the son of a provincial military leader. Like his father and grandfather before him, he entered the military. By 1759, he had reached the rank of captain, and he was placed in command of the Spanish garrison at Tubac, south of present-day Tucson, Arizona. Over the next 10 years, he took part in major Spanish campaigns against Apache Indians and other tribes of what is now the American Southwest.

In the 1770s, Spanish colonial leaders in Mexico viewed British and Russian encroachment in northern California as a threat to missions, military bases, and agricultural settlements established by JUNÍPERO SERRA and GASPAR DE PORTOLÁ. Spanish settlers along the California coast needed to be resupplied from Mexico, but sending ships up the coast proved unreliable. In 1773–74, Serra lobbied the Spanish colonial government in Mexico City to sponsor an overland expedition that would open a route from the settlement in what is now southern Arizona at Tubac, across the desert and through the Sierra Nevada to San Gabriel Arcangel, near present-day Los Angeles, California.

Commissioned to undertake this task, Anza, leading a company of 35 soldiers and accompanied by the Franciscan missionary FRANCISCO GARCÉS, left Tubac in January 1774, heading westward. The expedition followed the Gila River to the Colorado, which they crossed near the present-day California-Arizona state line. The route west closely paralleled the present U.S.-Mexican border in Arizona.

On crossing the COLORADO RIVER, Anza and his men headed northward along the Sierra Nevada, then crossed into California through the San Carlos Pass. They entered the Cahuilla Valley, reaching the area of present-day Riverside, California. The party arrived at the San Gabriel mission, nine miles from present-day Los Angeles, in March 1774. Anza continued north to Monterey, from where he returned to Tubac.

In November 1775, Anza led a party of 225 colonists, soldiers, and missionaries, including Garcés, from the

province of Sonora in northern Mexico to Tubac, and from there, along the trail he had blazed the previous year, to San Gabriel, California. They then went north, via Monterey, to San Francisco Bay, which had been rediscovered by Portolá in 1769. Anza's chief subordinate, Lieutenant José Joaquín Moraga, supervised the establishment of the first permanent settlement on San Francisco Bay, known as San Francisco de Asís. This settlement's garrison later became the site of the U.S. Army's main installation on the central California coast, the Presidio.

Anza returned to New Mexico, where he became governor in 1777. He served in this capacity for 11 years, during which he continued to explore the Southwest. In 1779, he undertook expeditions from Santa Fe, New Mexico, into the Arkansas River region, as well as into the San Luis Valley of New Mexico and Colorado.

The next year, 1780, Anza attempted to establish a direct overland route between Santa Fe and the province of Sonora on the Gulf of California. Although his party reached Sonora, the lack of available water for travelers and their pack animals made this route impractical.

In 1781, the Yuma (Quechan) Indians revolted against Spanish rule, and the route Juan Bautista de Anza had blazed across their Yuma lands in the Colorado Basin to California was closed until after 1821, when Mexico achieved its independence from Spain. The trail then became an important link between Mexican settlements in California and New Mexico. After 1849, Anza's route became an important road for settlers and gold seekers traveling across southern New Mexico and Arizona to central and northern California.

Applegate, Jesse (1811–1888) *American pioneer on the Oregon Trail, settler of Oregon*

Originally from Kentucky, Jesse Applegate moved with his family to the Missouri frontier at the age of 10. He studied surveying at the Rock Springs Seminary in Shiloh, Illinois. From 1828 to 1832, he was employed in the state surveyor general's office in St. Louis, Missouri, where he heard accounts of the frontier regions of the northern plains and ROCKY MOUNTAINS from such MOUNTAIN MEN as WILSON PRICE HUNT, JEDEDIAH STRONG SMITH, and DAVID E. JACKSON.

Applegate was strongly opposed to the spread of slavery; his views brought him into conflict with the powerful proslavery faction in Missouri. In 1843, seeking to settle on new lands free of slavery, Applegate and his family, along with the families of his two brothers, Lindsay and Charles, joined about 1,000 other settlers, among them the missionary MARCUS WHITMAN, in a wagon train migration to Oregon Country. The "Great Migration," led by frontier guide Peter Burnett, was the largest wagon train ever to attempt

the westward crossing and included more than 5,000 head of oxen and cattle.

The wagon train left Independence, Missouri, on May 22, 1843, and followed the California and Oregon Trail to Fort Laramie in present-day Wyoming. It then crossed the Continental Divide at the SOUTH PASS of Wyoming's Wind River Range. After stopping for supplies at JAMES BRIDGER's newly opened Fort Bridger on the Green River, the emigrants headed into present-day Idaho and reached Fort Boise on the Snake River.

At Fort Hall in Idaho, the travelers were joined by MARCUS WHITMAN, who helped guide the party on the next leg of the journey. Until that time, the Oregon Trail beyond Fort Hall had been suitable only for pack animals. Applegate's party had to enlarge the route to make it passable for wagon traffic.

Crossing northeastern Oregon's Blue Mountains, Applegate led the migrants along the Umatilla River to its confluence with the COLUMBIA RIVER. They then followed the Columbia River to the HUDSON'S BAY COMPANY trading post at Fort Vancouver, opposite present-day Portland, Oregon. Applegate was received by Hudson's Bay Company director JOHN M'CLOUGHLIN, who directed the migrants southward to the fertile Willamette Valley, which they reached in November 1843. Applegate and his family settled on Salt Creek, near the present site of The Dalles, Oregon.

In 1846, Applegate, with fellow pioneer Levi Scott and other associates, set out in search of a shorter route from Idaho to Oregon, south of the usual trail along the Snake River. He explored the Humboldt River region and the Black Rock Desert of northwestern Nevada, then traveled northeast to Fort Hall, Idaho.

From Fort Hall, Applegate set out with a party of settlers back to Oregon. Despite repeated raids by Indians, who preyed upon the travelers' cattle, and the hardships wrought by the severe winter weather of 1846–47, Applegate succeeded in leading this party through northern Nevada and northern California into Oregon's Willamette Valley, following a new and shorter route—the Applegate Trail—which traversed the region around Klamath Lake and the Umpqua Valley.

In 1849, Applegate moved his family to the Umpqua Valley, a region suitable for farming, where he founded Yoncalla, one of the earliest settlements in that part of southwestern Oregon.

Applegate was active in territorial and later state politics in Oregon, and he made an unsuccessful bid for governor in 1861. He also served as Oregon's surveyor general and, in 1853, he helped establish a new wagon route into northern California, which became part of the Oregon and California stage road.

Following his initial trek west to Oregon in 1843, Applegate wrote an essay, *A Day with the Cow Column in 1843*,

first published in 1868. In it he described the challenges facing the early migrants along the Oregon Trail to the Pacific Northwest.

Jesse Applegate's involvement in the Great Migration of 1843, and subsequent trailblazing efforts in Idaho and Nevada, contributed to the ensuing massive influx of settlers into Oregon during the 1840s and 1850s.

Arago, Jacques (1790–1855) *French artist, writer in the South Pacific*

Jacques Arago was born in the southern French town of Estagel, the younger brother of the physicist and astronomer François Arago.

In September 1817, Arago departed France on the *Uranie* under the command of LOUIS-CLAUDE DE SAULCES DE FREYCINET, as the expedition's artist and journalist. During the next three years, he circled the world and toured the South Pacific Ocean, visiting the Marianas, the Hawaiian Islands, and the British settlements on the southeast coast of Australia. His illustrations of the voyage included watercolors and drawings of native scenes.

Arago returned to France in November 1820. His illustrated, popular account of the voyage, *Journey Around the World*, was published in 1822, several years before the appearance of the official account of the expedition by Freycinet. In the years that followed, Arago was involved in the theater as a writer and director. Although stricken with blindness in 1837, he published an expanded account of the expedition under Freycinet in 1838–40.

In his work as an artist and journalist in the South Pacific, Jacques Arago depicted naturalistic scenes of native life and customs, as well as written and pictorial accounts of meetings between the French and native leaders.

Arculf (fl. 680s) *Frankish pilgrim to the Middle East*

Arculf, of Frankish descent, possibly was the bishop of Périgueux in southwestern France or a monk attached to a mission. The Anglo-Saxon scholar Saint Bede relates in his three-volume *Historia ecclesiastica gentis Anglorum* (Ecclesiastical history of the English people), from about 731, that Arculf landed in a storm on the Scottish island of Iona, where he described his travels to Saint Adamnan, the abbot of the Iona monastery. He claims he had visited holy sites in the Middle East. Adamnan used Arculf's account to write a geography, *De Locis Sanctis* (Concerning the sacred places), which he presented as a gift to Aldfrith, king of Northumbria, in 698.

Arculf, as recorded by Adamnan, gave a detailed account of Jerusalem, Bethlehem, Nazareth, Damascus, and other cities, including their churches. He also describes many geographic sites from the Bible, including the Dead

Sea and the Jordan River. His guide through Palestine was Peter of Burgundy. After leaving Palestine, Arculf visited Alexandria, then crossed the MEDITERRANEAN SEA, sailing past Crete, to Constantinople (present-day Istanbul, Turkey). On the return trip, Arculf describes islands to the east of Sicily, where the third volume of *De Locis Sanctis* ends.

Arculf's trip to the Holy Land was not a unique pilgrimage for his time, yet no similar detailed record exists.

Arias de Ávila, Pedro (Pedro Arias Dávila, Pedrarias Dávila) (ca. 1442–1531)

Spanish conquistador in Central America

Pedro Arias de Ávila, known to his contemporaries as Pedrarias, was born in the Segovia region of Spain, of Spanish-Jewish ancestry. He was well connected to the court of Spanish monarchs Ferdinand and Isabella, and he took part in military campaigns against the North African Moors in 1510.

In July 1513, Arias de Ávila was appointed chief colonial administrator of Darién, the Spanish colony on the Atlantic coast of what is now Panama in CENTRAL AMERICA. Several months later, while Arias de Ávila was still in Spain preparing for his expedition to the Americas, news of VASCO NÚÑEZ DE BALBOA's crossing of the Isthmus of Panama and sighting of the Pacific Ocean reached the Spanish court.

Arias de Ávila arrived in Darién in late June 1514. Among his expedition of about 2,000 men were several Spanish conquistadores who would play significant roles in the conquest and exploration of the Americas, including HERNANDO DE SOTO, SEBASTIÁN DE BENALCÁZAR, DIEGO DE ALMAGRO, and PASCUAL DE ANDAGOYA.

A conflict with Núñez de Balboa developed from the beginning of Arias de Ávila's governorship of Panama, which ultimately led to Núñez de Balboa's arrest and execution on trumped-up charges of treason in 1519. That same year, Arias de Ávila moved the principal settlement from Darién, on the Atlantic coast of Panama, to Panama City, on the Pacific coast. During the next five years, Arias de Ávila organized expeditions that explored to the north and west and that brought the Chiriquí region of western Panama under Spanish domination. In 1524, he supported Almagro and FRANCISCO PIZARRO in their explorations southward along the Pacific coast, which eventually led to the conquest of the Inca in Peru and Ecuador.

In 1526, Arias de Ávila was replaced as governor of Panama. Soon afterward, he undertook an expedition northward into present-day Nicaragua, defeating rival forces under FRANCISCO FERNÁNDEZ DE CÓRDOBA. He remained in control until his death in 1531.

In Spain, Pedro Arias de Ávila had been known as El Galán (the gallant one) for his courtly manner and gallantry,

and El Justador (the Jousting) for his military prowess. In Panama, however, his reputation for cruelty and ruthlessness in dealing with both the Indians and his Spanish rivals earned him the title *Furor Domini* (wrath of God). Panama City, which he founded in 1519, endured as the oldest surviving European settlement on the American mainland.

Arias de Saavedra, Hernando (Hernandarias Saavedra) (1561–1634)

Spanish soldier, colonial leader in Paraguay and Argentina, son-in-law of Juan de Garay

Hernando Arias de Saavedra, of Spanish ancestry, was born in Asunción, in present-day Paraguay. At the age of 15, he participated in an expedition in search of LOS CÉSARES, a fabled city of Indian riches thought to exist in southern South America. At the age of 19, he settled in Buenos Aires, in present-day Argentina, when it was founded for the second time by the conquistador JUAN DE GARAY. He later married Garay's daughter. In his 20s, Arias de Saavedra served in armies sent out against Indians living inland from Buenos Aires.

Arias de Saavedra and his family returned to Asunción in 1589, and he served as governor in 1592–94. He was appointed governor of the Río de la Plata colony in 1598 and served through 1609. He served a second term in 1614–18. In 1617, he accomplished the separation of the province of Río de la Plata from the administration of Asunción, with Buenos Aires as the seat of the new provincial government.

During his governorships, especially between 1604 and 1608, Arias de Saavedra encouraged further exploration of the interior and launched a series of expeditions, leading some of them himself, ever hopeful of locating Los Césares.

Hernando Arias de Saavedra contributed to Spanish exploration of South America as both a military and political leader.

Armstrong, Neil Alden (1930–)

American astronaut, first human to walk on the Moon

Neil Armstrong was born in Wapakoneta, Ohio. At the age of 16, he became a student pilot. Earning a navy scholarship, he enrolled at Purdue University in 1947. In 1950–52, he served as a combat pilot in the Korean War. After his tour of duty, he returned to Purdue and in 1955 earned a B.S. degree in aeronautical engineering.

That same year, Armstrong joined the National Advisory Committee for Aeronautics (NACA) at the Lewis Research Center in Ohio, soon transferring to the NACA Flight Research Center at Edwards Air Force Base in California, where he was a test pilot for experimental aircraft. In 1962, he joined the second group of trainees to become ASTRONAUTS of the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA).

Armstrong's first assignment was as backup to the *Gemini 5* mission, part of the GEMINI PROGRAM. In 1966, he served as command pilot for the *Gemini 8* mission, during which he and David R. Scott performed the first successful docking of two vehicles in space. He then was part of the backup crews for the *Gemini 11* mission and *Apollo 8* mission of the subsequent APOLLO PROGRAM.

In 1968, Armstrong was given command of the *Apollo 11* mission. He, Edwin "Buzz" Aldrin, Jr., and Michael Allen Collins took off from Cape Canaveral, Florida, on July 16, 1969, propelled by the *Saturn V* rocket designed specifically for Apollo craft. They arrived in orbit around the Moon on July 20, and after eight hours of preparation, Armstrong and Aldrin separated from the *Columbia* command module in the *Eagle* lunar module and three hours later landed on the Moon's Mare Tranquillitatis (sea of tranquility).

Armstrong became the first human to walk on the Moon on July 20, 1969, 10:56 P.M., Eastern Daylight Time. For two and a half hours, while Collins orbited the Moon in the command module, he and Aldrin explored the Moon's surface. They planted a U.S. flag, collected 48 pounds of lunar soil and rock, and set up scientific experiments, including an instrument to measure solar wind, a seismometer to detect moonquakes, and a laser reflector to reflect pulses of laser for measurements between the Earth and the Moon. After 21½ hours on the lunar surface, Armstrong and Aldrin lifted off and rejoined Collins in the command module. They returned to Earth on July 24, accomplishing a successful splashdown in the Pacific Ocean about 810 miles southeast of Hawaii.

Armstrong received the Presidential Medal of Freedom and numerous other awards for the *Apollo 11* mission. His activities after his career as an astronaut have included NASA deputy association administrator for aeronautics in the Office of Advanced Research and Technology, professor of engineering, businessman, presidential adviser on space exploration, and media personality.

The expedition to the Moon was the work of a team of scientists, engineers, technicians, and astronauts. But as the first man to walk on the Moon, Neil Armstrong receives special notice in the history of exploration. He is famous for the quote "That's one small step for man, one giant leap for mankind" as he took his first step on the lunar surface, as watched by millions of people around the world. Other missions would follow to the Moon, five of them successful manned landings.

Arthur, Gabriel (fl. 1670s) *English colonist in Virginia and the trans-Appalachian region*

Gabriel Arthur was born in England and arrived in the Virginia colony prior to 1673 as the indentured servant of En-

glish military officer and exploration sponsor Major General ABRAHAM WOOD.

In 1673, Arthur and another Virginia colonist, JAMES NEEDHAM, were sent by General Wood to explore the trans-Appalachian frontier lying to the west of the Virginia colony. Arthur and Needham left the Virginia colony's western outpost at Fort Henry, present-day Petersburg, Virginia, in April. Traveling southwestward through North Carolina's Yadkin Valley into what is now eastern Tennessee, they were taken captive by Indians, thought to be a band of Cherokee.

Arthur remained among his captors for more than a year, learning their language and participating in several raids on other tribes. He then traveled southward with them as far as Spanish Florida. Along the way, he explored the Blue Ridge of North Carolina. Returning north with a party of Indians in 1674, he traveled eastward through the CUMBERLAND GAP, becoming one of the first non-Indians to cross the APPALACHIAN MOUNTAINS by this route. He then explored the Kanawha River region of present-day West Virginia. Arthur's companion, Needham, had managed to escape but was later killed by his Indian guide.

Arthur was again taken captive by a raiding party of Shawnee Indians near the mouth of the Scioto River in present-day Ohio. He then traveled with this band into the Scioto River region and explored what is now southeastern Ohio.

After surviving an ambush by Ocaneechi Indians, Arthur convinced the Shawnee that he would be able to open British trade relations with them if they granted his freedom. He returned to Fort Henry some time in 1674.

Gabriel Arthur's travels through what is now West Virginia, southeastern Ohio, eastern Tennessee, the Carolinas, Georgia, and Florida resulted in the first recorded explorations of the trans-Appalachian frontier by an Englishman. His accounts of the Cumberland Gap and the Ohio country to the west provided the impetus for further exploration, including that of DANIEL BOONE a century later.

Ashley, William Henry (ca. 1778–1838)

American fur trader in the West, soldier, politician

William Henry Ashley, a native of Virginia, moved to the Missouri Territory in 1803, the year the United States finalized its acquisition of the Louisiana Territory from France. Settling first in Sainte Genevieve, he later made his home in St. Louis, where he went into business with his friend, the Pennsylvanian ANDREW HENRY. During the War of 1812, Ashley and Henry prospered by selling gunpowder and lead to the U.S. Army. Ashley was also active in the Missouri territorial militia, serving as a major; after the war, he reached the rank of general.

Ashley was prominent in politics, and when Missouri achieved statehood in 1821, he was elected the first lieutenant governor. Because of severe financial reverses resulting from the Panic of 1819, Ashley sought to recoup his losses by initiating the FUR TRADE to the upper MISSOURI RIVER. In partnership with Henry, Ashley recruited MOUNTAIN MEN for an expedition from St. Louis to trade furs with the Mandan and other Indian tribes in present-day North and South Dakota and Wyoming. In the spring of 1822, Ashley and Henry and a small party of trappers and frontiersmen traveled northward from St. Louis via the Missouri River to the mouth of the Yellowstone River, where they established a trading post, Fort Henry (later Fort Union). The venture failed to bring in the necessary profits, and the following year Ashley sponsored a second expedition.

The Arikara Indians, who lived on the Missouri near the present North Dakota-South Dakota state line, and who up to that time had acted as middlemen in the fur trade, felt their interests threatened by the appearance of the trappers. In spring 1823, Ashley's men, heading by KEELBOAT for Fort Henry, stopped at the Arikara settlement along the Missouri to trade for horses. The Indians launched a surprise attack, and Ashley and his men narrowly escaped.

Although a punitive military expedition, headed by Colonel HENRY LEAVENWORTH, soon arrived and dispersed the Arikara to the Mandan Indian villages in North Dakota, Indian attacks made further travel on the upper Missouri into the northern ROCKY MOUNTAINS impractical. To meet this challenge, Ashley instituted the "brigade system," in which parties of trappers were sent westward from Fort Kiowa in present-day South Dakota into the foothills of the Rockies. Taking part in these expeditions were mountain men JAMES PIERSON BECKWOURTH, JAMES BRIDGER, ROBERT CAMPBELL, JAMES CLYMAN, THOMAS FITZPATRICK, HUGH GLASS, DAVID E. JACKSON, EDWARD ROSE, JEDEDIAH STRONG SMITH, and WILLIAM LEWIS SUBLETTE.

In spring 1824, after Andrew Henry had left the fur trade, Ashley assumed complete ownership of what was known as the ROCKY MOUNTAIN FUR COMPANY. In November of that year, Ashley himself led a supply train of pack animals westward along the North Platte and South Platte Rivers over the Wind River Range of what is now southern Wyoming, through the SOUTH PASS to the Green River of what is now northern Utah.

Starting in April 1825, Ashley and his party began to explore the Green River of northern Utah, as well as the Uinta River and the Great Salt Lake region. Using makeshift boats fashioned from buffalo hides stretched over willow sticks, they negotiated the perilous rapids of the Green River as it coursed through what is now northern Utah's Dinosaur National Monument. They explored the river's southern branch to determine whether it was the so-called Buenaven-

tura River, erroneously thought to flow directly to the Pacific Ocean. However, based on reports by French trappers in the area, Ashley correctly concluded that the southern Green River was actually a northern tributary of the COLORADO RIVER. Traveling overland through the Uinta Mountains, Ashley and his mountain men met up with ÉTIENNE PROVOST. The combined party headed northeastward to Henry's Fork on the Green River, where Ashley had arranged to meet with the rest of his trappers in July 1825, the first trappers' annual rendezvous.

After selling supplies to the trappers and purchasing their season's catch of furs, Ashley embarked on an expedition northward through the SOUTH PASS, then explored the Sweetwater, Popo Agie, and Bighorn Rivers. He returned to St. Louis via the Yellowstone and Missouri Rivers.

In summer 1826, Ashley was again at the Green River rendezvous, where he sold his fur interests to David Jackson, Jedediah Smith, and William Sublette.

Ashley returned to St. Louis, his financial condition greatly improved, and he continued to be prominent in Missouri political circles. Although unsuccessful in his bid for election as governor of the state, he was elected to Congress, serving in the House of Representatives from 1831 to 1837.

William Henry Ashley's fur-trading ventures into the Rockies demonstrated that there was a practical overland supply route into the region. His exploits opened the American West to exploration and travel routes not restricted to the rivers. His 1824–25 expedition into the Rockies of southern Wyoming and Utah blazed the trail that would, more than 40 years later, be the basis of the route used by the builders of the Union Pacific Railroad.

Astor, John Jacob (1763–1848) *American fur trader, financier, sponsor of expeditions to the Pacific Northwest*

The son of a butcher, John Jacob Astor was born in Waldorf, near the German university town of Heidelberg. At the age of 16, he moved to England to join his brother's musical instrument business. Five years later, he immigrated to America, arriving first in Baltimore, then settling in New York City.

Through his 1785 marriage to Sarah Todd, whose family was wealthy and politically well-connected, Astor was able to launch a successful business career. Aided by his wife's knowledge of furs, Astor operated a store in New York that developed a thriving trade not only in imported musical instruments, but also in animal pelts from Montreal and the Hudson River Valley. By 1800, he had expanded his business to include real estate development in and around New York City.

Astor also became a leading mercantile force in the trade with China from New York, dealing especially in furs. Still, his profits were limited by fur prices fixed by the

HUDSON'S BAY COMPANY and the NORTH WEST COMPANY based in Montreal. Prompted by the Louisiana Purchase of 1803 and the ensuing explorations of MERIWETHER LEWIS and WILLIAM CLARK in the largely unknown region between the Mississippi River and the Pacific coast, Astor organized a venture to obtain furs from the Pacific Northwest and ship them directly to the lucrative markets in China.

In April 1808, under the aegis of President Thomas Jefferson, Astor chartered the AMERICAN FUR COMPANY. His original plan was to establish a chain of trading forts along the route of the Lewis and Clark Expedition, terminating at the mouth of the COLUMBIA RIVER on the coast of present-day Oregon. He established two subsidiary companies, the Pacific Fur Company in June 1810 and the Southwest Fur Company in June 1811.

The Pacific Fur Company was to establish a settlement called Astoria on the Oregon coast, near the Columbia River site where Lewis and Clark had wintered in 1805. At the same time, Astor entered into an agreement with the Canadian fur companies to supply their Great Lakes operations. He also obtained additional financial backing from the RUSSIAN-AMERICAN COMPANY, agreeing in return to transport supplies to its settlements in Alaska.

Two expeditions were sent to the Oregon coast to establish Astoria. The first, the seaward arm of the enterprise aboard Astor's ship, the *Tonquin*, headed by ROBERT STUART, left New York City in September 1810, rounded CAPE HORN, and reached the Oregon coast in March 1811. After the founding of the Astoria settlement, the *Tonquin* sailed northward along the coast, heading for the Russian posts in southern Alaska. At a stopover in Nootka Sound, where Astor's men intended to trade for sea otter pelts with the Nootka Indians, the ship came under attack. The Nootka killed all hands but one, who, although badly wounded, managed to ignite the ship's powder magazine. The explosion destroyed the ship and killed a number of Nootka.

An overland expedition, led by Astor employee WILSON PRICE HUNT, departed St. Louis in April 1811. The Astorians traveled up the Missouri, then overland into present-day Wyoming and Idaho, where they followed the Bighorn and Snake Rivers to the Columbia River's outlet on the Pacific Ocean at Astoria in February 1812.

Supplying the Astoria enterprise by sea from New York proved difficult. The situation became critical with the outbreak of the War of 1812 and the imposition of British naval blockades. Anticipating the imminent seizure of the Astoria settlement by the British, Astor's agents in Oregon sold the fort to the North West Company in 1813.

After 1815, Astor concentrated his Great Lakes operations out of centers at Green Bay, Wisconsin, and Grand Portage, Minnesota. His South West Company soon dominated most of the trade from Mackinac on Lake Michigan

south and west to St. Louis and the ROCKY MOUNTAINS. His American Fur Company proved more efficient than the independent Missouri traders and smaller concerns, such as the ST. LOUIS MISSOURI FUR COMPANY and the ROCKY MOUNTAIN FUR COMPANY, and, by the late 1820s, held a near-monopoly on the FUR TRADE in the trans-Mississippi West, with the exclusion of the Pacific Northwest, which was dominated by the Hudson's Bay Company.

By the 1830s, demand for western beaver pelts by European and American hat manufacturers had declined because silk hats had replaced beaver as the dominant fashion. In addition, the number of beavers throughout the traditional trapping areas of the Great Lakes and eastern Rockies had been depleted. As a result, Astor sold his fur-trading empire to a consortium of St. Louis traders in 1834.

Although John Jacob Astor's expeditions were launched to expand his business empire, they also enabled the earliest organized explorations of large portions of North America, previously known only to Native Americans and a handful of MOUNTAIN MEN. Washington Irving's 1836 book *Astoria* provides a chronicle of the Oregon coast venture, based on Astor's own notes and journals and the accounts of other participants.

Atkinson, Henry (1782–1842) *U.S. Army officer on the Missouri River*

Henry Atkinson was born in North Carolina. In 1808, he joined the U.S. Army, and during the War of 1812, he was promoted to colonel.

On July 4, 1819, Atkinson led 1,100 troops from St. Louis up the MISSOURI RIVER on an expedition in which he hoped to reach the mouth of the Yellowstone River. The steamboats transporting the Yellowstone Expedition broke down, and Atkinson and his command reached only as far as Council Bluffs on the Missouri River in present-day Nebraska. At this point, Atkinson established a log outpost, known as Fort Atkinson.

In summer 1820, Atkinson dispatched military exploring expeditions to the north and west. One group, under Major STEPHEN HARRIMAN LONG, reached as far as Pikes Peak in the ROCKY MOUNTAINS. Another, under Captain Matthew J. Magee, explored northward to the mouth of the Minnesota River.

Five years later, Atkinson led a second Yellowstone Expedition. His command of 476 troops left the Council Bluffs post on May 16, 1825. This time, traveling by hand-cranked, paddle-wheel-driven KEELBOAT, he reached a point on the Yellowstone 100 miles above its mouth and negotiated treaties with Indian tribes of present-day eastern Montana.

Atkinson, who had been promoted to brigadier general in 1820, commanded troops in the Indian wars in Illinois,

Wisconsin, and Minnesota during the late 1820s and early 1830s.

Henry Atkinson's post at Council Bluffs became a focal point for fur traders and MOUNTAIN MEN of the upper Missouri and eastern Rockies. It was also an important starting point for early government explorations of the American West, including the 1827 expedition into present-day Kansas led by Colonel HENRY LEAVENWORTH. Moreover, his 1825 negotiations with the upper Missouri and Yellowstone tribes ended two years of Indian resistance and helped open the northern plains and Rocky Mountains to white trade and exploration.

Atkinson, Lucy (fl. 1820s–1860s) *British traveler, writer in Russia and central Asia, wife of Thomas Wittlam Atkinson* Few details are known of Lucy Atkinson's origins or early life. She was definitely British by birth, yet her maiden name and place of birth remain unknown.

In about 1840, Atkinson went to live in St. Petersburg, Russia, where she worked as a tutor and governess for a daughter of General Mouravioff, governor general of eastern SIBERIA. It was as a member of Mouravioff's household that she first met English artist and architect THOMAS WITTLAM ATKINSON in 1846. He was about to embark on a sketching trip to SIBERIA and had contacted Mouravioff to obtain travel documents for his journey across Russia and into the regions to the east. Upon Thomas's return to St. Petersburg the following year, he and Lucy became engaged and were married in Moscow soon afterward.

In February 1848, Atkinson left Moscow with her husband, accompanying him on his sketching expedition eastward into Russian Asia. They traveled by horse-drawn sledge southeastward across the Ural Mountains to Barnaul, a goldmining center on the upper Ob River in the Altai Mountains. They crossed the mountains toward the northeastern Mongolia border. At a mountain lake called Altin Kool (golden lake), they were hosted by Kalmuck tribesmen, who accompanied them on a tour of the waters by native CANOE.

After a camel trip across the Kirghiz steppes, Atkinson and her husband reached the town of Kopal in September 1848, near the Russian-Chinese border. Atkinson gave birth to a son there whom the couple named Alatau, after the mountain that rises above Kopal. Six months later, they set out on a return journey to Barnaul, arriving in December 1849.

After a few months at Barnaul, Lucy and Thomas Atkinson resumed their travels, heading eastward into south-central Siberia. For the next several years, while Lucy remained with her infant son at Irkutsk on Lake Baikal, Thomas undertook expeditions into the surrounding country to sketch and make natural history studies.

The Atkinsons returned to England in 1854 in time for young Alatau to begin school. Thomas Atkinson produced an illustrated book of his travels, published in 1857.

After her husband's death in 1861, Lucy Atkinson compiled her own book from letters to her friends, *Recollections of Tartar Steppes and Their Inhabitants* (1863). The work provided the English reading public with details about peoples and lands east of the Ural Mountains.

Atkinson, Thomas Wittlam (1799–1861)

British artist, traveler in Russia and central Asia, husband of Lucy Atkinson

Thomas Atkinson, an English artist and architect living in the Russian city of St. Petersburg, undertook a sketching trip to Siberia in 1846. Two years later, accompanied by his wife LUCY ATKINSON, he headed eastward across the Ural Mountains. Over the next five years, they journeyed to parts of central Asia rarely visited by western Europeans. Their travels took them from Barnaul, in the Altai Mountains, across the Kirghiz steppes to the Chinese border. He also reportedly visited Mongolia. He and his wife returned to St. Petersburg in 1853, after a journey that had taken them across almost 40,000 miles of Russian territory.

While traveling, Atkinson produced hundreds of watercolor paintings of central Asian scenes. Engravings made from them were used to produce illustrations for his account of his travels, *Oriental and Western Siberia: A Narrative of Seven Years' Explorations and Adventures in Siberia, Mongolia, the Kirghis Steppes, Chinese Tartary, and Part of Central Asia* (1857). The book was well received in both England and the United States, and he became a highly acclaimed lecturer on Russian Asia. He was also elected as a member of the ROYAL GEOGRAPHICAL SOCIETY.

Atlasov, Vladimir Vasilyevich (Vladimir

Atlasov) (unknown–1711) *Russian Cossack in eastern Siberia and the Kamchatka Peninsula*

Vladimir Atlasov, a Siberian Cossack, settled in Yakutsk in 1672, where he served as an administrator for the czarist government. In 1695, he took command of Fort Anadyr on the shore of the Bering Sea, then Russia's northeasternmost outpost. From there, in conjunction with fellow Cossack LUKA MOROZKO, Atlasov undertook exploring expeditions into the region south of the Anadyr River that led to Russia's first knowledge and subsequent settlement of the Kamchatka Peninsula.

In 1699, in command of a force of 120 men, Atlasov headed south from Fort Anadyr. Upon reaching the Kamchatka River, he claimed the entire Kamchatka Peninsula for Czar Peter I (Peter the Great). The next year, he founded

Verkhnekamchatsk, the first Russian settlement on the Kamchatka Peninsula.

Atlasov journeyed to Moscow in 1700, where he presented an account of his explorations to Czar Peter. In 1708, he returned to Kamchatka as the region's chief administrator. Five years later, he was killed in a rebellion of his own men.

Vladimir Atlasov is credited with the Russian discovery and conquest of Kamchatka. His exploits helped extend Russia's domination of central Asia to the Pacific Ocean; his explorations revealed that Kamchatka was a peninsula. The Russian settlement of Kamchatka provided the next generation of Russian explorers with a staging point for expeditions across the Sea of Okhotsk to the Kuril Islands of northern Japan, and eastward across the Bering Sea to Alaska and the west coast of North America.

Audubon, John James (1785–1851)

American artist, naturalist in the Ohio and Mississippi Valleys

John James Audubon was born in Les Cayes, Haiti, the son of a French sea captain and a Haitian Creole woman. He was raised in France, studying art under the French artist Jacques-Louis David. In 1803, Audubon settled on his father's Pennsylvania estate, Mill Grove, near Philadelphia. It was there that he first began to study and paint birds.

In 1807, Audubon moved to Louisville, Kentucky, and entered the mercantile business. Three years later, he undertook a trade expedition down the Ohio River to Henderson, Kentucky, and established a general store, as well as a lumber and grist mill. He continued his painting of birds while on hunting expeditions into the largely unsettled Kentucky frontier region. At this time, he became acquainted with frontiersman DANIEL BOONE.

By 1819, Audubon's business had failed, leaving him bankrupt. He moved to Cincinnati and found work as a taxidermist. In 1820, he traveled down the Ohio River and MISSISSIPPI RIVER to New Orleans, where he supported his family by painting portraits and at times taught art. His fortunes improved in 1827, when he went to England and succeeded in winning financial support for the publication of his paintings of birds. This work, *The Birds of North America*, was published serially from 1827 to 1838.

Audubon returned to America in 1831, settling for a time in Charleston, South Carolina. In the 1830s, he undertook expeditions in search of wildlife subjects to paint, traveling over a wide area of North America, including the dunes and lagoons along the Texas coast and the wild regions of Florida, as well as the coast of Labrador.

In his later years, Audubon and his family lived at "Minnielands," their Hudson River estate in what is now New York City.



John James Audubon (Library of Congress)

John James Audubon became one of the foremost authorities on North American birds and established an enduring reputation as a painter of wildlife subjects. His painting expeditions through the frontier regions of the United States in the first half of the 19th century resulted in the discovery of 40 previously unknown bird species.

Auribeau, Alexandre Hesmivy d'

(unknown–1794) *French naval officer in the South Pacific and East Indies*

Alexandre Hesmivy d'Auribeau was second in command to ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux, on the French ship *Recherche*, which sailed from Brest, France, in September 1791 in search of JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, who had become lost in his explorations of the South Pacific Ocean several years earlier.

In July 1793, near the coast of New Guinea, d'Entrecasteaux succumbed to SCURVY, and Auribeau assumed command. Over the next year, his ship sailed through the EAST INDIES, stopping at various Dutch settlements in present-day Indonesia. The French Revolution was then at its height, and Auribeau, a royalist, had to contend with

political dissension among his own men as well as the distrust of Dutch authorities, who had become wary of any French presence during this critical time. In August 1794, he died at Semarang on the island of Java. According to some sources, he may have been poisoned, but most scholars believe that he died of dysentery.

Alexandre Hesmivy d'Auribeau played a key role in the first search efforts for the French explorer La Pérouse. Ironically, even in the South Pacific, halfway around the world from France, he was plagued with the political strife of the French Revolution.

Ávila, Pedro Arias de See ARIAS DE ÁVILA, PEDRO.

Avilés, Pedro Menéndez de See MENÉNDEZ DE AVILÉS, PEDRO.

Ayllón, Lucas Vásquez de (ca. 1475–1526)

Spanish colonial official in Santo Domingo, early colonizer on the southeast coast of North America

Few details are known of Lucas Vásquez de Ayllón's life before 1502, the year he first arrived in Santo Domingo, the chief Spanish settlement on the Caribbean island of Hispaniola (present-day Haiti and the Dominican Republic). In Santo Domingo, he served in the colonial government as a magistrate.

In 1520, inspired by the reports of JUAN PONCE DE LEÓN, Ayllón sent out an expedition under Francisco Gordillo that reached the coast of present-day South Carolina. Gordillo returned to Santo Domingo with about 70 Indian captives. The next year, Ayllón took one of these captives, an Indian (probably Shakori) known as Francisco Chicora, to Spain and presented him at the court of Charles I (Holy Roman Emperor Charles V). Chicora related to the Spanish monarch a fabulous account of his homeland, claiming that his native land contained a great wealth of precious stones and gold, that the kings and queens there were giants, and that the people had huge, rigid tails growing out of their posteriors, forcing them to dig holes in the ground in order to sit down.

With the death of Ponce de León in 1521, Ayllón was granted a royal patent to colonize Florida and what is now the southeastern United States. With Chicora, he sailed from Santo Domingo in 1526. His fleet of six ships carried 500 colonists and slaves. On the first landing at the mouth of the Santee River, near present-day Georgetown, South Carolina, Ayllón established the settlement of San Miguel de Guadalupe. He then explored southward along the coast of present-day Georgia, to the mouth of the Savannah River.

Chicora disappeared soon after landing. Over the next few months, the colonists were decimated by swamp fever. Ayllón himself succumbed in the winter of 1526–27. Only 150 of the colonists survived to return to Santo Domingo in 1527.

Lucas Vásquez de Ayllón attempted to establish one of the earliest Spanish settlements on the mainland of the present-day United States. The next major Spanish colonizing effort on the southeast coast of North America did not occur until 40 years later with the founding of St. Augustine, Florida.

Ayolas, Juan de (unknown–ca. 1538)

Spanish conquistador in South America

Juan de Ayolas was a lieutenant in PEDRO DE MENDOZA'S 1535 expedition from Spain to the Río de la Plata region of South America.

In 1535–36, encouraged by the reports of SEBASTIAN CABOT, Ayolas explored up the Río de la Plata, from the site of present-day Buenos Aires, Argentina, in search of gold and silver. From the Río de la Plata estuary he reached the Paraná River, which he ascended, and along its banks he founded the settlement of Corpus Cristi. He then explored the Paraguay River in search of a route to Peru. At one point he obtained gold and silver from the Guaraní Indians, but these riches had probably originated among the Inca Indians west of the ANDES MOUNTAINS. He penetrated the interior of South America as far as what is now the Chaco region of Paraguay and northern Argentina, and he may have reached the eastern slopes of the Andes.

Probably in early 1538, Ayolas was killed in a clash with Guaraní near present-day Asunción, Paraguay. Soon afterward, his lieutenant, DOMINGO MARTÍNEZ DE IRALA, succeeded in securing Asunción.

Juan de Ayolas's explorations, along with those of his lieutenant Martínez de Irala, led to the opening of the upper Río de la Plata and its tributaries to extensive Spanish settlement.

Azara, Félix de (1746–1811) *Spanish official, naturalist in South America*

Félix de Azara was born in the Aragon region of Spain. In 1775, while serving as a Spanish army officer against the North African pirates in present-day Algeria, he was wounded and earned a promotion to the rank of brigadier general.

Azara went to the Río de la Plata region of South America in 1781, as a commissioner in a Spanish government survey that determined the boundary between Spanish and Portuguese territory. Over the next 20 years, he undertook extensive explorations along the Paraná and



Félix de Azara (Library of Congress)

Paraguay Rivers, during which he made studies of the region's natural history.

Following his return to Spain in 1801, Félix de Azara published a series of scientific and geographic studies of the upper Río de la Plata river system. His works provided Europeans with one of the earliest scientific accounts of the interior of South America, as well as a definitive history of the conquest of the region now comprising Paraguay and northern Argentina.

Azevado, Francisco de (1578–1660)

Portuguese or Spanish missionary in India and Tibet

Francisco de Azevado was a Portuguese or Spanish Jesuit missionary priest in India during the early 1600s. In 1631, he journeyed from Delhi, India, across the HIMALAYAS by way of the Mana Pass, and into Tibet. He succeeded in reestablishing a Jesuit mission and church in Tibet, continuing the work begun several years earlier by missionary priest ANTONIO DE ANDRADE. Azevado's mission in Tibet lasted for only a few years. In 1635, he was forced to abandon it in the face of hostility from Tibetan Buddhist authorities.

Although Francisco de Azevado failed to establish a permanent Christian missionary presence in Tibet, he was one of the first Europeans to journey there since the end of the Middle Ages.

B



Back, Sir George (1796–1878) *British naval officer in the Canadian Arctic*

Born in Stockport, Cheshire, England, George Back entered the Royal Navy in his early teens as a midshipman, serving in the last naval engagements of the Napoleonic Wars.

In 1818, Back served under SIR JOHN FRANKLIN in an unsuccessful attempt to navigate from Spitsbergen (present-day Svalbard), north of Norway, across the Arctic Ocean to the Bering Sea.

The next year, 1819, Back took part in Franklin's overland expedition into the Canadian Arctic. With Franklin, he traveled from York Factory on HUDSON BAY, along the Nelson and Saskatchewan Rivers to Lake Athabasca. From there, he joined Franklin on an exploration northward to Great Slave Lake and the Coppermine River, which they followed to its mouth on the Arctic coast. The expedition then charted the northern coastline of Canada eastward to Point Turnagain. Back spent three years exploring with Franklin, during which the expedition faced extreme hardships due to shortages of food. At one point, Back heroically trekked southward from the Arctic coast to Great Slave Lake in order to obtain food supplies from the Indians for Franklin and his men, covering 250 miles in less than eight weeks. Without adequate food himself, he survived only by eating lichens, a pair of leather trousers, and an old shoe.

Back returned to Arctic Canada with Franklin in 1825. Starting from New York, they journeyed overland to Great Slave Lake and descended the Mackenzie River to its mouth

on the Beaufort Sea. They then undertook an exploration westward along the northern coast of Canada, intending to reach British naval vessels waiting for them at Icy Cape, Alaska. Impeded by ice and the rugged coastline, they managed only to reach a point 370 miles west of the Mackenzie's mouth, about half the distance to Icy Cape, Alaska. The expedition returned to England in fall 1827.

In 1833, Back was promoted to the rank of lieutenant in the Royal Navy. That year, he undertook an expedition in search of SIR JOHN ROSS, who, with his nephew SIR JAMES CLARK ROSS, had disappeared while exploring the Arctic coast of Canada by ship. While wintering at Great Slave Lake in 1833–34, Back received news that Ross and his party had safely returned to England and instead set out to explore to the north and east. From the Indians, he heard reports of a stream known as the Great Fish River, which flowed into the Arctic north of Great Slave Lake, several hundred miles east of the Coppermine River. He succeeded in locating the Great Fish River and traveled its 550-mile length to its outlet on Simpson Strait, south of King William Island. Back returned to England in 1835.

In 1836, Back was promoted to captain and embarked on a seaward expedition to the Canadian Arctic in command of the *Terror*. From Hudson Bay, he sailed northward, attempting to negotiate the NORTHWEST PASSAGE. Charting the Arctic coastline, he sailed around Southampton Island but was trapped by the ice in Frozen Strait. The *Terror* was icebound until spring 1837, by which time it had been

so severely damaged that Back was forced to head back to England. On the return voyage, the ailing ship was in danger of sinking and had to be beached on the coast of Ireland.

Back returned to regular naval service after 1837. He was awarded a baronetcy for his Arctic explorations, and, in 1857, he was made an admiral.

Sir George Back's exploits in the Canadian Arctic included extensive overland and seaward explorations. His work filled in many gaps in the previously uncharted coastline of northern Canada. The Great Fish River, which he explored during his 1833–35 expedition, was subsequently renamed the Back River in his honor. He recounted his experiences in his books, *Narrative of the Arctic Land Expedition to the Mouth of the Great Fish River* (1836) and *Narrative of Expedition in H.M.S. Terror* (1838).

Baffin, William (ca. 1584–1622) *English mariner in Greenland and the Canadian Arctic*

Little is known of William Baffin's early life except that he was apparently a highly skilled mariner and was self-educated in navigation and mathematics. In April 1612, he sailed as a pilot on the ship *Patience*, captained by JAMES HALL, undertaking an expedition in search of the NORTHWEST PASSAGE, sponsored by London-based COMPANY OF MERCHANTS OF LONDON DISCOVERERS OF THE NORTHWEST PASSAGE.

From the port of Hull, England, Baffin sailed to what is now Godthaab, on the southwest coast of GREENLAND. Baffin and Hall then transferred to the expedition's other ship, the *Heartsease*, and explored northward into Davis Strait along the west coast of Greenland as far as 67° north latitude, then turned south. While ashore at Rommel's Fjord, Greenland, Hall was killed by Inuit. Baffin then returned to England, having made important navigational observations relating to magnetic variations of the COMPASS in high northern latitudes. On this voyage, he also made early calculations of longitude at sea.

In 1613–14, Baffin made two voyages to Spitsbergen (present-day Svalbard) under the sponsorship of the London-based MUSCOVY COMPANY. Baffin returned to the service of the Company of Merchants of London Discoverers of the Northwest Passage in 1615. That year, he sailed as a pilot aboard HENRY HUDSON's former ship, the *Discovery*, under the command of ROBERT BYLOT, a survivor of Hudson's ill-fated final voyage. Baffin navigated the *Discovery* through Hudson Strait and explored the northwest coast of HUDSON BAY, seeking an outlet to the Pacific Ocean. After surveying the coastline northward beyond Southampton Island and into Foxe Basin, Baffin rightfully concluded that Hudson Bay provided no navigable outlet westward to the Pacific, although later explorers would search the region again.

On a second voyage with Bylot in 1616, Baffin sailed northward along the west coast of Greenland and into a large bay that was later named after him. He entered Kane Basin on the extreme northwest coast of Greenland and explored the coast of a large body of land later known as Baffin Island. Proceeding south, he found and named Jones Sound and Lancaster Sound, which flank Devon Island on the north and south. Upon his return to England, he reported that there was little hope in locating a waterway through the islands and frozen straits west of Greenland.

Baffin served next in the BRITISH EAST INDIA COMPANY's fleet, commanding the ship *London*. In 1622, he took part in a military campaign in the Persian Gulf against the Portuguese. He was killed in an assault on the Portuguese-held fortress at Queshm, near the Strait of Hormuz.

William Baffin's geographic findings north and west of Greenland were not confirmed until subsequent British explorations in the early part of the 19th century. His reports slowed down attempts to locate an eastern entrance to the Northwest Passage. On his second voyage with Bylot in 1616, Baffin reached as far north as 77°45' north latitude, a record until SIR GEORGE STRONG NARES's Arctic expedition of 1852. Ironically, Lancaster Sound, which Baffin first charted in 1616, proved to be the eastern entry point for the Northwest Passage, first successfully navigated in the early 20th century.

Baikie, William Balfour (1825–1864)

Scottish naval surgeon, naturalist in West Africa

Born in Scotland, William Baikie became a medical doctor, with a background in the natural sciences. He also developed an interest in the study of foreign languages.

In 1854, he took part in a British government-sponsored expedition to West Africa that attempted to make contact with the German explorer of Africa, HEINRICH BARTH, who had reached the upper NIGER RIVER from the SAHARA DESERT. As a naval surgeon aboard the *Pleiad*, Baikie sailed from England to the Niger Delta, on the west coast of Africa.

Following the death of the ship's captain, Baikie took command of the expedition. Traveling by steamboat, he ascended the Niger to its principal tributary, the Benue, which he followed upstream for several hundred miles. Unable to locate Barth, he returned to England.

Baikie undertook a second exploration into West Africa in 1857. While ascending the Niger, his vessel was wrecked. Nevertheless, he again reached the confluence of the Niger and Benue Rivers, where, in 1859, he established a trading settlement at Lokoja.

Baikie remained on the Niger for the next seven years, during which he studied the region's natural history as well as the various languages and dialects of the native population. He also translated the Bible into Hausa, then the pre-

dominant language of West Africa. In 1864, while on his way back to Great Britain, Baikie died on the West African coast in Sierra Leone.

William Baikie's 1854 exploration of the Benue River took him farther upstream than any European had reached to that time. His settlement at Lokoja in what is now south-central Nigeria opened the upper Niger River region to Western commerce. As a scientific explorer, he collected the earliest data on the region's native cultures, languages, and natural history.

Baines, Thomas (1822–1875) *British painter in Africa and Australia*

Born in 1822 in King's Lynn, Norfolk, England, Thomas Baines pursued a career as a painter. He traveled and painted in southern and central Africa and in Australia, some of his work in an official capacity, with assignments from the British government.

In 1848–51, Baines served as artist to the British army in South Africa. In 1855–56, he visited Australia as part of the North Australian Exploring Expedition, led by Augustus Charles Gregory, which traveled along the Victoria River and Sturt Creek in the Northern Territory, before returning overland to Moreton Bay, Queensland.

In 1858–59, back in Africa, Baines accompanied DAVID LIVINGSTONE on his expedition to the ZAMBEZI RIVER and despite frequent personal quarrels with Livingstone, produced valuable work. In 1860–66, he traveled with an expedition headed by James Chapman to Namibia and Victoria Falls. Thereafter he lived in South Africa.

In addition to his sketches made during his travels, from which he painted oils and watercolors, Thomas Baines kept journals in which he recorded his observations on native peoples and wildlife. His paintings were the first views of central and southern Africa seen by Europeans.

Baker, Florence (Florence von Sass Baker, Lady Baker) (ca. 1841–1918) *Hungarian-English explorer in East Africa, wife of Sir Samuel White Baker*

Florence Baker, née von Sass, was the second wife of British explorer SIR SAMUEL WHITE BAKER, whom she met in 1858, while Baker was traveling in the Balkan region of southeastern Europe. The facts of her earlier life are uncertain. She was Hungarian by birth, daughter of Finnicek von Sass, probably 20 years younger than Baker. It is thought that she lost her family during the 1848 revolutions in Europe. She ended up a slave to Turks, and Baker purchased her and liberated her.

In 1861, von Sass accompanied Baker on his first expedition to East Africa, during which he planned to undertake a search for the source of the NILE RIVER. They traveled

first to Egypt, then sailed along the Nile to Khartoum in the Sudan, where they remained for 14 months, preparing for the trip into the interior of equatorial East Africa by studying Arabic.

In December 1862, von Sass and Baker left Khartoum and sailed up the Nile to Gondokoro, where they met with the British explorers JAMES AUGUSTUS GRANT and JOHN HANNING SPEKE. They continued up the Nile into the kingdom of Bunyoro, at times traveling with an Arab slave caravan. They encountered some opposition from the brother of the king of Bunyoro, a native chief named M'Gambi. M'Gambi at one point demanded that in order for Baker to continue his explorations, he would have to leave von Sass behind for "his pleasure." Von Sass's indignation led M'Gambi to relent and even provide 300 of his men as an escort.

In March 1863, von Sass and Baker pushed southeastward in search of the uncharted lake known by the local people as Luta N'zige. En route, she suffered an acute case of sunstroke. Although she fell into a coma for a week, she fully recovered.

On March 14, 1864, von Sass and Baker finally reached the lake in what is now western Uganda, which they named Lake Albert (Albert Nyanza). They also located Murchison Falls, a source of the Nile, naming it after the president of the ROYAL GEOGRAPHICAL SOCIETY.

Upon their return to London in 1865, von Sass and Baker were married. While delivering his first lecture to the Royal Geographical Society that year, Baker formally introduced his wife to the English public.

Florence Baker returned to Egypt with her husband in 1869, accompanying the Prince of Wales to the opening ceremonies of the Suez Canal. When her husband was appointed governor general of the equatorial Nile Basin (the White Nile region in south-central Sudan), she accompanied him there, and during the next four years, she assisted in his efforts to eliminate the SLAVE TRADE in the region. They returned to England in 1873, at the conclusion of Baker's term of office.

Florence Baker was one of the few women to play an active role in the history of African exploration and travel into the continent's interior, not as a missionary, but solely for the purpose of exploration. Samuel Baker credited her courage and devotion as essential to his success in exploring East Africa.

Baker, James (Jim Baker) (1818–1898)

American fur trader, guide, interpreter in the American West
James (Jim) Baker left his home in Belleville, Illinois, in the late 1830s, soon embarking on a career in the FUR TRADE in the northern and central ROCKY MOUNTAINS. He was part of the AMERICAN FUR COMPANY's 1838 expedition

along the Oregon Trail, led by fur trader THOMAS FITZPATRICK. During this trip, Baker left the main party and joined with JAMES BRIDGER to trap in the Green River Valley of what is now eastern Utah and southern Wyoming.

Except for a brief visit to his hometown in Illinois during 1840–41, Baker remained in the northern Rockies, operating as a trapper for Bridger for nearly two decades. During that time, he married a Shoshone Indian woman and became fluent in several Indian languages.

In 1857–58, Baker served as an interpreter and guide to Captain RANDOLPH BARNES MARCY's U.S. Army command, which had been sent to Utah to quell the Mormon uprising. At one point, Baker guided Marcy's troops over more than 600 miles of snow-covered mountain trails—from eastern Utah southwestward to Taos, New Mexico—to obtain supplies for Fort Bridger, which had been cut off during the conflict.

Sometime after 1858, Baker settled on the Green River and operated a store on the Mormon Trail. He then moved to Denver, Colorado, following the Pikes Peak (Colorado) gold rush of 1859.

Starting in 1865, Baker served for several years as a guide and interpreter for the federal government's agency to the Ute Indians. Baker spent his later years in retirement in southern Wyoming near the Colorado border.

As a trader, guide, and interpreter, Jim Baker helped in the opening of the American West to non-Indian settlement.

Baker, Sir Samuel White (1821–1893)

British explorer, writer in East Africa, government official, husband of Florence Baker

Samuel Baker was born in London, the son of a wealthy family with extensive business interests in Great Britain and its overseas empire. He attended private schools in England and Germany, where he was trained as an engineer, with a specialization in railroad construction.

In 1842, following his marriage to the daughter of an English clergyman, Baker traveled to Mauritius, the British island colony in the Indian Ocean, east of Madagascar, where his father owned several sugar plantations. He later moved with his wife to CEYLON (present-day Sri Lanka), off the south coast of India, where he established an agricultural colony as well as a resort at Nuwara Eliya.

Tropical fever in Ceylon caused Baker to return to England in 1855. Soon afterward, on a hunting trip in the Pyrenees, his wife died. He then undertook travels into the Balkan countries of Europe, where he directed the construction of a railroad that connected the Danube River with the Black Sea. During his travels, he met Florence von Sass, a Hungarian woman, who later became his wife (FLORENCE BAKER).

Following travels in Asia Minor (present-day Turkey), Baker and von Sass went to Cairo, Egypt, in 1861, from



Sir Samuel Baker (Library of Congress)

where they headed southward into the Sudan, in search of the source of the NILE RIVER. They remained in Khartoum for over a year, studying Arabic and undertaking explorations of the tributaries of the Nile that flowed into the river from Ethiopia. By studying the silt of the Atbara River of northern Ethiopia, they determined that the rich soil of the Nile Delta originated from Ethiopia.

In 1862, Baker and von Sass set out from Khartoum and ascended the Nile southward across the Nubian Desert. By February 1863, they had arrived in Gondokoro and there met up with British African explorers JAMES AUGUSTUS GRANT and JOHN HANNING SPEKE, who informed them they had determined that the source of the Nile was Lake Victoria. Grant and Speke also reported to Baker the existence of an as yet uncharted lake that they believed was also a principal source of the Nile, known by the natives as Luta N'Zige. Baker and von Sass then continued southward to Juba on the White Nile.

Baker and von Sass set out from Juba in March 1863, traveling through the remote East African regions of La-

took a and Obbo and making contact with the Dinka people. They were forced to head southward by way of a roundabout route because of problems with porters and hostile local peoples. Heavy rains, and opposition to their expedition by the ruler of the African kingdom of Bunyoro, hampered their progress.

Finally, on March 14, 1864, after two and a half years of exploring along the Nile into unknown regions of East Africa south of the Sudan, Baker and von Sass reached the shores of the Luta N'Zige, in what is now northwestern Uganda. Baker renamed it Lake Albert (Albert Nyanza), in honor of Prince Albert, husband and consort to Queen Victoria, after whom the principal source of the White Nile—Lake Victoria (Victoria Nyanza)—had been named. Over the next two weeks, Baker and von Sass explored Lake Albert in a native CANOE and located the 120-foot-high Murchison Falls, which he named after Sir Roderick Murchison, then president of the ROYAL GEOGRAPHICAL SOCIETY.

Baker and von Sass returned to England in 1865, where they were married. Baker was awarded a gold medal by the Royal Geographical Society. In 1866, he was knighted by Queen Victoria for his achievements in African exploration.

In 1869, the Bakers returned to Egypt for the opening ceremonies of the Suez Canal. Samuel Baker agreed to lead a military expedition into the upper Nile region of the southern Sudan (then still part of Egypt), on behalf of the Ottoman viceroy of Egypt, Ismail Pasha.

With a command of 1,500 men, Baker and his wife again ascended the Nile, reaching as far south as Fatiko. Commissioned to establish Egyptian rule over the region and wipe out the SLAVE TRADE, he established a military outpost. Over the next four years, he ran into conflicts with both Arab slavers and local African rulers. Nevertheless, he did succeed in organizing the government of a new Egyptian province in south-central Sudan, called Equatoria, of which he was appointed governor general.

With the expiration of his term of office in 1873, Baker and his wife returned to England. They settled on his estate in Devonshire but continued to make periodic hunting trips to far-off places, including Japan and the ROCKY MOUNTAINS of the western United States.

Sir Samuel Baker's explorations in East Africa did much to clarify the geography of the region for Europeans. His administration in the southern Sudan helped somewhat to stem the slave trade. In his later years in England, he was considered a foremost authority on Africa. He wrote about his experiences in Ceylon in his book *The Rifle and the Hound in Ceylon* (1854) and recounted his African exploits in *The Albert N'yanza, Great Basin of the Nile, and Explorations of the Nile Sources* (1866) and *The Nile Tributaries of Abyssinia* (1868).

Bakhov, Ivan (unknown–1762) *Russian mariner in the Siberian Arctic*

Ivan Bakhov was a Russian mariner operating out of the Bering Sea port of Anadyr on the Pacific coast of northeastern SIBERIA. In 1748, while on a voyage from Anadyr southward along the coast to the Kamchatka Peninsula, his ship was wrecked on the shores of Bering Island. He survived the winter there, and, the following spring, he improvised a vessel from the wreckage of his ship and sailed it west to Kamchatka.

In 1755, the Russian government authorized Bakhov to explore the Arctic coast of Siberia eastward from the mouth of the Lena River. Bakhov did not begin his expedition until summer 1760. Accompanied by an associate named Nikita Shalaurov, he set out in a small boat from the Lena's outlet into the Laptev Sea; they sailed eastward along the coast to the mouth of the Yana River and wintered there.

Bakhov resumed his eastward exploration in spring 1761. He sailed into the East Siberian Sea, reaching as far as the mouth of the Kolyma River. While encamped the following winter, he succumbed to SCURVY. Shalaurov survived to report the results of the expedition.

In his 1760–62 explorations of the north coast of Siberia, Ivan Bakhov succeeded in navigating through a major Asian portion of the NORTHEAST PASSAGE not previously visited by Europeans.

Balboa, Vasco Núñez de See NÚÑEZ DE BALBOA, VASCO.

Baldaya, Afonso Gonçalves (Alfonso Baldaya)

(fl. 1430s) *Portuguese mariner on the west coast of Africa*

In 1435, Portuguese mariner Afonso Baldaya took part in GIL EANNES's second voyage southward along the West African coast, below Cape Bojador. They were sponsored by HENRY THE NAVIGATOR, prince of Portugal, for whom Baldaya acted as cup bearer.

The next year, Baldaya commanded an expedition of his own that sailed to a point below the TROPIC OF CANCER, to the north of Cape Blanco on the Atlantic coast of the present-day West African nation of Mauritania. He returned to Portugal with a cargo of seal skins, the first time goods from West Africa had been taken directly to Europe without the intervention of Arab middlemen.

Baldaya's 1436 voyage marked the first time a ship from Christian Europe had sailed to a point south of the tropic of Cancer, below the extent of Muslim-controlled territory on the west coast of Africa. With Eannes, he was one of the early pioneers of Prince Henry's program of maritime exploration that eventually led the Portuguese to develop a sea-way passage around Africa to India and the Far East.

Balmat, Jacques (1762–1834) *French mountain climber in the Alps*

Jacques Balmat was from Chamonix in Savoy, formerly a duchy and now part of France. Like other men from his village, he became a crystal hunter who climbed into the Alps near his home in search of quartz crystals used in the making of jewelry. In the process, Balmat became an accomplished *montagnard*, the French word for mountaineer.

Back in 1760, Horace Bénédict de Saussure, a Swiss aristocrat and naturalist from Conches, near Geneva, offered a reward to the person who found a route to the top of MONT BLANC, the highest peak in the Alps at 15,771 feet above sea level. Attempts for 25 years, even a number of well-organized expeditions starting in 1775, had failed, but knowledge of possible routes and of mountaineering techniques had been gained. By the time Balmat was in his 20s, he had gained a great deal of experience on the glacier-covered rock of the high Alps. Michel Paccard, a doctor from Chamonix, also had spent time in the Alps seeking the route to Mont Blanc's summit with the help of local guides. While locating a route in advance of their final assault, Balmat became the first known man to spend nights on the upper glaciers. He approached Paccard and told him of his route, and, in a subsequent expedition, the two men reached the summit on August 8, 1786.

Balmat climbed to the summit six more times in his career, one of them in 1787 with a scientific expedition under Saussure, during which he used a barometer to measure Mont Blanc's altitude (his result of 15,626 feet coming close to later readings conducted with more accurate equipment). In one climb late in life, he was accompanied by a local woman, Marie Paradis, in the first female ascent. Balmat's final ascent was in 1817, at the age of 57, although he continued his alpine activities until disappearing in 1834 while searching for gold in the Sixt Valley of the Alps.

Jacques Balmat's efforts, along with those of Paccard and Saussure and other early climbers in the Alps, helped shape what was to become modern MOUNTAIN CLIMBING. Balmat's role in the conquest of Mont Blanc was that of the local guide, beginning a tradition carried on by such other guides as MATTHIAS ZURBRIGGEN and TENZING NORGAY.

Banks, Sir Joseph (1743–1820) *British naturalist in Labrador, Newfoundland, and the South Pacific, sponsor of scientific expeditions*

Born in London, Joseph Banks was the son of an affluent Devonshire doctor. He attended Eton and Harrow, then went on to Oxford University.

Banks's main interest was in NATURAL SCIENCE, especially zoology and botany. On his father's death in 1761, he inherited a fortune, enabling him to devote his life to scien-

tific study. About this time, he initiated the program of plant experimentation and research at London's Kew Gardens.

In 1763, Banks undertook a scientific expedition to Labrador and Newfoundland, seeking specimens of new species of plants and animals.

From 1768 to 1771, Banks circled the world as the chief scientist on JAMES COOK's first voyage to the South Pacific Ocean. Sailing on the *Endeavour*, Banks furnished his own extensive array of scientific equipment and provided his own staff of assistants and servants. His chief assistant was DANIEL CARL SOLANDER.

Banks and his staff collected hundreds of specimens of previously unknown species of plants and animals throughout the voyage. En route to Tahiti, Banks made a landing at Tierra del Fuego and undertook the first scientific studies of the wildlife at the tip of South America. In Tahiti, Banks broadened his research to include the ethnology and language of the native people.

In Australian waters, Banks collected specimens of the life forms found along the Great Barrier Reef. Accompanied by Cook, he made a landing on the eastern Australian coast at a spot subsequently named Botany Bay (modern-day Sydney), after the hundreds of new species of plants that Banks discovered there. Banks collected specimens of Australian marsupials, including the kangaroo, and took the first stuffed specimen of this animal back to Europe.

In 1772, soon after his return to England, Banks led a scientific expedition, including JOHN GORE, to the Hebrides and ICELAND. Six years later, he was elected president of En-



Sir Joseph Banks (Library of Congress)

gland's leading scientific organization, the ROYAL SOCIETY. In 1788, Banks helped establish, the Association for Promoting the Discovery of the Interior Parts of Africa, also known as the AFRICAN ASSOCIATION, which under his direction in 1795 sponsored MUNGO PARK's explorations of West Africa.

Sir Joseph Banks, who was knighted and awarded a baronetcy in 1781, became the chief adviser to the British government on scientific matters. Under his influence, government-sponsored exploring expeditions regularly included a scientific staff. The animal and plant specimens that Banks collected on Cook's first voyage formed the basis of the natural history collection of the British Museum.

Baptista, Pedro João (Pedra Baptista)

(fl. early 1800s) *Portuguese colonial official in south-central Africa*

In 1802, Pedro Baptista, of Afro-Portuguese descent, was in the employ of the Portuguese colonial government as a *pombeiros*, a slave agent. He left Cassange on the Atlantic coast of Angola and, accompanied by Amaro José, trekked eastward across south-central Africa. Baptista and José first headed northeastward, then, on reaching the Kasai River, followed it to its headwaters to the south.

Traveling overland, Baptista and José reached the Lualaba River at the settlement of Kolwezi in present-day southern Democratic Republic of Congo. They proceeded eastward to Lake Mweru, then crossed present-day northeastern Zambia to Lake Malawi. From the lake, they traveled into the Tete region of Mozambique and, in 1804, descended the ZAMBEZI RIVER to its outlet on the Indian Ocean at the Mozambique Channel.

Soon after reaching the east coast of Africa, Baptista and José set out on a return journey to Angola, arriving there in 1811. The entire trip, first east to west, then west to east, covered about 4,000 miles.

Pedro Baptista's journey in 1802–04 was the first known European crossing of the African continent, predating the explorations of DAVID LIVINGSTONE by nearly 50 years. His trip established the earliest overland trade links between Angola and Mozambique, at that time Portugal's main colonies in Africa. He also opened up the Kasai River to European commerce. In his 1811 report to Portuguese colonial authorities, he described the interior of south-central Africa as agriculturally well developed, with law and order effectively maintained by a few powerful native rulers.

Baranov, Aleksandr Andreyevich (Alexander Andreyevich Baranov, Alexandr Andreivich Baranof) (1747–1819)

Russian fur trader, administrator of Russian Alaska

Aleksandr Baranov was a native of Kargopol, Russia, a small village near the Arctic Ocean port of Archangel. At the age

of 15, he traveled Moscow, where he was employed as a clerk to a German trading firm. In the early 1770s, he moved east to the Siberian city of Irkutsk. From there, he headed to the Anadyr region in the extreme northeastern Siberian Arctic, directly across the BERING STRAIT from Alaska's Seward Peninsula. He attempted to establish a fur-trading enterprise, but his business was destroyed by the Siberian native Chukchi.

Back in Irkutsk, Baranov became acquainted with GRIGORY IVANOVICH SHELIKOV, who was at that time developing the FUR TRADE in Russia's newly acquired North American territory, Alaska. In 1790, Baranov was hired to manage the Shelikov-Golikov Company, then operating on Kodiak Island in the Gulf of Alaska. That year, he sailed for Kodiak from the Siberian port of Okhotsk aboard the *Three Saints*. The ship was wrecked on Unalaska Island in the Aleutian Archipelago, however. In spring 1791, using boats built from skins, Baranov and his men completed the journey to the settlement at Three Saints on Kodiak. Soon afterward, under Baranov's direction, DIMITRY IVANOVICH BOCHAROV, a subordinate, undertook an exploration of the north shores of the Alaska Peninsula. Bocharov's expedition also discovered that the Egegik River provided a shortcut for small boats across the Alaska Peninsula into the Shelikov Strait.

The Shelikov-Golikov enterprise in Alaska flourished. Baranov extended the company's trade operations west and south along the Alaskan coast. In 1791–93, Baranov led explorations around Kodiak Island and the Kenai Peninsula, and into Cook Inlet in the area of present-day Anchorage, Alaska. He also explored islands in Prince William Sound, and, in 1792, he established a shipyard at present-day Seward, Alaska. Three years later, Baranov explored Yakutat Bay and claimed it for Russia. He also expanded the company's operation on what came to be known as Baranof Island, establishing the settlement of Mikhailovsk.

In 1799, the settlement was enlarged to include the city of New Archangel, which developed into a cosmopolitan center with a reputation as the "St. Petersburg of the Pacific." Also that year, Czar Paul I granted Shelikov and Baranov a royal monopoly for trade and exploration of all territory in Russian North America, north of 55° north latitude. In addition, Baranov was granted official status that made him the virtual governor of Russian possessions in North America.

Under Baranov's leadership, the Russians accelerated their exploitation of the fur resources of the Aleutian Islands and Gulf of Alaska region, trapping to near extinction such species as the Alaska blue fox, the Arctic fox, the Alaska seal, and especially the sea otter. Baranov employed native workers in the RUSSIAN-AMERICAN COMPANY enterprise, organizing whole Aleut villages as factories involved in all aspects of production. He was frequently criticized for his harsh treatment of the native peoples, although he was married to an Alaskan Indian woman.



Aleksandr Baranov (Library of Congress)

The Tlingit Indians of the panhandle of southeastern Alaska refused to work for Baranov and the Russians; during the 1790s, they came to resent the Russian encroachment on their hunting lands. In 1802, they rose up against the New Archangel settlement, destroying the city. Two years later, with the help of Royal Russian naval forces under explorer and naval officer YURY LISIANSKY, Baranov successfully recaptured New Archangel and rebuilt the city.

In 1804–05, Baranov directed an expedition southward along the North American coast from the Gulf of Alaska to the coast of northern California. He also sponsored an expedition aboard the *Juno* to the mouth of the COLUMBIA RIVER in 1805. Yet the ship was unable to reach the Oregon coast because of storms, instead landing at San Francisco Bay. Had the *Juno* put in to the Columbia, it might have encountered the expedition of MERIWETHER LEWIS and WILLIAM CLARK, then wintering nearby.

The Russian government hoped to maintain exclusive trading rights over its North American interests, but Baranov repeatedly entered into business ventures with foreign commercial interests. He negotiated an arrangement with JOHN JACOB ASTOR's Pacific Fur Company, a subsidiary of the AMERICAN FUR COMPANY, to supply Russian trade centers in Alaska in 1813, but Astor's ship failed to reach Alaska.

From his headquarters at New Archangel, Baranov also attempted to extend Russian influence to California and the South Pacific. In 1812, under Baranov's direction, I. A. Kuskov, an associate of the Russian-American Company, led an expedition south from Alaska to the California coast, and inland to a site on Bodega Bay, 50 miles north of present-day San Francisco, where he established Selenie Ross (later known as Fort Ross) among the Pomo Indians.

In 1815–17, Baranov sought to create a Russian sphere of influence in the HAWAIIAN ISLANDS, under his subordinate Dr. G. A. Schaffer, a venture that was soon abandoned. The Fort Ross settlement also proved unprofitable over subsequent years and, in 1841, was sold to Swiss pioneer John Sutter.

Because of his continued involvement with foreign traders, and amid Russian Orthodox Church criticism of his abusive treatment of the Alaska Natives, Baranov ran afoul of Russian authorities in Moscow. He was recalled as director of the Russian-American Company in 1818. On his voyage home to Russia in 1819, he died at sea in the Indian Ocean, off the coast of the Indonesian island of Batavia.

At the height of his career, Aleksandr Baranov was the chief administrator of a vast trading empire that stretched from Bristol Bay, north of the Aleutian Archipelago, as far south as the Sacramento Valley of California. His life closely paralleled the careers of Canadian and American fur traders, such as DONALD MACKENZIE, JOHN MCLOUGHLIN, PETER SKENE OGDEN, and WILLIAM HENRY ASHLEY, who helped open up lands beyond the ROCKY MOUNTAINS to non-Indian development during the same period.

Barents, Willem (Willem Barentzoon, Willem Barentz) (unknown–1597) *Dutch mariner in the European Arctic*

Few details exist of Willem Barents's origins and early life. By 1594, he had established a reputation in the Netherlands as a highly capable mariner and navigator. In June of that year, he commanded the *Gesandte*, one of three ships sent out by the Dutch government in search of the NORTH-EAST PASSAGE. Another ship in this fleet was captained by the expedition's principal supporter, JAN HUYGHEN VAN LINSCHOTEN.

From Holland, Barents sailed northward along the coast of Europe, rounded Norway's North Cape, then headed eastward as far as the islands of Novaya Zemlya, off the north coast of eastern European Russia. He navigated northward along the west coast of Novaya Zemlya, reaching its northernmost extremity, which he named Ice Cape. Farther progress eastward beyond this point was blocked by ice.

Barents then turned southward, charting the strait that divides Novaya Zemlya into two large islands. Meanwhile, Linschoten had his ship follow the Russian mainland eastward beyond Novaya Zemlya, sailing in ice-free waters as far as the mouth of the Kara River and the Kara Sea. Barents rejoined Linschoten and the rest of the fleet in an island group west of Novaya Zemlya that he called the Orange Islands in honor of the Dutch ruling family.

Barents returned to Amsterdam after the three-month voyage. His navigational reports were encouraging, and the Dutch government organized another expedition that they

hoped would locate an ice-free passage eastward to China and the Far East. In spring 1595, Barents embarked from Holland as the chief pilot of a Dutch fleet of seven ships, commanded by Linschoten. On this expedition, he guided the ships as far as Vaigach Island, lying between the southernmost of the Novaya Zemlya islands and the Russian mainland, before being forced back by ice. Barents returned to Amsterdam with little new geographic or navigational information.

In 1596, Barents undertook his third voyage in search of the Northeast Passage. Backed by a group of Amsterdam merchants, he commanded one of two ships in an expedition that sailed from Holland in June of that year. The other vessel was under the command of Dutch sea captain Jan Cornelizoon Rijp.

In contrast to the first two voyages, which had hugged the northern European coastline, Barents sailed due north this time, from the northern end of Norway toward the NORTH POLE. He followed this northward course to test a theory then held by many European geographers that the waters north of the initial Arctic PACK ICE were freely navigable. North of Norway, Barents and Rijp came upon an island which they called Bear Island, after a violent encounter there with a polar bear. They continued northward and came upon Spitsbergen (present-day Svalbard). Although he made the first European sighting of that region since the days of the VIKINGS, Barents later mistakenly charted these islands as the east coast of GREENLAND.

Finding his way north of Spitsbergen blocked by icebergs, Barents turned eastward, seeking the Northeast Passage by the more conventional route. Following a disagreement, Rijp and his ship turned back to Holland. Barents reached the northern end of Novaya Zemlya, but after rounding Ice Cape again, he found his progress completely blocked and his ship trapped by ice. He made a landing at a bay he called Ice Haven, where his crew of 16 men managed to improvise a shelter from driftwood and parts of the ship. They subsisted on foxes and walrus that they hunted, and were repeatedly troubled by polar bear attacks.

Under Barents's leadership, only one member of the crew died that winter. By June 1597, the ship was still trapped in ice. Barents and his men then set out in two of the ship's small boats. Not far off the coast of Novaya Zemlya, Barents died of SCURVY and was buried at sea. The rest of the crew managed to reach the Russian mainland. With the help of Russian fishermen, they traveled westward more than 1,500 miles to the Kola Peninsula, where they met up with Rijp. From there, they safely reached Holland in November 1597.

In 1871, a Norwegian seal-hunting expedition discovered the house built by Barents and his men at Ice Haven. They also came upon tools and other artifacts of the expedition, including Barents's journal. These items were subse-

quently acquired by the Dutch government and displayed at a museum in The Hague.

Willem Barents undertook the earliest recorded explorations of the European Arctic regions since the time of the Vikings. His voyages resulted in much new navigational information concerning the Arctic coast of Europe, and his exploits were subsequently followed up by such well-known mariners as HENRY HUDSON and WILLIAM BAFFIN. His exploration of Spitsbergen permanently fixed that region on European charts. While exploring Spitsbergen in 1596, he attained a point farther north than any European on record to that time. Over the ensuing months, he and his men wintered closer to the North Pole than anyone ever had before. The Barents Sea, which stretches eastward from northern Norway and Spitsbergen to the west shores of Novaya Zemlya, was named in his honor.

Baret, Jeanne (Jean Baré) (ca. 1740–ca. 1803)

French traveler in the South Pacific

Jeanne Baret was born in the Burgundy region of France. In 1764, French naturalist JOSEPH-PHILIBERT COMMERSON hired her as a governess to look after his young son. In February 1767, she sailed with Commerson as his scientific assistant from Rochefort, France, aboard the ship *Étoile* as part of LOUIS-ANTOINE DE BOUGAINVILLE's expedition to the South Pacific Ocean.

Baret had boarded the *Étoile* in a man's clothes. None of Bougainville's expedition suspected her deception until they reached Tahiti. There, her true sex was revealed, reportedly detected by the Tahitians, or, according to one account, because of her apparent lack of interest in the uninhibited Tahitian women.

Commerson and Baret left the Bougainville expedition on the island of Mauritius. After Commerson's death in 1773, she married a wealthy colonist there. She is thought to have returned eventually to St. Malo, France.

If she returned to France by a westward route, Jeanne Baret is the first woman known to have completed a CIRCUMNAVIGATION OF THE WORLD.

Barrow, Sir John (1764–1848) *British naval official, founder of the Royal Geographical Society*

John Barrow was born to a family of moderate means in Liverpool, England. He was educated in local schools, studying mathematics, geography, and astronomy.

After working for a brief period at a Liverpool iron foundry, Barrow joined a whaling voyage to GREENLAND. Sailing with a Captain Potts from Liverpool, he made his first voyage into Arctic waters, in the course of which he perfected his skills in mathematics and geography.

Following his return from Greenland, Barrow accepted an appointment as a mathematician at the British Royal

Observatory at Greenwich. He subsequently traveled to China as a staff member of the British diplomatic mission. From there, he went to Cape Town, South Africa, as an aide to the British governor. He returned to England in 1802, when Cape Town reverted to Dutch administration.

In 1804, Barrow became second secretary of the Admiralty, a post he held for 40 years. In 1818, amid reports that previously ice-blocked portions of the Arctic Ocean had become accessible to ships, he initiated a series of exploratory expeditions to survey the Arctic coasts of Greenland and Canada, and to seek a NORTHWEST PASSAGE. Among those who led these explorations were SIR JOHN ROSS, DAVID BUCHAN, SIR WILLIAM EDWARD PARRY, SIR JOHN FRANKLIN, SIR GEORGE BACK, and FREDERICK WILLIAM BEECHEY.

Barrow's geographic interests extended to the then uncharted regions of West Africa, and in the 1820s his influence led to the British government-sponsored expeditions of WALTER OUDNEY and HUGH CLAPPERTON that attempted to explore the NIGER RIVER. At that time, Barrow was among those who mistakenly believed the Niger was a tributary of the NILE RIVER.

In 1830, Barrow helped found the ROYAL GEOGRAPHICAL SOCIETY. As one of its early presidents, he sponsored SIR ROBERT HERMANN SCHOMBURGK's explorations of what is now Guyana in South America in the 1830s and early 1840s.

Awarded a baronetcy and knighted in 1835, Barrow retired from the Admiralty 10 years later.

Under John Barrow's leadership, British naval expeditions into the Arctic in the first half of the 19th century brought back definitive geographic information concerning one of the last uncharted regions of the world. Point Barrow in Alaska and Point Barrow and Cape Barrow in Canada, were named in his honor. Well into the 20th century, Barrow's Royal Geographical Society continued to encourage and support explorations of Africa, Asia and the polar regions.

Bar Sauma, Rabban (ca. 1220–1294) *Turkish monk from China in the Middle East and Europe*

A descendant of Onggud Turks who had allied themselves with the Mongols, Rabban Bar Sauma was born in northern China. He was raised a Nestorian Christian. (The Nestorian Church, also referred to as the Assyrian or East Syrian Church, was one of the most active Christian denominations in Asia.) Pursuing religious studies, he became a Nestorian monk at about age 25.

Sometime before 1278, Bar Sauma, along with his student Markos, who went on to become a Nestorian leader, set out on a pilgrimage to Jerusalem, traveling the southern SILK ROAD below the Takla Makan Desert and arrived in Mongol-held territories in Persia (present-day Iran) two years later. Although Bar Sauma never reached Jerusalem because

of reported dangers along the route there, he visited other Nestorian holy sites as well as cities in present-day Armenia and Georgia. He also was appointed as part of a delegation representing the interests of the Mongols that visited Constantinople (present-day Istanbul), Naples, Rome, Genoa, Paris, and Bordeaux. He died in Baghdad in 1294.

Bar Sauma departed China soon after MAFFEO POLO, NICCOLÒ POLO, and MARCO POLO arrived there; his journey crossed some of the same lands in the opposite direction. Their journeys and others in subsequent years led to a sharing of ideas and trade goods between Asia and Europe.

Barth, Heinrich (Henry Barth) (1821–1865)

German scholar, explorer in Africa

Born in Hamburg, Germany, to a wealthy family with extensive commercial interests, Heinrich Barth began his studies at the University of Berlin in 1838, concentrating in history, archaeology, philology, and Arabic. From 1845 to 1847, he made extensive field trips throughout the Middle East and North Africa, and, in 1848, he accepted a professorship at the University of Berlin's department of archaeology.

In 1849, Barth joined a British government-sponsored expedition to West Africa, aimed at suppressing the SLAVE TRADE and promoting legitimate trade contacts. In March 1850, with British antislavery activist JAMES RICHARDSON and German geologist ADOLF OVERWEG, he headed southward across the SAHARA DESERT from Tripoli, Libya. Near Agades, in what is now central Niger, they separated. Barth and Overweg traveled southward into present-day northeastern Nigeria, while Richardson continued south and east toward Lake Chad.

Along the way, disguised as a Muslim scholar, Barth visited the restricted city of Kano. Upon reaching Kukawa, east of Lake Chad, he learned that Richardson had died of fever en route, and he assumed leadership of the expedition.

From late 1851 to mid-1852, Barth Overweg undertook four explorations of Lake Chad. In September 1852, Overweg succumbed to malaria. As the only surviving member of the expedition, Barth continued his explorations of West Africa with a trek to Yola and the upper reaches of the Benue River. In 1853, he headed northwest to TIMBUKTU in the kingdom of Mali, where he remained for more than nine months. By 1854, he was back in Kukawa, from where he began a trip northward across the Sahara, along a route that took him east of the Ahaggar Mountains to the Mediterranean coast at Tripoli.

Barth returned to Europe in 1855 after five years of traveling in West Africa. In 1856, he was awarded a gold medal by the ROYAL GEOGRAPHICAL SOCIETY. Over the next two years, he published a five-volume account of his African experiences, *Travels and Explorations in North and Central Africa*.

In the late 1850s and early 1860s, Barth undertook scientific expeditions throughout Greece and Turkey. In 1863, he was awarded a professorship in geography at the University of Berlin.

Heinrich Barth's five-year exploration of West Africa below the Sahara was one of the first scientific expeditions into the region. His account revealed much about the region's culture and economy. From his explorations of the upper Benue River, he concluded that it had no connection with Lake Chad, as was then believed by European geographers. He was one of the first Europeans to make an extended stay in Timbuktu and live to tell about it.

Bartram, John (1699–1777) *American naturalist in eastern North America, father of William Bartram*

John Bartram was born and raised near Darby, Pennsylvania, where he spent his early years on the farm of an uncle. In 1728, he settled near Philadelphia, establishing a farm of his own on the Schuylkill River.

While in his early 20s, Bartram developed a keen interest in the natural sciences and corresponded with English naturalist Peter Collinson. Soon after settling on the Schuylkill, he established the first botanical garden in North America at Kingsessing, now part of Philadelphia.

Bartram undertook a series of expeditions in search of new plant specimens that took him across a wide area of the North American colonies. In 1743, he traveled northward into what is now New York State to the south shore of Lake Ontario, exploring along the Mohawk Trail. He subsequently went specimen-collecting in the Blue Ridge of the western Carolinas, and, in 1755, with his son WILLIAM BARTRAM, he explored New York's Catskill Mountains and western Pennsylvania.

In 1765, Bartram was appointed the official American botanist for the English king George III. That year, accompanied by his son, he sailed south to eastern Florida and explored northward into Georgia. Among the new species of plants he identified on his expedition was the royal palm.

John Bartram's scientific work and writings became well known in England and throughout Europe, earning him a reputation as one of the foremost botanists of his day. His books also revealed much about life on the North American frontier, including observations on the society and culture of both Indians and non-Indian settlers. In a communication to Benjamin Franklin, he proposed a government-sponsored scientific survey beyond the western limits of non-Indian settlement.

Bartram, William (1739–1823) *American naturalist, writer in the American Southeast, son of John Bartram*

William Bartram was the son of JOHN BARTRAM, who pioneered the study of botany in America. William was born

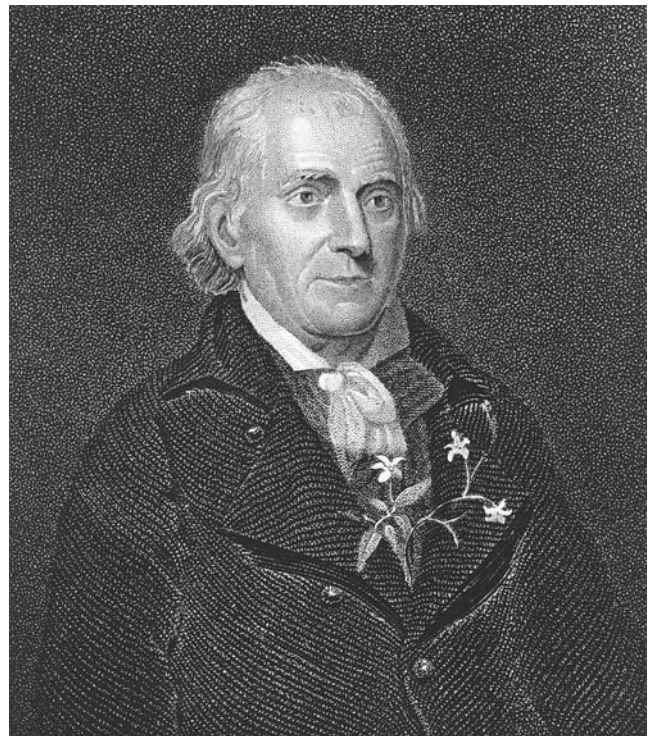
in Kingsessing, Pennsylvania, on the Schuylkill River, in what is now part of the Philadelphia metropolitan area, where, years earlier, his father had established the first botanical garden in North America.

William Bartram, like his father, developed an early interest in botany, especially in drawing the plants and flowers unique to North America. He studied drawing, printing and engraving with Benjamin Franklin in Philadelphia during the early 1750s. In 1757, Bartram began working for a Philadelphia merchant, and, by 1761, he had gone into business as an independent trader on the Cape Fear River in North Carolina.

Four years later, Bartram accompanied his father on an expedition along the St. Johns River of central and northeastern Florida. Although the purpose of this 1765–66 trip was primarily to collect, draw, and study the region's flora and fauna, Bartram also made contact with the Seminole Indians of Florida.

After his return to the Philadelphia area, Bartram's botanical sketches came to the attention of Quaker naturalist Dr. John Fothergill, who subsequently financed a four-year exploration of the Southeast. From 1773 to 1777, Bartram and a small party traveled throughout the Carolinas, Georgia, and Florida, collecting samples and seeds of indigenous plants and making sketches of wildlife.

An account of Bartram's adventures during these years was presented in his 1791 book, *Travels through North and South Carolina, Georgia, East and West Florida, the Cherokee*



William Bartram (Library of Congress)

Country, the Extensive Territories of the Muscogulges, or Creek Confederacy, and the Country of the Choctaws. Well received, the work was soon translated into several European languages. Its vivid descriptions of the southeastern frontier landscape soon became a source of imagery for such British Romantic poets as William Wordsworth and Samuel Taylor Coleridge.

Bartram's father died in 1777, after which William helped his older brother John maintain the botanical garden in Kingsessing.

In addition to travel accounts, William Bartram also wrote some of the earliest ethnological studies of the Southeast tribes, including his 1789 work, *Observations on the Creek and Cherokee Indians*, first published in 1853, 30 years after his death.

Basargin, Grigory Gavrilovich (unknown–1853)

Russian naval officer in the Caspian Sea

In 1819, Vice Admiral Grigory Basargin of the Russian navy began his explorations of the Caspian Sea along the west coast of Azerbaijan, acquired by Russia from Persia (present-day Iran) six years earlier.

Under Basargin's command were two ships, the *Kazan*, a warship, and the *Kura*, a transport vessel. During the next two years, he surveyed the Caspian's southwest coast, from Lenkoran to the mouth of the Kura River, compiling geographic data subsequently used to produce the first accurate charts of the region.

Starting in 1823, Basargin charted the northwest coast of the Caspian Sea, around the outlet of the Volga River, a project that took three years.

Grigory Basargin's naval explorations provided the earliest accurate details of the west shores of the Caspian Sea, the world's largest landlocked body of water.

Bashmakov, Pyotr (fl. 1750s) *Russian mariner, trader in the Aleutian Islands*

Pyotr Bashmakov was a Russian seafarer and fur hunter on the Pacific coast of SIBERIA during the mid-1700s. In 1753, he undertook a fur-hunting voyage from the Kamchatka Peninsula eastward into the North Pacific Ocean and Bering Sea. East of Bering Island, Bashmakov's ship, the *Yeremiya*, was wrecked on one of the westernmost of the Aleutian Islands, stranding Bashmakov and his crew there for nearly two years. They eventually managed to construct a small boat from the wreckage and sail back across the Bering Sea to Kamchatka.

In late 1756, Bashmakov sailed again from Kamchatka for the Aleutians. On the ship, *Pyotr i Pavel* (Peter and Paul), he stopped first at Bering Island, and, in spring 1757, he headed as far east as the Aleutian island of Tanaga. His party

returned to Kamchatka the next year with a valuable cargo of furs.

Pyotr Bashmakov's fur-hunting expeditions eastward from the Kamchatka Peninsula were among the first commercial ventures to follow up the explorations of the Aleutians undertaken by VITUS JONASSEN BERING in 1740–41.

Basov, Emelyan (Yemelyan Basov)

(ca. 1705–ca. 1765) *Russian Cossack mariner, trader in eastern Siberia and the Bering Sea*

Emelyan Basov was a Russian Cossack who, in 1726, embarked from the eastern Siberian city of Yakutsk and explored northward along the Lena River, in search of a water route to the Pacific ports on the Kamchatka Peninsula.

By 1733, Basov was in command of the port of Okhotsk, and from there he undertook a series of Russian government-authorized explorations of the Sea of Okhotsk.

In 1742–43, Basov organized a fur-trading enterprise and launched his first expedition across the Sea of Okhotsk to the east coast of the Kamchatka Peninsula and the Bering Sea. Using a small wooden boat built without nails, called a *shitik*, he reached Bering Island in 1743. Over the next several years, he extended his fur-hunting expeditions to other parts of the Commander (Komandorski) Islands. He retired from the FUR TRADE after 1748, settling on Kamchatka.

Emelyan Basov helped extend the Russian fur trade from the upper reaches of north-central SIBERIA'S Lena River region to the Bering Sea islands off the coast of easternmost Siberia. His development of the Commander Islands as a fur-trading base eventually led to further regional exploration and settlement in the Aleutian Islands and on the Alaskan mainland.

Bass, George (1771–ca. 1805) *British naval surgeon, explorer in Australia and Tasmania*

George Bass was born in Asworthy, Lincolnshire, England. In 1795, after receiving training in medicine, he arrived in Port Jackson (present-day Sydney), Australia, as ship's surgeon on the HMS *Reliance*. Also on that voyage was British naval officer MATTHEW FLINDERS.

Later that year, Bass joined Flinders in an exploration of nearby Botany Bay and the Georges River, which flows into it. Traveling in a small boat called the *Tom Thumb*, Bass and Flinders ascended the Georges River as far as the eastern slopes of the BLUE MOUNTAINS.

In 1796, Bass and Flinders undertook a reconnaissance of the Australian southeast coast below Sydney. They explored what was thought to be the mouth of a river and discovered it was actually a natural harbor, which Bass named Port Hacking after the expedition's pilot.

Bass commanded an exploratory expedition of his own the following year. In December 1797, he sailed with a six-

man crew in an open whaleboat from Sydney as far south as Cape Howe, Australia's southeasternmost point. Bass and his party continued around Cape Howe westward along the uncharted south coast of the Australian continent and reached a bay southeast of present-day Melbourne, which Bass named Western Port.

While returning eastward along the coast, Bass rounded Wilson's Promontory and investigated nearby islands. He detected signs of a strong west-flowing ocean current, a discovery that led him to believe he was in an uncharted strait that separated Van Diemen's Land (present-day TASMANIA) and the mainland. Up to that time, Van Diemen's Land was thought to be a southern extension of the Australian continent.

In October 1798, Bass and Flinders undertook another exploration of the Australian south coast. Sailing from Sydney in a sloop called the *Norfolk*, they reached what later became known as Flinders Island, and, starting from there, circumnavigated Tasmania in a counterclockwise direction, firmly establishing that it was indeed an island. Flinders and Bass subsequently explored up the Derwent River, deep into Tasmania's interior.

Little is known of Bass's life after 1799. He is believed to have traveled to South America, where he died between 1803 and 1808.

George Bass, along with Flinders, undertook one of the earliest European penetrations of the Australian interior. His subsequent explorations provided geographers with new information on the south coast of the continent, much of which remained uncharted at the close of the 18th century. The expanse of water that separates Tasmania from the Australian mainland was named Bass Strait in his honor.

Bastidas, Rodrigo de (1460–1526)

Spanish conquistador, colonizer in Central and South America

Rodrigo de Bastidas was born in the town of Triana, near Seville, Spain. He prospered in commerce and served as an official in the Spanish judiciary.

In 1500, Spanish monarchs Ferdinand and Isabella authorized Bastidas to undertake a trading expedition to the region south and west of Trinidad. The venture was inspired by CHRISTOPHER COLUMBUS, who had visited this part of the northeast coast of South America in 1498, returning to Spain with pearls obtained in trade with the Indians.

Bastidas outfitted two ships with trade goods and sailed from Spain in 1501. Accompanying him as pilot was JUAN DE LA COSA, who had sailed to the Caribbean Sea with Columbus on his first two voyages in 1492–93. Also joining Bastidas on the expedition was the young VASCO NÚÑEZ DE BALBOA.

Following Columbus's course, Bastidas's expedition reached Trinidad and the South American mainland. He headed westward along the coast of what is now Venezuela, exploring the Gulf of Maracaibo. He was the first European to visit the Magdalena River, as well as the large natural harbor of Cartagena in present-day Colombia, naming them both.

Bastidas traded with the coastal Indians, obtaining pearls and brazilwood (valued in Europe as a source of red dye and for making musical instruments), in exchange for inexpensive European metal goods. Although the natives did not wear clothes and had no use for sewing implements, Bastidas managed to trade needles for large quantities of pearls after demonstrating how valuable needles could be in removing thorns and in cleaning teeth.

West of Cartagena, the coastline veered sharply southward, leading Bastidas and Cosa to believe they were entering a strait to the Pacific Ocean and Asia. Instead, they came upon the Gulf of Darien at the eastern end of the Isthmus of Panama and explored the Gulf of Urabá. They discovered that the hulls of the ships, infested with wood-eating worms, had begun to leak. They headed eastward for Spain after making temporary repairs on an island near Jamaica. But the ships were in no condition for a transatlantic voyage, and Bastidas was forced to beach the vessels on the island of Hispaniola (present-day Haiti and the Dominican Republic).

Once on Hispaniola, Bastidas and his men carried their cargo of pearls and remaining trade goods overland to the Spanish settlement of Santo Domingo. Along the way, they continued to barter with the local natives, but they were soon arrested for unlicensed trading by the newly appointed governor, Francisco de Bobadilla.

Bastidas remained imprisoned in Santo Domingo until June 1502. He was then sent back to stand trial in Spain aboard one of a fleet of 30 ships. Bobadilla sailed on another of the fleet's ships with a large contingent of native slaves. Soon after embarking, the fleet was struck by a severe hurricane. Only the ship carrying Bastidas and his cargo of pearls managed to reach Spain. Most of the ships, including the one carrying Bobadilla, were lost with all hands.

In Spain, Bastidas was acquitted of all charges against him, and he managed to retain a large portion of the wealth derived from the pearls he had brought back.

In 1524, Bastidas was granted permission from the Spanish Crown to establish a colony on the part of the South American coast he had explored 23 years earlier. In 1526, he founded the settlement of Santa Marta on the coast of what is now Colombia. Bastidas forbade his colonists to exploit or enslave the natives, in contrast to the usual practice in other Spanish colonies. This policy drew resentment among his followers, and they soon rebelled against him. In 1526, suffering from wounds inflicted by the rebels, he withdrew to Cuba, where he died.

Rodrigo de Bastidas was the earliest European to explore and visit the coast of CENTRAL AMERICA, preceding Columbus's 1502 expedition there by one year. He was among the few CONQUISTADORES to treat the natives relatively fairly, and he openly opposed their enslavement. With Cosa, Bastidas explored and charted the coasts of present-day Venezuela, Colombia, and Panama, from the Gulf of Venezuela to the Gulf of Darien. His settlement at Santa Marta became an important port for the Magdalena River. Balboa first learned of Panama while with Bastidas in 1501; 12 years later, he reached the Pacific Ocean.

Batakov, Anton (fl. 1780–1790s) *Russian mariner in northeastern Siberia, the Aleutian Islands, and Alaska*

In 1785, Anton Batakov, a Russian navigator, joined the Russian government's Northeastern Secret Geographical and Astronomical Expedition, a venture organized to locate a sea route from the Kolyma River in northeastern SIBERIA to the BERING STRAIT and the west shores of Alaska.

By 1786, Batakov had traveled eastward across Siberia to Okhotsk. The next year, sailing on a specially constructed vessel, the *Pallas*, he followed the Kolyma northward to its outlet in the East Siberian Sea, from where he explored the Arctic coast of northeastern Siberia.

In 1789, after two years in Okhotsk, Batakov joined the expedition's leader, former British naval officer JOSEPH BILLINGS, in a voyage across the Sea of Okhotsk to the port of Petropavlosk on the Pacific coast of the Kamchatka Peninsula. They sailed across the Bering Sea to Kayak Island in the Gulf of Alaska, arriving in summer 1790.

A year later, Batakov and Billings sailed westward from Kayak Island into the Aleutians, stopping at Unalaska Island, then headed northward into the Bering Strait. After visiting St. Matthew and St. Lawrence Islands, they undertook a reconnaissance of the Alaskan mainland to the east, as well as the coastline of the Chukchi Peninsula on the Asian mainland to the west. They crossed the Chukchi Peninsula, from St. Lawrence Bay eastward to the Kolyma River, traveling on the backs of reindeer.

With the completion of the Northeastern Secret Geographical and Astronomical Expedition in 1793, Batakov returned westward across Siberia, arriving in St. Petersburg in 1794.

Anton Batakov explored the region between northeastern Asia and northwestern North America. His examination of the East Siberian Sea's south shores provided navigational information on the easternmost segment of the NORTHEAST PASSAGE. In addition, he surveyed the Gulf of Alaska, the Aleutian Islands, and the islands in the Bering Strait. Along with Billings, he was one of the earliest Europeans to venture overland across the Chukchi Peninsula.

Bates, Henry Walter (1825–1892)

British naturalist in South America

Henry Bates was born in Leicester, England. He attended local private schools, preparing for a career in business. During his teens, he developed an interest in entomology, the study of insects, making frequent trips into the English countryside to collect butterflies and other specimens.

In 1844, while working as a clerk in a brewery in Burton-upon-Trent, he befriended ALFRED RUSSEL WALLACE, a local schoolteacher who, like Bates, was a naturalist. Inspired by the exploits of CHARLES ROBERT DARWIN and ALEXANDER VON HUMBOLDT, as well as by W. H. Edwards' book *A Voyage Up the River Amazon* (1847), they planned a scientific expedition to South America.

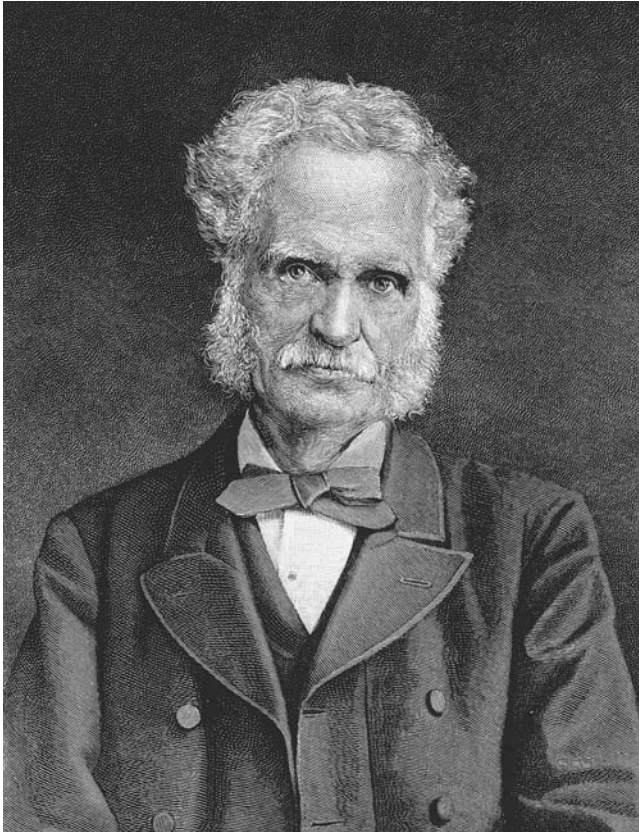
In April 1848, Bates and Wallace sailed to Belém, Brazil, aboard a cargo vessel called the *Mischief*. By late June of that year, they reached the mouth of the Pará River, the southeastern estuary of the AMAZON RIVER. They traveled up the Pará to its principal tributary, the Tocantins, which they explored southward for more than 1,000 miles. Bates and Wallace then returned to the north and, traveling separately, ascended the Amazon across north-central Brazil to Manaus. Meeting up again at Manaus, Bates continued up the Amazon on his own. At the same time, Wallace, who by this time had been joined by his brother Herbert, explored the Negro River flowing into the Amazon at Manaus from the north.

Bates explored westward along the Amazon for almost 400 miles, reaching what is now Tefé, Brazil. He remained there until 1851, when he lost all his money in a robbery and returned to Pará on the Atlantic coast. At Pará, Bates met up with Herbert Wallace, who had contracted yellow fever and would die later that year. Alfred Wallace returned to England in 1852.

Soon afterward, Bates resumed his explorations, traveling up the Amazon to Santarém, halfway between Manaus and the river's mouth at Pará. He remained in the region until 1855, collecting thousands of insect specimens and exploring a great distance southward along the Tapajós River. In 1855, he returned to the western reaches of the upper Amazon, where, over the next three years, he undertook several explorations even farther to the west. On one of his last expeditions, he attempted an overland trek to the ANDES MOUNTAINS but was forced back by illness.

Bates returned to England in 1859. His classic account of his decade of exploring the rivers of northern Brazil, *The Naturalist on the River Amazon*, was first published in 1863. He became assistant secretary of the ROYAL GEOGRAPHICAL SOCIETY.

During his 10 years on the Amazon and its tributaries, Henry Bates collected more than 14,000 insect specimens, including 8,000 newly discovered species. His scientific findings include the earliest observations on the way certain species of butterflies develop natural disguises that put off predators. The idea became known as the Batesian Theory



Henry Bates (Library of Congress)

of Mimicry and provided support for some of Darwin's ideas on natural selection.

Batts, Thomas (unknown–1698) *English colonist in Virginia, the Appalachian Mountains, and West Virginia*

In September 1671, Captain Thomas Batts, serving under Virginia colonial military leader Major General ABRAHAM WOOD, set out with ROBERT FALLAM from Fort Henry (present-day Petersburg, Virginia) to explore the Piedmont region in search of new sources of furs.

From the falls of the Appomattox River, Batts and Fallam traveled westward across the Blue Ridge into the Kanawha and New River Valleys of present-day West Virginia through Indian territory. They explored the headwaters of the Kanawha River, then returned to Fort Henry in late October or early November 1671.

With their journey through the Blue Ridge to the New and Kanawha Rivers, Thomas Batts and Fallam became the first Englishmen to cross the APPALACHIAN MOUNTAINS and enter the Ohio Valley watershed region.

Battutah, Abu Abd-Allah Muhammad Ibn

See IBN BATTUTAH, ABU ABD-ALLAH MUHAMMAD.

Baudin, Thomas-Nicolas (1754–1803)

French naval officer in Australia and Tasmania

Nicolas Baudin was born on the Île de Ré, an island in the Bay of Biscay, off the coast of La Rochelle, France. He became an officer in the French navy and a ship's captain by 1793. That year, in command of a scientific expedition for the Museum of Natural History in Paris, he sailed from France to China and India and the islands of present-day Indonesia. He made a successful return trip to France in 1795. During the next two years, Baudin led additional scientific expeditions to the Antilles in the Caribbean, as well as along the coast of South America.

In 1800, Baudin took command of an official French government naval and scientific expedition to Australia. Planned by Napoleon, the project was intended to establish French control over Van Diemen's Land (present-day TASMANIA), as well as the unexplored south coast of Australia. Baudin also had instructions to chart the continent's west and north coasts.

Baudin departed Le Havre, France, in October 1800. He commanded the French warship the *Géographe*, along with the cargo vessel *Naturaliste*, captained by French naval officer Jacques-Felix-Emmanuel Hamelin. A team of 24 scientists, including astronomers, mineralogists, botanists, and zoologists, including zoologist FRANÇOIS PERON, accompanied him. Two other Baudins were among the crew—naval officers Charles Baudin and François-Nicolas Baudin—but they were not related to him. After stopping in the CANARY ISLANDS, Baudin commanded his two ships southward along the coast of Africa, where their progress was slowed by lack of wind. Food and other provisions became short, and many among the crew were stricken with SCURVY. By the time the expedition reached the French Indian Ocean settlement on Île de France (present-day Mauritius), a number had died. Others were too sick to continue and had to be left behind.

From Île de France, Baudin sailed eastward across the Indian Ocean. Still short of provisions, he sailed directly for the west coast of Australia instead of heading to Van Diemen's Land farther to the east. By June 1801, he had reached Cape Leeuwin on the extreme southwest coast of Australia. At a site Baudin named Géographe Bay, he sent a party of scientists ashore to collect samples of wildlife and make contact with the natives.

Soon after heading northward to explore the west coast of Australia, Baudin and the *Géographe* became separated from the *Naturaliste*. He continued up the coast toward the Dutch settlement at Timor, on the way exploring Shark Bay as well as sites along the northwest coast of Australia not visited by Europeans since the voyages of WILLIAM DAMPIER 100 years earlier.

By August 1801, Baudin had reached Timor, where he was joined by the rest of the expedition aboard the *Naturaliste*. At Timor, more men had to be left behind because

of scurvy and an outbreak of dysentery. After nearly three months on Timor, Baudin sailed directly southward and eastward around Australia to Van Diemen's Land, reaching it in January 1802. He then undertook a three-month survey of the Tasmanian coast, sending parties inland to study the native Bara-Uru people and collect animal and plant specimens. Proceeding along the coast of Van Diemen's Land, he determined that the supposed small island was actually an extension of the eastern Tasmanian mainland, known today as the Tasman Peninsula.

In April 1802, while exploring along the south coast of Australia, at a site subsequently named Encounter Bay, Baudin met up with British naval captain MATTHEW FLINDERS, who had been mapping the coast from the west. Baudin obtained a copy of Flinders's maps of the newly charted south coastal region, then sailed to the British settlement at Port Jackson, present-day Sydney. From there, the *Naturaliste* sailed for France by way of the Indian Ocean and the CAPE OF GOOD HOPE with a large number of scientific specimens, while Baudin and the *Géographe* returned to the south and explored along the south coast of Australia. They stopped at Kangaroo Island, which Flinders had visited the previous year.

In spring 1803, Baudin retraced his route along the west coast of Australia, then continued along the north coast into the Gulf of Carpentaria. The *Géographe* then started back for France.

That summer, at a stopover at Mauritius, Baudin died from an illness he had contracted on the voyage. Under the command of Pierre Milius, the *Géographe* returned to France in late March 1804.

Nicolas Baudin's 1800–1804 expedition secured for France more than 100,000 samples of animal and plant life from Australia and Tasmania, including many varieties of kangaroos, as well as several hundred live specimens. Following his death in 1803, the French government credited him with mapping much of the Australian and Tasmanian coastlines, although Baudin's reported findings were really those of Flinders (a fact not revealed until Flinders returned to Europe in 1810, after being imprisoned on Mauritius for more than six years by the French).

Bauer, Ferdinand Lucas (1760–1826)

Austrian naturalist, artist in Australia

Born in Feldsberg, Austria, Ferdinand Bauer was the son of artist Lukas Bauer. He also pursued a career in art, becoming known for his drawings of plants. In 1786–87, he accompanied British botanist J. Sibthorp on a scientific expedition to study the flora of the Middle East.

Bauer's work as a botanical illustrator came to the attention of SIR JOSEPH BANKS, on whose recommendation he was appointed as a natural history artist with the English ex-

plorer MATTHEW FLINDERS's 1801–03 expedition to Australia aboard the *Investigator*. Along with the expedition's naturalist, ROBERT BROWN, he took part in scientific forays throughout southern Australia, including a specimen-hunting expedition on Kangaroo Island.

Bauer also joined Flinders, Brown, and artist WILLIAM WESTALL in an excursion by small boat up Spencer Gulf, during which they penetrated inland for 200 miles. At the gulf's northern end, they climbed a peak later named Mount Brown in the Flinders Range.

In 1803, Bauer remained with Brown at Port Jackson (Sydney), Australia, while Flinders left to seek a replacement for the *Investigator*, damaged on its passage through the Great Barrier Reef. Over the next 18 months, Bauer and Brown examined the plant life of coastal Australia around Sydney. Bauer undertook an expedition on his own to Norfolk Island in the Pacific Ocean, about 1,000 miles northeast of Sydney. Flinders failed to return by 1805, and Bauer and Brown set out to England on their own.

In England, Bauer prepared illustrations for Sibthorp's multivolume work on the flora of the Middle East. In 1812, he settled at Hietzing, Austria, where he continued his drawing and painting of plants at the Schönbrunn Gardens.

In addition to botanical studies, Ferdinand Bauer assisted Brown in examining the newly discovered animals of Australia, helping to bring back to London the first live specimens of such creatures as the koala and the bare-nosed wombat.

Baumann, Oskar (1864–1899) *Austrian explorer in Africa*

Oskar Baumann was born in Vienna, Austria. His early career as an explorer took him to present-day Bosnia and Herzegovina and Croatia, where he participated in mountain-climbing expeditions in the southern Dinaric Alps.

In 1885, Baumann was a member of an Austrian expedition to central Africa, which ascended the CONGO RIVER (Zaire River) from its mouth on the Atlantic coast of Angola, to its upper reaches, as far as Stanley Falls in what is now north-central Democratic Republic of the Congo.

The next year, Baumann traveled to West Africa and explored the island of Fernando Po in the Gulf of Guinea, off the coast of present-day Cameroon.

Baumann returned to East Africa in 1888, where he embarked on an expedition to the region around MOUNT KILIMANJARO. In 1890, under the sponsorship of the German East Africa Society, he explored south of Lake Victoria into what is now northern Tanzania, making the European discovery of Lake Manyara and Lake Eyasi.

Two years later, in 1892–93, Baumann led a German expedition to Lake Victoria, from where he undertook the first European investigation of its principal source, the

Kagera River. Baumann spent his last years in East Africa, dying in Zanzibar in 1899.

Oskar Baumann's explorations in Africa revealed that the Kagera River, which drains into Lake Victoria, was the true source of the NILE RIVER.

Beale, Edward Fitzgerald (1822–1893) *U.S. Navy officer, American official, surveyor in the American West*
A native of Washington, D.C., Edward Beale was a graduate of the U.S. Naval Academy at Annapolis. In 1845–46, as a lieutenant, he sailed with Commodore Robert Stockton aboard the *Congress* to the California coast. The ship reached San Diego just in time for the outbreak of the California uprising and the U.S.-Mexican War.

Beale went ashore with a party of marines to join U.S. Army forces under STEPHEN WATTS KEARNY at San Pasqual, south of present-day Los Angeles. The Americans were soon surrounded by Mexican troops. With frontiersman CHRISTOPHER HOUSTON CARSON (Kit Carson), Beale managed to pass undetected through the Mexican lines to Commodore Stockton and the American fleet at San Diego, where he brought news of Kearny's besieged forces. A company of marines was soon deployed north to San Pasqual, relieving Kearny's troops.

After the war's end in 1848, Beale made several trips across the North American continent, including one in 1849–50 that carried to the East the earliest news of the 1848 gold strike at Sutter's Mill, near Sacramento, leading to the California gold rush of the following year.

In the early 1850s, Beale was the superintendent of Indian Affairs for California and Nevada. During that time, he came under the patronage of Missouri senator Thomas Hart Benton, who was also the father-in-law of western explorer JOHN CHARLES FRÉMONT. In 1853–54, the federal government enacted legislation sponsoring topographic surveys in preparation for a proposed transcontinental railroad route. Benton, representing Missouri financial interests, backed several privately sponsored railroad surveys and placed Beale in command of an expedition to evaluate a railroad route that would extend from St. Louis, Missouri, along the 38th parallel to California.

Beale succeeded in mapping this route, but sectional differences and the eventual onset of the Civil War delayed construction of the transcontinental railroad for the next 15 years.

In 1857–58, Beale oversaw the famous "Camel Experiment," which employed up to 75 camels as draft animals in the construction of a wagon route from Camp Verde in western Texas near Bandera Pass, across the southern plains and desert to Fort Tejon, California. This road crossed the Colorado River at the western end of the Mojave Desert, later known as Beale's Crossing. While the camels were of

great service in the road-building project, their use never caught on in the West among frontier wranglers. The trail itself became an important link for the Butterfield Overland Stage Company's service to California and was a much-traveled route for immigrants to California. It was known first as the Southern Overland Trail and later as the Butterfield Southern Route.

In 1861–65, Beale served as California's surveyor general. In 1876–77, he was the U.S. ambassador to the Austro-Hungarian Empire.

Edward Beale's innovative use of camels failed to endure, but his explorations and road-building projects throughout the 1850s helped paved the way for the construction of the first transcontinental railroad links in the late 1860s.

Beatus of Valcavado (fl. 770s) *Spanish monk, cartographer*

Beatus of Valcavado, a Benedictine monk, lived in Spain during the last half of the eighth century A.D. In 776, he produced a religious work, *Commentary on the Apocalypse*, which included a map of the known world. Unlike modern world maps, Beatus's map depicted Jerusalem and the Middle East at the top, where north usually is, and consequently provided little aid to medieval navigators or geographers. His intention was to symbolically express the importance of Jerusalem as the focus of the Christian world.

Throughout the early medieval period, European mapmakers adopted Beatus's geographic orientation, portraying a view of the world that was considerably more limited than the one held by the ancient Greeks and Romans.

The map by Beatus of Valcavado influenced European geographic knowledge over the next 500 years, until the travels of MARCO POLO in the late 1200s.

Beautemps-Beaupré, Charles-François

(1766–1854) *French cartographer in the South Pacific*

Charles Beautemps-Beaupré was born in the French town of La Neuville-du-Pont, in the Marne region east of Paris. He became a highly skilled cartographer, specializing in the charting of coastlines. In 1785, he took part in a survey of the Baltic Sea, producing scientifically based maps for the French government.

In September 1791, Beautemps-Beaupré sailed from Brest, France, aboard the *Récherche* with ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux's expedition in search of JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, missing in the South Pacific Ocean since early 1788. As the expedition's chief hydrographer, Beautemps-Beaupré made scientifically based maps of the uncharted coasts of southern Australia and southern TASMANIA. East of

New Guinea, he identified the exact location of New Caledonia, the Solomon Islands, the Santa Cruz Islands, and other island groups in the Melanesian region of the western South Pacific.

As a result of the international crises brought about by the ongoing French Revolution, Dutch authorities on Java detained Beautemps-Beaupré along with the rest of the expedition when it arrived there in fall 1793. In 1796, Beautemps-Beaupré returned to France, sailing there by way of the CAPE OF GOOD HOPE. He went on to direct all of the major navigational and cartographic projects undertaken by the French government in the first half of the 19th century.

Charles Beautemps-Beaupré is considered the “father of hydrography,” the technique of mapping coastlines with attention to navigational detail. Although his atlas of the Entrecasteaux expedition to the South Pacific was not published until 1808, British naval authorities captured copies of his charts of Tasmania as early as 1795, making them available to MATTHEW FLINDERS for his 1801–03 explorations. Beautemps-Beaupré was the first cartographer to represent the southeast coast of Tasmania, where the British established the settlement of Hobart in 1803. Moreover, his charts provided the first accurate location of the Solomon Islands, explored by Spanish navigator ÁLVARO DE MENDAÑA in 1567.

Becknell, William (ca. 1790–1865) *American trader in the American Southwest*

Prior to 1821, William Becknell, probably a native of Kentucky, arrived in Franklin, Missouri, where he engaged in trade with Indians of the southern plains. At that time, Spanish provincial authorities had barred American traders from entering their New Mexico province.

In August 1821, Becknell set out with a party of three companions and their pack animals into the southern plains for the purpose of trading horses and mules with the Indians and capturing, according to his own account, “Wild Animals of every description.” They left Franklin, Missouri, and headed westward for Fort Osage and the Arkansas River. Becknell’s party followed ancient Indian and Spanish trails and reached the mouth of the Purgatoire River in present-day southeastern Colorado by October. From there, they headed southward into the mountains via Raton Pass.

The group soon encountered a detachment of Mexican soldiers, who informed them that Mexico’s independence had been declared, and that they would now be able to continue to Santa Fe to sell their much-sought-after trade goods. Becknell and his companions then crossed into northern New Mexico and reached Santa Fe by early November, where they sold their goods at a huge profit.

Becknell returned to his home in Franklin, Missouri, and wasted no time in organizing a second, larger trade expedition. In 1822, he set out with three wagons carrying trade goods and headed across the Kansas plains. Rather than heading southward into New Mexico via Raton Pass, a route that was then nearly impassable to wagon traffic, Becknell and his party blazed a trail across the Cimarron Desert in the region of present-day southwestern Kansas and the Oklahoma Panhandle. This trail, which came to be known as the Cimarron Cutoff, was extremely hazardous because of Comanche and Kiowa Indian attacks and because of lack of water for men and draft animals. Overcoming these obstacles, Becknell and his traders, among them WILLIAM WOLFSKILL and EWING YOUNG, reached Santa Fe and again realized an enormous profit on the goods they had carried from Missouri. Open trade between New Mexico and Missouri soon flourished.

In 1824, Becknell organized a much larger trade caravan, consisting of 24 wagons and 80 men, and again headed from Independence, Missouri, to Santa Fe. Later that year, Becknell took a party of traders northward from Santa Cruz, New Mexico, about 50 miles north of Santa Fe, into the Green River region in what is now northeastern Colorado.

By 1828, Becknell had established a ferry service and trade center on the MISSOURI RIVER at Arrow Rock, near present-day Sibley, Missouri. He went on to serve in the Missouri state legislature, then moved to Texas, where he took part in the Texas Revolution and struggle for independence from Mexico. He eventually settled at Clarksville in northeastern Texas’s Red River region.

William Becknell’s accomplishments earned him the reputation as the “Father of the Santa Fe Trail.” His 1822 expedition to Santa Fe marked the first use of wagons on the route to the New Mexico settlements. Becknell also produced some of the earliest maps of the Santa Fe Trail and provided impetus for the federal government to undertake a topographic survey of this route. His pioneering efforts led the federal government to provide military protection for trade caravans traveling westward to New Mexico across the southern plains. Fur traders soon followed Becknell’s route into the southern ROCKY MOUNTAINS.

Beckwith, Edward Griffin (1818–1881)
U.S. Army officer, American topographer in Utah and Nevada

Born in Cazenovia, New York, E. G. Beckwith was an 1842 graduate of West Point. He subsequently took part in several major campaigns in the U.S.-Mexican War of 1846–48.

In 1849, Beckwith served under Major WILLIAM HEM-SLEY EMORY in the Mexican Boundary Commission survey of the Gila River region of present-day southern Arizona.

In spring 1853, Beckwith, a lieutenant in the U.S. Army Corps of Topographical Engineers, joined Lieutenant JOHN WILLIAMS GUNNISON in a survey of a proposed transcontinental railroad route along the 38th parallel from Fort Leavenworth, Kansas, to the Pacific coast. After Gunnison and others were killed by Ute Indians in Utah's Sevier River Valley, the expedition was reorganized under Beckwith's command.

In spring 1854, Beckwith led a party of scientists and topographers in a survey along the 41st parallel, westward from Fort Bridger in Wyoming's Green River region to California. He crossed Utah's Wasatch Mountains to Pilot Peak, then followed the Humboldt River to a point north of Pyramid Lake. In the Sierra Nevada, he located two passes, Madeline Pass and Nobles' Pass, that could be used for a rail line to the Sacramento River.

Two years later, in 1856, Beckwith supervised the construction of a military wagon road from Fort Riley, Kansas, into the ROCKY MOUNTAINS to Fort Bridger, Wyoming.

Beckwith went on to serve in the Union army during the Civil War, taking part in campaigns in Virginia and Louisiana.

E. G. Beckwith's route across northern Utah and Nevada in 1854 was eventually adopted by the Union Pacific for the first transcontinental railroad, completed in 1869.

Beckwourth, James Pierson (Jim Beckwith)

(ca. 1800–ca. 1866) *American fur trader, trapper in the American West, army scout*

James (Jim) Beckwourth was born on a plantation in Fredericksburg, Virginia, the son of the Irish aristocrat Sir Jennings Beckwourth and a mixed-race slave woman. In 1810, he moved with his father to the Louisiana Territory, and he later settled in St. Louis, Missouri. On being granted his freedom by his father, Beckwourth set out in the early 1820s for Illinois's Fever River region, where he worked in the lead mines near the town of Galena.

Two years later, Beckwourth was hired by WILLIAM HENRY ASHLEY to take part in his 1824–25 expedition up the MISSOURI RIVER from St. Louis. The purpose of this trip was to take supplies and trade goods to Ashley's fur trappers and traders in the Green River region of present-day Wyoming and Utah. Beckwourth, serving as a blacksmith and personal assistant to Ashley, attended the first annual fur traders' rendezvous at Henry's Fork, a branch of the Green River, in summer 1825. Soon afterward, Beckwourth himself became a trapper, and he spent the winter of 1825–26 with mountain man JEDEDIAH STRONG SMITH in the Cache Valley of what is now northern Utah.

In 1828, Beckwourth trapped the ROCKY MOUNTAINS of Utah and southern Wyoming with ROBERT CAMPBELL,

narrowly escaping death when Campbell's party was attacked by Blackfeet Indians in the "Fight in the Willows." Reportedly, it was Beckwourth who saved his companions by breaking through the line of attacking Indians and summoning the help of another party of MOUNTAIN MEN.

Later in 1828, fellow mountain man CALEB GREENWOOD convinced the Crow Indian chief, Big Bowl, that Beckwourth, with his Indian-like mixed-race features, was actually the chief's long-lost son, who had been kidnapped as a child by marauding Cheyenne Indians. Welcomed into the tribe, Beckwourth soon rose to prominence among the Crow as a warrior and chief. At this time, both Greenwood and Beckwourth were associated with KENNETH MCKENZIE and the AMERICAN FUR COMPANY, and, during the next six years, Beckwourth used his influential position among the Crow to advance his and Greenwood's trade activities in the northern and central Rockies.

Leaving the Rocky Mountain FUR TRADE in 1837, Beckwourth traveled to Florida, where he took part in the Second Seminole War of 1835–42, as a muleteer for U.S. Army troops.

Returning to the West in 1838, Beckwourth traveled to the southern plains, where he undertook trading expeditions with LOUIS VASQUEZ and Andrew Sublette along the Santa Fe Trail. In the early 1840s, Beckwourth lived for a time in Pueblo, Colorado. At the outbreak of the U.S.-Mexican War in 1846, he was in California and took an active part in the Bear Flag Republic's revolt against Mexican rule.

Beckwourth settled in Santa Fe after the war, where he operated a saloon for a short time before returning to California with the gold rush of 1849. In 1851, he was involved in building wagon roads to supply miners in the Sierra Nevada.

The Pikes Peak (Colorado) gold rush of 1859 took Beckwourth to Colorado, where he was two years later, at the onset of the Civil War. He served as an army scout and interpreter for Colorado militia forces under Colonel John Chivington in the 1864 campaign against the Cheyenne.

In 1866, Colonel Henry B. Carrington hired Beckwourth as a peace emissary to his former adoptive tribe, the Crow. While on this mission, Beckwourth was reportedly killed by tribal members, who may have poisoned him because they believed he had brought an earlier smallpox epidemic to their people. Other reports indicate Beckwourth may have died in Denver the following year.

Jim Beckwourth's early career as a fur trapper and mountain man during the 1820s and early 1830s took him to parts of the middle and northern Rockies then known only to other trappers and Indians. He accompanied some of the men who undertook the earliest significant explorations of that region. His subsequent experiences on the old Santa Fe Trail and in the Sierra Nevada took him to

uncharted territory. He is sometimes confused with EDWARD ROSE, another mountain man of African descent.

Beebe, Charles William (1877–1962)

American naturalist, oceanographer

Charles William Beebe was born in Brooklyn, New York, and attended Columbia University. In 1899, he became curator of the New York Zoological Society and started a collection of living birds in the New York Zoological Park in the Bronx. In 1916, he became the director of tropical research and as such, led scientific expeditions in North America, CENTRAL AMERICA, South America, the Caribbean region, and Asia. He became increasingly interested in oceanographic research, and in 1923 he conducted studies in the waters off Bermuda and the Galapagos Islands.

With American engineer Otis Barton, Beebe developed the BATHYSPHERE, a type of SUBMERSIBLE. On August 15, 1934, after a series of dives beginning in 1930, each progressively deeper, Beebe and Barton made a descent of 3,028 feet, a record at that time.

Beebe wrote about the bathysphere expeditions in *Half Mile Down* (1934). Among his many other books are *Galapagos* (1923), *Jungle Days* (1925), *Beneath Tropic Seas* (1928), *Book of Bays* (1942), *High Jungle* (1949), and *Unseen Life in New York* (1953). He also edited *Book of Naturalists* (1944).

William Beebe was one of the pioneers of underwater exploration. His design for the bathysphere was later incorporated into that of the BATHYSCAPH, developed by AUGUSTE PICCARD and first used in 1947.

Beechey, Frederick William (1796–1856)

British naval officer in the Pacific Ocean and Arctic regions

Frederick Beechey was born in London, England. The son of portrait artist Sir William Beechey, he had a background in art and natural history. He entered the Royal Navy in his early teens, taking part in naval engagements throughout the Napoleonic Wars, and he served aboard a British warship at the Battle of New Orleans in January 1815, part of the War of 1812.

Promoted to lieutenant, Beechey joined SIR JOHN FRANKLIN in his 1818 naval expedition north of Spitsbergen (present-day Svalbard). In 1819–20, with SIR WILLIAM EDWARD PARRY, he explored the Arctic coast of Canada. Beechey produced drawings of Arctic scenes on these polar expeditions.

In 1821–22, Beechey, accompanied by his brother Henry Beechey, undertook a coastal survey of North Africa east of Tripoli, Libya.

In 1825, at the rank of commander, Beechey embarked on a three-year expedition to the Pacific Ocean. His

main objective was to reach the north Alaskan coast and there meet up with Franklin, who was at that time exploring Arctic Canada from the east. In command of the *Blossom*, he sailed from Spithead, England, in May 1825, and reached the Pacific coast of South America by the following autumn. A scientific team with the expedition made several inland investigations into the coastal regions of Chile and Peru.

From South America, Beechey headed westward across the Pacific, stopping at Easter Island, then continued to Pitcairn Island, where he met with the last surviving member of the *Bounty* mutineers.

Beechey headed eastward from Pitcairn Island to Tahiti and made the European discovery of islands in the Gambier archipelago. From Tahiti, he sailed northward to Oahu in the HAWAIIAN ISLANDS, then proceeded northwestward to the Kamchatka Peninsula, extending from the Pacific coast of SIBERIA.

From Petropavlovsk on Kamchatka, Beechey and the *Blossom* sailed to the islands of the BERING STRAIT and the west coast of Alaska. He reached Kotzebue Sound on the northwest Alaskan coast in late July 1826. An exploring party in a small boat reached as far north as a small peninsula that Beechey named Point Barrow in honor of second secretary of the Admiralty SIR JOHN BARROW. It proved to be Alaska's northernmost point. Beechey's men were unable, however, to reach Franklin and his expedition, who were then at a point 146 miles to the west. With PACK ICE becoming a problem, Beechey commanded his ship southward toward the Spanish settlements on the California coast.

In spring 1827, after repairs to the ship, Beechey sailed from California to the Bonin Islands, an archipelago south of Japan not visited by Europeans since 1639. He then headed back to Kamchatka and the Bering Strait and reexplored the Alaskan coast, making the European discovery of Port Clarence. Expeditions sent out in small boats this time reached as far north as Icy Cape, but were again unable to locate Franklin.

Beechey then headed southward along the coasts of North and South America, rounded CAPE HORN, and arrived in England in mid-October 1828. Less than three weeks earlier, Franklin had also safely returned.

Over the next two decades, Beechey directed maritime surveys of South America and Ireland for the British government. In 1854, he was appointed a rear admiral; the next year, he was elected president of the ROYAL GEOGRAPHICAL SOCIETY.

Frederick Beechey's 1825–28 explorations took him farther north along the coast of North America than any European had been up to that time. Members of that expedition visited and named Point Barrow, Alaska's northernmost extremity. He completed the first comprehensive exploration of the west coasts of both North and South

America. In the western Pacific Ocean, he located islands only briefly explored by the Spanish two centuries earlier. His account of his Arctic and Pacific explorations, *Narrative of a Voyage to the Pacific and Bering's Strait*, was first published in 1831.

Begichev, Nikifor Alekseyevich (1874–1927)

Russian mariner, fur trader in the Siberian Arctic

Russian seafarer Nikifor Begichev participated in BARON EDUARD VON TOLL's 1900–1902 attempt to negotiate the NORTHEAST PASSAGE across the top of Asia. With Toll, he sailed around Cape Chelyuskin, Asia's northernmost point, and explored the New Siberian Islands of the Laptev Sea. Following Toll's disappearance in the Siberian Arctic in 1902, Begichev took part in search operations the next year. Traveling overland from the mouth of the Yana River to Bennett Island in the New Siberian chain, he came upon letters indicating that Toll and his entire party had perished.

In 1904, Begichev took part in the Russo-Japanese War, serving in the defense of Port Arthur on the Pacific coast of SIBERIA. He subsequently entered the northern Siberian FUR TRADE, operating around the Taymyr Peninsula on the Arctic coast of central Siberia. In 1908, he located an island in a region previously thought to be a peninsula and named it Bolshoy Begichev. While revisiting the area in 1915, he took part in the rescue of crewmembers of a fleet of Russian icebreakers.

In 1921–22, while engaged in fur trapping on the Taymyr Peninsula, Begichev aided in the search for members of ROALD ENGELBREGT GRAVNING AMUNDSEN's expedition, who had become separated from the *Maude* on its voyage through the Northeast Passage. Begichev was with the Soviet scientific expedition that found the remains of Amundsen's men on the west coast of the Taymyr Peninsula in 1922.

In 1926, Begichev undertook a fur-trapping expedition down the Pyasina River to its mouth on the eastern shore of the Kara Sea, where he remained until his death from SCURVY in 1927.

Nikifor Begichev explored the northernmost reaches of the central Siberian Arctic, a region still largely uncharted as late as the 1920s. His exploits in support of Toll and Amundsen contributed to the opening of the Northeast Passage as a trade route.

Behaim, Martin (Martin Boenheim, Martin Behem, Martin of Bohemia) (ca. 1436–ca. 1506)

German cartographer, mariner, in service to Portugal

Martin Behaim was born in the German city of Nuremberg. There are conflicting reports regarding his birth date: either 1436 or 1459. His early education included the study of as-

tronomy and mathematics. He became involved in textile manufacturing in what is now Belgium.

By the late 1470s, Behaim's scientific curiosity was aroused by the explorations of Portuguese navigators. He traveled to Lisbon, where he became acquainted with CHRISTOPHER COLUMBUS and supported his ideas on the feasibility of a westward passage to India.

Behaim's interest in mathematics and astronomy broadened to the applied science of navigation. In 1485–86, he may have served as cosmographer on the expedition of DIOGO CÃO, which explored the west coast of Africa as far south as the mouth of the CONGO RIVER (Zaire River).

Behaim became active in Portuguese navigational research under King John II, taking part in the development of an improved version of the ASTROLABE, an important navigational instrument of the 15th and 16th centuries. In 1484, the Portuguese monarch knighted him for this accomplishment.

In 1486, Behaim was instrumental in establishing an early Flemish settlement on Fayal in the AZORES.

By 1490, Behaim had returned to Nuremberg, where, in 1492, he completed an early GLOBE of the known world. He made several diplomatic trips between Portugal and the Low Countries before settling permanently in Portugal.

Martin Behaim's 1492 globe, still in existence, depicts a large island, west of the Azores, thought by some historians to indicate a knowledge of Brazil and the South American mainland that predated Columbus's return from his first voyage. In addition, FERDINAND MAGELLAN used a copy of Behaim's globe to gain Spanish sponsorship for his 1519–22 voyage to the SPICE ISLANDS (the Moluccas), which also accomplished the first CIRCUMNAVIGATION OF THE WORLD.

Beketov, Pyotr (fl. 1620–1660s) *Russian Cossack leader in Siberia*

Pyotr Beketov was a Russian Cossack leader who in 1628 initiated a campaign of conquest that brought much of southeastern SIBERIA under Russian domination. From the central Yenisey River, he led a force of Cossacks south and east into the upper Tunguska River region and established a fur-trading settlement at the mouth of the Oka River.

Three years later, in 1631, Beketov pushed eastward across central Siberia, from the Yenisey to the Lena River, and from there headed southwestward toward Lake Baikal. The next year, he headed northward along the Lena, and on its banks established a settlement that later developed into the Siberian city of Yakutsk. Starting in 1633, he expanded Cossack and Russian influence into the Aldan River region to the east.

In the 1640s, Beketov commanded important central Siberian outposts, including Bratsk. From there, in 1652, he undertook a military expedition into the region southeast of Lake Baikal. In 1654, he traveled up the Amur River. The

next year, his force succeeded in defending against a Manchu invasion from the south.

By 1660, Beketov had consolidated Russian control over territory as far south as the Amur River. He later returned to the Yenisey River to the north, having opened up the fur resources of southeastern Siberia to European Russian traders.

Pyotr Beketov was one of the Cossack leaders who contributed to the Russian exploration and conquest of the region east and south of the Yenisey River, as far as the Lena River to the east and as far as the Amur River to the south. His settlement at Yakutsk on the Lena developed into an important center of the FUR TRADE for all of eastern Siberia.

Bekovich-Cherkassky, Aleksandr (Alexandr Bekovich-Cherkassky) (unknown–ca. 1717) *Russian mariner, military leader in the eastern Caspian Sea region*

Aleksandr Bekovich-Cherkassky was born to a noble family in Kabardia, a Circassian Muslim principality between the Black and Caspian Seas. In his early years, he went to live in European Russia, where Czar Peter I (Peter the Great) took charge of his education, sending him to western Europe in 1707 to study navigational techniques.

By 1715, Bekovich-Cherkassky was an accomplished navigator and military officer. At that time, Czar Peter was seeking to expand Russian interests south and east into central Asia, and he believed that the Amu Darya River (the Oxus of ALEXANDER THE GREAT's time) could provide an access route from the southern Caspian Sea to its headwaters in the Hindu Kush, north of India. Accordingly, in 1715, he dispatched Bekovich-Cherkassky on an exploratory expedition in search of the mouth of the north-flowing Amu Darya.

Bekovich returned to Czar Peter with reports from native tribesmen that the Amu Darya River flowed into the southern Aral Sea, east of the Caspian, after being diverted by the Uzbek people of Khiva. Plans were then made to redirect the Amu Darya to its original course.

In 1716, Bekovich led a 3,000-man military expedition by ship from the mouth of the Volga River, along the north coast of the Caspian Sea, to the mouth of the Ural River. He then proceeded southward overland across the Ust-Urt Plateau, toward Khiva.

Bekovich and his Russian forces defeated the Khivans in preliminary engagements. The Khivan monarch, known as the Khan, pretended to sue for peace and convinced Bekovich to divide his forces. On entering the city of Khiva, each Russian contingent was attacked and defeated. Most were killed, and the few survivors were enslaved. Bekovich himself never returned from the campaign and is presumed to have died in about 1717.

Aleksandr Bekovich-Cherkassky's expedition into the eastern Caspian region was the last Russian attempt to take

the area until the middle of the 19th century. The Aral Sea, which Bekovich-Cherkassky had heard about in 1715, was not identified by Europeans until 1844.

Belcher, Sir Edward (1799–1877) *British naval officer in the Pacific Ocean and Arctic regions*

Born in Halifax, Nova Scotia, Edward Belcher entered the Royal Navy in 1812. As a midshipman, he served in naval engagements off the coast of North Africa in 1816.

In 1818, at the rank of lieutenant commander, Belcher took part in a British naval expedition to the North Pacific Ocean. Trained in chartmaking as well as navigation, he subsequently undertook a hydrographic survey of the coasts of North and West Africa, producing official maps of these regions for the Royal Navy.

Belcher sailed with FREDERICK WILLIAM BEECHEY on the *Blossom* in his 1825–28 expedition to the South Pacific and North American Arctic, serving as the principal hydrographer. Part of the expedition's objective was to make contact with SIR JOHN FRANKLIN, then exploring overland in the Canadian Arctic.

On the second visit to the northwest coast of Alaska in summer 1827, Belcher led an exploring party northward from Kotzebue Sound as far as Icy Cape. Unable to contact Franklin, he attempted a return, but his small boat was wrecked in heavy seas near Chamisso Island. Although four of his party drowned, Belcher and the survivors managed to reach an island, where they were soon rescued by Beechey and the *Blossom*.

In 1837, Belcher, by then a captain, traveled to the west coast of Panama and there took command of the *Sulphur*, relieving the ailing Beechey, who had become ill during his explorations along the west coast of South America.

Over the next year, Belcher sailed along the coasts of the Americas, undertaking inland exploring expeditions in Nicaragua and El Salvador. He ranged as far north as Alaska's Prince William Sound and visited the Russian settlement at Sitka. In addition, on this voyage he charted the Sacramento and Columbia Rivers, making a stop at the HUDSON'S BAY COMPANY post, Fort Vancouver, near present-day Portland, Oregon.

Belcher and the *Sulphur* headed west across the Pacific in late 1839. While visiting the Fiji Islands, he met up with the American exploring expedition commanded by CHARLES WILKES. At Singapore, Belcher was ordered to sail to the southeast coast of China to take part in the naval operations of what later became known as the Opium War of 1839–42. In October 1840, Belcher commanded the *Sulphur* in a naval battle against Chinese forces that ended with the British capture of Hong Kong.

In November 1840, Belcher's ship was damaged in a typhoon and he was compelled to sail back to England. The homeward course took the ship along the east coast of

Africa. Belcher explored the Mozambique Channel between Madagascar and the African mainland before rounding the CAPE OF GOOD HOPE.

Belcher reached England in July 1842. Soon afterward, he was knighted for his efforts in the Opium War. The next year, he was appointed commander of the *Samarang* and undertook a three-year expedition to present-day Indonesia and the South China Sea.

In 1852, Belcher took command of the Royal Navy's last official effort to locate Franklin, missing in the Canadian Arctic since 1845. SIR FRANCIS LEOPOLD MCCLINTOCK served under him. Once again in command of the *Blossom*, he sailed into the islands of the Canadian Arctic from the east, passing through Lancaster Sound, then headed northward along the west coast of Devon Island into Wellington Strait.

In 1854, with his fleet of five ships icebound near Dealy Island, Belcher ordered his men to abandon the vessels, fearing their destruction. They managed to reach supply ships anchored off Beechey Island, on which they then returned to England. One of the abandoned ships, the *Resolute*, was recovered by American whalers in Davis Strait almost a year later. It was taken to Connecticut, restored to seaworthiness, and presented by the United States to Queen Victoria as a gift.

After Belcher's return to England, the Admiralty denied him further naval commands because it was felt he had exercised poor judgment in abandoning his ships in the Canadian Arctic. Yet he remained in the navy for the rest of his life, reaching the rank of full admiral in 1872.

Sir Edward Belcher was a naturalist as well as a navigator and undertook natural history studies in North America, South America, and CENTRAL AMERICA. Although his 1852–54 search for Franklin was fruitless, it did result in additional knowledge of the geography of the maze of straits and islands of the polar regions of northern Canada.

Bell, Gertrude Margaret Lowthian

(1868–1926) *British archaeologist, mountain climber, traveler, writer in the Middle East*

Born in England, Gertrude Bell attended Oxford University in 1883–87, graduating with honors in history. In the late 1880s, she engaged in MOUNTAIN-CLIMBING expeditions in Europe in which she set several alpine records.

In 1892, Bell traveled extensively in Persia (present-day Iran), studying its ancient heritage. Starting in 1901, she toured throughout the Middle East, visiting present-day Israel, Turkey, Syria, and Iraq, while undertaking archaeological studies.

In 1913–14, Bell traveled with a native trade caravan from Damascus southward into the Arabian Desert, planning to reach Riyadh. Forced to turn back by Muslim opposition at the northern Arabian city of Ha'il, she followed

a different route to Damascus by way of Palmyra, covering areas of the Middle East not usually visited by Europeans.

Bell was fluent in both Farsi and Arabic, skills she put to use at the outbreak of World War I, when she went to work for the British intelligence service, operating out of Cairo, Egypt.

Soon after the war's end in 1918, Bell was assigned as an assistant political officer with the British government's Arab Bureau in what was then Mesopotamia. Working alongside the British Middle East explorer and scholar THOMAS EDWARD LAWRENCE (Lawrence of Arabia), she played an important role in the organization of the modern nation of Iraq by supporting the selection of King Faisal I as the nation's first ruler.

Bell went on to establish the Iraqi state museum for antiquities in Baghdad, serving as its first director. From 1897 until her death by suicide in 1926, she published a prolific body of writings about her experiences in the Middle East and her archaeological discoveries, including *Poems from the Divan of Hafiz* (1897), *The Desert and the Sown* (1907), *Amurath to Amurath* (1911), *Palace and Mosque at Ukaidir* (1914), *The Arab of Mesopotamia* (1917), and her first book, *Persian Pictures*, issued posthumously in 1928. She was the first woman to receive a medal from the ROYAL GEOGRAPHICAL SOCIETY, in 1918.

Gertrude Bell was one of the first European women to travel extensively in the Arabian Desert, and was one of the earliest female archaeologists to undertake field research in the Middle East.

Bellingshausen, Fabian Gottlieb Benjamin von (Baron von Bellingshausen, Thaddeus Bellingshausen, Faddey Faddeyevich Bellingsgauzen) (1778–1852) *German-born naval officer in Antarctica and the South Pacific, in service to Russia*

Fabian Gottlieb von Bellingshausen was born on the Baltic island of Saaremaa, into a noble Estonian family of German descent. In his youth, he entered the Russian navy; in 1803–06, he circumnavigated the world as a midshipman with ADAM IVAN RITTER VON KRUSENSTERN's expedition.

In 1819, at the rank of captain, Bellingshausen took command of a Russian naval expedition to the Antarctic seas south of the known latitudes. He sailed from the port of Kronstadt, near present-day St. Petersburg, in July 1819. Accompanying his ship, the *Vostok* (east), was the *Mirny* (peaceful), captained by MIKHAIL PETROVICH LAZAREV.

Bellingshausen and his expedition headed into the South Atlantic Ocean, touching first at Rio de Janeiro before reaching South Georgia Island. From there, he headed east and south, commanding the first ships to sail below the ANTARCTIC CIRCLE since the voyages of JAMES COOK in the 1770s. On January 27, he came within 20 miles of Princess

Martha Coast of Greater (East) Antarctica and sighted the edge of the ice sheet, which some claim constitutes the first sighting of the continent (before the Englishman EDWARD BRANSFIELD).

With the onset of the antarctic winter season, Bellingshausen and his ships headed northward into the central South Pacific Ocean. Over the next few months, he located a number of uncharted islands in the Fiji Islands and the Tuamotu Archipelago. The expedition also visited Tahiti, explored the coast of TASMANIA, and reprovisioned at Sydney, Australia.

In December 1820, Bellingshausen returned to the Antarctic. At 69° south latitude, he sighted and named Peter I island. Soon afterward, he located a larger body of land that he named Alexander I Land, known today as Alexander I Island.

On his return northward, in February 1821, Bellingshausen and his men encountered American whaling captain NATHANIEL BROWN PALMER at South Shetland Island.

During his travels, Bellingshausen conducted studies in the natural sciences. The expedition brought back many species of birds from the Southern Hemisphere, including the first specimen of the emperor penguin. He also undertook observations of ocean currents and studied the Sargasso Sea. He went on to a distinguished career in the Russian navy, including service against the Turks in the eastern MEDITERRANEAN SEA. He was appointed an admiral in 1843, after which he commanded the port of Kronstadt.

Baron von Bellingshausen's circumnavigation of Antarctica resulted in an early sighting of land below the Antarctic Circle (some claim his as the first sighting of the Antarctic continent). The Bellingshausen Sea is named in his honor.

Beltrami, Giacomo Costantino (1779–1855)

Italian traveler in northwestern Minnesota

Giacomo Beltrami was born in the northern Italian town of Bergamo, near Milan, and grew up to hold judicial offices in the Venetian government. In 1821, he was exiled from Venice after being implicated in a plot against the Austrian-backed government.

In his first year of exile, Beltrami toured the European continent, covering a wide area between Livorno in Italy and Brussels in Belgium, visiting major cities as well as rural areas in France and what is now Germany. He then crossed to England, spending time in London, Windsor, and Oxford and, in mid-1822, sailed from Liverpool for the United States. After landing in Philadelphia, he traveled to Baltimore and Washington, D.C., where he was received by President James Monroe.

From Washington, Beltrami set out westward on a tour across the APPALACHIAN MOUNTAINS and into the Ohio Valley. As he traveled by stagecoach and hired wagon



Giacomo Beltrami (*Library of Congress*)

through Kentucky, he recorded his impressions of the region and its inhabitants. He eventually reached Pittsburgh, from where he headed southwestward, toward the MISSISSIPPI RIVER.

Beltrami had originally planned to travel southward to New Orleans and Mexico, but, upon reaching the confluence of the Ohio and Mississippi Rivers, near what is now Cairo, Illinois, he decided instead to head northward into the upper reaches of the Mississippi. He began his journey up the Mississippi from St. Louis aboard the steamboat *Virginia*, on a voyage that marked the first successful attempt by a steam-powered vessel to travel upstream as far as Fort St. Anthony (near present-day Minneapolis, Minnesota). He was accompanied on this trip by the newly appointed Indian agent to the Chippewa (Ojibway) and Sioux (Dakota, Lakota, Nakota), Major Lawrence Taliaferro.

From Fort St. Anthony, Beltrami traveled up the Minnesota River with a U.S. Army expedition commanded by Major STEPHEN HARRIMAN LONG. Long had been assigned to survey the border between the United States and Canada, from the Red River of the North eastward to Lake Superior. Near Pembina, in what is now northeastern North Dakota, Beltrami left Long and his soldiers and traveled southeastward up the Red Lake River by CANOE, in search of the source of the Mississippi River.

In mid-August 1823, following an attack by Sioux, Beltrami's Chippewa guides abandoned him. Unskilled at paddling, he waded upstream, towing the canoe behind him. He entered Red Lake, and there obtained new Indian guides. Soon afterward, he came upon an as yet unnamed lake, which he christened Lake Julia. A stream he observed flowing southward out of this body of water he wrongly concluded was the source of the Mississippi. (The true source is Lake Itasca as determined by HENRY ROWE SCHOOLCRAFT in 1832.)

By mid-October 1823, Beltrami was back in St. Louis, then continued southward to New Orleans. Over the next two years, he wrote and published an account of his exploration and supposed discovery of the Mississippi's source.

Beltrami traveled into Mexico before returning to Europe in 1826. In 1849, he was permitted to return to Italy, where he spent his remaining years.

Giacomo Beltrami's claim that he had located the source of the Mississippi was rejected by most geographers of his day. Nonetheless, in 1866, the Minnesota state government named a newly organized section of northwestern Minnesota, Beltrami County, in recognition of his explorations. It contains Red Lake and the upper Red Lake River, which he explored in 1823.

Benalcázar, Sebastián de (Sebastián de Belalcázar, Sebastián Moyano) (ca. 1479–1551)

Spanish conquistador in Peru, Ecuador, and Colombia

Sebastián de Benalcázar was born in Belalcázar, a village in south-central Spain. Little is known of his origins, or early life, except that he was of a humble family; his original surname was Moyano.

In 1498, Benalcázar accompanied CHRISTOPHER COLUMBUS on his third expedition, which explored the coasts of present-day Trinidad and northeastern South America. He remained in the WEST INDIES, settling first on Hispaniola (present-day Haiti and the Dominican Republic), then moving to the Spanish settlement of Darién on the mainland of CENTRAL AMERICA in what is now Panama. By 1522, he had established himself as a military and colonial leader, participating in the Spanish conquest of Nicaragua.

In 1531, Benalcázar joined forces with FRANCISCO PIZARRO in his third attempt to conquer the Inca Empire of Peru, taking part in the Spanish victory at Cajamarca in 1532. In 1534, he launched his own expedition of conquest. He pushed into what is now Ecuador, and, with the support of local Canari Indians, he occupied the Inca Indian provincial capital of Quito. In 1535, he established the port city of Guayaquil.

In 1536, Benalcázar undertook another expedition farther north, penetrating the interior of what is now

Colombia. Along the way, he established settlements at Popayán and Cali. An Indian captured the previous year had told Benalcázar of a fabulous kingdom to the east, rich in gold and precious stones, ruled by the "Gilded One," an Indian monarch covered by gold dust in sacred ceremonies.

Benalcázar continued to search for the land he dubbed EL DORADO for the next few years. In 1539, he went eastward across Colombia's central mountains, the Cordillera, reaching the upper Magdalena River Valley, near present-day Bogotá. There, he met up with GONZALO JIMÉNEZ DE QUESADA as well as NIKOLAUS FEDERMANN, both of whom had been exploring the region from the east. Subsequently, the three conquistadores traveled to Spain to resolve their conflicting claims. In Spain, Benalcázar was named governor of the Popayán in what is now southwestern Colombia.

During the 1540s, Benalcázar became embroiled in the civil wars generated by GONZALO PIZARRO and DIEGO DE ALMAGRO. He ordered the execution of a rival without authorization and was himself condemned to death. In 1551, in Cartagena, while en route to Spain to appeal this sentence, he died of fever.

Sebastián de Benalcázar expanded the Spanish conquest of the Inca northward into what is now Ecuador and Colombia. He founded the first important seaports on the northwest coast of South America and led the first European explorations across what is now Colombia. He is credited with introducing the legend of El Dorado, an idea that continued to generate explorations into the South American interior until the early 1600s.

Benavides, Alonzo de (Alonso de Benavides)

(fl. 1620s) *Spanish missionary in New Mexico*

Alonso de Benavides was born in the AZORES off Portugal, on the island of São Miguel. He traveled to the Americas in about 1600, settling in Mexico City, where he studied for the priesthood and entered the Franciscan order three years later. He subsequently became director of the novices at the Franciscan monastery in Puebla in east-central Mexico.

With the beginning of organized Spanish colonization of New Mexico in 1621, Benavides was appointed as father custodian of that province, in charge of all Franciscan missionary activities, including the construction of missions, schools, and churches.

In 1622, Benavides traveled with a party of some 30 Franciscan friars to New Mexico, where he undertook expeditions into the lands of the Apache Indians of the upper Gila River Valley of present-day southwestern New Mexico. In 1626, at Santa Fe, he established the Chapel of San Miguel, one of the earliest Catholic chapels in the United States.

From Santa Fe, Benavides and his missionary staff embarked on a series of expeditions along the Rio Grande and Pecos River, seeking to convert the Indians. Their missionary work took them into the lands of the Navajo (Dineh) and Hopi Indians, as well as the Rio Grande Pueblo Indians. Benavides established a mission at the Acoma Pueblo of Keres Indians in 1629. That same year, he founded a missionary settlement, Santa Clara de Capoo, on the edge of Apache country. Santa Clara de Capoo developed into a base for further missionary forays into the lands of the Apache.

From 1622 to 1629, Benavides succeeded in converting as many as 16,000 Indians to Christianity and provided a strong cultural base for Spanish domination of the region's native population.

In 1630, Benavides was relieved of his duties as father custodian of New Mexico. He then returned to Spain, via Mexico City, where he presented a detailed report of his activities to King Philip IV, hoping to gain increased support for his missionary pursuits in New Spain. This report, known as the *Memorial*, includes extensive physical descriptions of the territory that Benavides explored during his years among the Indians of the American Southwest.

During the early 1630s, Benavides again traveled to the Americas and revisited the missions he had established in New Mexico. In 1634, he left for Goa, the Portuguese colony on the east coast of India, where he eventually became archbishop.

Through his missionary work, Alonzo de Benavides helped open the American Southwest to Spanish colonization.

Benjamin of Tudela (Rabbi Benjamin of Tudela)

(unknown–1173) *Spanish rabbi in the Middle East and central Asia*

A Spanish Jew, Rabbi Benjamin was born at Tudela in northeastern Spain. In 1159, he set out from Saragossa for the Mediterranean coast near Barcelona. He then embarked from the port of Marseilles on an eastward journey in which he planned to visit Jewish communities.

Benjamin of Tudela first sailed to Italy, then traveled into Greece, Anatolia (Turkey), and Syria and visited Jerusalem and the Holy Land. He crossed into Mesopotamia (present-day Iraq), where he met with the caliph of Baghdad. After traveling in Arabia and Persia (present-day Iran), according to his own later account, he reached China's western frontier before going on to India and Ceylon (present-day Sri Lanka).

In 1173, Rabbi Benjamin of Tudela returned to Spain by way of Egypt and Sicily. He died later that same year. His account, *Massoth Schel Rabbi Benjamin*, originally written in Hebrew, was soon translated into Latin and other languages and became one of the first widely circulated travel books in medieval Europe. An English edition, *The Itinerary of Rabbi Benjamin of Tudela* (also known as *Book of Travels*

and *The Travels of Rabbi Benjamin*), first appeared in the 1840s. He was the first medieval explorer of the Orient and is thought to be the first European to have reached China.

Bent, Charles (1799–1847) *American trader, first U.S. territorial governor of New Mexico, brother of William Bent*

Charles Bent was born in the Virginia town of Charleston, part of present-day West Virginia. In 1806, his family moved to the Louisiana Territory and settled in St. Louis, where his father, Silas Bent, was appointed first deputy surveyor and then a justice of the supreme court of the Missouri Territory.

Starting in 1822, Bent embarked on a career in the FUR TRADE on the upper MISSOURI RIVER. He worked for JOSHUA PILCHER'S ST. LOUIS MISSOURI FUR COMPANY for three years, eventually becoming Pilcher's partner. By the late 1820s, however, competition by JOHN JACOB ASTOR'S larger AMERICAN FUR COMPANY, coupled with the decline in the demand for beaver pelts brought on by a change in fashion to hats made of silk, led Bent to leave the fur trade and concentrate on the commercial opportunities presented by the newly reopened Santa Fe Trail.

Starting in about 1826, Bent became active in the trade in furs and buffalo hides on the upper Arkansas River, near present-day La Junta, Colorado. In 1829, he organized and led a trade caravan westward from Westport, Missouri (near present-day Kansas City), and followed the Santa Fe Trail across the southern plains. Accompanying him on this trip was WILLIAM BENT, one of six brothers who, at various times, participated in frontier trade. This 1829 trade expedition was one of the earliest to use oxen to pull wagons along the Santa Fe Trail. Near the present Colorado–New Mexico stateline, Bent led his trade caravan through the Cimarron Cutoff established by WILLIAM BECKNELL. They eventually reached Santa Fe, where they sold their trade goods at a considerable profit.

By 1833, Bent was in partnership with frontier entrepreneur CÉRAN DE HAULT DE LASSUS DE ST. VRAIN. That year, he founded Bent's Fort on the Arkansas River, just above the mouth of the Purgatoire in what is now southeastern Colorado. Bent's Fort soon became an important base for traders and settlers headed westward from Kansas and western Missouri. Bent himself began to reside in Taos at about this time, and placed his brother William in charge of the operations at Bent's Fort.

In 1837, Bent and St. Vrain established a second trading post in Colorado: Fort St. Vrain, on the South Platte River, north of Pikes Peak. With supplies from the American Fur Company and the HUDSON'S BAY COMPANY, Bent and St. Vrain's enterprise dominated the Indian trade south of the Black Hills.

In 1835, Bent married Maria Ignacio Jaramillo, the daughter of a prominent Taos family. Her sister, Josephine, later married frontiersman CHRISTOPHER HOUSTON CARSON (Kit Carson), a hunter at Bent's Fort.

In 1842, Bent entered into a peace agreement with the Comanche Indians that enabled him to expand his trade operation into the Canadian River region of northern Texas.

Colonel STEPHEN WATTS KEARNY's military expedition from Kansas used Bent's Fort as a staging area for the 1846 invasion of New Mexico. With the successful occupation of Santa Fe and the surrounding area, Kearny named Bent as the first governor of the provisional U.S. Territory of New Mexico.

In January 1847, the Mexicans and Tiwa Indians of Taos rose in rebellion against the American occupation. While in Taos that month, Bent was killed and scalped by warriors, who then paraded his body through the streets of that town. American forces under Sterling Price soon put down the revolt.

Charles Bent's trade enterprise along the Santa Fe Trail and his forts on the Arkansas and Platte Rivers contributed to the non-Indian settlement of southern Colorado. By developing the Santa Fe Trail as a regular route from the Missouri frontier, Bent also paved the way for future settlers headed across the southern plains to Arizona and California. Bent's Fort itself provided an important stopover point for the subsequent explorations of JOHN CHARLES FRÉMONT, JAMES WILLIAM ABERT, JOHN WILLIAMS GUNNISON, EDWARD FITZGERALD BEALE, and others to the ROCKY MOUNTAINS and Far West.

Bent, James Theodore (1852–1897)

British archaeologist in Africa and the Middle East

Born in England, James Theodore Bent studied archaeology at Oxford University, graduating in 1875.

In 1885–87, Bent studied the native customs in the Aegean Sea islands; in 1889–90, he undertook a study of antiquities in what is now Turkey, as well as in Bahrain in the Persian Gulf.

Bent's next studies, in 1891, involved the ancient burial grounds in present-day Zimbabwe in southern Africa. He described his work in the 1892 book *The Ruined Cities of Mashonaland*.

Accompanying Bent on many of his expeditions was his wife, Mabel Bent. Starting in 1893, the Bents began four years of study and travel in Arabia, during which James produced one of the earliest European maps of the Hadhramaut region of what is now Saudi Arabia.

James Theodore Bent's archaeological studies led to travel and exploration of islands in the MEDITERRANEAN SEA, and in Africa and the Near East, increasing European knowledge of those regions.

Bent, William (1809–1869) *American trader, trapper, scout, Indian agent in the West, brother of Charles Bent*

William Bent, one of CHARLES BENT's six brothers, was born in St. Louis. At the age of 15, he traveled up the Arkansas River to trap for furs in what is now southeastern Colorado. In 1830, he joined his brother Charles and CÉRAN DE HAULT DE LASSUS DE ST. VRAIN in the FUR TRADE. In 1833, they established Bent's Fort on the Arkansas River, about 12 miles above the mouth of the Purgatoire River, near present-day La Junta, Colorado.

While Charles Bent directed the company's operations from Taos and Santa Fe, New Mexico, William Bent remained at the upper Arkansas River site, where he supervised the construction of Bent's Fort, completed in 1833. William remained as the manager of this post and directed operations there over the next 16 years.

In 1846, Colonel STEPHEN WATTS KEARNY arrived at Bent's Fort in command of U.S. forces on their way to invade New Mexico and northern Mexico at the outbreak of the U.S.-Mexican War. Bent was commissioned by Kearny as an army scout to lead his troops along the remaining stretch of the Santa Fe Trail into New Mexico. In New Mexico, he also served as a scout for Sterling Price in the suppression of the Mexican and Pueblo revolt in Taos in early 1847, during which his brother Charles was killed.

With Cérán St. Vrain's retirement in 1849, William Bent assumed sole control of Bent, St. Vrain & Co. Also in 1849, the federal government tended an offer to buy Bent's Fort for use as a military base. Rather than accept the government's low price, Bent blew up the fort. In 1853, he established a new trading post 40 miles downstream on the Arkansas at the mouth of the Purgatoire River. Bent's New Fort, as it came to be known, served as an important stopover point and trading center on the Santa Fe Trail, as well as a base for government surveys of the West. American settlers were attracted to the lands around the post and it became the first permanent Anglo-American settlement in present-day Colorado.

The Pikes Peak (Colorado) gold rush of 1859 brought about a great influx of non-Indian fortune-seekers and settlers into eastern Colorado, increasing tensions with the Cheyenne Indians. Bent, a respected figure among tribes of the southern plains because of his years of fair dealing with them and his three marriages to local Indian women, was given the position of Indian agent, which he held for several years.

In 1860, Bent leased Bent's New Fort to the U.S. Army. Soon afterward, it was destroyed by a flood. A new army post, Fort Lyon, was later built on the site.

Bent spent his retirement years in Westport, Missouri, which had been the starting point of the Santa Fe Trail. Among his neighbors was CHRISTOPHER HOUSTON CARSON (Kit Carson), who had worked for Bent as a hunter at

the upper Arkansas River post in the 1830s, as well as LOUIS VASQUEZ and other fur traders who operated in the southern ROCKY MOUNTAINS during the 1820s and 1830s.

From his early days as a fur trapper on the upper Arkansas River, through his career in the Santa Fe Trail trade on the southern plains, William Bent played a key role in the exploration and settlement of the region. He served as an intermediary between the Indians, the settlers, and U.S. Army forces that began to arrive in southeastern Colorado during the years before and shortly after the Civil War. In addition, both government and commercial expeditions exploring the region north and south of the Santa Fe Trail made use of trading posts managed by him.

Bering, Vitus Jonassen (1681–1741) *Danish mariner in Siberia and Alaska, in service to Russia*

Vitus Bering was born in Horsens, Denmark. In the early 1700s, he embarked on a seafaring career that began with a trip to the EAST INDIES aboard a Dutch ship. Returning to Europe in 1703, he entered the service of the Royal Russian Navy as a sub-lieutenant, reaching the rank of captain in 1724.

In 1725, Czar Peter the Great commissioned Bering to undertake an exploration of SIBERIA'S Pacific coast to determine if there were a land connection between Asiatic Russia and the extreme northwestern part of North America. Czar Peter I and other Russian leaders were also interested in establishing an Arctic route to open trade connections with China and India.

That year, in what became known as the First Kamchatka Expedition, Bering traveled overland across Russia and Siberia to the mouth of Kamchatka River on the Siberian peninsula of the same name. Here, he directed the construction of a ship, the *St. Gabriel*. In 1728, he sailed from Kamchatka northeast along the Siberian coast to the Gulf of Anadyr. During this leg of the expedition, he explored Krest Sound and Preobrazheniya Bay.

Bering continued northward through what later became known as the BERING STRAIT, as far as 67°18' north latitude, making the European discovery of St. Lawrence Island and the Diomed Islands along the way. Because of heavy fog, he failed to sight the coast of Alaska. Determining to his satisfaction that there was no land connecting Siberia and North America, he sailed south and west back to Kamchatka.

Bering returned to St. Petersburg in 1730, where Empress Anna had come to the Russian throne. Although the Russian admiralty deemed the results of his initial explorations to be inconclusive, Empress Anna appointed Bering to lead a much larger exploration of eastern Siberia and the unknown seas to the east. In 1733, Bering again headed eastward across Russia and Siberia in command of what came to be known as the Great Northern Expedition, which also included the Second Kamchatka Expedition. This ven-

ture was organized on a large scale, involving 13 ships and as many as 600 men.

Over the next six years, with Martin Spanberg and ALEKSEY ILYICH CHIRIKOV serving as Bering's chief lieutenants, explorations were undertaken from the Pacific port of Okhotsk into the Lake Baikal region and the Amur Basin. Seaward expeditions were also made along the Arctic and Pacific coasts of Siberia, and southward to the Kuril Islands, north of Japan.

Bering resumed his seaward explorations to the east in 1740. Sailing on the *St. Peter*, which had been constructed at Okhotsk, he rounded the southern end of the Kamchatka Peninsula to the newly established settlement of Petropavlovsk on the Pacific coast. There, he joined Chirikov, who had directed the construction of another vessel, the *St. Paul*. (The settlement's name had been derived from the Russian names for these two ships.)

On June 5, 1741, the two ships sailed from Petropavlovsk and headed eastward. Accompanying Bering was German naturalist GEORG WILHELM STELLER, who had been sent by the Russian Academy of Science to study the flora and fauna of Siberia and regions to the east. They explored Avacha Bay and searched in vain for the fabled Gama Land, a non-existent landmass that was believed to lie in the mid-Pacific. The two ships were soon separated, and Bering continued eastward. On July 16, 1741, he sighted Mount St. Elias on the Alaskan mainland and, soon afterward, he landed on Kayak Island in the northeastern corner of the Gulf of Alaska. Chirikov's contingent had also sighted the Alaskan coast farther to the south.

Bering went on to explore Kodiak Island. On his return journey toward Siberia, he charted the Kenai Peninsula of Alaska and the Aleutian Islands. In early November 1741, near one of the Commander (Komandorski) Islands off the coast of the Siberian Kamchatka Peninsula (later called Bering Island), Bering's ship ran aground.

Although Bering and his crew survived the shipwreck, they were stricken with SCURVY while stranded. Bering, along with 18 of his crew, died. The survivors were able to build small boats from the wreckage of the *St. Peter* and eventually reached the Siberian mainland.

Chirikov and Spanberg returned to St. Petersburg in 1743, with navigational reports indicating conclusively that Siberia and North America were separated by the Bering Strait. They also brought back samples of sea otter pelts, which soon inspired the expansion of the Russian FUR TRADE eastward from Siberia to the Aleutians and into the Gulf of Alaska.

Reports of the Bering Strait had been made as early as the mid-16th century, considered by some to be the western outlet to the fabled STRAIT OF ANIAN, a mythical NORTHWEST PASSAGE through North America to the Atlantic. Cossack seafarer and explorer SEMYON IVANOVICH DESHNEV, based on his explorations of the Gulf of Anadyr

during the 1650s, had also suspected that Siberia did not extend into the North American continent. Vitus Bering's expeditions were the first to base this finding on modern navigational methods. His explorations provided the basis for Russia's colonization of the Aleutians over the next 100 years, as well as the coastal islands and the mainland of Alaska.

Berlandier, Jean-Louis (ca. 1805–1851)

French naturalist in Texas

Jean-Louis Berlandier was born in the French town of Fort de l'Ecluse, not far from Geneva, Switzerland. He was largely self-educated, studying Latin and Greek on his own while working as an apprentice to a pharmaceutical company in Geneva.

The young Berlandier studied under Swiss botanist Auguste-Pryame de Candolle and accompanied him on field trips in France and Switzerland. Berlandier's talent as a naturalist came to the attention of Mexico's foreign minister, Lucas Alemán, one of Candolle's former students. In 1825, the Mexican government was organizing a scientific expedition to explore Texas and establish the boundary between Mexico and the United States. Alemán enlisted Berlandier to take part in this expedition, and the young Frenchman journeyed to Mexico City in 1827.

Berlandier left Mexico City with the Mexican Comisión de Límites on November 10, 1827. The group under General Manuel de Mier y Terán headed northward into Texas, reaching the Rio Grande at present-day Laredo on February 2, 1828. They then continued toward the settlement of San Fernando de Bexar (present-day San Antonio), arriving on March 1, 1828.

During the following spring and summer, Berlandier made an extensive exploration of the region northwest of San Antonio including a detailed study of the area's flora. In fall 1828, he was invited to take part in a buffalo and bear hunt with a group of Comanche Indians. A detachment of Mexican soldiers and civilians also took part in this hunt, commanded by Colonel José Francisco Ruiz, who was well acquainted with the Comanche.

In early November 1828, Berlandier traveled with the Comanche and Mexican hunting party into the largely unexplored area northwest of San Antonio. After the Comanche had left the Mexican soldiers and civilians at the Guadalupe River in late November, the group continued on and explored northward as far as the Pedernales River, then headed southward through Frio Canyon before returning to San Antonio on December 18, 1828.

Following his service with the Mexican scientific expedition into Texas, Berlandier settled in Matamoros, Mexico, across the Rio Grande from present-day Brownsville, Texas. He established himself as a medical doctor and married a Mexican woman. He died in a drowning accident while at-

tempting to cross the San Fernando River, south of Matamoros, in 1851.

Jean-Louis Berlandier's account of his experiences with the Comanche hunting party, entitled "Caza del oso y cibolo en el noroeste de Tejas" ("Hunting bear and bison in northwestern Texas"), first appeared in a Mexican scientific journal in 1844. An artist as well as a naturalist, he illustrated his writings with field sketches, landscapes, and some of the earliest scientifically drawn maps of the interior of Texas. Berlandier's observations on the topography of the Texas interior and on the ethnology of its native people provide an accurate depiction of this area in the years prior to the extensive non-Indian settlement of the 1830s and 1840s.

Bernier, Joseph Elzéar (1852–1934)

Canadian mariner in the Arctic

Born in L'Islet, Quebec, J. E. Bernier followed family tradition and pursued a career as a mariner. At the age of 14, he started as a cabin boy and, after three years, became captain of the first of 105 ships that he would command during his lifetime. He also served as a dockmaster at Lauzon, managed an ice company, and served as governor of a prison.

Bernier developed an interest in Arctic navigation. He also came to the conclusion that Canadian Arctic holdings were being violated by foreign whaling ships: He believed that any country adjacent to the Arctic had rights to any islands within a triangle from the north shore of its mainland to the apex at the NORTH POLE. To assert Canadian sovereignty over Arctic islands, he first proposed an expedition to the Canadian government in 1902. In the years to come, from 1904 to 1911, he carried out Arctic expeditions on behalf of Canada, during which he left documentation declaring sovereignty on most islands up to the 80th parallel.

In 1912–17, Bernier led several private expeditions to the Arctic archipelago, prompted by rumors of gold on Baffin Island. In 1922–25, he again sailed for the Canadian government, charting islands in the eastern Arctic. He came out of retirement at the age of 75 for one last expedition, seeking an Arctic route for grain ships to and from Churchill on HUDSON BAY.

J. E. Bernier's 12 Arctic expeditions helped establish the dominant presence of Canada in the use of islands to its north. They also provided a body of knowledge concerning the geography of the Canadian Arctic and the navigation of Arctic waters.

Berrío, Antonio de (Antonio de Berreo)

(ca. 1520–1597) *Spanish mariner in South America*

Little is known of Antonio de Berrío's early life, except that he was probably born in Spain and was a seafarer. He married a niece of GONZALO JIMÉNEZ DE QUESADA, Spanish

colonial governor of what is now eastern Colombia, becoming his heir.

Starting in 1584, Berrío initiated a series of thorough explorations of the ORINOCO RIVER, seeking the fabled land of EL DORADO. Over the next 10 years, he expanded his search to include the Guiana (present-day Guyana) region of northeastern South America. His son, Fernando de Berrío, explored the southern tributaries of the Orinoco.

In 1595, Berrío was taken prisoner at Trinidad by English explorer SIR WALTER RALEIGH. He was soon released at the port settlement of Cumana in present-day Venezuela. With information provided by Berrío, Raleigh himself set out in search of El Dorado. Berrío died in the Americas in 1597.

Antonio de Berrío's efforts to find mythical, gold-laden Indian lands led to increased knowledge among both the Spanish and the English of the Orinoco River system.

Beutler, August (fl. 1750s) *Dutch pioneer in South Africa*

August Beutler was an 18th-century Dutch settler in southern Africa's Cape Town colony. In 1752, Beutler organized and led a group of colonists in an overland expedition eastward from Cape Town, along the south coast of Africa, beyond Algoa Bay, and into the present-day Transkei region.

August Beutler's expedition was one of the earliest efforts to expand European settlement in southern Africa beyond the region around the CAPE OF GOOD HOPE.

Bienville, sieur de See LE MOYNE, JEAN-BAPTISTE.

Billardièrre, Jacques-Julien Houtou de la
See LA BILLARDIÈRE, JACQUES-JULIEN HOUTOU DE.

Billings, Joseph (ca. 1758–1806) *British navigator, astronomer in the Siberian Arctic and Alaska, in service to Great Britain and Russia*

Joseph Billings was born in Furnham Green, England, near London. He embarked on a naval career, becoming skilled in navigation and astronomy. Serving on the *Discovery* as an astronomer on JAMES COOK's expedition of 1776–80, he made his first journey into Arctic waters, to the north of the BERING STRAIT.

In 1783, Billings entered the Russian navy. Two years later, at the rank of captain lieutenant, he took command of Russia's Northeastern Secret Geographical and Astronomical Expedition, which was dispatched to locate a NORTHEAST PASSAGE from the extreme northeast coast of SIBERIA into the Bering Strait.

With Cook, Billings had reached as far as Cape Shmidta on the central coast of the East Siberian Sea. For the Russians, he planned to explore from the mouth of the Kolyma River eastward to Alaska. Yet, in 1786–87, he only succeeded in reaching the western end of the East Siberian Sea, hundreds of miles west of Cape Shmidta and Bering Strait. With the onset of winter, he settled at Yakutsk for almost a year, engaging in the central Siberian FUR TRADE.

Starting in 1789, Billings, along with ANTON BATAKOV and NIKOLAY DAURKIN directed a seaward attempt to pass through Bering Strait and reach northeastern Siberia. Sailing from Okhotsk on the east coast of Siberia, he failed in an attempt to find an ice-free passage northwestward.

In 1790, in command of the ship *Slava Rossy*, with Batakov and GAVRIIL ANDREYEVICH SARYCHEV, Billings explored the Aleutian Islands, as well as the Gulf of Alaska as far east as Mount Saint Elias. The next year, he made an overland crossing of the Chukchi Peninsula, traveling by reindeer westward to the Kolyma River region. By 1793, Billings was in Irkutsk, and from there he returned to St. Petersburg.

Joseph Billings spent nearly 10 years exploring the northern reaches of eastern Siberia. His work revealed geographic information on the relationship between North America and Asia and resulted in some of the first accurate maps of the Chukchi Peninsula and the Sea of Okhotsk, as well as the Aleutian Islands and Prince William Sound of Alaska.

Binger, Louis-Gustave (1856–1936) *French explorer, colonial official in West Africa*

Louis-Gustave Binger was a native of Strasbourg, France. His first visit to Africa was with the French military. He returned to the coast of Senegal in 1887, from where he began a three-year exploration of the interior. The expedition was supported in part by the French government, which at the time was interested in establishing a colonial presence in West Africa.

Binger ascended the Senegal River. Heading southeastward across present-day Mali, he reached Bamako on the upper NIGER RIVER. From that point, he examined the region south of the great bend of the Niger River to the headwaters of the Volta. By late 1889, he had reached the Comoe River, which he descended to its mouth on the Gulf of Guinea. For this achievement, Britain's ROYAL GEOGRAPHICAL SOCIETY later awarded him its Founder's Medal.

In 1892, Binger surveyed the boundary between the Ivory Coast and the Gold Coast (present-day Ghana). In carrying out this work, he ascended the Volta River northward to its confluence with the Comoe.

In 1893, Binger became French colonial governor of the Ivory Coast, and in 1897, he was appointed director of African Affairs for the French colonial office.

As a result of the explorations of Louis-Gustave Binger, the region north of the Ivory Coast, which now comprises much of Mali and Guinea, came under French control as French West Africa. Binger was known as one of the creators of France's one-time colonial empire in West Africa. An Ivory Coast city near the mouth of the Comoe River is known today as Bingerville.

Bingham, Hiram (1875–1956) *American historian in South America, explorer of Inca sites in the Andes*

Born in Honolulu, Hawaii, Hiram Bingham was the grandson of the American missionary of the same name who founded the first Protestant mission in Hawaii. He studied at Yale and Harvard Universities and at the University of California and in the course of his academic career, specializing in Latin American history, taught at Yale, Harvard, and Princeton.

In 1906–07, Bingham explored Venezuelan general Simón Bolívar's route across Venezuela and Colombia a century earlier. In 1908–09, Bingham explored an old Spanish trade route from Buenos Aires, Argentina, to Lima, Peru. In 1911, as director of the Yale Peruvian Expedition, Bingham explored the Urubamba Valley in the ANDES MOUNTAINS in search of the Inca sites of Vilcabamba and Vitcos, men-

tioned in Spanish texts. He located instead the ruins of the ancient Inca city of Machu Picchu, located on a peak rising up above the valley about 50 miles northwest of Cuzco, Peru. Archaeological evidence indicates that Machu Picchu was a country retreat for Inca emperors, with temples, shrines, and baths. Bingham subsequently located the ruins of Espíritu Pampa (plain of ghosts), now believed to be Vilcabamba, the last Inca capital, which fell to the Spanish in 1572. In the years to come, Bingham carried out additional fieldwork of Inca sites. The National Geographic Society sponsored some of his work.

In World War I, Bingham directed an Aviation Instruction Center at Issoudun, France. In 1923–24, he served as lieutenant governor of Connecticut, then as governor for one year before becoming a U.S. (Republican) senator from Connecticut for eight years.

Hiram Bingham's expeditions, which he wrote about in *Inca Land* (1922), *Machu Picchu* (1930), and *Lost City of the Incas* (1948), increased knowledge of the Inca and the Spanish conquest. The road to Machu Picchu is known as the Hiram Bingham Highway in his honor.

Biruni, Abu ar-Rayhan Muhammad ibn Ahmad al- (Abu Raihan Muhammad al-Biruni, al-Ustadh) (973–1048) *Arab scholar in India*

Al-Biruni was born in Kath, formerly considered part of the Persian Empire and presently part of Karakalpak in Uzbekistan. Of Arab ancestry, he was associated with the court of Sultan Mahmud and later Sultan Mawdud—probably originally as a captive, then as an adviser as well as a tutor—in the city of Ghazna (present-day Ghazni, near Kabul, Afghanistan). He became one of the most renowned scholars among Muslims, mastering the Arabic, Persian, Turkish, Sanskrit, and Hebrew languages and writing about mathematics, astronomy, physics, botany, geography, geology, mineralogy, and history in 113 works.

In 1017 or 1018, al-Biruni traveled to India for the first time, accompanying Mahmud's military force. While there, he studied Indian customs, languages, science, and geography, which he wrote about in one of his best-known books, *India*. Al-Biruni explored parts of the GANGES RIVER and theorized that the sea had once covered the INDUS RIVER. Among his observations in other writings were a computation of the Earth's circumference close to modern values and different ways to determine north and south and LATITUDE AND LONGITUDE.

Al-Biruni, known as al-Ustadh (the master), influenced his contemporaries as well as Islamic and Hindu scholars for generations. Although most of his works were lost, and surviving works were not translated into European languages until the 20th century, some historians refer to the period of intellectual activity during his lifetime as “the age of al-Biruni.”



Hiram Bingham (Library of Congress)

Biscoe, John (1794–1843) *British mariner, seal hunter in Antarctica*

Born in Enfield in Middlesex, England, John Biscoe joined the Royal Navy in 1812. Starting in 1830, he commanded seal-hunting expeditions on ships owned by the Enderby brothers of England. Charles Enderby, a fellow of the ROYAL GEOGRAPHICAL SOCIETY, encouraged Biscoe and his other captains to explore for new lands during their voyages in the Southern Hemisphere.

In 1831, Biscoe sailed from TASMANIA southward in search of signs of land in the portion of the Antarctic adjacent to the Indian Ocean. He circumnavigated Antarctica, reaching as far as 69° south latitude by late January. He came upon what he took to be a part of the mainland, naming it Adelaide Land. Less than a month later, while exploring the Antarctic south of the Indian Ocean, Biscoe sighted ice cliffs, which he determined were actually exposed parts of a landmass covered with ice from the sea. He named the region Enderby Land, after his employers.

John Biscoe was one of the first mariners to chart large areas of the world's last known continent. Enderby Land was not explored again until SIR DOUGLAS MAWSON's expedition of 1929–31. In 1908–10, French polar explorer JEAN-BAPTISTE-ÉTIENNE-AUGUSTE CHARCOT showed that Adelaide Land, which Biscoe also sighted and named, was really an island. Biscoe Bay, near the Bay of Whales, as well as Biscoe Island off Graham Land, are named in recognition of his Antarctic explorations.

Bishop, Isabella Lucy Bird (1831–1904)

British world traveler, writer

Isabella Bishop, née Bird, was originally from Yorkshire, England, where her father was a clergyman. She suffered from a variety of maladies, including insomnia, severe headaches, and a chronic spinal problem. At the age of 21, partly to regain her health, she embarked on a life of travel.

In 1854–55, Bird traveled widely in the United States and Canada. She set off again in 1872, visiting Australia and NEW ZEALAND. From there she went to the HAWAIIAN ISLANDS, where she climbed Mauna Loa, the 13,675-foot volcanic mountain.

From Hawaii, Bird went to San Francisco, California, and after resting for a few months at a sanatorium, she set out by train for the Sierra Nevada in fall 1873. At Truckee, Nevada, she left the train and over the next four months, traveled 800 miles on horseback into the ROCKY MOUNTAINS. At Fort Collins, Colorado, she lived for a short time with a family of settlers.

In 1878, Bird journeyed to the Far East. She visited the remote regions of northern Japan, where she lived among the aboriginal Ainu people. From Japan, she traveled to Hong Kong, then to the Malay Peninsula.

Bird married Dr. John Bishop in 1881, settling in Edinburgh, Scotland. Her husband died five years later. In 1888, Bishop resumed her life of travel, visiting India, Persia (present-day Iran), Syria, and the Kurdistan region of present-day Iraq.

In 1894, Bird traveled to Korea. She proceeded to China in 1896, traveling in a small boat to the farthest navigable point of the YANGTZE RIVER (Chang). By sampan, she reached as far as the Tibet border. Soon afterward, she made a final visit to Morocco.

In her 50 years of travels, Isabella Bishop circled the globe three times, journeying to places in the American West, the Pacific, and Asia seldom visited by Europeans, especially European women. She authored a number of books detailing her exploits as a world traveler, including *Englishwoman in America* (1856), *The Hawaiian Archipelago* (1875), *A Lady's Life in the Rocky Mountains* (1879), *Unbeaten Tracks in Japan* (1880), *Journeys in Persia and Kurdistan* (1891), and *Korea and Her Neighbors* (1898). In 1892, she was elected as the first woman member of the ROYAL GEOGRAPHICAL SOCIETY.

Bjarni Herjulfsson See HERJULFSSON, BJARNI.

Black Beaver (1806–1880) *Lenni Lenape (Delaware) Indian guide, U.S. Army scout, interpreter, fur trapper, trader in the American West*

Black Beaver, a member of the Lenni Lenape (Delaware) Indian tribe, was born in Illinois. As a young man, he moved to the West and took part in the FUR TRADE in the ROCKY MOUNTAINS during the 1820s–30s.

In 1834–35, Black Beaver joined General HENRY LEAVENWORTH and Colonel HENRY DODGE in their exploration of the southern plains. The purpose of these expeditions was twofold: to convince Comanche, Kiowa, and Pawnee Indians to accept the resettlement of Southeast tribes into the Indian Territory, and to explore and chart the little-known regions lying to the west and south of what is now eastern Oklahoma.

Along with the part-Cherokee Indian JESSE CHISHOLM, Black Beaver traveled with the Dodge-Leavenworth expedition westward from Fort Gibson in present-day eastern Oklahoma, southwestward along the Arkansas River, and across the southern plains into the Washita Mountains and Red River region of present-day western Oklahoma and northern Texas. This first expedition of 1834 penetrated the lands of Osage and Kiowa Indians. Black Beaver served as the interpreter in the ensuing negotiations between the army and tribal leaders.

Over the next year, several other expeditions from Fort Leavenworth, Kansas, onto the southern plains were undertaken by Leavenworth's command, with Black Beaver as guide and interpreter. He participated in the exploration of

the Cross Timbers region, a 30-mile-wide belt of forested land lying between the Arkansas River and COLORADO River, where contact was made with the Comanche. Black Beaver helped guide Leavenworth's men as far as the eastern Rockies of what is now Colorado.

During the U.S.-Mexican War of 1846–48, Black Beaver was an army scout for U.S. forces under General William Selby Harney in his campaign on Mexico's east coast.

In 1849, following the discovery of gold in California, the flow of migrants across the southwestern desert to the Pacific coast increased dramatically. That year, Black Beaver assisted Captain RANDOLPH BARNES MARCY in leading a wagon train of 500 settlers westward across Texas and New Mexico. On the return journey, Black Beaver blazed a new trail from the Brazos River, in northwest Texas, eastward to Fort Smith, Arkansas, then the gateway to the southwestern frontier.

Black Beaver worked as a trader and trapper in the Southwest throughout the 1850s, and, with the outbreak of

the Civil War in 1861, he served as a scout for Union forces in the New Mexico and western Texas campaigns. At the war's close in 1865, Black Beaver served as an interpreter for the U.S. Army at the Little Arkansas Council, an important diplomatic conference with tribes of the southern plains.

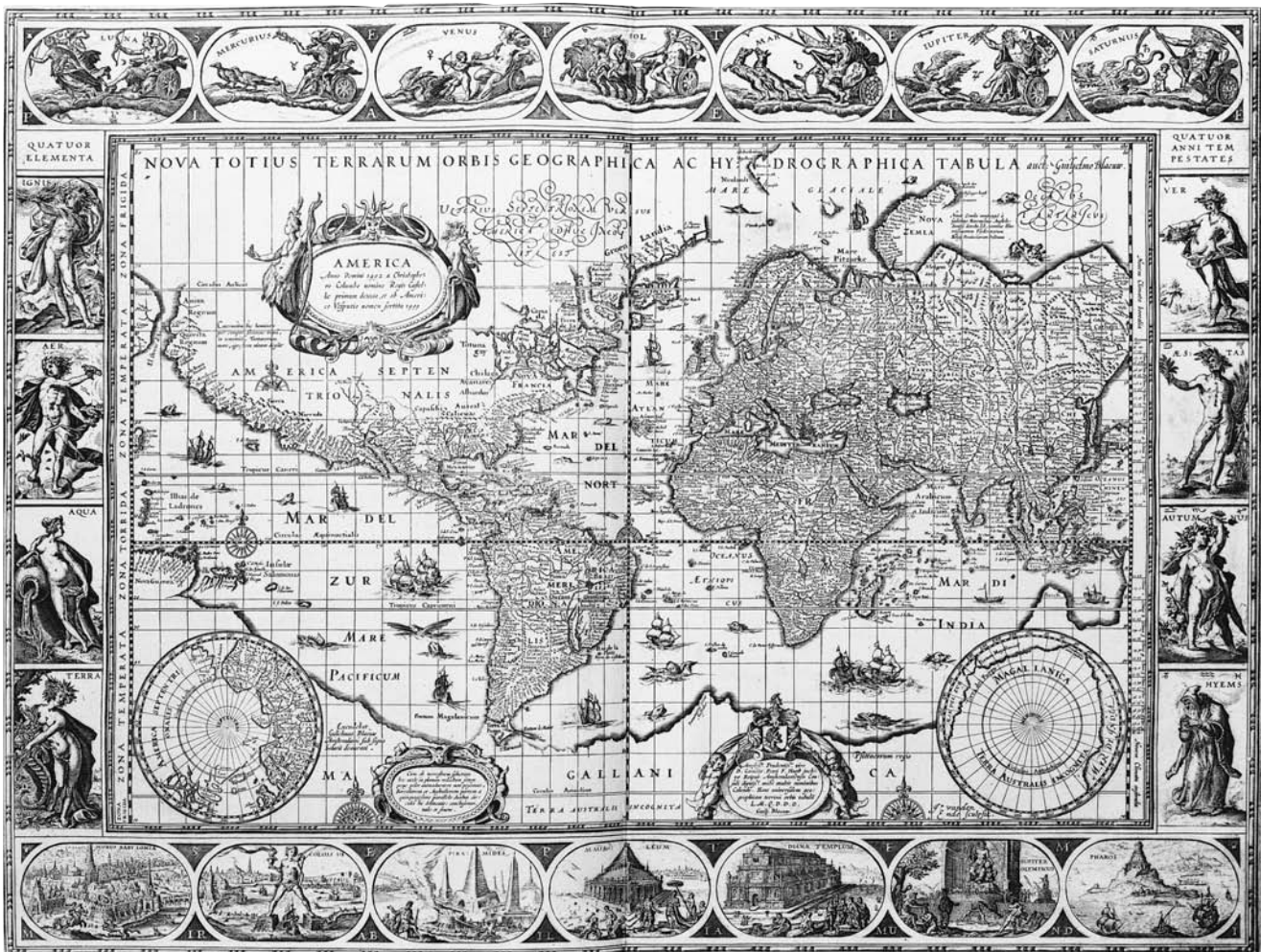
In his later years, Black Beaver settled on Lenni Lenape lands along the Washita River near Anadarko in the Indian Territory (present-day Oklahoma). He became a leader and spokesperson for the Lenni Lenape in their dealings with the army and the Bureau of Indian Affairs.

Black Beaver was one of many Native American guides, interpreters, and trailblazers essential to the non-Indian exploration of North America.

Blaeu, Willem Janzoon (Guilielmus Blaeu)

(1571–1638) *Dutch geographer, cartographer, publisher*

A native of the Netherlands, Willem Blaeu studied geography and astronomy under the 16th-century Danish astronomer Tycho Brahe. In the early 1600s, Blaeu established



Map of the world by Willem Blaeu (1610) (Library of Congress)

a printing business in Amsterdam, which became one of the foremost publishers of maps and atlases.

Blaeu's earliest works were mainly celestial and terrestrial globes. He published a large atlas in 1630, the first such work to appear since ABRAHAM ORTELIUS's annual atlas of 1570–98. Blaeu's atlas included the first detailed maps of both North and South America, plus recently discovered geographic information. It was one of the first maps to show accurately that Tierra del Fuego was not connected to a GREAT SOUTHERN CONTINENT, but was an island off the tip of South America.

Over the next 42 years, the Blaeu atlas appeared in new editions, eventually encompassing 11 volumes, with information on all the known continents. Blaeu compiled geographic data for his maps from the works of English mapmaker John Speed, and also drew from the maps of the Flemish cartographers Ortelius and GERARDUS MERCATOR. After his death, Blaeu's sons Cornelius and Johann carried on the business until 1672.

Throughout the 1600s, Willem Blaeu's maps and atlases reflected the latest geographic findings. Although his maps were among the first to be mass-produced, they gained a reputation throughout Europe for high quality and accuracy, largely due to Blaeu's development and use of specially designed printing presses.

Blaxland, Gregory (1778–1853) *Australian pioneer in the Blue Mountains*

Born in Kent, England, Gregory Blaxland was among the first generation of colonists in what is now New South Wales, Australia. As a farmer near the coastal settlement of present-day Sydney, he faced financial ruin because of severe drought conditions in 1810.

In search of new pasture lands and a new source of water, Blaxland traveled up the Warragamba River, hoping to find a route through the high cliffs and deep canyons of the BLUE MOUNTAINS, less than 50 miles west of Sydney. From his two forays up the Warragamba, Blaxland determined that a route through the Blue Mountains could be found by following interconnected ridges rather than attempting any direct ascents.

In May 1813, accompanied by fellow landowner WILLIAM CHARLES WENTWORTH, surveyor William Lawson, and aboriginal guide James Burnes, as well as several convict servants, Blaxland set out from his farm at South Creek. The party, equipped with pack-horses, followed the high ridges without making descents into the canyons. They eventually reached a peak affording a view of the Bathurst Plains, a large fertile region to the west, naturally irrigated by the abundant waters of the Lett River.

Later that year, an expedition sponsored by the British colonial governor, Lachlan Macquarie, followed Blaxland's route, continued beyond his westernmost point, and, on

crossing the GREAT DIVIDING RANGE, located the Fish River.

Less than two years after Blaxland's 1813 trek into the Blue Mountains, convict laborers constructed a road along his route that connected Sydney with the newly established inland settlement of Bathurst. In 1815, Blaxland himself settled at Bathurst, the first British settlement west of the Blue Mountains.

By blazing a trail through the Blue Mountains, Gregory Blaxland opened up eastern Australia to the rapid exploration and settlement that took place over the next 75 years. The peak from which he first saw the region west of the Blue Mountains is known today as Mount Blaxland.

Bligh, William (1754–1817) *British naval officer in the Pacific*

William Bligh was born and raised in Tyntan, near the port city of Plymouth, England. He began his naval career in his early teens, and then, in 1776–80, he served as sailing master on the *Resolution* during JAMES COOK's third Pacific expedition. On this voyage, Bligh first visited Tahiti; explored Prince William Sound, Alaska; and, in January 1779, undertook a reconnaissance of Kealakekua Bay on the newly explored island of Hawaii.

Upon his return to England in 1780, Bligh was promoted to lieutenant. He took part in hydrographic surveys, as well as naval engagements at Dogger Bank in the North Sea and at Gibraltar.

In December 1787, Bligh took command of the *Bounty* in an expedition aimed at obtaining breadfruit trees in Tahiti and introducing them as a food source for slaves in the WEST INDIES. After a 10-month journey, the *Bounty* reached Tahiti in late October 1788. Six months later, Bligh set out for the WEST INDIES with a cargo of living breadfruit trees. On April 28, 1789, while off the Friendly Islands, members of the crew, led by Fletcher Christian, rose up in mutiny. Along with 18 loyal crew members, Bligh was set adrift in a 23-foot-long open boat, with a minimal supply of food and water.

Using only basic navigational instruments and no charts, Bligh sailed the open boat across nearly 4,000 miles of the western Pacific. After three months, he safely brought his men to Timor, a Dutch colonial port in what is now Indonesia. Some of the mutineers were later captured, tried, and executed. Others, including Christian, founded a community on Pitcairn Island, where their descendants still live.

Bligh returned to England in spring 1790. Soon afterward, he was given command of the *Providence*, and in 1791–93, he undertook another voyage to Tahiti, succeeding in transporting more than 300 live breadfruit trees to Jamaica.

In the late 1790s and early 1800s, Bligh distinguished himself in naval actions against the French. In 1801, he was commended by Admiral Horatio Nelson for his service in the victory at Copenhagen.



William Bligh (Library of Congress)

Bligh was appointed governor of New South Wales, Australia, in 1805. His attempts to stem alcohol consumption led to the so-called Rum Rebellion, in which the officers under his command mutinied and imprisoned him in 1808. Released in 1810, Bligh returned to England, where he was appointed rear admiral in 1811, then vice admiral in 1814.

William Bligh's naval career is most associated with the 1789 *Bounty* mutiny, and his reputation as an overly harsh disciplinarian often obscures his maritime accomplishments. Yet, as a sailing master, he played a significant role in Cook's explorations of the Gulf of Alaska, where Prince William Sound's Bligh Reef was named in his honor. Moreover, his 1789 open-boat voyage following the *Bounty* mutiny was a remarkable navigational endeavor. Although Bligh succeeded in his second attempt to transport live Tahitian breadfruit plants to Jamaica and the British West Indies, his efforts had limited practical results. The native laborers of the West Indies did not take to breadfruit as a staple food, continuing to prefer bananas and plantains.

Block, Adriaen (Adriaen Blok) (fl. 1610s)

Dutch navigator on the east coast of North America

Dutch seafarer Adriaen Block first explored the waters off the coast of present-day New York and New England with HENRY HUDSON in 1609.

In 1613, Block returned to New York Bay as commander of one of five ships in a fleet sent out by the Dutch government to trade for furs with the Indians of the Hudson River Valley. His ship, the *Tiger*, ascended the Hudson River and spent the winter in contact with Native Americans near present-day Albany, New York. In early 1614, the *Tiger* was destroyed by fire. Block then directed his crew in the construction of a new ship, the *Unrest*.

From Albany, Block sailed down the Hudson to Manhattan, then navigated the treacherous currents of a narrow channel of the East River between present-day Wards Island and Astoria, Queens. With its passage through what he named *Hellegat* or Hell Gate, Block's *Unrest* became the first European ship to enter Long Island Sound from the west. While exploring along the south coast of present-day Connecticut, Block became the first European to discover the Housatonic and Connecticut Rivers. He sailed up the Connecticut River for a distance of about 50 miles, to the site of present-day Hartford, before returning south to Long Island Sound. Then, sailing eastward, he came upon a large island, which became known as Block Island.

Block next explored what is now Rhode Island and the Massachusetts coast, rounding Cape Cod and reaching as far north as Nahant Bay, just north of present-day Boston. Leaving the *Unrest* at Cape Cod, he joined the rest of the Dutch fleet on a return trip to the Netherlands.

Adriaen Block led the first Dutch expedition to follow up Henry Hudson's explorations of the east coast of North America. Soon after his return to Amsterdam in 1614, he produced an early map of New Netherland, which clearly showed Long Island as separate from Manhattan. The *Unrest*, which his men built on the Hudson, was one of the first European ships to be constructed in what is now the United States.

Blunt, Anne Isabella (Lady Anne Blunt, Baroness Wentworth) (1837–1917) *British traveler in the Middle East, writer, wife of Wilfrid Scawen Blunt*

Born Anne Isabella Noel, Lady Anne Blunt was the daughter of William, earl of Lovelace, and Augusta Ada Byron; granddaughter of Lord Byron the poet; and great-great-granddaughter of the British naval officer and explorer JOHN BYRON. She had become an accomplished artist by the time of her marriage in 1869 to British diplomat and later poet WILFRID SCAWEN BLUNT.

Lady Anne accompanied her husband on his many travels into North Africa and the Middle East. In 1877–79, she joined him in an expedition into the heart of the Arabian Peninsula, including present-day Iraq. Although she and Blunt wore native clothes, they made no attempt to disguise themselves as Muslims.

Lady Anne Blunt's 1881 book, *A Pilgrimage to Nejd*, is an account of her experiences as the first European woman to travel openly in present-day Saudi Arabia.

Blunt, Wilfrid Scawen (1840–1922) *British traveler in the Middle East, writer, husband of Anne Isabella Blunt*

Wilfrid Blunt served briefly in the British diplomatic service before embarking on a career as a poet and political activist with strong anti-imperialist convictions. With his wife, ANNE ISABELLA BLUNT, he traveled widely in North Africa and the Middle East.

Blunt was a breeder of Arabian horses. In 1877, he planned a trip deep into the Arabian Peninsula to buy breeding stock for his stud farm. Blunt and his wife started from Iskenderun on the Mediterranean coast of southeastern Turkey and traveled down the Euphrates River to Baghdad. From Baghdad, they followed the Tigris River northward, touring the region that once comprised ancient Mesopotamia (present-day Iraq), then returned to Damascus and the coast of the MEDITERRANEAN SEA.

The Blunts returned to Damascus in 1879. They befriended an influential Arab sheik and, under his protection, traveled southward from Damascus into the Nefud (Nejd) region of present-day central Saudi Arabia. They studied the life and culture of the bedouin and Shammar people, then headed northward to Baghdad. They eventually reached the Persian Gulf port of Bushehr, where they obtained passage back to Europe.

Wilfrid Blunt and Lady Anne Blunt were among the first Europeans to travel into the interior of Arabia openly as Christians. Blunt's outspoken sentiments on behalf of the rights of Muslims in the face of European colonialism probably aided in his travels through regions not usually hospitable to non-Muslims.

Bocharov, Dmitry Ivanovich (fl. 1770s–1790s)

Russian mariner in southern Alaska

Dmitry Bocharov was a Russian mariner along the Pacific coast of SIBERIA. In 1771, along with GERASIM ALEKSEYEVICH IZMAILOV, he became involved in a mutiny on the Kamchatka Peninsula and was forced to travel southward through the Kuril Islands and the islands of northern Japan to Canton in southern China. He made his way to Europe aboard a French vessel. Back in Russia, he was jailed briefly but was soon cleared of complicity in the mutiny.

By the early 1780s, Bocharov had returned to seafaring around Kamchatka and the Sea of Okhotsk. He entered the service of Russian fur entrepreneur GRIGORY IVANOVICH SHELIKOV, taking part in the 1783–84 voyages establishing the first Russian fur-trading settlements at the eastern end of the Gulf of Alaska.

In 1786, Bocharov, sailing in an open boat, surveyed the Aleutian Islands southwest of Kodiak. Two years later, again with Izmailov, he explored a wide stretch of the north coast of the Gulf of Alaska, from the Kenai Peninsula eastward to Yakutat Bay.

Bocharov commanded the *Three Saints* in 1790, when it took ALEKSANDR ANDREYEVICH BARANOV from eastern Siberia to Alaskan waters. On that voyage, the ship was wrecked on Unalaska Island, but under Bocharov's direction, the passengers and crew constructed small open boats on which they were able to reach Kodiak.

In 1791, Bocharov explored the eastern end of the Alaska Peninsula and succeeded in finding a water route between Bristol Bay to the north and the Gulf of Alaska to the south.

Dmitry Bocharov's explorations led to an expansion of the Russian FUR TRADE in southern Alaska. By discovering a passage through the Alaska Peninsula, he provided an important shipping link between the trading settlements north of the Aleutians and the principal Russian settlements on the Gulf of Alaska.

Bodega y Quadra, Juan Francisco de la
(Juan Francisco de la Bodega y Quadra
Mollineda, Juan Francisco Bodega y Cuadra)

(1744–1794) *Spanish naval officer in Alaska and the Pacific Northwest*

Juan Francisco de la Bodega was born in Lima, Peru. His father was a Spanish diplomat at Cuzco, and his mother, a descendant of a leading Peruvian family. In 1762, Bodega joined the Spanish navy's marine guard, and, over the next 12 years, he rose in rank to ship's lieutenant while serving on Spanish warships.

In 1774, Bodega traveled to San Blas, the main port of the Spanish navy's North Pacific Fleet, on the central west coast of Mexico. The following year, with an expedition headed by BRUNO HECETA, he commanded the schooner *Sonora* along the Pacific coast of North America, and explored what is now known as Grays Harbor in Washington. Accompanied by JUAN JOSEF PÉREZ HERNÁNDEZ, Bodega followed the coast of what is now British Columbia and the southern Alaskan panhandle, reaching 58°30' north latitude. En route, he explored Prince of Wales Island; on its western side, he located and named Bucareli Sound. Also on this voyage, Bodega sailed into Sitka Sound and sighted Mount Edgecombe. Heceta meanwhile had been forced to turn back off Vancouver Island in present-day British Columbia.

In 1776, Bodega returned to Peru, where he obtained a new ship for Spanish exploration in the Pacific Northwest. In command of the *Favorita*, he again sailed to Alaskan waters as part of Lieutenant Ignacio de Arteaga's expedition of 1779. The Spanish government had sent the fleet to investigate the extent of Russian colonization in Alaska and to intercept the ships in JAMES COOK's expedition that were then exploring the BERING STRAIT for a northern passage across Asia or North America.

Bodega again reached Prince of Wales Island and undertook an extensive survey of Bucareli Sound. He then continued northward into the eastern Gulf of Alaska, sighting Mount Saint Elias and Kayak Island. He took part in the official ceremonies at Nuchek Bay and on the Kenai Peninsula, in which Arteaga officially claimed southern Alaska for Spain. Bodega reached as far west as Kodiak Island but did not venture beyond that point, and was thus unable to meet up with Cook's expedition, at that time commanded by CHARLES CLERKE.

Throughout the 1780s, Bodega held high positions in the Spanish navy in Havana, Cuba, and in Cádiz, Spain. He returned to San Blas in 1789. In 1792, he took command of the Spanish naval base at Nootka Sound on the west shore of Vancouver Island. His appointment came in the wake of the Nootka Sound Crisis of 1789, which had brought Great Britain, Spain, and the United States to the brink of war.

At Nootka in 1792–93, Bodega supervised the administration of the diplomatic settlement of the crisis. There he met with American sea captain ROBERT GRAY and British naval officer GEORGE VANCOUVER, providing both with navigational information about the Pacific coast. Bodega directed further Spanish exploration around Vancouver Island, especially the Strait of Juan de Fuca. He also established a Spanish naval installation at what is now Neah Bay, Washington. Ships under his command explored northward from Nootka into the fjords of British Columbia and southeastern Alaska, making one of the final searches for the NORTHWEST PASSAGE undertaken by a European power. After a year in command at Nootka, Bodega returned to San Blas. Before long, he died of a seizure in Mexico City.

In the early 1790s, under the leadership of Juan Francisco de la Bodega, Spanish influence in the Pacific Northwest reached its highest point. Bodega's explorations along the northwest coast of North America resulted in accurate navigational data, which aided in the subsequent findings of Vancouver and Gray. While seeking to carry out the terms of the diplomatic settlement at Nootka, Bodega directed one of Spain's last great official explorations of North America.

Bodmer, Karl (Carl Bodmer) (1809–1893)

Swiss artist on the upper Missouri River

Karl Bodmer was born in Riesbach, Switzerland. He first studied art with his uncle, Swiss draftsman Johann Jakob Mayer, then went to art school in Paris.

While on a sketching trip in Germany in 1832, Bodmer was engaged by ALEXANDER PHILIPP MAXIMILIAN to accompany him on an expedition to the American West and provide drawings and pictures of Indians and frontier

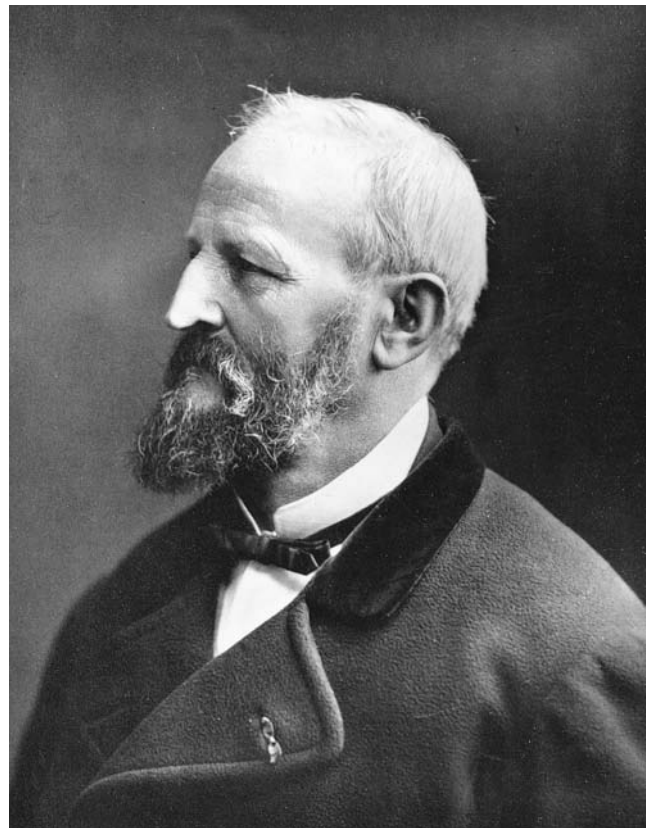
scenes. In May of that year, he traveled with Maximilian and the prince's servant to Boston, New York, and St. Louis. From there, they traveled on a fur company steamboat up the MISSOURI RIVER to the frontier trading posts in what is now Nebraska, South and North Dakota, and Montana.

Bodmer produced pictures of the Sioux (Dakota, Lakota, Nakota) Indians who came to trade at Fort Pierre in present-day South Dakota. Farther up the river at Fort Clark (now Bismarck, North Dakota), he painted portraits of the Mandan Indians and scenes of their daily life.

Bodmer and Maximilian went on to Fort Union at the mouth of the Yellowstone River. They continued by KEELBOAT into present-day Montana as far as the mouth of the Marias River, where they spent a few weeks at Fort McKenzie.

At Fort McKenzie, Bodmer painted portraits of Blackfoot Indians and produced landscapes of the distant ROCKY MOUNTAINS. He witnessed a surprise attack by Assiniboine and Cree Indians against the Blackfeet encamped outside the fort, recording the incident in a painting.

Bodmer and Maximilian returned in fall 1833 to Fort Clark, where they spent the winter. Over the next several



Karl Bodmer (Library of Congress)

months, Bodmer made pictures of Mandan life around the post. He also painted Arikara and Hidatsa Indians.

Bodmer returned to St. Louis with Maximilian in spring 1834. The two traveled back to New York, then sailed for Europe.

In Paris, Bodmer worked at turning his pictures into engravings that served as illustrations for Maximilian's 1839 account of the expedition: *Travels in the Interior of North America*. Although the book was published in a limited edition, Bodmer's pictures were well received and gained him widespread recognition.

In his later career, Bodmer became part of the art colony at Barbizon and developed a long association with the artist Jean-François Millet. He continued to execute scenes of early American frontier life, including depictions of the exploits of frontiersman DANIEL BOONE.

Karl Bodmer took part in one of the earliest expeditions to the upper Missouri whose aims were cultural and scientific, rather than commercial and political. His pictures preserve the images of the vanished Mandan, who were all but wiped out by a smallpox epidemic just three years after his visit.

Bogle, George (1746–1781) *British official in Tibet*

George Bogle was born near Haddington in southern Scotland to a fairly prominent family. After his early education at Haddington and Glasgow, he attended the University of Edinburgh, then studied at a private school until 1764. That year, he began to work for his older brother's banking business, but he left in 1769 and entered the service of the BRITISH EAST INDIA COMPANY.

By 1774, Bogle had become a judicial official in India, serving on behalf of the British East India Company and its governor general, Warren Hastings. That year, Hastings commissioned Bogle to undertake a diplomatic mission across the HIMALAYAS into Tibet. With Alexander Hamilton and a small party of other East India Company men, along with several natives, Bogle traveled northward from Calcutta through Bhutan, crossed the Tsangpo River, and reached Shigatse in southern Tibet. He established friendly relations with the Dalai Lama of Tibet, then returned to India.

From 1776 to 1779, Bogle continued to hold high positions as a colonial administrator in northeastern India. He planned a second expedition to Tibet but died before he could carry it out. Soon after his death in 1781, the rulers of Tibet forbade further visits by Europeans, and no trade connections were made.

George Bogle was the first European to visit Tibet since Jesuit missionaries earlier in the 18th century. In 1876, nearly a century after his death, British geographer Clement R. Markham published an account of the journey, based upon private papers and journals provided by Bogle's family.

Boller, Henry A. (1836–1902) *American fur trader on the upper Missouri River*

Henry Boller was born in Philadelphia, Pennsylvania, the son of a fairly successful merchant. As a boy, he developed an interest in the western frontier, especially the life of the Indians. He was particularly influenced by frontier artist GEORGE CATLIN's illustrations of Indian life on the upper MISSOURI RIVER.

Although Boller entered the University of Pennsylvania in 1852, he left short of graduation, soon seeking his father's support for a voyage to India or China. Instead of sending his son to the Far East, the elder Boller accompanied Henry on a trip to St. Louis, Missouri, in spring 1857, where they investigated the possibility of entering the upper Missouri FUR TRADE. Henry again traveled to St. Louis the next year and found a job with the independent fur-trading outfit Clark, Primeau & Company.

Boller was hired as a clerk and was assigned to the company's fur-trading post near Fort Berthold, on the north bank of the Missouri, not far from present-day Stanton, North Dakota. At this post, he dealt extensively with Mandan and Gros Ventre (Atsina) Indians.

Boller's tenure at the Knife River trading post ended in spring 1860, when Clark, Primeau & Company was acquired by the AMERICAN FUR COMPANY. He returned to St. Louis and entered into a business partnership with the veteran frontier fur trader CHARLES LARPENTEUR.

Because of the American Fur Company's domination of the upper Missouri fur trade, Boller and Larpenteur were unable to arrange steamboat service to carry their goods to the Dakotas and points west. As a result, in August of that year, they shipped their goods north via the Mississippi River to the port of St. Paul, Minnesota. From St. Paul, Boller, Larpenteur, and their men carried their goods overland by wagon train to Pembina on the Red River of the North in present-day northeastern North Dakota. As planned, the wagon caravan broke into two groups at Pembina. Larpenteur led one party westward to the mouth of the Yellowstone River, into the lands of the Assiniboine Indians. Several miles above the mouth of the Yellowstone, he established his trading post, Fort Stuart. Meanwhile, Boller accompanied the rest of the wagons and men in a journey across what is now central North Dakota to Fort Berthold, on the Missouri, where he had started in the fur trade three years earlier.

Boller, along with another partner, trapper Jeff Smith, spent the next summer, fall, and winter trading for furs in the Fort Berthold region, operating out of a makeshift trading station they had converted from an Indian earth lodge. In March 1861, Boller and Smith traveled up the Missouri and Yellowstone Rivers to join Larpenteur and the rest of the trading expedition at Fort Stuart.

Boller and Smith arrived at Fort Stuart just as the winter fur-trapping season was coming to a close. Since at that

time there were no steamboats servicing the independent fur traders that far up the Missouri, they suggested to Larpenteur that they transport the winter's fur harvest back along the overland route to Pembina and St. Paul for shipment down the Mississippi River to St. Louis. Larpenteur disagreed with this idea; he prevailed in his plan to ship the furs down the Missouri by boat directly to St. Louis. A 65-foot flat-bottomed craft, known as a Mackinaw boat, was constructed for the trip; after Boller and Smith had gone on ahead, Larpenteur traveled downriver with the furs. In this way, Boller and his partners were able to ship their goods directly to St. Louis by the easier and cheaper downriver route, thereby avoiding the costly and time-consuming overland trek to St. Paul.

In St. Louis that summer, Boller received his share of the profits, then left the firm and returned to Philadelphia. There he soon became engaged to marry Mary Parsons, a journalist. In 1863–64, he lived in Montana, taking part in the gold rush around Bannack and Virginia City. He also spent time in the Salt Lake region of Utah.

In 1864, Boller briefly returned to Philadelphia, but he soon set out again for Montana. In 1866, he traveled to California, purchased a herd of horses, and drove them back to Montana to sell at a considerable profit. He then returned to Philadelphia to marry Mary Parsons.

Boller's wife was an accomplished journalist, and with her encouragement, he wrote of his career on the upper Missouri River and the Montana frontier in the book *Among the Indians: Eight Years in the Far West, 1858–1867* (1867). The work includes detailed descriptions of steamboat travel on the upper Missouri and everyday life of Native Americans.

In 1868, Boller and his wife settled in Junction City, Kansas, where he became involved in the cattle business. In about 1878, he moved with his family to Denver, Colorado, finding work first in insurance and then in the real estate business. Boller had plans to revise his book, but he died before its completion.

Henry Boller witnessed the last years of the fur trade on the upper Missouri. His travels and those of earlier mountain men helped open the American west to non-Indian settlement.

Bombay, Sidi (unknown–1889) *African guide, interpreter in East and central Africa*

Sidi Bombay was a Yao tribesman from the interior of what is now Tanzania. Little is known of his origins or early life except that he had been a slave owned by a man from Bombay, India, and that he had adopted that city's name as his own. After gaining his freedom, he served as a soldier with the forces of the sultan of Zanzibar.

In summer 1857, Bombay, who was fluent in Hindustani, Arabic, and East African languages, was hired by SIR

RICHARD FRANCIS BURTON and JOHN HANNING SPEKE as guide and interpreter for their expedition into the interior of East Africa in search of the source of the NILE RIVER. Soon after the explorers set out from the coastal settlement of Bagamoyo in August, Bombay was given the additional responsibility of managing the supply caravan. In August 1858, while Burton remained behind at Tabora to recover from illness, Bombay accompanied Speke on a journey northward to Lake Victoria.

Bombay, who proved essential to the success of the expedition, was again engaged by Speke on his return to East Africa in 1860 to follow up his earlier investigations of Lake Victoria, this time with JAMES AUGUSTUS GRANT. Bombay's duties included recruiting additional porters as well as serving as Speke's second in command when Grant was incapacitated by a leg injury. Although many of the native bearers eventually deserted, Bombay and his men remained loyal to Speke and Grant throughout the expedition.

Bombay was employed by SIR HENRY MORTON STANLEY in 1871, when he set out in search of Dr. DAVID LIVINGSTONE in East Africa's lake region. Two years later, he accompanied English explorer VERNEY LOVETT CAMERON in his east-to-west trek across the African continent.

Bombay served for a short period as a missionary. He then retired to a farm in Zanzibar purchased for him by Speke and lived on a pension granted to him by the ROYAL GEOGRAPHICAL SOCIETY in recognition of his contributions to European exploration in Africa. He died on his farm in 1885.

Sidi Bombay, like other native guides and interpreters, proved indispensable to the European exploration and discovery of the interior of Africa. His geographic knowledge, linguistic abilities, and administrative skill helped Burton, Speke, Cameron, and Stanley in their travels throughout hazardous regions of the African continent.

Boncourt, Louis-Charles-Adélaïde Chamisso de See CHAMISSO DE BONCOURT, LOUIS-CHARLES-ADÉLAÏDE.

Bonin, Charles (1865–1929) *French traveler in Asia*

In 1893, Frenchman Charles Bonin traveled into Southeast Asia, visiting Malaya (present-day Malaysia) and Laos. He then went to China, and over the next seven years, he traveled widely throughout Mongolia and Tibet and into SIBERIA. Bonin subsequently served in the French Ministry of Foreign Affairs as director of archives.

In the course of his travels in China, Charles Bonin charted the YANGTZE RIVER (Chang) and YELLOW RIVER (Huang He) using modern scientific methods. In 1898,

he made the first European foray into the lands of the Lolo people.

Bonneville, Benjamin Louis Eulalie de

(1796–1878) *U.S. Army officer, American fur trader in the American West*

Benjamin de Bonneville was born near Paris, France, as the French Revolution was giving way to the rise of Napoléon Bonaparte. His family was prominent in radical politics and among family friends were many revolutionary sympathizers, including Marie-Joseph de Lafayette and the American political writer Thomas Paine.

When Bonneville was seven, his family chose to leave France rather than live under the Bonaparte autocracy. In 1803, with the help of Paine, they moved to the United States, where Bonneville was raised and educated. He attended West Point, receiving a commission as second lieutenant in 1815.

Bonneville's first army assignments took him to garrisons in New England. He also saw service supervising the construction of a military road in Mississippi. In 1821, he was sent to what was then the western frontier post of Fort Smith in present-day Arkansas, and subsequently he was stationed at posts in present-day Oklahoma and Missouri. During his military service on the western frontier in the 1820s, he was in close contact with fur traders working the ROCKY MOUNTAINS in present-day Colorado, Utah, and Wyoming.

In 1825, Bonneville accompanied Lafayette on a tour of the Mississippi River Valley. The next year, Bonneville was promoted to the rank of captain and assigned to the frontier garrison at Fort Gibson in present-day Oklahoma.

In 1830–31, Bonneville organized his own fur-trading venture. In New York City, he obtained the financial support of veteran fur entrepreneur JOHN JACOB ASTOR. Soon afterward, he applied to the army for a two-year leave of absence. In addition to developing business interests, Bonneville intended to provide the army with topographic data on the regions west of the Rocky Mountains and north of Mexico.

On May 1, 1832, Bonneville led a wagon caravan of 110 men from Fort Osage on the Missouri River in western Missouri, northwest toward the Green River region of what is now northeastern Utah and southwestern Wyoming. His expedition crossed the Continental Divide by traveling through the SOUTH PASS in Wyoming's Wind River Range, one of the early successful crossings westward through the Rockies with loaded wagons.

From the South Pass, Bonneville led his men westward along the Oregon Trail. Along the way, they passed by the rock formations known as Red Buttes. Then, entering the Green River Basin, high in the Rockies, they traveled into the Bear Lake region of present-day northeastern Utah.

The expedition arrived in time for the fur trappers' rendezvous in summer 1832, held that year at Pierre's Hole on the western slopes of the Teton Mountains. Soon afterward, Bonneville directed the construction of Fort Bonneville along the Green River, north of Pierre's Hole—a site that provided a commanding presence over the passes through the Rockies. Over the next three years, Bonneville led two expeditions from this installation north and west into the COLUMBIA RIVER region of Oregon.

In 1833, Bonneville dispatched one of his mountain men, JOSEPH REDDEFORD WALKER, along with 40 others, to explore the region westward, across the Sierra Nevada to the California coast. That same year, he sent an application to his superiors in Washington, D.C., to extend his leave, but this communication never reached its destination.

Veteran fur traders tended to bypass Fort Bonneville in favor of the more lucrative prices available from the HUDSON'S BAY COMPANY's posts on the Columbia River and from the other posts on the MISSOURI RIVER and Yellowstone River. With his business losing money, Bonneville headed back East in 1835. At Independence, Missouri, he learned that the army had never received his application for an extension of his leave. Believing he had overstayed his leave for two years without authorization, his superiors cashiered him from the service.

Bonneville journeyed to Washington, D.C., where he remained throughout 1836 seeking reinstatement. During this time, he contacted author Washington Irving, selling him a firsthand account of his experiences in the FUR TRADE. Irving edited Bonneville's narrative and published this work the following year as *The Adventures of Captain Bonneville*.

Bonneville's reinstatement in the military was accomplished in 1836 through the direct intercession of President Andrew Jackson. Historians have speculated, based on the ease with which he obtained his leave and his subsequent reinstatement, that Bonneville's leave from the army may actually have been a cover for intelligence-gathering activities concerning the Mexicans in California, the British in Oregon, and Indian tribes. Moreover, Bonneville's main competition in the fur trade was from Astor's own AMERICAN FUR COMPANY forts, which seems paradoxical considering that it was Astor who provided much of Bonneville's financial backing. In any event, after 1836, Bonneville was once again an officer in the U.S. Army.

Bonneville remained in the army for the next 29 years. He fought in the U.S.-Mexican War of 1846–48, and, during the 1850s, commanded U.S. garrisons in Oregon. In 1857, as a colonel in command of U.S. forces in the New Mexico territory, he led a military expedition, comprised of U.S. Army troops and Pueblo Indian auxiliaries, from Albuquerque into the Gila River region of what is now south-central Arizona. The Gila River Expedition of 1857 was

intended as a punitive military strike against the Apache Indians. In meeting this objective, Bonneville also led his command into the little-known region of the recently acquired Gadsden Purchase of 1853, undertaking one of the earliest official U.S. explorations of this area.

During the Civil War, Bonneville directed recruiting operations for the Union army, retiring from the service in 1865, at the rank of brevet brigadier general. He settled at Fort Smith, Arkansas, where he lived until his death in 1878.

Benjamin de Bonneville's explorations of the Rocky Mountains and the Columbia River region provided the government with important geographic and military data that was useful in the subsequent U.S. takeover of the Oregon Country in 1846. In addition, Bonneville's expedition under Joseph Walker blazed an important route for emigrants across Utah, northern Nevada, and the Sierra Nevada into California, which later became the well-traveled California Trail. In addition to Irving's account of Bonneville's explorations, Bonneville himself prepared one of the earliest scientifically based maps of the river system of the central Rockies and Pacific Northwest. Bonneville Lake and Bonneville Dam in southern Oregon were named after him, as well as the Bonneville Salt Flats on the western edge of northwestern Utah's Great Salt Lake Desert.

Boone, Daniel (1734–1820) *American frontier hunter, soldier, guide in Kentucky*

Daniel Boone was born to a family of English Quakers near Reading, Pennsylvania. In 1749, he moved south with his family to the Yadkin Valley in the frontier region of northwestern North Carolina.

With the outbreak of the French and Indian War in 1754, Boone became a wagoner for British troops and colonial militia forces in western Pennsylvania. He survived General Edward Braddock's disastrous 1755 offensive against the French and Shawnee Indian allies at Fort Duquesne (present-day Pittsburgh). The next year, he married his neighbor Rebecca Bryan. In 1758, he again took part in an assault on Fort Duquesne, which resulted in a British victory under General John Forbes.

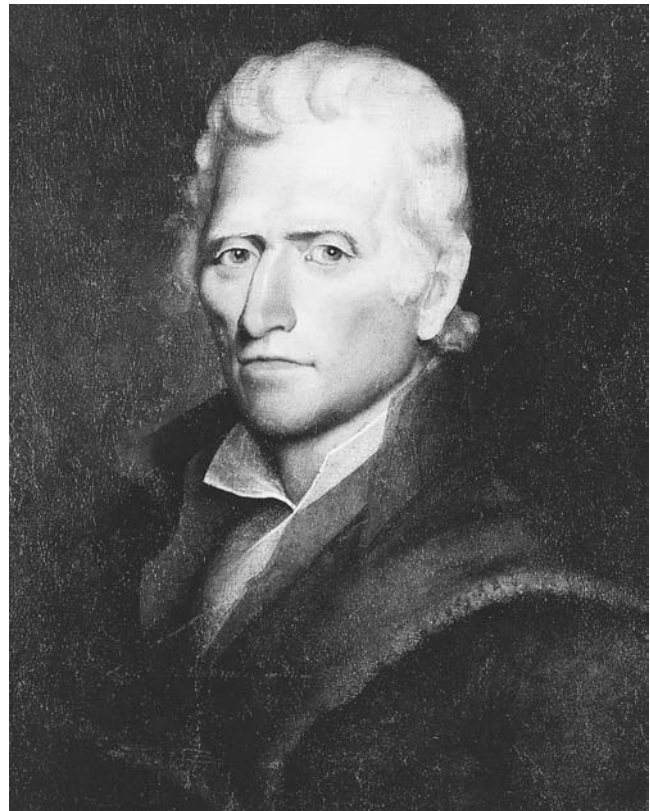
In 1763, following the conclusion of the French and Indian War, Boone traveled south to East Florida, which had then become a British possession. He explored the St. Johns River of northeastern Florida, with plans to settle there. But his wife refused to move from North Carolina, and Boone remained in the Yadkin Valley for the next several years. In 1767–68, he made a hunting expedition into the APPALACHIAN MOUNTAINS but failed to reach Kentucky.

Boone had become acquainted with frontiersman JOHN FINLEY during his service in the French and Indian War.

On their reunion in 1768, Finley told Boone about the territory of eastern Kentucky. Later that year, Boone set out on a hunting expedition. A hunter by profession, he periodically went on extended forays into the wilderness to hunt for deer, whose hides provided an important cash supplement to his farming income. Because of threatened resistance from Cherokee Indians, who resented Boone's encroachment on their lands in defiance of the Proclamation Line of 1763, Boone was forced to return to his North Carolina home without reaching his intended destination, the Blue Grass country of Kentucky.

Accompanied by his brother Squire Boone, his brother-in-law John Stuart, Finley, and several other frontier companions, Daniel Boone set out on another hunt in 1769, sponsored in part by North Carolina land developer Judge Richard Henderson. Henderson and his Transylvania Company sought to develop the lands beyond the Proclamation Line and engaged Boone and his small party, who, as hunters, would be less likely to arouse the suspicions of British authorities concerning settlement plans.

The group passed through the CUMBERLAND GAP of southwestern Virginia, then followed an ancient Cherokee Indian trail known as the Warriors' Trace. Boone and part of his company then traveled by way of the South Fork of the Kentucky River to the site of present-day Irvine,



Daniel Boone (New York State Library, Albany)

Kentucky. From there, they explored the Kentucky and Red Rivers as far as the Eskippikithiki region. By December 1769, Boone had traveled throughout much of central Kentucky, including the Blue Grass region. That same month, Stuart and Boone were captured by a Shawnee Indian war party, but they soon escaped.

Stuart disappeared over the winter of 1769–70, while hunting on his own (his body was found five years later—he had apparently been killed by Indians). That spring, Boone's brother Squire returned east to North Carolina for additional supplies. Left alone, Boone explored the Licking and Kentucky River Valleys of northeastern Kentucky. He reached the Ohio River and followed it as far as the Falls of the Ohio in the vicinity of present-day Louisville, Kentucky.

Boone was rejoined by his brother in late July 1770 at an encampment on the Red River and spent the rest of that year hunting for deer in the Green and Cumberland Valleys. With a substantial quantity of valuable hides and furs, the brothers set out on the return journey to North Carolina in March 1771. Near the Cumberland Gap, however, they were waylaid by Cherokee. The Indians confiscated all of the Boones' furs, hides, horses, and mules and warned the frontiersmen against trespassing on their reserved lands in the future. Boone and his brother returned safely to the Yadkin Valley soon afterward.

In 1773, in defiance of the Indians, Boone undertook a colonizing expedition into the Cumberland Gap region. In addition to his own family, Boone led seven other families of frontier settlers into eastern Kentucky from North Carolina. They had hardly penetrated the Cumberland Gap when they were ambushed by Cherokee. Boone's 17-year-old son James was killed in the attack, and the party fled back to North Carolina.

Boone's colonizing efforts into the trans-Appalachian region were interrupted by the outbreak of Lord Dunmore's War of 1774 against the Shawnee. In this conflict, Boone served as courier for colonial troops and surveyors operating around the headwaters of the Ohio River near present-day Louisville, Kentucky.

In 1775, Boone undertook another colonizing expedition through the Cumberland Gap, sponsored again by Judge Richard Henderson and his Transylvania Company. With an advance party of about 30 frontiersmen, he blazed a route from the Shenandoah Valley through the Cumberland Gap as far as the southern reaches of the Kentucky River, south of present-day Lexington, Kentucky. He established a permanent settlement, known as Boonesborough (or Boonesboro). Settlers from east of the Appalachians soon arrived, and the area was annexed as a county of Virginia.

With the onset of the American Revolution, Boonesborough was subject to attacks by the British-allied

Shawnee. Boone himself was captured by a war party in 1778, but he was adopted into the tribe by a chief known as Blackfish. He managed to escape after a few months of captivity and provided military intelligence to the American forces concerning British and Shawnee strategy.

In 1779, Boone established a settlement at Boone's Station, near present-day Athens, Kentucky. Financial reverses precipitated by legal problems concerning his land claims led Boone to take his family to the area of present-day Mayesville, West Virginia, where he operated a tavern.

In 1796, Boone attempted to win the government contract to develop his Wilderness Road into a wagon route, but the project was granted to another party. Meanwhile, one of his sons, Nathan Boone, had migrated westward to the Louisiana country, at that time a Spanish possession. Three years later, Boone also traveled westward; he was granted a land claim by the Spanish government in the Femme Osage region of what is now Missouri. He lost title to these lands following the acquisition of the Louisiana Territory by the United States in 1803. A special act of Congress eventually reinstated Boone's claim to his Spanish land grant.

Boone lived on the Missouri frontier at the settlement of St. Charles near St. Louis for the remainder of his life. From about 1800 to 1818, he continued to make expeditions into the western wilderness, hunting and exploring. He entered the Platte River region, perhaps as far west as the eastern ROCKY MOUNTAINS, before his death in 1820.

Daniel Boone's hunting and colonizing expeditions into eastern and central Kentucky helped to bring about the non-Indian settlement of that region after the American Revolution. The Wilderness Road, established by Boone in the mid-1770s, encouraged migration into the trans-Appalachian country of Kentucky and Tennessee, providing the basis for regular travel between the original settlements in the East and the newly established frontier regions extending west to the Mississippi and Missouri Rivers. Boone's exploits were popularized in John Filson's 1784 book, *Discovery, Settlement, and Present State of Kentucky*. His reputation in the popular culture as a frontiersman and explorer only deepened in 1824, when his character was immortalized in verse as part of British Romantic poet Lord Byron's work *Don Juan*.

Borchgrevink, Carsten Egeberg (1864–1934)

Norwegian explorer in the Antarctic

Born in Norway, Carsten E. Borchgrevink settled in Australia in 1888. His first trip to the Antarctic region was in 1894–95, aboard the Norwegian whaling ship *Antarctica*. On January 23, 1895, he was among the crewmembers who went ashore on Victoria Land, becoming one of the first men to set foot on the Antarctic continent.

Borchgrevink was in England in the late 1890s, where he succeeded in obtaining support for a scientific expedition to Antarctica from British newspaper publisher Sir George Newnes. After a stopover in NEW ZEALAND, his expedition sailed to Antarctica on the *Southern Cross* in August 1898, reaching the coast at Cape Adare in mid-February 1899 during the Antarctic summer. The ship soon returned to New Zealand, leaving Borchgrevink and the nine others in his party for the Antarctica winter.

Over the next year, Borchgrevink made several expeditions overland on skis and dogsleds into the interior of Antarctica. On one expedition from the Cape Adare base, he reached 78° 50' south latitude, which up to that time was the most extreme southern point ever reached.

Borchgrevink and his expedition were picked up by the *Southern Cross* when it returned in early February 1900. Before leaving the Antarctic, he made a navigational study of the Ross Ice Shelf, revealing that it had moved southward almost 30 miles since its first sighting by SIR JAMES CLARK ROSS in the early 1840s.

Carsten E. Borchgrevink was a pioneer in Antarctic exploration. His 1899–1900 expedition was the first to winter on the Antarctic continent and undertake extensive exploration into the interior. His account of his exploits, *First on the Antarctic Continent*, was published in 1901.

Borough, Stephen (Stephen Burrough)

(1525–1584) *English mariner in Russia and the European Arctic, brother of William Borough*

Stephen Borough was born in Northam, Devonshire, England. Embarking on a career as a seafarer, he became an accomplished sea captain and navigator. In 1553, he commanded the *Eduard Bonaventure* in a three-ship trading expedition to Russia, sponsored by SEBASTIAN CABOT and headed by SIR HUGH WILLOUGHBY. The pilot general on the voyage was RICHARD CHANCELLOR.

Following the west coast of Norway northward, Borough and Chancellor located and named North Cape, then rounded it and entered the White Sea. They soon reached the Russian port of Archangel.

In 1556, Borough again sailed to the Arctic coast of European Russia, supported by Cabot and his newly formed MUSCOVY COMPANY. In command of the *Searchtrifft*, Borough went even farther east on this voyage, locating a strait between Vaigach Island and Novaya Zemlya providing an entrance to the Kara Sea.

Borough had planned to travel as far as the mouth of the Ob River, east of Novaya Zemlya, but was forced back by ice. He wintered at Archangel and in the spring, he undertook a search for Sir Hugh Willoughby and his ships, missing since 1554. From a Dutch vessel, he learned that

Willoughby's fleet had been wrecked and all hands lost. Before returning to England in 1557, Borough explored the coasts of the Kola Peninsula, Finland, and Lapland.

In 1561, Borough commanded the *Swallow* for the Muscovy Company in a voyage to Russia, taking the company's chief factor, ANTHONY JENKINSON, on the first leg of his trade mission to the Caspian Sea and central Asia.

In 1563, Borough entered the naval service of Queen Elizabeth I and, for the next 20 years, he served as chief pilot for her fleet of ships on the Medway River in southeastern England. His brother, WILLIAM BOROUGH, was also a seafarer and served with Stephen in his voyages to Russia in 1553 and 1556.

Stephen Borough's voyages not only opened up Russia to English commerce, but also provided the earliest navigational information for subsequent maritime expeditions in search of a NORTHEAST PASSAGE between Europe and the Far East.

Borough, William (William Burrough)

(1536–1599) *English mariner in Russia and the European Arctic, brother of Stephen Borough*

Born in Northam, Devonshire, England, William Borough was the younger brother of STEPHEN BOROUGH. Starting at the age of 16, he sailed as an ordinary seaman on his brother's voyages to Russia.

Over the next 20 years, William Borough continued to make regular trips from England to Russia as a captain for the London-based MUSCOVY COMPANY's trading fleet. In 1568, he helped organize an expedition attempting to find a NORTHEAST PASSAGE in the eastern reaches of the Barents Sea. Over the next six years, he traveled widely in the region between the ports on the White Sea and Moscow. He helped plan and organize MARTIN FROBISHER's 1576 exploration of GREENLAND.

In about 1579, Borough entered the English navy and commanded warships in campaigns against pirates in the Baltic Sea. In 1581, he published a major work on navigation, *A Discourse of the Variation of the Compass, or Magnetical Needle*. He served under SIR FRANCIS DRAKE in a naval campaign against the Spanish at Cádiz in 1587, and, the next year, he commanded a warship in the English victory over the Spanish Armada.

William Borough produced written accounts of his travels and observations in Russia during his years there for the Muscovy Company. He also drew up new navigational charts based on the latest explorations of the Russian Arctic coast. In his 1581 *Discourse* he was one of the earliest navigators to cite the errors in maps by GERARDUS MERCATOR and other cartographers, caused by their not taking into account variations in COMPASS readings in high northern latitudes.

Bougainville, Hyacinthe-Yves-Philippe Potentien de (baron de Bougainville)

(1782–1846) *French naval officer in the South Pacific, son of Louis-Antoine de Bougainville*

Hyacinthe de Bougainville was the eldest son of French naval officer and explorer LOUIS-ANTOINE DE BOUGAINVILLE. He was born in Nantes, France, and following his early education at the École Polytechnic in 1798–1800, he entered the French navy.

In 1800, Bougainville sailed to the South Pacific with NICOLAS BAUDIN as a midshipman on the *Géographe*, then returned from Australia in 1803 on the expedition's other ship, the *Naturaliste*. He held numerous naval assignments in the Napoleonic Wars of 1803–14.

In 1817–19, Bougainville was a lieutenant commander in a French naval expedition to Southeast Asia and the Moluccas. He commanded the *Thetis* and *Espérance* in a CIRCUMNAVIGATION OF THE WORLD in 1824–26. In 1838, he was made a rear admiral.

In the first half of the 19th century, Hyacinthe, baron de Bougainville, carried on the tradition of French maritime exploration in the Pacific begun by his father in the 1760s. His account of his 1824–26 voyage, *Journal of a Circumnavigation of the World*, along with an atlas, was published in 1827.

Bougainville, Louis-Antoine de (comte de Bougainville) (1729–1811) *French naval officer in the Atlantic and Pacific, father of Hyacinthe-Yves-Philippe Potentien de Bougainville*

Louis-Antoine de Bougainville was born in Paris, the son of a prominent lawyer in the court of Louis XV. He first embarked on a legal career but then undertook the study of mathematics under French mathematician Jean le Rond d'Alembert. By 1756, he had published a major work on integral calculus, *Traité du calcul intégral*, for which he was elected to Great Britain's prestigious ROYAL SOCIETY.

Bougainville entered the French army in 1753. He served in French Canada as aide-de-camp to General Montcalm in the French and Indian War of 1754–63, taking part in engagements on Lake Champlain and negotiating the French surrender at Quebec.

Back in France in 1763, Bougainville launched a campaign to reestablish a French overseas colonial empire. With financial backing of relatives and merchants of the port of St. Malo, he succeeded in organizing a colonizing enterprise on the Falkland Islands in the South Atlantic Ocean (known by the French as the Malouines and by the Argentines as the Malvinas), for the resettlement of Acadians displaced from Canada by the British. The French government supported Bougainville's plan, hoping that it would provide France with control of the main sea route to the Pacific

Ocean, one of the last regions where the British had not yet established a strong naval presence.

From 1764 to 1766, Bougainville headed three expeditions to the Falklands and established a small Acadian colony called Fort St. Louis. In this period, he also explored Tierra del Fuego and Patagonia. His chief maritime adviser, PIERRE-NICOLAS DUCLOS-GUYOT, undertook a navigational survey of the eastern approach to the Strait of Magellan.

In 1766, when France was compelled by international circumstances to sell the Falklands to Spain, Bougainville was sent to oversee the transfer of the islands. To compensate him for the loss of his colony, France offered him the governorship of the French Indian Ocean colonies on Île de France (present-day Mauritius) and Bourbon (present-day Réunion). Instead, Bougainville chose to undertake a government-sponsored CIRCUMNAVIGATION OF THE WORLD.

Bougainville sailed from Brest, France, in December 1766, commanding the frigate *Boudeuse*. Two months later, the expedition's other vessel, the *Étoile*, sailed from the French port of Rochefort, joining up with Bougainville and the *Boudeuse* at Rio de Janeiro in June 1767. On reaching the Falklands, Bougainville negotiated the Spanish takeover of the islands, then sailed to Tierra del Fuego. Hampered by rough seas and bad weather, his ships took 52 days to make the westward passage through the STRAIT OF MAGELLAN, during which a detailed study of the strait was made, including the charting of a bay that now bears his name. Bougainville also studied the inhabitants of Patagonia and Tierra del Fuego, disproving earlier reports that these natives were giants.

One of the intended aims of Bougainville's world voyage was to search for Terra Australis, the elusive GREAT SOUTHERN CONTINENT. Upon entering the Pacific, he first headed northward to the TROPIC OF CAPRICORN, then sailed due west. The expedition soon came upon the Tuamotu Islands. Unable to make a landing because of outlying reefs, Bougainville named them the Dangerous Archipelago. Continuing westward, he reached Tahiti in April 1768. Although British navigator SAMUEL WALLIS had visited Tahiti eight months earlier, Bougainville claimed the island for France, calling it New Cythera. The French were well received by the Tahitians; Ahutoru, the chief's son, was allowed to join the expedition.

Still seeking the fabled Great Southern Continent, as well as the east coast of New Holland (which turned out to be Australia), Bougainville sailed westward from Tahiti to the islands of Samoa, which he named the Navigator Archipelago. He also charted the Solomon Islands, which originally had been visited by Spanish navigator ÁLVARO DE MENDAÑA in 1568, but had been lost to navigation because of inaccurate charting.

At one point, Bougainville and his ships were less than 250 miles off the coast of northeastern Australia, but they were prevented from reaching the mainland by the Great Barrier Reef, a portion of which is now known as Bougainville Reef.

Short on provisions, Bougainville was forced to head his expedition northward in search of a passage to the SPICE ISLANDS (the Moluccas) where he planned to obtain live spice plants for transplanting on Île de France. His explorations around the New Hebrides revealed that they were islands, and not part of a great landmass as previously thought. Landing on New Britain, he came upon a plaque left by British explorer PHILIP CARTERET on his visit there a few months earlier.

In summer 1768, Bougainville reached the Dutch settlement of Batavia in what is now Indonesia. Outbreaks of scurvy forced him to abandon plans to obtain spice plants in the Moluccas. After obtaining fresh provisions from the Dutch, he sailed back to France by way of Île de France and the CAPE OF GOOD HOPE, arriving at St. Malo in March 1769.

In 1771, Bougainville published his account of the trip, *A Voyage Around the World*. The next year, he tried unsuccessfully to gain support for a French expedition to the NORTH POLE. Appointed a commodore in the French fleet, he took part in 1779 in naval operations against the British in the American Revolution. In 1782, following his defeat by the British at Martinique in the Caribbean Sea, he retired from the navy. He returned to active service under the French revolutionary government after 1790. He was made a count of the empire by Napoléon I in 1808.

Louis-Antoine, comte de Bougainville commanded the first official French expedition to circumnavigate the world. His explorations in 1766–69 confirmed the existence of many islands unknown to Europeans since the Spaniards had explored the western Pacific Ocean in the 16th century. His voyage resulted in the European discovery of straits in the Solomons and in the New Hebrides that now bear his name. Bougainville Island, the largest of the Solomons, was also named in his honor. The Louisiade Archipelago and New Cyclades reappeared on maps as a result of Bougainville's Pacific expedition. The expedition's naturalist, JOSEPH-PHILIBERT COMMERSON, sent back thousands of new species of plants and animals during the voyage. Among them was the tropical flowering vine known as the bougainvillea, named after Bougainville. Observations on the culture of the Tahitians influenced French Enlightenment authors Jean-Jacques Rousseau and Denis Diderot in their concept of the noble savage. Bougainville's eldest son, HYACINTHE-YVES-PHILIPPE POTENTIEU DE BOUGAINVILLE, also embarked on a naval career that took him around the world.

Bourgmont, Étienne-Veniard de (sieur de Bourgmont, Étienne de Bourgmont)

(1680–ca. 1730) *French soldier, fur trader on the Missouri River and Great Plains*

Étienne de Bourgmont was born in the Normandy region of France, the son of a doctor. In about 1700, he immigrated to French Canada, where he worked as one of the VOYAGEURS in the FUR TRADE on the eastern Great Lakes.

Within a few years, Bourgmont entered the French military, serving as an ensign under HENRI DE TONTI at the French fur-trading settlement at Detroit. When Tonti retired in 1705, Bourgmont temporarily took command at Detroit. An Indian uprising erupted the following year, and in 1707, Bourgmont deserted, fleeing to an island in Lake Erie with other army defectors. He was soon joined there by Madame Tichenet, known as La Chenette, a woman with whom he was romantically linked.

In about 1712, Bourgmont and the other deserters were apprehended by French authorities. He soon became friendly with French colonial governor ANTOINE LAUMET DE LA MOTHE, who allowed Bourgmont to escape southward into the French Louisiana country. Eventually Bourgmont settled among the Indians of the central MISSOURI RIVER region.

Over the next five years, Bourgmont established friendly relations with the Oto, Omaha, Pawnee, and other tribes of the Missouri River and its tributaries. He also undertook explorations up the Missouri, reaching as far as the mouth of the Platte River in present-day eastern Nebraska.

In 1717, Bourgmont wrote an account of his travels on the Missouri, *La Description*, describing the region as far to the north as the Arikara Indian villages in what is now central South Dakota, although it is not certain he traveled there himself.

In 1719, the French colonial governor of Louisiana, JEAN-BAPTISTE LE MOYNE, appointed Bourgmont a captain in recognition of his efforts in establishing peaceful relations with the Indians of the upper Louisiana country. Bourgmont subsequently took part in the French victory over the Spanish in western Florida. Soon afterward, he returned to France and reported his findings on the upper Missouri to the French government.

In 1723, the Company of the Indies, the French trading monopoly in Louisiana, concerned over Spanish encroachment from the west, commissioned Bourgmont to return to North America and establish a French outpost in what is now north-central Missouri. Bourgmont founded Fort Orleans at the mouth of the Grand River. In 1724, he set out with a small detachment of French soldiers to the west to make peace with the Comanche Indians. He ascended the Missouri to the mouth of the Kansas River. After following that stream briefly, he set out overland. In present-day western Kansas, where almost 200 years earlier FRANCISCO

VÁSQUEZ DE CORONADO had fruitlessly sought Indian riches, Bourgmont met with Comanche chiefs and succeeded in gaining their allegiance to the French.

Not long after his return to Fort Orleans, Bourgmont convinced several Plains Indian chiefs to accompany him to Paris, where they were received with great acclaim by the French royal court. Bourgmont married a wealthy widow and remained in France. For his efforts in securing an alliance with the Missouri River tribes, the French government granted him a title of nobility.

Although he did not ascertain the actual source of the Missouri, Étienne de Bourgmont's explorations took him to a point on the river farther north than any known European had been to that time. His 1724 expedition across the Kansas plains into Comanche country was the deepest French penetration into the territory west of the MISSISSIPPI RIVER to date.

Bouvet de Lozier, Jean-Baptiste-Charles

(1704–1786) *French naval officer in the South Atlantic*

An orphan at the age of seven, Jean-Baptiste Bouvet studied for a time in Paris before working in the shipyards of St. Malo. He decided to pursue a career in navigation and by 1731 had reached the rank of lieutenant in the FRENCH EAST INDIA COMPANY.

In 1733, Bouvet proposed a plan to locate the GREAT SOUTHERN CONTINENT, or Terra Australis, in the South Pacific Ocean—perhaps the same land reportedly located by Binot Paulmier de Gonneville in 1504 and known as GONNEVILLE'S LAND—where ships might stop over on journeys to the Far East. His proposal was finally accepted, and in July 1738, Bouvet departed Lorient, France, with two ships, the *Aigle* and *Marie*. The following October, the expedition arrived at Santa Catarina Island off the coast of Brazil and continued southward the next month.

On January 1, 1739, in the South Atlantic Ocean, east of the South Sandwich Islands, southwest of Africa's CAPE OF GOOD HOPE, and north of the ANTARCTIC CIRCLE, Bouvet and his expedition encountered a landmass covered in glaciers that they thought to be a promontory of Antarctica; Bouvet named it the Cape of Circumcision. Bouvet waited for 12 days, hoping to land, but finally gave up because of perpetual fog. Avoiding DRIFT ICE, the expedition headed eastward in search of other lands. With supplies dwindling and the crew suffering from cold and SCURVY, Bouvet directed his ships northward on January 24 for the Cape of Good Hope. The expedition returned to France in late February.

Because Jean-Baptiste Bouvet did not correctly chart the location of what turned out to be a 22-square-mile island, neither JAMES COOK nor SIR JAMES CLARK ROSS could locate it. It was not until 1808 that British whalers rediscovered

it. In 1822, the American sealer Benjamin Morrell managed the first landing and named it Bouvet Island in honor of the French discoverer. Great Britain claimed the island in 1825, calling it Liverpool Island. Norway occupied it in 1924, however, and, the next year, Great Britain relinquished its claim. In 1971, Bouvet Island and adjacent waters were designated a nature reserve, and in 1977, Norway established an automated meteorological station on the island.

Boyd, Louise Arner (1887–1972) *American explorer in the Arctic*

Louise Arner Boyd was born in San Rafael, California, near San Francisco, into a family with a fortune made by her maternal great-grandfather in the California gold rush of 1849. A 1907 debutante, she became socially active in wealthy circles. In 1910, she joined her parents in a year-long tour of Europe and Egypt.

By 1920, both of her parents had died, and Boyd inherited her family's considerable wealth. She made another trip to Europe soon afterward. In 1924, she first ventured into the Arctic regions as a passenger on a Norwegian cruise ship.

In 1926, Boyd embarked on her first Arctic exploring expedition. In Norway, she chartered the ship *Hobby* and, along with a few friends, sailed northward into the Arctic Ocean to Franz Josef Land. This was primarily a recreational cruise in which Boyd and her companions hunted polar bears and seals, recording the trip with both motion pictures and photographs.

Boyd's next expedition to the Arctic was in summer 1928. Again sailing from Norway on the *Hobby*, she assisted the Norwegian government in its search efforts for ROALD ENGLEBREGT GRAVNING AMUNDSEN, who had disappeared on a rescue mission on behalf of Italian Arctic explorer UMBERTO NOBILE and his expedition. During the next few months, Boyd and her companions on the *Hobby* explored eastward and westward from Spitsbergen (present-day Svalbard), covering more than 10,000 miles between Franz Josef Land and the Greenland Sea. Although the search for Amundsen was fruitless, the Norwegian government awarded Boyd the Chevalier Cross of the Order of St. Olav for her efforts. She was the first non-Norwegian woman to be so honored. In addition, she received from the French government the Cross of the Legion of Honor.

In 1931, Boyd undertook a scientifically oriented exploration of the Arctic, aimed at collecting geographic and geological data as well as making a photographic study of Arctic animals and plants. She engaged the ship the *Veslekari* and sailed to the east coast of GREENLAND. Among her party were a botanist, a big game hunter, and the writer Winifred Menzies. Boyd and her expedition stopped at an Inuit settlement near Scoresby Sound, where

she made a study of their life and culture; she later reported the experience in a series of articles published in *The Christian Science Monitor* in 1932. In her surveys of Greenland's east coast, she reached the uncharted De Geer Glacier. The region between De Geer Glacier and the Jaette Glacier was later named Louise Boyd Land, in her honor.

In summer 1933, Boyd undertook her third Arctic expedition, under the sponsorship of the AMERICAN GEOGRAPHICAL SOCIETY. Again sailing on the *Veslekari*, a vessel that she used on all her subsequent Arctic explorations, Boyd and her scientific team studied the glacial features along Greenland's east coast. They explored north of Scoresby Sound, examining Franz Josef Fjord and King Oscar Fjord. A sonic depth finder was used on this expedition to study subsurface coastal features. Boyd recounted her experiences on this expedition in her book, *The Fiord Region of East Greenland*, published in 1935.

In 1937 and 1938, Boyd explored the Arctic seas north and east of Norway, between Bear Island and Jan Mayen Island. These two expeditions used ultrasonic depth research to determine the existence of a submarine ridge between

these Arctic islands. Boyd's book about this expedition was to be published in 1940. However, with the onset of World War II in Europe, she was advised by the U.S. government that the information included in it, especially her photographs, could be of a strategic value to the Germans. The work, *The Coast of Northeast Greenland*, was finally published in 1948.

In 1941, in connection with preparations for the impending war, the National Bureau of Standards commissioned Boyd to undertake an expedition to the Arctic region to study the effects of polar magnetic phenomenon on radio communications. After America's entry into the war later that year, she became a technical adviser to the War Department on matters dealing with strategic planning in the Arctic. In recognition of her services, the U.S. Army awarded Boyd a Certificate of Appreciation in 1949, citing her valuable contributions of Arctic geographic knowledge to the war effort.

Boyd's next and last Arctic exploit took place in 1955 when, at the age of 68, she chartered an airplane and became the first woman to fly over the NORTH POLE. She spent her last years in San Francisco, where she died at the age of 85.

Louise Arner Boyd's Arctic explorations resulted in new geographic information about Greenland's east coast and revealed significant features about the floor of the Greenland Sea. She was the first woman to play a leading role in the history of modern Arctic exploration.



Louise Arner Boyd (Library of Congress)

Bozeman, John Merin (1835–1867) *American pioneer in Colorado and Montana*

John Bozeman, originally from Georgia, headed westward to Colorado in 1861 to try his luck as a prospector. With new gold strikes in southwestern Montana, he relocated to Virginia City and Bannack.

At that time, to reach Montana from the east, non-Indians traveled to the headwaters of the MISSOURI RIVER by way of Fort Benton, or westward along the Oregon Trail, northward through the SOUTH PASS of Wyoming's Wind River Range, then along the Overland Trail through Idaho via Fort Hall. Both the Missouri River route and the overland routes were circuitous. Travelers along the Oregon and Overland Trail were forced to cross the Continental Divide twice. The direct route northward from Colorado crossed through the heart of hunting lands that the government had reserved for the Sioux (Dakota, Lakota, Nakota) and Northern Cheyenne Indians, east of the Bighorn Mountains of north-central Wyoming.

In the winter 1862–63, Bozeman and a companion, the trapper John Jacobs, with Jacobs's mixed-blood daughter, departed Bannack, Montana, heading eastward across the Bighorn Mountains of Wyoming, then southward, accomplishing a more direct route to Colorado.

The following spring, 1863, Bozeman led a wagon train out of Julesburg, Colorado, a settlement on the South Platte River in northeastern Colorado, and followed the river and the Overland Trail along the first leg of the usual route to the Montana goldfields at Bannack and Virginia City. When warned by Indian war parties to stay off lands reserved by treaty, the majority of emigrants remained on the long route west of the Bighorns. Bozeman and a small party left the wagon train, however, and, traveling mostly at night, headed northward along the east side of the Bighorn Mountains. When they reached the Yellowstone River, they crossed the Belt Mountains through what later came to be known as the Bozeman Pass, and arrived in the Montana gold country, having avoided the usual roundabout route along the Overland Trail to Fort Bridger in Wyoming and to Fort Hall in Idaho. In spring 1864, Bozeman led a second, larger wagon train the entire distance of his new route, the first such crossing.

Indian attacks against travelers on the new trail were common. Yet the U.S. government wanted to encourage gold mining in Montana, mainly because the U.S. Treasury was short of gold in 1865, following the conclusion of the Civil War. As a result, starting about 1865, the army began constructing forts to protect the travelers heading northward from Colorado into southwestern Montana. Among these were Fort Phil Kearny, Fort C. F. Smith, and Fort Reno. Soon regular wagon traffic was following the Bozeman Trail.

Meanwhile, Bozeman had begun to prosper as a result of his new trade route into Montana, and, in 1864, he had established the town of Bozeman in Montana's Gallatin Valley. The Bozeman Trail attracted cattlemen, who saw a great opportunity to bring much needed beef cattle north from Texas into the Montana mining country around Bannack and Virginia City. The first cattle drive from Texas to Montana was undertaken in 1866.

The increased number of travelers passing through Sioux lands, coupled with the devastating effects on hunting lands inflicted by the cattle drives, led to increased Indian raids. By the end of 1866, a full-scale conflict was underway, known as Red Cloud's War or the War for the Bozeman Trail, under the Oglala Sioux Red Cloud and younger war chiefs, such as Crazy Horse and Hump.

Bozeman himself was killed on the trail by Blackfoot Indians in 1867. The next year, that portion of the Bozeman Trail between Fort Reno and Fort Phil Kearny in north-central Wyoming, and Fort C. F. Smith on the Bighorn River in southern Montana, was closed by the government in accordance with the Fort Laramie Treaty of 1868, ending Red Cloud's War. The Bozeman remained closed for nearly 10 years, until the final defeat of the allied Sioux, Northern Cheyenne, and Northern Arapaho under Sitting Bull in the wars for the Black Hills in 1876–77. The road was then re-

opened and served as the main trade and cattle route into Montana.

John Bozeman's journey in 1863 blazed a much-needed cut-off from the Oregon Trail east of the Bighorn Mountains into the Montana goldfields. His endeavors opened the northern plains to commerce from Colorado and Texas and helped bring about U.S. military action against the Plains tribes and their subsequent displacement by non-Indian settlers.

Brackenridge, Henry Marie (1786–1871)

American traveler, writer on the Missouri River, envoy to South America

Born in Pittsburgh, Pennsylvania, Henry Marie Brackenridge, starting at the age of two, was tutored by his father, the writer and scholar Hugh Henry Brackenridge. When seven years old, he was sent by his father to St. Genevieve on the MISSISSIPPI RIVER near St. Louis, a port city at that time under Spanish dominion. From 1793 to 1796, the young Brackenridge learned French at St. Genevieve; he then returned home to continue his education, studying the classics with his father and attending the Pittsburgh Academy. He went on to study law and was admitted to the Pennsylvania Bar in 1806.

Brackenridge first settled in Baltimore, Maryland, intending to establish a practice in admiralty law. Unable to build a clientele, he returned to the MISSOURI RIVER frontier about 1810, settling in St. Louis. Because of his interest in exploration, he joined MANUEL LISA's fur-trading expedition up the Missouri, which departed St. Louis in April 1811. Traveling by KEELBOAT with Lisa's ST. LOUIS MISSOURI FUR COMPANY contingent, Brackenridge journeyed through the lands of the Sioux (Dakota, Lakota, Nakota) Indians and reached the Mandan and Arikara villages in present-day South and North Dakota in June. After spending some time among the fur traders and trappers on the upper Missouri, as well as with the naturalist JOHN BRADBURY, he returned downriver to St. Louis in August. Brackenridge's account of his journey was later incorporated into Washington Irving's 1836 work on the upper Missouri and western FUR TRADE, *Astoria*.

Between 1811 and 1814, Brackenridge practiced law in St. Louis and New Orleans. During this period, he learned the Spanish language and studied the principles of Spanish law and helped formulate the code of laws that would become the legal system of Louisiana. He also served as a territorial deputy attorney general as well as a judge. In 1814, Brackenridge's account of his travels and observations on the lower Mississippi, *Views of Louisiana*, was first published.

Brackenridge's knowledge of Spanish and Spanish law came to the attention of President James Madison, and in 1817, he was appointed as a secretary to the U.S. State De-

partment's commission that traveled to South America to report on the newly established independent republics. His subsequent report provided a basis for the Monroe Doctrine. His account of his experiences on that tour, *Voyage to South America*, appeared in 1819.

In 1821, Brackenridge was sent to Florida, where he served first as a secretary to Florida territorial governor Andrew Jackson, then as a federal judge. He was on the bench in Florida until his removal in 1832, following a dispute with Jackson, who had become president.

Brackenridge spent his remaining days on his estate near Pittsburgh, where he founded the community of Tarantum. In 1834, he published an account of his frontier experiences, *Recollections of Persons and Places of the West*.

Since most of the exploration of the upper Missouri in the first decades of the 19th century was undertaken by commercial interests, especially unlettered mountain men and frontier trappers, Henry Marie Brackenridge's account serves as a rare record of the region as seen through the eyes of an educated person. His writings include a description of travel by keelboat on the Missouri River in the years before the introduction of the steamboat.

Bradbury, John (1768–1823) *Scottish naturalist in North America*

John Bradbury, a native of Scotland, was educated in England, concentrating in botany and zoology. In 1809, the Botanical Society of Liverpool sent him to the United States for a scientific study of the plant life of the American frontier. Upon his arrival, he was welcomed by former president and fellow naturalist Thomas Jefferson. At that time, St. Louis was the gateway to the frontier regions to the west, and Jefferson arranged for Bradbury to travel to that city and use it as a base for his scientific expeditions.

Over the following year, Bradbury undertook numerous excursions into the region surrounding St. Louis, up to a distance of 300 miles from the city.

In spring 1811, Bradbury joined WILSON PRICE HUNT's fur-trading expedition up the MISSOURI RIVER, the overland contingent of JOHN JACOB ASTOR's venture to the Oregon coast. Bradbury remained with the Astorians until June 1811, when they reached one of Astor's trading forts on the Missouri in what is now southern South Dakota. He joined fellow writer HENRY MARIE BRACKENRIDGE, who was touring the upper Missouri with MANUEL LISA's expedition, and traveled farther up the Missouri into what is now North Dakota, spending time among the Mandan and Arikara Indians, before returning to St. Louis in August.

The outbreak of hostilities between the United States and England in the War of 1812 prevented Bradbury's return to England, and he undertook an extensive tour of the Ohio Valley.

Returning to England in 1815, John Bradbury published an account of his travels on the American frontier. His book, entitled *Travels in the Interior of North America in the Years 1809, 1810, and 1811*, includes information on the geographic features of the upper Missouri region, as well as detailed studies of its flora and fauna. Noteworthy among his wildlife descriptions is the account of the massive herds of buffalo on the banks of the Missouri in the Dakotas, extending for miles and numbering in the many thousands. In addition, Bradbury describes the lives of Indian peoples and of Missouri River boatmen.

Bransfield, Edward (ca. 1785–1851) *British naval officer in the Antarctic*

Irish-born Edward Bransfield was serving on the British ship *Andromache*, based in Valparaíso, Chile, in 1819, when he heard reports from whalers and sealers of land sightings to the south in uncharted seas. He commandeered the brig *Williams*, under Captain William Smith, for an exploratory expedition on behalf of the British navy.

Heading southward, Bransfield reached and charted the South Shetland Islands, landing on King George Island. On January 30, 1820, farther to the south, he spotted snow-covered mountains on an expanse of land that would later be charted as the northwest coast of the Antarctic Peninsula. At about the same time, FABIAN GOTTLIEB VON BELLINGSHAUSEN, sailing for Russia, was also south of the ANTARCTIC CIRCLE.

With its energy and resources directed toward the discovery of the NORTHWEST PASSAGE, the British Admiralty showed little interest in Edward Bransfield's discovery. In November of that same year, 1820, the American mariner NATHANIEL BROWN PALMER sighted the southern Antarctic Peninsula and, for a time, received credit for the first sighting of Antarctica. Bransfield had originally named the peninsula Trinity Land. It later became known as Palmer Land. With newfound interest in the region, Great Britain renamed the peninsula Graham Land, after R. G. Graham, Lord of the Admiralty. In 1965, the United States and Great Britain agreed on the name Antarctic Peninsula. Bransfield Island, Bransfield Strait, and Mount Bransfield are named after the British explorer.

Brazza, Pierre-Paul-François-Camille Savorgnan de (Pietro Paolo Savorgnan di

Brazza) (1852–1905) *Italian-born French naval officer, official in West Africa*

Born in Rome, Pietro di Brazza attended the French naval academy, a position arranged by his father, an Italian count. In 1874, as a young officer, Brazza traveled to the French colony of Gabon in West Africa. After returning to Europe,

he became a naturalized French citizen and adopted the French form of his name, Pierre Savorgnan de Brazza.

In 1875–77, Brazza, on behalf of French interests in the region, explored Africa's Ogowe River as well as the Alima, a tributary of the CONGO RIVER (Zaire River). In 1879–82, in the employ of the French National Committee of the International Association, which sought to counter SIR HENRY MORTON STANLEY's efforts to annex the Congo basin on behalf of King Leopold II of Belgium, Brazza explored and developed the upper Congo region. In 1880, he founded Franceville in what is now Gabon and Brazzaville in what is now Congo. Brazza's treaties with tribal leader Makoko that same year provided the basis for France to assume control of the French Congo, an area of 193,000 square miles north and west of the Congo, which was declared a French protectorate in 1891 and became part of French Equatorial Africa (modern-day Gabon and Republic of the Congo) in 1910. Belgium's Congo Free State came to be known as Zaire and is now the Democratic Republic of the Congo.

Starting in 1883, Brazza served as a French colonial official. During his tenure, he continued to carry out expeditions in the region. In 1886–98, he was commissioner general of the French Congo. In 1905, he again traveled there on behalf of the French government to investigate reports of forced labor and cruelty on French-run rubber plantations, but he died of dysentery during the trip.

Pierre Savorgnan de Brazza helped open up the Congo River to French interests and helped France secure a foothold in West Africa.

Brébeuf, Jean de (Saint Jean de Brébeuf)

(1593–1649) *French missionary in the eastern Great Lakes region*

Jean de Brébeuf was born in the Normandy region of France to a noble family. Starting in 1617, he studied under the Jesuits, becoming a priest five years later.

In 1625, Brébeuf traveled to North America and began his missionary work among the Montagnais Indians of Quebec. The next year, accompanied by Indian guides, Brébeuf undertook a CANOE voyage westward to the Georgian Bay region of Lake Huron, where he soon established a Jesuit mission to the Huron (Wyandot) Indians. When French Canada was threatened by a British invasion in 1628, he was recalled to Quebec. He returned to France the next year.

With French control of Quebec reestablished in 1633, Brébeuf returned to Canada and resumed work among the Huron. He was the author of the 1635 and 1636 editions of the *Jesuit Relations* about the Huron missions. In 1640, Brébeuf and other Jesuit missionaries were forced to flee from the Georgian Bay settlements following an outbreak of smallpox, which the Huron blamed on them. They went south to live among the Neutral (Attiwandaronk) Indians in present-day southeastern Ontario between Lake Ontario and Lake Erie.

Brébeuf's efforts among the Neutral were hampered by the Indians' belief that he was a sorcerer and he left in 1641. By 1644 he was again at work among the Huron.

In 1649, the Iroquois (Haudenosaunee) invaded Huron territory. Brébeuf, GABRIEL LALEMENT, and several other Jesuit missionaries were captured and tortured, then burned to death. In 1930, Brébeuf, along with Lalement, was declared one of the Jesuit Martyrs of North America and canonized by Pope Pius XI.

Jean de Brébeuf's work among the Indians of Georgian Bay and the Straits of Mackinac established some of the earliest non-Indian settlements in that part of French Canada. He developed the St. Ignace missionary settlement on Mackinac Island, which served as a base for the MISSISSIPPI RIVER explorations of JACQUES MARQUETTE and LOUIS JOLLIET.

Bréhant de Galinée, René de (ca. 1645–1678)

French missionary in the eastern Great Lakes region

René de Bréhant was born at Rennes in northwestern France, a descendant of a French noble family that traced its lineage back to the CRUSADES. He attended the Sorbonne in Paris, studying astronomy and mathematics in addition to preparing for the priesthood. Soon after receiving a degree in theology, he entered the Sepulchian Order, and in 1668, he arrived in French Canada as a missionary priest.

Bréhant spent a year at the Sepulchian headquarters near Montreal, learning the Algonquian language in preparation for a planned evangelical mission to the Potawatomi Indians of the upper Mississippi Valley.

In early July 1669, Bréhant left Montreal with a group of missionaries led by FRANÇOIS DOLLIER DE CASSON. The missionaries were accompanied by a number of VOYAGEURS, including RENÉ-ROBERT CAVELIER DE LA SALLE as interpreter. They followed the St. Lawrence River to Lake Ontario, then proceeded along its south shore to the Niagara River. After crossing the Niagara River, near what is now Hamilton, Ontario, Bréhant and his missionary companions parted company with La Salle, whose abilities as an interpreter proved limited.

Bréhant, Dollier, and the other missionaries explored westward for some distance, then encamped for the winter on the north shore of Lake Erie. In late March, they set out again for Potawatomi territory, but they were forced to change their plans when the CANOE carrying their religious items, including a portable altar, was lost in a storm. Without proper equipment to carry out their evangelical work, the missionaries decided to head back toward Montreal.

Not wanting the expedition to be a total failure, Bréhant and the others decided to explore the Great Lakes by following a northern route back to Montreal. From Lake Erie, they followed the Detroit River into Lake St. Clair and Lake Huron. After a visit to the mission in the Straits

of Mackinac, they headed eastward into Georgian Bay and Lake Nipissing. On the last leg of the journey, they traveled up the Ottawa and St. Lawrence Rivers, arriving back in Montreal on June 18, 1670.

Upon his return to Montreal, Bréhant became ill. During his convalescence over the next few months, he wrote an account of his journey, producing a map of the route followed to and from the Great Lakes. The map, one of the first ever drawn of the eastern Great Lakes, was presented to the colonial governor of New France, Jean-Baptiste Talon.

Bréhant returned to France in 1671. He died seven years later while en route to Rome.

René de Bréhant's travels with Dollier into the Great Lakes covered much territory already known at that time to the French. Nevertheless, his map clearly showed for the first time that Lakes Ontario, Erie, and Huron were connected.

Brendan, Saint (Saint Brendan the Navigator, Brandan, Brandon, Brendon, Brendan of Clonfert, Brendan the Voyager) (ca. 484–ca. 578)

Irish monk, legendary explorer of the North Atlantic

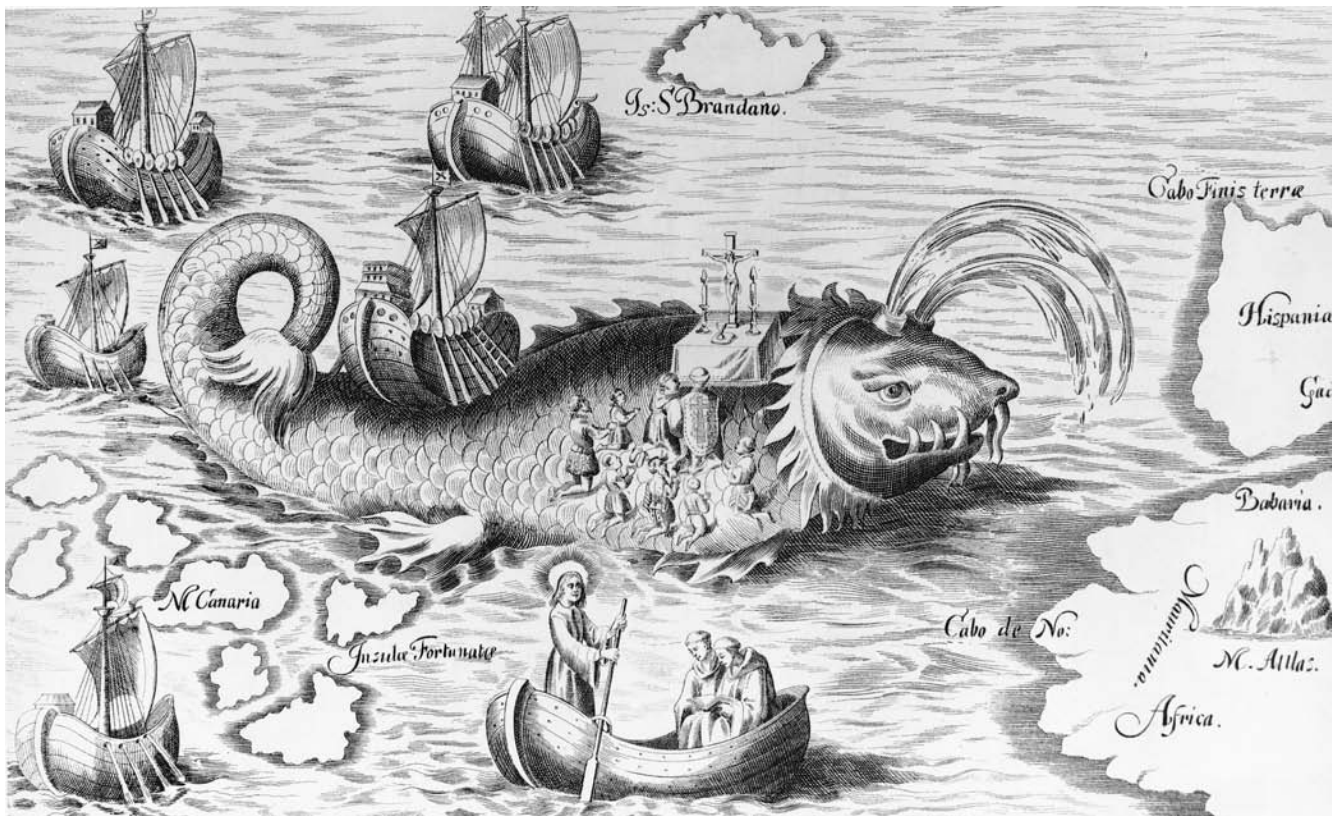
Born in or near Tralee on the southwest coast of Ireland, Brendan was ordained a priest in A.D. 512. He established monasteries in Ireland at Ardfert and Clonfert and under-

took evangelical missions to the Shetland Islands, Brittany, Cornwall, and Wales.

As reported in the early-10th-century Irish geographic works *The Book of Lismore* and *Navigatio Sancti Brendani* (also known as *The Voyage of St. Brendan*), Brendan reportedly went on a pilgrimage across the Atlantic Ocean. Sea pilgrimages in an open boat made of ox-hides stretched over a wooden frame, known as a CURRAGH, were a common practice.

According to the *Navigatio*, Brendan and a party of 17 Irish monks sailed westward from the southwest coast of Ireland and visited several islands in the Atlantic. Along the way, they came upon fabulous creatures, including giant sheep, pygmies, and sea-cats. Some historians have speculated that Brendan may have reached the Faeroe Islands between ICELAND and northern Scotland. The pygmies may have been Inuit (Eskimo) encountered off the coast of GREENLAND, and the sea-cats could have been walrus. In addition, as the story is told, a friendly whale named Jasconius is described as visiting the monks each Easter; the monks reportedly celebrated Easter Sunday mass on its back.

After five years of wandering among the islands of the North Atlantic, Brendan and his companions supposedly arrived in a land of continental dimensions, which they identified as “The Land Promised to the Saints.” After exploring the interior for weeks, they reached a large river, where an



The legend of Saint Brendan (Library of Congress)

angel reportedly appeared to tell them that this land was reserved for others to missionize at some point in the future. As instructed, they returned to Ireland.

In his later years, Brendan was associated with St. Columba at the monastery on the island of Iona, off the west coast of Scotland.

Although there is little historical evidence on where Brendan actually went on his voyage to the west, some historians have theorized that between 566 and 573, he may have reached Iceland, the CANARY ISLANDS, the AZORES, or the Madeira Islands. A popular speculation is that the Irish monk reached the Western Hemisphere and made a landing on Bermuda or the North American mainland.

St. Brendan's legendary explorations inspired medieval cartographers to include a ST. BRENDAN'S ISLE on their maps, lying west of Africa, near the conjectured islands of "Antillia" and "High Brassil." On his 1492 globe of the world, MARTIN BEHAIM indicated a "St. Brendan's Island" west of the Canary Islands, near the EQUATOR. Throughout the later Middle Ages, the story of St. Brendan's voyage preserved hopes that unknown lands lay waiting to be discovered westward across the Atlantic. Coupled with the sagas of the VIKINGS, the legend of St. Brendan influenced the voyages of CHRISTOPHER COLUMBUS and other European explorers of the late 15th and early 16th centuries.

Bressani, Francesco-Gioseppe (Father Francis Joseph Bressani) (1612–1672) *Italian missionary in French Canada*

Francesco-Gioseppe Bressani was born in Rome. He joined the Jesuit order at the age of 15 and subsequently embarked on an academic career, becoming a professor of mathematics, philosophy, and literature.

In 1642, Bressani traveled to French Canada, where he ministered to French colonists and Huron (Wyandot) Indians near Quebec. In 1644, he left the Jesuit settlement at Trois Rivières on the St. Lawrence River, and, accompanied by a party of Christianized Huron, he headed westward up the river for the Jesuit mission on the shores of Lake Huron's Georgian Bay. Soon after starting out, Bressani and his Huron companions were attacked by an Iroquois (Haudenosaunee) Indian war party near present-day Sorel, Quebec. The priest was taken captive and held for four months. During a trip to the upper Hudson River region, Bressani won his release when he was ransomed by Dutch fur traders. He then made his way to the Dutch colony of New Amsterdam (present-day New York City), from where he sailed to France.

In July 1645, Bressani returned to Quebec and again traveled westward to the Lake Huron region for missionary work among the Huron. In 1648, with the outbreak of a full-scale war between the Iroquois and the Huron, Bressani

set out for Quebec with a group of Huron refugees. En route, he was wounded in an Iroquois attack, but he managed to reach Quebec, where he remained for the next year. On his way back to the Lake Huron mission, he learned that it had been destroyed by Iroquois. Soon afterward, he returned to Europe, and he lived his remaining years in Florence, Italy.

Francesco-Gioseppe Bressani's account of his years as a missionary in French Canada, entitled *Brève Relation*, was published in Macerata, Italy, in 1653. His experience as a captive of the Iroquois illustrates the resentment the Iroquois maintained against the French and the Jesuits that stemmed from SAMUEL DE CHAMPLAIN's initial military alliance with the Huron in 1609.

Bridger, James (Jim Bridger) (1804–1881)

American fur trapper, scout, guide in American West

Born in Richmond, Virginia, James (Jim) Bridger moved with his family to Missouri, settling near St. Louis. By the time he was 13, he was orphaned and working as a blacksmith in the St. Louis area.

In 1822, Bridger answered WILLIAM HENRY ASHLEY's call for fur trappers to take part in his first expedition up the MISSOURI RIVER to the Dakotas and northern ROCKY MOUNTAINS. He was with Ashley's original contingent of men who trapped for furs during the winter of 1822–23, based around the newly established Fort Henry at the mouth of the Yellowstone River.

The following winter of 1823–24, Bridger trapped under Ashley's partner ANDREW HENRY, along with fellow mountain men John Fitzgerald and HUGH GLASS, exploring the Green River region of present-day southern Wyoming and northern Utah.

The next winter, 1824–25, Bridger trapped northwestern Utah's Rocky Mountains, and, in late 1824 or early 1825, he reached the Great Salt Lake, becoming one of the first non-Indians to explore it. Noting that the water was salty rather than fresh, Bridger speculated that he had come across an arm of the Pacific Ocean. JAMES CLYMAN, HENRY FRAEB, LOUIS VASQUEZ, and other trappers determined the lake was landlocked in 1826.

From 1826 to 1834, Bridger continued to trap for Ashley's various successors in the FUR TRADE, including JEDEDIAH STRONG SMITH and WILLIAM LEWIS SUBLETTE of the ROCKY MOUNTAIN FUR COMPANY. In 1835, he attended the Green River fur traders' rendezvous with CHRISTOPHER HOUSTON CARSON (Kit Carson). From 1838 to 1843, he was associated with JOHN JACOB ASTOR'S AMERICAN FUR COMPANY and worked the Rocky Mountains in search of beaver pelts.

By the late 1830s, fur trappers had seriously depleted the supply of beaver in the Rockies. Meanwhile, demand for

the pelts declined as silk became more fashionable among eastern and European hatmakers. In 1843, with his trapping partner Louis Vasquez, Bridger established a trading post, Fort Bridger, on the Oregon Trail, at the Green River's Black Fork, near the present-day town of Green River, Wyoming. Bridger and Vasquez traded for buffalo hides with Indian and non-Indian hunters and provided supplies and accommodations for travelers along the Oregon Trail headed for the Pacific Northwest and northern California.

In its first year of operation, Bridger's post was host to a large Oregon-bound wagon train, led by JESSE APPLIGATE. In 1847, BRIGHAM YOUNG, leading the first Mormon wagon train westward into the what is now Utah, stopped at Fort Bridger, where Bridger provided supplies and helpful information about the route south and west into the Great Salt Lake Basin. JOHN CHARLES FRÉMONT, during his expeditions of the 1840s into the Rockies, also stopped at Fort Bridger, where he received trail information and supplies from the mountain man.

In 1849–50, Bridger was a guide for Captain HOWARD STANSBURY's expedition seeking a route through Utah's Wasatch Mountains. During this venture, Bridger explored the route known as Cheyenne Pass, as well as what later became known as Bridger's Pass. The latter, in years to come,

served as an important route for overland stages and for the Union Pacific Railroad.

In 1853, the Mormons in Utah and southern Wyoming, suspecting that Bridger was supplying firearms and ammunition to the Ute Indians, forced Bridger to sell his interest in the trading post.

In 1855–56, Bridger served as guide for Irish big-game hunter Sir George Gore on a hunting expedition into the Yellowstone Valley of present-day northwestern Wyoming. This expedition brought back oral accounts of scenic wonders, spurring interest in the region among easterners.

When Mormon settlers in northern Utah openly resisted federal authority during the Mormon War of 1857–58, federal troops under Colonel Albert Sidney Johnston were sent to put down the uprising, with Bridger as guide.

In 1859–60, Bridger was a guide to Captain WILLIAM FRANKLIN RAYNOLDS's expedition from Fort Pierre and Fort Union in the Dakota Territory through Wyoming and Montana. In the course of this government-sponsored enterprise, Bridger helped locate a suitable wagon route connecting the Oregon Trail with the Walla Walla Valley of present-day eastern Washington.

In 1861, Bridger helped lead the Berthoud party through the Rockies from Denver in an attempt to find a shorter wagon route to the Great Salt Lake.

In about 1864, Bridger blazed a trail northward from Denver to the gold mining country around Bannack and Virginia City, Montana. Unlike the Bozeman Trail, established about the same time, Bridger's route ran west of Wyoming's Bighorn Mountains, thus circumventing the sacred hunting grounds of the Sioux (Dakota, Lakota, Nakota) and Cheyenne Indians. Although Bridger's trail northward from Colorado may have been safer for travelers to Montana, as well as less antagonistic to the Indians, it was longer and less traveled than JOHN MERIN BOZEMAN's route. The inevitable conflict with the Sioux led to the government's Powder River Expedition of 1865, during which Bridger again served as a scout for federal troops, this time commanded by General Patrick Edward Connor.

Although Bridger was troubled by failing eyesight, he continued to act as a guide and scout for the U.S. government and railroad interests. In 1866, he led a survey party measuring the length of the Bozeman Trail and conducted an expedition surveying the route across Wyoming and Utah for Grenville Mellon Dodge's Union Pacific Railroad project.

By 1868, Bridger's health had forced him into retirement. He settled near his old trading partner, Louis Vasquez, at Westport, Missouri, where he spent the remainder of his life.

Jim Bridger's career as a fur trapper in the 1820s and 1830s, and his later adventures as a trader and guide



Jim Bridger (drawing by Frederic Remington) (*Library of Congress*)

for explorers, military men, and settlers, spanned nearly the entire period of exploration and settlement of the northern plains and northern Rockies. The trails he helped blaze later became routes for wagon trains and railroads. Moreover, his explorations of the Yellowstone Valley of northwestern Wyoming contributed to the eventual preservation of this wilderness area as the nation's first national park in 1872.

Brosses, Charles de (1709–1777) *French geographer*
Charles de Brosses was born at Dijon in the Burgundy region of France. He became one of the leading scholars of his time, contributing to Diderot's *Encyclopedia* of 1751–72. Also prominent in politics, he was president of Burgundy's local governing body.

De Brosses had a keen interest in geography, and, in 1756, he published his *Histoire de la navigation aux terres australes* (History of navigation to southern lands), a study of explorations into the world's southern latitudes. Among the exploits he chronicled were those of French navigator Binot Palmier de Gonneville who sailed the southern seas in 1504, where he reportedly reached a large landmass, later known as the legendary GONNEVILLE'S LAND. Based on this and other accounts, de Brosses promoted the idea of a GREAT SOUTHERN CONTINENT, maintaining that such a landmass had to exist in the Southern Hemisphere in order to counterbalance the continents of the Northern Hemisphere.

De Brosses found further evidence to support his idea of geographic equilibrium in French sea captain JEAN-BAPTISTE-CHARLES BOUVET DE LOZIER's voyage of 1738–39, in which he reached land at 54° south latitude, farther south than any lands then charted in the Southern Hemisphere. He named it Cape Circumcision, after the feast day (January 1, 1739) on which he reached it, and concluded that it was the northern tip of a huge continent that extended to the south, the fabled Gonneville's Land. In his 1756 book, de Brosses held the cape as proof of the existence of the Great Southern Continent. Subsequent explorations would reveal that what Bouvet had found was actually only a small island, 1,100 miles off the Atlantic coast of Antarctica, known today as Bouvet Island.

In his *History of Navigation*, de Brosses first coined the term *Australasia* to refer to the Great Southern Continent. He also originated the term *Polynesia* as a reference to the many island groups in the South Pacific. Many of his geographic notions were erroneous. He contended that large stretches of open sea could not freeze, and that icebergs originated from freshwater rivers, their existence in southern latitudes underscoring the existence of a large southern landmass with an extensive inland river system that flowed to the sea.

De Brosses's geographic work influenced the French and British navigators who, following the conclusion of the Seven Years War in 1763, set out to explore the great uncharted regions of the Southern Hemisphere. South Pacific explorers JOHN BYRON, LOUIS-ANTOINE DE BOUGAINVILLE, and JAMES COOK were both familiar with his work when they searched for the Great Southern Continent during the 1760s.

Charles de Brosses promoted the idea that the aim of exploration into uncharted lands should be to advance scientific knowledge and to elevate the cultures of primitive peoples encountered, rather than merely for national gain by conquest. He was one of the first to propose that newly located lands could be used as places where European criminals could be sent for resettlement and rehabilitation, an idea that was eventually realized with the establishment of the first penal colony in New South Wales in Australia, in 1788.

Broughton, William Robert (1762–1821)
British naval officer on the Pacific coasts of North America and Asia

Few details exist of William Broughton's early life. After entering the British navy as a midshipman in his early teens, he took part in naval operations against the French on the Atlantic coast of North America and off the coast of India in 1778–83, during the American Revolution.

In 1791, as a naval lieutenant, Broughton took command of the brig *Chatham*, accompanying GEORGE VANCOUVER and the *Discovery* on an expedition to the northwest coast of North America. They first sailed to the Pacific Ocean by way of the CAPE OF GOOD HOPE and Australia. The two ships separated. Broughton headed across the Pacific toward Tahiti, locating an island group about 400 miles east of NEW ZEALAND, which he named the Chatham Islands after his ship.

In late May 1792, on North America's Pacific Northwest Coast, Broughton, guided by American merchant captain ROBERT GRAY's reports, located and entered the mouth of the COLUMBIA RIVER and undertook the first exploration by non-Indians up that river from the Pacific. His party reached a point 119 miles upstream, near what is now Washougal, Washington, east of the Willamette River's mouth at present-day Portland, Oregon.

Broughton subsequently sailed with Vancouver to Monterey, California, and, after traveling overland across Mexico to Vera Cruz, he returned to England in 1793.

In 1796, Broughton, in command of the *Providence*, returned to the northwest coast of North America. Arriving too late to rejoin Vancouver, he sailed westward across the Pacific, then surveyed Asia's Pacific coast from the Kamchatka Peninsula southward to Korea and Japan. On May

16, 1797, the *Providence* was wrecked when it struck a reef off the coast of Formosa (present-day Taiwan). Nevertheless, all of the crew survived, and Broughton carried out the rest of the Asian coast survey aboard a sloop that had been accompanying his ship. In May 1798, he arrived at Macao, the Portuguese colony off the southeast coast of China, from where he returned to England.

Broughton went on to serve in British naval campaigns in the Napoleonic Wars of the early 1800s. In 1810, he participated in the British campaign against the French colony on the Indian Ocean island of Mauritius, and, the next year, he took part in the attack on the Dutch colony on Java. After 1812, he returned to England, later settling in Florence, Italy.

In 1804, Broughton published an account of his expedition along the Asian coast, entitled *A Voyage of Discovery to the North Pacific Ocean*. He also left journals describing his exploration of the northwest coast of North America and his journey across Mexico.

Although Robert Gray is generally credited with the non-Indian discovery of the Columbia River, it was William Broughton who first charted it in 1792. Great Britain later claimed sovereignty over the Oregon Country partly on the basis of Broughton's investigations of the lower Columbia River Basin. In 1805, WILLIAM CLARK and MERIWETHER LEWIS relied on Broughton's charts of the lower Columbia River during their overland expedition to the Pacific.

Brown, Robert (1773–1858) *Scottish naturalist in Australia and Tasmania*

Robert Brown was born in Montrose, Scotland, the son of an Episcopal clergyman. He attended the Montrose grammar school, where he befriended James Mill, who later became a leading British philosopher. After studying philosophy at Marichal College in Aberdeen, Brown entered the University of Edinburgh in 1789. By that time, he had developed a keen interest in natural history, especially botany, and had become a member of the Natural History Society of Edinburgh. In 1791, he prepared a comprehensive collection and study of the flora of Scotland.

In 1795, Brown was commissioned as an officer and assistant surgeon in a Scottish regiment of the British army. After his service with the army in the north of Ireland, he was sent to London on recruiting duty in 1798, where he met British naturalist SIR JOSEPH BANKS. Banks recognized Brown's potential as a scientist and secured his appointment as the official naturalist on MATTHEW FLINDERS's expedition to Australia in 1801.

Brown sailed from Portsmouth with Flinders on the *Investigator* in July 1801, reaching the west coast of Australia that December. Over the next few months, he made nu-

merous landings on the Australian coast. Accompanied by natural history artist FERDINAND LUCAS BAUER, he undertook an extensive study of the region's wildlife. In addition to thousands of plant specimens, Brown collected animals unique to Australia, including kangaroos, emus, and certain varieties of lizards and cockatoos.

In February 1802, the *Investigator* sailed 148 miles up Spencer Gulf on Australia's south coast. Near its head, Flinders sighted a peak he named Mount Brown, in honor of the Scottish naturalist. Two months later, at Encounter Bay, Brown served as Flinders's interpreter in his meeting with the French maritime explorer THOMAS-NICOLAS BAUDIN.

Following a stop at Port Jackson (present-day Sydney), Brown continued with the Flinders expedition in an exploration of the east and north coasts of Australia. He examined the flora and fauna along the shores of the York Peninsula, and the coast of the Gulf of Carpentaria, and encountered several aborigines.

In August 1803, Brown and the rest of the scientific staff remained behind at Port Jackson; Flinders continued to explore in ships borrowed from the BRITISH EAST INDIA COMPANY while the *Investigator* underwent repairs. Flinders had instructed the scientists to seek their own return passage if he did not return after 18 months. Brown took part in studies of plant life around Sydney, including an investigation of the reproductive features of orchids.

Brown then sailed to the newly established British colony on TASMANIA, where he spent 10 months examining the island's plants and animals. Among the species he studied was the Tasmanian wolf, found only on that island.

Brown returned to Port Jackson in early 1805, but Flinders failed to arrive within the arranged time, having been taken prisoner by the French at Île de France (present-day Mauritius) in late 1803. Soon afterward, Brown and the other scientists sailed back to England on the refurbished *Investigator*. On the return voyage, they made a stopover at Cape Town, South Africa, where Brown collected additional plant specimens. He arrived back in England in October 1805, with a total of almost 4,000 specimens of plants, 1,700 of which were new to science. He also brought back various live animals, including the bare-nostriled wombat.

Over the next five years, Brown compiled a comprehensive catalogue and study of the plants he had collected in Australia and Tasmania, published in 1810 as *Prodromus Florae Novae Hollandiae*. In addition, he contributed scientific material to Flinders's account of the expedition, published in 1814. In classifying the new plants he had discovered, Brown had to establish 14 new genera.

Brown went on to a long and distinguished career as one of England's foremost natural scientists. He developed a close association with Joseph Banks, and upon Banks's

death in 1820 Brown inherited his house, library, and natural history collection. He was made a fellow of the ROYAL SOCIETY in 1811, and, in 1827, he became curator of the British Museum's botanical collection. That same year, he published the scientific findings for which he is best known, the phenomenon known as Brownian Movement, which substantiated the kinetic molecular theory of matter. In 1831, he discovered the nucleus of the plant cell.

With his work as a naturalist in Australia and Tasmania, Robert Brown carried on the tradition of British scientific exploration and inquiry in the South Pacific begun in the late 1760s with the voyages of JAMES COOK.

Bruce, James (Laird of Kinnaird) (1730–1794)

Scottish explorer in East Africa

James Bruce was born on his family's estate, Kinnaird, in Stirlingshire, Scotland. Following his early education at Harrow, he went on to Edinburgh University in 1747. In about 1750, forced to curtail his studies for health reasons, he went to London and worked for a wine merchant's firm, marrying the owner's daughter in 1753. Nine months after his marriage, his wife died, and Bruce sought solace in travel to exotic places.

Starting in 1755, Bruce journeyed along the southern shore of the MEDITERRANEAN SEA, visiting sites of Roman ruins from Tunis to Tripoli. He also sailed to Crete, Rhodes, and the Mediterranean coast of present-day Turkey.

In 1763, Bruce was appointed Great Britain's consul general at Algiers. Commissioned also to continue his study of classical ruins in North Africa, he hired Italian artist Luigi Balugani to make drawings and serve as his assistant. He remained in the diplomatic service for two years.

In 1768, Bruce resolved to undertake an expedition into the interior of East Africa in search of the source of the NILE RIVER. An accomplished linguist, he readied himself for his journey by becoming fluent in Spanish, Portuguese, Arabic, and Amharic, the principal language of Ethiopia. Accompanied by Balugani, he traveled to Alexandria, Egypt, where he drew on earlier medical training to practice as a doctor. With his reputation as a medical man, he obtained diplomatic letters that aided in his subsequent travels to Arabia and Ethiopia.

In mid-1768, Bruce and Balugani ascended the Nile from Alexandria, reaching as far upriver as Aswan. Because of hostile tribes, Bruce and his assistant headed eastward across the desert to the RED SEA coast. They crossed over to Jidda on the Arabian Peninsula, then headed southward, re-crossing the Red Sea to the Eritrean port of Massawa, which they reached in September 1769. From Massawa, they journeyed into the Ethiopian interior, arriving at the capital city of Gondar in February 1770.

In Gondar, Bruce was received by the Ethiopian king, Tecla Haimanot, and by the regent and real power behind the throne, Ras Michael of Tigre. He won the favor of the Ethiopian rulers by instituting sanitary measures that stemmed an outbreak of smallpox in the royal palace. At that time, a civil war was raging in the country, and Bruce took part in several military campaigns on behalf of the monarchy. Following his appointment as a provincial governor, he explored the region around Lake Tana, visiting Tisiat Falls. On November 14, 1770, at the nearby Springs of Geesh, he found what he (mistakenly) took to be the source of the Nile emanating from underground streams. These he named the Fountains of the Nile. Actually, he had located the source of the Blue Nile, a principal tributary of the main course of the Nile.

Bruce remained in Gondar until late 1771. Earlier that year, his artist assistant Balugani had died. From Gondar, Bruce descended the Blue Nile to its confluence with the White Nile at the site of present-day Khartoum. Although the White Nile appeared to be the greater stream at that junction, Bruce still concluded the Blue Nile to be the main course of the river.

Bruce left the river at Berber and undertook an arduous 18-day overland trek northward across 400 miles of the Nubian Desert. Upon reaching Aswan, he traveled down the Nile to Cairo, from where he sailed to Europe, returning to England in June 1774.

Bruce presented the results of his explorations in an interview with King George III; he was subsequently elected a fellow of the ROYAL SOCIETY. Nonetheless, his account of his African exploits was met with much skepticism by London's intelligentsia, including the renowned man of letters Dr. Samuel Johnson.

Soon after his return, Bruce retired to his family estate in Scotland and wrote a multivolume work on his explorations in Africa, *Travels to Discover the Source of the Nile*, first published in 1790. Four years later, he was fatally injured in a fall down the main staircase at Kinnaird as he descended to assist a lady into a carriage.

James Bruce's explorations rekindled European interest in the uncharted interior of Africa, especially with regard to the elusive source of the Nile, and helped lead to the founding of the AFRICAN ASSOCIATION. He was not the first European to locate the source of the Blue Nile in Ethiopia, having been preceded by Portuguese missionaries PEDRO PAEZ and JERONIMO LOBO by about 150 years. Bruce's mistaken conclusion that the Blue Nile was the main branch of the river was not revealed until the explorations of SIR RICHARD BURTON and JOHN HANNING SPEKE in the late 1850s. Nevertheless, he was the first European to undertake an expedition aimed specifically at finding the Nile's source, and was one of the earliest explorers to report the connection between the White Nile and the Blue Nile at Khartoum.

Bruce, William Spiers (1867–1921)*Scottish physician, polar explorer*

William S. Bruce was born in London of Scottish parentage. Trained in medicine at Edinburgh University, he also studied natural sciences, especially oceanography. In 1892–93, he made his first voyage to the polar regions as ship's surgeon on the Scottish whaler *Baleena*, sailing from Dundee to the Antarctic.

In the late 1890s, Bruce continued his polar explorations in Franz Josef Land, the Arctic archipelago north and east of Scandinavia. He returned to the South Polar region in command of the Scottish National Antarctic Expedition of 1902–04. Aboard the ship *Scotia*, he surveyed the shore of the Weddell Sea, along the Atlantic portion of Antarctica. He observed a range of 150-foot cliffs on the coast and determined that although covered with ice, they were part of an Antarctic landmass. He named this region Coats Land, after his chief sponsor, Scottish industrialist Andrew Coats. No landing was possible at this time because of ice conditions.

Between 1906 and 1920, Bruce turned his attention back to the Arctic, making seven voyages to Spitsbergen (present-day Svalbard), where he continued his oceanographic studies. During these years, he also edited the multivolume report of the 1902–04 Scottish National Antarctic Expedition, and he recounted his experiences in the Arctic and Antarctic in the book *Polar Explorations* (1911).

The Scottish National Antarctic Expedition led by Dr. William S. Bruce took place at the same time as the British expedition under ROBERT FALCON SCOTT, as well as those sponsored by France and Sweden. Bruce also helped initiate Argentina's annual expeditions to the Antarctic when he arranged for that country to take over the Laurie Island weather station, in recognition of Argentine rescue efforts of explorers from other countries.

Brûlé, Étienne (ca. 1592–1633) *French explorer in four of the five Great Lakes*

Étienne Brûlé first traveled to North America in 1608, as a protegee to French explorer and colonizer SAMUEL DE CHAMPLAIN. He remained at the newly founded Quebec settlement for the next two years, and, in 1610, he was sent to live among the Algonquian-speaking Indians of the St. Lawrence River Valley to learn their language and customs.

The next year, Champlain, before returning to France, sent Brûlé to live among the Huron (Wyandot) Indians. Brûlé became familiar with the Iroquoian language and culture and was accepted as a friend by tribal leaders.

In 1611–12, Brûlé traveled westward along the St. Lawrence River with the Huron, visiting the lands of other tribes, including the Montagnais and Nipissing. He traveled by birchbark CANOE to the western extent of the St.

Lawrence River, then along the Ottawa River, part of the present-day boundary between Quebec and Ontario, Canada. Crossing along the south shore of Lake Nipissing, he entered the French River and followed it to its outlet at the northern end of Georgian Bay, becoming the first European to see Lake Huron.

From the Huron settlements on Georgian Bay, Brûlé, traveling by canoe with intermittent overland portages, headed southward and reached the northwestern end of Lake Ontario. He then journeyed back to Montreal and Quebec, rejoining Champlain, who had returned from France.

In 1615, Brûlé joined Champlain on an expedition to gain Huron support for an attack on the Iroquois (Haudenosaunee) Indians in what is now central New York State. Brûlé served as Champlain's interpreter, and the two Frenchmen, with a small party of Huron, retraced Brûlé's previous route to Georgian Bay. After traveling southward, they parted at Lake Simcoe: Champlain headed for the Iroquois settlements on Lake Oneida near present-day Syracuse, New York, and Brûlé continued with his own party of Indians across Lake Ontario and into the Niagara River. He crossed the narrow strip south of Niagara Falls and came upon Lake Erie. After recruiting a force of Erie Indians for the campaign against the Iroquois, he headed southwestward to join Champlain.

Brûlé and his Indian allies arrived too late to be of any service to Champlain at Lake Oneida. Champlain then sent Brûlé farther south to gain the support of the Susquehannock Indians. He reached Otsego Lake near present-day Cooperstown, New York, and entered the Susquehanna River, following it for 440 miles to its outlet into the Atlantic Ocean at Chesapeake Bay, through parts of the present-day states of New York, Pennsylvania, Maryland, and Virginia. In spring 1616, while returning to Montreal, Brûlé was captured by the Iroquois, but eventually managed to escape.

In 1621, Brûlé embarked on yet another expedition to the Great Lakes. He headed westward from the St. Lawrence and, following his earlier route along the Ottawa River, Lake Nipissing, and the French River, entered Georgian Bay. This time, he continued westward along the north shore of Lake Huron. With him traveled another Frenchman, named Grenolle. In the Manitoulin Island area, Brûlé came across valuable copper deposits. Although he missed the entrance to Lake Michigan at the Straits of Mackinac, he proceeded through Sault Sainte Marie and the St. Marys River, thus becoming the first European to enter Lake Superior. His accounts are sketchy, but it is thought he continued along the south shore of Lake Superior as far west as present-day Duluth, Minnesota.

Throughout the 1620s, Brûlé remained among his Huron friends, with intervening visits to Montreal and Que-

bec. In 1628, when the British Kirke brothers succeeded in wresting control of the St. Lawrence Valley from the French, Brûlé offered his services to them. He reportedly was aboard the vessel that captured his former mentor, Champlain, in 1629. French control of Quebec was restored in 1632. The next year, a disagreement with his Huron hosts led to Brûlé's death at their hands.

During his 25 years in French Canada, Étienne Brûlé's explorations took him to four of the five Great Lakes: Lake Ontario, Lake Erie, Lake Huron, and Lake Superior. Moreover, his 1615–16 journey from Otsego Lake, in New York, down the Susquehanna to Chesapeake Bay revealed the existence of a canoe-and-portage route linking the Great Lakes to the Atlantic coast. His expedition to the western end of Lake Superior in 1621 took him about 1,200 miles into the interior of North America.

Brunel, Olivier (Oliver Brunel) (ca. 1540–1585)

Dutch mariner in Russia and the European Arctic

Olivier Brunel, born in Brussels or Louvain, was of Flemish ancestry. He pursued a career in navigation and hoped to make a fortune in trade with the Orient by discovering the NORTHEAST PASSAGE.

Brunel carried out his first known voyage in about 1565, sponsored by the White Sea Trading Company, rounding the North Cape of Norway into the Barents Sea and onto its inlet, the White Sea. He was taken prisoner by Russian authorities, accused of being a spy by the MUSCOVY COMPANY of London, and held at Yaroslavl, north of Moscow, until 1570. The Stroganovs, an influential Russian merchant family, lobbied for his release and hired him to develop trade relations between Russia and the Netherlands. During this period, he reportedly became the first European to make the overland journey from Moscow to the Ob River to the west. It was this journey that prompted him to plan a sea journey through the Kara Sea to the mouth of the Ob River for a proposed route to the empire of Cathay (China). He reportedly first spoke of his plans for this voyage as early as 1581 and perhaps made a failed attempt that summer.

In 1583, under the sponsorship of Frederick II of Denmark and Norway, Brunel, together with a Norwegian business partner, Arent Meyer, undertook a voyage of exploration to GREENLAND from Bergen, Norway. DRIFT ICE and fog off Greenland caused them to abandon the mission.

In 1584, backed by a Dutch consortium and again in partnership with Meyer, Brunel pursued his dream of a sea route to Cathay but made it only as far as the west coast of Novaya Zemlya before being blocked by ice. The next year, he made another attempt to reach the Ob River, entering the Kara Sea by way of the Yugor Strait. With passage again blocked by ice, he decided instead to make a landing at Pe-

chora Bay and trade his cargo with the native Samoyeds, an undertaking that proved successful. The landing boat capsized on the return to the ship, however, and Brunel was drowned.

Olivier Brunel's sea and land voyages helped further trade contacts between European nations and expand knowledge of the European Arctic, as started by the Britons SIR HUGH WILLOUGHBY, RICHARD CHANCELLOR, and STEPHEN BOROUGH and continued by fellow Dutchman WILLEM BARENTS.

Bruni, Antoine-Raymond-Joseph de (chevalier d'Entrecasteaux) (1737–1793)

French naval officer in the South Pacific

Antoine-Raymond-Joseph de Bruni, chevalier d'Entrecasteaux, was born at his family's chateau in the Provence region of southern France. He was of noble descent, and his father served as a high government official in Provence.

After entering the Marine Guard in 1754, d'Entrecasteaux went on to serve with distinction in the Battle of Minorca of 1756, a French naval victory over the British in the western MEDITERRANEAN SEA. By 1770, he had been promoted to lieutenant commander, and, over the next several years, he directed the operations of ports and arsenals in France.

In 1785, d'Entrecasteaux was made commander of French naval forces in the Indian Ocean and the Far East. Two years later, he was named governor of the French colony on Île de France (present-day Mauritius) in the Indian Ocean.

Promoted to rear admiral in 1791, d'Entrecasteaux took command of an expedition commissioned to search for JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, who had been missing with his two ships since 1788. In command of the *Récherche*, d'Entrecasteaux was accompanied by another vessel, the *Espérance*, captained by JEAN-MICHEL HUON DE KERMADEC. In addition to seeking the lost La Pérouse expedition, he had been instructed to survey the coasts of New Holland (present-day Australia), Van Diemen's Land (TASMANIA), and New Caledonia. From New Caledonia, Entrecasteaux planned to follow La Pérouse's assumed course to the northeast coast of New Guinea. They departed from Brest on September 29, 1791.

Upon arriving in Cape Town in January 1792, d'Entrecasteaux received secondhand reports that traces of the La Pérouse expedition might have been sighted in the Admiralty Islands. With this news, he changed his plans: instead of going to Australia, he headed directly for the Admiralty Islands by way of the SPICE ISLANDS (the Moluccas). Unfavorable sailing conditions held back the ships' progress across the Indian Ocean. Running low on food and water, the expedition was compelled to head south and east to southern Tasmania.

By April, d'Entrecasteaux had reached the southeast coast of Tasmania. Upon reconnaissance of the shoreline, he learned that Adventure Bay was not part of the mainland, but was actually part of one of two islands in an uncharted bay.

From Tasmania, d'Entrecasteaux sailed northeastward to New Caledonia, where he undertook the first survey of that island's west coast. He then continued into the Bismarck Archipelago, stopping at Baku and New Ireland. After failing to find a trace of La Pérouse's expedition in the Admiralty Islands, d'Entrecasteaux explored around the Solomon Islands, a group that had been incorrectly indicated on maps since their initial European discovery by Spanish navigator ALVARO DE MENDAÑA in 1568.

By the time d'Entrecasteaux and his expedition arrived at the Dutch settlement on Amboina in September 1793, the Reign of Terror had begun in France. Class tensions developed among the men under his command. Although the Netherlands was on the verge of war with France, the Dutch provided help. A month later, d'Entrecasteaux sailed back toward the west coast of Australia, then made an extensive cruise along the Great Australian Bight, making the European discovery of the Recherche Archipelago. Meanwhile, Jean-Michel Huon de Kermedec made the European discovery of Esperance Bay. The expedition returned to the southern Tasmanian coast, coming into contact with native peoples. After cruising along the coast of NEW ZEALAND, where the French engaged in some trading with the native Maori, they again explored New Caledonia and visited the Santa Cruz Islands. D'Entrecasteaux then directed the course westward to the Solomon Islands. He soon located a new island group now known as D'Entrecasteaux Islands.

D'Entrecasteaux next expanded his search for La Pérouse to the eastern end of New Guinea. By chance he explored Vanikoro Island, unaware that it was on that very island's reefs that La Pérouse's ships had been wrecked.

The French government had allowed only three years for d'Entrecasteaux's expedition. By July 1793, he decided to return to France. He became ill with SCURVY and dysentery en route to the Dutch East Indian port of Batavia and died at sea. Command of the expedition went to ALEXANDRE HESMIVY D'AURIBEAU, who was soon faced with political problems with the Dutch and with his own crew.

Much of the geographic and scientific data obtained by chevalier d'Entrecasteaux fell into the hands of the British, inspiring them to establish present-day Hobart, Tasmania. The islands south of Hobart are named North and South Bruny (Bruni) after the French explorer, as is D'Entrecasteaux Channel, which separates them from the mainland. D'Entrecasteaux is credited with finally establishing the correct position of the Solomons, which had been mistakenly charted by Mendaña in 1568, PHILIP CARTERET in 1767, and LOUIS-ANTOINE DE BOUGAINVILLE in 1768.

Brunner, Thomas (1821–1874) *British explorer in New Zealand*

Thomas Brunner immigrated to NEW ZEALAND from England as a 19-year-old assistant surveyor with the New Zealand Company. Starting in 1843, he undertook the first penetration by Europeans into the interior of New Zealand's South Island. He headed southward from the site of present-day Motueka on the west shore of Tasman Bay, reaching as far as the Richmond Range.

In 1845, Brunner set out again, guided by a Maori named Ekuhu and accompanied by Charles Heaphy and William Fox. On this expedition, Brunner and his party traveled southward from the eastern side of Tasman Bay into what is now known as New Zealand's Hot Springs District, where they explored the region around Lake Rotoroa.

Brunner continued his explorations of South Island the next year, in an expedition from Golden Bay on the island's northwestern corner. Again guided by Ekuhu and accompanied by Heaphy, he followed the west coast of South Island to the Grey River, then headed eastward into the interior and explored the Taramakau River.

Later in 1846, Brunner began his most extensive exploration of South Island. With Ekuhu as his guide, he headed southward from Tasman Bay to the upper reaches of the Buller River, then descended that stream westward to its mouth at Cape Foulwind, on the Tasman Sea. He proceeded southward along the west coast of South Island to the Grey River. Following the Grey River north and east into the interior, he traversed the Southern Alps to the slopes of the Paparoa Range.

After exploring the Taramakau River, Brunner returned to the west coast of South Island, exploring as far south as Mount Cook and Titihira Head.

Thomas Brunner's explorations revealed much about the major rivers and mountain ranges of South Island, New Zealand, a region that had been until that time known only from earlier coastal surveys. The Lake Rotoroa area that he visited, with its natural hot springs, subsequently became a major New Zealand health resort region. In the course of his 1846–48 expedition, Brunner became the first European to visit the lake in the northern part of New Zealand's South Island that now bears his name. His book, *Journal of an Expedition to Explore the Interior of the Middle Island of New Zealand*, was published in 1851, the same year he received a medal from the ROYAL GEOGRAPHICAL SOCIETY.

Bruyas, Jacques (1635–1712) *French missionary in North America*

Jacques Bruyas was originally from Lyon, France. Ordained a Jesuit missionary priest, he crossed the Atlantic Ocean to New France, arriving in Quebec in early August 1666. The following summer, he began his missionary work among

the Iroquois (Haudenosaunee) tribes who then dominated what is now central and western New York State. He journeyed to the lands of the Mohawk, Oneida, and Onondaga part of the Iroquois League, remaining among them a few years, then was transferred to Sault St. Louis mission among the Huron (Wyandot), the main Jesuit settlement in the St. Lawrence Valley.

Bruyas served as superior to all the Jesuit missions in French Canada from 1693 to 1699. He was subsequently named Jesuit envoy to the Onondaga.

While traveling throughout the lands of the Iroquois, Bruyas, a philologist, made a study of their language, subsequently producing a Mohawk dictionary.

As with other French Jesuits of the 1600s, Father Jacques Bruyas's work among the Native Americans led to the exploration of uncharted regions of northeastern North America.

Brydges, Harford Jones (1774–1829)

British diplomat in central and southwest Asia

Harford Brydges was a diplomatic officer for the British government in the first decade of the 19th century. At that time, mounting concerns over Russia's expansion of its sphere of influence in the Middle East led the British government to seek stronger ties with Persia (present-day Iran) and its neighboring countries. To this end, Brydges was commissioned to lead a diplomatic mission to Persia in 1807.

Sailing westward from Bombay, India, Brydges and his party entered the Persian Gulf and disembarked at the port of Bushehr in what is now Iran. He then undertook a tour of the kingdom of Persia, visiting such major cities as Esfahan, Qazvin, and Teheran.

Brydges remained in Persia for four years, during which he traveled extensively throughout the coastal Baluchistan region on the Arabian Sea coast, as well as the south shore of the Caspian Sea. He also explored parts of Afghanistan and the Caucasus Mountains to the north. His journeys took him across much of the same territory covered 2,100 years earlier by ALEXANDER THE GREAT and his army.

Harford Brydges's reports provided the British government with new information about parts of central and southwest Asia that had rarely been visited by Europeans.

Buchan, David (1790–1845) *British naval officer in the Arctic Ocean*

As an officer in the British navy, David Buchan served in the Napoleonic Wars of 1803–15. By 1818, he had reached the rank of captain. That year, under the direction of SIR JOHN BARROW, second secretary of the Admiralty, he was commissioned to lead a seaward expedition across the Arctic

Ocean to the Pacific Ocean, passing as close as possible to the NORTH POLE.

In April 1818, Buchan, in command of the *Dorothea*, accompanied by then-lieutenant SIR JOHN FRANKLIN in command of the *Trent*, sailed from London to Spitsbergen (present-day Svalbard), north of Norway. At that time, it was believed that the Arctic PACK ICE did not extend northward beyond a point between GREENLAND and Spitsbergen, and that an open, ice-free polar sea existed around the North Pole. Two other ships, commanded by SIR JOHN ROSS and SIR WILLIAM EDWARD PARRY, also took part in the Royal Navy's 1818 Arctic expedition. Buchan and Franklin were to sail from Spitsbergen due north to the BERING STRAIT, while Ross and Parry sailed westward through Davis Strait, west of Greenland. The four ships then were to rendezvous in Bering Strait.

Buchan and Franklin reached the northwest coast of Spitsbergen, where their ships were trapped by ice for more than a month. At one point, icebergs nearly crushed Buchan's vessel. His expedition reached as far north as 80°34' north latitude before the impregnable, southward-drifting pack ice forced him to abandon the expedition. The ships returned to England in October 1818.

The notion of an open polar sea as pursued by David Buchan died hard. The North Pole would be reached early the next century using sledges.

Bukhgolts, Ivan Dmitryevich (fl. 1700s)

Russian army officer in central Asia

Ivan Bukhgolts, a high-ranking army officer in the service of Russian czar Peter the Great, was commissioned in 1715 to lead a gold-prospecting expedition south from the Irtysh River settlement of Tobolsk to the Yarkand River region of Chinese Turkestan. In command of a force of 2,000 men, Bukhgolts ascended the Irtysh in boats.

In the western Altai Mountains, Bukhgolts's party was attacked by a force of Kalmyk tribesmen. Although outnumbered five to one, they managed to hold off the Kalmyks for three months. They then retreated down the Irtysh River to its confluence with the Om, where they constructed fortifications the following year.

Although Ivan Bukhgolts did not realize his objective of penetrating the Yarkand River region of Chinese Turkestan, his post at the junction of the Om and Irtysh Rivers endured as an important permanent Russian foothold in central Asia, becoming the present-day city of Omsk.

Burchell, William John (ca. 1782–1863)

British naturalist in South Africa and Brazil

William J. Burchell was born in Fulham, near London, England, where his father operated a plant nursery. In 1805, he

traveled to the South Atlantic Ocean island of St. Helena, for work as a schoolmaster and botanist in the employ of the BRITISH EAST INDIA COMPANY. While on St. Helena, he contacted Dutch colonial authorities in Cape Town, South Africa, and obtained permission to undertake a scientific exploration of the region.

Burchell arrived in Cape Town in November 1810, and he set out for the interior the following June. Traveling in a frontier wagon, and accompanied only by a small party of native tribesmen, he crossed the Karroo Desert, east of Cape Town. From the Orange River, he traveled into Bechuanaland (present-day Botswana) and also visited the region around the settlement of Griqualand, southwest of present-day Kimberly. In the course of his explorations, Burchell collected over 63,000 specimens of plant and animal life, undertook astronomical studies, and made weather observations.

After five years in Africa, Burchell returned to England. His account of his explorations, *Travels in the Interior of Southern Africa*, was first published in 1822 and included panoramic views of Africa produced by a process known as scenographic projection, a precursor to photographic techniques. Burchell also presented 43 African animal specimens to the British Museum.

In 1825, Burchell sailed to Rio de Janeiro, from where he conducted a scientific expedition into the interior of Brazil, studying the Brazilian rainforest in the Minas Gerais region. He became the first European to venture into the Goias region near present-day Brasilia. In 1829, he headed northward to Belem, from where he returned to England with thousands of flora and fauna specimens.

In recognition of his scientific contributions, William J. Burchell received an honorary degree from Oxford University in 1834. Moreover, many of the new botanical and zoological species he brought back from Africa and South America were named after him.

Burckhardt, Johann Ludwig (Jean-Louis Burckhardt, John Lewis Burckhardt, Ibrahim ibn Abdullah) (1784–1817) *Swiss scholar, explorer in Syria, Egypt, and Arabia*

Johann Ludwig Burckhardt was born in Lausanne, Switzerland, the son of a wealthy German-Swiss family. He attended universities in Leipzig and Göttingen, Germany, studying Arabic and the culture and history of the Middle East.

In 1806, Burckhardt arrived in London, where a professor at Göttingen had arranged for him to meet with SIR JOSEPH BANKS, then an influential member of the AFRICAN ASSOCIATION, which hoped to send an explorer across the SAHARA DESERT from the NILE RIVER and reach TIMBUKTU on the NIGER RIVER. With his background in Arabic, Burckhardt succeeded in winning this commission in 1808.

In spring 1809, Burckhardt traveled from England to Aleppo, Syria. He expanded his knowledge of Arabic and immersed himself in a study of Islam in preparation for the proposed trip across the Sahara with a caravan of Muslim pilgrims returning from Mecca. While in Syria, he assumed the Arabic name Ibrahim ibn Abdullah. Burckhardt remained in Syria for more than two years, during which he lived with the nomadic tribes of northern Arabia and made several trips into the interior from Aleppo, visiting the site of the ancient city of Palmyra north of the Syrian Desert.

In June 1812, Burckhardt set out for Cairo, the first leg of his intended journey to the Niger River. Traveling southward through the valley of the Jordan River, he reached the site of the ancient tomb of Khaznet Firaun, then entered the forgotten city of Petra. Carved into the rock cliffs above the Wadi Musa in what is now Jordan, Petra had been settled since the days of the Old Testament and had eventually become a thriving Roman city. Burckhardt was the first European to visit Petra since the CRUSADES in the Middle Ages.

By September 1812, Burckhardt was in Cairo, where he attempted, without success, to arrange for passage with a caravan westward across the Sahara into the Fezzan region of present-day Libya. He then undertook two years of exploration into Egypt, the Sudan, and Arabia. Starting from the town of Isna, he ascended the Nile as far as Tinareh. En route back to Isna in March 1813, he located the ancient Egyptian temple at Abu Simbel, with its 60-foot-high statues of Pharaoh Ramses II.

Still unable to find a westward-heading caravan, Burckhardt, in early 1814, decided to explore the Nubian Desert, then cross the RED SEA to Arabia. Once in Arabia, he planned to make a pilgrimage to Mecca, believing it would give him credibility as a Muslim. He reached Shendi in the northeastern Sudan, then headed eastward to the Red Sea port of Suakin. From Suakin, he sailed to Jidda on the Arabian Peninsula. Proceeding toward Mecca, he was aided by letters from the viceroy of Egypt that vouched for him as a faithful Muslim. Burckhardt entered Mecca, then visited the other Islamic holy city, Medina, the first European to do so.

Following Arabia's Red Sea coast northward, Burckhardt reached the Sinai Peninsula, which he explored before returning to Cairo in late June 1815. In Cairo, he continued his search for a westward caravan that would take him to Libya and the southern Sahara, and also set about preparing a written account of his journeys.

In 1817, Burckhardt developed a severe case of dysentery and died. Soon afterward, the African Association began to publish his works on the Middle East.

Johann Ludwig Burckhardt did not succeed in his initial objective of reaching the Niger from North Africa. Nonetheless, the surviving accounts of his journeys in Egypt, the Sudan, and Arabia provided much new information for Europeans. His reports on the Wahhabi in Arabia,

the reformist religious movement that took control of that region in 1811, were the first to reach Europe. In addition, he is credited with rediscovering the city of Petra in what is now Jordan. His descriptions of Medina and Mecca later inspired the subsequent explorations of SIR RICHARD FRANCIS BURTON.

Burke, Robert O'Hara (ca. 1821–1861)

Irish colonist in Australia

Robert O'Hara Burke was a native of St. Clerans in County Galway, Ireland. Educated in Belgium, he embarked on a military career with the army of the Austrian Empire in 1840. Eight years later, he returned to Ireland and served with the Irish Mounted Constabulary.

In 1853, Burke immigrated to Victoria, Australia, and continued his career with the colony's police force. By 1860, he had reached the rank of police inspector. At that time, an overland telegraph route was sought that would connect the settled southern region of Australia with the north, thereby providing a link with shipping from British India. In 1860, the colonial government of Victoria, spurred on by South Australia's offer of a prize of £2,000 to anyone who could make the first south-to-north crossing of the Australian continent, organized the Great Northern Exploration Expedition and appointed Burke to lead it.

Equipped with camels and horses, Burke, with WILLIAM JOHN WILLS as second in command, and a company of 18 men, left Melbourne in late August 1860. In late September, upon reaching Menindee in western New South Wales, Burke decided to push on with a small advance party, leaving the bulk of his command to await his return.

From Menindee, Burke, Wills, Charles Gray, and several others pushed north and east to the Bulloo River. They crossed the northern section of the Sturt Desert and reached Cooper's Creek, where Burke planned to rendezvous later with the rest of the expedition. On December 16, 1860, Burke, accompanied by Wills, Gray, and camel driver John King, left the Cooper's Creek encampment and set out for a final push to the coast. After nearly three months of trekking across the deserts and plains of northern Australia, they reached the tidal basin of the Flinders River. With their progress hampered by coastal swamps, they could not reach the seacoast, but they were close enough to hear the surf breaking on the shores of the Gulf of Carpentaria.

The very next day, Burke, Wills, Gray, and King set out on the return journey southward. By that time, they were critically short of food. Yet they pushed on, hoping to reach the supply depot at Cooper's Creek. Gray died along the way, although Burke, Wills, and King managed to reach Cooper's Creek on April 21, missing a relief party by only hours. Two days later, they set out down Strzelecki Creek, hoping to reach JOHN MCDOUALL STUART's outpost at

Mount Hopeless, 150 miles distant. The rest of the journey proved disastrous; they were forced to kill their remaining camels for food, and in their weakened state, had inadvertently wandered in a circle back to Cooper's Creek, where they arrived again on May 28. Earlier that day, the relief party had also returned to Cooper's Creek, but, seeing no sign of Burke and his companions, had left again.

By this time, Wills was too weak to continue, so Burke and King left him behind and went in search of aid. Two days later, Burke died of starvation, and when King returned to Wills in early July, he found him dead as well. For the next few months, King managed to survive on food provided by a local group of Aborigines and was finally rescued by a relief expedition on September 15.

Robert O'Hara Burke's 1860–61 expedition suffered from poor planning and wavering leadership on his part. Despite the tragic outcome, he nonetheless succeeded in making a south-to-north crossing of the Australian continent. Stuart, however, gained official recognition for accomplishing the deed first.

Burnes, Sir Alexander (1805–1841)

British diplomat in central Asia

Alexander Burnes was born in Montrose, Scotland. At the age of 17, he entered the service of the BRITISH EAST INDIA COMPANY, serving as an officer with its armed forces at Surat, on the west coast of India north of Bombay. He studied Indian languages there, becoming an interpreter for the company.

In 1826, Burnes was sent to the Kutch region of western India, where he developed an interest in the geography of central Asia. His explorations into central Asia began in 1831, when he ascended the INDUS RIVER into what is now northern Pakistan on a diplomatic mission to the Maharajan Ranjit Singh of Lahore.

The next year, Burnes left Lahore dressed as an Afghani native. Traveling northward through Peshawar, he crossed the Hindu Kush and entered Afghanistan. After visiting the Afghani cities of Kabul and Balkh, he continued northwestward to Bukhara in what is now Uzbekistan. He visited the eastern Caspian Sea region, then headed southward for Teheran and the Persian Gulf port of Bushehr, from where he sailed to England.

Back in England, Burnes wrote an account of his experiences in south-central Asia, *Travels into Bokhara*, first published in 1834.

In 1839, Burnes returned to Afghanistan as Great Britain's diplomatic representative to that country's unpopular ruler, Shah Shujah. Two years later, Burnes was killed by an assassin in Kabul.

Sir Alexander Burnes's travels into Afghanistan and central Asia provided the British government with firsthand in-

formation on the geography and culture of the territory north of the Indian subcontinent, a region that during the 1830s and 1840s had great strategic bearing on the competing expansionist policies of Great Britain and Russia.

Burney, James (1750–1821) *British naval officer in the Pacific, writer*

James Burney was born in London, the eldest son of English composer and musical historian Charles Burney. At the age of 10, he entered the Royal Navy as a cabin boy. At 20, he sailed to Bombay, India, as a seaman.

In 1772–74, Burney served as a lieutenant on the *Adventure* in JAMES COOK's second voyage to the Pacific Ocean. In December 1773, he led a party of marines ashore on the coast of NEW ZEALAND, in search of some missing crew members. His discovery of their grisly remains revealed that the indigenous peoples there were hostile and cannibalistic, a finding that warned Cook and other mariners to be cautious on later visits to New Zealand.

Returning to England on the *Adventure* with Burney in summer 1774 was a Tahitian native named Omai. With the help of Burney's sister, novelist Fanny Burney, Omai was presented to London society and was received with great celebrity.

Burney joined Cook on his third voyage to the Pacific in 1776–80, serving as first lieutenant on the *Discovery*. On this expedition, he led a party that explored the island of Atiu in the Cook Island group, where he established friendly relations with the natives.

Burney was promoted to captain in 1782. He left active sea duty two years later. Starting in 1804, and continuing for 12 years, he published a comprehensive record of explorations in the Pacific, entitled *Chronological History of the Voyages and Discoveries in the South Sea or Pacific Ocean*. His history of buccaneers in the Americas was published in 1816 and was followed three years later by a book on Russian explorations in eastern SIBERIA. He was appointed a rear admiral in 1821 and died in London later that same year.

Known for his writings, James Burney was an eyewitness to many of the maritime voyages of exploration detailed in his works.

Burton, Sir Richard Francis (Mirza Abdullah) (1821–1890) *British soldier, writer, linguist, explorer in India, Arabia, Africa, and South America*

Richard Burton was born in Torquay on the south coast of England. His father, an Irishman, was a colonel in the British army. Following his early education at schools on the European continent, Burton entered Oxford University, where he began his study of Arabic. He remained at Oxford for only about a year, being expelled in 1840 for dueling.

In 1842, Burton enlisted in the BRITISH EAST INDIA COMPANY's armed forces in western India, the Bombay Native Infantry, serving as an officer in the lower Indus Valley's Sind region for the next seven years. He traveled widely throughout what is now Pakistan, studying native languages, including Persian, Afghani, and Hindustani, and perfecting his command of Arabic. Burton became the official interpreter for his regiment. He also undertook an undercover mission that involved spying on his fellow soldiers at all-male brothels in Karachi. His reports aroused a great deal of controversy, and Burton was transferred from India back to England in 1849.

In 1853, Burton obtained a year's leave of absence to continue his studies of Arabic and travel in Arabia. That year, he sailed to Suez, from where he undertook a journey to the Muslim holy cities of Mecca and Medina. Disguised in native dress as an Afghani physician, he traveled under the name of Mirza Abdullah. To ensure that his non-Muslim identity would not be detected, Burton had himself circumcised before embarking on his trip into Arabia. He reached Mecca in late January 1854, then proceeded to Medina. He made sketches of the holy shrines of Islam, including the Kaaba, the cube-shaped building containing Islam's most sacred object: the Black Stone. Although Burton had planned to travel across the Arabian Peninsula and explore the Rub' al-Khali (the EMPTY QUARTER) in the southeast, illness forced him to return by steamer to Egypt. From there, he reached Bombay.

In 1854, Burton was commissioned by the Indian army to undertake an exploration of Somaliland, present-day Somalia, the region of East Africa around the Horn of Africa. Along with a small number of other officers, including JOHN HANNING SPEKE, G. E. Herne, and William Stroyan, Burton organized the expedition at Aden. Before the main party set out, Burton journeyed to the slave-trading center of Harar in northwestern Ethiopia. Again disguised in native dress, he succeeded in entering the city, which until that time had never been visited by a non-Muslim, and managed to meet the region's ruler. After 10 days, he returned to Aden, making a harrowing journey across the desert by himself.

Burton's subsequent expedition into Somalia with Speke and the other officers met with less success. They had not yet begun to explore the interior when they were attacked by natives at the coastal city of Berbera. Stroyan was killed, and both Burton and Speke were wounded.

Burton recovered and went on to serve with the British army in the Crimean War of 1854–56. In 1855, reports by German missionaries JOHANN LUDWIG KRAPP and JOHANN REBMANN suggested that a large inland sea, comparable in size to the Caspian, lay deep in the interior of East Africa, and might prove to be the long-sought-after source of the NILE RIVER. In 1856, with backing from both the ROYAL

GEOGRAPHICAL SOCIETY and the British Foreign Office, Burton organized an expedition to find this body of water and solve the mystery of the Nile's source. Accompanying him to Africa again was John Hanning Speke.

In August 1857, Burton and Speke set out from Bagamoyo on the Indian Ocean coast of present-day Tanzania, opposite Zanzibar. Unlike earlier expeditions in search of the Nile's source, which usually began from the Nile's delta in Egypt, Burton planned to reach the headwaters of the river by penetrating the continent from the east. The expedition included 130 porters and 30 pack animals, carrying supplies to last two years. The sultan of Zanzibar provided guides and a caravan leader; one guide in particular, SIDI BOMBAY, proved to be of invaluable service.

Following the route of Arab slave caravans, Burton and Speke reached Tabora (then called Kezeh), about 500 miles inland. From Arab traders at Tabora, they learned that the great inland sea was actually three separate large lakes. Continuing westward, they followed the Malagarasi River to its mouth, and, on February 13, 1858, reached the shores of Lake Tanganyika (the second largest lake in Africa) at Ujiji, becoming the first Europeans to see it. Both explorers were



Sir Richard Burton (Library of Congress)

by this time stricken with malaria and other tropical ailments. Burton was nearly paralyzed and suffered from an infected jaw; Speke was practically blind from fever. They spent some time recovering among the Arab traders at Ujiji. Speke then undertook an exploration by dugout CANOE of Lake Tanganyika. Burton at that time was convinced that this immense inland body of water was the source of the Nile. Yet Speke, after partially surveying the lake, returned to Ujiji without any conclusive proof that the great White Nile flowed from it.

Burton and Speke, running low on supplies and not fully recovered, headed back to the coast from Ujiji in summer 1858. Returning to Tabora, Speke decided to explore northward on his own, upon hearing reports of an even larger lake. Burton, too ill to continue, instead recuperated at Tabora and undertook an ethnological study of the natives. Six weeks later, Speke returned, claiming he had located the source of the Nile at Lake Victoria, 200 miles to the north. Burton still held to his belief that the Nile flowed from Lake Tanganyika, and the issue became a serious point of contention between them.

On the homeward trip, Burton remained in Aden while Speke continued on to England, arriving two weeks ahead of Burton. Despite a pledge not to reveal his findings until Burton had returned, Speke appeared before the Royal Geographical Society. By the time Burton arrived in England, Speke had received most of the glory and credit for the African expedition. Over the next few years, Burton hotly contested Speke's claim that Lake Victoria was the principal source of the Nile. Their dispute ended in September 1864, when Speke died in an apparent hunting accident on the eve of a public debate with Burton on this issue.

Soon after returning from Africa, Burton married Isabel Arundell. In 1860–61, he visited North America, traveling to Salt Lake City, Utah, where he made a study of the Mormon community, the subject of his 1861 book, *City of the Saints*.

Burton returned to Africa in 1861, beginning four years of service as British consul in the Gulf of Guinea regions of Benin, Dahomey, and Biafra, in what is now Nigeria. In his first year in West Africa, he succeeded in making the first known ascent of Mount Cameroon.

In 1865, Burton was appointed British consul in São Paulo, Brazil. His South American travels included a crossing of the continent.

Burton returned to the Middle East in 1869, serving as a diplomat in Damascus. Starting in 1872, he assumed a similar post at Trieste, then a part of Austria.

In 1877–78, Burton took part in a gold-seeking expedition to Arabia. In 1881–82, he joined VERNEY LOVETT CAMERON in search of gold in what is now Ghana.

In 1886, Burton was knighted by Queen Victoria. He died in Trieste four years later.

Sir Richard Burton's efforts to find the source of the Nile ended in controversy. As it turned out, in 1874, HENRY MORTON STANLEY confirmed Speke's claim that Lake Victoria was the principal source of the Nile, although it was subsequently revealed that the Kagera River, which flows into Lake Victoria, is technically the ultimate source. Burton nonetheless played a major role in the exploration of central Africa, undertaking one of the first expeditions to reach the interior from the Indian Ocean coast. He was the first Englishman to visit Mecca, and the first European to travel to Harar, Ethiopia, and live to tell about it. Burton was also an accomplished linguist, having mastered 29 languages and 11 dialects. Furthermore, he was a major literary figure of the 19th century; he published numerous works about the places he explored, as well as a multivolume translation of the *Arabian Nights*.

Button, Sir Thomas (unknown–1634)

English naval officer, explorer in Hudson Bay

Thomas Button was an English naval captain in 1611, when HENRY HUDSON's ship the *Discovery* returned to England following an unsuccessful expedition sponsored by the MUSCOVY COMPANY in search of the NORTHWEST PASSAGE, the fabled all-water route westward across the top of North America to the Pacific Ocean and the Orient. Hudson's men had mutinied and abandoned him to die of exposure in the bay that now bears his name. The mutineers had then brought back to England news of Hudson Strait and the great body of water to the west, actually HUDSON BAY. They reported the existence of tides coming from the western side of the bay, which led many of Hudson's sponsors to believe that the outlet to the fabled Northwest Passage could be found there.

Some of Hudson's former backers then reorganized as the COMPANY OF MERCHANTS OF LONDON DISCOVERERS OF THE NORTHWEST PASSAGE, and hired Button and another captain, by the name of Ingram, to undertake a voyage and retrace Hudson's route. The company was chartered by England's King James I and underwritten in part by geographer RICHARD HAKLUYT. It was hoped that this expedition might find the Northwest Passage and possibly rescue Hudson, whose fate at that time was unknown. Also along on this expedition was ROBERT BYLOT.

Button, in command of the *Resolution*, and Ingram, on Hudson's old ship, the *Discovery*, sailed westward through Hudson Strait, hoping to determine that it led into the Pacific. But the ensuing westward voyage brought them to the northwest shore of Hudson Bay, forcing a course southward.

Button and his men spent the winter of 1612–13 near the mouth of the Nelson River, named in honor of one of the ship's officers who had died on the voyage. This point on

the southwestern edge of Hudson Bay in present-day northeastern Manitoba, Canada, would become the site of the important HUDSON'S BAY COMPANY post—York Factory—in 1684.

In spring 1613, Button sailed the *Resolution* northward along the west coast of Hudson Bay, but he soon surmised that it provided no outlet to a western ocean. He explored as far north as Southampton Island at the extreme northwestern corner of Hudson Bay, then set sail for England.

Thomas Button's 1612–13 exploration, and the subsequent expeditions of WILLIAM BAFFIN, JENS MUNK, LUKE FOXE, and THOMAS JAMES, eventually led geographers to conclude that Hudson Bay had no access to the Pacific Ocean. Although Button's voyage yielded neither the Northwest Passage, nor any trace of Henry Hudson, his reports added to the navigational knowledge of Hudson Bay and laid the basis for subsequent voyages.

Bylot, Robert (fl. early 1600s) *English mariner in the Canadian Arctic*

Robert Bylot, an English seafarer of the early 17th century, first appears in history as a crewmember on HENRY HUDSON's last voyage to North America on the *Discovery* in 1610–11, in which HUDSON BAY was explored. After the mutiny and marooning of Hudson and several others in June 1611, Bylot commanded the *Discovery* on its return voyage across the Atlantic Ocean, landing first on the southwest coast of Ireland, then continuing to England. Along with the seven other survivors of the ill-fated voyage, Bylot was subsequently acquitted of any wrongdoing.

Bylot returned to Hudson Bay the following year in another attempt to locate the NORTHWEST PASSAGE, sailing with SIR THOMAS BUTTON on the *Resolution* and spending the winter of 1612–13 on the west shore of Hudson Bay, at the mouth of the Nelson River.

In 1614, Bylot sailed again to the North American coast on the *Discovery*, serving as mate under Captain William Gibbons. During that voyage, the ship reached no farther than a bay on the coast of Labrador. Beset by bad weather there, the expedition was forced to return to England without having undertaken any additional explorations.

In 1615, Bylot commanded the *Discovery* in yet another expedition in search of the Northwest Passage. His pilot and navigator was WILLIAM BAFFIN. In exploring the northern part of Hudson Bay, they attempted to negotiate Frozen Strait near Southampton Island. Unable to find a clear passage, they concluded that the bay did not provide a western outlet with enough sea-room for large sailing ships.

The last recorded voyage undertaken by Bylot was in 1616. Sailing with Baffin on the *Discovery*, he took part in the European discovery of Baffin Bay and Lancaster Sound.

Robert Bylot, along with RICHARD HAKLUYT, was a member of the COMPANY OF MERCHANTS OF LONDON DISCOVERERS OF THE NORTHWEST PASSAGE. As an early Arctic explorer of North America, he took part in five major expeditions in search of the Northwest Passage. Although Bylot and Baffin were unable to navigate Lancaster Sound on their 1616 voyage, it proved, two centuries later, to be the entrance to a seaward route to the BERING STRAIT—the long-sought Northwest Passage.

Byrd, Richard Evelyn (1888–1957) *American naval officer, aviator, polar explorer*

A native of Winchester, Virginia, Richard E. Byrd was the son of one of that state's most prominent families. He attended the Virginia Military Institute, then went on to the United States Naval Academy, graduating as an ensign in 1912.

Byrd briefly left the navy in 1916 due to an ankle injury but returned as a training officer in World War I. In 1917, he underwent training as a naval aviator in Pensacola, Florida.

In the years following World War I, Byrd took an active role in the development of naval aviation. For the proposed navy transatlantic flight of 1919, he prepared fueling stations in Nova Scotia. He subsequently was a liaison between the navy's newly formed Bureau of Aeronautics and the U.S. Congress, and was briefly assigned to duty in England in 1921, where he took part in AIRSHIP test flights.

Byrd's first venture into the polar regions was in 1924–25, when he commanded an airborne squadron attached to Donald MacMillan's expedition to GREENLAND. From the camp established at Etah, Greenland, Byrd navigated an aircraft piloted by American aviator Floyd Bennett in a series of flights over the Greenland ice cap, resulting in the charting of some 30,000 square miles of territory.

The next year, Byrd organized a flight over the NORTH POLE. By this time, he had been promoted to the rank of commander in the U.S. Navy and had become a leading figure in aeronautical exploration of the Arctic. With the financial backing of American auto manufacturer Edsel Ford, Byrd obtained a Fokker monoplane and arrived in Spitsbergen (present-day Svalbard), north of Norway, in April 1926. His ship, the *Chantier*, put in to the harbor at Spitsbergen at the same time that ROALD ENGELBREGT GRAVNING AMUNDSEN, LINCOLN ELLSWORTH, and UMBERTO NOBILE were making preparations for their own flight, by airship, over the North Pole. The presence of the two teams of explorers in Spitsbergen at the same time led to much public speculation about a race to the Pole.

On May 9, 1926, with Bennett as pilot and Byrd in command and navigating, their plane, dubbed the *Josephine*, took off from Spitsbergen. When engine trouble developed en route, Byrd refused to make an emergency landing, and

the mechanical problem resolved itself. After a seven-hour flight, Byrd and Bennett flew over the North Pole, the first men ever to do so. While circling over the top of the world, Byrd threw down the medal worn by ROBERT EDWIN PEARY on his 1909 overland trek to the North Pole. (There is some indication, based on Byrd's diary, that they may have missed the mark, however, making Amundsen, Ellsworth, and Nobile, who passed over the Pole three days later on May 12, the first men to do so.)

In June 1927, shortly after Charles Lindbergh's historic transatlantic aeronautical achievement, Byrd was a crew member on the trimotor *America* in its successful New York-to-Paris flight.

Byrd undertook his first Antarctic exploration in 1928. Traveling by way of NEW ZEALAND, his expedition of 75 men and four aircraft arrived at the Bay of Whales in December of that year. Byrd established Little America, a large base camp not far from where Amundsen had established his Framheim base 18 years earlier. During the next several months, Byrd undertook preliminary explorations from the air, resulting in the mapping of the Rockefeller Mountains. In addition, a geological expedition undertook a survey of the Transantarctic Mountains.

On November 28, 1929, in the late Antarctic spring, Byrd and his flight crew took off from Little America aboard the trimotor aircraft the *Floyd Bennett* (named after Byrd's former partner, who had died in the course of an Arctic search-and-rescue mission in 1928). Byrd was again navigator on this flight; his pilot was Bernt Balchen, who formerly had served with Amundsen in the Arctic. Aerial photographer Ashley McKinley was also on board. From the Bay of Whales, they flew over the Queen Maud Range, seeking a pass southward to the Polar Plateau. To clear the peaks, they were forced to jettison more than 250 pounds of emergency food and survival gear. At 1:15 A.M. on November 29, 1929, Byrd and his crew flew over the SOUTH POLE. With this flight, Byrd became the first man to have flown over both the North and South Poles. What was known as the First Byrd Antarctic Expedition headed back to New York in February 1930. Upon his return, Byrd was promoted to the rank of rear admiral.

During the next three years, Byrd raised financial backing for another assault on the South Polar region. By January 1934, he was back in Little America, where he established a larger base camp. His equipment this time included six tractors and several early snowmobile-type vehicles. There were also four aircraft. This party of 120 men, one of the largest expeditions ever to visit the Antarctic, intended to undertake scientific studies involving physics, biology, geology, and meteorology.

Byrd established a scientific research station in a small hut situated 125 miles inland from Little America. Traveling overland with a convoy of three light Citroën trucks that had been fitted out for the roadless Antarctic interior with



Richard E. Byrd (New York State Library, Albany)

caterpillar-type tractor tracks, Byrd arrived at the site on March 28, 1934. Left there alone, Byrd was able to contact the main base of Little America by radio. However, a rescue expedition, if needed, could not reach him until the end of the Antarctic winter season (August in the Northern Hemisphere). After only two months alone at the advance base, Byrd began to suffer from the effects of carbon monoxide poisoning from fumes emitted from a faulty generator. He was in an extremely weakened state when a relief party arrived by tractor on August 10, 1934. Another two months elapsed before he was well enough to be flown back to Little America on the coast.

The Second Byrd Antarctic Expedition yielded much new geographic knowledge, including the location of the Edsel Ford Mountains and Marie Byrd Land. Byrd's aerial explorations of the Ross Ice Shelf revealed for the first time the continental proportions of Antarctica. At the beginning of February 1935, Byrd and his team left Antarctica for the United States.

In 1939, Byrd commanded the United States Antarctic Service Expedition, a large, government-sponsored undertaking initiated to counter German encroachments on Antarctic territory previously claimed by Norway. This was the first U.S. government venture into the Antarctic since CHARLES WILKES's voyage in the late 1830s. Byrd established

two new bases, one at Stonington Island off the Antarctic Peninsula and another near Little America. The expedition was brought to an end in summer 1941 with the U.S. entry into World War II.

Byrd took part in the war in the Pacific, surveying sites for air strips and establishing transpacific air routes that were adopted in the postwar years.

In 1946, Byrd was placed in command of Operation High Jump, which was the largest polar expedition to that time, involving 4,500 men, 19 aircraft, four helicopters, and a naval task force of 13 ships. Extensive aerial reconnaissance of Antarctica was undertaken in 1947–48. Byrd made another flight to the South Pole, passing over previously unexplored regions. A helicopter survey discovered the Bunger Oasis, a series of uncharted lakes.

In preparation for the INTERNATIONAL GEOPHYSICAL YEAR of 1957–58, Byrd was senior adviser to the U.S. Navy's large-scale 1956 expedition to Antarctica: Operation Deep Freeze. In January of that year, he made his third and final flight over the South Pole. He had campaigned for an international treaty of cooperation in regard to Antarctic research and exploration, and his hopes for such an agreement were realized before his death in 1957.

Admiral Richard E. Byrd modernized polar exploration and pioneered American leadership in the exploration of the Antarctic in the 20th century. He has a prominent place in the history of aviation aerial exploration as the first man to fly over both the North and South Poles. As the first man to spend a winter alone in the interior of the Antarctic continent, he is one of the pioneers of modern polar exploration. Byrd's organized aerial exploration of Antarctica conclusively showed that the South Polar landmass was indeed a continent, and not a series of island chains, as had been previously speculated.

Byron, John (1723–1786) *British naval officer in the South Atlantic Ocean and South Pacific Ocean*

John Byron, the son of an aristocratic and titled family, was born on his family's baronial estate, Newstead Abbey, in Nottinghamshire, England. He reportedly first went to sea as a cabin boy in the Royal Navy at the age of eight or nine. In 1740, he sailed as a midshipman on the *Wager* in Commodore GEORGE ANSON's voyage to South America.

Shipwrecked off the coast of Patagonia the following year, the young Byron was held under brutal conditions by Native Americans, who eventually turned him over to Spanish authorities in Chile. Byron was imprisoned briefly by the Spanish, who were at war with Great Britain, then was sent back to Europe on a French vessel. He did not reach England until 1745. His account of his ordeal in South America was published in 1746 and proved an immediate literary success.

Promoted to captain, Byron took part in naval actions in the last years of the War of the Austrian Succession (1740–48). In 1760, during the Seven Years War (1756–63), he commanded British naval vessels in engagements against the French off the coast of New Brunswick and Cape Breton Island, Canada.

By the war's end in 1763, Byron had reached the rank of commodore. In 1764, he was placed in command of a naval expedition assigned to seek out uncharted lands between the CAPE OF GOOD HOPE and CAPE HORN. The onset of a period of international peace provided the British Admiralty with an opportunity to explore the southern reaches of the Atlantic Ocean and Pacific Ocean for Terra Australis, the fabled GREAT SOUTHERN CONTINENT. Geographers at that time speculated that this undiscovered land existed around the southernmost Southern Hemisphere as a counterbalance to the great known landmasses of the Northern Hemisphere. Finding this unknown land was to be Byron's primary objective.

Byron's ship, the *Dolphin*, sailed from Plymouth in June 1764. It was one of the earliest vessels to have a hull sheathed in copper. Accompanying the *Dolphin* was the sloop *Tamar*.

After sailing to Rio de Janeiro by way of Madeira and the Cape Verde Islands, Byron's expedition continued southward to the coast of Patagonia. In the STRAIT OF MAGELAN, Byron located Port Famine, and, in late 1764, he encountered LOUIS-ANTOINE DE BOUGAINVILLE's ship on its way back from the Falkland Islands. Unaware of the French colony on the Falklands, Byron laid claim to this island group for Great Britain on his subsequent survey of the South Atlantic in January 1765.

By April 1765, Byron and his ships had entered the Pacific Ocean. He sailed westward along a latitude that would have taken him to the east coast of Australia had he not been forced by weather conditions to head northwestward. He sighted several uncharted islands in the Tuamotu Archipelago, including Napuka and Tepoto, bestowing on them the name Disappointment Islands, after he was unable to find a suitable anchorage there. Farther westward, in the Gilbert Islands, he sighted Nukunau, which he named

Byron Island. He also explored previously uncharted islands in the Marshall and Mariana chains.

Byron then came upon an archipelago he called the King George Islands. While ashore on one of them, Takaroa, in search of fresh coconuts and scurvy grass, he came upon a portion of a boat left there in 1722 by the Dutch explorer JAKOB ROGGEVEEN in his CIRCUMNAVIGATION OF THE WORLD. Byron eventually reached Formosa (present-day Taiwan) and from there, continued around the world by way of Batavia (present-day Jakarta) and Cape Town, South Africa, reaching England in May 1766.

In 1769, Byron began three years of service as the colonial governor of Newfoundland. He returned to active naval duty in 1775 as a rear admiral. Promoted to vice admiral in 1778, he took part in naval battles against the French in the American Revolution. In 1779, Byron earned the nickname "Foul-Weather Jack," when a convoy under his command, carrying British troops to North America, was beset by the worst Atlantic storms in British naval history. Later that year, he commanded the British fleet in a costly but indecisive naval battle against the French near Grenada in the Caribbean Sea. After that action, he held no other major commands.

Byron was the grandfather of English romantic poet George Gordon, Lord Byron, and the great-great-grandfather of the travel writer Lady ANNE BLUNT. The elder Byron's 1746 book, *Narrative of Great Distresses on the Shores of Patagonia*, was an inspiration for the shipwreck scenes in his grandson's verse work *Don Juan*.

John Byron's 1764–66 voyage was the first purely scientific expedition undertaken by the British navy. His *Account of a Voyage round the World in the Years 1764, 1765, and 1766* was first published in 1767. Great Britain's claim over the Falkland Islands dates back to Byron's explorations. Although he succeeded in adding several islands to the charts of the South Pacific, Byron provided no conclusive proof for the existence or nonexistence of Terra Australis. Over the next 10 years, the Admiralty sent out additional exploring expeditions, including those led by SAMUEL WALLIS, PHILIP CARTERET, and JAMES COOK.



Cabeza de Vaca, Álvar Núñez

(ca. 1490–ca. 1564) *Spanish soldier in the American Southeast and Southwest*

Álvar Núñez Cabeza de Vaca was born to a noble family at Jerez de Frontera in Andalusia, Spain. Early in his life, he embarked on a career in the military, serving in campaigns in Navarre and Italy. In 1513, he entered the service of the duke of Medina Sidonia.

In 1527, Cabeza de Vaca was appointed treasurer of PÁNFILO DE NARVÁEZ's expedition to Florida. In April 1528, the expedition landed at Tampa Bay. Despite Cabeza de Vaca's objections, Narváez sent his fleet northward up Florida's Gulf Coast, planning to rendezvous with them later. Cabeza de Vaca then traveled with Narváez and his 300 men through the Florida Panhandle in a vain search for Indian gold and riches. After several months, they tried to meet up with the ships near Apalachee Bay but failed to find them.

Cabeza de Vaca then supervised the construction of five makeshift barges on which Narváez and his men planned to follow the Gulf Coast to Panuco (present-day Tampico), Mexico. By late 1528, the barges were south of the Mississippi Delta, where they were swept out to sea by the river's current and separated in a storm. Cabeza de Vaca, in command of one of the barges, managed to reach the shore of what was probably Galveston Island, Texas, along with a number of his men. They were joined by other survivors, including two officers of the expedition, Alonso del Castillo

Maldonado and Andrés Dorantes de Carranza, plus Dorantes's Moorish slave ESTEVANICO.

Without food on the island, some of the men resorted to cannibalism. Cabeza de Vaca, stricken with fever, was forced to remain behind when Castillo and Dorantes took the remaining survivors to the Texas mainland. Eventually he regained his strength and followed them. Unable to contact the other Spaniards, he wandered through northeast Texas for the next four years, subsisting through trade with the Indians.

In 1533, Cabeza de Vaca met up with Castillo, Dorantes, and Estevanico at a point on the Colorado River of Texas about 100 miles north of present-day San Antonio, where the Indians gathered annually to feast on the region's harvest of wild pecans. He learned that all of the other members of the Narváez expedition were either dead or enslaved by Indians. The four present were at that time involuntary guests of the Indians, unable to travel freely. Nonetheless, they agreed to meet at the same spot the following summer and attempt to reach a Spanish settlement in Mexico.

In summer 1534, Cabeza de Vaca rejoined the other men as planned. A year later, led by Indian guides, they headed north and west across Texas into present-day New Mexico. Cabeza de Vaca gained a wide reputation as a healer among the tribes of the Southwest by performing Catholic rites over the sick, with some success.

The four men reached the Rio Grande at what is now Rincon, New Mexico, about 60 miles north of present-day

Las Cruces. They crossed the river at this point and turned south into Chihuahua, Mexico. It is thought they entered the desert region of southeastern California before wandering through Sonora, Mexico. They reached the Gulf of California, passed through the Sierra Madre, and finally met up with a Spanish slave-hunting party in north-central Mexico. After a month's rest at Culiacán, Cabeza de Vaca went on to Mexico City, arriving in July 1536.

Cabeza de Vaca reported to Mexico's royal governor, ANTONIO DE MENDOZA, that he had heard reports of Indian cities located north of the region through which he had wandered, prompting the later search for the Seven Cities of CIBOLA. Back in Spain in 1538, he contributed to the official report on the fate of the Narváez expedition. He was asked to join HERNANDO DE SOTO's expedition to Florida, but declined, refusing to be second in command.

In 1540, Cabeza de Vaca was appointed governor of the Río de la Plata colony, present-day Paraguay. In late 1541, he arrived at Santa Catarina, an island off the coast of Brazil, where he obtained additional supplies. Crossing to the South American mainland, he set out for the colonial capital at Asunción, 600 miles inland. He followed northeastern Argentina's Paraná River from its mouth to its confluence with the Iguazu, where he and his party became the first Europeans to see the spectacular Iguazu Falls, higher and wider than Niagara Falls. The inland journey to Asunción took over four months. Without Indian trails to follow, his 250-man expedition had to hack their way into the South American interior, as well as construct bridges to cross the numerous bends in the river.

Arriving in Asunción in March 1542, Cabeza de Vaca discovered that the colonists were short on supplies and oppressed by corrupt royal officials. He immediately instituted reforms, which led the officials to conspire against him.

In September 1542, Cabeza de Vaca led 400 Spanish soldiers and about 800 Guaraní Indians in an exploration up the Paraguay River as far as Puerto de los Reyes, where they were forced to turn back, unable to penetrate the dense rainforest.

On returning to Asunción in April 1543, Cabeza de Vaca was imprisoned by his political enemies. Two years later, he was sent back to Spain in chains to face charges of malfeasance in office. Nevertheless, his allies in Asunción managed to smuggle back documents that eventually cleared him of any wrongdoing. He remained in Spain for the rest of his life, serving as a royal magistrate in Seville.

Álvar Núñez Cabeza de Vaca's account of his adventures in North America, entitled *Naufragios* (Shipwrecks), was published in 1542. His eight-year sojourn from Florida to the Gulf of California constituted the first known crossing of the North American continent, predating SIR ALEXANDER MACKENZIE's voyages and the MERIWETHER LEWIS and WILLIAM CLARK expedition by more than 250 years. His re-

ports gave impetus to the subsequent expeditions of Hernando de Soto and FRANCISCO VÁSQUEZ DE CORONADO. In South America, Cabeza de Vaca's explorations increased geographic knowledge about the headwaters of the Río de la Plata.

Cabot, John (Giovanni Caboto)

(ca. 1450–ca. 1499) *Italian spice trader, mariner in North America, in service to England, father of Sebastian Cabot*

John Cabot is believed to have been born Giovanni Caboto in Genoa, Italy, about the middle of the 15th century. By 1461, he had moved with his family to Venice and had become an accomplished navigator, sailing for Venetians in the SPICE TRADE. In this capacity, he made voyages throughout the eastern MEDITERRANEAN SEA and to trade centers in what is now Lebanon, and may have visited Mecca in present-day Saudi Arabia.

The Venetian merchants in the spice trade obtained pepper, nutmeg, and cloves—items essential in Europe for the preservation of meat—from caravans that traveled across Asia. Cabot claimed that while in Mecca he learned that the spices originated in eastern Asia. He theorized that if a direct route to Asia could be found, higher profits could be realized by circumventing Arab middlemen.

By 1476, Cabot had become a naturalized Venetian citizen. During this period, CLAUDIUS PTOLEMY's *Geographia* was translated into Latin and published in Europe, reviving the theory that the world was round and that Asia could be reached on a westward crossing of the Atlantic Ocean. During the 1480s, Cabot tried to obtain backing for an expedition across the Atlantic Ocean to China, then known as Cathay, in order to establish a direct all-water route to the markets of the Far East. He first went to Valencia, where he attempted to gain the support of Spanish king Ferdinand at the same time CHRISTOPHER COLUMBUS was seeking sponsorship for a similar enterprise. Cabot is thought to have been in Barcelona in 1493, when Columbus made his triumphant return with news of his reaching what was then believed to be the outlying islands of the Indies.

Cabot journeyed to England in 1494 to seek the support of King Henry VII. Also in 1494, sovereignty over the newly explored lands in the Western Hemisphere was divided between Spain and Portugal under the terms of the Treaty of Tordesillas, following the bull of Pope Alexander VI in 1493. King Henry VII of England, in defiance of this proclamation, granted Cabot royal patents to explore westward across the Atlantic, as well as a trade monopoly on any new lands or routes to Asia that he might locate.

Cabot had at this time settled in Bristol, one of England's principal seaports, whose merchants had for years been involved with the trade in fish between Iceland and the Iberian Peninsula. Bristol merchants were forced to pay the

highest prices for spices, which they obtained through middlemen in the Middle East and Venice. Seeking to circumvent the Scandinavians in the fish trade and the Venetians in the spice trade, a syndicate of merchants provided financing for Cabot's proposed expedition across the Atlantic, presumably to Asia.

On May 20, 1497, John Cabot set sail aboard the ship the *Mathew* with a crew of 18 men, probably including one of his three sons, SEBASTIAN CABOT. They put in first at Dorsey Island on the southwest coast of Ireland, then sailed westward, maintaining a course between latitudes 50 and 51 degrees, the approximate latitude of Bristol. Cabot successfully navigated due west across the Atlantic, reaching the coast of North America on June 24, 1497.

The precise location of Cabot's landfall is uncertain. If he did in fact follow a course due west from Bristol, it is likely that he reached the shores of either northern Newfoundland or Cape Breton Island in what is now Nova Scotia. During his brief visit ashore, he encountered no people, but did see tools, fishing nets, and the remains of a settlement. He may have also explored southwestern GREENLAND.

Cabot sailed the *Mathew* around the east coast of Newfoundland, possibly as far south as present-day Maine. He soon headed back to England, with a brief stopover in Brittany, France. He reached Bristol in early August, with the news that he had reached China and the lands of the Great Khan. Later that month, he met with King Henry VII, who rewarded him with a sum of money and an annuity for his accomplishments. A second, larger expedition across the Atlantic was soon planned.

With five ships and 200 men, Cabot again sailed from Bristol in May 1498. His objective on this journey was to reach the island of "CIPANGU," presumably present-day Japan, where Cabot believed the spices originated. One of the ships developed trouble and was forced to put in on the west coast of Ireland; the four remaining ships sailed westward with Cabot. Nothing is known for certain of the results of this voyage. Some accounts say that Cabot and his crew were lost at sea; others relate that he reached the North American mainland and explored as far south as Chesapeake Bay, then returned to England, and, having failed to establish a new route to Asia, died in obscurity.

In any event, John Cabot's voyages, along with those of Christopher Columbus in the WEST INDIES and PEDRO ÁLVARES CABRAL in South America, enabled 16th-century geographers to understand that a large continent lay between Europe and Asia and contributed to the first published maps of the Americas, produced by JUAN DE LA COSA, AMERIGO VESPUCCI, and MARTIN WALDSEEMÜLLER. America, considered to have been named in honor of Amerigo Vespucci, may actually have been named after one of Cabot's original Bristol backers, a merchant named Richard Amerike. Al-

though Cabot returned from his first voyage with no treasures from the Orient, he did bring back a quantity of cod, which he reported to be in abundance in the waters off the islands of northeastern North America. His report brought about soon afterward an influx of European fishing fleets to the Grand Banks region off the Canadian coast. Cabot's explorations also inspired attempts to find the fabled NORTHWEST PASSAGE across the top of North America to Asia. The voyages of GASPAR CÔRTE-REAL and MIGUEL CÔRTE-REAL to Labrador followed in the early 1500s. One of them took back to Europe Beothuk Indians in possession of a gold sword and other items made in Venice and believed to have been left behind by Cabot's crew. The body of water lying between Cape Breton Island and Newfoundland, although never explored by Cabot, was later named Cabot Strait in his honor. His son Sebastian went on to undertake numerous expeditions to both North and South America.

Cabot, Sebastian (ca. 1475–1557) *Italian mariner in the Americas in service to England and Spain, cartographer, merchant, sponsor of expeditions in search of Northeast Passage, son of John Cabot*

Sebastian Cabot was born in Venice, the son of explorer and navigator JOHN CABOT. He may have accompanied his father on at least one of his two voyages to North America in 1497–98. In 1500, the younger Cabot reportedly undertook a voyage of exploration from the English port of Bristol to the coast of what is now Nova Scotia.

In 1509, Cabot, with the sponsorship of Bristol merchants, again sailed the Atlantic Ocean to the northeast coast of North America. By that time, the explorations of his father, as well as those of CHRISTOPHER COLUMBUS, had been documented in maps published by MARTIN WALDSEEMÜLLER, indicating a large continuous landmass between Europe and the Far East. Cabot's 1509 voyage westward from Bristol was an attempt to find a water route north of the newly explored continent, one of the earliest attempts to seek the fabled NORTHWEST PASSAGE.

During the expedition, Cabot, sailing along the coast, may have entered Hudson Strait and the eastern portion of HUDSON BAY. According to his own account, he believed this arm of the Atlantic Ocean to be the Pacific Ocean, but he was forced to turn around because of a threatened mutiny. On the return voyage, Cabot first sailed southward along the coast and reported sighting Newfoundland, Nova Scotia, and Long Island.

In 1512, Cabot was appointed chief cartographer to the court of Henry VIII of England. After several more years in England, he sought sponsorship from the Spanish Crown for additional exploring expeditions. In about 1518, he was named chief pilot to the court of Charles I, king of Spain and emperor of the Holy Roman Empire (as Charles V).

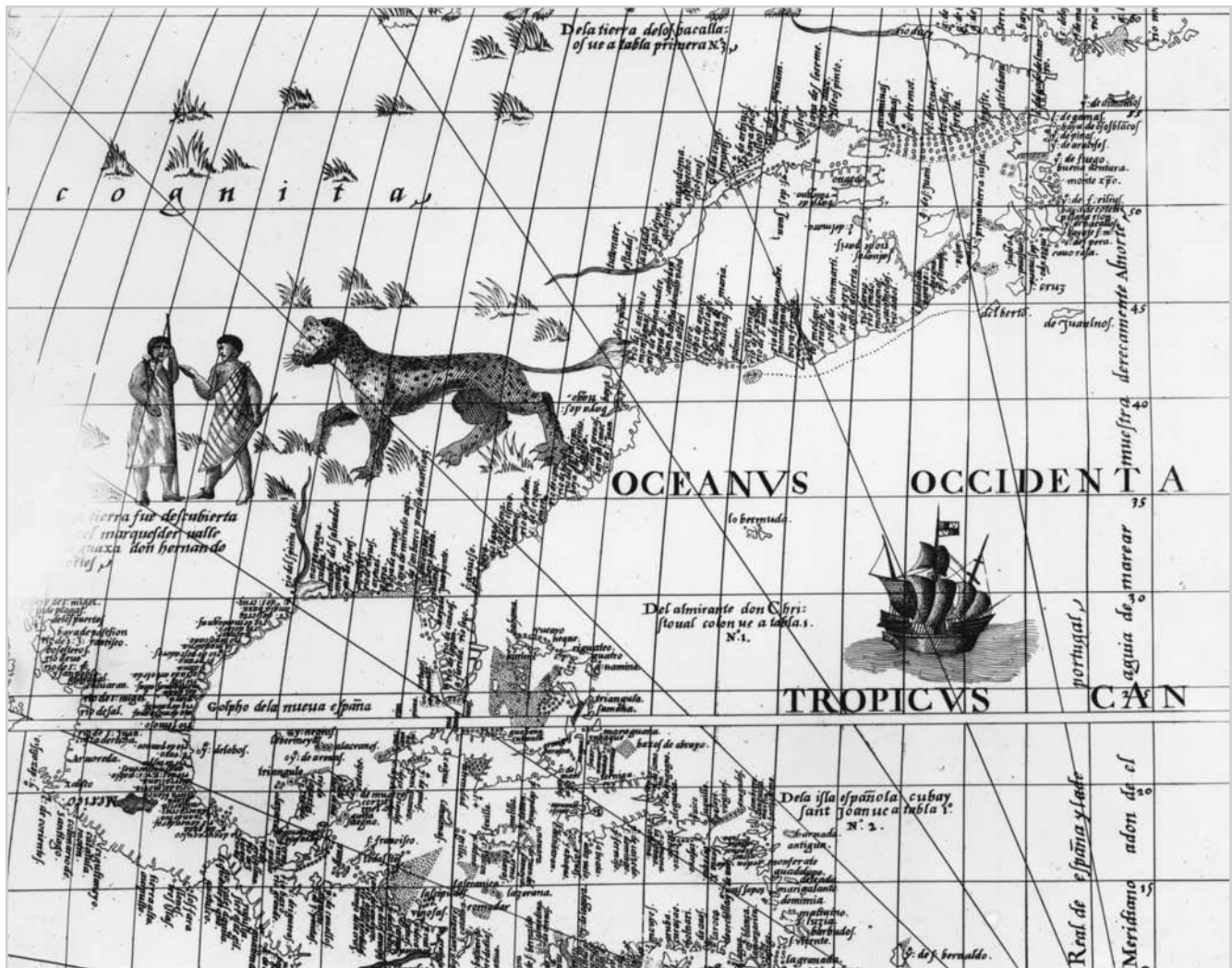
By 1522, the news of the successful CIRCUMNAVIGATION OF THE WORLD by FERDINAND MAGELLAN had reached Spain, and it was now firmly established that the Orient could be reached via an all-water route around the tip of South America. In 1525, Cabot was commissioned captain general of a large Spanish expedition to the EAST INDIES. He was to travel to the SPICE ISLANDS (the Moluccas) of present-day Indonesia and seek the legendary land of OPHIR; he was also assigned to make astronomical observations and undertake a geographic survey of the South American coast.

In April 1526, Cabot sailed with a fleet of four ships, carrying 200 soldiers and colonists, from the Spanish port of Sanlúcar de Barrameda, south of Seville. He headed southward to the Cape Verde Islands off the west coast of Africa. From there, his ships turned southwestward and reached the port of Recife, Brazil, in September 1526. While exploring the southeast coast of Brazil, he located the island of Santa Catarina, which he named in honor of his wife.

Cabot also landed in the estuary of the Río de la Plata near present-day Buenos Aires, where he encountered sur-



John Cabot and Sebastian Cabot in North America (*Library of Congress*)



Detail of map of eastern North America by Sebastian Cabot (1544) (Library of Congress)

vivors of the JUAN DÍAZ DE SOLÍS expedition of 1515–16, who had heard reports of a “White King” with a domain rich with gold and silver. (ALEJO GARCÍA was the individual most associated with the reports.) Cabot had been directed by the Spanish Crown to survey the boundary line between Spanish and Portuguese territory in South America established by the 1494 Treaty of Tordesillas, then proceed southward around CAPE HORN to the East Indies. The lure of riches in the interior of South America led Cabot to abandon his plans to go to the Orient. Instead, he spent the next three years exploring the inland waterways of the Paraguay and Barmejo Rivers of present-day Argentina, Uruguay, Paraguay, and Brazil. He found little gold but explored the Paraná River to the Apipe Rapids, and possibly as far as the site of Asunción, Paraguay.

In 1528–29, one of Cabot’s lieutenants, Francisco César, led an advance expedition deep into the interior and reached the foothills of the ANDES MOUNTAINS. He re-

turned with samples of gold, probably from the kingdom of the Inca, further inspiring Cabot to search for a fabled wealthy kingdom. The city of LOS CÉSARES, named after César, became a persistent legend from this time. The concept of EL DORADO also grew out of such reports. During this period, Cabot established the colony of San Espíritu on the Paraná River. Soon after his departure for Spain in 1529, however, the settlement, which was peopled by colonists originally headed for the Moluccas, was wiped out by Timbu tribesmen.

Cabot returned to Spain in 1530, resuming his duties as chief pilot, a position previously held by AMERIGO VESPUCCI and Díaz de Sólís. He remained in service to Spain until the late 1540s, at which time he returned to England. He now sought the backing of London merchants for trade expeditions to northern Russia. He also intended to locate a NORTHEAST PASSAGE to the Orient across the top of Europe and Asia.

In 1551, Cabot was appointed first governor of the London-based MUSCOVY COMPANY. Between 1553 and 1556, he organized and financed expeditions into regions northeast of Scandinavia. Explorers such as SIR HUGH WILLOUGHBY and RICHARD CHANCELLOR sailed under his sponsorship. In 1556, well into his eighties, Sebastian Cabot sponsored STEPHEN BOROUGH's expedition from England to the White Sea on the Arctic coast of European Russia.

Sebastian Cabot's reputation as an explorer was for a time tarnished with accusations that he attempted to claim for himself the accomplishments of his father. Yet his own explorations in both North and South America provided Europeans with their first clear idea of the extent of the new lands. His early expeditions initiated a search for the Northwest Passage that would persist for more than 400 years, into the age of nuclear-powered icebreakers and submarines. In South America, Cabot's explorations of the inland waterways of the Río de la Plata and other rivers led to the rapid colonization of these regions by Spain and Portugal. His later efforts to find a Northeast Passage led to increased trade to the northern ports of Russia and broke the trade monopoly of the North Sea and Baltic Sea cities of the HANSEATIC LEAGUE. Along with HENRY HUDSON, he was one of the few early explorers to seek both the Northwest and the Northeast Passage.

Cabral, Gonçalo Velho (ca. 1386–ca. 1447)

Portuguese colonist in the Azores

Gonçalo Cabral, a Portuguese nobleman, was an associate of HENRY THE NAVIGATOR, prince of Portugal, working at his navigational study center at Sagres in southwestern Portugal. In the early 15th century, the Isles of SAINT BRENDAN appeared as real places on Catalan maps used by Henry and other geographers at Sagres. In 1431, Cabral was sent by the Portuguese prince to investigate these islands, which were believed to lie several hundred miles southwest of Portugal.

On his first attempt, in 1431, Cabral reached as far as the Formigas Rocks in the Atlantic Ocean, only about 25 miles east of his destination. In the course of a voyage the next year, he located and named Santa Maria; on a subsequent voyage, he came upon a second island, Sao Miguel. Soon afterward, he reached a third island, Terceira. It was Prince Henry who named the island group, giving them the Portuguese designation Ilhas dos Acores ("Isles of the Hawks"), known in English as the AZORES.

Given dominion over the Azores, Cabral undertook to colonize them, bringing in settlers from Portugal as well as Flemings from the Low Countries. Over the next century, the Azores became an agricultural center, as well as an important stopover point for early Atlantic crossings.

Although the Azores had been known to Portuguese mariners as early as 1427, Gonçalo Cabral is generally rec-

ognized as having made the first accurate sighting of them, and it was his voyages that led to their initial colonization. In the decades that followed, most Portuguese exploration concentrated on following the African coastline to India. Nevertheless, Cabral's reports of the Azores instilled in the minds of Portuguese and other European explorers the idea that additional new and fertile lands lay west of Europe across the Atlantic.

Cabral, João (1599–1669) *Portuguese missionary in India and Tibet*

João Cabral was a Portuguese Jesuit who arrived at the Ganges Delta, near the site of present-day Calcutta, India, in 1626, along with fellow Jesuit ESTEVÃO CACELLA. The purpose of their intended journey was to introduce Christianity to Tibet.

Cabral and Cacella traveled northeastward into the Brahmaputra River region and headed westward to Cooch Behar. From there, they headed northward into Bhutan and traversed the HIMALAYAS and entered into Tibet. At the Tibetan town of Shigatse, they established a Christian mission.

Soon after founding the Shigatse mission, Cacella undertook a trip along the Himalayas in an attempt to visit another mission at Tsaparang, while Cabral headed back to India for supplies. Cabral followed a route that took him through Katmandu in Nepal, then traveled eastward back to Cooch Behar. There, he met up with Cacella, who had been unable to reach his destination.

Cabral was back at the Shigatse mission in 1631, but he remained for only a year before being transferred back to India. Cacella died in Tibet after contracting an illness.

João Cabral was among the handful of Jesuit missionaries who kept alive links with remote Tibet during the 17th century. His work, along with that of fellow Jesuits ANTONIO DE ANDRADE and FRANCISCO DE AZEVADO, carried on a tradition of Western religious contacts with Tibetan Buddhists.

Cabral, Pedro Álvares (Pedro Álvares Cabral, Pedralvarez Cabral, Pedro Álvarez de Cabral)

(ca. 1467–ca. 1520) *Portuguese mariner in Brazil and India*

Pedro Cabral was a native of Belmonte in east-central Portugal. His family's close ties to the Portuguese monarchy led, in 1483, to his appointment as a page to the court of King John II.

After 1495, Cabral continued his career at court under Manuel I. In 1499, soon after VASCO DA GAMA's return from his successful voyage around the CAPE OF GOOD HOPE, Manuel chose Cabral to command a large trading fleet in a follow-up voyage to India. Cabral had been ap-

pointed an admiral, although more for his diplomatic and commercial ability than for his nautical experience. In charge of part of the fleet was BARTOLOMEU DIAS, the Portuguese navigator who, in 1487, had determined Africa's southernmost point and rounded the Cape of Good Hope.

Cabral's 13 ships sailed from Lisbon in March 1500, carrying more than 1,200 men, including merchants, soldiers, and Franciscan missionaries, as well as a number of convicts. Sailing southward from Portugal, they stopped at the CANARY ISLANDS, then proceeded toward the Cape Verde Islands. Although earlier Portuguese navigators, including Dias, had closely followed the coastline of Africa in their search for a route to India, Cabral acted on da Gama's advice to sail due south from the Cape Verdes, away from the African continent, thus avoiding unfavorable winds in the Gulf of Guinea. He planned on taking advantage of strong westerly winds at a point south and west of the African mainland to carry his fleet around the Cape of Good Hope and into the Indian Ocean.

Sailing farther southwest than any other European navigator had yet ventured, Cabral's fleet neared the coast of Brazil and, on April 22, 1500, sighted the South American mainland at about 17° south latitude. They anchored off the coast of present-day Caravelas, within sight of Mount Pascoal, about midway between Salvador to the north and pre-

sent-day Rio de Janeiro to the south. Four days later, at Port Seguro, Cabral went ashore and took formal possession of the new land for Portugal, calling it Terra da Vera Cruz (land of the true cross), despite his uncertainty concerning whether he had discovered an island or a continent.

Cabral's men undertook a brief exploration inland, coming into contact with the region's Tupinanba Indians. News of his accomplishment was immediately sent back to Portugal on one of the ships. Two of the convicts were left on the Brazilian mainland, with instructions to learn what they could about the land; it is believed that they fell victim to cannibalistic natives soon after Cabral's departure on May 2, 1500.

Ten days after setting out from Brazil, the Portuguese sighted a comet that many took as an omen of troubles yet to come. Approaching the Cape of Good Hope from the west, the ships were caught in a severe storm. Four of them went down with all hands, Dias among them. Another ship was lost and did not rejoin the fleet until the following year. With his few remaining vessels, Cabral made his way around the Cape of Good Hope and northward along the east coast of Africa, stopping at Kilwa and Malindi, before heading northeastward across the Arabian Sea to India's Malabar Coast.

At the Indian port city of Calicut, Cabral attempted to establish a Portuguese trading post. Arab traders, resentful of any European encroachment, incited an attack on Cabral's settlement. In response, Cabral attacked and destroyed 10 Arab trading vessels, massacred their crews, and bombarded the city of Calicut. He then headed 120 miles southward along the Malabar Coast to the friendlier port of Cochin, where he became the first European to purchase spices and other valuable items directly from Eastern merchants.

On the return voyage to Portugal, at the Cape Verde Islands, Cabral met up with AMERIGO VESPUCCI's expedition, which had set out to investigate Cabral's earlier claims on Brazil. He was also rejoined by the ship separated in the storms off the cape. Commanded by Diogo Dias, brother of Bartolomeu Dias, it had returned from a visit to Madagascar.

Cabral returned to Portugal in July 1501. In the course of the voyage to India, he had lost more than half of his ships and nearly 900 of his original 1,200 men. Nevertheless, the profitable cargo he brought back from India, in addition to the news of his exploration of Brazil, soon earned him command of Portugal's next major trading venture. Before he could set out, however, the king replaced him with da Gama.

Cabral is not known to have taken part in any subsequent voyages. He settled at Santarém, Portugal, marrying the well-connected and wealthy Dona Isabel da Castro in 1503.

Pedro Cabral's Terra da Vera Cruz became known to later geographers as Brazil, after a type of wood found



Pedro Cabral (Library of Congress)

there, much valued as a source of red dye. Brazil had also been the name of a fabled mid-Atlantic island which had appeared in medieval maps since the days of SAINT BRENDAN. Although he is generally considered the European discoverer of Brazil, Cabral was not the first explorer to sight the Brazilian mainland, having been preceded by less than a year by Spanish mariners, including ALONSO DE OJEDA and VICENTE YÁÑEZ PINZÓN. Nevertheless, Cabral had sailed into an area where no land had been anticipated, while his predecessors had explored the extensions of known coastlines. As the European discoverer of Brazil, Cabral provided Portugal with its only significant territorial claim in the Western Hemisphere, an outcome of the division of the New World agreed to by Spain and Portugal under the terms of the Treaty of Tordesillas of 1494. Cabral also achieved the main objective of his 1500–1501 voyage by establishing trade with India and breaking the monopoly on the European SPICE TRADE with the Orient exercised by the Arabs and the Venetians in the eastern Mediterranean. Cabral's reports of new lands west of Africa led to the 1501–02 voyage of Vespucci, who ultimately determined that the Americas were in fact continents and not part of the Far East.

Cabrillo, Juan Rodríguez (João Rodrigues Cabrilho) (ca. 1500–1543) *Portuguese mariner on the California coast, in service to Spain*

Juan Cabrillo, originally from Portugal, entered the service of Spain sometime before 1520. That year, he took part in the Spanish conquest of the Aztec in Mexico under the command of PÁNFILO DE NARVÁEZ. Three years later, he served under PEDRO DE ALVARADO in the conquest of what is now Guatemala and El Salvador.

Cabrillo remained in Guatemala as an assistant to Alvarado, who had been named the colony's captain general. In 1540, Alvarado was commissioned to lead an expedition to the SPICE ISLANDS (the Moluccas), a key source of spices in what is now Indonesia. His fleet of 13 ships landed at Navidad, a port on the central Pacific coast of Mexico south of present-day Guadalajara, in 1540. Because of reports of the fabled Seven Cities of CIBOLA from explorers MARCOS DE NIZA and ÁLVAR NÚÑEZ CABEZA DE VACA, however, ANTONIO DE MENDOZA, the Mexican governor, directed Alvarado to undertake a side exploration of the coast north of Baja California, in the hope of finding a seaward route to Cibola and the riches it promised. He also was to search for the fabled STRAIT OF ANIAN, which was thought to lead from the Pacific Ocean to the Atlantic Ocean. Alvarado was diverted from the expedition because of an Indian uprising—the Mixtón War—in the vicinity of Guadalajara. After Alvarado's death during a retreat, Cabrillo was placed in command of the expedition northward.

Cabrillo sailed from Navidad on June 27, 1542, in command of two ships, the *San Salvador* and the *Victoria*. He headed along the west coast of Mexico, rounded the tip of Baja California, then continued along the coast beyond Cabo del Engaño (Cape Deceit). An earlier expedition, led by FRANCISCO DE ULLOA, had attempted to explore beyond this point in 1539–40, but had never returned to Mexico.

After about a week at sea, Cabrillo and his men sighted the mainland of what is now southern California and, in September 1542, they became the first Europeans to explore San Diego Bay, which Cabrillo originally named San Miguel. Cabrillo sent a small party ashore to explore inland. The Spaniards managed to survey some of the territory around present-day San Diego despite an Indian attack.

Cabrillo directed his ships along the California coast, visiting Santa Monica and San Pedro Bays, as well as Santa Catalina and San Miguel Islands. In his account, Cabrillo noted the dense Indian population along the coast; the number of campfires sighted on the shore near San Pedro Bay led him to name it Bahía de los Fumos (Bay of Fires). The expedition made landings to explore the inland regions, encountering Native Americans of various tribes, all of them friendly. The expedition continued to Monterey Bay and in November 1542, eventually reached Point Reyes and explored what came to be known as Drake's Bay.

Severe weather forced Cabrillo's return southward to Monterey Bay. The expedition then landed at San Miguel Island for the winter; Cabrillo suffered a fall and developed a fatal infection, dying on January 3, 1543.

Command was assumed by Cabrillo's chief pilot, BARTOLOMÉ FERRELO. The expedition departed San Miguel in February 1543, again sailing northward along the California coast. Ferrelo is thought to have reached the coast of present-day Oregon near the mouth of the Rogue River, or possibly even the COLUMBIA RIVER, before returning to Mexico in April.

Juan Cabrillo's voyage was the first European exploration along the California coast.

Cacella, Estevão (1585–1630) *Portuguese missionary in India and Tibet*

Estevão Cacella was a Portuguese Jesuit who traveled to India as a missionary in 1626 with JOÃO CABRAL. The two priests traveled from Cooch Behar, near what is now Calcutta, up the GANGES RIVER and into Bhutan, then crossed the HIMALAYAS, and entered Tibet.

After establishing a mission at Shigatse, Cacella undertook a journey along the northern side of the Himalayas to the mission at Tsaparang, which had been established in 1625 by ANTONIO DE ANDRADE. Cabral had meanwhile returned to India for additional supplies.

Severe snowstorms led Cacella to abandon his attempt to negotiate the northern slopes of the Himalayas. He made his way south to India, rejoining Cabral at the village of Cooch Behar.

Cacella returned to Tibet in February 1630. Having become seriously ill in the course of the seven-month journey, he soon died.

Estevão Cacella, with other Jesuit missionaries of the 16th and 17th centuries, helped maintain what little contact there was between Europe and Tibet.

Cadamosto, Alvisé da (Alvisé Ca'da Mosto, Luigi da Cadamosto, Luigi da Cada Mosto) (1432–1488)

Italian mariner along coastal Africa, in service to Portugal

Alvisé da Cadamosto, from a Venetian noble family, embarked on a seafaring career. By the early 1450s, he was engaged in the maritime trade between Italy and the Flemish ports on the coast of what is now Belgium.

In 1454, a storm drove Cadamosto's ship ashore on the coast of Portugal. News of the arrival of the experienced Venetian mariner reached HENRY THE NAVIGATOR, prince of Portugal, who had been sponsoring explorations in search of a sea route to the Orient. Henry soon met with Cadamosto and persuaded him to undertake a series of voyages along the west coast of Africa in order to establish trade contacts with tribes of the sub-Saharan region, beyond the control of the Muslim nations to the north.

Cadamosto, equipped by Henry with a ship, crew, and supplies, sailed on his first voyage under the Portuguese flag in 1455. He had been instructed to learn what he could about the inland trade between TIMBUKTU and the African coast, especially in regard to spices, gold, and slaves. Accompanying Cadamosto was Portuguese seafarer Vincent Dias. After stops at the CANARY ISLANDS and Madeira, they headed for Cape Blanco and the coast of Mauritania, where Cadamosto investigated the trade practices of the natives, later reporting on the commerce in salt and gold between the coastal peoples and inland peoples.

Cadamosto continued southward along Africa's west coast, reaching as far as the continent's westernmost point, Cape Verde, then explored up the Senegal River about 60 miles. There he met with the local ruler, an African Muslim named Budomel, staying on as a guest for a month. On his return to the mouth of the Senegal River, he was joined by another Italian navigator in service to Portugal, Antoniotto Usodimare, of Genoa. With Usodimare, Cadamosto sailed to the mouth of the Gambia River.

Having reached about 13° south latitude, farther south than any European mariner had been to that time, he noted how low the NORTH STAR was over the horizon, an indication that he was approaching the EQUATOR. He soon became the first known European to observe and identify the

Southern Cross, a constellation visible only near or south of the equator. While attempting to explore up the Gambia River, Cadamosto's ship was attacked by native warriors in canoes and forced to withdraw to the open sea. Soon afterward, he sailed back to Portugal.

The next year, 1456, Cadamosto embarked on his second expedition for Prince Henry. Again joined by Usodimare, he commanded a fleet of three ships. After sailing southward to Cape Verde, they proceeded westward. Relying on basic navigational instruments, they sailed 320 miles out of sight of land until they came upon a group of uncharted islands. Cadamosto named them the Cape Verde Islands and claimed them for Portugal. On the return trip to Portugal, he explored the coast of what is now Guinea-Bissau, where he made the European discovery of the Bijagos Islands.

Alvisé da Cadamosto returned to his native Venice in 1463. Although the Portuguese were highly secretive about their geographic discoveries, he produced an eyewitness account of early European exploration of Africa. Published posthumously in Italy in 1507, it provided details of tribal customs, as well as descriptions of animal and plant life Cadamosto observed in his travels, including the earliest account of the hippopotamus. Sailing in sturdy lateen-rigged CARAVEL ships, he made some of the earliest extended voyages out of sight of land, preceding the later expeditions of Italian-born explorers CHRISTOPHER COLUMBUS, JOHN CABOT, and AMERIGO VESPUCCI. Like Cadamosto, they also carried out explorations in the service of a country other than their own.

Cadillac, Sieur de See LA MOTHE, ANTOINE LAUMET.

Caesar, Gaius Julius (100–44 B.C.) *Roman general, statesman in northern Europe*

Julius Caesar was born into one of the Roman Republic's most prominent patrician families. Through family connections and his marriage to the daughter of the powerful Lucius Cornelius Cinna, he rose politically in Roman society and achieved a position as one of Rome's chief military leaders.

Caesar led an invasion into Gaul (present-day France and Belgium) in 58–56 B.C., extending Roman influence northward from the MEDITERRANEAN SEA. He remained active in the region over the next years, leading to Roman domination of the Gallic tribes and extensive road building.

To link Italy with newly acquired Gaul, Caesar established a route through the Alps by way of the 8,000-foot-high Great St. Bernard Pass, providing northern Italy with overland access to the Upper Rhone Valley and the Lake Geneva region of present-day Switzerland.

Caesar also undertook an invasion of the island of Britain, landing with two Roman legions at present-day Dover in 55. The next year, he landed five more legions from Rome. While the Roman subjugation of Britain was not completed until the next century, Caesar's campaign was the first recorded contact between Mediterranean peoples and those of the British Isles since *PYTHEAS* in the fourth century B.C. In his brief sojourn there, Caesar undertook astronomical studies on the length of days in the higher latitudes. He subsequently reported on Britain's geographic location relative to the rest of the Roman provinces, erroneously placing it east of the known region of Spain.

Caesar returned to Italy in 49. He became embroiled in a power struggle with Roman leader Pompey, but achieved victory in the ensuing civil war. A group of senators, fearful of his influence and power over the Roman people, assassinated Caesar in the senate building in Rome on March 15, 44 B.C.

Julius Caesar extended the scope of classical civilization as far as the Atlantic coasts of present-day France and England, providing the Romans with the first accurate accounts of those regions.

Caillié, René-Auguste (René-Auguste Caillié)

(1799–1838) *French explorer in West Africa*

René-Auguste Caillié was a native of Mauze in western France's Deux-Sèvres region. Coming from a family of modest means, he had little formal education. While he was still very young, his family fell into disgrace when his father, the village baker, was jailed for larceny.

By his mid-teens, Caillié had been drawn to the idea of exploring Africa, his interest reportedly sparked by the great expanses of territory marked "unknown" on contemporary maps of that continent. In 1816, at the age of 17, he ran away to the nearby port of Rochefort and signed on as a cabin boy on a ship headed for the African west coast. Caillié jumped ship in Senegal, where he joined a British expedition, led by a Major Gray, in search of news of *MUNGO PARK*, who had disappeared 10 years earlier along the *NIGER RIVER*. On his first venture to Africa, Caillié made several trips between the Senegalese coastal settlements of Dakar and St. Louis, and explored along the lower Senegal River. After less than a year, he was stricken with tropical fever, becoming so ill that he had to return to France.

Caillié remained in France for the next seven years, saving his money and preparing for another trip to Africa. He had determined that posing as an Arab traveler was the only effective way to explore the interior.

In 1824, Caillié returned to Senegal. He traveled to the desert region of Mauritania and lived for a year among the Braknas tribe, who taught him the Arabic language and Islamic ritual.

In 1825, having been refused financial support by the French colonial governor of Senegal for a proposed expedition to the Niger River and *TIMBUKTU*, Caillié traveled to the British colony in Sierra Leone, where he found employment as superintendent of an indigo plantation. Learning that the Geographical Society of Paris was offering a prize of 10,000 francs to anyone who could reach Timbuktu and return to Europe with a description of the fabled metropolis in the desert, he organized an expedition.

In March 1827, Caillié embarked from Freetown, Sierra Leone, and, after a short voyage along the coast, reached Conakry in present-day Guinea. He headed inland, traveling alone across the desert to the foothills of the Fouta Djallon Range and the upper reaches of the Senegal River. Arriving at Tieme in August 1827, he was stricken with *SCURVY*, which laid him up for four months. He resumed his journey in January 1828, reaching the upper Niger River Valley at Kouroussa. Pretending to be an Egyptian Arab returning to his homeland from France, Caillié descended the Niger River on a large trading *CANOE*. He arrived at Kabara, the port of Timbuktu, in late April 1828.

In Timbuktu, Caillié was struck by how the actual city, an austere trading settlement in the desert, differed from the fabled magnificence described by the 16th-century historian *LEO AFRICANUS* and other early travelers. Caillié remained there for two weeks, during which he learned that another European, the Scotsman *ALEXANDER GORDON LAING*, had reached the city in 1826, but had been murdered by his Muslim guide soon after their departure. On May 4, 1828, Caillié left Timbuktu, traveling northward across the *SAHARA DESERT* with a slave caravan. He crossed the Great Atlas Mountains, reaching the *MEDITERRANEAN SEA* at Tangier, where he secured passage back to France.

The Geographical Society of Paris awarded Caillié the cash prize; he was further honored with admission to the Legion of Honor. Nevertheless, some critics, especially those in England, doubted Caillié's claim of having reached Timbuktu, principally because his realistic descriptions did not live up to the expectations fueled by earlier legendary accounts. Granted a pension by the French government, Caillié retired in France. While in Africa, he had developed tuberculosis, and he succumbed to this illness in 1838.

Although René-Auguste Caillié brought back no new geographic information concerning the course of the Niger River, a mystery that puzzled European geographers until the middle of the 19th century, his three-volume account, published in 1830, provided the first accurate description of Timbuktu. His last journey in Africa had taken him across 4,500 miles of territory, most of which at that time was unknown to Europeans. Doubts about his accomplishments were put to rest in the 1850s after German explorer *HEINRICH BARTH*'s expedition to Timbuktu confirmed Caillié's findings.

Cam, Diego See CÃO, DIOGO.

Cameron, Verney Lovett (1844–1894)

British naval officer in central Africa

Verney Lovett Cameron, the son of a clergyman, was born in Radipole, Dorsetshire, on England's south coast. At the age of 13, he entered the British navy as a midshipman, and, over the next 10 years, he saw active service in the Indian Ocean, taking part in British efforts to stem the SLAVE TRADE. In 1868, he participated in a British military expedition against Ethiopia.

Promoted to lieutenant by 1870, Cameron returned to England, where he was stationed at the naval base at Sheerness, off the coast of Kent. That year, he offered his services to the ROYAL GEOGRAPHICAL SOCIETY, proposing to lead an expedition into East Africa in search of the missing missionary and explorer, DAVID LIVINGSTONE.

Cameron's initial offer was turned down; soon afterward, in 1871, American journalist SIR HENRY MORTON STANLEY succeeded in locating Livingstone. Nonetheless, the following year, the Royal Geographical Society organized an expedition to take supplies to Livingstone, who had remained in Africa, and appointed Cameron to lead it, directing him also to undertake an exploration of the region around Lake Tanganyika.

Cameron, in command of the Livingstone East Coast Expedition, headed into the interior of what is now Tanzania in late March 1873. Starting out from Bagamoyo, an Indian Ocean port city opposite Zanzibar, he traveled with W. E. Dillon, a British naval surgeon; Lieutenant Cecil Murphy, a British army artillery officer; and Robert Moffat, Livingstone's nephew.

After a 500-mile trek inland, Cameron and his party reached Tabora. In late October 1873, they received word that Livingstone had died; a few days later, Livingstone's body was brought to Tabora. Moffat by then had died, and Dillon and Murphy decided to head back to England.

Undaunted, Cameron stayed on to explore Africa. Proceeding farther westward, he reached Ujiji on Lake Tanganyika. He undertook an extensive exploration of this vast inland body of water, Africa's second largest lake, and subsequently produced the first detailed map of it. His survey revealed that 96 rivers flowed into the lake. He also made the European discovery of the Lukuga River, the only river flowing out of it.

In Ujiji, Cameron arranged to have Livingstone's personal belongings and journals shipped back to England, then headed into the region east of Lake Tanganyika. He soon reached Nyangwe, a slave trading center on the Lualaba River. He determined that the Lualaba could not be a tributary of the NILE RIVER, as many geographers believed at that time. Using a barometer to determine altitude, he con-

cluded that this river, at a much lower elevation than the Nile to the north, and with a much greater volume of water than was found in the upper Nile, was more likely a tributary to Africa's other great river, the CONGO RIVER, now known as the Zaire.

Hostile Arab slavers made it impossible for Cameron to hire canoes and native bearers to explore the Lualaba northward and find out if it did indeed join the Congo as he believed. Instead, he set out on a southwestward journey across the watershed between the Congo and the ZAMBEZI RIVER. Traveling overland by way of Kabambare, he crossed present-day Zaire and reached the Atlantic coast of Africa in northern Angola, arriving on November 7, 1875.

Upon his return to England the following April, Cameron was proclaimed the first European to have traversed tropical Africa from the Indian Ocean to the Atlantic coast and was awarded the Founder's Medal by the Royal Geographical Society. He recounted his experience in his 1877 book *Across Africa*.

In the early 1880s, Cameron returned to Africa, joining SIR RICHARD FRANCIS BURTON in an expedition to present-day Ghana, in search of mineral wealth. With Burton, he coauthored an account of this adventure, *To the Gold Coast for Gold*, first published in 1883. That year, Cameron left the navy, but he continued in government service as a diplomat in Africa, aiding in Britain's campaign against the SLAVE TRADE. During the late 1880s, he was active in promoting a railroad link between Cape Town, South Africa, and Cairo, Egypt. In 1894, while in southern England, he was killed in a horseback riding accident.

Verney Lovett Cameron's speculation that the Lualaba River flowed northward to the Congo River was shown to be true with the subsequent explorations of Henry Morton Stanley and JOSEPH THOMSON. Moreover, Cameron's 1873–75 expedition into central Africa brought back the first detailed information on the region east of Lake Tanganyika, and the first report of the Lukuga River. Although unable to undertake an exploration of the Congo River itself, he traversed its entire watershed with the Zambezi, and, in so doing, became the first European to make an east-to-west crossing of the African continent below the SAHARA DESERT.

Campbell, John (1766–ca. 1840) *Scottish missionary in South Africa*

John Campbell was born in Edinburgh, Scotland, where, in his early years, he was a schoolmate of author Sir Walter Scott. He excelled in business and went on to become a philanthropist, using his financial resources to sponsor religious causes.

In 1812, soon after Great Britain gained control of the Dutch colony around the CAPE OF GOOD HOPE, the

London Missionary Society requested that Campbell go to South Africa to inspect its missions.

After sailing to Cape Town that year, Campbell journeyed eastward along the coast into the largely unsettled region around what is now Port Elizabeth. At Algoa Bay, he headed inland, traveling northward across the open grasslands known as the highveld. Eventually he entered the land of the Botswanas, at Kuruman, on the southern edge of the Kalahari Desert. From there, he followed the course of the Hartz River eastward to the Vaal River, which took him to the west-flowing Orange River and the Atlantic coast of Namaqualand, in present-day southern Namibia. From there, he returned to Cape Town in 1814, where he lived for the next several years.

Campbell undertook a second journey into the interior of South Africa in 1819–21. He traveled northward into the Kalahari region and penetrated the northern part of the present-day Transvaal region, where he located the source of the 1,000-mile-long Limpopo River. He returned to London after 1821, having covered more than 2,000 miles of remote inland territory. He continued to work on behalf of African missions for the next 20 years. He also authored several books recounting his African experiences.

John Campbell's explorations beyond the frontier region of early-19th-century South Africa preceded by more than two decades the mass migrations of the Boers into what later became the Orange Free State and the Transvaal.

Campbell, Robert (1804–1879) *American trapper, merchant on the Missouri River and in the Rocky Mountains*

Robert Campbell was born near the town of Omagh in what is now Northern Ireland. He came from a fairly affluent family and received a good education before immigrating to America in his late teens.

By 1824, Campbell was in St. Louis, Missouri, at that time the hub of the burgeoning FUR TRADE to the upper MISSOURI RIVER and northern ROCKY MOUNTAINS. Troubled by chronic lung disease, Campbell sought to recover his health with a trip into the unspoiled wilderness and joined WILLIAM HENRY ASHLEY's 1824–25 expedition to take supplies to the fur traders and trappers in the Uinta Mountains in what is now northeastern Utah.

Campbell, with Ashley's party, including THOMAS FITZPATRICK, traveled up the Missouri to the North Platte River at Fort Atkinson, near present-day Omaha, Nebraska. Following the North Platte westward across the plains, the group explored present-day western Nebraska and the eastern Colorado Rockies. They proceeded southward, reached the South Fork of the Platte River, then headed westward to the Green River. They traveled down the Green on makeshift boats into the Uinta Mountains, east of the Great Salt Lake. Along the way, Campbell traveled through the

Green River's Flaming Gorge, a narrow waterway that passed between 2,500-foot-high overhanging cliffs. He was among the first non-Indians to explore Browns Hole and the rapids of the Green River in what is now northeastern Utah's Dinosaur National Monument.

At a point below Browns Hole, the group encountered French-Canadian explorer and trapper ÉTIENNE PROVOST and his party, and the leaders of the two expeditions conferred on what each had learned en route.

Campbell then explored with the combined Ashley-Provost expedition into the Uinta Mountains, and, in July 1825, he attended the first annual trappers' rendezvous at Henrys Fork of the Green River, at the south end of what is now known as the Flaming Gorge Reservoir on the Utah-Wyoming boundary line.

Campbell remained active in the Rocky Mountain fur trade. On his way to the trappers' rendezvous of 1828, his party, including JAMES PIERSON BECKWOURTH, was attacked by Blackfeet warriors, but they successfully fought off the Indians in a battle that later came to be known as the "Fight in the Willows." During the 1829 trapping season, he explored Crow Indian lands between the Powder and Bighorn Rivers in what is now north-central Wyoming. Following this expedition, Campbell visited his Irish homeland in 1830–31.

Back in the Rockies in 1832, Campbell and WILLIAM LEWIS SUBLETTE trapped the western slopes of the Teton Mountains, south of what is now Yellowstone National Park. During this expedition, the mountain men survived an attack by Gros Ventre (Apsinon) Indians in a skirmish at Pierre's Hole.

Campbell and Sublette remained partners in the fur trade for the next 10 years. From St. Louis, they operated a thriving supply business to the fur trappers on the upper Missouri, northern plains, and northern Rockies. In 1833, they established Fort William, a large trading fort at the mouth of the Yellowstone River (near the American Fur Company's main fur-trading center at Fort Union), in what is now northwestern North Dakota. Campbell himself managed this trade center in 1833–34. CHARLES LARPEUR sometimes worked with him.

In 1834, Campbell and Sublette founded Fort Laramie in southeastern Wyoming, a settlement that became an important stopover point for travelers on the Oregon Trail.

Campbell ended his partnership with Sublette in 1842. Campbell went on to establish a prosperous mercantile business in St. Louis, specializing in supplying the fur trade and buying beaver pelts for shipment to the East.

In 1851, Campbell returned to his old post at Fort Laramie, which had since been sold to the U.S. Army. There he assisted his old trapping friend, Thomas Fitzpatrick, in negotiating a peace treaty with Sioux (Dakota, Lakota, Nakota) Indians.

Campbell's business dealings in St. Louis made him a wealthy man. He expanded his enterprises into commercial banking and real estate. Yet he never broke his ties with the frontier, and during the post-Civil War years, he served as a peace commissioner for President Ulysses S. Grant's Peace Policy to the Indians.

Robert Campbell, like the other traders and trappers of the 1820s and 1830s, explored uncharted lands and helped open the American West to non-Indian settlement.

Campbell, Robert (1808–1894) *Scottish fur trader in western and northwestern Canada and Alaska*

At the age of 22, Scottish-born Robert Campbell immigrated to North America to work for the HUDSON'S BAY COMPANY at its fur-trading posts on the Canadian frontier. Starting in 1834, he began a series of annual explorations of the Mackenzie and Yukon Rivers.

During his explorations of the Mackenzie River, Campbell became the first known non-Indian man to see the Pelly River. In 1843, he returned to the Pelly and followed it northwestward to the Lewes and Yukon Rivers, thus determining the headwaters of eastern Alaska's interior river system, which eventually flowed into the Bering Sea. In 1848, at the confluence of the Lewes and Yukon, he established the northwesternmost post for the Hudson's Bay Company at that time, Fort Selkirk, which abutted the region controlled by the RUSSIAN-AMERICAN COMPANY.

In 1850–51, Campbell continued his explorations of the Yukon River, reaching its confluence with the Porcupine River in northeastern Alaska. Soon afterward, Fort Yukon was established there as another post for the Hudson's Bay Company.

In 1852, Campbell traveled to London, where he helped prepare maps of the interior river system of northeastern Alaska and what is now the western Yukon Territory. He soon returned to the Canadian West, where he was the Hudson's Bay Company's chief factor for Saskatchewan until his retirement in 1871. He spent his later years on his Manitoba ranch.

Robert Campbell's account of his penetrations into the Canadian northwest, *The Discovery and Exploration of the Pelly River*, was first published in 1883. His explorations of the rivers to the north and west of the Great Slave Lake provided geographers with important data on the then-uncharted areas of Canada's northern regions, as well as the previously uncharted area of northern Alaska.

Cano, Juan Sebastián del (Juan Sebastián de Elcano, Juan Sebastián Delcano) (ca. 1476–1526)

Spanish mariner in first circumnavigation of the world

Juan Sebastián del Cano, of Basque ancestry, was born in northern Spain. By 1519, he had become an experienced

seafarer and navigator and was appointed captain of the *Concepción*, one of five ships that set out from Spain for the EAST INDIES under the command of FERDINAND MAGELLAN.

Six months into the voyage, while wintering on the Atlantic coast of Patagonia, Cano took part in a mutiny by some of Magellan's officers and men who wanted to abandon the expedition and return to Spain. Magellan prevailed, however, and subsequently sent Cano, still in command of the *Concepción*, along with another vessel, the *San Antonio*, in search of a passage westward to the Pacific Ocean. In October 1520, following a violent storm, Cano returned to Magellan, having located the entrance to what later became known as the STRAIT OF MAGELLAN.

The expedition, following up Cano's report, sailed into the strait and entered the Pacific. In April 1521, Magellan was fatally wounded in the Philippines. That September, Cano was elected to command the expedition, then reduced to only three ships, the *Concepción*, the *Trinidad*, and the *Victoria*. With less than half of the original 237 men in the expedition surviving, there were too few crew members to man all three ships; as a result, Cano ordered the *Concepción* burned.

By late November 1521, Cano, in command of the *Victoria* and accompanied by the *Trinidad*, finally reached Magellan's intended destination, the SPICE ISLANDS (Moluccas), in what is now Indonesia. After obtaining a valuable cargo of spices, the two ships set sail in January 1522. The *Trinidad* was not seaworthy enough to attempt a passage around the CAPE OF GOOD HOPE, and instead sailed eastward in the hope of reaching a Spanish port in Panama. But it was soon captured by the Portuguese. Cano avoided capture by entering the Indian Ocean by way of Banda Strait and Timor, then sailed directly across the Indian Ocean and around the Cape of Good Hope, not making a landfall until he reached the Portuguese-held Cape Verde Islands off the coast of West Africa. There, he tried to persuade the Portuguese that he had just returned from the Americas, not the restricted East Indies. The Portuguese did not believe him, however, and took 13 of his men prisoner.

In September 1522, Cano reached Spain. Of the 237 men and five ships that had started out with Magellan, only 18 men and one ship returned. Nevertheless, the spices that Cano brought back from the Moluccas more than paid the cost of the enterprise. Spanish monarch Charles I (Holy Roman Emperor Charles V) honored Cano for completing the first CIRCUMNAVIGATION OF THE WORLD, and his participation in the mutiny in Patagonia was forgiven.

In 1525, Cano again sailed for the Moluccas in an expedition that planned to claim that rich source of spices for Spain. The next year, while retracing Magellan's route across the Pacific, he died of SCURVY.

Juan Sebastián del Cano initially received most of the credit for undertaking the first circumnavigation of the world. Magellan's role as the expedition's originator and leader was not recognized until years later. In any event, CHRISTOPHER COLUMBUS's idea of reaching the Orient by sailing westward was first realized by Cano, who also played a key role in locating the eastern entrance to the Strait of Magellan.

Cão, Diogo (Diego Cam) (ca. 1450–1486)

Portuguese mariner on the Atlantic coast of Africa

Diogo Cão, or Diego Cam, was probably born in Trás or Montes, Portugal. While still young, he served as a squire at the court of HENRY THE NAVIGATOR, prince of Portugal, at Sagres, where he was exposed to work being done by geographers and navigators at Henry's school of navigation.

By 1480, Cão had become an accomplished seafarer and navigator, serving as admiral with the Portuguese navy. That year, he undertook his first recorded voyage to the west coast of Africa, and, while visiting ports on the Gulf of Guinea, he may have met CHRISTOPHER COLUMBUS.

Soon after coming to the throne in 1481, King John II of Portugal commissioned Cão to continue the exploration of Africa that had begun under Prince Henry. Cão left Portugal in June 1482, and, sailing southward along the west coast of Africa, went beyond what is now Santa Catarina in Gabon, the southernmost point previously reached by European navigators.

In August 1482, Cão came upon the mouth of a great river. On its north bank, he erected a 13-foot-high limestone pillar known as a *PADRÃO*, proclaiming Portuguese sovereignty over the region, with inscriptions in Portuguese, Latin, and Arabic. From local natives, Cão learned that the river was called the Kongo (or CONGO RIVER, now known as the Zaire River), after the powerful monarch, Mani Kongo, who controlled the region from Mbanzu farther upriver. Four members of Cão's crew set out to explore the Congo and contact the king, as well as seek out the legendary white ruler known as PRESTER JOHN. Meanwhile, Cão continued his exploration southward.

In late August 1483, at what is now Cape St. Mary, Angola, about 500 miles south of the mouth of the Congo, Cão erected a *padrão*, then headed back northward. He stopped at the Congo's mouth to pick up the men he had left there; not finding them, he took four native potentates back to Portugal, as hostages.

Cão reached Lisbon on April 8, 1484, where King John honored him with a knighthood. The next year, Cão embarked on a second voyage. He reached the mouth of the Congo, where he was joined by the four Portuguese left behind in 1483. The four native princes were returned to their homeland as well, having been well treated in Portugal. Cão

then sailed his ship up the Congo for a distance of about 100 miles. A record of his visit still exists as graffiti carved into the face of the cliffs overhanging the river at the Yellala Falls.

From the Congo, Cão sailed farther southward along the coast of what is now Angola and erected a *padrão* at Cabo Negro. He had hoped to find an end to the African continent and a passage eastward to India. His supplies running low, he set up another *padrão* at Cape Cross, on the Atlantic coast of what is now Namibia, and headed back to Portugal, having explored an additional 1,500 miles of African coastline with no southern end of the continent in sight.

By 1486, Cão was in Portugal. He may have taken with him the African prince known as Cacuto, who returned to west-central Africa in the early 1490s and aided the Portuguese in winning control of the region. Cão also took back a large shipment of black pepper, which, although it had a disastrous effect on the Portuguese spice market, nonetheless made the voyage highly profitable. Cão may have again explored the coast of West Africa. He reportedly died south of Cape Cross, Namibia, later that same year, 1486.

Diogo Cão's explorations revealed that the African continent extended much farther southward than had been speculated. His charting of the Congo River provided Portugal with access to trade with the interior of central Africa. The pillars he set up along the African coast endured for hundreds of years, and several of them were recovered and deposited in museums in Europe. In reaching the coast of Namibia at Walvis Bay, he was the first European to sail almost as far south as the TROPIC OF CAPRICORN. His explorations along the coast of Africa soon led to the first European voyage around the CAPE OF GOOD HOPE, accomplished by Portuguese navigator BARTOLOMEU DIAS in 1487. German cartographer MARTIN BEHAIM accompanied Cão on at least one of his voyages.

Cárdenas, García López de See LÓPEZ DE CÁRDENAS, GARCÍA.

Carpini, Giovanni da Pian del (John de Piano de Carpini, John of Pian de Carpini, John de Plano Carpini, John of Plano, John of Piano Carpini)

(1182–1252) *Italian friar, early traveler in central Asia*

Giovanni del Carpini was born in the north-central Italian city of Perugia, near Assisi. A disciple of St. Francis of Assisi, he entered the religious order established by his companion.

In 1245, Carpini headed the Franciscan order in Cologne. That year, he was summoned to Lyons by Pope Innocent IV. The eastern frontier of Europe had undergone a siege by the Mongol tribes from the steppes of central Asia, who had advanced as far west as Kiev and Hungary by 1240. Soon afterward, there was a lull in their aggression, and ru-

mors began to circulate in the West that the Mongols were sympathetic to the Christians and might be persuaded to ally themselves with the European powers in an attack against the Muslim Turks, then occupying the Holy Land and also threatening Europe.

In Lyons, Carpini was designated envoy to the Mongols. With a letter from the pope, entreating the current Mongol khan (ruler), Ogadei, a descendant of GENGHIS KHAN, to desist from the further slaughter of Christians and to embrace Christianity, Carpini departed Lyons on April 16, 1245. He first traveled to Bohemia, where he met with King Wenceslaus, who had had some contact with the Mongols during their most recent onslaught on his eastern frontier. In Poland, Carpini was joined by another Franciscan, Friar Benedict, who acted as his interpreter. They proceeded eastward across the Ukraine by horseback, stopping at Kiev before continuing to the Dnieper and Don Rivers, north of the Black Sea.

In February 1246, Carpini and his party reached the Volga River, where they encountered a large encampment of Mongols, headed by Batu. From Batu, they obtained the horses necessary to cross the barren steppes of central Asia, and, with a letter of safe conduct, they continued their journey, traveling north of the Caspian and Aral Seas into the northern reaches of the GOBI DESERT.

Carpini arrived at the Mongol Imperial Encampment near Karakorum on July 22, 1246. Since leaving Lyons 15 months earlier, he had traveled across 3,000 miles of eastern Europe and central Asia. At that time, more than 2,000 Asian princes and their respective entourages had assembled at Karakorum to witness the coronation of the new khan, Kuyuk, uncle of Batu. Carpini learned then that the former khan, Ogadei, had died in 1241, and he realized that Ogadei's death was the reason for the sudden lull in Mongol aggression against Europe.

Carpini presented his papal letters to Kuyuk. In turn the khan gave Carpini letters for the pope in which he curtly communicated that he would not become a Christian, and that he could not accept the overtures for peace unless they were presented personally by the pope and the princes of Christendom. He then offered to send his own emissaries back to the pope with Carpini, but the Franciscan declined the suggestion, fearing the Mongols would learn how disunited the European powers actually were.

On November 13, 1246, Carpini and Friar Benedict were allowed to leave Karakorum. Over the next 10 months, they made a harrowing winter crossing of central Asia, reaching Kiev in June 1247.

On his return to western Europe, Carpini presented his account to the pope in Lyons. He was subsequently appointed archbishop of Antivari on the Dalmatian coast, in what is now Yugoslavia, and served as a papal diplomat to the court of Louis IX of France.

Giovanni del Carpini wrote a detailed account of his journey into Mongolia, entitled *The Book of the Tartars*, which provided Europeans with one of the first descriptions of the life and customs of the native peoples of central Asia. Carpini initiated the first dialogue between the East and West in medieval times, setting a precedent for the subsequent diplomatic missions of WILLIAM OF RUBROUCK and André de Longjumeau, as well as for the commercial travels of MARCO POLO.

Carson, Christopher Houston (Kit Carson)

(1809–1868) *American frontiersman, guide in the American West*

Christopher (Kit) Carson was born near Richmond, Kentucky. In 1811, his family took him to the Missouri frontier. In 1826, he left Old Franklin, Missouri, where he had been apprenticed to a saddle-maker, and traveled with a trade caravan along the Santa Fe Trail to Taos, New Mexico.

Over the next several years, Carson operated out of Taos as a trapper, trader, and hunter. In 1829, he accompanied EWING YOUNG on an expedition from Taos across the Mojave Desert to California's San Joaquin Valley.

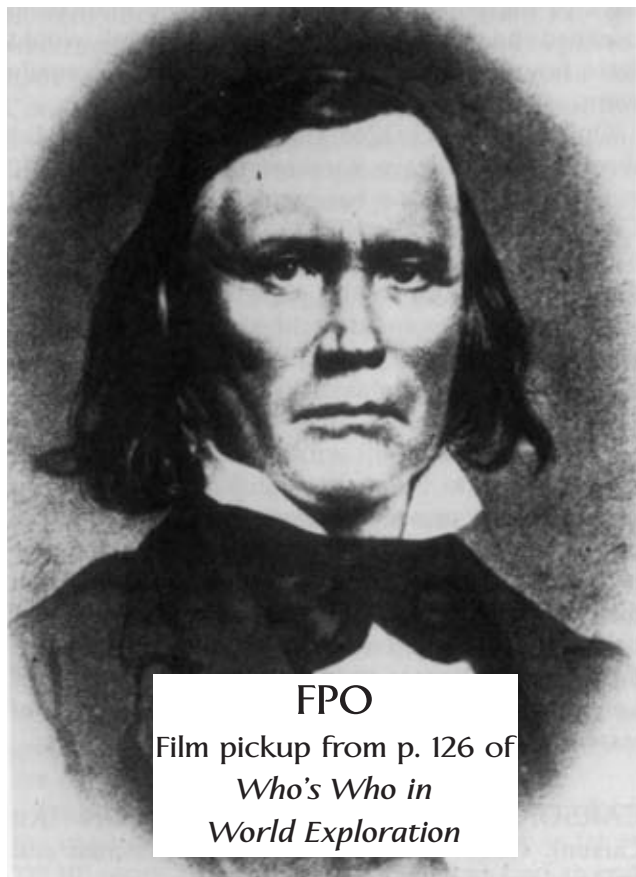
Carson returned to Taos with Young in 1831. That year, he explored the Old Spanish Trail with fur trader Richard Bland Lee and crossed the southern ROCKY MOUNTAINS into what is now central Utah to ANTOINE ROBIDOUX's post at Fort Uinta.

In about 1832, fur trader THOMAS FITZPATRICK recruited Carson in Taos. Over the next decade, Carson trapped beaver throughout the Rockies and Far West, gaining much knowledge of little-known passes, rivers, deserts, and mountain ranges. In 1835, he attended the Green River fur traders' rendezvous with trapper JAMES BRIDGER.

With the decline in the beaver trade after 1838, Carson turned to other pursuits. In 1840–42, he worked as a hunter and guide out of Bent's Fort in present-day eastern Colorado. In 1842, while traveling back from St. Louis by riverboat, Carson met explorer JOHN CHARLES FRÉMONT, who hired him as a guide for his expedition to the northern Rockies.

Carson guided Frémont's 1842, 1843, and 1845 expeditions into the Rockies, the Great Basin, and the Far West. His explorations with Frémont took him from the northern plains to the Snake River and COLUMBIA RIVER and across the Sierra Nevada into California.

While in California with Frémont in 1845–46, Carson became active in the California revolt and the subsequent U.S.-Mexican War of 1846–48. In fall 1846, Carson was sent eastward from California with military dispatches reporting the progress of the war there. En route, in the valley of the upper Rio Grande, south of Albuquerque, New Mexico, he encountered General STEPHEN WATTS KEARNY and his forces traveling westward across the desert toward San



Kit Carson (Library of Congress)

Diego. Carson informed Kearny of the rough terrain over which he had just come, prompting Kearny to leave his wagons behind and proceed westward with only a column of mounted soldiers. The general was so impressed by Carson's knowledge of the territory to the west, that he drafted the frontiersman into service as his chief guide. Carson led Kearny's men westward along a route that, after skirting the southern end of the Rockies, followed the Gila River, then crossed the southern Sierra Nevada to reach San Diego on the Pacific coast.

In 1849, Carson completed an overland trip from California to Washington, D.C., in which he brought to the East one of the earliest reports that gold had been discovered at Sutter's Fort.

After the U.S.-Mexican War, Carson settled in Taos. In 1853, he joined other former mountain men in driving 135,000 head of sheep from Taos to the booming market in central California. During the 1850s and the Civil War years, Carson took part in military campaigns against Kiowa, Comanche, Ute, Apache, and Navajo (Dineh) Indians. He was a federal Indian agent for the Moache Ute and Jicarilla Apache and took part in treaty negotiations with them and other Southwest and southern plains bands.

Kit Carson applied the skills he learned as a fur trapper and mountain man to the exploration of the American West. Through the reports of Frémont, he achieved a reputation as the foremost frontiersman and western guide of his day. The trail through the Sierra Nevada that he and Frémont pioneered in 1844 was later named Carson Pass in his honor. It soon became an important route for settlers and gold seekers headed into California from Nevada.

Carteret, Philip (ca. 1733–1796) *British naval officer in the South Pacific*

Philip Carteret was born at Trinity Manor on England's island of Jersey. Descended from a long line of distinguished seafarers, he entered the British navy as a midshipman in his early teens. During the Seven Years War of 1756–63, he took part in naval engagements in the MEDITERRANEAN SEA, and, in August 1758, he was promoted to the rank of second lieutenant.

In 1764, Carteret served as first lieutenant on the *Dolphin*, under the command of JOHN BYRON, with whom he circumnavigated the world, returning to England in May 1766.

Just three months after returning from his voyage with Byron, Carteret again sailed from Plymouth on another British naval exploring expedition, in command of the sloop *Swallow*, accompanying the expedition's commander, SAMUEL WALLIS, on the *Dolphin*. After crossing the Atlantic Ocean, the ships reached the entrance to the STRAIT OF MAGELLAN in December 1766, then spent the next four months negotiating a passage to the Pacific Ocean. In April 1767, as both ships entered the Pacific, they were driven apart by strong winds and currents. Each then continued on alone, with Wallis and the *Dolphin* sailing westward across the Pacific, while Carteret and the *Swallow* followed a northward course along the west coast of South America. Off the coast of central Chile, he headed westward. After several months at sea, he located an island, which he named Pitcairn, after the marine on board who had first sighted it. He then came upon an archipelago, which he called the Admiralty Islands, and he subsequently charted the Santa Cruz Islands, which had not been visited since the voyage of ÁLVARO DE MENDAÑA in 1595.

Carteret sailed north of New Guinea, made a stop at Mindanao in the Philippines, and also charted some islands in the Solomons. Approaching the coast of Australia, he detected a southward current, which led him to conclude that NEW ZEALAND and Australia were separated by a channel. He also explored New Britain in the Melanesian archipelago, where he left a plaque that was found a few months later by French explorer LOUIS-ANTOINE DE BOUGAINVILLE. Soon afterward, Carteret located and

named nearby New Ireland; Carteret Harbor there is named in his honor.

In November 1767, Carteret reached the Dutch colony of Makasar on the Indonesian island of Celebes, where he was forced to remain for four months while his crew recovered from sickness and his ship underwent extensive repairs.

Carteret sailed from Makasar in spring 1768, and, after long stopovers in Batavia (present-day Jakarta, Indonesia) and Cape Town, South Africa, he returned to England in March 1769. His voyage around the world had taken 31 months, during which he had lost half of his original crew. Carteret remained in the British navy, reaching the rank of vice admiral in 1794.

Philip Carteret's CIRCUMNAVIGATION OF THE WORLD was remarkable in that he completed the voyage in the face of severe problems with both his ship and the health of his crew. Pitcairn Island, charted in the course of Carteret's 1766–69 voyage, served as a refuge for the *Bounty* mutineers in 1789.

Cartier, Jacques (1491–1557) *French mariner, fur trader in eastern Canada*

Jacques Cartier was born in Saint-Malo, a seaport in France's Brittany region. A member of a prominent family, he became an accomplished master pilot and navigator and, by 1520, had married the daughter of a high city official. He is thought to have accompanied explorer GIOVANNI DA VERRAZANO on his 1524 voyage to the mid-Atlantic coast of North America; he may also have been with Verrazano on his 1527 expedition to the coast of Brazil.

In 1532, King Francis I of France paid a visit to the Abbey of Mont-St.-Michel, not far from St.-Malo. The abbey's treasurer, a relative of Cartier, introduced Cartier to the king. With Spain and Portugal dividing up newly explored lands in the Americas, Francis I was eager to initiate a French transatlantic expedition and accepted Cartier's proposal to undertake a voyage in search of a NORTHWEST PASSAGE to the Far East. Francis I provided some backing for this expedition, with the rest coming from commercial interests in Brittany.

With two ships and about 120 men, Cartier set sail from St.-Malo on April 20, 1534. Following a course due west, he landed at Cape Bonavista on the east coast of Newfoundland on May 10, 1534. Although the islands and peninsulas of the present-day Canadian Maritime Provinces had been visited by French fishing fleets for some years prior to Cartier's arrival, his was the first organized French expedition to this part of North America.

Seeking the Northwest Passage, Cartier sailed around the coast of Newfoundland, which had not yet been determined to be an island. He passed through the Strait of Belle Isle, separating Newfoundland from southern Labrador, and

entered the Gulf of St. Lawrence. He charted the coast of southern Labrador and visited numerous islands in the gulf, including Anticosti Island, the Magdalen Islands (Îles de la Madeleine), and Prince Edward Island. At Dog Island he set up a large cross.

The expedition reached the coast of the Gaspé Peninsula and visited Chaleur Bay, where Cartier's men had contacts with the Micmac Indians, trading European manufactured goods for furs. In July 1534, Cartier went ashore at Gaspé Bay and officially claimed the land for the king of France. Cartier's men befriended a party of Huron (Wyandot) Indians under Chief DONNACONNA, who had journeyed from their home on the St. Lawrence River to hunt seals. Cartier convinced the Huron chief to allow his two sons to accompany the expedition as guides, promising to return the boys within a year.

By early August 1534, Cartier had explored the Atlantic shoreline of what is now Quebec province. Although he had failed to locate the Northwest Passage, he had heard from the Indians of the land of SAGUENAY, a country reportedly rich in gold and valuable minerals. The expedition soon set sail for France, reaching St.-Malo on September 5, 1534.

By the next spring, Cartier had received a commission to sail beyond the known coast of Newfoundland, continue



Jacques Cartier (Library of Congress)

his search for the Northwest Passage to China, and locate Saguenay. With three ships and a company of 112 men, Cartier set sail from St.-Malo on May 19, 1535. After a voyage of 50 days, he sighted Funk Island, off the northeast coast of Newfoundland. Cartier's ships then rounded the northern tip of Newfoundland and sailed southwestward through the Strait of Belle Isle into the Gulf of St. Lawrence. On August 10, 1535, he put in at a natural harbor on the mainland, north of Anticosti Island, naming the site "La Baye saint Laurins" (the Bay of St. Lawrence) in honor of the saint whose feast day falls on that date. In the years that followed, the name was used to identify both the great gulf and the river flowing into it, whose wide estuary Cartier soon reached.

On August 29, 1535, Cartier began his explorations up the St. Lawrence River (which he called "La Grande Rivière" and later "Rivière de Hochelaga," after the Indian settlement he was to find on its banks). A week later, he arrived at the Huron village of Stadacona, Donnaconna's home village at the site of present-day Quebec City. Donnaconna was reunited with his sons, who had traveled to France with Cartier the previous fall and had returned with Cartier on

this voyage. On being informed of another, larger Huron settlement farther up the St. Lawrence, Cartier led a small French party in longboats 150 miles farther upriver, reaching Hochelaga on the site of present-day Montreal, on October 2, 1535.

At Hochelaga, Cartier climbed the mountain that he called Montreal (Mount Royal) and from the top saw that rapids would make further exploration west on the St. Lawrence difficult. At this point, he had penetrated the Canadian mainland to a distance of 1,000 miles from the open sea.

Cartier returned to Stadacona, where his men built a fort in which to spend the winter. Over the next months, the French were beset with SCURVY. More than one-third died; others survived by drinking a Huron tea made from the bark of evergreen trees, a source of vitamin C unknown to them.

In late May 1536, Cartier set sail for France with only two of the ships because of the loss of crew; the smallest of the three vessels was presented to the Huron as a gift, which the Indians stripped for its iron. Chief Donnaconna was cajoled into accompanying the French on this return voyage. Along the way, they explored Cape Breton Island, the Cape



Jacques Cartier at the Huron village of Hochelaga (present-day Montreal) (*Library of Congress*)

of St. Lawrence, and the Magdalen Islands. Cartier also explored Cabot Strait and determined that Newfoundland was an island. By mid-July 1536, Cartier and his expedition arrived back in St.-Malo. Donnacona and other Huron accompanying him contracted European diseases and died abroad.

War with Spain delayed preparations for a third expedition to Canada. In spring 1541, French nobleman JEAN-FRANÇOIS DE LA ROCQUE DE ROBERVAL, the king's lieutenant general, was directed to establish a colony in Canada. Cartier departed St.-Malo that May; Roberval was to follow later. Five ships with more than 1,000 crew and colonists, many drawn from France's prisons, made this crossing.

Cartier reached the mouth of the St. Lawrence River in early summer, then sailed upriver to Cap Rouge, just above Stadacona. After founding a settlement, Cartier continued his explorations. He had all but given up his search for the Northwest Passage to the north of Stadacona, seeking instead the fabled land of Saguenay. A branch of the St. Lawrence River—later named the Saguenay—led Cartier to a region where he found what he thought was gold and precious stones. After obtaining mineral samples, the expedition sailed for France in June 1542.

En route, Cartier put in at St. John's, Newfoundland, where he encountered Roberval and his ships. Although ordered by Roberval to return to the St. Lawrence and Cap Rouge, Cartier and his men left under cover of darkness, heading for home. They arrived in St.-Malo in mid-October 1542. The minerals from Canada turned out to be pyrite, or FOOL'S GOLD, and quartz, both without cash value.

Cartier may have been sent on a fourth voyage to the St. Lawrence River region in 1543 to bring Roberval and his beleaguered colonists home to France, but no conclusive proof of this journey exists.

In any case, after 1543, Cartier remained in France for the rest of his life. He wrote an account of his Canadian adventures, commonly known as *Bref récit*, first published in Paris in 1545, then translated into Italian and published in Venice in 1556. In London, in 1580, RICHARD HAKLUYT published an English translation of the Italian edition as *A Short and Briefe Narration*.

Jacques Cartier's expeditions provided the foundation for France's claim to Canada. His explorations along the St. Lawrence River Valley had additional significance in that, unlike other early-16th-century voyages, they made use of small boats, among them the native CANOE, to investigate inland waterways that would have been unnavigable by larger vessels. He also initiated the practice of trading European manufactured goods with Indians for furs, a practice that would have great commercial impact in the coming centuries, with the development of the FUR TRADE. France realized that, despite the fact that the Northwest Passage to

China had not been discovered, North America itself had natural resources to exploit. Nevertheless, full-scale French settlement of Canada was delayed for over 60 years after Cartier's last voyage because of the religious wars that persisted in Europe throughout the 16th century. French explorations of the region resumed again in the early 1600s under SAMUEL DE CHAMPLAIN.

Carver, Jonathan (1710–1780) *British colonist, soldier in the western Great Lakes and on the upper Mississippi River*

Jonathan Carver was born in the town of Weymouth, Massachusetts, south of Boston. He was raised in Connecticut, where he became a shoemaker. From 1746 to 1763, he served with the colonial militia in the last two phases of the French and Indian Wars.

In 1766, the British sent famed Indian fighter Major ROBERT ROGERS to assume command over their garrison on Mackinac Island at the northern entrance to Lake Michigan. Rogers had long dreamed of discovering a NORTHWEST PASSAGE from the Great Lakes that would provide a water route to the Pacific Ocean. Carver, who may have known Rogers from his militia days, was hired by Rogers to undertake an expedition from Mackinac, exploring the rivers in the lands beyond the west shores of Lake Michigan, a precursor to a planned expedition to locate a river route to the Pacific.

In spring or summer 1766, Carver and a small party, starting from Mackinac Island, traveled along the north and west coasts of Lake Michigan to Green Bay. From there, they followed the Fox River, then traveled overland to the Wisconsin River, which they followed to its outlet on the MISSISSIPPI RIVER near present-day Prairie du Chien, Wisconsin. En route, Carver explored much of what is now southern and western Wisconsin.

Carver and his group then ascended the Mississippi River as far as present-day Minneapolis-St. Paul. At this point on the upper Mississippi, they came upon the Falls of St. Anthony, which had been visited by French explorer LOUIS HENNEPIN in 1680.

Carver continued to explore the Minnesota River beyond the Falls of St. Anthony, then wintered among the Sioux (Dakota, Lakota, Nakota) Indians. In spring 1767, he returned to the Mississippi, descending it back to Prairie du Chien. He joined up with a second party, led by Captain James Tute, which had been sent into the field by Rogers in search of the Northwest Passage.

The intended route up the Mississippi and westward was not passable at this time due to a war between the Sioux and Chippewa (Ojibway) Indians. Carver was forced to follow the Minnesota River until it turned northwestward. From the Minnesota River, the expedition entered the



Jonathan Carver (Library of Congress)

Chippewa River and followed that stream into what is now southwestern and central Minnesota.

Carver continued eastward via rivers and overland portages, until he reached the northeastern extent of Lake Superior. He crossed this section of the lake and stopped at Grand Portage in the extreme northeastern region of present-day Minnesota, near the outlet of the Pigeon River. Rogers had promised to provide supplies to the expedition at this point, but they had not yet arrived. After a period of waiting, Carver abandoned the planned expedition to the Pacific, heading back to Massachusetts sometime in 1768.

Over the next two years, Carver tried without success to receive payment from Rogers for his efforts in exploring the Minnesota and Wisconsin frontiers. In 1769, he sailed for England, where he wrote a book about his journeys, entitled *Travels Through the Interior Parts of North America in the Years 1766, 1767, and 1768*, which was not published until 1778. He died, impoverished, two years later.

Jonathan Carver's book was the first English-language account of the upper Mississippi and western Great Lakes areas, a region previously explored for the most part by the French. It had success in both Europe and North America, generating interest in the region and bringing sufficient funds to Carver's estate to raise his family from poverty. According to the publisher of a later edition of Carver's book, the Sioux had granted Carver more than 10,000 square miles of Minnesota territory while he lived among them in 1766–67. This led to claims by Carver's descendants, as well

as by assignees of these claims, which persisted well into the 20th century.

Casson, François Dollier de See DOLLIER DE CASSON, FRANÇOIS.

Catesby, Mark (ca. 1679–1749) *British naturalist, traveler in the American Southeast, Bermuda, Jamaica, and the Bahamas*

Mark Catesby was born in Sudbury, Suffolk, England. He had an interest in the natural sciences from an early age, and after his initial scientific training in London, he raised funds for a trip to America, where he planned to investigate new species of plants and animals.

In 1712, Catesby traveled to Virginia, where some of his relatives had settled, and began a seven-year study of the fauna and flora of North America, collecting specimens while traveling through a wide area of the mid-Atlantic and southern region of the American colonies. He went inland as far as the Blue Ridge, and also traveled to the Caribbean Sea, undertaking plant and animal studies in Bermuda and Jamaica.

Throughout his travels in colonial America, Catesby sent back seed and plant specimens to scientists in England; by the time he returned to England in 1719, he had earned a reputation as one of the foremost collectors of American wildlife.

Catesby's work had come to the attention of prominent British naturalist Sir Hans Sloane, and with Sloane's support as well as assistance from South Carolina colonial governor Francis Nicholson, Catesby undertook a second scientific expedition to America. He arrived in Charleston, South Carolina, in May 1722, and after exploring the interior of the Carolinas, he lived among the Indians at Fort Moore on Georgia's Savannah River. He also undertook field trips into Florida and made a study of plant and animal life in the Bahamas.

Catesby settled in London in 1726, where he produced his two-volume illustrated scientific study, *The Natural History of Carolina, Florida, and the Bahama Islands*, published serially from 1731 to 1743. In 1733, he won official recognition for his scientific work with admission to the ROYAL SOCIETY.

Mark Catesby's published work includes color illustrations depicting both plants and animals in a single setting, a technique later adopted by JOHN JAMES AUDUBON. He went on to produce scientific work on the migratory patterns of birds, basing these findings on his ornithological studies in South Carolina. He was among the earliest naturalists to refute the theory that birds hibernated underwater over the winter months, correctly theorizing that they actu-

ally migrated to warmer climates. Catesby's plant specimens later formed the basis for the British Museum's initial botanical collections. His 1731 *Natural History*, reportedly used by Thomas Jefferson and MERIWETHER LEWIS, included a new map of the Carolinas and other regions he had visited, providing new insights into the geography as well as the wildlife of the little-known interior of the American Southeast. Largely as a result of his work, many plants originally found only in North America were first introduced and cultivated in Europe. A Caribbean plant, the catesbea, was named in his honor.

Catlin, George (1796–1872) *American artist in North and South America*

George Catlin was born and raised on his family's farm near Wilkes-Barre, Pennsylvania. He went on to study law at Litchfield, Connecticut, eventually passing the Pennsylvania bar and opening a law practice near his hometown in Luzerne County, Pennsylvania.

Losing interest in his law career, Catlin studied art in Philadelphia and New York and soon managed to earn a

living as a portrait painter. In 1824, he happened to see a delegation of western Indian chiefs at Charles Willson Peale's natural history museum in Philadelphia. Regarding these Native Americans as the remnants of a doomed race, whose images would be lost to history unless preserved by art, he resolved to undertake this task. During the rest of the 1820s, he made numerous painting trips to Indian reservations in the East and also painted delegations of Indians visiting Washington, D.C.

In 1830, Catlin traveled to St. Louis, where, with the help of the former explorer WILLIAM CLARK, who was serving as superintendent of Indian affairs, he spent the next two years painting upper MISSOURI RIVER Indians visiting the frontier settlement.

Clark helped Catlin make arrangements to travel up the Missouri by riverboat. The artist departed St. Louis on March 26, 1832, aboard the steamer *Yellowstone*, on its maiden voyage for JOHN JACOB ASTOR'S AMERICAN FUR COMPANY, and reached Fort Union at the confluence of the Yellowstone and Missouri Rivers in present-day northeastern North Dakota on June 26, 1832. Throughout the summer, Catlin painted portraits of Indians who came to trade at the



Painting by George Catlin (the artist being chased by buffalo in the American West) (Library of Congress)

post. That fall, he returned to St. Louis by CANOE, accompanied by two trappers.

The following spring, 1833, Catlin again set out for the frontier, journeying into what is now southeastern Wyoming along what came to be known as the Oregon Trail. Over the next months, Catlin's painting expeditions took him westward across the northern plains and into the ROCKY MOUNTAINS, as far as Utah's Great Salt Lake.

In winter 1833–34, Catlin traveled along the Gulf Coast, between Pensacola, Florida, and New Orleans, Louisiana. In spring 1834, he left New Orleans and traveled up the MISSISSIPPI RIVER by boat to Fort Gibson on the Arkansas River in what is now Oklahoma.

From Fort Gibson, Catlin traveled along the Santa Fe Trail with the U.S. First Regiment of Mounted Dragoons, commanded by General HENRY LEAVENWORTH and Colonel HENRY DODGE. The expedition passed through the lands of the Comanche, Wichita, and other Indians of the southern plains. Catlin produced portraits of tribal leaders, as well as scenes of everyday life. He observed and painted a buffalo hunt, as well as ritualistic practices such as the Sun Dance. The expedition reached the Red River region of what was then Mexican-held Texas. Catlin, like Leavenworth and many other members of the Dragoon Regiment, was stricken with fever. Leavenworth soon died. Catlin remained in a Comanche village and, though sick, continued to paint. Recovering after a few weeks, he returned to St. Louis.

In 1835–36, Catlin traveled northward into the frontier regions of Minnesota and Wisconsin. In addition to painting the indigenous tribes, he explored uncharted parts of Minnesota. The Indians took him to their pipestone quarry in southwestern Minnesota near the present South Dakota state line, where they obtained the mineral they used in making ceremonial pipes and ornaments. Catlin was one of the first non-Indians to visit this site; the mineral, unique to this region, was subsequently named catlinite in his honor.

For two years, starting in 1837, Catlin toured the major cities of the eastern United States with his paintings. During the 1840s, he was in Europe, where his works were met with critical acclaim. By 1851, however, he was beset by financial difficulties and was forced to sell most of his paintings to satisfy creditors. He returned to the United States in about 1852, but he soon left to paint the Indians of Central and South America. From 1852 to 1857, he traveled throughout Central America and South America, including the ANDES MOUNTAINS. He also continued his journeys in North America during the 1850s and 1860s, traveling to the Pacific Northwest and Alaska. In 1870, he settled in Jersey City, New Jersey, where he died two years later.

Catlin published several illustrated books of his travels, including *Manners, Customs, and Condition of the North American Indians* (1841); *Catlin's North American Indian Portfolio* (1844); and *Last Rambles Amongst the Indians of the Rocky Mountains and the Andes* (1868).

Like fellow frontier painters KARL BODMER, PAUL KANE, and RUDOLPH FRIEDERICH KURZ, George Catlin provided images of the vanishing Indian way of life. His far-reaching painting expeditions throughout the Americas also provided visual perspectives of lands as they appeared prior to non-Indian settlement.

Cermenho, Sebastián Meléndez Rodríguez (Sebastião Rodrigues Cermenho, Rodríguez Cermeño, Cermeñón) (fl. 1590s) *Portuguese mariner along the California coast, in service to Spain*

Sebastián Rodríguez Cermenho was born in Portugal. As a young man, he found work as a navigator on Spanish ships out of Manila in the Philippines.

In 1595, Cermenho sailed from Manila aboard the *San Agustín* to explore North America's Pacific coastline and locate an inlet where Spanish ships could find shelter from British privateers and be refitted. On November 30, the ship ran aground near Point Reyes, north of present-day San Francisco, a region explored more than 50 years earlier by JUAN RODRÍGUEZ CABRILLO. Cermenho named the bay to the south San Francisco, but it later came to be known as Drake's Bay after SIR FRANCIS DRAKE. The expedition built a smaller boat from the wreckage, the *San Buena Ventura*. Sailing southward, the Spanish made a sighting of another bay on December 10, which Cermenho named San Pedro. SEBASTIÁN VISCAÍNO would make a landing here seven years later and rename it Monterey Bay. Cermenho's expedition continued south, charting the coastline and eventually reaching Acapulco, Mexico.

Although Cabrillo's and Viscaíno's explorations are better known, Sebastián Rodríguez Cermenho contributed to Spanish knowledge of California's coastline and can be credited with the European discovery of Monterey Bay.

Céron, Álvaro de Saavedra See SAAVEDRA
CÉRON, ÁLVARO DE.

Chaillé-Long, Charles (1842–1917)
American explorer in central Africa, in service to Great Britain and Egypt

Charles Chaillé-Long was born in Princess Anne on Maryland's east shore, a descendant of a French-Huguenot family that had settled there in about 1685. His great-grandfather had been one of the signers of the U.S. Constitution in 1787.

Chaillé-Long attended Washington Academy in Maryland. Upon completion of his studies in 1860, he entered the Union army, serving in the Maryland Infantry throughout the Civil War, during which he was promoted to captain.

Mustered out of the service at war's end, Chaillé-Long undertook literary studies on his own until 1869, when he resumed his military career with an appointment as a lieutenant colonel in the Egyptian army, which was under British control. In Cairo, he became chief of staff to the general in chief and taught French at a military school. In 1874, he was appointed chief of staff to British general Charles "Chinese" Gordon, governor general of Egypt's southernmost province in equatorial Africa.

In April 1874, Chaillé-Long embarked on a secret diplomatic mission into the kingdom of Buganda (present-day Uganda), where he succeeded in negotiating a treaty with King Mutesa that led to Egypt's annexation of the upper Nile Basin. While in that region, he undertook an investigation of the headwaters of the White Nile River and, in so doing, became the first European to come upon Lake Ibrahim (now known as Lake Kioga) in what is now central Uganda. Chaillé-Long subsequently traveled along a stretch of the NILE RIVER that JOHN HANNING SPEKE had been unable to explore in 1862, and he determined that Lake Kioga was one of the principal sources of the White Nile. At Mooli on the White Nile, he was wounded in an attack. Returning to northern Egypt, he was promoted to colonel and made an honorary nobleman by the khedive of Egypt.

In January 1875, Chaillé-Long led a military expedition from Gondokoro in the Sudan into the Niam Niam region

west of the Nile and succeeded in bringing the area under Anglo-Egyptian control. He also explored the natural divide between the CONGO RIVER (Zaire River) and Nile River, examining the upper Bahr el Ghazal River and its tributaries and completing the geographic investigation of the region undertaken by GEORG AUGUST SCHWEINFURTH five years earlier. He returned to Cairo with an adult Akka Pygmy, one of the first of the pygmy people to travel outside their rain-forest habitat.

Chaillé-Long's next expedition took him to the east coastal region around the Horn of Africa. In September 1875, he led an Anglo-Egyptian force into what is now Somalia. After occupying the city of Kismayu, he explored Somalia's Giuba River. He returned to Egypt in early 1876, when the military expedition was recalled by the British.

In August 1877, Chaillé-Long left the Egyptian military and returned to the United States. He settled in New York City and received an appointment as chief clerk of the city's police court. Attending Columbia University's school of law, he graduated and was admitted to the bar in 1880. The next year, he returned to Egypt to practice international law in Alexandria.

In 1882, an insurrection broke out in Alexandria against the ruling khedive, and Chaillé-Long took charge of American diplomatic affairs after the regular consular staff fled the city. As provisional U.S. consul general in Alexandria, he helped rescue hundreds of foreign refugees and, with the help of U.S. naval forces in the harbor, managed to restore order following a British counterattack. For his bravery in the face of grave danger, the Egyptian government offered him a commission as a brigadier general, which he did not accept.

In August 1887, U.S. president Grover Cleveland appointed Chaillé-Long ambassador to Korea. The next year, while in Korea, he took part in a scientific expedition to Cheju (then known as Quelpart), an island formed from an extinct volcano in the East China Sea. He subsequently served as the U.S. delegate to a number of major international conferences in Europe.

Charles Chaillé-Long received the Charles P. Daly Gold Medal from the AMERICAN GEOGRAPHICAL SOCIETY in 1910, in recognition of his contributions to geographic knowledge of Africa, especially for identifying one of the principal sources of the White Nile. He recorded his experiences in Uganda and the southern Sudan in his book, *Central Africa: Naked Truths of Naked People*, first published in 1876.

Chamisso de Boncourt, Louis-Charles-Adélaïde (Adelbert von Chamisso) (1781–1836)
French-born German naturalist, poet in South America, the Pacific, Alaska, and northeastern Siberia

Louis Chamisso de Boncourt was born at his family's estate in the Champagne region of northeastern France. In 1792,



Charles Chaillé-Long (Library of Congress)

with the onset of the Reign of Terror during the French Revolution, he departed France with his family, settling first in Holland, then in the German city of Würzburg. In his mid-teens, Chamisso served as a page in the Prussian royal court at Berlin, and in 1798, he entered the Prussian army as an ensign.

Although his family was able to return to France in 1803, Chamisso remained in Prussia. Having left the army in 1808, he embarked on a literary career, achieving great fame in France and Germany as a lyric poet. From about 1810 to 1812, he joined Madame de Staël (Germaine de Staël) and her literary associates in Paris and at her estate on Lake Geneva, Switzerland.

In 1812, Chamisso returned to Prussia to study botany, zoology, and anatomy at the University of Berlin. In 1815, he accepted an appointment as naturalist on a Russian-sponsored maritime expedition to the Pacific Ocean, and, in August of that year, he boarded the *Rurik* at Copenhagen, commanded by OTTO VON KOTZEBUE. Also engaged as a naturalist on this voyage was the German physician and scientist JOHANN FRIEDRICH ESCHSCHOLTZ. LOUIS CHORIS sailed with the expedition as a draftsman.

During the next three years, Chamisso sailed around the world aboard the *Rurik*. Traveling first to the coast of Brazil, he made a study of animal and plant life. He discovered a new type of palm tree, which he called *Cocos romansoffiana*, after the expedition's chief Russian supporter, Nicholas Petrovitch Romanzof. He also studied the marine life of the South Atlantic Ocean, especially jellyfish and mollusks.

After rounding CAPE HORN and visiting the coast of Chile, the *Rurik* stopped at Easter Island, then sailed westward across the Pacific to the Marshalls and Gilberts before heading northward for the Russian port of Petropavlovsk on northeastern SIBERIA's Kamchatka Peninsula.

By summer 1816, the *Rurik* had reached the west coast of Alaska, where Chamisso undertook studies of animal and plant life around Kotzebue Sound. From there, the expedition sailed to the Asian side of the BERING STRAIT. Chamisso studied the Chukchi people of eastern SIBERIA, comparing them to the Inuit (Eskimo) he had observed in Alaska. With the onset of winter, the *Rurik* returned to southern waters, stopping first at the Spanish missions on the California coast.

Chamisso made observations on the mission society in San Francisco, especially its impact on the Native American population of coastal California. He also conducted a study of marine life around San Francisco Bay, with special attention to a creature he identified as the California eared seal, more commonly known as the California sea lion.

In November 1816, the expedition reached the HAWAIIAN ISLANDS. Chamisso participated in native ceremonies

and rituals and observed the Hawaiian festive dance, the hula. From Hawaii, the expedition sailed to Guam in the Marianas, then went on to the Philippines. Chamisso made a study of insects around Manila Bay.

In spring 1817, Kotzebue sailed the *Rurik* back to Bering Strait, but, because of ill health, decided to end the expedition and return to Europe by way of the CAPE OF GOOD HOPE. On a stopover in England, Chamisso made a journey to London and conferred with veteran naturalists of the South Pacific, SIR JOSEPH BANKS, ROBERT BROWN, and JAMES BURNEY.

The *Rurik* returned to in St. Petersburg in August 1818. Chamisso returned to Berlin, where he was named conservator and chief horticulturalist for the royal botanical gardens. He continued to flourish as a poet and prose writer in Europe. In 1821, he published an account of his CIRCUMNAVIGATION OF THE WORLD with Kotzebue, as well as an expanded version, entitled *Voyage Journal*, which first appeared in 1835.

Louis Chamisso de Boncourt was known in Germany as Adelbert von Chamisso. His accomplishments as a botanical scientist in the Pacific and in Brazil are less well known than his literary endeavors; his work as a naturalist was honored, however, in the naming of Chamisso Island in Alaska's Kotzebue Sound. Chamisso's published account maintains that the Indians of South America had never become a seafaring people, an idea widely accepted in Europe and not seriously challenged until the voyage of THOR HEYERDAHL in 1947.

Champlain, Samuel de (1567–1635) *French mariner, soldier, fur trader, cartographer in northeastern North America*

Samuel de Champlain was born in Brouage, France, on the Bay of Biscay. Descended from a long line of seafaring men, he carried on the family tradition, embarking on a career in the French navy. He became a skilled geographer and cartographer as well as a navigator. He also served in the French army in the wars with Spain of the 1590s and developed skills as a surveyor.

Following the Treaty of Vervins in 1598, which ended the French Wars of Religion and led to the removal of Spanish troops from France, Champlain traveled to Spain, where his uncle held some influence. In 1599, with his uncle's help, Champlain traveled with a Spanish fleet to colonies in Cuba, Mexico, Puerto Rico, the Antilles, and Panama. Upon his return in 1601, he wrote an account of his travels, entitled *Bref Discours* (Brief discourse), which included one of the earliest proposals for the construction of a canal route across the Isthmus of Panama.

At the beginning of the 17th century, France, under King Henry IV, was facing severe financial problems fol-

lowing nearly a century of warfare with Spain. Once the military situation had been resolved in 1598, the king sought ways to bring needed commerce and money into the country. With the Spanish and Portuguese developing prosperous colonies in the Americas, he wanted France to do the same and solicited the financial backing and military expertise of his former officers to initiate voyages of exploration and settlement into Canada. Among them were Aymar de Chastes, governor of Dieppe and vice admiral of France; François Grave, sieur de Pontgrave; and Pierre de Gua, sieur de Monts. In exchange for a monopoly on the FUR TRADE over an area stretching from the Gulf of St. Lawrence to the shores of what is now southern New Jersey, de Chastes agreed to head an expedition to the coast of Canada in 1603. As royal geographer, Champlain was assigned to the expedition to prepare maps and seek a NORTHWEST PASSAGE through the North American continent to China and the Far East.

In summer 1603, Champlain and de Chastes sailed from the port of Honfleur in Normandy. The expedition passed through the Strait of Belle Isle and entered the Gulf of St. Lawrence. This region had been visited by French and Portuguese fishermen and early fur traders throughout the 16th century, since before JACQUES CARTIER's voyages of the 1530s and 1540s.

Champlain and de Chastes reached Tadoussac at the mouth of the Saguenay River, about 400 miles from the Atlantic outlet of the St. Lawrence River. Earlier French colonists had attempted to establish a settlement there, but it had been abandoned by 1601. From the Indians at Tadoussac, Champlain learned of water routes and portages north, south, and east.

After exploring northward up the Saguenay River for a distance of 40 miles, Champlain returned to the St. Lawrence and visited the Huron (Wyandot) village at Hochelaga (present-day Montreal). At this point, he encountered the same obstacle that had blocked Cartier's explorations 60 years earlier: the Lachine Rapids, barely navigable by CANOE and impassable by ship or longboat. The expedition returned to France in the fall of 1603, with glowing reports of the potential for the fur trade in the St. Lawrence River and Gulf of St. Lawrence region. Champlain also wrote an account of observations on the Indians he had encountered, entitled *Des Sauvages*.

Despite de Chastes's death in France in 1603, a second and larger expedition was planned. In June 1604, two ships sailed from France under the command of Champlain and de Gua. While part of the expedition returned to Tadoussac, Champlain's party remained in the Bay of Fundy and explored Cape Breton Island, the south coast of Nova Scotia,



Map of New France by Samuel de Champlain (1632) (New York State Library, Albany)

and Passamaquoddy Bay on the coast of what is now northern Maine. Locating the Atlantic outlet of the St. Croix River, the border between present-day Maine and New Brunswick, Champlain traveled 10 miles upriver and established the Acadia colony of about 80 men on Dochet Island to exploit the fur trade of the southern Laurentian Mountains.

About half the colonists died during the winter of 1604–05 as a result of food shortages and an outbreak of SCURVY. In spring 1605, Champlain and the Sieur de Monts moved the colony to a better location on the Annapolis Basin of southeastern Nova Scotia. The settlement, Port Royal, later became Annapolis-Royal, Nova Scotia.

Over the next two years, Champlain used Port Royal as a base for his explorations of the east coast of Canada and the present northeastern United States. In 1605–07, he sailed and charted southward to Cape Breton Island, Maine, Boston Bay, Plymouth Harbor, Cape Cod, Narragansett Bay, Nantucket, and Martha's Vineyard. He reached and named Mount Desert Island off the Maine coast and traveled up the Penobscot River as far as present-day Bangor, Maine. In his continuing search for a Northwest Passage to the Pacific Ocean, he also explored Maine's Kennebec and Dead Rivers, the Chaudière River of Quebec, and the Charles River in Massachusetts. Champlain was also seeking "Norumbega," a fabled Indian land of riches, first reported by GIOVANNI DA VERRAZANO nearly a century earlier. De Gua lost his fur monopoly in 1607, and Champlain and the Port Royal colonists returned to France.

In 1608, Champlain departed France on another expedition, sailing for the upper St. Lawrence River. At the Huron village of Stadacona, located at the narrows of the St. Lawrence, he established Quebec (present-day Quebec City), the first permanent French colony on the North American mainland. Champlain soon made trade and military alliances with the Huron, Algonkin, and Montagnais tribes.

Champlain again returned to France in 1608–09, where he married Helen Boule, the daughter of a royal official. Although she was only 12 years old and Champlain 40, her substantial dowry enabled him to proceed in his efforts at colonization and exploration in New France.

In return for French military support in their perpetual wars against the Iroquois (Haudenosaunee) Indians to the south, the Huron and various Algonquian-speaking tribes agreed to take Champlain on explorations into the rivers and uncharted wilderness south of the St. Lawrence. In spring 1609, he left Quebec with a party of French and Indians and journeyed by birch-bark canoe along the St. Lawrence to the entrance of the Richelieu River. They traveled south along the Richelieu until they entered the valley lying between the Adirondacks and the Green Mountains. The river led them into a large freshwater body extending

south for 107 miles. At present-day Chimney Point, Vermont, Champlain named the lake after himself. At the same time, HENRY HUDSON was less than 150 miles away exploring what is now the Hudson River.

A confrontation with the Iroquois soon ensued at the southern end of Lake Champlain at present-day Crown Point, New York. Although his party was outnumbered by the Iroquois (probably Mohawk), the French were able to rout the attackers by firing guns as they charged. The Indians fled, never having seen firearms.

After a brief period in France, where Champlain consolidated his trade monopoly over the St. Lawrence region, he returned to Canada in 1611. Traveling to the upper St. Lawrence, he established a summer outpost above the Lachine Rapids—Sault Saint Louis—which developed into the city of Montreal.

Two years later, in 1613, Champlain and a company of French and Indians successfully negotiated the rapids of the upper St. Lawrence in birch-bark canoes and reached the Ottawa River. Exploration to the south was blocked because of the Iroquois, but Champlain was confident that the Ottawa would lead him to the great body of water to the west, which he believed to be the Pacific Ocean, based on the reports of another French explorer, Nicolas de Vignau. Champlain and his party traveled as far as Allumette Island in what is now southwestern Quebec before returning to Montreal.

Champlain made a second attempt to reach the body of water at the western end of the Ottawa River in 1615, accompanied by his protégé, ÉTIENNE BRÛLÉ. Together they traveled beyond Allumette Island, portaged to Lake Nipissing, then canoed along the French River to its outlet into Georgian Bay on the northeast shore of Lake Huron, which was one of the Great Lakes, and not the Pacific Ocean as they had believed.

From the Georgian Bay Huron, Champlain and Brule recruited a large force of warriors, then headed southward to attack the Onondaga tribe of the Iroquois confederacy at their stronghold on Onondaga Lake near present-day Syracuse, New York. Champlain left Brûlé and his group at Lake Simcoe and proceeded southward along the eastern end of Lake Ontario to Oneida Lake. Champlain was wounded in the attack against the Onondaga, which proved to be less than a military success. Instead of returning to Montreal, however, he traveled again to Georgian Bay with the Huron, where he spent the winter. He sent Brûlé to follow the course of the Susquehanna River.

In spring 1616, Champlain was back in Montreal, where he continued to administer New France for the next 19 years. Although he did not undertake any major explorations of his own after 1615, he directed trade and exploration expeditions by a group that came to be known as "Champlain's Young Men," including Brûlé, who traveled as far west as Lake Superior and as far south as Chesapeake

Bay, and JEAN NICOLET, who visited Lake Michigan and Green Bay.

In the early 1620s, the administration of New France came under the direction of Cardinal Richelieu. Champlain was appointed as Richelieu's chief representative and was a leader of the Company of 100 Associates overseeing the French fur monopoly in Canada. In 1627, Quebec and Montreal were besieged by the British, and in 1629, Champlain was taken prisoner and sent to England, where he worked on a third edition of his book, *Voyages de la Nouvelle France*.

French control of Canada was restored in 1632, and Champlain returned to administer the colonial empire in 1633. He died in Montreal two years later.

Called the "Father of New France," Samuel de Champlain did much to open up the western frontier of Canada for France. His explorations, along with those of his "Young Men," penetrated the interior of Canada west and south of the St. Lawrence region, deep into the central part of the North American continent. Unlike the British colonists on the Eastern Seaboard, who were blocked from westward expansion by the Iroquois tribes and the APPALACHIAN MOUNTAINS, the French, under Champlain, exploited the network of inland rivers and portages to expand their trade interests as far as the west shores of Lake Superior and Lake Michigan. Champlain, cartographer and geographer, also produced the first accurate maps of eastern Canada. His pro-Algonquian ties incurred the wrath of the Iroquois, affecting French-Iroquois relations throughout the French and Indian Wars, from 1689 to 1763.

Chancellor, Richard (ca. 1520–1556)

English mariner in the Russian Arctic

Little is known of Richard Chancellor's origins or early life. By the early 1550s, he had gained a reputation in England as an accomplished navigator. At that time, English commercial interests were seeking an alternative to the southern sea routes to India and the Far East then dominated by Portugal and Spain. In 1551, veteran explorer SEBASTIAN CABOT and London merchants organized a joint stock company, the MUSCOVY COMPANY, for the purpose of establishing a northern sea route to the Orient by way of the NORTHEAST PASSAGE.

Chancellor was named pilot general of a three-ship expedition sponsored by Cabot and his company and headed by SIR HUGH WILLOUGHBY. He sailed on the ship *Edward Bonaventure* with STEPHEN BOROUGH as captain. Willoughby sailed on the flagship *Bona Esperanza*. Cornelius Durforth was the captain of the third ship, the *Bona Confidentia*.

Chancellor and Borough sailed from the Thames River port of Gravesend in May 1553. They planned to join up

with the other two ships off the coast of northern Norway. Just east of North Cape, at Varangerfjord, the ships were separated in a storm. Willoughby and Durforth's ships temporarily found safe harbor on the coast of the Kola Peninsula (Lapland), but the crews perished in the Arctic winter. Chancellor and Borough meanwhile reportedly crossed the Barents Sea and reached the west coast of the Novaya Zemlya islands in their search for the Northeast Passage.

Driven back by ice, Chancellor and Borough sailed the *Edward Bonaventure* westward into the White Sea and made a landing at the mouth of the Northern Dvina River, where they established an English trading post. They soon learned they had arrived in Russia, and, upon invitation of the Russian government, traveled about 1,000 miles by sled to the court of Czar Ivan IV (Ivan the Terrible) in Moscow.

The English were warmly welcomed by Ivan, and, after establishing trade contacts with the Russian monarch, returned to their ship on the White Sea. Instead of continuing their search for the Northeast Passage, Chancellor and Borough sailed back to England, arriving in summer 1554. Although the voyage had not revealed any new geographic knowledge in regard to a northern sea route to the Far East, his visit to Russia provided a new market for English goods and was greeted in London with great enthusiasm. Cabot's merchant company became known as the Muscovy Company and concentrated its efforts on the development of Anglo-Russian trade.

In 1555, Chancellor made his second voyage to Russia for Cabot's company, again sailing to the White Sea and traveling overland to Moscow, where he learned the fate of Willoughby and the rest of the previous expedition. He recovered Willoughby's journal and set off for England in summer 1556 with a formal trade agreement from the Russian government. Chancellor's wife accompanied him on his second voyage to Russia. Returning to London with him was the first Russian ambassador to the English court. On the return voyage, the *Edward Bonaventure* was wrecked off the coast of Scotland. Chancellor and his wife were drowned, although the Russian ambassador survived and eventually reached London.

Richard Chancellor was a pioneer of modern British Arctic exploration. The ships used in his voyages were the first to be specially outfitted and reinforced for heavy ice conditions in the Arctic seas. A highly skilled navigator, Chancellor was one of the first mariners to use a navigational instrument known as the arbalest, a predecessor of the SEXTANT, which enabled him to determine latitude by measuring the altitude of the sun above the horizon. Although his 1553 voyage to the Arctic coast of Russia fell far short of locating the Northeast Passage, the trading post he established on the White Sea developed into the port of Archangel and opened up trade in Russian furs and English woolen cloth. ANTHONY JENKINSON, who succeeded Chancellor as chief

English trade agent in Russia, subsequently extended the Muscovy Company's trade to the Caspian Sea.

Chang Ch'ien (Zhang Qian, Chang K'ien)

(unknown–114 B.C.) *Chinese diplomat in central Asia*

Originally from Hangchung, west of present-day Beijing, Chang Ch'ien was an officer in service to the Chinese emperor Wu-ti (Wudi) in the latter part of the second century B.C. China, at that time ruled by the Han dynasty, was threatened by the nomadic Hsiung-nu (Xiongnu) people from northern Asia, known in the West as the Huns.

In 138 B.C., Chang was sent on a diplomatic mission from China westward to the land of the Yue-chi (Yuezhi, also known as the Tocharians), a nomadic people who had been driven across the Hindu Kush mountain range into the region now comprising Afghanistan. His party of 100 Chinese envoys and soldiers was soon attacked by the Hsiung-nu, and Chang, taken prisoner, was taken to the Hsiung-nu's stronghold in the Altai Mountains of central Asia. He remained a captive for 10 years, during which time he married a Hsiung-nu woman by whom he had a child.

Chang managed to escape from the Hsiung-nu in about 128. He continued westward to the upper reaches of the Jaxartes River (the present-day Syr Darya River, near Tashkent in what is now Uzbekistan). From there, he traveled into Bactria and Fergana (present-day northern Afghanistan). He noted that bamboo and cloth produced in southern China were traded in the region, having been shipped there from India, a land all but unknown to the Chinese. He also received reports of other civilizations to the west, including Persia (present-day Iran), Mesopotamia (present-day Iraq), and the Eastern Roman Empire in Asia Minor.

Unable to negotiate an alliance with the Yue-chi, he set out for China by way of Tibet. Along the way, he was again taken prisoner by the Hsiung-nu, but he escaped this time after only a year of captivity and returned home.

In 115, the Han emperor again sent Chang on a diplomatic mission, this time to seek an alliance with the Wu-san (Wusan) people, a nomadic tribe of the Issyk Kul region that had settled in Sinkiang in western China. He set out in command of an expedition of 300 mounted men, carrying a large shipment of gold and silk.

Although Chang did not succeed in creating an alliance with the Wu-san tribe, he did send out envoys laden with gifts of silk and gold to Persia and the eastern Roman provinces, opening up trade links between China and the Hellenistic world of the eastern MEDITERRANEAN SEA. He is thought to have returned to China by 109 B.C.

Chang Ch'ien was the earliest known Chinese explorer. His two diplomatic missions brought back geographic information that ultimately affected the Chinese view of the world, leading China to become aware of civilizations be-

yond its borders to the west and south, including Mesopotamia, Rome, India, and Burma (present-day Myanmar). One tangible result of his travels was the establishment of the SILK ROAD, which opened up trade with the Roman Empire far to the west and provided the main communication link between the East and the West for the next 1,300 years.

Ch'ang-ch'un (Chang Chun, Chen-jen)

(1148–1227) *Chinese priest in central Asia, in service to the Mongols*

Ch'ang-ch'un was a Taoist (Daoist) sage, well respected among his fellow Chinese. In 1219, he was ordered by GENGHIS KHAN, ruler of the Mongols, to embark on a trip of reconnaissance through central Asia and visit the ruler on his expedition of conquest.

That same year, at age 69, Ch'ang-ch'un departed Lai-chou (Laizhou), near present-day Yantai on the Gulf of Chihli (Bo Hai), and set out toward Genghis Khan's court at Yen-King (present-day Beijing). Two years later, in May 1221, with a Mongol escort and 19 disciples, he traveled northward to the Kerulen River in Mongolia, then westward through the steppelands and across the Altai and Tian Shan mountain ranges to Tashkent and Samarkand in present-day Uzbekistan. Next, he crossed the Hindu Kush, arriving in Perwali, south of present-day Kabul, Afghanistan, after 14 months. There, he met up with Genghis Khan and reported on the peoples and politics of the steppelands.

Accompanying Ch'ang-ch'un on his journey was Li Chih-chang, who wrote a narrative of the journey, providing an early account of the geography and peoples of central Asia.

Charbonneau, Jean-Baptiste (Pomp)

(1805–1866) *Shoshone-French Canadian guide, trapper in the American West, son of Toussaint Charbonneau and Sacajawea*

Jean-Baptiste Charbonneau was born in a Mandan Indian village by Mandan the upper MISSOURI RIVER, near the site of present-day Bismarck, North Dakota. He was the son of French-Canadian trapper TOUSSAINT CHARBONNEAU and the Shoshone Indian SACAJAWEA (Sacagawea).

At the time of his birth in February 1805, the Lewis and Clark Expedition was encamped at its nearby winter headquarters, Fort Mandan, preparing to continue its expedition across the northern plains and ROCKY MOUNTAINS to the Pacific coast. Toussaint Charbonneau and Sacajawea were hired as guides and interpreters for the expedition, and the infant, referred to as Pomp in the journals of MERIWETHER LEWIS and WILLIAM CLARK, was carried on a cradleboard by his mother to the Pacific coast in present-day

Oregon and back. In the years after the expedition, young Charbonneau lived with Clark in St. Louis and there received his early education at a Catholic-run day school.

By the age of 17, Charbonneau had returned to the Great Plains and was employed at a trading settlement on the Kansas River. In 1823, he met Prince Paul Wilhelm of Württemberg (a former state of Germany), who was gathering scientific data west of the Missouri River. The prince was so impressed by Charbonneau's intelligence, as well as his skills as a frontiersman, that he offered to take the young man with him to Europe.

From 1823 to 1829, Charbonneau lived with Prince Paul Wilhelm at his castle near Stuttgart, Germany, where he studied French, German, and Spanish. He also took part in hunting expeditions in the nearby Black Forest and traveled throughout Europe and North Africa.

In 1829, Charbonneau returned to the United States with the prince for an expedition into the upper Missouri River regions of present-day North Dakota and Montana. He remained on the Great Plains following the prince's return to Europe.

In the early 1830s, Charbonneau was a trapper for the AMERICAN FUR COMPANY, working with ANTOINE ROBIDOUX in present-day northern Utah and southern Idaho. He was present at the fur trappers' rendezvous on the Green River in summer 1833. As a trapper in the central and northern Rocky Mountains, Charbonneau became friends with such mountain men as JOSEPH L. MEEK, JAMES BECKWORTH, and JAMES BRIDGER.

By the end of the 1830s, the trade in beaver pelts had declined, and Charbonneau turned to guiding parties of emigrants and other travelers into the Rockies and Great Plains.

In 1839, Charbonneau worked with frontier traders LOUIS VASQUEZ and Andrew Sublette (WILLIAM LEWIS SUBLETTE's brother), helping establish Fort Vasquez on the South Platte River, located near the site where Denver, Colorado, would develop 20 years later. In 1840, Charbonneau transported one of the earliest shipments of buffalo robes and dried buffalo tongues down the South Platte to St. Louis.

Sir William Drummond, a hunter and sportsman from Scotland, hired Charbonneau as a guide for his 1843 hunting trip into the northern Rockies. Charbonneau guided the party through the SOUTH PASS of Wyoming's Wind River Range into the Green River region of northern Utah, then northward into the area of present-day Yellowstone National Park. After the expedition, Charbonneau continued to hunt buffalo and antelope for Drummond, sending the meat back to his patron's castle in Scotland.

In August 1845, Charbonneau was a guide for Lieutenant JAMES WILLIAM ABERT and a detachment of the U.S. Corps of Topographical Engineers in their expedition to the Canadian River region of the Texas Panhandle and present-day western Oklahoma.

The next year, 1846, saw the outbreak of the U.S.-Mexican War. Starting in October, Charbonneau served as a guide for Colonel Philip St. George Cooke's Mormon Battalion in its expedition across the southwestern desert, from Santa Fe, New Mexico, to San Diego, California. Along the way, he helped blaze a wagon road through northern Mexico and present-day southern Arizona. Charbonneau led the expedition west and north to the Gila and Colorado Rivers, then to the Pacific coast at San Diego by January 1847.

Following the war, Charbonneau was drawn to the California goldfields in 1849. He lived in the American River region near Sacramento for the next decade and a half, where he was joined by his former trapping companion, Jim Beckwourth.

In 1866, Charbonneau left California and traveled eastward to join the gold rush in southwestern Montana. On the way, he contracted a fever and died on the Owyhee River near the present Idaho-Nevada border.

During his career as a trapper, hunter, and guide, Jean-Baptiste Charbonneau helped open a vast area of North America to non-Indian travel and settlement. This territory stretched west from St. Louis and the upper Missouri to the Pacific coast and from the rivers and mountains of present-day Utah and Wyoming to the southwestern deserts of present-day New Mexico, Arizona, and southern California.

Charbonneau, Toussaint (ca. 1758–ca. 1840)

French Canadian guide, interpreter in the American West, husband of Sacajawea, father of Jean-Baptiste Charbonneau
Details of Toussaint Charbonneau's early life are obscure. He was probably born in Montreal while Canada was still under the control of the French. In the 1790s, he worked for the NORTH WEST COMPANY, a Montreal-based fur trading enterprise, as one of their VOYAGEURS. He trapped and traded for furs with the Indians of the upper MISSOURI RIVER region, becoming familiar with their language and customs. He had married as many as three Indian women by 1804.

In fall 1804, Charbonneau was operating around the Mandan Indian villages near what is now Bismarck, North Dakota. At that time, he was married to the Shoshone Indian woman SACAJAWEA (Sacagawea). In early November, he met with MERIWETHER LEWIS and WILLIAM CLARK at their winter headquarters among the Mandan and, along with Sacajawea, was hired as a guide and interpreter. With their newborn son, JEAN-BAPTISTE CHARBONNEAU, Charbonneau and Sacajawea set out with the expedition in April 1805.

Although Charbonneau probably provided valuable service as an interpreter in dealing with the northern plains tribes, most of the references to him in the journals of Lewis and Clark refer to his ineptitude as a guide in contrast to his wife's abilities. In early May 1805, Charbonneau's

CANOE was nearly swamped, and it was only the forbearance of Sacajawea that saved the craft from capsizing. Charbonneau was described as responding to this incident by crying out in terror. A few weeks later, in early June 1805, Charbonneau was chased by a large grizzly bear that had been shot by some of the expedition members near the Marias River in the vicinity of present-day Loma, Montana. On the return trip, in late April 1806, Charbonneau's horse threw him and his load. For his services to the Corps of Discovery, Charbonneau was paid \$500.³³

After the expedition, Charbonneau settled briefly in the St. Louis area. He eventually left his young son in the care of Clark in St. Louis and returned to the life of a fur trader on the upper Missouri. Among his employers during this period were MANUEL LISA and JOHN JACOB ASTOR'S AMERICAN FUR COMPANY.

During the War of 1812, Charbonneau helped prevent the upper Missouri tribes from siding with the British. After the war, he was employed from time to time as a guide to various expeditions to the West, including early forays by American traders on the Santa Fe Trail to Taos, New Mexico. These expeditions took him into unexplored regions of the southern and central ROCKY MOUNTAINS, as far west as the Great Salt Lake.

In 1820, Charbonneau was an interpreter and guide for Colonel STEPHEN HARRIMAN LONG'S expedition to the Great Plains region of Kansas. Three years later, Charbonneau provided his services to Prince Paul Wilhelm of Württemberg on his tour of the Great Plains. Soon afterward, Prince Paul Wilhelm took Charbonneau's son Jean-Baptiste to Europe to be educated.

In the early 1830s, Charbonneau, although in his seventies, worked as a fur trader and trapper for WILLIAM SUBLETTE and ROBERT CAMPBELL. In 1833–34, he was hired as an interpreter by ALEXANDER PHILIPP MAXIMILIAN and the artist KARL BODMER for a tour of upper Missouri.

In about 1839, Charbonneau made a trip to St. Louis to claim back pay owed by the federal government for his diplomatic services among the Indians, then returned to the Mandan lands in present-day North Dakota, where he died soon afterward.

Toussaint Charbonneau left behind a less than heroic image as a frontiersman and explorer of the Great Plains and Far West. Yet his contributions as an interpreter with many important expeditions have earned him a place in the history of exploration of the American West.

Charcot, Jean-Baptiste-Étienne-Auguste

(1867–1936) *French physician, oceanographer, polar explorer*

Jean-Baptiste Charcot was born in the Paris suburb of Neuilly-sur-Seine, the son of the noted French neurologist



Jean-Baptiste Charcot (Library of Congress)

Jean-Martin Charcot. The younger Charcot became a doctor of medicine and also pursued his interest in the natural sciences, especially oceanography.

In 1902, Charcot raised funds for a French expedition to the Antarctic. At that time, German, Swedish, English, and Scottish teams were actively engaged in exploration of the continent. Although Charcot had planned to relieve the Swedish expedition under NILS OTTO GUSTAF NORDENSKJÖLD, which was stranded on the Antarctic Peninsula, by the time he arrived there in 1903, the Swedes had already been rescued by an Argentine vessel. Charcot then set about exploring and mapping the west coast of the peninsula.

In the Antarctic summer of 1904–05, Charcot led survey expeditions to Alexander I Island. He sighted and named the Loubet coast after then-president of France Émile-François Loubet. Although his vessel, the *Français*, was damaged when it struck a rock, he proceeded with his exploration of western Antarctica's coastline, then sailed to Patagonia, where he sold the ship to the Argentine government. Two years later, the *Français* was lost in a wreck in the Río de la Plata.

Back in France, Charcot planned a second French Antarctic expedition. In August 1908, he sailed from Le Havre, France, on the *Pourquoi-Pas?* (the "Why Not?"), a ship specially designed for polar exploration. His expedition reached western Antarctica by way of the STRAIT OF MAGELLAN. First stopping at Wiencke Island, the expedition explored the Palmer Archipelago, where again the ship was damaged on a rock. Despite this setback, Charcot continued to explore and map the Antarctic shoreline, determining that the Loubet Coast was identical with the land identified

as Adelaide Land by JOHN BISCOE in 1831, and determined that it was actually an island. Charcot also located and named the Fallières Coast. An island off the coast of Graham Land was subsequently named Charcot Island. In 1910, Charcot concluded his second Antarctic expedition and returned to France.

Over the next 25 years, Charcot undertook oceanographic studies in the Atlantic and Arctic Oceans. In 1921, he led a scientific expedition to Rockall off the west coast of Scotland. Some of his later expeditions attempted to trace the voyages of such ancient explorers as PYTHEAS and SAINT BRENDAN. On one such venture in 1936, the *Pourquoi-Pas?* went down off the coast of ICELAND, and Charcot and 38 members of his expedition died.

Dr. Jean-Baptiste Charcot contributed much to the geographic knowledge of Antarctica. The charts he produced of the Antarctic coastline were the only accurate ones available as late as 1935.

Charlevoix, Pierre-François-Xavier de
(1682–1761) *French historian on the Great Lakes and Mississippi River*

Born in France, Pierre-François de Charlevoix entered the Jesuit order as a young man. After studying at the College Louis le Grand in Paris, he sailed to New France, probably arriving in 1705. For the next four years, he taught rhetoric at Quebec's Jesuit college. In 1709, he returned to Paris and served as a professor at the College Louis le Grand, eventually receiving an appointment as the school's prefect.

In 1720, Charlevoix made another trip to New France, during which he traveled westward along the St. Lawrence

River into the Great Lakes. From the southern end of Lake Michigan, he explored the Illinois River in the vicinity of present-day Peoria, Illinois, then proceeded to the MISSISSIPPI RIVER. He traveled the entire length of the Mississippi to New Orleans and the Gulf of Mexico.

Charlevoix survived a shipwreck in the gulf on his return trip to France. He eventually arrived in Paris and resumed teaching.

Pierre-François de Charlevoix's six-volume *History of New France*, first published in 1744, contains a detailed account of his 1720 journey through the Great Lakes and down the Mississippi to New Orleans. This narrative provides a view of the central and lower Mississippi River region, including descriptions of Native American tribes, only a few decades after RENÉ-ROBERT CAVELIER DE LA SALLE and his followers explored the area in the late 17th century.

Chatillon, Henri (1816–1875) *American trader, trapper, guide in the American West*

While a young man, Henri Chatillon was a mountain man and fur trapper throughout the Great Plains and ROCKY MOUNTAINS. As such, he was among the earliest non-Indians to use little-traveled mountain trails.

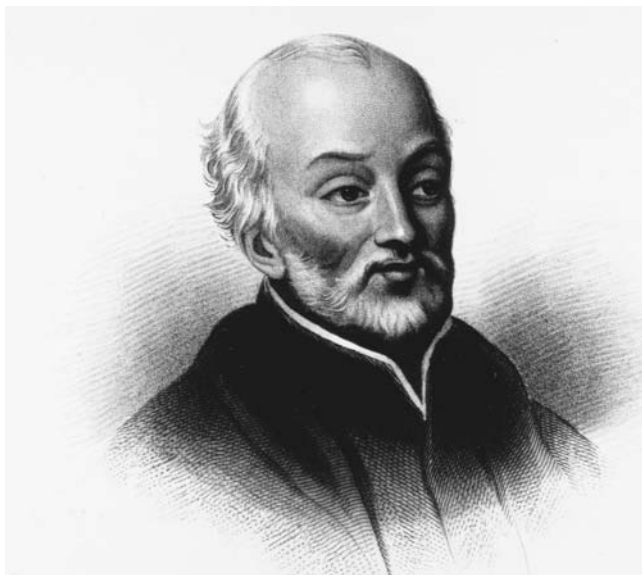
In 1846, while in St. Louis, Missouri, in the employ of the frontier trading concern of PIERRE CHOUTEAU, JR., Chatillon was hired as a guide by the historian Francis Parkman. He led Parkman's party on an expedition west from Independence, Missouri, to Fort Leavenworth in present-day Kansas. They then headed up the Platte River to Fort Laramie in present-day Wyoming. The expedition turned south and visited Bent's Fort on the Arkansas River in southeastern Colorado, then returned eastward to Missouri via the Santa Fe Trail.

Chatillon was married to Bear Robe, the daughter of a Sioux (Dakota, Lakota, Nakota) chief. After his Indian wife died, he married a non-Indian woman and settled in St. Louis.

Like other MOUNTAIN MEN of his day, Henri Chatillon used his knowledge of Indian trails to earn a living as a guide following the decline of the FUR TRADE. He is depicted in Parkman's account of his 1846 western journey, *The California and Oregon Trail*, which first appeared in 1849.

Cheadle, Walter Butler (1835–1919)
British physician, explorer in the Canadian West

In 1862, Walter Cheadle, a British pediatrician and medical researcher, and WILLIAM-WENTWORTH FITZWILLIAM MILTON (Viscount Milton), a young British nobleman, left Quebec, Canada, on the first leg of a journey in search of an overland NORTHWEST PASSAGE across western Canada. Two years earlier, gold had been discovered in the Cariboo



Pierre-François-Xavier de Charlevoix (Library of Congress)

district of eastern British Columbia, and finding a direct route to these goldfields from central Manitoba was the expedition's main objective.

From Quebec, Cheadle and Milton traveled by boat and train westward through the Great Lakes region by way of Toronto, Detroit, and Chicago. From St. Paul, Minnesota, they headed overland by stagecoach to eastern North Dakota and the Red River of the North. Progressing up the Red River by CANOE, they reached Fort Garry—present-day Winnipeg, Manitoba—in late August 1862. After equipping themselves with horses and supplies for the journey across Canada's northern plains, they set out for Carlton House, a fur-trading post on the North Saskatchewan River in what is now northwestern Saskatchewan.

Cheadle and Milton wintered at Witchekean Lake. In spring 1863, they continued along the North Saskatchewan River toward the ROCKY MOUNTAINS. In the eastern foothills of the Canadian Rockies, at Jasper, Alberta, they hired an Iroquois (Haudenosaunee) guide to lead them through the Yellowhead Pass, a route at that time little known to non-Indian travelers. Before embarking on the trek through the Rocky Mountains, Cheadle and Milton had been joined by a fur trader named Louis Battenotte and his wife and child, as well as another adventurer identified only as a Mr. O'B. After leading Cheadle and his companions through the Yellowhead Pass to the Fraser River west of the Continental Divide, the Iroquois guide left the expedition before it reached the Cariboo district.

Cheadle and his party wandered through what is now eastern British Columbia's Mt. Robson Provincial Park and, unable to locate an overland trail north to the goldfields, were compelled to follow the North Thompson River southward. By the time they had reached Kamloops, they were short on supplies and suffering from exhaustion and starvation. They found aid at the nearby HUDSON'S BAY COMPANY post and among the Shuswap Indians.

Cheadle and Milton took the usual route to the Fraser River, which they followed to Victoria, British Columbia, on the Pacific coast, where they recovered from their ordeal. They then completed their journey to the Cariboo goldfields by following the Fraser River northward from Yale.

After returning to England, Dr. Walter Cheadle and Viscount Milton published, in 1865, an account of their travels in the Canadian West, with the self-explanatory title *The North-West Passage by Land, Being the Narrative of an Expedition from the Atlantic to the Pacific, Undertaken with the View of Exploring a Route across the Continent to British Columbia through British Territory, by One of the Northern Passes in the Rocky Mountains*. In later published articles, as well as in lecture appearances in England, they urged the development of more direct east-west routes through the Rockies to the interior of eastern British Columbia. In 1865, soon after the completion of their trans-Canada expedition,

the Canadian government completed the Cariboo Wagon Road, which ran from the head of navigation on the Fraser at Yale, 400 miles northward into the Cariboo district. Several decades passed before a more direct route into the Cariboo district was established.

Chelyuskin, Simeon (fl. 1740s) *Russian mariner in the Siberian Arctic*

There are few available details of 18th-century Russian navigator Simeon Chelyuskin's origins or early life. He was a captain in VITUS JONASSEN BERING's second expedition beginning in 1733 and lasting until 1743, carried on by others after Bering's death in 1741.

In 1742–43, in the course of that expedition, Chelyuskin was assigned to explore the Arctic coast of northern SIBERIA. Sailing from the White Sea, he headed eastward and explored Novaya Zemlya, then continued to the Ob River estuary.

Beyond the Ob River, Chelyuskin followed the Arctic coast of Siberia to the east shore of the Kara Sea. His ship was stopped by ice as he approached the northern end of the Taymyr Peninsula, at which point he resorted to sledges. Traveling over the frozen sea, Chelyuskin and his party rounded the Taymyr Peninsula, the northernmost point of Asia, becoming the first Europeans ever to do so. They entered the Laptev Sea, completing a survey of the Arctic coast of Siberia begun almost 20 years earlier.

The point of the Taymyr Peninsula around which Simeon Chelyuskin traveled in 1743 was subsequently called Cape Chelyuskin in honor of his accomplishment. Cape Chelyuskin is the northernmost point of the Asian continent and of any continental landmass.

Cheng Ho (Zheng He, Zheng Ho) (1371–ca. 1434) *Chinese admiral in the Indian Ocean and East Africa*

Cheng Ho was born in Kunyang, a town in China's southern Yunan province, the son of Chinese Muslims. In 1381, at the age of 10, he entered the service of the Ming rulers as a eunuch. Over the next 10 years, under the command of the emperor's uncle, Chu Ti, he served with distinction in military campaigns against the Mongols.

In 1402, when Chu Ti usurped the throne and came to power as the Ming emperor Yung-lo (Yongle), Cheng Ho was commissioned to mount a series of naval expeditions in search of the deposed former ruler, Chu Yun-wen, who was believed to have fled overseas. As it turned out, Chu Yun-wen was never found. Although some sources suggest he was actually killed in the rebellion in 1402, legend has it that he managed to elude capture and lived as an itinerant monk until his death in 1440.

Appointed an admiral by the new emperor, Cheng Ho departed the estuary of the YANGTZE RIVER (Chang), near Shanghai, in 1405. His fleet, consisting of 62 large ships, plus 225 smaller vessels—varying designs of the JUNK—carried a combined crew of more than 27,000 men. This first expedition sailed southward to the South China Sea and, after stopovers on the coast of what is now Vietnam, continued on to Sumatra. There it defeated the fleet of the Chinese pirate Chen-Tsu-i. The pirate leader, taken captive, was escorted to the Ming capital at Nanking (Nanjing), where he was executed.

In 1407, Cheng Ho's fleet sailed westward across the Indian Ocean and reached Calicut on the Malabar Coast of India, where trade contacts were established. On the homeward journey, his ships visited Siam (present-day Thailand) and the island of Java in the Indonesian archipelago.

Cheng Ho's third expedition left China in 1409. After another voyage to India, his ships visited Ceylon (present-day Sri Lanka), Malacca, and Sumatra. A fourth expedition, undertaken from 1413 to 1415, extended Chinese trading contacts as far as Hormuz at the entrance to the Persian Gulf. The Chinese fleet also visited ports on the south coast of Arabia and in Aden.

Starting in 1417, under Cheng Ho's command, Chinese vessels began trading along the east coast of Africa, establishing commercial contacts with African ports along the Indian Ocean from Mogadishu southward to Mombasa and Zanzibar.

Cheng Ho's maritime ventures were stalled with the death of Emperor Yung-lo in 1424. He commanded one more large-scale expedition in 1433. On the way to East Africa, with a stopover at Calicut, India, in 1434–35, he died. His body was taken back to Nanking for burial.

Cheng Ho's accomplishments earned him the nickname "The Three-Jeweled Eunuch." His seven voyages opened up most of the coastal regions of the Indian Ocean to Chinese trade. Careful records were kept, including nautical charts, detailing extensive Chinese geographic knowledge extending from Southeast Asia to India, the Persian Gulf, and East Africa. China established trade and diplomatic contacts with more than 35 countries. Among the many items brought back to the Ming emperor from Cheng Ho's explorations were exotic animals, including a giraffe, which arrived from the African kingdom of Malindi in 1415. During the years immediately following Cheng Ho's death, China reverted to its traditional isolationism, and the SPICE TRADE between the Far East and Europe came under the control of the Muslim powers of the Persian Gulf and western India. Although many of the records of Cheng Ho's expeditions were destroyed by his political rivals after his death, some endured and provide evidence of Chinese contacts with southern Asia and East Africa just prior to the be-

ginning of the EUROPEAN AGE OF EXPLORATION in the 1400s.

Chen-jen See CH'ANG-CH'UN.

Chesnard de la Giraudais, François (fl. 1760s)

French naval officer in the South Atlantic and South Pacific François Chesnard was born in the French seaport of Saint-Malo. He embarked on a seafaring career at a very early age, and went on to command French naval vessels in the Seven Years War of 1756–63.

In 1759, Chesnard captained one of the ships in the French naval convoy that carried LOUIS-ANTOINE DE BOUGAINVILLE to Canada. At the war's end in 1763, Bougainville appointed Chesnard to command the *Sphinx* in his colonizing expedition to the Falkland Islands.

Chesnard subsequently commanded the supply ship *Étoile* in Bougainville's exploring expedition to the Pacific Ocean. Sailing from the French port of Rochefort in February 1767, Chesnard headed for the Falkland Islands to join Bougainville. The *Étoile*, in need of repairs, was forced to put in at Rio de Janeiro; Bougainville, commanding the expedition's other vessel, the *Boudeuse*, met Chesnard there in late June.

Now sailing with the *Boudeuse*, Chesnard directed the *Étoile* to the Spanish port of Montevideo, Uruguay. In November 1767, with the onset of the Southern Hemisphere's summer season, Chesnard and Bougainville sailed southward to the STRAIT OF MAGELLAN. The difficult passage through the strait to the Pacific Ocean took 52 days. Continuing across the Pacific, the *Étoile* and the *Boudeuse* visited Tahiti and other recently explored island groups, as well as the Dutch colonies in present-day Indonesia. After a stopover at the French colony on what is now the island of Mauritius in the Indian Ocean, Chesnard and Bougainville continued westward to Europe by way of the CAPE OF GOOD HOPE. Chesnard returned to Rochefort in April 1769, a month after Bougainville had reached Saint-Malo.

François Chesnard's skill as a seafarer and navigator contributed greatly to the success of Bougainville's scientific expedition to the Pacific, an early French CIRCUMNAVIGATION OF THE WORLD.

Ch'ien, Chang See CHANG CHIEN.

Chirikov, Aleksey Ilyich (Aleksei or Alexei Ilich Chirikov) (1703–1748) *Russian naval officer in Alaska*

Russian-born Aleksey Chirikov began his naval career at the age of 12, when he entered the Moscow School of

Navigation. He went on to the St. Petersburg Naval Academy, graduating in 1721.

From 1725 to 1730, Chirikov was a lieutenant and scientist in VITUS JONASSEN BERING's First Kamchatka Expedition. Bering had been commissioned by Czar Peter I to explore eastern SIBERIA and determine if a land connection existed between Asiatic Russia and the North American continent.

In 1728, Chirikov was aboard the *St. Gabriel* with Bering and took part in the exploration to the north and east of the Siberian coast, leading to exploration of the Gulf of Anadyr, the Chukchi Peninsula, Krest Sound, St. Lawrence Island, and the two Diomed Islands.

In spring 1741, Chirikov commanded the ship *St. Paul* in Bering's second expedition eastward from Kamchatka across the North Pacific Ocean. His orders were to continue the search for an isthmus between North America and Russia. Chirikov was also looking for the fabled Gama Land, a large island that Russian geographers believed was in the northern Pacific to the east of Siberia. Chirikov lost sight of Bering's ship but continued sailing eastward. On July 15, he made the first sighting of Alaskan land at Prince of Wales Island. The next day, Bering independently sighted Alaskan land at Kayak Island. On his return trip to Kamchatka, Chirikov sighted Alaska's Kenai Peninsula, as well as a number of the Aleutian Islands, one of them later named in his honor.

In 1742, Chirikov again sailed from the Siberian port of Okhotsk and explored the Pacific coast of Kamchatka as well as the Commander Islands.

Aleksey Chirikov, along with Bering, helped clarify the geography of the region between Siberia and Alaska. Their reports of an abundance of fur-bearing animals in the islands of the Gulf of Alaska spurred the later development of the RUSSIAN-AMERICAN COMPANY'S FUR TRADE.

Chisholm, Jesse (ca. 1805–1868) *American guide, interpreter, trader on the southern plains*

Born in Tennessee, Jesse Chisholm was the son of a frontier trader of Scottish descent and a Cherokee Indian woman. In about 1817, he moved with his family to the vicinity of Fort Smith in what is now western Arkansas. At that time, this post on the Arkansas River was a gateway to the southern plains.

Chisholm's Indian heritage was an advantage in his subsequent career as a trader to the Native Americans of present-day Oklahoma, northern Texas, and southern Kansas. He was said to be able to converse in at least a dozen Native American languages in addition to Cherokee.

After the opening of the Santa Fe Trail in 1821, federal military expeditions were sent out to survey the route westward and to negotiate treaties with the region's Indians. During the 1820s, Chisholm worked as a guide and inter-

preter for several of these military forays onto the southern plains.

In 1834–35, Chisholm helped blaze a trail for the U.S. First Dragoon Regiment, led by General HENRY LEAVENWORTH and Colonel HENRY DODGE, into the territory south and west of Fort Gibson. The expedition explored Comanche and Kiowa Indian lands of present-day southwestern Oklahoma and the Red River region of northern Texas, as far west as Pikes Peak in the eastern Colorado Rocky Mountains.

In the ensuing years, Chisholm established frontier trading posts in the Indian Territory, including one at Camp Holmes, which later developed into the south-central Oklahoma city of Lexington, and one at Left Hand Spring, near present-day Oklahoma City, Oklahoma.

At the outbreak of the Civil War in 1861, Chisholm acted as an intermediary between the tribes of western Oklahoma and the Confederate government. But as the war persisted, he left the Indian Territory and settled among the neutral Indian tribes of southern Kansas. In 1864, he founded a trading post among the Wichita Indians at the confluence of the Arkansas and Little Arkansas Rivers.

At the war's end in 1865, Chisholm undertook a trade expedition south from his Kansas post across the Indian Territory into northern Texas and the Red River region. He took trade goods to the Kiowa and Comanche, exchanging them for a shipment of buffalo hides. His return journey by wagon led him across the Colorado River of Texas, the Brazos River, and the Washita River. His wagon was so loaded down that it created deep ruts in the trail on his way back north, forming the beginnings of a permanent route between Texas and Kansas. Chisholm continued to trade with the Indians until his death at Left Hand Spring (now Geary, Oklahoma) in 1868.

In fall 1867, cattle and meat entrepreneur Joseph McCoy developed Jesse Chisholm's route as a cattle trail from San Antonio, Texas, northward through the Indian Territory into Kansas. Because it had few settlements, forests, hills, or other obstacles for cattle drovers, the trail was ideal for the overland transportation of cattle. It passed through Chisholm's settlement on the Little Arkansas River, which soon developed into the city of Wichita, Kansas. From there, the trail continued to the small community of Abilene and connected with the Kansas Pacific Railroad. For the next 10 years, until the late 1870s, this route, which became known as the Chisholm Trail, provided passage for millions of head of cattle to the meat markets of St. Louis and Chicago. Abilene and Wichita, because of their strategic location at the northern terminus of the Chisholm Trail, were rapidly transformed into booming "cow towns." The Chisholm Trail fell into disuse with the expansion of the Santa Fe Railroad in the late 1870s. Part of Chisholm's original route was adopted by the Santa Fe Railroad through central Kansas.

Choris, Louis (1795–1828) *German-Russian painter in Brazil and the North and South Pacific*

Louis Choris was born in Iekaterinoslav, the son of German parents who had settled in Russia. His ability as a painter of natural subjects gained early recognition, and, in 1813, at the age of 18, he served as the official artist in a scientific expedition to the Caucasus Mountains.

In 1815, Choris joined OTTO VON KOTZEBUE's Russian expedition to the Pacific Ocean, as a draftsman. Sailing on the *Rurik* from the Russian port of Kronstadt, near present-day St. Petersburg, he spent the next three years traveling around the world. En route, he took part in inland investigations of plant and animal life in Brazil, Polynesia, Alaska, the Aleutian Islands, the HAWAIIAN ISLANDS, and northeastern SIBERIA.

Choris returned to Europe in 1818. Settling in Paris, he undertook a study of lithography. From 1823 to 1826, he published his *Picturesque Journey Around the World 1815–18*, including his own lithographs, which were based on the paintings and drawings he had made on Kotzebue's expedition. Much of the flora and fauna depicted had been collected and identified by the expedition's naturalist, LOUIS-CHARLES-ADÉLAÏDE CHAMISSO DE BONCOURT.

Choris traveled to the United States in 1827, living briefly in New Orleans. He then went to Veracruz, Mexico, from where he planned to embark on an expedition into the Mexican interior. Shortly after he began his journey inland in March 1828, he was killed, probably in an attack by bandits.

Among the artists who had accompanied the late-18th-century and early-19th-century scientific expeditions to the Pacific, Louis Choris was one of the few whose drawings not only detailed plant and animal life, but also depicted the life and culture of native peoples. His skill as a lithographer enabled him to mass-produce his illustrations and make them widely available in Europe.

Chouart des Groseilliers, Médard (Sieur des Groseilliers) (1618–ca. 1697) *French-Canadian trader in the western Great Lakes and Hudson Bay regions, brother-in-law of Pierre-Esprit Radisson*

Médard Chouart, a native of the Marne region of north-central France, was known as the Sieur des Groseilliers after his St. Lawrence River estate. He migrated to French Canada in the early 1640s, where he first worked as a lay assistant at a Jesuit mission to the Huron (Wyandot) Indians on Georgian Bay in Lake Huron. He returned to Quebec following the Iroquois (Haudenosaunee) invasion of Huron country, whereupon he entered the FUR TRADE.

In August 1654, Groseilliers traveled to the western Great Lakes with a group of unlicensed fur traders, the COUREURS DE BOIS. After heading westward on the upper

St. Lawrence, they reached the Ottawa River, then followed the portage route to Lake Nipissing and the French River to Georgian Bay. From Lake Huron, they passed through Mackinac Strait and then into Lake Michigan, which they crossed to Green Bay.

Groseilliers established himself in the region as a trader to such tribes as the Chippewa (Ojibway), Potawatomi, and Menominee. During his two-year stay, he explored parts of present-day Illinois, Michigan, and Wisconsin, including the Fox and Wisconsin Rivers. He also visited the upper reaches of the MISSISSIPPI RIVER. From the Indians, he heard reports of Lake Winnipeg to the northwest.

Groseilliers returned to Quebec in August 1656 with 250 Huron and a large shipment of furs. He embarked on his second fur-trading expedition to the western Great Lakes in spring 1659, accompanied by his brother-in-law PIERRE-ESPRIT RADISSON. From Georgian Bay, they passed through Sault Sainte Marie and traveled the length of Lake Superior to Chequamegon Bay, where they established a fur-trading post. The Indians told them of a north-flowing river that drained into a great sea, probably HUDSON BAY or James Bay. Groseilliers believed the "great sea" might lead to the much-sought-after NORTHWEST PASSAGE to China and the Orient.

Upon their return to Montreal in August 1660, Groseilliers and Radisson were arrested by French authorities for unlicensed fur trading, and most of their furs were confiscated. As a result, over the next years, they attempted to elicit British support for a trading enterprise to Hudson Bay. They first went to Boston, where they generated enough interest for some New England merchants to sponsor a 1663 seaward expedition, which was turned back by ice in Hudson Strait.

In London, in 1665–67, Groseilliers and Radisson gained the support of a merchant group for an expedition to Hudson Bay. Groseilliers, aboard the *Nonsuch*, sailed from London in spring 1668, reaching James Bay about two months later. Sailing from London on the *Eaglet*, Radisson was forced to turn back off Ireland. At the mouth of the same river where HENRY HUDSON had wintered more than 50 years earlier, Groseilliers and his men constructed a trading post, Charles Fort (Rupert Post), the first permanent non-Indian settlement on Hudson Bay. They named the river the Rupert, in honor of the expedition's chief sponsor, Prince Rupert, a cousin of King Charles II.

In August 1669, Groseilliers returned to London with a cargo of furs. In May 1670, Groseilliers and his backers received a charter for the HUDSON'S BAY COMPANY from King Charles II, granting them a royal trade monopoly over all the lands whose rivers drain into Hudson Bay. The area of one and a half million square miles comprised almost half of present-day Canada, as well as large portions of what is now Minnesota and North Dakota.

Groseilliers subsequently worked for the French-owned *Compagnie du Nord* fur-trading enterprise, retiring in 1684.

Sieur des Groseilliers's explorations of Lake Michigan and Lake Superior firmly established the location and extent of the western Great Lakes for future traders and settlers. His exploits in Hudson Bay led to the formation of the Hudson's Bay Company, one of the oldest continually operating business enterprises in history and a key force in the exploration of the Canadian West for the next two centuries.

Chouteau, Auguste Pierre (1786–1838)
American fur trader, guide on the Santa Fe Trail and southern plains, son of Jean Pierre Chouteau, brother of Pierre Chouteau, nephew of René Auguste Chouteau

Auguste Pierre Chouteau was the eldest son of early Missouri frontier trader JEAN PIERRE CHOUTEAU. He attended West Point, graduating in 1806. He soon resigned from the army, however, to join his family's business and, in 1809, helped found the ST. LOUIS MISSOURI FUR COMPANY. In 1809–11, he took part in several of the company's fur-trading expeditions to the upper MISSOURI RIVER and northern ROCKY MOUNTAINS, along with MANUEL LISA and ANDREW HENRY.

Chouteau returned to military service for the War of 1812. After the war's end, he undertook trade expeditions from St. Louis westward across the southern plains into the lands of Arapaho, Comanche, and Kiowa Indians.

In 1817, Chouteau, with Jules de Mun, ventured into New Mexico, which was then held by Spain. The two were arrested and detained at Santa Fe by the Spanish. Chouteau was soon released, but Spanish officials confiscated his \$30,000 worth of trade goods intended for sale to the fur traders of the southern Rockies.

In the 1820s and 1830s, Chouteau extended his business to Indian tribes of present-day Oklahoma and Kansas. He expanded his family's Arkansas River trading business at Salina, in what is now northeastern Oklahoma, and established additional trading posts throughout the Indian Territory, as far west as the Wichita Mountains in what is now southwestern Oklahoma.

In 1832, Chouteau guided author Washington Irving on a journey across the Great Plains from St. Louis to the Arkansas River trading post at Salina. Irving published an account of this trip in his 1835 book, *Tour of the Prairies*.

Chouteau supplied guides and other assistance to the 1834 expedition under HENRY LEAVENWORTH and HENRY DODGE into the Wichita Mountains and Canadian River Valley.

Participating in the FUR TRADE with Manuel Lisa, Auguste Pierre Chouteau played an important role in the early exploration of the upper Missouri and northern Rockies. He

also was an early American pioneer trader and explorer of the Santa Fe Trail west from St. Louis.

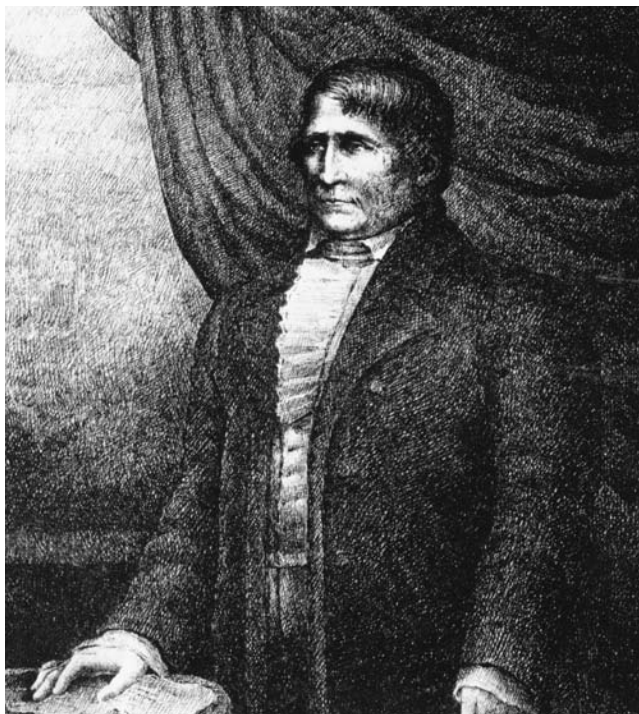
Chouteau, Jean Pierre (Pierre Chouteau, Sr.)
(1758–1849) *American fur trader on the Mississippi River and in Oklahoma, half brother of René Auguste Chouteau, father of Auguste Pierre Chouteau and Pierre Chouteau*

Born in New Orleans, Jean Pierre Chouteau, also known as Pierre Chouteau, Sr., settled in St. Louis, which was founded in 1764 by his half brother RENÉ AUGUSTE CHOUTEAU. Entering the family's trading concern, he dealt with the Osage Indians of the southeastern plains under a monopoly issued by Spain.

In 1796, Chouteau journeyed to the future site of Salina, Oklahoma, north of the Arkansas River where, six years later, he established a trading post.

In 1809, Chouteau was commissioned by the federal government to escort Mandan Indian chief Shahaka back to his tribal home near present-day Bismarck, North Dakota. The chief had visited President Thomas Jefferson in Washington, D.C., on the invitation of MERIWETHER LEWIS and WILLIAM CLARK.

Later in 1809, Chouteau, along with his eldest son AUGUSTE PIERRE CHOUTEAU, became a partner with MANUEL LISA, ANDREW HENRY, PIERRE MENARD, and other St. Louis merchants in the ST. LOUIS MISSOURI FUR COMPANY. Chouteau provided Lisa with trade goods and supplies for



Jean Pierre Chouteau (Library of Congress)

his expeditions to the upper MISSOURI RIVER and northern ROCKY MOUNTAINS.

In the following years, Chouteau continued in the FUR TRADE as an independent trader with his son Auguste Pierre. He operated trading posts on the lower Missouri until his retirement in 1820. Like his brother, René Auguste, Chouteau was an original trustee of St. Louis and served in the Missouri territorial legislature. Both were among St. Louis's most prominent citizens.

The trading fort established by Jean Pierre Chouteau north of the Arkansas River in 1802 played an important role in the settlement of the Indian Territory and served as a starting point for government expeditions into what is now Oklahoma and northern Texas.

Chouteau, Pierre (Pierre Chouteau, Jr.)

(1789–1865) *American fur trader in the American West, son of Jean Pierre Chouteau, brother of Auguste Pierre Chouteau, nephew of René Auguste Chouteau*

Pierre Chouteau, Jr., son of frontier trader JEAN PIERRE CHOUTEAU, was born in St. Louis, Missouri, when it was still Spanish territory. At the age of 16, he joined his family's St. Louis fur-trading concern. Over the next years, he accompanied his father and MANUEL LISA on several expeditions to the upper MISSOURI RIVER for furs.

In 1813, Chouteau went into partnership with Bartholomew Berthold and traded for furs with the Indian tribes of the upper Missouri River. They were later joined by Bernard Pratte. Their company, known as Berthold, Chouteau & Pratte, grew to dominate the upper Missouri FUR TRADE.

By 1833, Chouteau had become the managing partner of the AMERICAN FUR COMPANY's western division, and, the next year, he purchased the division from JOHN JACOB ASTOR. Also in 1833, he journeyed up the Missouri to the mouth of Teton River on the company's steamship, the *Yellowstone*, accompanying ALEXANDER PHILIPP MAXIMILIAN and artist KARL BODMER. Chouteau visited the company's trading post, Fort Pierre, named in his honor, at the site of present-day Pierre, South Dakota.

Chouteau's company was reorganized in 1838 as Pierre Chouteau, Jr. & Co. Until 1864, this company dominated commercial activity over a vast region of the West, stretching from the MISSISSIPPI RIVER to the Rockies, and from Texas to Minnesota.

In his later years, Chouteau settled in New York City, where he became a leading railroad financier.

As the youngest member of a family of traders, Pierre Chouteau, Jr., participated in the early exploration of trade routes. His business empire grew with the FUR TRADE on the upper Missouri and northern Rockies and was one of the earliest beneficiaries of the exploration of the American West.

Chouteau, René Auguste (1749–1829)

American fur trader on the Mississippi River, founder of St. Louis, Missouri, half brother of Jean Pierre Chouteau, uncle of Auguste Pierre Chouteau and Pierre Chouteau

René Auguste Chouteau was born in New Orleans. In August 1763, he joined his stepfather, PIERRE LIGUESTE LACLEDE, on a fur-trading expedition up the MISSISSIPPI RIVER to the Illinois River.

In early November 1763, Chouteau and Laclede arrived at Kaskaskia in present-day Illinois and crossed the Mississippi in search of a suitable site for a trading post on the west bank. They decided on a rocky bluff a few miles south of the mouth of the MISSOURI RIVER.

Chouteau returned to the site in February 1764 and, on the instructions of his stepfather, established the fur-trading settlement that became St. Louis, Missouri.

In 1768, Chouteau became his stepfather's partner in a trading concern. Laclede died 10 years later, and Chouteau and his half brother, JEAN PIERRE CHOUTEAU, assumed control of the company.

Chouteau's business spread to the Osage Indians. His profits increased dramatically when he started shipping his goods directly to Montreal via the Mississippi and Great Lakes, thus eliminating middlemen in New Orleans.



René Auguste Chouteau (Library of Congress)

In 1794, the Spanish governor of Louisiana granted Chouteau a monopoly over trade with the Osage Indians. That year, he established Fort Carondelet on the Osage River in present-day western Missouri. After the Louisiana Purchase of 1803, he was appointed U.S. commissioner to the Osage. He came to be the wealthiest landowner in St. Louis and served as a judge, a territorial legislator, and a trustee of the city.

René Auguste Chouteau played a key role in the St. Louis FUR TRADE, thus contributing to the exploration of the upper Missouri, Great Plains, and ROCKY MOUNTAINS. Fort Carondelet, Chouteau's post on the Missouri frontier, was an important base for the 1806–07 explorations of ZEBULON MONTGOMERY PIKE. St. Louis, which Chouteau founded, blossomed into the gateway to the West and was the starting point for the western explorations of MERIWETHER LEWIS and WILLIAM CLARK, as well as JOHN CHARLES FRÉMONT.

Christie, Charles (unknown–1812) *British army officer, surveyor in Pakistan, Persia, and Afghanistan*

Captain Charles Christie, a British officer and surveyor, served with Sir John Malcolm in several diplomatic missions to Persia (present-day Iran) in the early 1800s.

In 1810, accompanied by SIR HENRY POTTINGER, Christie sailed northward along India's west coast from Bombay to Karachi, then set out to explore inland into Baluchistan. Disguised as native traders, Christie and Pottinger reached Nushki in present-day northern Pakistan. From there, Christie traveled on his own, heading north and west across the Dasht-e Margow, a sunken desert region in southern Afghanistan. He continued northward across central Afghanistan to the city of Herat, then returned to Persia, and, traveling east-to-west, he rejoined Pottinger at Esfahan. They visited Teheran, then Qazvin, south of the Caspian Sea. Christie traveled on his own to Tabriz in what is now Iranian Azerbaijan, and finally to Baku, a port on the west coast of the Caspian Sea.

Charles Christie's explorations into what is now Pakistan, Iran, and Afghanistan provided the British Foreign Office with information about the interior of western Asia, a region that remained strategically important throughout the 19th century in the international rivalry between Great Britain and Russia.

Chu Ssu-pen (Chu-Ssu-Pen, Zhu Siben)

(1273–1337) *Chinese cartographer*

Chu Ssu-pen studied under Daoist teachers Chang Jen-ching and Wu Chhlian-chieh. He became a renowned cartographer of the Mongol Yuan dynasty (1260–1368) in China. He drew on the work of earlier scholars, going back

as far as the astronomer Chang Heng, of the second century and the cartographer P'ei Hsiu of the third century, and gathered new information from his own travels and those of contemporary Persian and Arab traders and European explorers such as MAFFEO POLO, NICCOLÒ POLO, and MARCO POLO.

Between 1311 and 1320, using principles of geometry, Chu Ssu-pen created a seven-foot-long roll-map of China known as Yü T'u Yuditu, or "Earth map." The original map has been lost, but it was revised by the Ming scholar Lo Hung-hsien and published as an atlas, *Kuang Yü T'u*, in about 1555.

Chu Ssu-pen's work influenced cartography among the Chinese and other peoples for generations, until more scientific methods began to be applied in the early 19th century. The Italian missionary MATTEO RICCI's 1602 world map obviously drew on information from Lo Hung-hsien's derivative atlas, which presented fairly accurate geographic information of Africa, including its triangular shape and the location of the NILE RIVER and CONGO RIVER (Zaire River), the East and South China Seas, and Asian and Indian Ocean island groups.

Clapperton, Hugh (1788–1827) *British naval officer, explorer in North and West Africa*

Hugh Clapperton was born in Annan on the southwest coast of Scotland, the son of a surgeon. While still very young, he embarked on a seafaring career, serving first as a cabin boy on a merchant ship, then eventually entering the British navy.

By 1820, Clapperton was a naval lieutenant, having served in the Great Lakes region of Canada as well as in the East Indies. That year, he was selected to take part in a British government-sponsored expedition into West Africa. Known as the Bornu Mission, one of its major objectives was to trace the course of the NIGER RIVER.

In October 1821, Clapperton and the expedition's leader, WALTER OUDNEY, a British botanist and naval surgeon, traveled to Tripoli in present-day Libya, where they were joined by the rest of the expedition, including British army officer DIXON DENHAM.

From Tripoli, Clapperton and the others headed southward across the SAHARA DESERT, arriving at Murzuk in southwestern Libya in April 1822. Although they were delayed at Murzuk for several months by the local ruler, the bey of Murzuk, the expedition was soon permitted to leave. South of the Fezzan region, they headed eastward at Ghat, Libya, and explored the Ahaggar Mountains in present-day southern Algeria.

Clapperton, Oudney, and Denham continued their trek toward the upper Niger River, traveling southward through what is now the West African nation of Niger, and entered



Hugh Clapperton (Library of Congress)

the kingdom of Bornu in present-day northeastern Nigeria. They reached Lake Chad on February 4, 1823, becoming the first Europeans ever to penetrate that far into the interior of West Africa.

In December 1823, from Kuka, the capital of the Bornu kingdom (present-day Kukawa, Nigeria), Clapperton and Oudney set out for the Nupe region to the southwest, while Denham went to explore around Lake Chad on his own. Seeking to determine the true course of the Niger, Clapperton and Oudney intended to test the theory that the river flowed southward into the Gulf of Guinea, and was not a western tributary of the NILE RIVER, as many geographers mistakenly believed.

Clapperton and Oudney traveled westward across northern Nigeria's Hausa region, reaching Kano, an important city on the caravan route to the coast, in early January 1824. Oudney, stricken with tropical fever, died before long, and Clapperton continued by himself, reaching the city of Sokoto, north of the Niger.

Clapperton was unable to proceed beyond Sokoto to the Niger due to opposition from local Muslim rulers, who were wary of any British presence north of the Gulf of Guinea as a threat to the West African SLAVE TRADE. Forced to turn back to Kuka without learning anything new about

the Niger, he returned to Tripoli with Denham, and from there went on to London, arriving in June 1825.

In London, Clapperton reported his findings to British government officials as well as to the AFRICAN ASSOCIATION. The association's members were still hoping to receive word of the German explorer FRIEDRICH CONRAD HORNE-MANN, who had disappeared in West Africa more than 20 years earlier. Clapperton, promoted to the rank of commander, immediately organized another expedition to West Africa.

In August 1825, Clapperton sailed for the Gulf of Guinea. He planned to explore the interior of West Africa from the south and establish the true course of the Niger, as well as visit TIMBUKTU. Among the members of his expedition were RICHARD LEMON LANDER and the Hausa guide WILLIAM PASCOE.

Landing at Badagri, near Lagos, in November 1825, Clapperton and his expedition proceeded northward into the former Youraba kingdom of present-day southeastern Nigeria. They traveled inland from the Bight of Benin, an area rife with insect-borne tropical diseases. Most of the European members of the expedition were soon stricken; only Clapperton and Lander managed to reach the Youraba capital at Katunga in late January 1826. Within two more months, they had arrived at Bussa on the Niger River.

After crossing the Niger at Komie, Clapperton and Lander made their way to Sokoto, where Clapperton had been turned back on his earlier expedition from the north. They remained at Sokoto for over a year, trying without success to find guides for their proposed trip to Timbuktu and exploration of the Niger. They had planned, on reaching Timbuktu, to follow the Niger downstream to its mouth and resolve the question of its true course. Yet Clapperton became ill in Sokoto and died there in 1827, reportedly succumbing to dysentery. Lander made his way to Kano and the Gulf of Guinea, eventually returning to England with Clapperton's notes and journals.

Clapperton's accounts of his two expeditions into West Africa were published posthumously in England. His *Narrative of Travels and Discoveries in Northern and Central Africa* first appeared in 1828. The next year, the record of his expedition from the south, *Journal of a Second Expedition into the Interior of Africa*, was published.

Hugh Clapperton's explorations did not conclusively settle the question of the course of the Niger. Nevertheless, he did contribute significantly to European geographic knowledge of Africa. He was among the first Europeans to see Lake Chad, and his own expeditions into West Africa, taken together, constitute the first north-to-south crossing of the western part of Africa. His written accounts of his travels in northern Nigeria provide the earliest European descriptions of the regions' Hausa people. Richard Lander returned to west Africa in the early 1830s and finally proved

that Clapperton had been correct in theorizing that the Niger flowed into the Gulf of Guinea, and was not connected to the Nile.

Clark, William (1770–1838) *U.S. Army officer, coleader of Lewis and Clark Expedition in the American West, territorial governor, Indian superintendent*

William Clark, younger brother of Revolutionary War Indian fighter George Rogers Clark, was born in Caroline County, Virginia. In about 1784, his family settled on the Kentucky frontier near the Falls of the Ohio. As he was growing up, he developed skills as a frontiersman. A self-taught naturalist, he studied plants and wildlife and became familiar with the customs of various Indian tribes.

In 1789, Clark joined the local militia, taking part in campaigns against Indians. Three years later, he was commissioned a lieutenant of artillery in the regular army. In 1793, while serving with General “Mad” Anthony Wayne in the war against the allied tribes of the Old Northwest under the Miami chief Little Turtle, he first met MERIWETHER LEWIS.

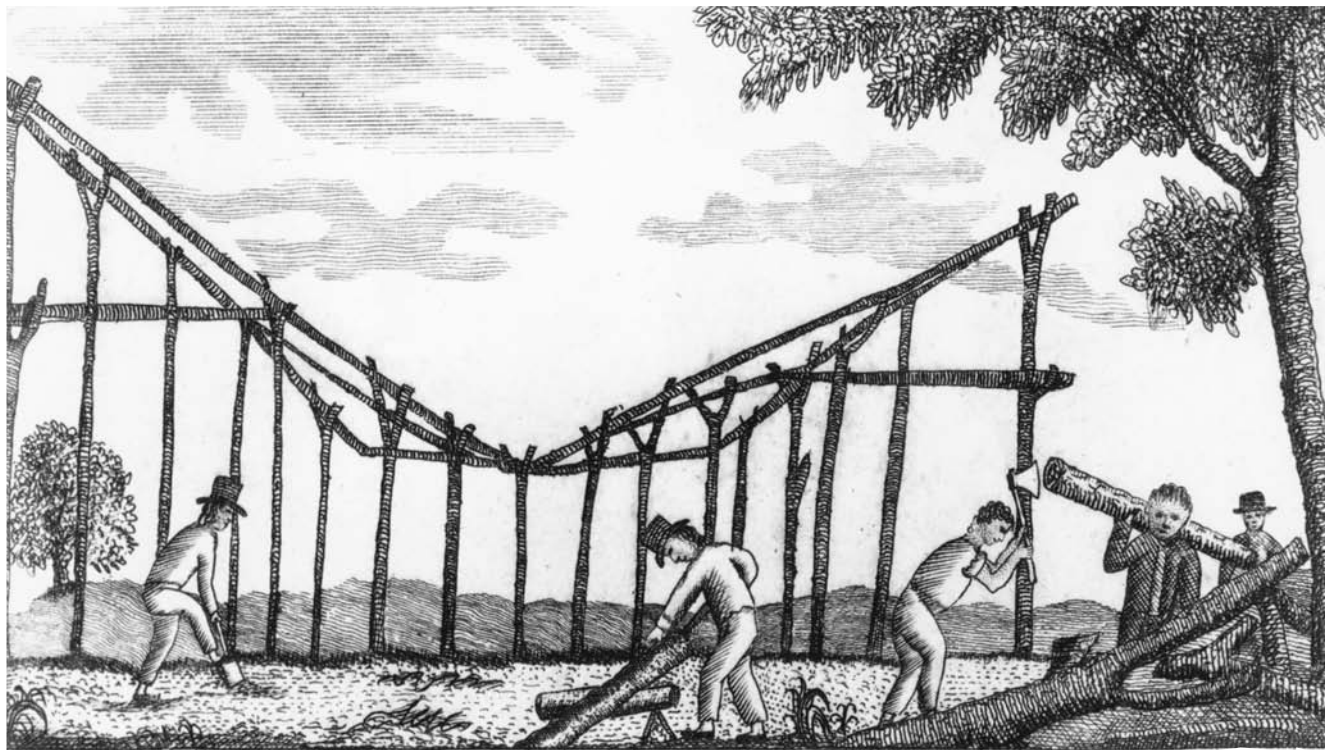
Leaving the army in 1796, Clark returned to his Kentucky plantation. In 1802, he accepted Lewis’s offer to colead a government-sponsored expedition across the ROCKY MOUNTAINS to the Pacific Ocean. Although com-

missioned a lieutenant, Clark, at Lewis’s request, would serve as an honorary captain.

With his African-American servant York, Clark joined Lewis at Louisville in the late summer of 1803. They traveled on a KEELBOAT down the Ohio River to the MISSISSIPPI RIVER, to a site opposite St. Louis called Camp Wood River. In winter 1803–04, Clark played a major role in recruiting and training the men who would take part in the trip to the Pacific. Clark’s responsibilities as second in command of the Corps of Discovery, as the Lewis and Clark Expedition was known, would also include making charts and establishing peaceful contacts with Native Americans encountered on the way.

On May 14, 1804, Clark and a party of about 45 soldiers, traders, and trappers departed St. Louis up the MISSOURI RIVER. In addition to the keelboat, the group traveled by PIROGUE. Their first stop was the Missouri River settlement of St. Charles, where they were soon joined by Lewis, who had traveled there overland after finishing up his affairs in St. Louis.

The expedition continued to the Mandan Indian villages near present-day Bismarck, North Dakota. During the winter stopover, 1804–05, Clark interviewed Indians and traders, seeking data on the lands lying beyond the headwaters of the Missouri. Clark recommended to Lewis the hiring of the trader TOUSSAINT CHARBONNEAU and his



William Clark and his men building huts, as shown in an 1810 publication of the journals of Patrick Gass, a member of the Corps of Discovery (*Library of Congress*)

Shoshone wife SACAJAWEA (Sacagawea) as interpreters and guides. Clark's servant York generated interest among Native Americans as the first black man they had ever seen. His popularity would persist among the women of the more than 50 tribes the expedition encountered.

In spring 1805, after traveling 1,200 miles beyond the Mandan villages in the Dakotas, Clark explored the main branch of the Missouri, while Lewis examined the course of the Marias River. He rejoined Lewis at the Great Falls of the Missouri. From there, they continued westward to the Oregon coast, reaching the mouth of the COLUMBIA RIVER on November 15, 1805.

On the return journey from the Oregon coast in spring 1806, Clark led part of the group overland from the Bitterroot Valley, across present-day Yellowstone National Park, to the Yellowstone River. He soon rejoined Lewis and the rest of the expedition on the Missouri River, a few miles below the mouth of the Yellowstone.

Clark and Lewis returned to St. Louis in September 1806, then traveled to Washington, D.C., to report their findings to President Thomas Jefferson.

In 1807, Clark was appointed principal Indian agent to the tribes of the Louisiana Territory and brigadier general in the territorial militia. He was back in St. Louis in 1808.

In August 1808, Clark led an overland expedition westward from St. Charles to the mouth of the Kansas River, where he established Fort Osage, near what is now Kansas City. His guide for this trip was Nathan Boone, son of frontier explorer DANIEL BOONE. The post, designed to prevent Spanish and British encroachment into the newly acquired Louisiana Territory, became an important starting point for trade and military expeditions onto the Great Plains.

In 1809, with MANUEL LISA, ANDREW HENRY, ANTOINE PIERRE MENARD, JEAN PIERRE CHOUTEAU, and others, he founded the ST. LOUIS MISSOURI FUR COMPANY.

In 1810, the AMERICAN FUR COMPANY'S WILSON PRICE HUNT arrived in St. Louis and conferred with Clark in preparation for his own overland expedition to establish a fur-trading post on the Pacific coast for New York financier JOHN JACOB ASTOR.

During the War of 1812, Clark was charged with maintaining the neutrality of the upper Missouri and northern plains tribes, especially the Sioux (Dakota, Lakota, Nakota). To this end, in 1814, he led a military expedition up the Mississippi and established an outpost at Prairie du Chien, in what is now Wisconsin, which became an important site for peace treaty conferences with the region's Indian tribes.

In 1813, Clark was appointed territorial governor of Missouri. When Missouri was admitted to the Union as a state in 1821, Clark failed in his bid for election as the state's first governor. At that time, he received an appointment as superintendent of Indian affairs at St. Louis, serving for the rest of his life. In his later years, he took part in military

campaigns in the Winnebago Uprising of 1827 and the Black Hawk War of 1832.

William Clark's expertise in dealing with Native Americans, aided by his friendship with the Shoshone Sacajawea, played a vital role in the success of the Lewis and Clark Expedition. His skills as a naturalist and mapmaker contributed much to the final report of the expedition, published in 1814. Clark's account of his 1808 expedition provided the first description of what is now the western part of the state of Missouri. With Lewis he was also the first to apply the descriptive name Great Plains to the region between the Missouri River and the Rocky Mountains.

Clavijo, Ruy González de (unknown–1412)

Spanish diplomat in central Asia

Ruy González de Clavijo was born in Madrid to a prominent Spanish family. In the early 1400s, he served as a nobleman at the court of Henry III, king of Castile. At that time, diplomatic contacts with the Mongol Empire east of the Black Sea had declined. The Mongol emperor Tamerlane had recently consolidated his power over much of present-day Georgia, and he ruled an empire that extended across much of central Asia and the Middle East.

In an attempt to reopen diplomatic and commercial ties with the Mongols, Henry III sent Clavijo on a diplomatic mission to meet with Tamerlane at his capital in Samarkand, then the leading cultural center of central Asia. Clavijo embarked from the southern Spanish port of Cádiz in May 1403, heading eastward across the MEDITERRANEAN SEA. He traversed Persia (present-day Iran), visiting the cities of Tabriz, Teheran, and Meshed.

In Samarkand by late summer 1404, Clavijo was welcomed by Tamerlane, who at that time was preparing for an invasion into China. Clavijo conferred with the Mongol ruler, then left for Spain in 1405, reaching Madrid the following year.

The results of Ruy González de Clavijo's diplomatic mission were probably negligible since Tamerlane died in 1405, while the Spanish envoy was on his homeward journey. Yet back in Spain, Clavijo wrote an influential account of his travels across what is now Iran and Uzbekistan. Entitled *Embassy to Tamerlane*, it was first published in Seville in 1582, and it provided Europe with an updated view of Persia and central Asia.

Clerke, Charles (1741–1779) *British naval officer in the Pacific*

Charles Clerke was born at Weathersfield Hall, in Essex, England, northeast of London, where his father was a local magistrate. At the age of 12, he joined the British navy, serving throughout the Seven Years War of 1756–63.

In 1764–66, Clerke sailed as a midshipman with JOHN BYRON's voyage around the world. After his return from this expedition, he wrote an account describing giants he reportedly observed while exploring Patagonia. It was published in the official journal of the ROYAL SOCIETY in 1768, as *An Account of the very tall men seen near the Streights of Magellan in the year 1764 . . .*, but it was subsequently exposed as a good-natured hoax on Clerke's part.

Starting in 1768, Clerke began more than 10 years of service under the command of JAMES COOK, taking part in all three of Cook's voyages of exploration.

On Cook's first voyage to the Pacific Ocean and around the world (1768–71), Clerke was a midshipman on the *Endeavor*, and, toward the end of that expedition, in May 1771, he was promoted to lieutenant.

On Cook's second voyage (1772–75), Clerke was second lieutenant on the *Resolution*. In fall 1774, on a newly explored island in the South Pacific near New Caledonia, he assisted the expedition's astronomer, William Wales, in an observation of a solar eclipse, in which they made the first use of an astronomical instrument known as Hadley's QUADRANT.

Soon after his return to England in 1775, Clerke was held in a debtor's prison, where he contracted tuberculosis. Upon his release in 1776, he sailed on Cook's third and final expedition (1776–80), as captain of the *Discovery*. In 1778, he made a study of the natural history of the Pacific coast of what is now British Columbia and Alaska. In April 1778, he joined Cook in a visit to a Nootka Indian village near present-day Vancouver, British Columbia.

Following Cook's death in the HAWAIIAN ISLANDS in February 1779, Clerke assumed command of the expedition on the flagship, the *Resolution*. Although suffering from advanced tuberculosis, he sailed northward to BERING STRAIT to complete Cook's assignment to survey the coast of Alaska and search for an entrance to the NORTHWEST PASSAGE. In summer 1779, the *Resolution* reached Icy Cape, Alaska, near 70°33' north latitude, at which point further progress was blocked by ice.

Clerke correctly concluded that no practical Northwest Passage could be found at that latitude, and he returned to the Asian side of the Bering Sea. In August 1779, en route to the Russian port of Avacha Bay on the Kamchatka Peninsula, he finally succumbed to tuberculosis. Command of the expedition then passed to JOHN GORE.

Charles Clerke was one of Captain Cook's most loyal officers. He returned to the cold and fog of the North Pacific to complete Cook's explorations for the Northwest Passage, despite the jeopardy to his own health, and helped prove that no viable sea route existed around the north coast of North America.

Clyman, James (Jim Clyman) (1792–1881)

American fur trader, trapper, guide in the American West

James (Jim) Clyman was born in central Virginia's Blue Ridge, where his family farmed on lands leased from George Washington. In 1811, Clyman and his family moved west to Ohio, where they established a farm. With the onset of the War of 1812, Clyman applied the skills learned on the frontier as a scout in the Ohio state militia campaigning against British-backed Shawnee Indians.

Soon after the war's end, Clyman moved farther west, settling first in Indiana, then Illinois. In Illinois, while employed as a surveyor, he explored the Sangamon River in the region between present-day Springfield and Decatur.

In early 1823, Clyman journeyed to St. Louis, where he was hired by fur trader WILLIAM HENRY ASHLEY to organize and accompany a fur-trapping expedition up the MISSOURI RIVER into the Yellowstone region of the Dakotas and present-day eastern Montana. He became the clerk for one company of Ashley's trappers and commanded a KEELBOAT. He departed from St. Louis that spring. When his party reached the Arikara Indian villages on the upper Missouri in present-day South Dakota, a war party attacked, killing 15. Clyman narrowly escaped, making his way downriver to Fort Atkinson near Council Bluffs, Nebraska.

Three months later, Clyman returned to the upper Missouri as part of Colonel HENRY LEAVENWORTH's punitive military expedition against the Arikara.



Jim Clyman (Library of Congress)

Ashley's objective for his 1823 fur-trading expedition was the Green River region of what is now northeastern Utah and southern Idaho and Wyoming. With the river route through the northern plains and ROCKY MOUNTAINS blocked by Indians, he decided to send an overland expedition from Fort Kiowa, a post on the Missouri more than 300 miles south of the mouth of the Yellowstone River, due west across the northern plains and into the Rockies. Clyman was part of this party, along with THOMAS FITZPATRICK, JEDEDAH STRONG SMITH, and WILLIAM LEWIS SUBLETTE.

Setting out on horseback from Fort Kiowa in September 1823, the group headed westward across the Black Hills of South Dakota for the Wind River Range in what is now western Wyoming. In early February 1824, they reached the mountains' eastern slopes and attempted to proceed through Union Pass. Severe winter storms drove them back, but friendly Crow Indians directed Clyman and Smith to a pass farther south. This proved to be the SOUTH PASS of the Wind River Range, which had been used a decade earlier by WILSON PRICE HUNT but had not been charted at that time. Following the Sweetwater Creek into the South Pass, Clyman and the others crossed the Continental Divide and reached the Green River in late March 1824.

Fitzpatrick soon returned to St. Louis with a bountiful harvest of pelts. In June 1824, Clyman and Smith, setting out on their return trip, attempted to negotiate the Sweetwater by makeshift CANOE after their horses had been stolen by Indians. Clyman was soon separated from the rest of the party and walked more than 700 miles through the eastern ranges of the Rockies, and across the Great Plains, to Fort Atkinson, near Council Bluffs.

The 1823–24 explorations of Clyman and Smith had revealed that the Sweetwater could be reached by following the Platte River, a tributary of the Missouri. This route enabled fur traders to enter the Green River region, avoiding Indian attacks along the Yellowstone.

Clyman returned to the upper Green River for the 1824–25 trapping season. He later attended Ashley's first trappers' rendezvous at Henrys Fork of the Green River in summer 1825.

During the next two years, Clyman explored the region around Utah's Great Salt Lake. In 1826, with Moses "Black" Harris, HENRY FRAEB, and LOUIS VASQUEZ, Clyman circumnavigated the large body of water, proving that it was not an arm of the Pacific Ocean.

Clyman and Sublette continued to trap in the Rockies. In 1827, Clyman led a party of trappers, with their annual catch, back to St. Louis, then returned to Illinois. While living in Danville, he served in military campaigns in the Black Hawk War of 1832, as part of the same company of volunteer militia as Abraham Lincoln.

In 1834, Clyman moved north to a settlement on the west shore of Lake Michigan near present-day Milwaukee,

Wisconsin. He opened a sawmill and profited from the booming lumber trade.

In spring 1844, Clyman joined a wagon train from Independence, Missouri, to Oregon, led by Moses "Black" Harris. The group traveled through the South Pass, which had become an integral part of the Oregon Trail. He spent the winter of 1844–45 with HUDSON'S BAY COMPANY factor JOHN M'CLOUGHLIN at Fort Vancouver on the COLUMBIA RIVER opposite present-day Portland, Oregon.

In spring 1845, Clyman led a party of emigrants southward through Oregon's Umpqua Valley into northern California. Once there, he joined up with an eastbound party led by CALEB GREENWOOD. This expedition attempted a more southerly route, rather than northward through present-day Idaho; it crossed the Sierra Nevada, then proceeded through the desert regions south and west of the Great Salt Lake and Utah's Wasatch Mountains, following the much touted but what proved to be harrowing Hastings Cutoff. On reaching Fort Laramie in June 1846, Clyman and Greenwood reportedly tried to warn the Donner Party against using the southern route from Fort Bridger. Their advice went unheeded, and the Donner Party went on to face disaster in the snows of the Sierra Nevada later that fall.

Clyman was back in Wisconsin by 1848, remaining only long enough to organize a wagon train westward to California. He took the conventional route through South Pass, which he had explored 25 years earlier. Clyman then guided the party southwestward along the Humboldt River, to the Truckee River, and into the fertile valleys north of San Francisco Bay. He married a member of this wagon train, a woman named Hannah McCombs, and settled permanently in California's Napa Valley.

Jim Clyman's explorations west of the Missouri as one of the MOUNTAIN MEN and a guide contributed to America's westward expansion. Although he had no formal education, he recorded his frontier experiences in diaries. His accounts include vivid descriptions of the 1844 crossing to Oregon. They were first published in 1928, in Charles L. Camp's *James Clyman, American Frontiersman, 1792–1881*.

Cnidus, Ctesias of See CTESIAS OF CNIDUS.

Cocking, Matthew (Mathew Cochon, Mathew Cockan, Mathew Cockings) (1743–1799)

British fur trader, traveler in the Canadian West

Matthew Cocking was a tailor's son from York, England. Little is known of his early life or education. In 1765, he joined the HUDSON'S BAY COMPANY and traveled to its post at York Factory on HUDSON BAY. His first job was that of "writer," and, over the next few years, he worked at transcribing journals and correspondence and recording accounts.

By 1770, Cocking was second in command at York Factory. At that time, the Hudson's Bay Company did not have outposts at any distance from the south coast of Hudson Bay, but obtained furs from the Indians who traveled annually to York Factory from the inland regions. Independent traders from Montreal were beginning to encroach into the Hudson's Bay Company's vast territory, which extended from what is now eastern Manitoba to western Saskatchewan. To counter this competition, the company needed information on native peoples and geography to the west of Hudson Bay. Although traders and agents had been sent out, their reports were less than clear or literate. In 1772, Cocking offered to explore west of Hudson Bay himself, and Andrew Graham, director at York Factory, arranged for him to journey westward with a band of Indians returning to their homeland on the Canadian prairies.

Cocking and his Indian companions left York Factory on June 27, 1772. They traveled from Hudson Bay by CANOE, following the Fox, Hayes, and Minago Rivers to the North Saskatchewan River, which took them into what is now the western Saskatchewan province. At Peonan Creek, they disposed of the canoes and, traveling overland, headed southward onto the prairies south of present-day North Battleford, Saskatchewan. Along the way, Cocking explored the Eagle Hills and the region to the south as far as the South Saskatchewan River.

Cocking wintered among the Indians, taking part in buffalo hunts and roundups and establishing friendly contacts with the Assiniboine, Cree, and Blackfeet, western tribes then unknown to the British. In spring 1773, Cocking and the Indians made their way back to the North Saskatchewan River for the annual fur-trading journey to York Factory. In new canoes, they returned along the same route they had followed the previous year, arriving at the Hudson Bay post on June 18, 1773.

In his report to the company, Cocking described the territory he had visited and recommended that the competition from the independent traders could be met by hiring more men who could handle canoes for the trade inland. He also suggested to the company's directors in London that trading posts be immediately established in the West.

In 1774, Cocking set off for Cumberland House in eastern Saskatchewan, the company's first inland trading post, where he planned to join SAMUEL HEARNE. While traveling westward by way of Lake Winnipeg, he encountered two of the company's traders who had been abandoned by their Indian guides.

At that point, Cocking's own Indian companions deserted him. He engaged other native guides who agreed to take him and the two traders westward, but to Lake Winnipegosis and not Cumberland House. From Lake Winnipegosis, he then explored the Red Deer River region south of Cumberland House. After a winter at Good Spirit Lake,

he made his way back to York Factory, arriving there in late June 1775. Although he had been unable to reach Cumberland House that season, the experience underscored for him the necessity of relying less on Indians for guides.

Later in 1775, Cocking reached Cumberland House. He served there for a few years, then directed operations at Severn House in present-day Ontario. In 1781, he served briefly as director at York Factory. He returned to York, England, the following year, where he retired on a pension from the Hudson's Bay Company.

During his years in Canada, Cocking had fathered three mixed-blood daughters, who remained at York Factory. In his will, he provided a legacy for them.

Matthew Cocking's vivid and accurate accounts of the regions west of Hudson Bay are preserved at the company's archives in Winnipeg. Largely because of his efforts, the Hudson's Bay Company expanded its field operations and was able to compete in the FUR TRADE with the independent traders from Montreal at a time when the Montrealers were about to consolidate into the formidable NORTH WEST COMPANY.

Colenso, William (1811–1899) *British colonist on New Zealand's North Island*

William Colenso was an early colonist on NEW ZEALAND's North Island. In 1838, he landed at Poverty Bay, on the island's east coast. Three years later, he undertook the first of three expeditions into the interior.

In 1841, Colenso went westward from Poverty Bay as far as Lake Waikaremoana, then explored the territory to the northwest, visiting the region around Lake Rotorua. He went northward, beyond present-day Auckland, and explored the island's northern peninsula as far as the Bay of Islands.

Colenso next set out to explore the southern part of North Island. In 1843, he explored southward along the east coast, reaching its southernmost point, near Wellington. His return trip to the north took him inland around Hawke Bay, and once again to Lake Waikaremoana. Colenso visited the interior of North Island again in 1847, exploring the region around Lake Taupo, the island's largest lake, and making one of the earliest crossings of the Ruahine Range to the south.

Taken together, William Colenso's three expeditions, between 1841 and 1847, amounted to the first comprehensive investigation into the interior of the North Island of New Zealand.

Collinson, Sir Richard (1811–1883) *British naval officer in the Canadian Arctic*

Born in Gateshead in northern England, Richard Collinson entered the British navy as a midshipman at the age of 12.

From 1828 to 1831, he served in maritime survey expeditions in the South Atlantic Ocean and in the seas around Antarctica. During the 1830s, he took part in SIR EDWARD BELCHER's survey of the coast of South America.

During the Opium War in 1839, Collinson undertook surveys for British naval operations in Chinese waters. By the time he returned to England in 1846, he had been promoted to captain, and he was subsequently named commander.

In 1850, Collinson was appointed to command a rescue expedition in search of SIR JOHN FRANKLIN and his men, who had been missing in the Canadian Arctic since 1845. The expedition's two ships, the *Enterprise*, commanded by Collinson, and the *Investigator*, captained by ROBERT McCLURE, departed England on January 31, 1850. They planned to search for Franklin in the Canadian Arctic from the Pacific Ocean, starting from BERING STRAIT and proceeding eastward along the north coast of Alaska.

Collinson's ship separated from the *Investigator* in the voyage around CAPE HORN. McClure, who had reached Bering Strait first, sailed northward into the Arctic Ocean; he eventually became icebound at Melville Island in September 1850. By the time Collinson had arrived at Bering Strait in late 1850, PACK ICE prevented him from continuing until spring 1851.

In July 1851, the ice cleared, and Collinson managed to sail the *Enterprise* around Alaska to Coronation Gulf on the Arctic coast of Canada. When the ice cleared again the following spring, he continued his eastward course, navigating through Dease Strait to Cambridge Bay on Victoria Island, where he spent the winter of 1852–53. While there, Collinson met some Inuit who gave him pieces of iron, which may have come from the auxiliary engine of one of Franklin's ships. Although these fragments could very well have been the first tangible relics recovered from that ill-fated expedition, without Inuit interpreters, Collinson was unable to obtain further information to confirm this.

In spring 1853, Collinson led a sledge party in an exploration of the east coast of Victoria Island, a region that was subsequently named the Collinson Peninsula in his honor.

Collinson and the *Enterprise* crew spent the winter of 1853–54 on the Arctic coast of Alaska. In the spring, they turned back westward for the homeward voyage. After a southward passage through Bering Strait, they reentered the North Pacific and sailed back to England, arriving there in May 1855. Collinson learned that most of the Canadian Arctic he had charted had previously been visited by McClure. McClure, after his ship had become icebound, had made his way eastward by sledge to Sir Edward Belcher's fleet near Melville Island, and, in so doing, he had made the first crossing of the NORTHWEST PASSAGE.

Collinson retired from active naval service in 1855, and in 1875 he was awarded a knighthood for his accomplishments as a naval surveyor and Arctic explorer. In 1889, an account of his exploits in the Canadian Arctic, entitled *Journal of H.M.S. Enterprise on the Expedition in Search of Sir John Franklin's Ships by Behring Strait, 1850–55*, was published.

Although Sir Richard Collinson failed to find the Northwest Passage, one of the objectives of his expedition, he did unwittingly come closer than any of the other rescue expeditions to the actual site of Franklin's final end in Victoria Strait. Furthermore, his navigation through the polar seas covered more degrees of longitude above the ARCTIC CIRCLE than any other expedition until that time, a record not matched until 1878 and the NORTHEAST PASSAGE expedition of the Swedish Arctic explorer NILS ADOLF ERIK NORDENSKJÖLD. Collinson's navigational charts and descriptions of Coronation Gulf and Dease Strait were later cited as extremely accurate and helpful by ROALD ENGELBREGT GRAVNING AMUNDSEN following his seaward navigation of the Northwest Passage in 1903–06.

Colter, John (ca. 1775–1813) *American fur trapper, guide in the American West*

John Colter was born at the outbreak of the American Revolution near Staunton, Virginia, on the eastern slopes of the Shenandoah Mountains. When about 28 years old, he enlisted as a private in the Corps of Discovery, better known as the Lewis and Clark Expedition.

In early May 1804, MERIWETHER LEWIS sent Colter and another expedition member, Moses Reed, up the MISSOURI RIVER from St. Louis to meet up with the rest of the party, camped at St. Charles, Missouri. Colter delivered letters from Lewis, as well as a quantity of tallow for the expedition.

After the expedition reached the Oregon coast in November 1805, Clark dispatched Colter to survey a site for a winter encampment. Later that month, Colter explored around Cape Disappointment near the mouth of the COLUMBIA RIVER with WILLIAM CLARK and eight other expedition members.

On the return journey through the northern Rocky Mountains in mid-June 1806, Clark noted in his journal that Colter and his horse fell into a stream known as Hungry Creek, but Colter managed to survive without injury and without losing his gun.

In mid-August 1806, while the expedition was approaching the Mandan villages on the upper Missouri near present-day Bismarck, North Dakota, Colter was given permission by Lewis and Clark to return to the Yellowstone River region with two trappers from Illinois, Joseph Dickson

and Forest Hancock. Little is known of this group's exploits; they may have traveled westward into what is now northwestern Wyoming and the area of present-day Yellowstone National Park.

Colter was returning to St. Louis via the Missouri in 1807, when he met the outward-bound party of MANUEL LISA at the mouth of the Platte River in present-day eastern Nebraska. Colter decided to travel with Lisa's trappers to the Yellowstone, following that stream to the mouth of the Bighorn River. Near present-day Custer, Montana, he helped Lisa and his men, including GEORGE DROUILLARD, construct a fur-trading post, Fort Raymond.

Lisa then sent Colter into the country of the Crow Indians to solicit their cooperation in the collection of beaver pelts. Colter spent the next months wandering through parts of present-day Wyoming and Idaho. He traveled from Pryor's Fork across the Pryor Mountains into the Bighorn Basin. Although his exact route is unclear, he probably headed southward into Wyoming's Wind River Mountains and may have crossed the Continental Divide by traveling westward through Union Pass. He continued westward toward the Teton Mountains and is believed to have been the first non-Indian to cross through Teton Pass. He then headed northward across the Madison River, then eastward back to Fort Raymond at the mouth of the Bighorn River. During his wanderings, he came upon gas vents in the ground spewing forth sulphurous fumes, as well as geysers and hot springs. This region of thermal activity, near present-day Cody, Wyoming, along the North Fork of the Shoshone River, became known as "Colter's Hell."

In 1808, Colter again set out from Fort Raymond for the beaver country of the Gallatin River, this time accompanied by about 500 Flathead Indians. While traveling northward toward what later became known as Bozeman Pass (named after JOHN MERIN BOZEMAN), the group was attacked by a force of about 1,500 Blackfeet Indians. Although Colter was wounded in the leg during the battle, he managed to kill one of the attackers and was later rescued by Crow Indians. He made his way back to Fort Raymond, where he soon recovered from his wounds.

In fall 1808, Colter again set out from Fort Raymond, joined by another Lewis and Clark Expedition veteran working for Manuel Lisa, a man named John Potts. The two trappers headed westward toward the Three Forks of the Missouri. Near the Jefferson River, Colter and Potts were attacked by another party of Blackfeet. Potts was killed and scalped by the Indians, and Colter was taken captive. His captors stripped him naked and, after giving him a brief head start, made him run through the wilderness and set out in pursuit. One of them caught up with him, but Colter managed to wrest his attacker's spear from him and kill him with it. He then ran to the Jefferson River and dove in. Finding a log jam and an air pocket, he hid until dark, then

waded six miles downstream. He reached the safety of Fort Raymond 10 days later.

In 1810, at Fort Mandan in present-day North Dakota, Colter met up with fur traders PIERRE MENARD, ANDREW HENRY, and George Drouillard. He guided this party to the Three Forks of the Missouri region of present-day Montana. The group suffered from snow blindness crossing the mountains via the Bozeman Pass, as well as repeated attacks by Blackfeet.

Colter left the upper Missouri FUR TRADE in late 1810, traveling 2,000 miles down the Missouri alone in a dugout CANOE. On reaching St. Louis, he conferred with William Clark, providing him with important data about the newly explored regions around the Bighorn and Yellowstone Rivers, including such features as the passes through the Wind River Mountains and Teton Mountains of Wyoming. Information gleaned from Colter later appeared in Nicholas Biddle's 1814 publication of the Lewis and Clark journals. His tales of thermal activity in Wyoming also appeared in Washington Irving's 1837 book *The Adventures of Captain Bonneville*. Colter spent his remaining years farming in Missouri.

Although no definite record of his travels in the northern Rockies exists, John Colter is believed to have been the first non-Indian to explore west of the Continental Divide into the regions that now comprise Yellowstone National Park and Grand Teton National Park. As a guide to fur traders, he participated in the earliest commercial applications of the geographic data from the Lewis and Clark Expedition.

Columbus, Christopher (Cristoforo Colombo, Cristóbal Colón, Cristovão Colombo)

(1451–1506) *Italian mariner in the West Indies, South America, and Central America, in service to Spain*

Christopher Columbus was born in the northwestern Italian seaport city of Genoa into a family of weavers and cloth merchants. His father also operated a wineshop and sold cheeses. Columbus may have studied mathematics, astronomy, and natural sciences at the University of Pavia. More likely, starting in 1474, after serving an apprenticeship in the weaving trade, he began to sail the MEDITERRANEAN SEA on commercial voyages for his father. In 1476, he sailed with a merchant fleet bound for Lisbon and England. Shipwrecked off the south coast of Portugal after an attack by French naval forces, Columbus managed to reach the Portuguese shore, near Lagos, then went on to Lisbon, where he joined his brother, Bartholomew, a cartographer.

Columbus settled in Lisbon, where he and his brother became known as leading map dealers. In 1477, Columbus may have taken part in a voyage to ICELAND, where he could have heard traditional accounts of the VIKINGS of lands to the west.



Christopher Columbus (Library of Congress, Prints and Photographs Division [LC-USZ62-103980])



Christopher Columbus's flagship, the *Santa María* (replica) (Library of Congress)

In 1479, Columbus married Dona Filipa Perestrello e Moniz, daughter of a prominent Portuguese settler on the Atlantic island of Madeira. Soon afterward, he moved with his wife to Madeira, where he worked as a buyer of sugar

for Genoese merchants. He made several voyages along the coast of West Africa, possibly for the Portuguese–West African SLAVE TRADE, as far south as the Portuguese settlement of Elmina on the coast of present-day Ghana, the

southernmost point then known to Europeans. There, he heard reports from mariners of evidence of land lying westward across the Atlantic Ocean.

By the early 1480s, Columbus had developed a plan to sail to Japan or China. His idea, known as “Enterprise of the Indies,” had been influenced by his reading of PTOLEMY, MARCO POLO, and the geographic works of the Florentine cosmographer Paolo Toscanelli.

From his interpretation of Ptolemy’s ideas on LATITUDE AND LONGITUDE, Columbus believed the Earth to be smaller than was commonly believed at that time. Based on his readings of Marco Polo, Columbus also theorized that eastern Asia extended closer to western Europe than had been depicted by geographers. Moreover, to Columbus, Polo’s description of an island, known as CIPANGU, lying 1,500 miles offshore from Asia, made a westward crossing to that land seem even more feasible.

Toscanelli, with whom Columbus corresponded, provided him with a map of the Atlantic, known then as the Ocean Sea and not distinguished from the rest of the world’s oceans. On this chart appeared the fabled island—ST. BRENDAN’S ISLE—supposedly discovered by the medieval Irish monk SAINT BRENDAN, as well as the legendary island of “Antillia.”

Columbus also relied on religious writings to back up his assertion. In his studies of the book of the prophet Esdras in the Apocrypha, he had read that the Earth was six parts land and only one part ocean. This view, taken together with an overestimation of the size of Asia, led him to conclude that the east coast of Asia was less than 3,000 miles from the CANARY ISLANDS, a distance the ships of his day were regularly sailing in voyages to and from Africa.

When, in 1484, Columbus presented his plan to John II of Portugal, the king’s geographers determined that what he proposed was impossible. They correctly estimated the westward distance across the Atlantic between Europe and eastern Asia to be more than 10,000 miles, far too great for a seaward expedition to be practical. The next year, Columbus’s wife died, and soon afterward, still seeking support for his project, he left Portugal for Spain, taking with him his five-year-old son, Diego.

Columbus reached the tiny port town of Palos, where he left his son in the care of monks at a nearby monastery. He then traveled to Cordoba and presented his plan to the court of King Ferdinand II and Queen Isabella I. The Spanish monarchs also rejected his plan, although he had the support at court of the duke of Medina Celi. Columbus briefly returned to Portugal in 1488, where King John again showed interest in his proposal. Yet, that year, BARTOLOMEU DIAS returned to Lisbon and reported his finding of the CAPE OF GOOD HOPE and a possible sea route around Africa to India, making Columbus’s plan seem unnecessary.

Back in Spain in early 1492, Columbus sent his brother Bartholomew to France to seek the support of King Charles VIII and to England to seek that of King Henry VII. Meanwhile, the Spanish finance minister, Luis de Santangel, advised Queen Isabella that Columbus’s venture was worth backing since the possible returns were immense compared to the relatively small initial investment. At that time, there was a shortage of gold in Europe, providing commercial incentive for continued voyages of exploration. Moreover, Turkish MUSLIMS had closed off the overland SPICE ROUTE to the Far East. Isabella was also concerned with finding new converts to Christianity.

In April 1492, an agreement between Columbus and the Spanish Crown was reached, under the terms of which Columbus was to become governor of any uncharted islands he should locate; to receive 10 percent of any profit from the enterprise; and to be granted the title of admiral of the Ocean Sea. Additional backing for the expedition came from the Genoese merchant community in Seville.

Columbus had befriended the Pinzóns, a family of seafarers and shipowners from Palos de Moguer. With their help, he obtained the *Santa María* and two smaller vessels, the *Niña* and the *Pinta*. About 90 men were recruited from among the local mariners, with MARTÍN ALONZO PINZÓN in command of the *Pinta* and his brother VICENTE YÁÑEZ PINZÓN as captain of the *Niña*. Columbus, as captain general, sailed on his flagship, the *Santa María*, with JUAN DE LA COSA as the expedition’s chief pilot.

Columbus and his small fleet sailed from Palos de Frontera on August 3, 1492. He headed directly for the Canaries, where he stopped for repairs to one of the ships. Taking advantage of the prevailing northeast TRADE WINDS, he set out across the Atlantic on September 6. Although the next three weeks of sailing were uneventful, the fact that he was sailing westward into unknown seas alarmed many of his men, and, by the first week of October 1492, the crew of the *Santa María* was on the brink of mutiny, demanding that Columbus turn back. Meanwhile, Martín Alonzo Pinzón advised Columbus that land might be encountered if they turned more to the southwest, which they did. On October 12, 1492, at two o’clock in the morning, a shoreline was sighted under a moonlit sky.

Columbus landed on what he called San Salvador, naming it in gratitude to the Savior. This was one of the Bahamas, afterward known as Watling Island and called Guanahani by the Arawak (Taino) people (although some scholars theorize that Columbus first touched soil at Samana Cay, 65 miles to the southeast). Believing he had come upon one of the outlying islands of the EAST INDIES, Columbus concluded that the Arawak were “Indians,” a name that came to be used for the indigenous peoples of the Western Hemisphere. From the Arawak he learned that islands with more gold lay to the south and west.

Taking some of the local people as guides, Columbus sailed southward, sighting and naming the islands of Ferdinandanda (now Long Island) and Isabella (now Crooked Island) in the Bahamas. He came upon what he took to be the mainland of Asia, which in fact was the north coast of Cuba. While exploring eastward, Columbus lost contact with Martín Alonzo Pinzón, who had sailed off on the *Pinta* in search of gold. On Cuba, Columbus sent an exploring party inland, led by his interpreter, a Spanish Jew named Luiz de Torres, in the hope of making contact with the Chinese ruler, the Great Khan. On returning, the party reported contacts with more tribal peoples; Columbus therefore decided to sail onward in search of the civilizations of China, Japan, and India.

On December 5, 1492, after crossing the Windward Passage, Columbus reached the eastern end of a large island he believed to be part of Japan, and which he named Española (later known as Hispaniola, now comprising Haiti and the Dominican Republic). On Christmas Eve, 1492, while anchored off the north coast of the island, the *Santa María* was wrecked when it was swept aground. Columbus

and his crew received aid in unloading the vessel from the Arawak leader GUANCANAGARI and his people and soon established a small fort with the wreckage of the ship. Called Navidad, Spanish for “Christmas,” in honor of its being founded on that day, it was the first attempted European settlement in the Western Hemisphere since the explorations of the Vikings about 500 years earlier.

With only one ship remaining, Columbus decided to leave 40 men behind to establish a colony, planning to return for them on his next voyage. He set out for Spain on January 4, 1493, and soon encountered Martín Alonzo Pinzón and the *Pinta*. The ships were separated again in a storm near the AZORES. Columbus was compelled to put in at Lisbon for repairs before continuing to Palos de Frontera, which he reached on March 15, 1493. Although Martín Alonzo Pinzón had arrived earlier at a northern Spanish port, by royal order he had to await the return of Columbus before he was permitted to disembark and report his findings.

Columbus was given a triumphant welcome by King Ferdinand and Queen Isabella. He presented the Spanish



The landing of Christopher Columbus in the Americas (painting by John Vanderlyn) (*Library of Congress*)

monarchs with gifts of gold, parrots, and a number of Native Americans and reported that he had reached the outlying islands of Asia. Although he had sailed farther westward than any European had until that time, he was unaware that the lands he had found were part of an uncharted continent.

Less than six months later, Columbus embarked on his second voyage, in command of a fleet of 17 ships, among them the *Niña*, carrying an expedition of 1,200 soldiers and colonists, including artisans and farmers, with livestock, tools, and seeds. Departing from Cádiz on September 25, 1493, Columbus first sailed to the Canaries, then took a more southerly route across the Atlantic, arriving on November 3, 1493, at an island he called Dominica in the Windward Islands, where he encountered the Carib Indians, a warlike people.

Columbus then made his way northward through the Lesser Antilles, sighting and naming many islands, including Mariagalante and Guadeloupe, as well as St. Thomas and St. Croix in the Virgin Islands. He came upon the coast of another large island, Puerto Rico, then sailed for Hispaniola and his settlement at Navidad, which he reached on November 28, 1493. The fort, however, had been burned to the ground and its men had been killed by the Arawak. From Guanacanagari, Columbus learned that, in the course of the past year, the colonists had repeatedly abused the native peoples, leading them to retaliate.

Columbus then founded a new, larger settlement, farther to the east, which he named Isabella. Exploring parties were sent inland in search of gold. Leaving another of his brothers, Diego, in charge of the new colony, Columbus then returned to reconnoiter Cuba's south coast. He sailed almost to Cuba's western end at Cape San Antonio, where he erroneously surmised that the coastline continued westward and that Cuba was a peninsula of the Asian mainland. He then sailed back to Hispaniola, making the European discovery of Jamaica along the way.

From the settlement of Isabella, Columbus sent ALONSO DE OJEDA to explore the interior and subdue the Indians, who had become hostile in response to brutal treatment by the Spanish. Not finding an easy source of gold on Hispaniola, Columbus, in 1495, turned to enslaving the Native Americans, sending back 500 native women to Spain that year. This practice led to the sickness and death of many of the captives as well as the introduction into Europe of a particularly virulent strain of syphilis. Soon after the arrival of Bartholomew Columbus in 1496, who assumed command of the colony, Columbus left for Spain, leaving instructions to establish a city on the south shore of Hispaniola. This city became present-day Santo Domingo, the oldest inhabited city in the Americas.

After Columbus arrived back in Cádiz in June 1496, he had to wait two years before he could begin his next voy-

age. The delay, due in part to international problems in Europe, also stemmed from Queen Isabella's disapproval of his treatment of the Indians, whom she considered her subjects as well as candidates for conversion to Christianity.

Columbus embarked on his third voyage on May 30, 1498, sailing with six ships from Seville. In the Canaries, he sent half his fleet directly to Hispaniola, and, with the other three ships, sailed southward to the Cape Verde Islands, then southwestward across the South Atlantic. On July 31, 1498, he sighted an island he named Trinidad in honor of the Holy Trinity. From there, he continued southward into the Gulf of Pará, where he traded for pearls with the natives. Although he at first thought he had found another island, which he named the Island of Zeta, he soon decided, from the great volume of freshwater emptying into the sea off the Orinoco Delta, that he had come upon a mainland. After examining the Venezuelan coast westward, he sailed back to Hispaniola, arriving at Santo Domingo in September 1498, where he found the colony to be in revolt against his brother Bartholomew.

Because of continuing abuse and exploitation of the Indians, a new governor was appointed for Hispaniola, Francisco de Bobadilla, in 1500. On his arrival in Santo Domingo, he ordered Columbus and his brother arrested for their misconduct in administering the colony, sending them back to Spain in chains. Although he was not prosecuted, Columbus was never reinstated to his former office. Yet he was placed in command of a fourth voyage in 1502, the aim of which was to continue the search for gold and to push westward beyond Cuba in the hope of locating a passage to the Far East.

Columbus sailed from Cádiz on May 11, 1502, with a fleet of four ships and 140 men. On his return to the Caribbean, he first landed on the island of Martinique, then proceeded to Hispaniola, where he was forbidden to land. He headed westward and soon came upon the *Islas de la Bahía* (Bay Islands), an island group off the coast of Honduras. Soon afterward, he reached the mainland of CENTRAL AMERICA near present-day Trujillo, Honduras, where he encountered Maya Indians from the Yucatán. Exploring southward along the coasts of present-day Nicaragua and Costa Rica, he made contact with more Indians, from whom he received gold. By October 1502, he was off the coast of Panama. The Indians informed him that it was an isthmus, leading Columbus to believe he was sailing along the Malay Peninsula. He continued southward, in the hope of finding a strait to Malacca.

Columbus attempted to establish a colony on the coast of Panama at Santa María de Belén. By February 1503, however, he had lost one of his ships in a wreck and some of his men to Indian attacks and disease, and he decided to sail back to Hispaniola. Unfavorable winds drove him to St. Ann's Bay on the north coast of Jamaica. His ships in

disrepair, Columbus and his men were forced to remain there a year, until a rescue vessel arrived from Santo Domingo.

Columbus made no more voyages after his return to Seville in September 1504. Although he had become wealthy from his exploits, he spent his last years in disfavor with the Spanish court and in obscurity. He died at Valladolid on May 20, 1506. Some years later, his remains were moved to Santo Domingo.

In addition to the economic inducements for his voyages, Columbus's expeditions were in effect experiments, to prove or disprove his hypothesis about world geography—the distance of Asia and the size of the world. Along with most educated people of his time, he knew that the world was a GLOBE (albeit a pear-shaped globe in his view), and not flat; he did not set out to prove that the world was round as is commonly believed. Yet he wrongly maintained until his death that he had reached Asia, not realizing the far greater ramifications of his landings. At the heart of his contribution to the history of exploration was his idea to sail westward across the ocean.

Columbus's voyages had the immediate effect of inspiring many more expeditions, especially those of seafarers who had sailed with him, including Juan de la Cosa, Alonso de Ojeda, and Vicente Yáñez Pinzón. For the native peoples of the WEST INDIES, the sudden European contact brought about by Columbus's voyages soon wrought catastrophic results. Through disease, military conquest, forced labor, and the slave trade, the Indians of the Caribbean were virtually exterminated by the middle of the 16th century. There followed in the years to come massive displacement and cultural dispossession of native peoples in other parts of the Americas.

Christopher Columbus of course did not “discover” America. The Indians of the Americas had arrived from Asia thousands of years before. And the Vikings had crossed from Europe five centuries earlier, thus making the first known “discovery” of the Americas by a European people. Yet Columbus was the first to reveal the existence of the Americas to all of Europe, and, in so doing, drastically altered Europeans' view of the world. He had sailed hoping to prove that the world was smaller than it was, and, after 10 years of exploring, his findings revealed just the opposite, that the world was considerably larger, containing vast uncharted lands and seas. In addition to new geographic awareness, Columbus's expeditions brought back to Europe new crops, such as sweet potatoes, corn, and tobacco; and new technologies, such as the Arawak use of the hammock, which was adopted by Europeans in their ships, improving sleeping conditions for crews. His exploits spurred on the EUROPEAN AGE OF EXPLORATION and redirected the course of world events, making 1492 one of the most widely known dates in history and Columbus the most famous explorer.

Commerçon, Joseph-Philibert (Philibert de Commerçon) (1727–1773) *French physician and naturalist in the Pacific and Indian Oceans*

Joseph-Philibert Commerçon was born in Châtillon-les-Dombes, near Bourg, in eastern France. His father was a lawyer. He studied medicine at Montpellier in the south of France, becoming a physician in 1747.

During the next eight years, Commerçon pursued his interest in natural history, especially botany, studying under the direction of French botanist Bernard de Jussieu and the Swedish botanist Carolus Linnaeus (Karl von Linné). In 1755, he was commissioned by the Swedish government to undertake a study of marine life in the MEDITERRANEAN SEA.

By 1767, he had become prominent in French scientific and philosophical circles; that year, he was appointed royal naturalist and botanist and he accepted a position as doctor and naturalist with LOUIS-ANTOINE DE BOUGAINVILLE's expedition around the world. He sailed on the expedition's supply vessel *Étoile*, which left Rochefort in February 1767.

Commerçon's first scientific work on this expedition was undertaken in the Falkland Islands, where he found several previously unknown species of sea birds. He also studied the king penguin and attempted, without success, to bring a living specimen back to Europe. Near Montevideo in present-day Uruguay, he studied a popular tropical plant, bestowing upon it the name *Bougainvillea* after the expedition's leader. A marine mammal he observed off the South American coast was subsequently named by French marine zoologists as Commerçon's dolphin.

In the STRAIT OF MAGELLAN, Commerçon studied many species of plants then unknown to science; he also observed an animal known as a colpeo or Magellan's wolf.

Commerçon's wife of two years had died in childbirth in 1762, and he had hired JEANNE BARET as governess for his young son. Commerçon had brought Baret on the voyage as his scientific assistant, having left the boy in France in the care of a relative. Disguised as a man, she managed to conceal her true gender from the crew until the truth was discovered on Tahiti.

At Batavia, present-day Jakarta, Indonesia, Commerçon discovered and named a plant known as the hortensia. He left the expedition at Île de France (present-day Mauritius) in the Indian Ocean in December 1768. In 1770, he sailed to Madagascar, where he undertook an extensive study of that island's flora and fauna. After six months on Madagascar, he returned to Île de France and worked at organizing his botanical collection. Developing pleurisy, he died there in March 1773.

Joseph-Philibert Commerçon was one of the first scientists to circumnavigate the world. He sent back to France a collection that included thousands of specimens of plants and animals, the majority of which were unknown to science. Ironically, Commerçon had written a *Martyrology of*

Botany, which recounted the lives of naturalists who had died in their pursuit of scientific knowledge. Published after his death by fellow French scientist Joseph Lalande, it was updated to include a chapter on Commerson himself.

Condamine, Charles-Marie de la See LA
CONDAMINE, CHARLES-MARIE DE.

Conti, Niccolò di (ca. 1395–1469) *Italian traveler in southern Asia*

Niccolò di Conti was born in Chioggia, an Italian fishing port on the Adriatic near Venice. He grew up to be a Venetian merchant.

In about 1419, Conti traveled to Damascus in present-day Syria, where he spent several years learning Arabic. From there, he traveled southward to Baghdad, then proceeded to the southern end of the Persian Gulf at Hormuz. After making a study of the life and culture of peoples along coastal Persia (present-day Iran), as well as learning the Persian language, he continued eastward across the Arabian Sea to India and eventually reached the Bay of Cambay north of Bombay.

In his subsequent journey across the Indian subcontinent, Conti visited the Malabar Coast, where he saw the shrine of St. Thomas; and, in the Madras region of southeastern India, he visited the ancient city of Vijayanagar. He then traveled north and east to the GANGES RIVER, and, from there, continued eastward to the Irrawaddy River region of Burma (present-day Myanmar). Crossing into the Malay Peninsula, he sailed to ports on the Indonesian islands of Java and Sumatra.

Conti's return to Italy was mostly by sea, during which he visited ports in Southeast Asia and stopped at Ceylon (present-day Sri Lanka). From Calicut on the Malabar Coast of India, he sailed to the island of Socotra, south of the Arabian Peninsula. After reaching Aden, he traveled up the RED SEA along the Arabian coast to Jidda.

In the course of his travels in Asia, Conti had been compelled to embrace Islam. He also had married an East Indian woman, who bore him four children. Upon reaching Cairo, on his way back to Italy, two of his children, as well as his wife, died of the plague.

In 1444, after 25 years in southern Asia, Conti finally returned to Venice. He converted back to Catholicism and reestablished himself as a merchant. His account of his travels in Asia was recorded by Giovanni Francesco Poggio Bracciolini, papal secretary to Pope Eugenius IV.

Niccolò di Conti was one of the few Europeans to visit India and the Far East since 1368, at which time Christian missionaries had been expelled from China. The story of his travels, as recorded by Poggio Bracciolini, provided Eu-

ropeans with updated information of life and culture in Asia in the later Middle Ages, and inspired the expeditions by Portuguese mariners, who began sailing from Europe to India at the close of the 15th century.

Cook, Frederick Albert (1865–1940)
American physician, polar explorer

Frederick Cook was born near Callicoon in southeastern New York State, the son of a doctor who had emigrated from Germany. When he was five, his father died, and he moved with his family to Brooklyn, New York. Cook went on to study medicine at Columbia University and continued his medical training at New York University, which awarded him an M.D. in 1890.

In 1891, Cook took part in his first polar expedition, accompanying ROBERT EDWIN PEARY to GREENLAND's Inglefield Gulf. Serving as the expedition's ethnologist and surgeon, he made a study of the Greenland Inuit, concentrating on their hunting and survival skills. His medical ability was called upon during this expedition when he treated Peary for a broken leg, resulting from a shipboard accident.

After taking part in two more expeditions to Greenland, Cook joined the Belgian Antarctic expedition under the command of ADRIEN-VICTOR-JOSEPH DE GERLACHE DE GOMERY. He sailed to Tierra del Fuego with Gerlache on the *Belgica* in 1897. Accompanying him was the Norwegian polar explorer ROALD ENGELBREGT GRAVNING AMUNDSEN. The *Belgica* was trapped in the Antarctic ice for more than 13 months, and the crew was stricken with SCURVY. Largely through the resourcefulness of Amundsen and Cook, the ship was finally freed and the crew members nursed back to health. Cook and the others on this expedition were among the first men to winter south of the ANTARCTIC CIRCLE.

In 1906, Cook led an expedition to Alaska, where he made an attempt at scaling MOUNT MCKINLEY. After most of the other members of his party turned back, Cook persisted in his efforts with only one other man. In September 1906, he reportedly reached the summit, becoming the first man to climb to the top of North America's highest peak.

Cook's next polar exploit was an attempt to reach the NORTH POLE itself. With the financial support of the Explorers Club, he sailed from Gloucester, Massachusetts, in July 1907 on a yacht belonging to his friend John R. Bradley. At a point on the northwest coast of Greenland called Anootok, not far from Etah, where Peary later established his base camp, Cook set out with a party of Inuit and crossed Kane Basin to Ellesmere Island. From the northern end of Ellesmere Island, he reached Cape Stallworthy, the northernmost point of Axel Heiberg Island. On March 17, 1908, accompanied by only four Inuit, Cook embarked on the last leg of the trek to the Pole. Two of the Inuit soon turned back. Cook continued northward and, as he later



Frederick Cook (Library of Congress)

claimed, he reached the North Pole on April 21, 1908. En route, he reportedly sighted a landmass that he called Bradley Land, although a subsequent aerial reconnaissance of the North Pole was unable to verify this finding. Ice conditions forced Cook and his two Inuit companions to winter on Cape Sparbo on Devon Island. He then made his way back to Anootok, Greenland, arriving there in early April 1909.

During Cook's return to Greenland, Peary had set out on his own journey to the North Pole. At Anootok, Cook encountered Peary's ship. Aboard was American financier and sportsman Harry Payne Whitney, husband of American heiress and artist Gertrude Vanderbilt Whitney. Entrusting his scientific data to Whitney, Cook headed overland to an ice-free port on the Greenland coast, from where he sailed to Copenhagen, Denmark. Five days later, Peary returned from his successful trek to the Pole and immediately cast doubt on Cook's claimed achievement.

In Denmark, and later in New York City, Cook was hailed as the first man to reach the North Pole. However, soon after Peary returned to the United States, a controversy erupted over whether Cook had actually accomplished the journey. Peary had not permitted Whitney to bring Cook's scientific data back to the United States, and its whereabouts has never been revealed. Although Peary's astronomical and navigational observations indicated that he had been at the Pole, the University of Copenhagen, charged

with settling the question, was unable to prove conclusively whether Cook had preceded Peary there.

The debate over who had first reached the North Pole raged on. Peary alleged not only that Cook failed to reach the Pole, but also that his prior accomplishment on Mount McKinley was a fraud as well. Noted explorers of the day were split on the issue. Lacking evidence, Cook's claim was discredited. He was accused of falsifying records that supported his claim, and he was expelled from the Explorers Club.

In the years that followed, Cook traveled to Europe and Argentina. Upon his return to the United States, he appeared in vaudeville shows as an acrobat and mime. Despite the doubts cast on his North Pole expedition, his 1911 book, *My Attainment of the Pole*, became a bestseller.

In the early 1920s, Cook was implicated in an illegal financial scheme involving oil leases in Texas. He was found guilty by a federal court of mail fraud in 1925 and was sentenced to 14 years in prison. After serving five years at the federal penitentiary in Leavenworth, Kansas, he was released on parole, and in 1940, shortly before his death, he was pardoned by President Franklin Roosevelt.

Dr. Frederick Cook is one of the most controversial figures in the history of exploration. Whether he reached the North Pole is still a subject of contention.

Cook, James (Captain James Cook) (1728–1779) *British naval officer in the Atlantic and Pacific*

James Cook was born in Marton-in-Cleveland, an agricultural village in Yorkshire, England, where his parents were farm workers. At the age of 16, he was apprenticed to a dry goods merchant in the fishing village of Staithes. About two years later, Cook moved to Whitby, the English seaport on Yorkshire's North Sea coast, where he began his seafaring career as shipwright and later as a ship's boy on the *Freelove*, which carried coal down the coast from Whitby to London. Over the next few years, Cook studied mathematics and astronomy on his own and developed his skills as a navigator.

In 1755, at the beginning of the Seven Years War between England and France, Cook enlisted in the Royal Navy as an able-bodied seaman, serving on the HMS *Eagle* under Sir Hugh Palliser. Palliser recognized Cook's talent for navigation and seamanship and helped to advance his naval career.

In 1759, Cook undertook a detailed navigational survey of the St. Lawrence River and its estuary. His charts were invaluable in the British landing and victory at Quebec that September.

Cook's expertise as a navigator and hydrographer became well known in 1760, with the publication of his *New Chart of the River St. Lawrence*. After Great Britain gained control of Canada in 1760, Palliser was appointed governor

of Newfoundland, and Cook continued to conduct coastal surveys of Newfoundland. He charted the northern approach to the Gulf of St. Lawrence through the Strait of Belle Isle, as well as the southern route through Cabot Strait. In spring 1764, Cook was given his first Royal Navy command, the schooner *Grenville*. Two years later, in July 1766, he took the *Grenville* to the Newfoundland coast to observe a solar eclipse. In 1768, the findings of this expedition were published by the ROYAL SOCIETY.

At this time, Great Britain had political and commercial, as well as scientific, motives to explore the Pacific Ocean. The BRITISH EAST INDIA COMPANY had achieved a dominant commercial and political position in the Bengal region of India by 1765. With the military situation in North America stabilized, the British turned their attention to seeking new trade routes to Asia. France, Britain's long-time military and commercial rival, was sending out expeditions to the South Pacific, providing further impetus for British exploration.

In early 1768, the Royal Society in conjunction with the Royal Navy, organized an expedition to Tahiti in the South Pacific. The official purpose of this mission was to observe an astronomical event, the Transit of Venus, on June 3, 1769, and thereby to calculate the distance between the Earth and the Sun and obtain data for accurate determinations of longitude. A second scientific motive, later revealed, was to locate what was thought to be the GREAT SOUTHERN CONTINENT, also known as Terra Australis. Geographers based their belief in its existence on the theory that the great continents of the Northern Hemisphere had to be counterbalanced with corresponding landmasses in the Southern Hemisphere. Earlier Dutch and Portuguese explorations of Australia and the EAST INDIES had been inconclusive in determining whether or not such a landmass existed, and newly developed navigational techniques had not yet been employed in the higher latitudes of the Southern Hemisphere.

Originally, Alexander Dalrymple, a fellow of the Royal Society, who later became the hydrographer for the British East India Company, had planned to lead the Tahiti expedition. Because he was not a seafarer, however, British naval authorities declined to grant him official command, leading to his withdrawal from the project and Cook's appointment instead.

A former coal ship from Cook's home port of Whitby, the *Endeavour*, was refitted for the voyage. With a crew of 94 men, including sailors, marines, and scientists, the *Endeavour* departed Plymouth on August 26, 1768, sailing southward to the east coast of South America and putting in at Rio de Janeiro. The expedition then proceeded southward along the coast to Tierra del Fuego and CAPE HORN.

Among the scientists aboard the *Endeavour* during Cook's first Pacific expedition were naturalists SIR JOSEPH

BANKS and DANIEL CARL SOLANDER. Cook joined Banks and Solander and their assistants in periodic sojourns into the South American coastal regions, including a study of Tierra del Fuego and its native peoples.

By April 1769, Cook had reached the central Pacific and put in at Tahiti. Good relations with the Tahitians were established, although there were periodic clashes, usually stemming from theft by the natives of the expedition's supplies and equipment. The islanders also stole nails from the underside of the hull for iron.

A temporary observatory was set up on Tahiti, called Fort Venus. The observation of the Transit of Venus, the passage of that planet across the face of the sun, was successfully completed in early June 1769, and Cook sailed southward from Tahiti, naming the island group of which it was a part the Society Islands, perhaps in honor of the Royal Society. Other accounts report that Cook named this chain the Society Islands because, as he wrote in his journal, "they lay contiguous to one another."

Having followed a southwestward course in search of the Great Southern Continent, Cook, on October 7, 1769, reached the east coast of NEW ZEALAND's North Island. He explored northward, rounded the island's northern tip at



James Cook (Library of Congress)

North Cape, then headed along the west coast. By the last week of January, after several anchorings near shore, the expedition came upon Queen Charlotte Sound, which had been thought to be a bay, according to earlier reports by Dutch navigators. On January 23, after surveying the area from a hilltop, Cook determined that it was actually a strait dividing New Zealand into two large islands, dispelling earlier Dutch reports that New Zealand was the western edge of a larger landmass. Sir Joseph Banks soon dubbed the passage Cook Strait in the captain's honor, and, on January 31, 1770, Cook officially claimed both islands in the name of the British Crown.

By the end of March 1770, Cook had completed his circumnavigations of both of New Zealand's main islands, during which his officers had made detailed charts of more than 2,400 miles of coastline. Although the Great Southern Continent remained elusive, Cook decided to sail for home. He had considered carrying on the search for Terra Australis along the way, but that would have required sailing southward into the high southern latitudes during the approaching Southern Hemisphere winter months. Moreover, the *Endeavour*, after two years at sea, was in no condition to withstand the storms so prevalent around Cape Horn at that time of year. Accordingly, Cook decided on a westward course back to England, by way of the Indian Ocean and the CAPE OF GOOD HOPE. On March 31, 1770, the *Endeavour* embarked from its anchorage in Cook Strait (near present-day Wellington, New Zealand) and sailed westward into the Tasman Sea.

Cook planned to sail first to Van Diemen's Land (present-day TASMANIA) and from there try to locate the north coast of New Holland and follow it westward into the Indian Ocean. Using copies of charts originally made by Dutch navigator ABEL JANSZON TASMAN nearly 130 years earlier, he also hoped to determine if Van Diemen's Land was connected to New Holland, as was then thought, or was actually a separate island. As it turned out, gale-force winds from the south drove the *Endeavour* northward, and instead of reaching Van Diemen's Land, on April 19, 1770, Cook came in sight of the mainland of southeast New Holland (Australia) at Cape Everard on the coast of what is now Victoria.

Cook then followed the coastline northward, discovering, on April 28, 1770, a large natural harbor. At first, Cook named it "Stingray Bay," when a reconnaissance revealed it was shaped like that marine creature. Moreover, during their stay the crew managed to catch and eat more than a few large stingrays, which the bay seemed to contain in abundance. Within a short time, however, Cook decided to change the name to Botany Bay when his scientists reported finding a wide variety of new plants there.

After a week at Botany Bay, Cook and the *Endeavour* continued northward. Fifteen miles up the coast they came upon another bay, which they did not explore, although Cook named it Port Jackson, after the then-current secretary of the Admiralty. Also known as Sydney Harbor, the settlement of

Sydney was founded on its shores in 1788. One of the earliest penal colonies in Australia, its name had been adopted from Cook's patron, British nobleman Viscount Sydney.

Cook's northward course took him into the waters between the Australian mainland and the Great Barrier Reef, a 1,250-mile-long coral formation that parallels Australia's northeast coast. On June 11, 1770, off Cape Tribulation in present-day Queensland, the *Endeavour* became stuck on the reef. Although the hull had been punctured, the protruding coral spike broke off from the reef, partially plugging the hole.

The *Endeavour* was still leaking badly, however, and it took two days for the crew to free the vessel from the reef. Nine days later, they reached a suitable anchorage at the mouth of a river that Cook named the Endeavour River after his ship. They remained there for the next six weeks to make extensive repairs to the vessel's underside.

When the voyage resumed, Cook cautiously continued northward, mindful of the hazards of the reef. On August 21, 1770, he reached Cape York, the northernmost point of the Cape York Peninsula. Before rounding it to the west, he went ashore on August 23, 1770, and took possession of the newly located east coast of New Holland in the name of King George III, naming the region New South Wales.

Cook then left Australian waters and headed for Torres Strait, which separates Australia from New Guinea and the Indonesian Archipelago. The *Endeavour* anchored for additional repairs at Batavia, present-day Jakarta, on Java, then headed across the Indian Ocean. In spring 1771 the *Endeavour* reached the Cape of Good Hope, where additional crewmen were obtained to replace those who had died of disease contracted in Batavia. After stopping at the island of St. Helena in the South Atlantic Ocean, the *Endeavour* sailed northward along the west coast of Africa, reaching England in July 1771.

Cook's first expedition to the South Pacific had taken nearly three years and had carried out a CIRCUMNAVIGATION OF THE WORLD. In addition to acquiring important astronomical data, its participants had learned much concerning the geography of New Zealand and Australia. Cook recorded observations on the life and customs of the South Pacific people he had encountered, including the Polynesians of Tahiti, the Maori of New Zealand, and the Aborigines of Australia. Banks, Solander, and their staff also brought back a wealth of scientific data about plant and animal species then unknown to Europeans, including the first specimens of kangaroo and other marsupials from Australia. The voyage also proved that a strict dietary regimen of fresh fruits and vegetables, as well as sauerkraut, a preservable food high in vitamin C, prevented outbreaks of SCURVY among the crew.

Still believing that Terra Australis might exist, the Royal Society and Royal Navy organized a second expedition to the South Pacific under Cook. On July 11, 1772, two ships, the *Resolution*, commanded by Cook, and the *Adventure*,

captained by TOBIAS FURNEAUX, departed Plymouth. Cook planned to head for Antarctic regions by way of the Cape of Good Hope and circumnavigate the world in the high southern latitudes, a route that could not help but bring him in contact with the Great Southern Continent.

After stopping at the AZORES and the Cape Verde Islands off Africa's west coast, Cook and his ships sailed southward, reaching Cape Town in November 1772. German naturalist JOHANN REINHOLD FORSTER and his son, JOHANN GEORG ADAM FORSTER, led the scientific contingent of the expedition. They made a brief investigation of the plant and animal life around Cape Town. The ships then sailed southward toward the Antarctic Ocean later in November, crossing the ANTARCTIC CIRCLE on January 17, 1773, the first such penetration in recorded history.

By late January 1773, Cook had decided that further exploration toward the Pole would be too hazardous because of the mammoth icebergs and the impassable frozen Antarctic waters. About this time, Cook's ship, the *Resolution*, lost sight of the *Adventure*. A rendezvous in New Zealand's Cook Strait had been prearranged in anticipation of such an occurrence. Cook sailed the *Resolution* north and reached southern New Zealand in March 1773, catching up with the *Adventure* about six weeks later at Cook Strait. In the meantime, Furneaux had explored Tasmania and made the European discovery of Adventure Bay.

The two ships sailed eastward across the Pacific to spend the rest of the season exploring the Pacific islands lying between New Zealand and the southern tip of South America. Proceeding northeastward, Cook and his ships reached Tahiti in August 1773, where he was welcomed by native leaders he had met on his first expedition. From Tahiti, Cook headed westward and came upon Tonga in an archipelago he named the Friendly Islands. From there, the ships returned to New Zealand. In late October 1773, the *Resolution* and *Adventure* were again separated, this time by a storm off the coast of New Zealand. The *Adventure* missed Cook by six days at a rendezvous point at Cook Strait and returned to England. With only the *Resolution*, Cook again headed into Antarctic waters in late November 1773. Blocked by ice, he was forced to head northward in February 1774, after reaching the southernmost point at 71°11' south latitude and unknowingly completing a circumnavigation of Antarctica.

In 1774, Cook relocated and correctly charted many South Pacific Islands that had not been visited since Portuguese, Dutch, and Spanish explorations of the previous two centuries. Among these were Easter Island, the Marquesas, the New Hebrides, and other islands in the Polynesian and Melanesian archipelagoes. The expedition returned to Tahiti in April, then headed westward across the Pacific to New Zealand. He also made the European discovery of New Caledonia. In November 1774, Cook made his final exploration toward Antarctic regions, but was once again turned back by the ice. Sailing for Tierra del Fuego at the tip of

South America, Cook was in the South Atlantic by early 1775 and soon made the European discovery of South Georgia Island and the South Sandwich Islands. He then headed back to Cape Town, then northward to England, arriving at Spithead on July 30, 1775.

With his circumnavigation of Antarctica, Cook brought back proof that there was no large habitable Great Southern Continent. In addition, he had added considerably to the geographic knowledge of the South Pacific. Longitudinal measurements were made with greater accuracy with the aid of the newly developed chronometer, designed by John Harrison, which kept a record of Greenwich Mean Time.

Both the British Admiralty and the Royal Society were pleased with the results of Cook's second voyage. He was received by King George III, promoted to the rank of ship's captain, and admitted as a member of the Royal Society. He was also granted the position as director of Greenwich Hospital, a post requiring little responsibility but with a substantial salary.

At the urging of the HUDSON'S BAY COMPANY, an expedition was arranged in search of an all-water route across the top of the North American continent, the long-sought NORTHWEST PASSAGE. In July 1776, Cook left England aboard the *Resolution*, on which he had sailed on his second voyage to the Pacific. The master of the ship for this journey was WILLIAM BLIGH, who would later gain notoriety as the captain of the HMS *Bounty*. CHARLES CLERKE also accompanied the expedition in command of the *Discovery*.

The expedition headed for the Pacific via the Cape of Good Hope, reaching the coast of Tasmania in late January 1776. Following a stopover at New Zealand, Cook headed eastward across the South Pacific. Along the way, he charted an archipelago now known as the Cook Islands. He also revisited the Friendly Islands and Tahiti.

In early 1778, Cook came upon the Sandwich Islands, known today as the HAWAIIAN ISLANDS. His scientific team made a study of the native peoples, as well as the plants and animals in the region. Heading north and east, the ships were off the west coast of Canada at Vancouver Island's Nootka Sound by early March 1778. The crew had contact with the Nootka Indians and learned that an abundance of valuable sea otter pelts were available for trade. The expedition headed northward to the Gulf of Alaska and explored Prince William Sound, then reached Unalaska Island in the Aleutian Islands in early July 1778. Cook pushed northward through the BERING STRAIT, stopping for a time on Siberia's Chukchi Peninsula. After reaching the northernmost latitude of 70° 44' north, where ice prevented further advance, he decided to head southward for the Sandwich Islands to spend the winter.

In January 1779, Cook and his expedition were back in Hawaiian waters. He undertook further explorations of the islands, including Maui and the largest island, Hawaii. On February 14, 1779, he was killed in a skirmish with native peoples at Kealakekua Bay on Hawaii.

Clerke assumed command of the expedition and returned northward to the North American coast to search for the Northwest Passage. Although no such route was found, the expedition's crew were able to trade with the Nootka for pelts, which they then took to China and sold at a spectacular profit. When Clerke died that same year, JOHN GORE assumed command. The *Resolution* and *Discovery* headed home by way of the Indian Ocean and the Cape of Good Hope, reaching England on August 23, 1780.

James Cook's three voyages of exploration had not only determined that there was no Great Southern Continent other than Antarctica but also cast doubts on the existence of a practical Northwest Passage across North America. Moreover, his travels had led to a variety of scientific discoveries in navigation and natural history. His explorations of Australia and New Zealand provided the basis for Great Britain's claim to these lands, where settlement would occur at a rapid rate in the years to come.

Cooper, Thomas Thornville (1839–1878)

British trader, traveler in China

In 1868, Thomas Cooper attempted to establish a trade route linking Shanghai, China, with northern Burma and India. That year, with two Chinese companions, he traveled from Shanghai to the south-central Chinese city of Batang. From there, he made his way to the upper course of the YANGTZE RIVER (Chang) then traveled southward along the upper Yangtze toward the Burmese border, but he was unable to go beyond the city of Atuntze, north of the present border with Vietnam.

Thomas Cooper was among the first Europeans to visit the interior of China following the loosening of the Chinese government's travel restrictions on foreigners in 1860. Although he did not reach his intended destination, he left an account of his adventures that described then little-known geographic features of southern China.

Coronado, Francisco Vásquez de (Francisco Vázquez de Coronado) (ca. 1510–1554)

Spanish conquistador in the American Southwest

Francisco de Coronado was born in Salamanca, Spain, a university town in the western province of León. At the age of 25, he was appointed to the staff of ANTONIO DE MENDOZA, Spain's first viceroy to the newly conquered Mexico, and he traveled to Mexico City with Mendoza in 1535. By 1539, after his marriage to Beatriz de Estrada, the daughter of a wealthy Spanish colonial family, Coronado was governor of the newly organized province of Nueva Galicia on the west coast of Mexico.

In 1536, ÁLVAR NÚÑEZ CABEZA DE VACA and the slave ESTEVANICO returned to Mexico City from their eight years of wandering in the American Southwest, with tales of cities

of great wealth to the north. Their accounts of CIBOLA seemed to coincide with the stories of the Seven Cities of Antillia, which, according to legend, had been established in the eighth century by seven Portuguese bishops who had somehow crossed the Atlantic Ocean. Three years later, under the sponsorship of Mendoza and Coronado, the Franciscan friar MARCOS DE NIZA and Estevanico were dispatched northward to locate this fabled land of wealth. In 1539, the expedition explored present-day southern Arizona. Estevanico was killed by the Indians, but Niza returned to Coronado in Nueva Galicia with reports that he had indeed seen a golden city.

Mendoza soon mounted a massive military expedition to claim these riches for Spain under Coronado's leadership. In February 1540, Coronado led a force of more than 300 Spanish CONQUISTADORES, 800 allied Indians, and nearly 1,000 African and Indian slaves northward from the Nueva Galician town of Compostela on the west coast of Mexico, north of Puerto Vallarta. The force reached the port of Culiacán inland from the mouth of the Gulf of California. A seaward expedition, commanded by HERNANDO DE ALARCÓN, left the nearby port of Altata with three ships and sailed northward into the gulf, hoping to reach Cibola via the mouth of the COLORADO RIVER.

In April 1540, Coronado led an advance party of about 100 soldiers and Indians from Culiacán along the Sierra Madre into the Sonora region of northwestern Mexico. This group crossed into the present-day United States, near the site of present-day Bisbee, Arizona, in early summer 1540.

On July 7, 1540, Coronado and his army came upon the Zuni pueblo of Hawikuh in what is now western New Mexico, the settlement espied by Niza on his earlier expedition. Hawikuh, soon captured by the Spaniards, proved to have no gold or other riches. Niza accompanied one of Coronado's lieutenants, MELCHOR DÍAZ, back to Mexico with instructions that the rest of the expedition proceed northward.

Díaz reached the main part of the Spanish force at Ures in Sonora, Mexico, then headed westward to make contact with Alarcón and his ships on the Colorado River. Díaz and his party reached the confluence of the Gila and Colorado Rivers but were unable to find the Spanish fleet. They soon found a message from Alarcón informing them that the naval force, after sailing up the Colorado River for a distance of 50 miles, had been unable to meet up with Coronado and had returned to Mexico. Díaz then crossed the Colorado River and explored the plateau regions north of the Gulf of California. He was injured en route in an accident with a Spanish lance and soon died.

Coronado had meanwhile set up his headquarters at Hawikuh. On July 15, 1540, he sent out an expedition to the northwest under PEDRO DE TOVAR, accompanied by Friar JUAN DE PADILLA, to search for another of the fabled cities, still hoping to find gold. Tovar came upon the Hopi Indian settlement of Awatovi, in what is now eastern Arizona. After



Francisco Vásquez de Coronado's march through the American Southwest (painting by Frederic Remington) (Library of Congress)

conquering the pueblo, he learned from the subjugated inhabitants of a great river to the west, probably the Colorado.

Coronado dispatched another officer, GARCÍA LÓPEZ DE CÁRDENAS, with a small force to the north and west. In mid-September 1540, López de Cárdenas and his men reached the rim of the Grand Canyon, the first Europeans to see this natural wonder.

At about the same time, another of Coronado's men, HERNANDO DE ALVARADO, reached the Acoma Pueblo of the Keres Indians, west of present-day Albuquerque, New Mexico. Alvarado and his party subdued its people, then headed eastward to the Indian pueblos of the upper Pecos River, near present-day Las Vegas, New Mexico. At the Pecos pueblo, Alvarado encountered two Plains Indians held captive, Ysopete and the TURK. The Turk informed Alvarado of a tribe of Indians far to the north and east who lived in towns resplendent with gold and jewels. Although Ysopete revealed the Turk's tales as lies, Alvarado took both of them back to Coronado in the hope that they would lead the Spaniards to this wealthy Indian civilization, identified as QUIVIRA.

In winter 1540–41, Coronado had moved his headquarters east to the Indian settlement of Tiguex on the Rio Grande, just north of what is now Albuquerque. Because of

the Turk's reports, Coronado, in spring 1541, led his expedition eastward into the northern panhandle of present-day Texas. He followed the Red and Canadian Rivers across the Staked Plains, making the European discovery of the Palo Duro and Tule Canyons. In the course of this journey, Coronado and his men became the first Europeans to encounter the vast buffalo herds of the Great Plains and witness how the Plains Indians hunted them.

Near Palo Duro Canyon, Texas, Coronado and an advance party of about 42 men turned northward through the western part of present-day Oklahoma, entering present-day Kansas. They crossed the Arkansas River, somewhere near present-day Dodge City, and came upon what is thought to have been Wichita Indian villages. After exploring the plains as far as present-day Lindsborg in central Kansas, Coronado decided he had been deceived by the Turk. It is theorized that the guide had used the Spaniards as a means to reach his home. Other sources suggest that the Turk had misunderstood the Spaniards, believing they would be interested in visiting the Pawnee, a people of the southern plains known to other tribes for the power of their medicine. Coronado had the Turk strangled for his apparent deception and an alleged attempt to incite the Pawnee against the Spanish, and began the long trek back to Tiguex.

The conquistadores spent the winter of 1541–42 at the Tiguex pueblo near present-day Albuquerque. In December 1541, Coronado suffered an injury when he fell from his horse. Weakened by this mishap, he led the expedition southward to the east shore of the Gulf of California, then proceeded to Compostela. He arrived in spring 1542, in time to take part in suppressing an Indian rebellion in Nueva Galicia known as the Mixtón War.

Charges of official misconduct were lodged against Coronado, stemming from his summary execution of the Turk and his failure to claim and occupy all the regions he had explored, although some of the priests in his party did remain behind to proselytize among the Pueblo Indians. In 1544, Coronado was dismissed from his post as governor of Nueva Galicia. Following an official inquiry, he was acquitted of any wrongdoing, and he spent the remainder of his life as a colonial administrator in Mexico City.

Although Francisco de Coronado's two-year expedition yielded no golden cities for Spain, his explorations brought back much information concerning the extent of the lands north of Mexico. His men were the first known Europeans to see the Grand Canyon, which was not visited again by Spaniards until the explorations of FRANCISCO TOMÁS HERMENEGILDO GARCÉS in 1776. The tribes of the Southwest also had their first contact with Europeans as a result of Coronado's quest. Horses that escaped from the Spanish were captured and used by the Native Americans, beginning the transformation of Plains Indian culture. In addition, the naval arm of the expedition, under Hernando de Alarcón, determined that Baja California was not an island but actually a peninsula. At the same time Coronado was seeking Quivira in Oklahoma and Kansas in spring 1541, another Spanish explorer, HERNANDO DE SOTO, was exploring the lower MISSISSIPPI RIVER region of present-day Arkansas less than 500 miles away.

Côrte-Real, Gaspar (Gaspar Côrte Real, Gaspar Côrtereal, Gaspar Côrterreal)

(ca. 1450–ca. 1501) *Portuguese mariner in the northern coastal regions of North America, brother of Miguel Côrte-Real*
Gaspar Côrte-Real was born in the Algarve region of southern Portugal, the youngest son of João Vaz Côrte-Real. According to some sources, his father may have been a member of a joint Portuguese-Danish expedition to GREENLAND and Newfoundland as early as 1472, supposedly sponsored by Alfonso V of Portugal and Christian I of Denmark. Documentation of this pre-Columbian voyage across the North Atlantic Ocean dates back only to the mid-1520s and cannot be authenticated. Nevertheless, as early as 1474, João Vaz Côrte-Real was named by the Portuguese crown as Discoverer of La Terra do Bacalhao (land of the codfish), which suggests that he may have explored as far as the fishing grounds between Greenland and Newfoundland.

In 1474, Gaspar's father was appointed military leader of Terceira, one of the AZORES, about 900 miles west of Portugal. As a branch of the aristocratic da Costa family, the Côrte-Reals were well connected, and, during the 1490s, Gaspar became a gentleman of the Portuguese court and a friend of King Manuel I. Following his father's death, he assumed the office of deputy captain of Terceira in 1497.

In 1499, Gaspar Côrte-Real may have undertaken a transatlantic expedition at his own expense. During this undocumented voyage, he supposedly located the fabled STRAIT OF ANIAN, the long-sought-after route through the North American continent to the Orient. Scholars have speculated that Côrte-Real's 1499 voyage took him along the North American coast, from the Gulf of St. Lawrence to the Gulf of Mexico.

By May 1500, Côrte-Real had moved to Lisbon, where he was given official sanction by Manuel I to undertake a voyage of exploration across the Atlantic, probably because of reports of newly explored lands brought back by JOHN CABOT and SEBASTIAN CABOT. There is some evidence to suggest that the same syndicate of merchants in Bristol, England, who sponsored the Cabots may have also provided financing for Côrte-Real's expedition.

Sailing from Lisbon, Portugal, in May 1500, Côrte-Real took his ship northward to ICELAND. He navigated through the Denmark Strait but was turned back by icebergs. The expedition then headed southward and rounded Cape Farewell at the southern tip of Greenland. Sailing northward along Greenland's southwest coast, the Portuguese encountered the remnants of a Norse colony. Côrte-Real continued north along the west coast of Greenland into the Davis Strait, near or beyond the ARCTIC CIRCLE, near the present-day settlement of Godthaab. But floating ice proved too much of an obstacle, and the expedition turned back southward, arriving in Lisbon in fall 1500. JOÃO FERNANDES also may have explored for Portugal, reaching Greenland and possibly even Newfoundland in 1500.

Côrte-Real believed he had reached the northeast coast of Asia, the riches and spices of the Orient lying to the south of this frozen region. He organized a second expedition, consisting of three ships, one of them commanded by his older brother MIGUEL CÔRTE-REAL, according to some sources. Departing Lisbon in May 1501, they sailed to the coast of what is now Labrador and headed southward. Although the Côrte-Reals spotted the Strait of Belle Isle leading into the Gulf of St. Lawrence, they declined to explore it, believing it would lead them inland only a few miles. Instead, they put in at Newfoundland, where they captured more than 50 Indians, probably Beothuk, with plans to take them back to Portugal as proof that they had reached Asia.

Miguel and two of the ships returned to Portugal with the Indians, while Gaspar and his ship continued to explore southward, confident that he would soon reach the coast of

China. The two ships under Miguel reached Lisbon in fall 1501, but Gaspar and his ship failed to appear.

In spring 1502, Miguel sailed again from Lisbon with two ships to search for his long overdue brother. But Miguel and his ship also disappeared somewhere off North America, and only one ship returned. No conclusive trace of either of the Côrte-Real brothers was ever found. An inscription on a rock at the mouth of the Taunton River, near present-day Dighton, Massachusetts, has been variously attributed to one or both of them.

The voyages of the Côrte-Reals were possible because of the use of a type of ship known as the CARAVEL, which was developed during the 15th century. The additional lateen sails allowed these vessels to take advantage of the northeast trade winds.

Some Portuguese historians still attribute the European discovery of the Americas to the Côrte-Reals rather than to CHRISTOPHER COLUMBUS. Gaspar Côrte-Real reportedly claimed the lands he visited for Portugal, calling them Terra Verde. Some European maps of the 1520s show the coastal regions of Labrador and Newfoundland as the “Land of the Côttereals.” Even though no European settlements developed from the explorations of Gaspar Côrte-Real, Portuguese fishermen continued to visit the Labrador and Newfoundland coasts for generations afterward to take back to European markets the region’s abundant codfish.

Côrte-Real, Miguel (Miguel Côrte Real, Miguel Côttereal, Miguel Côtterreal) (ca. 1450–ca. 1502)

Portuguese mariner in North America, brother of Gaspar Côrte-Real

Miguel Côrte-Real was the son of Portuguese mariner João Vaz Côrte-Real, related to Portugal’s prominent da Costa family. Born in southern Portugal’s Algarve region, he was raised in the AZORES, where his father was captain of the island of Terceira.

Following his father’s death in 1496, Côrte-Real moved to Lisbon, where he joined his brother GASPAR CÔRTE-REAL; both of them became friendly with the king of Portugal, Manuel I. Miguel provided financial support for Gaspar’s voyage to ICELAND and GREENLAND in 1500. According to some sources, Miguel played an active role in Gaspar’s second voyage of exploration to North America in 1501. On that expedition, Miguel may have commanded one of the three ships that reached the coast of Labrador in June 1501, and explored around Newfoundland and the entrance to the Strait of Belle Isle and the Gulf of St. Lawrence. Other sources indicate that although Miguel had invested in the second voyage, he had taken part in a naval campaign against the Turks in the eastern MEDITERRANEAN SEA while his brother sailed to North America.

In any event, Gaspar failed to return from the 1501 voyage, and in January 1502, Miguel received permission

from King Manuel to undertake an expedition in search of him. On June 24, 1502, Miguel and his ships arrived off the coast of present-day St. John’s in southern Newfoundland. The three vessels separated at that point, planning to reunite there in late August.

After Côrte-Real sailed southward to search for his brother, he was never seen again. When he failed to arrive at the rendezvous two months later, the two remaining ships returned to Lisbon. A third brother, Vasco Annes Côrte-Real, sent out another expedition in search of Gaspar and Miguel, but no trace of them was found.

Some historians and archaeologists have speculated that Miguel may have reached the coast of New England, where he became the leader of an Indian tribe, living until at least 1511. This theory is based on an interpretation of an inscription found on the “Dighton Rock,” at the mouth of the Taunton River in Massachusetts.

Miguel Côrte-Real, with his brother Gaspar, undertook some of the first voyages across the North Atlantic since the days of the VIKINGS. His family’s claim to Newfoundland was upheld by the Portuguese Crown until his last male heir, Manuel Côrte-Real, died in 1578.

Cortés, Hernán (Hernando Cortés, Hernando Cortez) (1485–1547) *Spanish conquistador in Mexico and Central America*

Hernán Cortés was born in Medillín, a town in central Spain’s Extremadura region. His father had been a captain in the Spanish army, and his family, although of the nobility, was of modest means. At the age of 14, Cortés went to Salamanca, where he embarked on a study of law, but he returned home after two years.

Entering the army in 1501, Cortés took part in Spanish campaigns in Italy. In 1502, he planned to sail to the WEST INDIES with CHRISTOPHER COLUMBUS’s fourth voyage. Just prior to departure, however, he broke his leg while climbing the wall of a prestigious boarding school for girls in Madrid following an amorous escapade.

In 1504, Cortés finally sailed to the Americas and became a minor government official at Azua in what is now the Dominican Republic. In 1511, he served with DIEGO VELÁSQUEZ in the conquest of Cuba, and he was later granted lands near Santiago and appointed a treasury official in Velásquez’s colonial government.

In 1518, Velásquez commissioned Cortés to lead a large expedition to the Yucatán Peninsula. FRANCISCO FERNÁNDEZ DE CÓRDOBA and JUAN DE GRIJALVA had recently undertaken voyages westward from Cuba to the Yucatán coast and had explored northward, returning to Santiago with reports of an advanced Indian civilization, rich in gold. Cortés had been instructed to follow up these reports and establish a small settlement on the mainland.



Hernán Cortés (Library of Congress)

Although Velásquez had dismissed Cortés as the expedition's commander following a disagreement between the two, Cortés defied his superior and sailed out of Cuba's Santiago Harbor. His fleet of 11 ships carried more than 500 soldiers and 16 horses and was equipped with cannons. He put in at Havana for additional supplies, then, on February 19, 1519, sailed westward to the island of Cozumel, off the coast of Yucatán. There he met Jerónimo de Aguilar, a priest who had been shipwrecked eight years earlier. Aguilar, who was fluent in the Mayan language of the region's Indians, joined Cortés as an interpreter.

At Tabasco at the mouth of the Grijalva River, Cortés landed and made contact with Maya Indians. The Indians paddled by CANOE to Cortés's flagship, the *Capitana*, and presented the Spanish commander with gifts of gold, cotton goods, and 20 female slaves. Among them was an Aztec princess, MALINCHE, who was later baptized as Doña Marina. She was fluent in both the Nahuatl language of the Aztec and Mayan, and together with Aguilar, who spoke Mayan and Spanish, provided Cortés with a direct means of communicating with the Aztec.

From Malinche, Cortés learned of the great wealth of the Aztec, whose capital city, Tenochtitlán (present-day Mexico City), was 560 miles inland. His fleet sailed farther up the

Mexican coast, and, at present-day Veracruz, Cortés and his men established a small settlement in April 1519. When Cortés made plans to lead an expedition overland to the Aztec capital, some of his men objected, claiming that he was overstepping Velásquez's orders. To prevent them from deserting, Cortés had the ships burned, sparing only one vessel with which to send the gold he had taken from Indians to King Charles I in Spain.

Guided by Totonac and other Indians who allied themselves with him against the Aztec, Cortés began his march to Tenochtitlán in August 1519. Along the way, he defeated the Indians at the city of Tlaxcala, who then joined his march to the Aztec capital. He reached the city of Cholula, the site of sacred Aztec shrines, where he defeated an Aztec force. Although the Spaniards were greatly outnumbered by the Aztec, they were able to gain the support of as many as 6,000 subjects of the Aztec Empire.

By the time Cortés had neared Tenochtitlán in early November 1519, the Aztec leaders were seeking a peaceful way to rid themselves of the Spanish threat. But the great quantities of gold sent to the invaders as gifts only encouraged the Spaniards in their campaign of conquest. Cortés and his men entered Tenochtitlán on November 8, 1519. He was greeted by the Aztec emperor, Montezuma (Moctezuma). Taking him hostage, Cortés claimed all of Mexico in the name of Spain and established an uneasy peace with the Aztec as he and his men continued to obtain gold from them.

In spring 1520, Cortés learned that Spanish forces under PÁNFILO DE NARVÁEZ had landed at Veracruz with orders to arrest him for having left in defiance of the Cuban governor's orders. With PEDRO DE ALVARADO in command at Tenochtitlán, Cortés took half his men back to the coast, where he defeated and imprisoned Narváez, then enlisted Narváez's forces against the Aztec.

In May 1520, Cortés and his augmented forces returned to Tenochtitlán. Alvarado had meanwhile incited a revolt by the Aztec on reacting violently to their ritualistic human sacrifices. Montezuma attempted to quell the uprising, but his people stoned him to death. On June 30, 1520, Cortés and his forces fled the Aztec capital, losing about half their numbers in the retreat. The defeat subsequently became known as Noche Triste (Sorrowful Night), because Cortés reportedly wept outside the city afterward.

Cortés and his men withdrew to Tlaxcala, and in spring 1521 he launched a counterattack against the Aztec. He had ships transported to Lake Texcoco, on which Tenochtitlán had been built, and, with the support of other Indians, recaptured the Aztec capital by late summer. The rapid ravages of a smallpox epidemic among the Aztec aided Cortés in his victory.

On October 15, 1522, Cortés was named Captain General of New Spain, as Mexico was called. Soon afterward, he sent out expeditions to the west and south to seek a route to the Pacific coast. In 1523, Alvarado led one group into

Oaxaca and subjugated Guatemala. In 1525, Cortés himself led an expedition into what is now Honduras. In 1527, he sponsored a voyage by ÁLVARO DE SAAVEDRA CÉRON that sailed westward from Mexico, across the Pacific Ocean, to New Guinea and the SPICE ISLANDS (the Moluccas).

In 1528, Cortés returned to Spain, where King Charles I named him Marquis of Oaxaca and granted him extensive lands in central Mexico. Cortés also obtained permission to explore the west coast of Mexico. Back in New Spain by 1530, he sent his cousin, Diego Hurtado de Mendoza, on an expedition that explored as far as La Paz Bay in the Gulf of California in 1532. In April 1535, Cortés sailed from the Pacific coast of Mexico to the east coast of Baja California, where he established a small settlement called Santa Cruz.

Cortés returned to Mexico City, the former Tenochtlán, in 1536. Three years later, he sent out FRANCISCO DE ULLOA on a voyage northward along the Pacific coast that may have reached present-day California.

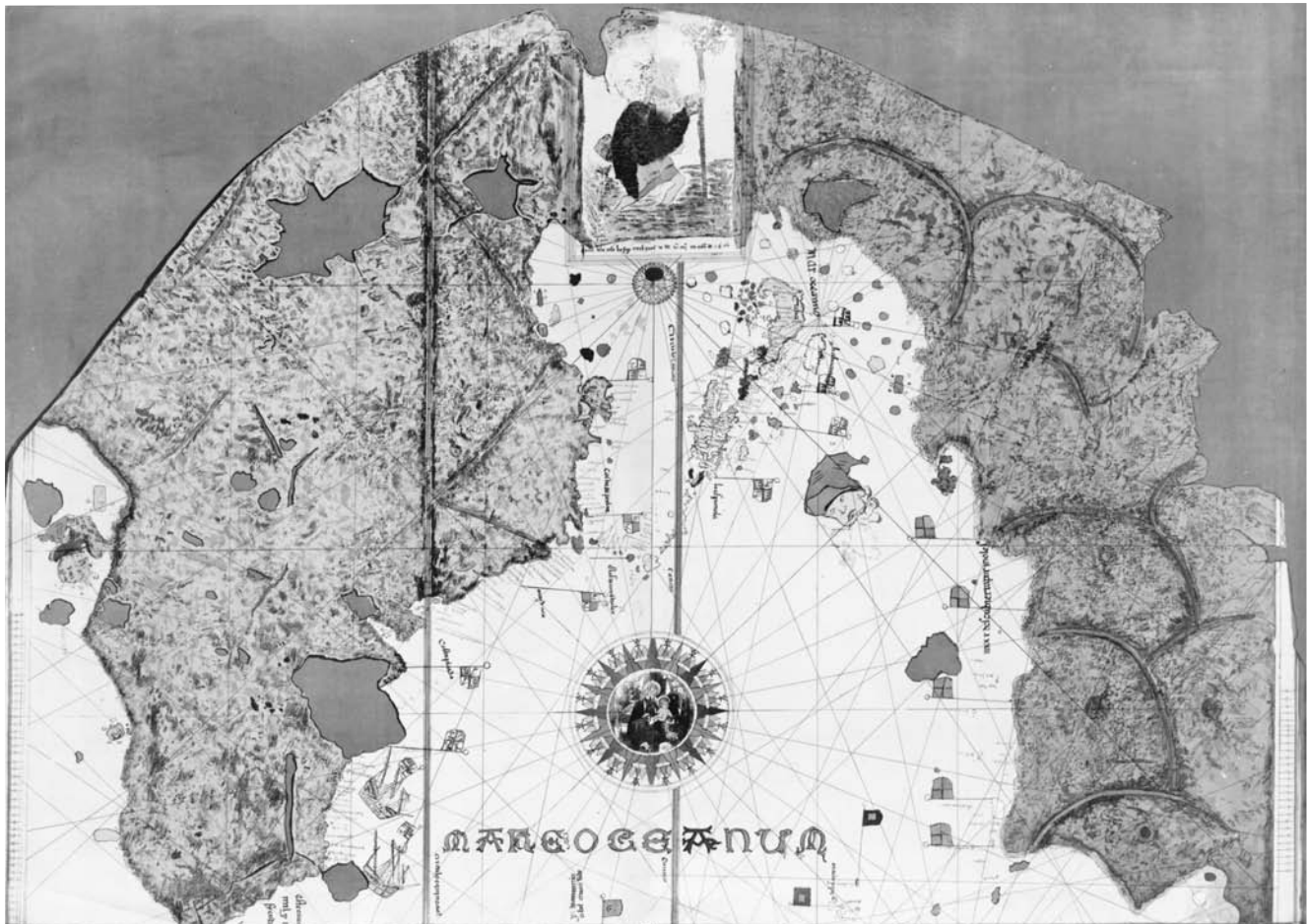
In 1540, Cortés returned to Spain to protest the challenge to his authority from the king's viceroy, ANTONIO DE MENDOZA. He also felt rebuffed at having been passed over for an expedition to the north, the leadership of that venture

going to FRANCISCO VÁSQUEZ DE CORONADO. Although Cortés supported the king in his efforts against the Moors in Algeria, he did not succeed in regaining his former position. He settled on his estate near Seville, where he died in 1547.

Hernán Cortés's conquest of the Aztec Empire was the first large-scale confrontation between the native peoples of the Americas and the Europeans. The great riches obtained from the Aztec subsequently inspired the expeditions of other CONQUISTADORES, including Pánfilo de Nárvaez and HERNANDO DE SOTO in North America's Southeast, Francisco Coronado in the Southwest, and FRANCISCO PIZARRO in Peru.

Cosa, Juan de la (ca. 1460–1510) *Spanish navigator and cartographer in the Caribbean, Central America, and South America*

Juan de la Cosa was born in Spain. Sources vary on the exact place of his birth, some indicating he was from Orduña in the Basque region, while others make him a native of Santa María near Cádiz in the south.



Detail of map of the world by Juan de la Cosa (1500) (Library of Congress)

By 1492, Cosa had become a highly skilled navigator and cartographer. He owned the ship the *Santa María*, on which he sailed in 1492 as CHRISTOPHER COLUMBUS's pilot on his first voyage to the Americas. Columbus reportedly relied on Cosa's maps in his historic expedition across the Atlantic Ocean. The next year, Cosa again sailed with Columbus on his second voyage.

In 1499, Cosa explored the north coast of South America with ALONSO DE OJEDA and AMERIGO VESPUCCI. In 1501, he took part in RODRIGO DE BASTIDAS's voyage to the coast of Central America.

Back in Spain in 1503, Queen Isabella granted Cosa a license to enslave the Indians along the coast of South America, from Cabo de Vela, in present-day Venezuela, to the Gulf of Uraba, on the Caribbean coast of present-day Colombia. Again with Ojeda, Cosa left Spain in September 1504, reaching the island of Margarita off the coast of Venezuela. After obtaining gold, pearls, and brazilwood from the natives, he explored north and west to the coast of Darién (present-day Panama), where he encountered the remnants of an expedition led by another Spanish adventurer, Luis Guerra.

Problems with his ships caused Cosa to remain on the coast of Darién for almost a year. He then managed to sail with his men in small boats to Hispaniola (present-day Haiti and the Dominican Republic), eventually returning to Spain with a fortune in gold and pearls.

In 1509–10, Cosa joined Ojeda in an expedition to the north coast of South America. After landing near present-day Cartagena, Colombia, he marched inland with Ojeda's men on a slave-hunting expedition, and he was killed in an attack by Indians.

Juan de la Cosa played an important role in the early exploration of South and Central America in the years immediately following the first two voyages of Columbus. He also produced the earliest maps to show the explorations of JOHN CABOT and SEBASTIAN CABOT and VASCO DA GAMA, as well as Christopher Columbus. His map of the world, produced in 1500, was one of the first to cast doubt on Columbus's claim that he had reached the coast of Asia. The newly visited lands were shown on Cosa's map as receding off to the west, with no clear indication that they were part of the Asian continent. Cosa also showed Cuba to be an island on this early map (contrary to Columbus's claim that it was part of the Asian mainland), a fact not established by navigators until 1508.

Courtauld, Augustine (1904–1959) *British explorer in Greenland*

In the late 1920s, Augustine Courtauld attended England's Cambridge University, where he was a classmate of GINO WATKINS. Under Watkins's leadership, Courtauld took part in the 1930–32 British Arctic Air Route Expedition, which

sought to determine the feasibility of an air route between Europe and North America by way of ICELAND and GREENLAND.

Courtauld arrived on the east coast of Greenland with Watkins and subsequently took part in establishing a base at Angmagssalik. An inland weather station was then set up on the Greenland ice cap, and Courtauld volunteered to man this isolated post alone and make meteorological observations throughout five months of the Arctic winter.

From December 1930 to May 1931, Courtauld lived in a tent buried in the snow on the ice cap, making an extensive study of weather conditions and their effects on proposed polar air routes.

Augustine Courtauld's winter alone in Arctic Greenland was the first such solo scientific endeavor of its kind. It preceded Admiral RICHARD EVELYN BYRD's solo Antarctic winter by three years.

Cousteau, Jacques-Yves (1910–1997)

French oceanographer

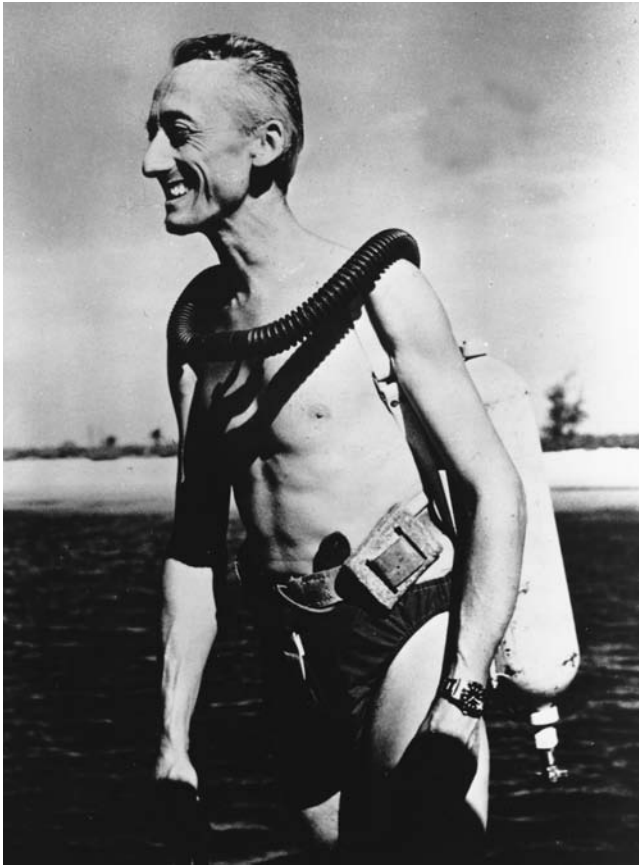
Jacques Cousteau was born in Saint André de Cubzac, France. He attended the French Naval Academy in Brest and became a gunnery officer. After serving in the Far East in 1934–35, he trained to be a navy pilot but was injured in an automobile accident. Swimming was part of his rehabilitation, during which he became interested in diving.

In 1943, during World War II, Cousteau and French engineer Émile Gagnan developed the aqualung, a breathing apparatus, to enable divers to stay underwater for several hours. It consists of a cylinder of compressed air connected through a pressure-regulating valve to a face mask.

In 1950, Cousteau purchased *The Calypso*, a U.S. World War II minesweeper, and converted it into a research vessel for oceanographic studies. In it, he began traveling the world's oceans and investigating marine life, geology, and archaeology. He also invented a watertight camera case and developed underwater filming techniques. In 1959, Cousteau designed the *Diving Saucer*, a two-man SUBMERSIBLE capable of diving to a depth of 1,000 feet. Later in life, he experimented with underwater houses in which divers lived for up to a month.

Cousteau wrote or cowrote more than 100 books, among them *The Living Sea* (1963) and *World Without Sun* (1965). He also produced documentaries, including the Academy Award-winning *The Silent World* (1956) and *World Without Sun* (1966), as well as *Voyage to the End of the World* (1975). He also created several television series; the best known, *The Undersea World of Jacques Cousteau*, ran from 1968 to 1976. Cousteau won numerous awards over the course of his life, including his induction into the Académie Française in 1989.

Jacques Cousteau, in addition to expanding the frontiers of oceanography through his inventions, helped make



Jacques Cousteau (Library of Congress)

the public aware of the world's ecosystems through his writings and films. He founded the Cousteau Society in 1973, which has carried on his work and is now run by his wife, Francine Cousteau.

Covilhã, Pero da (Pedro de Covilham, Pêro da Cavilhão, Pedro de Covilhão, Pedro de Cavilhã)

(ca. 1450–ca. 1530) *Portuguese diplomat in the Middle East, India, and East Africa*

Pero da Covilhã, a native of Portugal, served in the army in his country's wars with Spain. A spy, he spent some years living as a guest of the duke of Medina-Sidonia in Andalusia. He was fluent in both Spanish and Arabic and undertook several missions to North Africa.

In 1486, while Covilhã was serving in the royal bodyguard of King John II of Portugal, the Portuguese government received news from the west coast of Africa of a great Christian king, who ruled a powerful kingdom somewhere in the interior of East Africa. King John suspected that this African ruler was the legendary PRESTER JOHN and hoped that his Christian kingdom could serve as a buffer against the Arab powers in the Middle East, as well as provide an important link in the overland trade route to India. At that

time, Portuguese navigators were attempting to round the coast of Africa, although it was not known for certain whether a sea route existed between the Atlantic and Indian Oceans. To resolve the rumors about Prester John, as well as to obtain vital geographic information about the southeast coast of Africa, King John commissioned Covilhã to undertake a journey eastward to Africa and India.

In May 1487, Covilhã left Portugal, along with an Arabic-speaking native of the CANARY ISLANDS named Afonso de Paiva, and traveled to the island of Rhodes in the eastern MEDITERRANEAN SEA. Several months later, Portuguese navigator BARTOLOMEU DIAS embarked on the first voyage around the CAPE OF GOOD HOPE.

Upon reaching Rhodes, Covilhã and Paiva disguised themselves as Arab traders and sailed to Alexandria, arriving there with a shipment of honey. They both became ill at Alexandria, but they soon recovered and continued the journey, traveling first to Cairo, then to Sinai and the RED SEA. They sailed down the Red Sea in an Arab trading vessel, stopping at the Sudanese port of Suakin before arriving two months later at Aden. They then separated; Paiva headed into the interior of Ethiopia in search of Prester John, while Covilhã sailed across the Arabian Sea to the southwest coast of India.

Covilhã first visited the port of Cannanore on the Malabar Coast, then went on to Calicut and Goa, making a detailed study of the kinds of exotic products that were traded by Arab and Oriental merchants at these Indian commercial centers. He then sailed back across the Arabian Sea, stopping in Hormuz at the mouth of the Persian Gulf. From Hormuz, he sailed on an Arab trading ship southward along the east coast of Africa, as far as Sofala on the African mainland opposite the island of Madagascar, arriving there in 1490. During his stay, he was informed by Arab traders that there was a sea route around the tip of Africa. Covilhã then headed northward along the coast for Cairo to rejoin Paiva, visiting the East African ports of Kilwa, Mombasa, and Malindi.

At Cairo, Covilhã learned that Paiva had died. He was met there by two of King John's representatives, who told him that he could either return to Portugal or complete Paiva's mission in East Africa. Covilhã elected to continue the search for Prester John in Africa.

After sending a detailed report of his travels to King John in Portugal, Covilhã escorted one of the king's representatives to Hormuz, then sailed to the Red Sea port of Jidda on the Arabian Peninsula, which he reached in 1492. Soon afterward, disguised as a Muslim pilgrim, he entered the holy city of Mecca.

In 1493, Covilhã reached the kingdom of Abyssinia (Ethiopia), where he was well received by the Christian emperor, known as the Negus. Either he was not permitted to leave, however, or stayed by choice. He married an Ethiopian woman and spent the remaining years of his life as a trusted adviser to the Negus, living a life of privilege and

relative affluence, according to a Portuguese ambassador who visited him there 27 years later.

Pero da Covilhã's reports on the east coast of Africa provided important geographic information to VASCO DA GAMA in his 1497 voyage around the Cape of Good Hope to India. In addition, Covilhã sent back to Europe the earliest knowledge of the island of Madagascar, and his 1492 sojourn into Mecca may have been the first such visit to that holy city by a non-Muslim. His influence in the Ethiopian government helped Portugal become a dominant European power in East Africa.

Cresap, Thomas (ca. 1702–ca. 1790) *British soldier and frontiersman in the Ohio Valley*

Born in Skipton in Yorkshire, England, Thomas Cresap immigrated to colonial Maryland in 1717. In 1727, he settled near the present site of Wrightsville in south-central Pennsylvania. The Pennsylvania and Maryland colonies both claimed this territory, and an armed conflict between territorial militias erupted. Cresap, a captain with the Maryland militia, departed soon after the Pennsylvanians triumphed.

In 1740, Cresap established a trading fort on Maryland's westernmost frontier along a route frequently used by Iroquois (Haudenosaunee) Indian raiding parties in their attacks against the Cherokee Indians to the south. In time, Cresap established peaceful relations with Native Americans, serving often as a government representative in official dealings with both groups.

In about 1753, as one of the organizers of the Ohio Company, Cresap explored the Redstone Creek and Monongahela River of western Pennsylvania, accompanied by his friend, the Lenni Lenape (Delaware) Indian Nema-colin. Together they extended and improved the trail previously blazed into the Ohio Valley by CHRISTOPHER GIST, a route that later became famous as Braddock's Road.

Thomas Cresap helped open routes into the AP-PALACHIAN MOUNTAINS. On 18th-century maps of the northern Ohio Valley, Cresap's fort was indicated as one of the few stopover points for westward journeys from Maryland, Virginia, and Pennsylvania.

Cresques, Abraham (Cresques le Juif) (fl. 1370s) *Spanish cartographer*

Abraham Cresques, a Spanish Jew, lived in Palma on the Mediterranean island of Majorca. He was a highly skilled cartographer, and, in about 1375, he produced a large map of the world based on the most recent reports from MARCO POLO and ODORIC OF PORDENONE.

Commissioned by King Peter IV of Aragon, Cresques's world map became known as the *Catalan Atlas*. On a series of 12 panels, Cresques depicted the region to the east of

Europe as far as the Pacific Ocean. His map concentrated on those parts of the world recently visited by Europeans and did not detail northern Europe, northern Asia, or southern portions of Africa.

Cresques was one of the earliest cartographers to indicate caravan routes across the SAHARA DESERT, extending northward from the NIGER RIVER and Senegal River. He obtained new geographic information from Arabian seamen and Jewish merchants who, unlike most Europeans, could travel freely throughout much of the Islamic world of North Africa and the Middle East. His map was the first to show the Indian subcontinent as a peninsula, and to indicate clearly the AZORES in the Atlantic Ocean.

Abraham Cresques's *Catalan Atlas* was a milestone in the history of modern cartography. It was the first time that an image of the world was depicted based on the experience of travelers and reports from distant lands. Up to that time, most maps relied on traditional but unfounded concepts of world geography, with erroneous representations from myths and legendary accounts. Cresques also produced a copy of the *Catalan Atlas* for King Charles V of France. Abraham Cresques's son, Judah Cresques, eventually settled in Portugal and converted to Christianity. He continued his father's work as a cartographer in the service of HENRY THE NAVIGATOR, prince of Portugal, at his navigational school at Sagres. Known in Portugal as Jaume Ribes, the younger Cresques was Prince Henry's geographic adviser and produced many of the maps that detailed discoveries of Portuguese explorers along the west coast of Africa during the early 1400s.

Crevaux, Jules-Nicolas (1847–1882) *French physician, explorer in South America*

Jules-Nicolas Crevaux was born and raised in the Lorraine region of northeastern France. Trained as a physician, he served with French forces in the Franco-Prussian War of 1870. In 1871, he became a naval surgeon.

In 1876, Crevaux began a series of explorations into the interior of South America. He traveled to Cayenne on the coast of French Guiana, from where he undertook a survey of the Maroni River. From the headwaters of the Maroni, he continued southward into parts of French Guiana that had not yet been visited by Europeans. He crossed the Tumuc-Humac Mountains and reached the Jari River, which he followed to its confluence with the AMAZON RIVER in northeastern Brazil.

In 1878, Crevaux embarked on his second expedition into French Guiana. From Cayenne, he headed south and west to the upper Amazon, following it to its junction with the Ica. He also explored the Japurá and Putumayo Rivers, following them deep into the eastern slopes of the ANDES MOUNTAINS. In the Andes, he discovered relics of the Inca Indian civilization.

The next year, Crevaux undertook an exploration of the interior of what is now Colombia as well as Venezuela. He traveled along the Magdalena and Guaviare Rivers, eventually descending the ORINOCO RIVER back to the coast.

After a time in France, Crevaux, in 1882, sailed to Buenos Aires, from where he undertook what turned out to be his final exploration of South America. He had planned to complement his exploration of the Amazon Basin in the northern part of South America with a study of the Paraná River and its tributaries in the south. He also intended to visit the Indian tribes of the Gran Chaco region. It was while exploring the Pilcomayo River region in the Gran Chaco that Crevaux and 18 members of his expedition were attacked and killed by Toba Indians. Two Bolivian members of the expedition escaped and reported what had happened.

Jules-Nicolas Crevaux was the first European to cross the Tumuc-Humac Mountains of South America. His explorations of the Amazon and its northern tributaries provided significant new geographic information. Soon after his death, an updated atlas of the rivers of South America was published and was dedicated to him by the Geographical Society of Paris. Crevaux's own account of his travels, *Voyages dans L'Amérique du Sud* (Voyages in South America), was published in 1883.

Croghan, George (unknown–1782) *Irish-American frontier trader in the Ohio Valley, Indian agent*

George Croghan was born in Ireland and immigrated to Philadelphia, Pennsylvania, in about 1740. The next year, he undertook a trading expedition to the Indians of the Susquehanna Valley. He traveled west from Philadelphia, crossed the Blue Mountains, and reached the Susquehanna River near present-day Harrisburg, Pennsylvania.

By the late 1740s, Croghan had established a string of Indian trading centers in the Forks of the Ohio region, near present-day Pittsburgh. These included outposts at Pine Creek, Beaver Creek, and Logstown. He used these posts as bases for additional trading expeditions into the Ohio Valley. In 1748, he established a center at Pickawillany on the Maumee River in western Ohio. From there, Croghan explored as far west as the Wabash and Illinois Rivers, establishing trade contacts with Indian bands of the region.

In 1750, Croghan accompanied CHRISTOPHER GIST in his trans-Appalachian exploration.

Six years later, during the French and Indian War, as deputy to Indian superintendent Sir William Johnson, Croghan traveled throughout the Ohio Valley and negotiated neutrality agreements with the Shawnee and other Indians.

In May 1765, Croghan led an expedition from Fort Pitt westward into the Ohio Valley in order to assert British authority over former French settlements in the Ohio Valley and to establish trade with the Indians. Croghan and his

party were captured by Kickapoo Indians at the mouth of the Wabash River, but were released. Soon afterward, he accepted the surrender of the Ottawa chief Pontiac, who had led a rebellion of allied tribes in 1763.

In 1766, Croghan organized a large-scale trading expedition, known as the Grand Illinois Venture, to the Indians of the Wabash River, Illinois River, and MISSISSIPPI RIVER. He took 65 barges of trade goods, manned by 350 men, down the Ohio River from Fort Pitt and reached Indian settlements at Vincennes, Kaskaskia, Cahokia, and Fort de Chartres.

During the late 1760s, Croghan became involved in the land speculations of the Illinois Company and the Indiana Company. Business reversals, legal problems, and the outbreak of the American Revolution caused him to lose most of his large landholdings in 1775 around Fort Pitt. He returned to Philadelphia, where he died in 1782.

George Croghan pioneered trade routes west of the Allegheny Mountains into the Ohio Valley. His familiarity with the Ohio and Pennsylvania frontiers greatly assisted British and colonial forces in the French and Indian War of 1756–63. The Grand Illinois Venture of 1766 was the largest trade enterprise to the west during the American colonial period.

Crozier, Francis Rawdon Moira (1796–1848)

British naval officer, polar explorer

Francis Crozier was born in Ireland. At about the age of 14, he entered the British navy as a midshipman.

In 1821, Crozier was a lieutenant with SIR WILLIAM EDWARD PARRY's second expedition to the Canadian Arctic. Three years later, he returned to the Arctic with Parry's third expedition, which explored Lancaster Sound and Prince Regent Inlet. Then, in 1827, he took part in Parry's unsuccessful attempt to reach the NORTH POLE from Spitsbergen (present-day Svalbard).

Crozier served on British naval vessels off the coast of Portugal in the early 1830s, and, in 1835, he participated in a voyage into Baffin Bay.

In 1839, Crozier was appointed captain of the *Terror*, and, in September of that year, accompanied by the *Erebus*, he sailed to TASMANIA from London on the first leg of SIR JAMES CLARK ROSS's four-year exploration of the Antarctic. After sailing to Hobart, in Tasmania, where they arrived in August 1840, the expedition headed southward, crossing the ANTARCTIC CIRCLE in early January 1841. Soon afterward, Crozier joined Ross in a landing at Victoria Land on the Antarctic continent, and he subsequently explored the Ross Sea, Ross Ice Shelf, and the coast of Graham Land. In the following Antarctic summer, after wintering in NEW ZEALAND, Crozier again sailed to Antarctica with Ross and set a record for the southernmost point reached to that time.

In 1845, Crozier served as second in command to SIR JOHN FRANKLIN in his final attempt to find the Northwest

Passage. Again commanding the *Terror*, Crozier sailed to the Canadian Arctic with Franklin and the *Erebus*. The ships were ultimately trapped in the ice north of King William Island. Following Franklin's death in 1847, Crozier assumed command of the expedition. In spring 1848, he led 105 of the survivors southward from Prince William Island over the ice in a sledge journey for the HUDSON'S BAY COMPANY outpost, Fort Resolution, at the mouth of the Back River. Crozier and the remaining members of the expedition managed to reach land at Point Victory, but all soon died of SCURVY or starvation. The details of the fate of Crozier and the last members of the Franklin expedition were left in a canister on King William Island, but the canister was not discovered until 1859 by a search expedition commanded by SIR FRANCIS LEOPOLD McCLINTOCK.

Francis Crozier played a leading role in British naval expeditions to both polar regions. On Ross Island in the Antarctic, and on King William Island in the Canadian Arctic, there are points of land each named Cape Crozier in recognition of his exploits.

Ctesias of Cnidus (fl. 420s–410s B.C.)

Greek physician, writer, traveler in Persia and India

Ctesias was a native of the Greek city of Cnidus in Asia Minor, now part of Turkey. He was trained in medicine, and, from about 420 to 400 B.C., he served as court physician to Darius II and Artaxerxes Mnemon of Persia (present-day Iran). He traveled throughout the Persian Empire, as well as in India, and, upon his return to Greece, wrote about his experiences. In two historical and geographic works, known as *Indicus* and *Persicus*, he attempted to discredit earlier accounts of the regions east of Greece put forth by HERODOTUS.

Although Ctesias included descriptions of fabulous creatures, including men with giant feet, others with dog-like faces, and giant worms in the GANGES RIVER, fed on camels and oxen (a possible description of crocodiles), some of his reports were accurate. He was among the first to report correctly on the course of the Oxus River (now known as the Amu Darya).

Ctesius's *Indicus* and *Persicus* survive only as fragments in other ancient writings. Written in about 398 B.C., they may have served, along with the works of Herodotus, as an inspiration and guide for the subsequent expeditions of conquest undertaken by ALEXANDER THE GREAT less than 100 years later.

Cunningham, Allan (1791–1839) *British naturalist in New South Wales and Queensland, Australia*

Allan Cunningham was born in Wimbledon in Surrey, England, near London. He was educated in the London suburb of Putney; at the age of 18, he went to work as a botanist at the Royal Botanic Gardens in Surrey, commonly known as Kew Gardens.

Cunningham's skill as a naturalist came to the attention of SIR JOSEPH BANKS. In about 1813, under Banks's sponsorship, Cunningham took part in a two-year scientific expedition to Brazil in which he collected specimens of South American plants for the botanical collection at Kew.

Cunningham next went to New South Wales, Australia. Arriving there in 1816, he was attached as a botanist to several government-sponsored expeditions that explored the region north and west of Sydney, beyond the BLUE MOUNTAINS. In 1817, he joined the surveyor general of New South Wales, JOHN JOSEPH WILLIAM MOLESWORTH OXLEY, in an exploration of the Lachlan River.

In 1817–22, Cunningham made a study of Australia's coastal plant life with PHILIP PARKER KING. In 1823, he explored inland again, this time blazing a trail from the Hunter Valley northward through Pandora's Pass. This route enabled settlers from Bathurst to reach the fertile region north of Sydney known as the Liverpool Plains.

Cunningham's next expedition set out from Bathurst in May 1827. He reached the upper Hunter River at Segenhoe and crossed the Liverpool Range. Soon afterward, he became the first European to visit the Namoi, Gwydir, Dumaresq, and Macintyre Rivers. On June 8, 1827, he caught sight of a large tract of open country, ideal for settlement by sheep farmers. He named the region the Darling Downs, after the colonial governor of New South Wales, Sir Charles H. Darling. The next year, Cunningham succeeded in finding a direct route from the Pacific coast to that region.

Cunningham carried out a scientific expedition to Norfolk Island off the east coast of Australia, soon after which he returned to England. He served at Kew Gardens for several years, then was offered the position of official botanist of New South Wales in 1837. His career as the colony's botanist was cut short after only two years, when he developed tuberculosis following a voyage to NEW ZEALAND. He died near Sydney in 1839.

Allan Cunningham's explorations of New South Wales and Queensland uncovered new expanses of fertile lands that enabled sheep farming in Australia to expand and prosper. The route he established through the GREAT DIVIDING RANGE, linking the grazing country of the Darling Downs with the Pacific coast, is named Cunningham's Gap.

D



Da Gama, Vasco See GAMA, VASCO DA.

Dallman, Eduard (1830–1896) *German mariner in the Antarctic, Siberia, and New Guinea*

Born near the German seaport of Bremen, Eduard Dallman first went to sea at the age of 15. He found work on both freighters and whalers, and by 1859, he captained his own ship on a voyage to the Pacific Ocean.

In 1873, Dallman sailed on a whaling expedition to the waters off the Antarctic Peninsula. In addition to hunting whales, Dallman recorded geographic and scientific information. In 1877–83, he attempted to establish a sea route from Germany to SIBERIA, in particular to the estuaries of the Ob and Yenisei Rivers. In 1884, in the employ of the New Guinea Company, he explored the coastline of New Guinea.

Eduard Dallman is credited with the first German expedition to Antarctica.

Dampier, William (ca. 1651–1715) *English writer, mariner in western Australia, New Guinea, and the South Pacific*

William Dampier was probably born in England, although few details are known of his early life. He went to sea at the age of 16, serving in the British navy in actions against the Dutch. He settled in Jamaica for a few years, where he man-

aged a plantation, then moved to Honduras in about 1675, engaging in the logging business until 1678.

In 1679, Dampier joined a party of buccaneers with whom he crossed the Isthmus of Panama to the Pacific Ocean and carried out raids on Spanish shipping along the coast of Peru.

Dampier sailed from the coast of Virginia in 1683 as part of a fleet of PRIVATEERS under the command of a Captain Swan. He participated in raids against Spanish shipping on the west coast of Africa as well as on the north coast of South America and in the Caribbean Sea. He then sailed into the Pacific by way of CAPE HORN and, with his buccaneer companions, continued to raid Spanish possessions on the west coast of South America. From the Gulf of California, he sailed westward on one of the privateer vessels to the Philippines and the SPICE ISLANDS (the Moluccas), where he led attacks on Dutch and Spanish ships.

According to one source, Dampier captained a ship in 1687 in a pirating expedition along the coast of Chile, visiting the Galapagos and making an early sighting of Easter Island.

In 1688, Dampier and his crew spent five weeks exploring the northwest coast of Australia, between King Sound and Bathurst Island, a region largely unknown to European geographers at that time. He was subsequently marooned on the Nicobar Islands in the Bay of Bengal, but he managed to make his way back to England by 1691, having completed a CIRCUMNAVIGATION OF THE WORLD.



William Dampier (Library of Congress)

Dampier was unusual among the seafaring adventurers of his day in that he was well educated, with a background in the natural sciences. He wrote an account of his travels, published in 1697 as *A New Voyage Round the World*. An immediate popular success in England, it brought him to the attention of the British Admiralty. Commissioned an officer in the Royal Navy, Dampier was placed in command of a government-sponsored scientific expedition with plans to proceed to the east coast of Australia, a region relatively unexplored at that time.

Dampier, in command of the *Roebuck*, attempted to sail to eastern Australia by way of Cape Horn and the Pacific, but because of severe storms, he instead traveled to western Australia by way of the CAPE OF GOOD HOPE and the Indian Ocean. His first landing was at Shark Bay. He further explored and charted the northwest coast of Australia, locating an island group that later came to be known as the Dampier Archipelago. At the northern end of what is now known as Western Australia's Eighty Mile Beach, he explored a peninsula later named Dampier Land. From there, he sailed northward to Timor.

Dampier's subsequent exploration of the east coast of New Guinea revealed a strait, later known as Dampier Strait, which separates that large island from the smaller island of New Britain. (The narrow channel between northwestern New Guinea and the island of Waigeo is also named Dampier Strait.)

Dampier attempted to sail the *Roebuck* back to England by way of the Atlantic Ocean, but, on the return voyage, the ship became unseaworthy and had to be left at Ascension Island in the South Atlantic. A British naval vessel eventually carried Dampier and his expedition to England by 1701.

Dampier wrote an account of his voyage to Australia, *A Voyage to New Holland*, the first volume of which was published in 1703 and the second in 1709. In 1703, he embarked on another privateering expedition to the Pacific coast of South America. On this trip, a mutiny on one of the pirate vessels resulted in the marooning of several crew members in the Juan Fernandez Islands off the coast of Chile. Only one among them survived, a mariner named ALEXANDER SELKIRK, who was later rescued in 1709 by an expedition under Captain Woodes Rogers with Dampier serving as pilot. Selkirk's real-life adventure served as the inspiration for Daniel Defoe's 1719 novel *Robinson Crusoe*.

William Dampier and his crew were the first Englishmen to set foot on Australian soil and see kangaroos. In his scientific work, *Discourse of Trade Winds* (part of *Voyages and Descriptions*), published in 1699, Dampier speculated that the Australian continent was actually a group of large islands, separated by straits, an idea that was pursued by PHILLIP PARKER KING as late as 1817. Some early-19th-century explorers of Australia believed an inland passage into these straits could be found around the Dampier Archipelago. Along with his depiction of coastal Australia, Dampier provided some of the earliest descriptions of the region's Aborigines. Generally, he depicted Australia in less than favorable terms, and his account helped dissuade British settlement until the last decades of the 18th century. Among his geographic discoveries was the determination that New Britain was separate from New Guinea. Dampier's voyages marked the beginning of British scientific exploration of the Pacific, setting a precedent for the voyages of JOHN BYRON, SAMUEL WALLIS, PHILLIP CARTERET, and JAMES COOK.

Dana, James Dwight (1813–1895)

American naturalist in Australia and the Pacific

James D. Dana was born in Utica, New York, the descendant of an early New England family. He began his education at Charles Bartlett's Academy in Utica, where he developed a strong interest in the natural sciences.

In 1830, Dana entered Yale College, but he left three years later to become an instructor in the navy. Part of his service included a tour of the MEDITERRANEAN SEA aboard the *Delaware*. He returned to Yale in 1836, serving briefly as an assistant to natural history professor Benjamin Silliman. Dana soon accepted an appointment as geologist and mineralogist for an expedition under the command of Lieutenant CHARLES WILKES that toured the world in 1838–42.

Dana remained with the rest of the scientific team in Sydney, Australia, from January to the end of March 1840, while Wilkes and his ships explored Antarctic waters. Wilkes had dismissed the expedition's marine biologist in Sydney, and Dana assumed the responsibility of studying marine animal life in addition to his geological work.

Dana had started out on the *Peacock*, surviving the wreck of that vessel off the coast of Oregon in July 1841. From the site of the wreck near the mouth of the COLUMBIA RIVER, he traveled overland to San Francisco, where he boarded another of the expedition's ships.

Dana returned to New York by way of the CAPE OF GOOD HOPE in June 1842, having collected hundreds of specimens of zoophytes and mollusks new to science. Over the next 14 years, he wrote the volumes on geology, crustaceans, zoophytes, mollusks, and coral formations for the U.S. government's 20-volume report of the expedition. In 1849, he took over Silliman's position as professor of natural history at Yale.

James D. Dana went on to become the leading American naturalist of his day, his reputation based largely on the scientific work he accomplished on the Wilkes expedition. During his career at Yale, where he remained on staff the rest of his life, he produced a number of widely used standard texts on geology and mineralogy. He received many honorary degrees and awards for his scientific work.

Darwin, Charles Robert (1809–1882)

British naturalist in South America and the South Pacific, cousin of Sir Francis Galton

Charles Darwin was born in Shrewsbury, England, the son of a doctor. His maternal grandfather was the famous potter Josiah Wedgwood, and his paternal grandfather was the botanist and poet Erasmus Darwin. He was a cousin of SIR FRANCIS GALTON.

As a boy in the Shropshire countryside, the young Darwin collected butterflies, minerals, and shells. In 1825, he entered the University of Edinburgh, where he began three years of medical study. By 1827, Darwin had decided against a career as a doctor, reportedly because he could not stand the sight of blood. Consequently, in 1828, he began to study theology at Cambridge University, intending to become a minister.

While at Cambridge, Darwin's ability as a naturalist came to the attention of John S. Henslow, a professor of geology and botany. In 1831, on Henslow's recommendation, Darwin was appointed official naturalist for a British government-sponsored scientific expedition to the coast of South America.

On December 27, 1831, Darwin sailed from the naval base at Devonport, near Plymouth, aboard the British naval vessel HMS *Beagle*, captained by ROBERT FITZROY. The ex-

pedition's first stop was in the Cape Verde Islands off the west coast of Africa, where Darwin undertook a geological study of a volcanic island. From there, he sailed to Bahia, Brazil, and explored inland, collecting specimens of animal and plant life in the Brazilian rainforest. In April 1832, Darwin accompanied an Irish planter to his coffee plantation about 100 miles north of Rio de Janeiro, adding more specimens to his collection.

Darwin rejoined the *Beagle* for its southward cruise along the coast of South America. While Fitzroy and the rest of the expedition undertook an offshore hydrographic survey, Darwin explored up the Río de la Plata. While in Uruguay, Darwin discovered the fossilized bones of extinct animals, which appeared to be related to existing animals on the South American continent, a find that helped in the formulation of his later theory of evolution.

At Tierra del Fuego, Darwin made an early anthropological study of the natives, including observations on the experiences of three Indians who had been returned to Tierra del Fuego after three years in England. From the Patagonian coast of Argentina, he made a journey along the Santa Cruz River to within sight of the ANDES MOUNTAINS. The expedition then visited the Falkland Islands before making a passage through the STRAIT OF MAGELLAN and around CAPE HORN.

Darwin made several scientific forays into the interior of Chile in 1834. Traveling with a small party on horseback from Valparaíso, he crossed the Andes by way of Santiago and the Portillo Pass, reaching the Argentine town of Mendoza, then returned to the Pacific coast through the Uspalata Pass.

While in southern Chile in February 1835, Darwin experienced a severe earthquake and witnessed the eruption of the Osorno volcano. Soon afterward, the *Beagle* arrived at Concepción, where Darwin and the rest of the expedition observed the devastation the great earthquake had wrought on that seaport.

Later in 1835, Darwin did field work on the Galapagos Islands, 600 miles off the coast of Ecuador, studying animal and plant life, especially the giant tortoises and several varieties of iguanas.

The *Beagle* sailed westward across the Pacific Ocean from the Galapagos. After stopovers at Tahiti, NEW ZEALAND, Australia, and TASMANIA, the expedition entered the Indian Ocean and put in at Mauritius, where Darwin studied the natural process behind the formation of coral reefs and atolls.

Darwin and the *Beagle* returned to the Atlantic Ocean by way of the CAPE OF GOOD HOPE. On Ascension Island in the South Atlantic, he made a geological study of volcanic rocks.

Darwin arrived back in England in early October 1836. His voyage around the world had taken almost five years.

Throughout the trip, he had sent back reports and specimens to Henslow in England, and, by the time of his return, he had earned a reputation as one of the nation's foremost naturalists.

Over the next several years, Darwin was occupied in organizing and studying the specimens he had collected. He married his cousin Emma Wedgwood in 1839, and that same year, he published his first major scientific work, *Journal of Researches into the Natural History and Geology of the Countries Visited During the Voyage of the H.M.S. Beagle*.

In 1858, Darwin received a scientific paper by ALFRED RUSSEL WALLACE, who had also done extensive scientific research in South America. Darwin combined his own observations and correlations with those of Wallace to produce his epoch-making work, *On the Origin of Species by Means of Natural Selection* (1859), in which he first put forth his ideas on evolution. He subsequently formulated a theory on natural selection.

Charles Darwin's voyage on the *Beagle* from 1831 to 1836 laid the basis for the scientific work he produced throughout the rest of his life. He never went abroad again, having been a victim of acute seasickness during his time on the *Beagle*. For years after his return from that voyage, he suffered from ill health, which some have speculated was caused by Chagas disease, contracted from insect bites in the Andes. Darwin's work in the natural sciences had a profound impact, not only on the fields of biology and geology, but also on philosophy and theology. His theories on evolution and natural selection created an uproar in their challenge to the accepted belief that all species had been individually created and were generally immutable. As an explorer, Darwin added no new geographic knowledge, yet his scientific findings profoundly changed the way scientists perceived the Earth and its wildlife.

Daurkin, Nikolay (fl. 1760s–1790s) *Native explorer, interpreter in northeastern Siberia*

Nikolay Daurkin was a member of the nomadic Chukchi tribe of northeastern SIBERIA. In about 1760, he became a Cossack and served at the Russian military outpost at Anadyr on the Bering Sea. That year, he undertook an exploration on behalf of the Russian government into the Chukchi Peninsula. From natives on the Gulf of Anadyr, he learned of a huge landmass east of the Bering Sea. This was Alaska, known to the Chukchi as the "Great Land."

In late 1763, Daurkin explored Ratmanova Island in the BERING STRAIT, which he reached from the mainland, traveling over the ice by reindeer. His findings on this expedition were subsequently used in an official Russian map of the region. Daurkin explored the Chukchi Peninsula again in 1774, and, in the late 1780s and early 1790s, he served

as an interpreter in JOSEPH BILLINGS's expedition to north-eastern Siberia and the islands of the Bering Strait.

Nikolay Daurkin was one of the few natives of eastern Siberia to take an active part in the Russian exploration of his homeland, most of which was undertaken by European Russians and others from western Europe.

David-Néel, Alexandra (1868–1969)

French traveler, writer in China, India, and Tibet

Alexandra David-Néel, née David, was born in Paris, where her father, a teacher and political activist, was an associate of Victor Hugo. From her reading of such authors as James Fenimore Cooper and Jules Verne, she was inspired to travel to distant places. In her late teens, she ran away from home several times, once walking as far as the Italian Alps before being sent back to her parents in Paris. As a student in Paris, she undertook a study of comparative religion, developing an interest in Buddhism and Far Eastern cultures.

In about 1889, a small inheritance allowed David to make her first trip to Asia. She traveled by ship from France to CEYLON (present-day Sri Lanka) and, after touring that land, crossed the Gulf of Mannar to India. By train, she traveled throughout India, eventually returning to France for lack of funds.

David then embarked on a career as a singer with several touring opera companies. As a performer during the 1890s, she traveled to Greece and Tunis, as well as to Hanoi and Haiphong in French Indochina. In 1904, she settled for a time in Tunis, where she married Frenchman Philippe-François Néel, although, soon after the marriage, she and her new husband embarked on separate lives. She traveled and studied in Europe for the next seven years.

In 1911, David-Néel left Paris for India. From Calcutta, she headed northward to the principality of Sikkim in the foothills of the HIMALAYAS. In Darjeeling, she became the first European woman to obtain an audience with the Dalai Lama of Tibetan Buddhists, then in exile from Tibet. Her published interview established her reputation as a journalist and authority on central Asia.

In 1912, David-Néel went to Nepal, then settled in Benares, India, where she studied Hindu philosophy. Back in Sikkim by 1913, she lived in a cave with a Tibetan holy man and learned the Tibetan language. The next year, she obtained the services of a young Sikkimese named Yongden, who would become her assistant and traveling companion for the next 40 years. In 1916, she left India and traveled in Burma (present-day Myanmar), Japan, and Korea, reaching Peking (Beijing) in October 1917. She continued to western China, where she remained for three years, staying at Buddhist monasteries.

In 1921–22, David-Néel visited the Lake Koko Nor region of western China, traveled into Szechwan (Sichuan)

province, and attempted to enter Tibet, but was turned back by Chinese soldiers. In 1923, she entered Mongolia and traveled into the GOBI DESERT and the upper Mekong River region. Disguising herself as a native beggar and traveling with the Japanese philosopher and monk Ekai Kawaguchi, she crossed into Tibet through the Dokar Pass of the Kha Karpo range, a route, at an elevation of 21,000 feet, never previously traveled by a European. In February 1924, still in disguise, she became the first European woman to enter the Tibetan holy city of LHASA and remained there two months.

David-Néel returned to British India in August 1924, traveling southward through the Himalayan passes into Sikkim. Soon afterward, she returned to Europe and settled in the south of France, where she wrote articles and books about her travels in the Far East, including her 1927 book *My Journey to Lhasa*.

In 1936, David-Néel again set out for the Orient, traveling across Russia on the Trans-Siberian Railroad to Vladivostok. From there, she went to Manchuria, crossed western China, then returned to Tibet. She lived in the mountains along the Tibetan-Chinese border during most of World War II. In 1944, she returned to France, resuming her career as a journalist. She died at her home in the south of France in 1969, at the age of 101.

Alexandra David-Néel spent more than a half-century traveling and living in central Asia. In addition to being the first European woman to enter the forbidden city of Lhasa in Tibet, she also traveled along unmapped portions of western China. She was considered one of the foremost authorities on Tibetan Buddhism. In recognition of her accomplishments, she was admitted to the French Legion of Honor in 1964.

Dávila, Pedrarias See ARIAS DE ÁVILA, PEDRO.

Davion, Albert (unknown–1726) *French missionary on the lower Mississippi River*

Albert Davion was born in the northern French town of Saint-Omer, near the port of Calais. He was ordained a Jesuit priest, and in 1690, he arrived in Quebec to serve in the parish located on the Île d'Orléans in the St. Lawrence River.

In 1698, Davion was selected by the Catholic bishop of Quebec, Jean-Baptiste de la Croix Saint-Vallier, to join a missionary expedition to the lower MISSISSIPPI RIVER region, then known as Louisiana. In early July 1698, he embarked from Lachine, near Montreal, with another priest, Jean-François Buisson de Saint-Cosmé, along with a company of 12 VOYAGEURS. Traveling by CANOE, they reached the Great Lakes by way of the Ottawa River in early September. From Fort Michilimackinac, at the northern end of Lake Michi-

gan, they were guided down the portage route to the MISSISSIPPI RIVER by HENRI DE TONTI.

By late December 1698, Davion and his party had descended the Mississippi as far south as present-day Arkansas. He then explored the Yazoo River in what is now west-central Mississippi and established a mission to the Tunica Indians. Soon afterward, he traveled southward to Biloxi Bay and Mobile Bay, then returned to his mission on the Yazoo.

Over the next 20 years, Davion ministered to the Tunica and traveled frequently to the French settlements to the south on the Gulf Coast of present-day Mississippi and Alabama. In 1722, he retired from missionary service and settled in New Orleans before returning to his hometown in northern France three years later.

Albert Davion established one of the first settlements in the lower Mississippi less than 10 years after the explorations of RENÉ-ROBERT CAVELIER DE LA SALLE. His mission on the Yazoo provided JEAN-BAPTISTE LE MOYNE, sieur de Bienville, and PIERRE LE MOYNE, sieur d'Iberville, with a northern outpost for their subsequent settlements on the Gulf of Mexico.

Davis, John (John Davys) (ca. 1550–1605)

English mariner in the Arctic and South Atlantic

John Davis was born near Dartmouth in Devon, England, the son of a farmer. Educated at Totnes, he was a boyhood friend of John Gilbert and SIR HUMPHREY GILBERT, and probably knew their kinsman SIR WALTER RALEIGH. By the time he had embarked on a seafaring career at the age of 16, he had acquired extensive knowledge of navigation, and, by 1579, he had earned a reputation as one of England's foremost navigators and hydrographers.

In 1584, Davis organized an expedition to seek a NORTHWEST PASSAGE to the Far East from England. Among his supporters, known collectively as the North-West Company, were his Devon neighbors, the Gilberts; mathematician John Dee; Sir Frances Walsingham, a leading minister to Queen Elizabeth; and merchant William Sander-son, who provided financial backing for the venture.

In spring 1585, Davis sailed from Dartmouth with two ships, the *Moonshine* and the *Sunshine*. He reached the southern tip of GREENLAND, which he named Cape Farewell, rounded it and explored along the island's southwest coast, which he dubbed the Coast of Desolation. At a fjord he named Gilbert Sound, later the site of Godthaab, he sailed westward across what later became known as Davis Strait, to the east coast of Baffin Island.

On the southeastern portion of Baffin Island, Davis located and named Cumberland Sound, which he hoped would provide the much-sought-after Northwest Passage to the Orient. The onset of winter conditions forced him to sail back to England, where he arrived at the end of September 1585.

In 1586, Davis undertook his second expedition into Arctic waters west of Greenland. In addition to the two vessels from his earlier voyage, he had with him two more ships, the *Mermaid* and the *North Star*. While he returned to Godthaab on the southwest coast of Greenland on the *Moonshine*, he sent two of his ships to seek a passage between Greenland and ICELAND.

At Godthaab, Davis and his men kidnapped an Inuit who guided them farther northward along the west coast of Greenland, as far as what is now Sukkertoppen. The expedition again crossed Davis Strait to Baffin Island, this time exploring Exeter Sound in the hope that it would prove to be an ice-free passage to the Orient. When his progress was blocked by icebergs, Davis headed southward and reexplored Cumberland Sound, then returned to England, arriving at Ratcliffe on the Thames River in October 1586.

Davis's final expedition in search of a Northwest Passage west of Greenland departed England in spring 1587. With three ships under his command—the *Sunshine*, the *Elizabeth* and the *Ellen*—he sailed again to the southeast coast of Baffin Island, where he made the first sighting of a peak he named Mount Raleigh. He then sailed northeastward across Davis Strait to Greenland's west coast. He reached a point near present-day Upernavik, which he named Sanderson's Hope. At 72°46', it was the northernmost point anyone had yet reached. Davis attempted to penetrate the region to the west, but heavy ice conditions forced him southward. He explored southward beyond the southern end of Baffin Island and crossed the eastern entrance to what would later be known as Hudson Strait. Davis then reached the northern tip of Labrador, which he named Cape Chidley. Having explored both sides of Davis Strait, he sailed back to England.

Undaunted by his failure to find a navigable Northwest Passage in the waters west of Greenland, Davis next sought to find the western entrance to the Northwest Passage in the Pacific Ocean. To this end, he sailed in 1591 with an expedition under Thomas Cavendish that planned to circumnavigate the world, east-to-west. Yet the fleet was unable to negotiate a westward passage through the STRAIT OF MAGELLAN. In 1592, Davis, on the *Desire*, became separated from the other vessels near the strait's eastern entrance; after losing his sails in a storm, he drifted across the South Atlantic Ocean and came upon the Falkland Islands. He returned to Britain in 1593.

Starting in 1598, Davis piloted three English maritime expeditions to the EAST INDIES. He took part in the BRITISH EAST INDIA COMPANY's first trading expedition to the Orient in 1601, during which he sailed around the CAPE OF GOOD HOPE and visited Madagascar, as well as other Indian Ocean island groups, including the Chagos Archipelago and the Nicobar Islands. He also

reached the SPICE ISLANDS (the Moluccas) in the far western Pacific.

Davis's final voyage to the East Indies was in 1605, during which he was killed in a battle with Japanese pirates off the coast of present-day Singapore.

John Davis was a pioneer in British Arctic exploration. His three expeditions west of Greenland provided the basis for the subsequent voyages of HENRY HUDSON and ROBERT BYLOT and the exploration of HUDSON BAY in the first part of the 17th century. Although he did not succeed in finding a navigable Northwest Passage, a feat not accomplished until the early 20th century, Davis provided new geographic information about the region west of Greenland. His reports on these voyages included some of the earliest English accounts of contacts with Greenland Inuit. In addition to his exploits as an explorer, Davis invented an improved navigational instrument that enabled mariners to determine their position in high latitudes. Known as the Davis QUADRANT, it was widely used until the development of the SEXTANT in the early 1700s. Davis wrote about the Northwest Passage in his 1595 book, *Worldes Hydrographical Discription*, and authored a 1599 handbook for mariners entitled *The Seaman's Secrets*.

Davydov, Gavrili Ivanovich (1784–1809)

Russian naval officer in Alaska and the North Pacific

In 1802, just after completing his training as a naval officer with Russia's Naval Cadet Corps, Gavrili Davydov joined the RUSSIAN-AMERICAN COMPANY. Accompanied by a friend, Nikolay Alexandrovich Khvostov, he traveled from St. Petersburg eastward across the breadth of Russia and SIBERIA to the port of Okhotsk on the Pacific coast. He then sailed to the Russian-American Company's trading factories in the Aleutian Islands and Alaska, where he remained for over a year, returning to European Russia in early January 1804.

In 1805, after making a second journey to the Pacific coast of Siberia, Davydov and Khvostov sailed from a port on the Kamchatka Peninsula to the Russian fur-trading settlement at Sitka, at the eastern end of the Gulf of Alaska. Accompanying Davydov on this trip was the German naturalist and world traveler, GEORG HEINRICH VON LANGSDORFF, and N. P. Rezanov, a founder of the Russian-American Company.

In 1807, Davydov was back at Okhotsk, with the rank of lieutenant in the Russian navy. That year, he commanded the ship the *Avos* in a cruise southward across the Sea of Okhotsk to the Kuril Islands and the southern region of Sakhalin Island, north of Japan. Khvostov sailed in command of the *Junno*. In the course of this expedition, they attacked trading settlements on the northern Japanese island

of Hokkaido, an action that led to their arrest when they returned to Okhotsk. Davydov and Khvostov managed to escape from the authorities and made their way westward across Siberia and European Russia to St. Petersburg, where they were cleared of any wrongdoing in their raid on Japanese territory.

In 1808, Davydov served in Russian naval actions against Sweden, then settled in St. Petersburg. He was at work on an account of his travels in Siberia and Alaska when, in 1809, he and Khvostov both drowned in the Neva River, following a night out with friends in St. Petersburg. His book was finished by his friend Admiral A. S. Shishkov and published in Russian in 1810–12.

Gavriil Davydov's naval career in the North Pacific and North America coincided with the consolidation of Russian maritime and commercial dominance in eastern Siberia and Alaska. His account of his travels in Siberia and Alaska was published in a German edition in 1816, providing Europeans with a description of Russia's settlements in North America.

Dease, Peter Warren (1788–1863) *Canadian fur trader, surveyor in the Canadian Arctic and Alaska*

Raised in Montreal, Peter Dease entered the FUR TRADE at the age of 13. He served in the XY Company, then the NORTH WEST COMPANY, and in 1821, he became chief trader for the HUDSON'S BAY COMPANY.

In 1825–27, Dease was part of SIR JOHN FRANKLIN'S second Arctic expedition from the mouth of the Mackenzie River in Canada's Northwest Territories to Prudhoe Bay on Alaska's North Slope. In 1837–39, in a series of three expeditions, Dease, along with THOMAS SIMPSON, completed the survey of the coast, which had been begun by Franklin, from the mouth of the Mackenzie River westward to Point Barrow and eastward to the south shore of Victoria Island (which he and Simpson named after Queen Victoria) and King William Island and the west coast of the Boothia Peninsula. Dease retired from the fur trade in 1843, settling near Montreal.

Peter Dease was essential to the mapping of the Canadian Arctic. The geographic details he helped provide led to the British navy's attempts to navigate the NORTHWEST PASSAGE.

De Haven, Edwin Jesse (1816–1865) *U.S. naval officer, American polar explorer*

Born in Philadelphia, Edwin J. De Haven entered the United States Navy as a midshipman at the age of 13. He served on naval vessels in the Caribbean Sea and in the South Atlantic Ocean from 1829 to 1835, and, in 1837, he was in the Pacific Ocean.

At Callao, Peru, in 1839, De Haven joined the crew of the *Vincennes*, the flagship of a U.S. government expedition under the command of CHARLES WILKES. Over the next three years, he sailed with the expedition in its explorations in the Antarctic, the South Pacific, and along the northwest coast of North America. In July 1841, off the Oregon coast, De Haven acted heroically in saving some of the crew when one of the expedition's ships, the *Peacock*, was wrecked near the mouth of the COLUMBIA RIVER. Soon afterward, he was commissioned a lieutenant.

De Haven saw naval action in the U.S.-Mexican War of 1846–48, after which he was assigned to the U.S. Naval Observatory in Washington, D.C., where he took part in meteorological research.

In 1850, De Haven, because of his background in polar exploration and in science, was selected to command an expedition in search of SIR JOHN FRANKLIN and his men, who had been missing in the Canadian Arctic since 1845. New York shipping magnate Henry Grinnell financed this rescue mission, during which scientific studies would also be undertaken. Two ships were outfitted for the expedition, the *Advance* and the *Rescue*.

De Haven, in command of the two vessels, sailed from New York City on May 22, 1850. By the end of July, he was in Baffin Bay west of GREENLAND. In September 1850, his ships were trapped in the ice in Wellington Channel, northeast of Baffin Island. Unable to navigate freely, the expedition drifted with the PACK ICE northward for the next nine months, covering a distance of more than 1,000 miles. During this ordeal, De Haven charted land on the northern end of Devon Island, which he called Grinnell Land, after the expedition's sponsor.

By late May 1851, De Haven's ships were freed from the ice, and, without having found any trace of Franklin's expedition, they returned to New York the following September.

De Haven took part in a coastal survey along the southeastern United States from 1853 to 1857. With deteriorating health and failing eyesight, he retired from the navy in 1862.

Edwin J. De Haven was one of the first U.S. naval officers to take part in polar exploration in both the Arctic and Antarctic. He led the first American effort to find Franklin, and, although the rescue mission did not succeed, he added new geographic information about the Canadian Arctic north of Lancaster Sound.

del Cano, Juan Sebastián See CANO, JUAN SEBASTIÁN DEL.

de León, Juan Ponce See PONCE DE LEÓN, JUAN.

De Long, George Washington (1844–1881)

U.S. naval officer, American explorer in the Siberian Arctic

George W. De Long was born in New York City. He attended public schools in Brooklyn until 1861, then entered the U.S. naval academy at Annapolis, Maryland. Soon after graduating in 1865, he was commissioned an ensign and began serving with naval forces off the coast of Europe and in the South Atlantic Ocean. By 1869, he had been promoted to lieutenant.

In 1871, during a break from active duty in the North Atlantic, De Long was married to Emma J. Wotton aboard an American vessel off Le Havre, France. In summer 1873, De Long, aboard the *Juanita*, commanded by Captain D. L. Braine, took part in the search for CHARLES FRANCIS HALL and his expedition, missing in the region north of GREENLAND on the Arctic steamer *Polaris*. At Upernavik, south of western Greenland's Melville Bay, De Long and a fellow officer, Lieutenant Charles W. Chipp, along with seven others, continued the search northward along the ice-choked coast in a small steam launch. They cruised along the shore of Melville Bay, almost crossing it from south to north. Ten miles south of Cape York, just below the northwestern corner of Greenland, they were forced to turn back when their small craft was caught in a gale.

In fall 1873, De Long returned to New York City, where he took up duties as the executive officer of the school ship *St. Mary's*, anchored in New York Harbor. He served in that capacity for the next five years.

In 1879, De Long was appointed to lead an expedition planning to reach the NORTH POLE by way of the BERING STRAIT, as well as make an east-to-west crossing of the NORTHEAST PASSAGE. James Gordon Bennett, Jr., publisher of the *New York Herald*, had outfitted a ship for this purpose, the *Jeannette* (which had previously seen service in the Arctic as the *Pandora*, under the command of British polar explorer Sir Allen Young). By special act of Congress, the U.S. government assumed authority over the project while Bennett, who, 10 years earlier, had sponsored HENRY MORTON STANLEY's search for DAVID LIVINGSTONE in Central Africa, provided the financing.

De Long and a crew of 33 embarked from San Francisco, California, on the *Jeannette* on July 8, 1879. Among the five naval officers aboard was Lieutenant Chipp, who had accompanied De Long on his previous exploration of Melville Bay in Greenland. Stopping first at Unalaska Island, the *Jeannette* headed northward into the Bering Strait. De Long had planned to meet up with NILS ADOLF ERIK NORDENSKJÖLD, who was engaged in his west-to-east voyage through the Northeast Passage, but he arrived at Cape Serdze Kamen on the northern Siberian coast after Nordenskjöld had left for the Far East.

De Long had planned to make for Wrangel Island after passing through the Bering Strait, and use it as a jumping-

off point for a dash to the North Pole, using sledges and small boats. Wrangel Island, then known as Wrangel Land, was believed by some leading geographers to be the south coast of a large landmass, extending across the top of the world from the Arctic coast of SIBERIA to Greenland. But, on September 5, 1879, the *Jeannette* became trapped in the PACK ICE off the north coast of Wrangel Island. The ship drifted northwestward for the next 17 months. Passing around Wrangel Island, De Long realized that it was not part of a large landmass. Finally, on June 13, 1881, after being carried 600 miles north and west, to a point 150 miles north of the New Siberian Islands, the *Jeannette* was crushed and sank.

De Long and his expedition then headed by whale boats and sledges across the frozen East Siberian Sea, planning to reach the Asian mainland, 300 miles to the south. En route they came upon the northernmost New Siberian Islands, which they named Bennett, Henrietta, and Jeanette Islands. From there, they headed southward across the ice-free sea in several small boats. One boat, with eight crewmen under the command of Lieutenant Chipp, was lost in a gale with all hands, near the Delta of the Lena River. Another group, under the command of the engineering officer, George W. Melville, managed to reach the eastern mouths of the Lena and found aid in a small village.

De Long and 14 others entered the main mouth of the Lena on September 17, 1881, and attempted to travel up the frozen river. By early October, however, they were too weakened by exposure and starvation to continue. De Long sent two men ahead, who managed to reach the safety of a Russian settlement 25 miles away. Severe weather prevented them from returning for De Long, and he perished with 12 of his party sometime after October 30, 1881. The surviving members of the De Long expedition were reunited at Bulun on the lower Lena in late October 1881. In March 1882, Melville went back to the Lena Delta, where he located the bodies of De Long and the others, and recovered his commander's notes, journals, and scientific data.

In 1884, the U.S. government arranged to have De Long's remains, along with those of the others who had perished, returned to New York City. Emma Wotton De Long edited her husband's journals, and, in 1883, they were published as *The Voyage of the Jeannette*. George W. Melville's account of his rescue attempt, *In the Lena Delta*, was published in 1885.

Although George W. De Long's attempt to reach the North Pole ended in tragedy, his expedition led to several important findings about the Arctic Ocean. In addition to charting the ocean's 50,000 square miles, he determined the true dimensions of Wrangel Island, disproving the notion that it was part of a landmass extending to Greenland. When debris from the wrecked *Jeannette* began to appear off the coast of Greenland in 1884, it indicated the extent of the

westward drift of the Arctic Sea, and inspired FRIDTJOF NANSEN to undertake an intentional drift across the frozen Arctic Ocean 10 years later. The New Siberian Islands located by De Long now bear his name.

Denham, Dixon (1786–1828) *British army officer in North and West Africa*

Dixon Denham was born in London and, while still in his teens, entered the British army. He served in the Napoleonic Wars of 1798–1815, seeing action in the Peninsular Campaign in Spain as well as at the Battle of Waterloo in 1815.

In 1821, the British Foreign Office selected Denham, by then a major, to accompany HUGH CLAPPERTON and WALTER OUDNEY in an expedition into the Bornu kingdom of West Africa to trace the course of the NIGER RIVER. By the end of that year, Denham joined Oudney and Clapperton at Tripoli in present-day Libya.

Denham, Clapperton, and Oudney made a southward crossing of the SAHARA DESERT and, in February 1823, they became the first Europeans to see Lake Chad. While Clapperton went south and west in an attempt to reach TIMBUKTU, Denham explored to the southeast, examining the Chari River, the principal source of Lake Chad. After exploring the Waube and Logone Rivers as well, Denham rejoined Clapperton at a settlement south of Lake Chad, and the two made their way northward back to Tripoli. Oudney, in the meantime, had died of tropical fever.

Denham was back in England in 1825, where he was appointed superintendent of liberated slaves in West Africa. He was also named lieutenant governor of the British colony of Sierra Leone. He arrived in Sierra Leone in 1827; he died of fever there the following year.

Dixon Denham, with Clapperton and Oudney, undertook some of the earliest official British explorations into the interior of West Africa. Although the expedition did not settle the question of the course of the Niger, it did provide new information on the caravan routes between that river and Lake Chad. His account of his African explorations, entitled *Narrative of Travels and Discoveries in Northern and Central Africa*, was published in 1826.

Desideri, Ippolito (1684–1733) *Italian missionary in India and Tibet*

Ippolito Desideri was born in the town of Pistoia, in northern Italy's Tuscany region. At the age of 16, he began to study with the Jesuits, and he was ordained a priest in 1712.

One year after his ordination, Desideri sailed from Lisbon, Portugal, to the Portuguese colony of Goa on the southwest coast of India. At Goa, he studied some of India's native languages in preparation for missionary work. In 1714, Desideri journeyed inland to Delhi, where he was

joined by a Portuguese Jesuit named Emmanuel Freyre. The two missionaries traveled northward to Lahore, on the first leg of a journey to Tibet, where Desideri intended to reestablish a Jesuit mission at LHASA, the Tibetan capital.

From Lahore, Desideri and Freyre traveled into the Himalayas, crossing that range by way of the 11,758-foot-high pass of Zoji La. They reached Leh, the capital of the kingdom of Ladakh. Because Father Freyre had become ill, they decided to return to India. Instead of recrossing the mountains, they traveled by way of a southeastward route along the upper INDUS RIVER. They crossed Kashmir and visited the cities of Srinagar and Gartok. Their journey took them around Lake Mansarowar, which Desideri mistook for the source of the GANGES RIVER.

Desideri and Freyre made the final part of the journey with a military convoy taking a Tartar princess to Tibet and entered Lhasa in March 1716. Soon afterward, Freyre made his way back to India via Nepal; Desideri remained in Lhasa and studied the Tibetan language and Buddhism. The Mongol ruler of Tibet allowed him to preach Christianity. In 1720, Desideri witnessed the Tartar invasion of Tibet and the subsequent annexation of the kingdom by China. In 1721, when the Capuchin order was granted the exclusive right to maintain a mission in Tibet, Desideri was ordered by his superiors in Rome to return to India.

Desideri remained in Agra and Delhi for the next five years. In 1727, he sailed back to Europe by way of the CAPE OF GOOD HOPE, arriving in Port-Louis on the north coast of France in August of that year. He settled in Rome and wrote an account of his experiences in Tibet. Not translated until 1904, it was published in 1931 as *An Account of Tibet: The Travels of Ippolito Desideri*.

Ippolito Desideri was the last Christian missionary allowed to preach in Tibet until the early years of the 20th century. With Emmanuel Freyre, he entered Tibet along a route that would not be traveled by Europeans until the expedition of SIR FRANCIS EDWARD YOUNGHUSBAND in the early 1900s.

De Smet, Pierre-Jean (1801–1873)

Belgian missionary, guide in the Pacific Northwest

Pierre-Jean De Smet was born in Belgium. At the age of 20, he arrived in Florissant, Missouri, near St. Louis, where he studied at the Jesuit St. Stanislaus Seminary. Ordained a priest in 1827, he returned to Europe and spent the next 10 years raising funds and recruiting personnel to establish Jesuit missions to the northern plains and the Pacific Northwest.

In 1838, De Smet returned to St. Louis, and he soon journeyed up the Missouri to found a Jesuit mission among the Potawatomi Indians at present-day Council Bluffs, Iowa. Over the next two years, he made a series of trips up and

down the MISSOURI RIVER, visiting the Sioux (Dakota, Lakota, Nakota) tribes of what is now South Dakota. In 1839, he traveled aboard an AMERICAN FUR COMPANY steamboat farther upriver to present-day Sioux City, Iowa, for a peace council between the Potawatomi and the Sioux. He returned several weeks later by CANOE.

In 1840, De Smet traveled with an American Fur Company caravan overland to the Bitterroot Valley region of western Montana inhabited by the Flathead Indians. At present-day Stevensville, Montana, he established the St. Mary's mission. The next year, he was back in St. Louis to obtain additional supplies and personnel for the mission.

On his return trip to Montana, De Smet was accompanied by fur trader and mountain man THOMAS FITZPATRICK. In May 1841, at Sapling Grove in eastern Kansas, De Smet and Fitzpatrick met up with the first organized wagon train of emigrants headed for the rich farmlands of California, a group organized by settlers from Platte County, Missouri, under the name of the Western Emigration Society. The emigrants lacked the knowledge and experience to cross the Great Plains and the ROCKY MOUNTAINS, and De Smet and Fitzpatrick agreed to guide them.

Departing eastern Kansas in May 1841, De Smet and Fitzpatrick led the wagon train along the Platte River Valley of present-day Nebraska of southern Wyoming. After a stopover at Fort Laramie, the group headed westward to the Sweetwater River. They cut through the Rockies via the SOUTH PASS of Wyoming's Wind River Range, thus crossing the Continental Divide. From the western slopes of the Wind River mountains, they followed the Green River Valley northward into Soda Springs in what is now southeastern Idaho.

Near what is now Pocatello, Idaho, the wagon train divided. De Smet and Fitzpatrick led 32 of the pioneers to the COLUMBIA RIVER, which they followed to Fort Vancouver near present-day Portland, Oregon, then proceeded southward into northern California. The rest of the emigrants headed west and south from Pocatello, following the Humboldt River into the deserts of north-ern Nevada, and across the Sierra Nevada into central California.

From 1840 to 1846, De Smet established six interconnected missions—the Rocky Mountain missions—administering to such tribes as the Flathead, Kalispel, Coeur d'Alene, Blackfeet, Nez Perce, Cayuse, and Sioux. He became an important intermediary between Indians and the increasing number of non-Indian settlers in the Bitterroot



Detail of map of the American West by Pierre-Jean De Smet (1851) (*Library of Congress*)



Pierre-Jean De Smet (Library of Congress)

Valley of present-day Montana and eastern Idaho. In order to obtain additional support for his work, he made frequent trips across the Rockies and Great Plains to St. Louis. In the 1850s, he served as a government peace commissioner to the Yakama and Coeur d'Alene under Kamiakin, and, in the 1860s, to the Lakota Sioux under Red Cloud.

Pierre-Jean De Smet contributed to U.S. exploration and settlement by helping guide the first wagon train westward. The route he and Fitzpatrick followed became the primary route for thousands of emigrants heading for California via the Oregon and California Trails. Moreover, his missions provided important links for the construction of the Mullan Wagon Road, built by the U.S. Army in 1859, which connected Fort Benton, Montana, the westernmost navigable point of the Missouri River, with Fort Walla Walla, Washington. De Smet wrote prolifically about his work and experiences in the Far West, including the 1847 book, *Oregon Missions and Travels*.

de Solís, Juan Díaz See DÍAZ DE SOLÍS, JUAN.

de Soto, Hernando See SOTO, HERNANDO DE.

de Vaca, Alvar Núñez Cabeza See CABEZA DE VACA, ALVAR NÚÑEZ.

Dezhnev, Semyon Ivanovich (Semeon Dezhnyov, Semen Ivanov Deshnef, Simon Dezhnev) (ca. 1605–1672) *Russian Cossack leader in northeastern Siberia*

Semyon Dezhnev, a Russian Cossack, lived in frontier settlements in eastern and northern SIBERIA in the 1630s, including Tobolsk, Yeniseysk, and, after 1638, Yakutsk. In 1640–41, he took part in fur-trading expeditions to the Yana River, and the next year, he went farther eastward to the upper Indigirka River.

In 1644, Dezhnev accompanied a band of Cossacks descending the Indigirka River to its mouth on the East Siberian Sea, an arm of the Arctic Ocean. With Cossack leader MIKHAIL STADUKHIN, he was part of an expedition traveling in small boats along the Arctic coast of Siberia eastward from the mouth of the Indigirka to the Alazeya River's outlet on the East Siberian Sea. From there, he traveled with the Cossacks overland to the mouth of the Kolyma River, farther to the east.

Under the command of FYODOT ALEKSEYEV POPOV, Dezhnev and other Cossacks, in 1647, attempted to travel eastward from the mouth of the Kolyma River in search of a region supposed to be teeming with walruses, and thus a great potential source of ivory. The Cossacks were unable to proceed around the Chukchi Peninsula that year, but in 1648, Dezhnev led a party of 90 Cossacks in small boats and succeeded in circumnavigating the Chukchi Peninsula. Having advanced more than 1,000 miles eastward from the Kolyma's mouth, he sailed south of Wrangel Island. He rounded a cape at the Chukchi Peninsula's northeastern end and headed southward along the eastern Siberian coast, reportedly passing through what later came to be known as BERING STRAIT. Along the way, some of the boats were wrecked. Temporarily stranded, Dezhnev and only a handful of his men survived the winter on the Siberian coast.

Dezhnev may have made a landing on the northern portion of the Kamchatka Peninsula in 1648. In any event, he led his men inland from the mouth of the Anadyr River, of which he made the European discovery, and established the settlement of Anadyrsk.

In 1652, Dezhnev explored the Gulf of Anadyr. The region proved rich in walruses and provided a supply of furs and ivory for years. In 1662, after 10 years in the Gulf of Anadyr region, Dezhnev returned overland to Yakutsk. In 1664, he journeyed to Moscow with the proceeds of his trading exploits in eastern Siberia. He was made an Atman, or Cossack leader. He lived in Yakutsk until 1671, then spent his remaining years in Moscow.

Semyon Dezhnev's voyage around the Chukchi Peninsula demonstrated that the north coast of Russia and Siberia did not dip southward (as many hopeful seekers of the NORTHEAST PASSAGE had incorrectly speculated), but extended north of the ARCTIC CIRCLE as far as the Pacific coast. His sighting of the channel between Siberia and Alaska pre-

ceded the explorations of VITUS JONASSEN BERING by almost a century. Yet Dezhnev's explorations were never officially documented, and, although the strait he discovered appeared on early maps, it took Bering's expeditions to confirm the eastern limits of the Asian continent. The point of land east of the East Siberian Sea, at the northern end of Bering Strait, was named Cape Dezhnev. Also known as East Cape, it is the northeasternmost point of Asia.

Dias, Bartolomeu (Bartholomew Diaz, Bartholomeo Díaz de Novaes, Bartolomé Díaz)

(ca. 1450–1500) *Portuguese mariner on the west coast of Africa*

Few details exist of Bartolomeu Dias's early life or origins. Some sources suggest he was related to DINÍS DIAS, the Portuguese navigator who made the European discovery of Cape Verde, and João Dias, who first rounded Cape Bojador on the Atlantic coast of West Africa.

Dias first appears in official Portuguese records of 1478, indicating he was then involved in the ivory trade on the west coast of Africa. In 1481, John II (John the Perfect) became king of Portugal and immediately set about renewing Portuguese efforts to find a sea route around Africa to India—efforts that had been initiated earlier in the century by HENRY THE NAVIGATOR, prince of Portugal. That year, Dias, who was prominent at the court of King John and an accomplished mariner and navigator, commanded a vessel in a fleet under Diogo d'Azambiya on a trading expedition along West Africa to the Gold Coast (present-day Ghana) on the Gulf of Guinea. Dias was back in Lisbon in 1486, where he served as superintendent of the royal warehouses.

In 1487, Dias was placed in command of a follow-up expedition to DIOGO CÃO's voyage of 1485. Cão had reached as far south along the African coast as Cape Cross, part of present-day Namibia. It was not then known to Europeans how far south the African continent extended, or whether there was a passage into the Indian Ocean. While Dias was assigned to seek the southernmost extent of Africa by sea and possibly a route to India, PERO DA COVILHÃ was dispatched by King John on an overland journey to Africa and India.

Dias sailed from Lisbon in August 1487. His fleet of three ships consisted of two of the CARAVEL type and a supply vessel. Earlier voyages of exploration along the African coast had been limited in their range because of shortages of food and other supplies. It was hoped that a separate ship to carry stores would provide adequate support to circumnavigate the continent. King John also wanted to make contact with PRESTER JOHN, a fabled Christian monarch whose kingdom was believed to lie in the interior of East Africa. It was hoped that an alliance with Prester John would help overcome Muslim domination of the trade route to India, as

well as provide safe havens for the Portuguese in their sea voyages around Africa.

At various points along the west coast of Africa, Dias put ashore six African natives, who had been taken to Lisbon several years earlier by Cão. He gave them gold, silver, and spices as samples of what the Portuguese were seeking in trade, hoping at least one of them would eventually reach Prester John.

By December 1487, Dias had arrived in Luderitz Bay on the coast of present-day Namibia, several hundred miles beyond the farthest point reached by Cão. He set up a *PADRÃO* (pillar) declaring possession of the region for Portugal, and, leaving his supply ship with a party of nine men, he headed southward along the coast. But contrary winds and a north-flowing current led him to sail out to sea about 500 miles north of the CAPE OF GOOD HOPE. A subsequent storm blew the two vessels southward.

After almost two weeks of sailing out of sight of land, Dias picked up westerly winds. Expecting to reach the African coast, he found he could approach the mainland only by sailing northward, indicating that he had rounded the southern end of Africa. After a landing at Mossel Bay (which Dias named Cowherd Bay after the cattle he saw grazing there), he headed several hundred miles eastward along the south coast of Africa to a point where it appeared to angle to the northeast. He made a brief landing and had a hostile encounter with native Hottentot, killing one. At the mouth of the Great Fish River, which he dubbed Rio do Iffante in honor of Prince Henry, his crew compelled him to return to the supply ship they had left on the southwest coast of Africa. On the return voyage, he caught sight of Africa's southernmost point, Cape Agulhas, and, soon afterward, he sighted and perhaps named the Cape of Good Hope.

When Dias returned to Luderitz Bay, he discovered that only three of the nine men he had left had survived. The supply ship had become rotten with worms, and Dias had it burned. Following the coast, Dias sailed to the Gulf of Guinea, where on the island of Principe he rescued Portuguese navigator and soldier DUARTE PACHECO and several shipwrecked companions. Dias returned to Lisbon in December 1488.

In 1494, Dias was named to a high post in a trading syndicate on the Gulf of Guinea. Ten years passed after his epoch-making exploration of the southern limits of Africa until a voyage was undertaken, commanded by VASCO DA GAMA. In 1497, Dias, who had supervised the construction of the expedition's ships, accompanied da Gama as far as the Cape Verde Islands, from where he traveled to the West African coast and prospered in the ivory trade.

In 1500, Dias commanded several of the ships in PEDRO CABRAL's India fleet, intending to travel with the expedition as far as Sofala on the East African mainland, op-

posite Madagascar, with a royal charter to establish a Portuguese trading post. Following Dias's advice, Cabral sailed westward, away from the West African coast, and made the first European sighting of the southeast coast of Brazil. Shortly after leaving Brazil, Dias and all hands on his ship were lost, along with four other vessels, in a storm off the Cape of Good Hope. A ship captained by his brother was separated from Cabral's fleet in that storm; it went on to explore Madagascar and the Gulf of Aden before rejoining Cabral's ship in the Cape Verde Islands on the homeward voyage.

Bartolomeu Dias's determination of the southern extent of Africa proved to European geographers that the Indian Ocean was not landlocked and could be entered from the Atlantic Ocean. When Dias returned to Lisbon with this momentous news in 1488, CHRISTOPHER COLUMBUS was attempting to win King John's support for his proposed westward voyage to India. With Dias's findings, the Portuguese felt Columbus's project was unnecessary and rejected it. European knowledge of the coast of Africa had been extended 1,260 miles by Dias; an Atlantic entrance to the Indian Ocean provided the basis for da Gama's historic voyage to India in 1497–99. In addition, Dias's 1487–88 voyage demonstrated that Africa was not connected to the hypothetical GREAT SOUTHERN CONTINENT. Some sources suggest that Dias originally named the point of land he saw on his return voyage around Africa the Cape of Storms, and it was King John II who later gave it the more optimistic name Cape of Good Hope.

Dias, Dinís (Diniz Díaz) (fl. 1440s) *Portuguese mariner on the west coast of Africa*

Dinís Dias was a squire serving under HENRY THE NAVIGATOR, prince of Portugal, at Sagres, Portugal. In 1444, he was commissioned to explore southward along the west coast of Africa, beyond the Senegal River. It was to be a follow-up to NUÑO TRISTÃO's exploration of the Senegal River one year earlier.

By early 1445, Dias had descended the African coast south of the delta of the Senegal River and had reached a point of land that he named Cape Verde (green cape), after a green wooded peninsula he spotted there. It was the first greenery he had seen after sailing down 800 miles of desolate desert coastline. Sailing beyond Cape Verde, he noted that the coast of Africa began to extend eastward, and his subsequent reports inspired false hopes that he had rounded Africa. Near Cape Verde, he left a record of his voyage on a palm tree before returning to Portugal.

Soon afterward, Dias undertook a second voyage to the delta of the Senegal River and beyond, on behalf of a group of Portuguese merchants. This effort met with little success because of hostility by the natives.

Although Dinís Dias did not realize it at the time, Cape Verde is the westernmost point of the African continent. In any case, he significantly advanced the geographic knowledge of Africa with his reports on the eastward curve of the African coast south of Cape Verde. (An island group to the west of the cape, discovered by ALVISE DA CADAMOSTO in 1456, is also called Cape Verde.)

Díaz, Melchor (Melchior Díaz) (unknown–1540) *Spanish conquistador in Mexico and the American Southwest*
In 1536, Melchor Díaz, a professional soldier with Spanish forces in Mexico, was the local colonial administrator, or *alcalde*, of Culiacán, then a frontier garrison on the Pacific coast. Early in 1536, ÁLVAR NÚÑEZ CABEZA DE VACA and ESTEVANICO, after five years of wandering in the American Southwest, arrived in Culiacán, where they were welcomed by Díaz.

Three years later, in 1539, the Spanish viceroy of Mexico, ANTONIO DE MENDOZA, sent Díaz with a cavalry detachment northward from Culiacán to reconnoiter the region visited by Friar MARCOS DE NIZA, who, with Estevanico, had traveled there to investigate reports of the fabled Seven Cities of Cibola. The next year, Díaz and Niza took part in FRANCISCO VÁSQUEZ DE CORONADO's expedition into what is now New Mexico. Following the capture of the Hawikuh pueblo of the Zuni Indians, near present-day Zuni, New Mexico, Díaz escorted Niza back to Sonora in what is now northern Mexico.

At Ures in Sonora, Díaz met up with Coronado's additional forces and directed them to join the expedition's leader in the north. In September 1540, he set out from Ures with a small company of soldiers and headed westward toward the Gulf of California, where he planned to join the expedition's fleet, under HERNANDO DE ALARCÓN.

Díaz followed a route along the present Arizona-Mexico border. He reached the COLORADO RIVER at its confluence with the Gila River by following an ancient Indian trail. Near the Yuma (Quechan) Indian settlements on the Colorado, he came upon a stone monument that had been erected by Alarcón's men, and beneath it he found a message left by Alarcón informing him that the ships had sailed for Mexico.

Díaz then led his men across the Colorado River and explored the northern region of the Baja California peninsula. In late 1540, he was injured with a lance, dying after three weeks. His men then headed northeastward to rejoin Coronado in New Mexico.

As one of Coronado's lieutenants, Melchor Díaz traveled into the territory southwest of the main Spanish penetration of western New Mexico and Arizona, leading the first European exploration of northern Baja California. When he came upon the Colorado River, he named it the Tizon, which means "firebrand" in Spanish, after the torches he saw

carried by the Yuma downstream. He correctly surmised in his report that the river was the same one previously sighted from the rim of the Grand Canyon farther upstream by GARCÍA LÓPEZ DE CÁRDENAS. In his account, Díaz also described the starkly barren and inhospitable terrain around the northern end of the Gulf of California, an image that discouraged subsequent Spanish exploration into Baja California until the travels of Father EUSEBIO FRANCISCO KINO more than 150 years later.

Díaz del Castillo, Bernal (Bernal Díaz)

(ca. 1492–ca. 1584) *Spanish conquistador in Panama and Mexico*

Bernal Díaz del Castillo was born in Medina del Campo, Spain. By the age of 22, he had joined the ranks of the CONQUISTADORES in the Americas, and after settling in Cuba, he took part in the colonization of Panama under PEDRO ARIAS DE ÁVILA.

In 1518, Díaz del Castillo enlisted in HERNÁN CORTÉS's expedition to Mexico; over the next three years, he took part in the campaign against the Aztec Indians. For his efforts in support of Cortés, he was granted a large estate in what is now Guatemala, where he remained for the next 60 years as a landed squire and magistrate.

In the 1570s, Díaz del Castillo read with great dissatisfaction Francisco López de Gómara's history of Cortés's campaign, and in response he wrote his own account based on his eyewitness experience, entitled *Crónica verdadera de la conquista de la Nueva España* (The true history of the conquest of New Spain).

Bernal Díaz del Castillo's account was not published until 1632, long after his death. Although it has been criticized for exaggerating some of his own exploits in the campaign, it provides details of the campaign not revealed in the work of Gomara, who had never left Spain. It was the first major historical work of the Spanish conquest written by a participant and was among the earliest accounts to describe the Aztec point of view, relating how they believed that the arrival of the Europeans was the fulfillment of a divine prophecy.

Díaz de Solís, Juan (ca. 1470–1516)

Spanish mariner in the Caribbean and South America

Juan Díaz de Solís was born at Lebrija in southwestern Spain, near the ports of Sanlúcar de Barrameda and Cádiz. He became a seafarer in service to Portugal, taking part in voyages around the CAPE OF GOOD HOPE to India and developing a reputation as an accomplished pilot and navigator.

In the late 1490s, Díaz de Solís reportedly killed his wife in Portugal. To escape the consequences, he fled back to

his native Spain. He became associated with VICENTE YÁÑEZ PINZÓN, a veteran of CHRISTOPHER COLUMBUS's first voyage.

In 1506, at the request of King Ferdinand II of Spain, Díaz de Solís produced the first marine chart of the South American coast. That year, he and Pinzón jointly commanded a Spanish expedition in search of a transoceanic strait through the Americas. After following the route taken by Columbus in his fourth voyage of 1502–04, they circumnavigated Cuba and established with certainty that it was an island. In their exploration along the mainland, they examined the Yucatán and the Bay of Campeche, which they named the Gulf of the Nativity, then sailed southward into the Gulf of Honduras, returning to Spain by 1507.

In 1508, King Ferdinand commissioned Díaz de Solís to undertake another search for a southwest passage. On June 29, 1508, he sailed from the Spanish port of Sanlúcar de Barrameda with two ships, the *Isabeleta* and the *Magdalena*, again joined by Pinzón as co-commander. Having determined on their earlier voyage that no strait was to be found along the mainland of CENTRAL AMERICA, they explored southward along the Atlantic coast of South America. At 41° south latitude, they came upon the mouth of the Río Negro, flowing into the sea at a point on what is now the central Atlantic coast of Argentina. Díaz de Solís and Pinzón disagreed on how the rest of the voyage should be conducted, and they sailed back to Spain in 1509, where King Ferdinand had Díaz de Solís imprisoned for bringing the voyage to an abrupt conclusion. Yet he was released after two years, and, in 1512, he was named as Spain's "pilot major," succeeding AMERIGO VESPUCCI.

In late November 1514, the king commissioned Díaz de Solís to explore the coast of South America once again in an attempt to find a strait into the South Sea (the Pacific Ocean). This voyage had been given greater impetus by VASCO NÚÑEZ DE BALBOA's sighting of the Pacific Ocean the previous year, news that had rekindled hopes that a passage through the Americas, if found, would provide Spain with an all-water western sea route to the SPICE ISLANDS (the Moluccas) and the riches of the EAST INDIES.

In command of three ships, Díaz de Solís sailed from Spain on October 8, 1515. He reached the South American coast near present-day Rio de Janeiro, then proceeded southward, taking possession for Spain of much of what is now Uruguay and coming upon La Plata and Lobos Islands. In mid-February 1516, he reached what he at first thought was the entrance to the southwest passage. Díaz de Solís named it El Mar Dulce (the freshwater sea), the same name that Pinzón in 1500 had given to what later became known as the AMAZON RIVER.

Exploring upstream, Díaz de Solís soon determined that he had in fact reached the outlet of a river, not a passage to the Pacific, and renamed the estuary the Río Solís. He sailed a short distance up one of its chief tributaries, the Uruguay, and at Martín García Island, near present-day Buenos Aires, he went ashore with a landing party, intending to kidnap some natives to take to Spain. Although they appeared friendly, they were actually the fierce and cannibalistic Charrua, and they suddenly attacked Díaz de Solís and the men with him. The men aboard his ship watched helplessly as the natives hacked Díaz de Solís and the others to death, roasted the remains, and ate them.

After Díaz de Solís's death, command of the expedition went to his brother-in-law, Francisco de Torres. Torres took on a cargo of brazilwood, highly prized in Europe as a source of textile dye, and headed back to Spain, arriving in September 1516. On the homeward voyage, one of the ships was wrecked on the island of Santa Catarina off the Brazilian coast, and some of the survivors remained there until they were rescued by SEBASTIAN CABOT 10 years later. Cabot heard reports from the castaways of an Indian kingdom rich in silver thought to exist beyond the point on the river where Díaz de Solís had died and to have been discovered by ALEJO GARCIA. He then explored the estuary himself, renaming it the Río de la Plata (river of silver).

Juan Díaz de Solís made the European discovery of the Río de la Plata, the estuary of South America's second largest river system. In Spain, FERDINAND MAGELLAN heard from survivors of Díaz de Solís's last expedition that the coastline of South America appeared to extend southwestward. The news supported his idea that a westward passage to the Pacific existed in Spanish territory and helped him gain the backing of the Spanish government for his historic voyage of 1519–21.

Dietrich, Koncordie Amalie Nelle (1821–1891)

German naturalist in Australia

Amalie Dietrich, née Nelle, was born in the German state of Saxony. Growing up in a small village, she gained an understanding of plants and natural science through her mother's work as an herbal healer.

At the age of 24, she married an apothecary named Wilhelm Dietrich. They decided to supplement his income by gathering plants for scientists and collectors. When her husband was otherwise busy, Dietrich wandered throughout the countryside with her daughter and a cart pulled by a dog, in search of rare plant specimens as well as insects and rocks. Divorced at the age of 40, she applied for work as a naturalist with Johann Godeffroy, the owner of a Hamburg shipping firm, who was stocking his private museum. A letter of introduction from a collector helped her get hired, but at only half the pay as a male naturalist.

In 1863, Dietrich departed Hamburg on one of Godeffroy's boats, sailing around Africa's CAPE OF GOOD HOPE for Australia. Over the next 10 years, she traveled throughout the Queensland outback on collecting forays. In addition to flora, she gathered mammals, fish, and insects. She eventually settled in the coastal town of Bowen, where she maintained a zoo of animals that she intended to take back to Germany.

When she returned to Germany, Dietrich settled in Hamburg; there she cataloged her collections. Godeffroy later went bankrupt, and his museum was sold. Having lost her job and without help from her now-married daughter, she spent the rest of her life in a Hamburg home for the elderly.

Amalie Dietrich amassed an enormous collection of flora and fauna, among the largest ever gathered by a woman. Some of her samples and much of her written work were lost in the fire bombings of Hamburg during World War II, but records exist of the species she gathered. Six different species have been named for her, including the *Acacia dietrichiana* plant, the *Cephrenes amalia* butterfly, and the *Nortonia amaliae* wasp.

Diogenes (Diogenes the Greek) (fl. A.D. 40s–50s)

Greek merchant in East Africa

Diogenes the Greek was a mariner and merchant during the reign of the Roman emperor Claudius, A.D. 41–54. He plied his trade between India and the MEDITERRANEAN SEA, crossing the Arabian Sea and the Indian Ocean. On a return voyage from India, his ship was blown off course in the Gulf of Aden and was forced around the Horn of Africa (northeast tip of present-day Somalia), then southward down the continent's east coast.

Near Dar es Salaam, on the coast of what is now Tanzania, Diogenes managed to land at an ancient port known as Rhapta. From there, he traveled inland, reportedly reaching two large bodies of fresh water that might have been Lake Victoria and Lake Albert. He also reported seeing a range of snow-capped mountains. According to Diogenes, it was the runoff from the mountains' melting snow that formed the great lakes, which in turn were the source of the NILE RIVER.

Diogenes the Greek is one of the earliest known explorers of central Africa. After his return to the Mediterranean region, news of his travels began circulating among ancient scholars. In the second century, PTOLEMY wrote about the source of the Nile and the fabled MOUNTAINS OF THE MOON, thought to be the Ruwenzori Range or possibly MOUNT KILIMANJARO and Mount Kenya. The geography of the region was not determined until the mid-19th century and the explorations of SIR RICHARD BURTON, JOHN HANNING SPEKE, and SIR SAMUEL WHITE BAKER, among others.

Dodge, Henry (1782–1867) *U.S. Army officer in the American West*

Henry Dodge was born in Vincennes in present-day Indiana, then a frontier settlement on the Wabash River. When still in his teens, he moved with his family to the Missouri country, which was at that time under Spanish control.

In about 1806, Dodge took part in an independent military expedition down the MISSISSIPPI RIVER in support of Aaron Burr's plan to create a separate colony in the Spanish-held Southwest. Burr was arrested for treason, but Dodge returned to Missouri, never officially implicated in the conspiracy.

During the early 1800s, Dodge was a territorial sheriff and marshal in the newly organized Missouri Territory. With the outbreak of the War of 1812, he became a major of mounted troops in the Missouri territorial militia.

In 1827, Dodge moved to the Wisconsin Territory, where he founded the lead-mining settlement of Dodgeville. That year, he took part in suppressing a Winnebago Indian uprising under Red Bird. In 1832, he was made a colonel of a mounted Michigan militia unit as well as a major in the regular army, and he fought in the principal battles of the Black Hawk War involving Sac and Fox (Mesquaki) Indian bands.

In 1833, Dodge organized the First Dragoon Regiment, the precursor of the cavalry, which was sent to Fort Gibson in the Indian Territory (present-day Oklahoma). In 1834, under General HENRY LEAVENWORTH, Dodge set out from Fort Gibson and explored western Oklahoma's Wichita Mountains. Dodge's contingent also explored the Red River region of Mexican-held Texas and made diplomatic contacts with the area's Comanche, Kiowa, and Wichita Indian bands. The Lenni Lenape (Delaware) Indian BLACK BEAVER and part-Cherokee JESSE CHISHOLM served as guides with the expedition, and GEORGE CATLIN, the painter, traveled with it. The troops were afflicted with malaria, and one-third of the men died, including General Leavenworth.

The next year, 1835, Dodge led a large dragoon expedition that explored the ROCKY MOUNTAINS and the easternmost segment of the Oregon Trail. He and his men returned to Fort Gibson by way of the Santa Fe Trail and Bent's Fort, after covering 1,600 miles of territory. Also in 1835, Dodge established Camp Holmes on the Arkansas River and explored the Cross Timbers region of west Texas.

After 1836, Dodge returned to Wisconsin, where he served as Wisconsin territorial governor and later as the territory's representative in Congress. When Wisconsin achieved statehood in 1848, Dodge was one of its first two U.S. senators.

The official account of Dodge's spring 1834 expedition was written by Lieutenant Thomas B. Wheelock and submitted to the U.S. Congress as *Journal of the Campaign of the Regiment of Dragoons under Col. Henry Dodge from Fort Gibson to the Rocky Mountains in 1834*.

As a leader of early military exploration of the southern plains, Henry Dodge helped increase the U.S. government's knowledge of the region and open it to the relocation of the Southeast tribes, as well as to later non-Indian settlement. He was also a leading pioneer on the Wisconsin frontier, playing a key role in the development of Wisconsin as a state.

Dollier de Casson, François (1636–1701)

French missionary in Canada and the Great Lakes

François Dollier was born in the city of Nantes on the west coast of France. His family was of the bourgeois class, with connections to both the nobility and the military. He served for three years in the army under the command of French general Henri de Turenne, during which he reached the rank of captain of cavalry in campaigns against Spanish and Austrian forces in the European wars of the late 1650s.

Following his military service, Dollier entered the Sepulcian order, completing his studies at a seminary in Paris. Ordained a priest by 1666, he left that year for French Canada to take up duties as a missionary. Immediately upon his arrival in Quebec in September 1666, he was attached as a chaplain to a French regiment in a military expedition against the Mohawk Indians. He was soon sent on a similar mission to a garrison at Fort Sainte-Anne on Lamothe Island in Lake Champlain, in present-day northeastern New York State. He remained there almost a year, during which he helped the troops recover from an outbreak of SCURVY.

In summer 1667, Dollier was back at Montreal. He was sent to serve as a parish priest at the French settlement of Trois Rivières on the St. Lawrence River. After a year there, he made a journey to the Lake Nipissing region to study Indian languages. At that time, he learned of the Ottawa and Potawatomi Indians who dwelled in the upper Mississippi Valley to the south. Planning to expand his missionary work to these tribes, Dollier set about organizing an evangelical expedition.

Dollier and a number of Sepulcian priests departed Montreal in early July 1669, accompanied by a crew of *voyageurs*. Included in the party was fur-trader and explorer RENÉ-ROBERT CAVELIER DE LA SALLE, who was to serve as interpreter. Among the priests was RENÉ DE BRÉHANT DE GALINÉE, who had some geographic knowledge of the Great Lakes region to the west.

Leaving La Salle on the south shore of Lake Ontario, Dollier and the other priests continued westward to the Niagara River, guided by a friendly Iroquois (Haudenosaunee). Near what is now Hamilton, Ontario, they met up with Adrien Jolliet, brother of LOUIS JOLLIET, who provided them with directions on the best route to the upper MISSISSIPPI RIVER region and information on the region's tribes.

Dollier and his companions wintered on the north shore of Lake Erie. On March 23, 1670, Dollier erected a

cross, claiming the region for Louis XIV of France. Before long, the CANOE carrying Dollier's portable altar was lost. Without the necessary equipment to carry out his missionary work among the upper Mississippi tribes, Dollier decided to return to Montreal. Nevertheless, instead of traveling back to the St. Lawrence along the same route as the outbound journey, he led the party along the Niagara River into Lake Erie as far as the Detroit River and Lake St. Clair. The party then headed northward into Lake Huron, visiting the Sepulcian mission at Michilimackinac at the northern entrance to Lake Michigan. From there, they headed eastward to Georgian Bay, and made their way back to Montreal by way of Lake Nipissing and the Ottawa River, arriving in June 1670.

The outbreak of a new Iroquois-Huron (Wyandot) conflict later that year brought an end to Dollier's missionary work among the Indians. He did undertake a peace mission to Lake Ontario in summer 1670, returning to Montreal in mid-August. Soon afterward, he was named superior of the Sepulcian mission at Montreal, and he subsequently became vicar general of the diocese of Quebec. He remained in Montreal for the rest of his life, except for one brief visit to France in the mid-1670s. Dollier played a leading role in the development of the city of Montreal, including the laying out of the settlement's first streets and the construction of its first public buildings and churches. Toward the end of his life, he was involved in several projects to build canals around Montreal. He also wrote an early history of the city.

In the 1669–70 expedition, François Dollier and his companions became the first Europeans to enter the Niagara River from Lake Ontario. His explorations showed conclusively that the Great Lakes were interconnected and provided the basis for French claims to what is now southern Ontario. Dollier wrote an account of the journey, but he later destroyed it in favor of a superior work by Bréhan.

Domínguez, Francisco Atanasio (ca. 1740–1805)
Spanish missionary in the American Southwest

A native of Mexico City, Francisco Domínguez was ordained a Franciscan priest. In 1776, he was sent to New Mexico in a supervisory role, inspecting the missions at Santa Fe and Taos. He also was assigned the task of helping to organize and lead an expedition overland to the missionary outposts on the California coast along with fellow friar FRANCISCO SILVESTRE VÉLEZ DE ESCALANTE.

The Escalante-Domínguez expedition departed Santa Fe on July 29, 1776, and, until its return on January 2, 1777, covered a total of nearly 1,500 miles in present-day Colorado, Utah, and Arizona. A journal of the expedition kept by Escalante was also signed by Dominguez. The cartographer Don Bernardo Miera y Pacheco drew a detailed map of the lands visited.

Upon his return to Santa Fe and Mexico City, Francisco Domínguez submitted to his Franciscan superiors a report that was highly critical of the administration of the New Mexico missions. His negative views caused him to fall out of favor with the Franciscan hierarchy, leading to his assignment to an obscure missionary post in northern Mexico. Although the Escalante-Domínguez expedition failed to reach California, it brought back knowledge of uncharted lands of present-day Utah.

Donnaconna (ca. 1490–ca. 1539) *Huron chief in the St. Lawrence River region of Canada*

In summer 1534, Huron (Wyandot) chief Donnaconna led about 200 of his people from their village near the site of present-day Quebec City on the St. Lawrence River to the northeast shores of the Gaspé Peninsula to fish for mackerel. On July 16, 1534, the Huron encountered French explorer JACQUES CARTIER and his fleet, which was then exploring the Gulf of St. Lawrence as part of Cartier's first voyage of exploration to Canada.

Members of Donnaconna's Huron band first paddled out to Cartier's ships by CANOE, and then Cartier and a party of Frenchmen rowed ashore. Eight days later, on July 24, 1534, the French erected a large cross on the shores of Gaspé Harbor, formally claiming the land for France. Donnaconna then visited Cartier's vessel to explain that he was the chief of this region and to protest against the French taking possession of his domain. The French presented him with numerous trade goods and convinced him of their peaceful intentions. Donnaconna subsequently allowed two of his teenage sons, Domagaya and Taignoagny, to sail with the expedition to Europe.

While in France, Donnaconna's sons learned the French language and helped Cartier win backing for his second expedition to North America.

Cartier returned to Canada in summer 1535 with his second expedition, along with Donnaconna's sons, as promised. This time, Cartier's fleet sailed into the St. Lawrence River after exploring, with the help of the Huron, the bays, islands, and straits of the Gulf of St. Lawrence. The French ships then traveled up the St. Lawrence River, reaching the Huron settlement of Stadacona (present-day Quebec City) that September.

Despite Donnaconna's protests, Cartier and some of his crew proceeded up the St. Lawrence, guided by the chief's son Domagaya, to the larger Huron settlement of Hochelaga (present-day Montreal). The expedition then returned to Stadacona, where they spent the winter.

Donnaconna informed Cartier of a legendary land, rich in jewels and precious metals, that could be reached via the Ottawa or Saguenay Rivers. The Huron chief claimed to have visited this land himself. He told of its strange inhabitants who were white. Donnaconna also claimed to know

of lands of one-legged people and pygmies. Cartier, hoping to gain backing for another expedition, decided to kidnap the chief and take him to Europe. Although Donnaconna was originally held against his will by Cartier, and his warriors paddled out to the ships to rescue him, he reportedly agreed to go to France voluntarily with nine other Huron.

As they left Canada in spring 1536, Donnaconna shared his geographic knowledge with the French in the exploration of Cape Breton Island, the Cape of St. Lawrence, the Magdalen Islands (Îles de la Madeleine), and Renewse Harbor on Newfoundland. From there, the expedition sailed for France in June 1536, arriving in St.-Malo on July 15, 1536.

Donnaconna was well received in France. He met personally with King Francis I and became something of a celebrity of the royal court before dying, probably in 1539, from a European disease.

Donnaconna and his sons contributed to the French exploration of North America with accurate geographic information. Huron legends of Saguenay helped inspire backing for Cartier's third expedition to the St. Lawrence region in 1541. More than 60 years later, French explorer SAMUEL DE CHAMPLAIN retraced Cartier's route to Stadacona. At that time, no trace of Donnaconna's band could be found. The Huron had possibly been driven west by invading Iroquois (Haudenosaunee).

D'Orbigny, Alcide-Charles-Victor

Dessalines See ORBIGNY, ALCIDE-CHARLES-VICTOR DESSALINES D'.

Dorion, Marie (Marie Aoie, Marie of the Iowas, Dorion Woman) (1786–ca. 1853) *Ioway Indian guide and interpreter for Astorians in the Pacific Northwest, wife of Pierre Dorion, Jr.*

Marie Dorion was an Ioway Indian. She was living in the Red River region of what is now southwestern Arkansas, when, in about 1806, she married the part-Sioux (Dakota, Lakota, Nakota) fur trader and mountain man PIERRE DORION, JR. His father, PIERRE DORION, SR., was also a frontier trader and trapper.

Pierre Dorion, Jr., was active in the FUR TRADE on the upper Missouri River, working for a time for MANUEL LISA'S ST. LOUIS MISSOURI FUR COMPANY. In winter 1810–11, while in St. Louis, he signed up with JOHN JACOB ASTOR'S expedition, headed by WILSON PRICE HUNT, up the MISSOURI RIVER, then westward to the Oregon coast and the Pacific Fur Company (a subsidiary of the AMERICAN FUR COMPANY) outpost at Astoria. Dorion also arranged to have his wife and two small children accompany the Astorians.

The group set out from St. Louis in spring 1811. Although Hunt had voiced objections to having Marie Dorion and her children along, she proved to be valuable to the expedition. She helped guide the Astorians on their way westward from the Dakota region, across the northern plains to the Snake River, the COLUMBIA RIVER, and the Pacific coast. Dorion's linguistic ability also helped Hunt's party deal peaceably with the numerous Indian tribes.

Pregnant with her third child on the journey, Dorion gave birth to a son in December 1811. The infant survived only about eight days, however. The Astorians reached the mouth of the Columbia and Astoria the following February.

Dorion and her family remained at Astoria a year and a half, until fall 1813, when Astor's agents sold the Oregon outpost to the NORTH WEST COMPANY, anticipating its seizure by the British in the War of 1812. The Dorions were part of a group of trappers journeying eastward to the Snake River of what is now western Idaho to contact one of the Astorian trapping parties before returning to St. Louis. Along the way, they suffered from repeated Indian attacks. Her husband and the other trappers were killed, leaving Dorion and her two small children as the only survivors.

Dorion continued eastward to join Hunt's party. She managed to cross the Snake River, but heavy winter snows made the trail through the Blue Mountains of what is now northeastern Oregon and southeastern Washington impassable. She had to kill the remaining horses, drying their meat to preserve as food. For shelter, she fashioned a makeshift tent out of the hides of the slaughtered animals.

With the coming of spring, Dorion and her children turned back westward, making their way across 250 miles of wilderness to the land of Walla Walla Indians at the confluence of the Snake and upper Columbia Rivers in present-day southeastern Washington. She eventually met up with the rest of the Astorians, on their way back to St. Louis. She opted to stay in the West, however, heading northward to the Okanogan Mountains near the present-day Washington–British Columbia border.

Dorion settled at Fort Okanogan, marrying a trapper by the name of Venier. Within three years, however, Venier either had died or deserted her. By 1823, Dorion was living at Fort Walla Walla to the south, married to her third husband, Jean Baptiste Toupin, the post's interpreter. In the early 1840s, Dorion and Toupin migrated southwestward to the Willamette Valley, near what is now Salem, Oregon, where she spent her remaining years.

Dorion's eldest son, Baptiste Dorion, went on to work as an interpreter for the HUDSON'S BAY COMPANY in the Columbia River region. He subsequently worked in the upper Missouri River and Yellowstone region; one of his assignments was as interpreter for ALEXANDER PHILIPP MAXIMILIAN and KARL BODMER in spring 1833.

Like the Shoshone woman SACAJAWEA (Sacagawea), who traveled with the expedition of MERIWETHER LEWIS and WILLIAM CLARK, Marie Dorion played an important role in one of the early overland journeys by non-Indians to the Far West.

Dorion, Pierre, Jr. (unknown–1814) *American trader, guide, interpreter on the upper Missouri River, son of Pierre Dorion, Sr., husband of Marie Dorion*

Pierre Dorion, Jr., born along the MISSOURI RIVER, was the son of PIERRE DORION, SR., and his Sioux (Dakota, Lakota, Nakota) Indian wife. He grew up learning many of the frontier skills of his father and of his mother's people.

By 1804, the younger Dorion was representing the CHOUTEAU family of St. Louis in the FUR TRADE with the Sioux. In June of that year, his father had been engaged as an interpreter to the Sioux for the Lewis and Clark Expedition. On August 31, 1804, Dorion joined his father, MERIWETHER LEWIS, and WILLIAM CLARK in a conference with Yankton Sioux leaders near the confluence of the James and Missouri Rivers in present-day South Dakota. At this meeting, he persuaded the Indians to deal with American traders from St. Louis, rather than with British traders operating out of Canada. Soon afterward, Dorion, with his father, accompanied a delegation of Sioux to Washington, D.C., where they were received by President Thomas Jefferson and other federal officials.

In about 1806, Dorion married the Ioway Indian woman Marie Aioe, who became known as MARIE DORION. Until 1810, he took part in St. Louis fur trader MANUEL LISA's expeditions to the upper Missouri.

In 1811–12, Dorion and his wife, acting as interpreters and guides, accompanied WILSON PRICE HUNT and his party of Astorians from St. Louis up the Missouri, across the northern plains and ROCKY MOUNTAINS, to the Oregon Coast. This was the overland contingent of JOHN JACOB ASTOR's fur-trading enterprise to the mouth of the COLUMBIA RIVER on the Pacific coast. Three years later, in January 1814, near the confluence of the Boise and Snake Rivers along the present-day Idaho-Oregon border, Dorion was killed by Indians.

Pierre Dorion, Jr., took part in the initial American penetration of the upper Missouri with Lewis and Clark; with Lisa and Hunt, he was a member of the first two major overland commercial expeditions westward from St. Louis.

Dorion, Pierre, Sr. (ca. 1750–ca. 1820) *French-Canadian interpreter, trader, guide along the Missouri River, father of Pierre Dorion, Jr.*

A native of Quebec, Pierre Dorion, Sr., was a member of a prominent French-Canadian family. Sometime before 1780,

he moved to the frontier region of the upper MISSOURI RIVER, where he developed extensive contacts with the Sioux (Dakota, Lakota, Nakota) Indians of what is now South Dakota and mastered several Siouan dialects.

In early June 1804, Dorion met MERIWETHER LEWIS and WILLIAM CLARK as they traveled up the Missouri out of St. Louis. Because of his knowledge of Indian languages and customs, he was hired as an interpreter to the Sioux tribes. He also aided the Corps of Discovery with his knowledge of the region's geography. That August, he served as the interpreter at a conference between the Americans and several prominent Sioux chiefs. He also traveled with a delegation of Sioux leaders to visit Washington, D.C., and meet with President Thomas Jefferson.

In 1805–06, Dorion was hired by federal officials to transport a shipment of presents to the Arikara Indians north of Council Bluffs, as reparations for an Arikara chief who had become ill and died on a visit to the nation's capital. He was accompanied on this journey up the Missouri River by RENÉ JUSSEAUME.

Dorion was married, at various times, to several Sioux women. One of his mixed-blood children, PIERRE DORION, JR., would later serve as guide and interpreter for WILSON PRICE HUNT during his expedition from St. Louis to Astoria on the Oregon coast.

Dorion settled permanently on the Missouri River among the Sioux, near a fur-trading post that developed into the modern city of Pierre, South Dakota.

Frontiersmen such as Pierre Dorion, Sr., with their knowledge of Indian country, customs, and languages, were essential to the non-Indian exploration of North America.

D'Orville, Albert See ORVILLE, ALBERT D'.

Doudart de Lagrée, Ernest-Marc-Louis de Gonzague (1823–1868) *French naval officer, diplomat in Southeast Asia*

Ernest Doudart de Lagrée was born in St. Vincent de Mercure, in southeastern France's Isère region. In 1845, he embarked on a career as a French naval officer, later taking part in the Crimean War of 1854.

After commanding troops in French military actions in Southeast Asia in 1862, Doudart de Lagrée was named as his nation's ambassador to the king of Cambodia. Through his diplomatic efforts, the French were soon able to establish a colonial presence in Cambodia and neighboring Vietnam.

In 1866, Doudart de Lagrée, by then a commander in the French navy, was commissioned to lead the French government-sponsored Mekong Expedition. Inspired and promoted by French colonial official MARIE-JOSEPH-FRANÇOIS GARNIER, the purpose of the expedition was to explore the

upper reaches of the Mekong River to determine whether it could be used as a trade route into China. In June of that year, Doudart de Lagrée led a party of 21 men, including Garnier as second in command, up the Mekong River from Saigon (present-day Ho Chi Minh City), Vietnam.

Members of Doudart de Lagrée's party, led by Garnier, conducted a scientific survey of Cambodia's Angkor ruins. On coming upon the Sambor Rapids and the Khone Falls near the Cambodia-Laos border, Doudart de Lagrée and Garnier concluded that the Mekong would not provide a usable commercial water route from the Southeast Asian coast into China. They then set about making a scientific survey of the largely unknown region east of the Mekong, the Bolevens Plateau in southern Laos.

Although weakened by tropical fever contracted in southern Laos, Doudart de Lagrée continued toward southeastern China. By the time the expedition had entered China in August 1867, he was further afflicted with amoebic dysentery. He managed to reach Yunnan province, where he died the following March. Garnier took command, leading the expedition back to Saigon two months later.

Ernest Doudart de Lagrée's geographic expedition revealed much about the territory around the upper Mekong River. His notes and journals, published by Garnier, provided a detailed account of a region of Southeast Asia, which, at that time, had seldom been visited by Europeans. With Garnier, he was the first European to report on the un-navigability of the upper Mekong, a factor that led French colonial interests to concentrate their efforts on the region around the Gulf of Tonkin.

Doughty, Charles Montagu (1843–1926)

British writer and traveler in Arabia

Born in England to a well-off family, Charles Montagu Doughty studied geology at Cambridge University, graduating in 1865. Soon afterward, he traveled to Norway for field work on glaciers, then lived for a time in Scotland, studying philology.

During the late 1860s and early 1870s, Doughty continued his scientific and classical education at Oxford as well as at universities in Germany, Denmark, and France.

In 1875, Doughty left England for the Middle East, arriving in what is now Israel, from where he traveled into the Sinai region and the Jordan River Valley. By November 1876, he was in Damascus, Syria, and joined a caravan of Muslim pilgrims headed across the Arabian desert to the holy cities of Mecca and Medina. Unlike his predecessors JOHANN LUDWIG BURCKHARDT and SIR RICHARD FRANCIS BURTON, Doughty refrained from pretending to be a Muslim, although he did adopt native dress. As a self-professed Christian in Arabia, he did suffer occasional bad treatment. At the ruins of the ancient city of Petra (Wadi



Charles Montagu Doughty (*Library of Congress*)

Musa), Doughty studied stone inscriptions. He also found writings at Mada' in Salih. From there, he went on his own into western and central Arabia, traveling with different bands of nomadic bedouins. At Tayma, he located an inscription on an ancient wall that corresponded with the biblical story of Job. His journey with the bedouins took him through the Najd Desert, from Buraida to Jidda on the coast of the RED SEA, along a route that followed the mountain fringe of the central Arabian deserts. He left from Jidda for England in 1878.

Upon his return, Doughty wrote a long account of his experiences, entitled *Travels in Arabia Deserta*, first published in 1888. This work, known for its eccentric style, reminiscent of Elizabethan prose and the type of language found in the Bible, provided Victorian England with one of the most personal and detailed accounts of Arabian life and culture up to that time. THOMAS EDWARD LAWRENCE (Lawrence of Arabia) cited Doughty's *Arabia Deserta* as having had a profound influence on his own travels and writings.

Along with Burton and Burckhardt, Charles Montagu Doughty is considered one of the greatest explorers of Arabia. His archaeological observations in Arabia increased historical knowledge about the pre-Islamic Nabataean civi-

lization. He also provided European geographers with the earliest accounts of the lava beds, known as Harras, at the western edges of the Nafud and Najd Deserts. He is also well known for several volumes of poetry published in the early 1900s.

Drake, Sir Francis (ca. 1540–1596) *English mariner, privateer in the Americas and the Pacific Ocean, cousin of Sir John Hawkins*

Francis Drake was born in Tavistock in Devonshire, England, the eldest of 12 children of a farm worker. His parents were early converts to Puritanism, and his father, who had become a lay preacher, fled to Kent in the face of religious persecution. Raised on the southeast coast of England near Dover, the young Drake embarked on a seafaring career in his early teens.

Although Drake had only a rudimentary education, he acquired a practical knowledge of navigation and ship-handling during years of cruising the North Sea and the Bay of Biscay. A relative of SIR JOHN HAWKINS and his family of shipowners in Plymouth, Drake went to work with them.

In 1567–68, Drake commanded the *Judith* in an expedition to the north coast of South America and the Gulf of Mexico. With Hawkins, he eluded capture by the Spanish off the coast of Veracruz, Mexico. On his return to England, Drake's exploits came to the attention of Queen Elizabeth I and her secretary of state, Sir William Cecil. The queen commissioned Drake to undertake privateering expeditions against Spanish shipping in the WEST INDIES.

Starting in 1570, Drake regularly sailed to the Caribbean and the SPANISH MAIN for attacks on both Spanish ships and colonial settlements. In 1572, he made his most successful series of raids, in which he attacked and looted Nombre de Dios, Panama, and Cartagena in what is now Colombia. He then led his forces inland across the Isthmus of Panama, capturing a gold-laden mule train on its way to the royal treasury at Nombre de Dios. While in Panama in 1572, he climbed a mountain and from its peak gazed upon the Pacific Ocean, the first English sea captain to do so. He later claimed that the experience inspired him to sail the first English ship into the Pacific.

In 1573, Drake returned to England with a fortune in gold, silver, jewels, and other valuable cargo from his raids on Spanish ships and ports in the Americas. He then commanded English naval forces against rebels in Ireland. Meanwhile, English merchants and government officials had become interested in finding Terra Australis, the GREAT SOUTHERN CONTINENT of ABRAHAM ORTELIUS's 1570 atlas of the world. With the backing of both Queen Elizabeth and merchants, an expedition was organized to locate the fabled land and, if possible, find the Pacific entrance to the STRAIT OF ANIAN, a NORTHWEST PASSAGE believed to

exist through North America. Shortly before embarking in December 1577, Drake was secretly instructed by Elizabeth and her chief foreign minister, Sir Francis Walsingham, to sail through the STRAIT OF MAGELLAN and raid Spanish colonial settlements and ships on the Pacific coast of South America.

Drake's fleet of five ships sailed from Plymouth on December 13, 1577. Along with his flagship, the *Pelican* (renamed the *Golden Hind* during the voyage), were the *Elizabeth*, the *Marigold*, the *Swan*, and the *Christopher*. After leaving two of the ships at the mouth of the Rio de la Plata, off the coast of northern Argentina, Drake remained on the coast of Patagonia for about two months, during which he suppressed a mutiny on one of his vessels, executing Thomas Doughty, the leading conspirator. In August 1578, Drake and his three ships entered the Strait of Magellan, then passed into the Pacific 17 days later. Soon afterward, a series of storms struck, scattering Drake's fleet and driving his own ship, the *Golden Hind*, south and east of CAPE HORN. The *Marigold* went down with all hands, and the *Elizabeth*, blown back into the Strait of Magellan, sailed for England.

Drake, on the *Golden Hind*, determined that he had reached a latitude south of the Strait of Magellan, finding open sea beyond Tierra del Fuego, which at that time was believed by geographers to be the northern tip of the Great Southern Continent. This stretch of ocean between Cape Horn and the South Shetland Islands has since been named Drake Passage. Drake then proceeded westward past the southern end of Tierra del Fuego, proving it was an island and putting to rest rumors that prevailing winds and currents would make a westward passage south of the strait impossible.

On having found open ocean south of Tierra del Fuego, Drake abandoned his search for Terra Australis and headed northward along the coast of Chile and Peru. En route, he raided Valparaíso and captured the Spanish treasure ship *Cacafuego* off Callao. In addition to gold and silver, Drake also captured secret Spanish charts that guided him on his subsequent explorations of the west coast of the Americas and the Pacific.

Drake's search for the Pacific entrance to the Northwest Passage took him as far north as Vancouver Island near the present United States–Canada border. At that point, the coastline extended to the northwest, and Drake abandoned the quest, heading back southward along the Oregon and California coast. At Point Reyes, California, north of San Francisco, he put in at a natural harbor later known as Drake's Bay. While the *Golden Hind* underwent repairs on the beach, a small party of Drake's men explored about 30 miles inland from the coast. Drake took possession of the region in the name of Queen Elizabeth, calling it Nova Albion, the ancient name for England, because the coast at



Sir Francis Drake (New York State Library, Albany)

Drake's Bay reminded him of the White Cliffs of Dover near his home in Kent. The exact location of their landing has never been determined—either California or Oregon.

Drake and the *Golden Hind* left the California coast in July 1579, failing to sight the Golden Gate and San Francisco Bay because of heavy fog. Sailing westward, he stopped

briefly at the Farallon Islands, several miles off the coast of San Francisco, where the crew stocked up on supplies of seal meat. Drake's voyage across the Pacific took him within sight of the Mariana Islands. In the Philippines, he again wreaked havoc on Spanish ships. At that time, no English maritime forces had entered the Pacific, and the Spanish were taken off-guard by Drake's attacks. Some sources suggest that Drake intended to return to England through the Strait of Magellan, but with Spanish warships pursuing him from the south, and his own ship heavily laden with loot, he decided a westward course back to England would be more prudent.

By October 1579, Drake was in the SPICE ISLANDS (the Moluccas). In early January 1580, the *Golden Hind* was nearly lost when it ran upon a reef off the coast of the Indonesian island of Celebes. Drake demonstrated his great skill as a mariner when he saved his ship by maneuvering it off the reef without serious damage. At Ternate in the Moluccas, he entered into a trade agreement with the sultan, then sailed back to England by way of the Indian Ocean and the CAPE OF GOOD HOPE.

Having circled the world, Drake arrived back in Plymouth on September 26, 1580. Although he had not located the Great Southern Continent, Drake had brought back plundered riches showing a 5,000 percent profit on his backers' investment. The *Golden Hind*, the first English vessel to circumnavigate the world, was put on display at Deptford near London, although it fell into disrepair and had to be dismantled in the late 1600s. In November 1580, at Deptford, Queen Elizabeth went aboard and knighted Drake for his achievement. He was made mayor of Plymouth and appointed to a high naval position.

In 1585, Drake commanded English naval forces in raids on Vigo, Spain, and São Tiago in the Cape Verde Islands. He then sailed to the West Indies, where he captured Santo Domingo on Hispaniola (present-day Haiti and Dominican Republic), held Cartagena for ransom, and destroyed the Spanish settlement of St. Augustine on the east coast of Florida. In June 1586, he arrived at Roanoke, SIR WALTER RALEIGH's colony on the Carolina coast, and rescued the surviving colonists under Ralph Lane. Along with the colonists, Drake brought back two New World plants that would have a great influence on European life and culture: tobacco and the potato.

In 1587, Drake made a daring raid on the Spanish fleet at Cádiz. The next year, as a vice admiral, he played a commanding role in England's defeat of the Spanish Armada.

Drake undertook his final privateering expedition to the West Indies in 1595. With Hawkins, he attempted to attack Puerto Rico but was driven off by Spanish warships. The next year, stricken with dysentery, he died off the coast of Portobelo, Panama, and was buried at sea.

Sir Francis Drake commanded the first English circumnavigation of the world and the second such voyage, after that of FERDINAND MAGELLAN in 1519–22. His exploration of Drake Passage revised European geographic ideas about the Great Southern Continent. The chaplain on Drake's 1577–80 voyage, Francis Fletcher, wrote an account of the trip, *The World Encompass'd*, which included the earliest descriptions of what is now coastal California. In reaction to Drake's sudden appearance in the Pacific, the Spanish set about securing their position on the west coast of the Americas, and these efforts led to the seaward explorations of SEBASTIÁN VISCAINO to Monterey Bay, as well as the overland colonizing expedition of JUAN DE OÑATE into the American Southwest.

Drouillard, George (George Drewyer)

(ca. 1770–1810) *French-Canadian trader, guide, interpreter on the upper Missouri*

George Drouillard grew up on the frontier of the Great Lakes region. His mother was a Pawnee Indian woman, his French-Canadian father an interpreter for the British army at Detroit.

In late 1803, Drouillard joined the Corps of Discovery at its encampment at Fort Massac on the Ohio River in southern Illinois. He had been appointed on the recommendation of George Rogers Clark, the older brother of WILLIAM CLARK, coleader of the expedition with MERIWETHER LEWIS.

Drouillard, a skilled hunter and marksman, shot much of the wild game consumed during the Lewis and Clark Expedition. He also helped maintain good relations with the many tribes the expedition encountered, trading with them for food. On the return journey in spring 1806, he negotiated with the Nez Perce Indians of the Clearwater River region for the return of the horses left in their care the previous fall.

In 1807, Drouillard was part of fur trader MANUEL LISA's expedition to the mouth of the Bighorn River, during which he helped establish Fort Raymond, the first non-Indian settlement in what is now Montana. Mountain man JOHN COLTER was also part of this expedition. While in Montana, Drouillard explored the Yellowstone River country and the Absaroka Mountains. He also made fur-trading expeditions to the Rosebud and Tongue River region.

Drouillard returned to St. Louis in fall 1808, where he conferred with William Clark. From information provided by Drouillard, Clark produced the first map of the Bighorn River.

In March 1810, Drouillard made his last trip up the MISSOURI RIVER from St. Louis, traveling through Bozeman Pass to the Three Forks of the Missouri in southwestern Montana with ANDREW HENRY, PIERRE MENARD, EDWARD

ROSE, and John Colter. About two months later, near the mouth of the Jefferson River, Drouillard was killed in an ambush by Blackfeet warriors.

Drouillard's diligence as a hunter and a diplomat to the Indians contributed to the success of the Lewis and Clark Expedition. His explorations with Manuel Lisa and Andrew Henry expanded geographic knowledge of what is now central Montana and opened up the region to the St. Louis FUR TRADE.

Drygalski, Erich Dagobert von (1865–1949)

German geographer, geophysicist in Greenland and the Antarctic

Erich von Drygalski was born in Königsberg, a former German city on the Baltic, now Kaliningrad, Russia. He was educated in the earth sciences, with a special concentration in geophysics and marine studies.

In 1891, Drygalski led his first expedition to GREENLAND; the following year, he headed a scientific team that wintered in western Greenland. In 1901, Drygalski, as a leading German geophysicist and experienced polar explorer, was commissioned by his government to lead the German Antarctic Expedition. The project's aim was to study terrestrial magnetism around the South Polar region and explore unknown portions of the continent's Indian Ocean coastline.

Drygalski sailed from Kiel, Germany, on the *Gauss*, a vessel specially fitted out for polar exploration. In the southern Indian Ocean, the expedition made stops at the remote Kerguelen and Heard Islands, then headed due south for the Antarctic continent.

Drygalski and his party on the *Gauss* approached Antarctica from about 90° east longitude, along that part of the continent adjacent to the Indian Ocean. In February 1902, while still 40 miles from the Antarctic mainland, they became trapped in the PACK ICE. Over the next 12 months, Drygalski sent out exploring parties on sledges to survey a newly located strip of land he named Kaiser Wilhelm II Land, now known as Wilhelm II Coast. A captive BALLOON was employed by Drygalski and his team to make aerial observations of the interior. They also sighted the black cone of an extinct volcano on Wilhelm II Coast, which they named Gaussberg, or Mount Gauss, after their ship.

The *Gauss* remained trapped in the ice until February 1903, when under Drygalski's direction, the crew managed to free it by laying out ashes that drew enough radiated heat from the sun to melt a trench. The ship sailed through the trench into open water and back to Germany.

Drygalski wrote an account of his Antarctic experiences, *Zum Kontinent des Eisegens Sudens* (To the continent of the southern ice), published in 1904. The next year, he set to work editing the 18 volumes of the scientific reports from



Erich von Drygalski (Library of Congress)

the expedition, including three atlases. The task was not completed until 1931. In that time, he also held a professorship in geography at the University of Munich.

Erich von Drygalski's 1901–03 German Antarctic Expedition coincided with Scottish, Swedish, British, and French explorations in the Antarctic, all inspired by the Sixth International Geophysical Conference, which had convened in London in 1895. In recognition of his contributions to Antarctic exploration and research, a fjord on South Georgia Island and an island in Antarctica were named in his honor.

Dubuque, Julien (Julian Dubuque, Little Cloud)

(1762–1810) *French-Canadian trader, pioneer in the upper Mississippi Valley*

Julien Dubuque was born in St. Pierre les Brecquets in what is now southern Quebec, Canada. When in his early 20s, he headed westward into the upper Mississippi frontier to seek his fortune, and, in 1785, he arrived in Prairie du Chien on the upper MISSISSIPPI RIVER.

Upon exploring the region along the west shore of the Mississippi, Dubuque found lead deposits on the lands of the Fox (Mesquaki) Indians. He soon secured exclusive rights from that tribe to mine the lead on what is now the Iowa side of the Mississippi. He also established a fur-trading post there. Over the next 20 years, he made regular journeys down the Mississippi to St. Louis to trade his furs.

His lead-mining enterprise expanded to include a smelting furnace.

Dubuque originally named his settlement “The Mines of Spain,” and the governor of Spanish Louisiana, Francisco Luis Hector, baron de Carondelet, granted him official title to his holdings. In 1805, Dubuque’s mining operation was visited by American military explorer ZEBULON MONTGOMERY PIKE.

Julien Dubuque is credited with establishing the first non-Indian settlement in what is now Iowa. Twenty-seven years after his death, the city of Dubuque, named in his honor, was established near the site of his original settlement. He was highly regarded by the Fox Indians, who conferred upon him the name Little Cloud. When he died in 1810, he was buried with the honors of a Fox chief. His grave is located on a bluff overlooking the city that now bears his name.

Du Chaillu, Paul Belloni (ca. 1831–1903)

French-American traveler, writer in central Africa

Paul B. Du Chaillu probably was born in Paris, France. He was raised in the former colony of French Equatorial Africa (present-day Gabon on the west coast of central Africa), where his father was a trader. Educated by missionaries in his early years, he also taught himself native languages.

During the early 1850s, Du Chaillu’s accounts of his hunting expeditions into the interior of equatorial Africa began to appear in American newspapers. He moved to the United States in 1852, eventually becoming an American citizen.

Starting in 1855, with the support of the Philadelphia Academy of Natural Sciences, Du Chaillu undertook a four-year exploration into uncharted regions of the lower Gabon and Ogowé Rivers. He also collected specimens of rare birds and animals, many new to science. On this expedition, while exploring the N’tem Highlands, Du Chaillu encountered a gorilla, becoming the first non-African known to have seen one. He attempted to bring two young gorillas back, but the creatures died before they reached the United States.

Du Chaillu’s account of his expedition, *Explorations and Adventures in Equatorial Africa*, was published in 1861, two years after his return from Africa. His geographic reports, having no scientific data to back them up, were called into question by critics, as was his description of gorillas in the wild.

Resolving to make another exploration of the Gabon and Ogowé river regions, Du Chaillu acquired a practical knowledge of navigation to better document his explorations. From 1863 to 1865, he again explored equatorial Africa, this time verifying his findings with accurate navigational data. He also made the first known non-native con-

tact with area tribes, confirming the existence of the Pygmy people in the lower Congo River Valley. Du Chaillu returned from this expedition with scientific data proving his earlier charts, as well as the first gorillas ever to be seen in the United States. His account of his second expedition into equatorial Africa, *A Journey into Ashango-Land*, was published in 1867.

Du Chaillu continued to produce works on Africa, including *Stories of the Gorilla Country* (1867), *Wild Life Under the Equator* (1868), and *The Country of the Dwarfs* (1871). In 1871, he began seven years of extensive travel in Scandinavia, which he wrote about in his later books. He died in 1903 while on a visit to Russia.

Although his assertions were met with skepticism among his peers, Paul B. Du Chaillu’s geographic findings in west-central Africa were proven accurate in later explorations. His accounts of gorillas in the African wild were also confirmed.

Duclos-Guyot, Pierre-Nicolas (1722–1794)

French naval officer in the South Atlantic and South Pacific

A native of the northwestern French seaport of Saint-Malo, Pierre Duclos-Guyot went to sea when he was 13, serving his apprenticeship on merchant ships until 1742. That year, he entered the service of the BRITISH EAST INDIA COMPANY’s fleet as an ensign, and soon afterward he was commissioned a lieutenant.

In 1759, during the Seven Years War, Duclos-Guyot accompanied LOUIS-ANTOINE DE BOUGAINVILLE in a French naval expedition to Quebec. After the war in 1764, he commanded the *Aigle* in Bougainville’s colonizing efforts in the Falkland Islands. In 1765, he commanded the *Lion* in a voyage from the Falklands to the Pacific coast of South America. On his return trip, he located South Georgia Island in the South Atlantic Ocean.

Duclos-Guyot was second in command on the *Boudeuse* in Bougainville’s 1766–69 CIRCUMNAVIGATION OF THE WORLD. In 1777, he became captain of the port of Île de France, on present-day Mauritius in the Indian Ocean, serving in that post until health problems caused him to leave active naval service in 1784. Back in France, he returned to the navy with the outbreak of the French Revolutionary Wars in 1792. He died near Saint-Malo two years later.

Pierre Duclos-Guyot made the second recorded sighting of South Georgia Island in 1765, the first having been made by Anglo-French merchant-captain Antoine de la Roche in 1675. In 1775, JAMES COOK charted the island, named it, and claimed it for Great Britain. In the ensuing years, South Georgia Island became strategically important in explorations of Antarctica. Duclos-Guyot also played a significant role in the first official French circumnavigation of the world.

Duluth, Daniel Greysolon (sieur Duluth, sieur Dulhut, sieur Du Luth, sieur Du Lhut)

(1636–1710) *French fur trader and soldier in the Great Lakes region, cousin of Henri de Tonti*

Daniel Greysolon, sieur Duluth was born in the French city of Saint-Germain-en-Laye, just west of Paris. He fought for France in the Dutch Wars of the 1670s, taking part in the 1674 French victory at Seneffe, Belgium.

Shortly afterward, Duluth traveled to Montreal, Canada, along with his younger brother, Claude Greysolon, sieur de la Tourette. Meanwhile, his cousin HENRI DE TONTI was in the employ of RENÉ-ROBERT CAVELIER DE LA SALLE.

In 1678, Duluth was sent by French officials westward from Montreal to negotiate a peace between the warring Sioux (Dakota, Lakota, Nakota) and Chippewa (Ojibway) tribes in the western Great Lakes region of present-day Michigan, Wisconsin, and Minnesota. Additionally, Duluth was commissioned to further the search for a route to the Pacific Ocean, which many geographers then thought was not far to the west of the Great Lakes. For this expedition, he commanded a party of COUREURS DE BOIS, fur traders whose quasi-legal status would later cause Duluth difficulties with the French colonial authorities.

Traveling along the usual CANOE and portage routes from Montreal, Duluth and his men reached Lake Huron, then spent the winter of 1678–79 at Sault Sainte Marie. In spring 1679, he headed northwestward into Lake Superior and followed its south shore to its eastern terminus, near the site of the present-day city of Duluth, Minnesota. Duluth and his party continued westward into the interior of present-day Minnesota to the Sioux settlements at Mille Lacs Lake.

There, in 1679, Duluth secured a peace agreement that ended hostilities between the Sioux and Chippewa Indians, thus opening up the region's FUR TRADE to the French. That same year, at the Sioux village of Izatys, Duluth claimed the region around western Lake Superior for France.

Duluth also dispatched an advance party to explore westward. This group may have reached the region of present-day eastern North Dakota. Duluth's men later returned with reports of Sioux who had obtained salt from a body of water some three weeks' journey to the west. Hearing this, Duluth speculated that the salt had come from the shores of an outlet to the Great Western Sea and concluded that the Pacific Ocean, and the riches of China and the Orient, could easily be reached from the western Great Lakes. Some historians have speculated that the Sioux had meant the Great Salt Lake of Utah, but others doubt that the Minnesota and North Dakota Sioux ranged that far west. It has also been conjectured that the Indians actually obtained their salt from deposits along the Red River of the North in northeastern North Dakota.

To further stabilize the fur trade, Duluth had to arrange a peace settlement between the Sioux and Assiniboine. In

search of other Indian bands, he headed northeastward along the shore of Lake Superior, wintering at the mouth of the Kaministikwia River, the site of present-day Fort William, Ontario. In summer 1680, Duluth set out in search of a route to the Western Sea. Traveling southwestward, then south along the St. Croix River, along part of what is now the Wisconsin-Minnesota boundary, he reached the MISSISSIPPI RIVER near present-day Prescott, Wisconsin. At one point in his explorations, confident that he was nearing the Pacific, he reported that the Sioux he encountered spoke with Chinese accents.

In the course of his travels, Duluth learned that several members of La Salle's expedition were held captive by the Sioux. He returned to Mille Lacs Lake to obtain the release of MICHEL ACO, La Salle's lieutenant, and LOUIS HENNEPIN, a Belgian priest and, like Duluth, a veteran of the Battle of Seneffe. Duluth then escorted Aco and Hennepin to Mackinac, where they spent the winter of 1680–81. In spring 1681, Duluth was recalled to France amid charges of illegal fur trading with his band of *coureurs de bois*.

Acquitted of any wrongdoing, Duluth returned to Lake Superior in 1683. He established a trading fort at the mouth of the Kaministikwia River on Lake Superior's northwest shore. In 1683–84, Duluth assisted his brother Claude in establishing a second trading post in the area, Fort Tourette on the northeast shore of Lake Nipigon in present-day Ontario.

At the outbreak of fighting between the French and the Iroquois (Haudenosaunee) Indians in 1683, Duluth was sent to take charge of a company of soldiers in the St. Clair River region, the water link between Lake Huron and Lake Erie. He established Fort St. Joseph on the St. Clair River in 1686 and subsequently commanded Fort Frontenac at the eastern end of Lake Ontario.

In 1688, Duluth and his fur-trading associates returned to western Lake Superior and established a trading post at Rainy Lake. This site, 200 miles east of present-day Winnipeg, was at that time the westernmost extent of French settlement into the interior of Canada. Seven years later, in 1695, Duluth was forced to retire to Montreal because of failing health.

Through his voyages of diplomacy, trade, and exploration, sieur Duluth advanced knowledge of the western frontier to French interests. His ability to negotiate peace among warring tribes of the western Great Lakes enabled the rapid commercial development of the region.

Dumont d'Urville, Jules-Sébastien-César

(1790–1842) *French naval officer in the Pacific and Antarctica*

A native of France's Normandy region, Jules Dumont d'Urville was born in Condé-sur-Noireau, Calvados, to a noble family of modest means. His father died when he was

seven, and his early education was under the direction of his uncle, a priest.

After attending school at Caen, Dumont d'Urville entered the French navy in 1807 as a cadet. While at the naval academy at Toulon, he studied botany and entomology, becoming an accomplished naturalist as well as a midshipman. Graduating in 1810, he reached the rank of ensign two years later.

In 1819, Dumont d'Urville sailed on the *Chevette* to the eastern MEDITERRANEAN SEA where he charted the Dardanelles and the Black Sea. While cruising the Aegean Sea in 1820, he secured for France an ancient statue of Venus that had recently been discovered on the Greek island of Milos. The Venus de Milo was subsequently presented to the Louvre in Paris; for his efforts in this regard, Dumont d'Urville was inducted into the Legion of Honor in 1821.

Commissioned a lieutenant commander, Dumont d'Urville continued his naturalist studies at the Museum of Natural History in Paris. In 1822, he sailed on the *Coquille* as second in command under LOUIS-ISADORE DUPERREY in a voyage around the world. Throughout the expedition, which included stops at the Gilbert and Caroline archipelagoes in the Pacific Ocean as well as the Falklands and other islands in the South Atlantic, Dumont d'Urville collected thousands of plant and insect specimens, many of which were new to science.

Following his return from his voyage on the *Coquille* in spring 1825, Dumont d'Urville submitted a plan to the French navy for another expedition to study a limited area of the far western Pacific. His expedition won approval a few months later, and, at the rank of captain, he was given command of the *Coquille*. In addition to producing maps and studying flora, fauna, and native languages, Dumont d'Urville was directed to search for traces of the lost expedition of JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, missing in the Pacific since 1788.

In April 1826, Dumont d'Urville embarked from Toulon aboard the *Coquille*, renamed the *Astrolabe* after one of the vessels in La Pérouse's expedition. He first surveyed the entire southern coast of Australia, then explored an uncharted inlet, Jervis Bay, near Sydney. The naturalists and ethnologists with the expedition made a study of the Aborigines. While visiting Parramatta, also near Sydney, Dumont d'Urville met with British missionary SAMUEL MARSDEN, who provided him with information on NEW ZEALAND.

Dumont d'Urville sailed next to Cook Strait between the North Island and South Island of New Zealand. He had some contact with the region's Maori natives and undertook a study of New Zealand wildlife. In New Zealand, he was the first European to observe the kiwi bird in its native habitat. An island off the north coast of New Zealand's South Island was subsequently named after him.

From New Zealand, Dumont d'Urville's expedition sailed to the Fiji archipelago, where he charted more than 120 islands. He then visited the Laughlan Islands and located and named the great Astrolabe Reef off Vatulele.

After exploring the Loyalty Islands and New Ireland off the coast of New Guinea, Dumont d'Urville stopped at Hobart, Tasmania, where he learned from an English sea captain that natives on Vanikoro, north of the New Hebrides, had been seen with items that may have come from the La Pérouse expedition. Upon reaching Vanikoro, his men sighted wreckage from La Pérouse's ships on offshore reefs. Dumont d'Urville raised a monument there in memory of La Pérouse and the original *Astrolabe*, then sailed to Guam in the Marianas. From there, he returned to France, arriving in Marseilles in late February 1829.

Although his expedition had brought back much new scientific information on the western Pacific, Dumont d'Urville did not receive the recognition of the French Academy of Sciences as he had hoped. In 1830, he commanded the ship that took deposed French monarch Charles X and his family to England.

In 1832–34, Dumont d'Urville published his *Picturesque Journey Around the World*, which summarized European voyages around the world since FERDINAND



Jules Dumont d'Urville (Library of Congress)

MAGELLAN's journey for Spain. The popular success of this work led to Dumont d'Urville's next assignment, that of exploring the southern latitudes and locating the SOUTH MAGNETIC POLE. Sailing from Toulon in September 1837, the expedition included the *Astrolabe* as well as a corvette, the *Zélée*. The ships reached Tierra del Fuego at the tip of South America and attempted to penetrate the Antarctic ice pack. In early February 1838, the ships were trapped for five days in the ice at about 63° south latitude. During this period, the crew sighted land on the Antarctic coast. Dumont d'Urville named one section of the coastline Louis-Phillippe Land, after the reigning French king, and another part of the mainland Joinville Land, after the king's son, the Prince of Joinville. These sections of the Antarctic mainland were actually uncharted sections of Graham Land on the Antarctic Peninsula.

From the Antarctic, Dumont d'Urville took his ships to the South Orkney and South Shetland Islands and conducted meteorological studies and readings of deep-sea temperature. He proceeded up the Pacific coast of South America to Valparaíso, Chile, and, after a stopover of several months, sailed westward across the Pacific to Tahiti and the Tonga Islands. In the Fiji Islands, Dumont d'Urville directed a punitive action against a native village for the murder of a French naval officer on an earlier expedition. He then cruised throughout the Solomon and Caroline Islands, visited several Dutch colonial ports in present-day Indonesia, and arrived at Hobart, TASMANIA, in December 1839.

In Hobart, Dumont d'Urville conferred with the governor of Tasmania, SIR JOHN FRANKLIN, and with English seal-hunter JOHN BISCOE, who had sailed into the Antarctic some years earlier. With a large portion of his crew ill with dysentery and SCURVY, Dumont d'Urville left the *Zélée* at Hobart and undertook a search for the South Magnetic Pole with only the *Astrolabe*. He crossed the ANTARCTIC CIRCLE, reaching a latitude of 73° south, and sighted a portion of the mainland he named Adélie Land (now the Adélie Coast) after his wife. He also determined that the South Magnetic Pole was situated nearby. Soon afterward, he sighted an American vessel, the *Porpoise*, one of the ships in Lieutenant CHARLES WILKES's expedition. Neither ship acknowledged the other, and the incident was the cause of controversy over the European discovery of that portion of the Antarctic continent.

Dumont d'Urville returned to Hobart. With both ships, he undertook additional explorations of the Loyalty Islands and the Louisiade Archipelago off the coast of New Guinea, before returning to France by way of the Indian Ocean and the CAPE OF GOOD HOPE.

Dumont d'Urville reached Toulon, France, in early November 1840. He was soon promoted to the rank of rear admiral, awarded a medal by the Geographical Society of Paris and commissioned to write an account of his voyage to

the Antarctic. In May 1842, he was killed along with his wife and son in a railroad accident near Versailles. His *Voyage to the South Pole and Oceania*, a 23-volume work with seven atlases, was published between 1841 and 1854.

Jules Dumont d'Urville's voyage to the Pacific in 1826–29 brought back much new scientific and geographic data and also shed light on the fate of the earlier La Pérouse expedition. Geographers identified Melanesia, Micronesia, and Polynesia (see OCEANIA) as the major divisions of the island groups of the Pacific as a result of his explorations. Moreover, he led the first French expedition to the Antarctic in 1837–40. Near the Adélie Coast, not far from the South Magnetic Pole, which he located, the French subsequently established a permanent scientific base in 1950, named Dumont d'Urville Station in his honor.

Dunbar, Sir William (1749–1810) *Scottish scientist, surveyor in the lower Mississippi Valley*

The son of a nobleman, William Dunbar was born on his family's estate near Elgin, in Morayshire, Scotland. Following his early education in Glasgow, he studied astronomy and mathematics in London.

In 1771, Dunbar moved to North America for health reasons, settling for a brief time at Fort Pitt, present-day Pittsburgh, Pennsylvania. Two years later, he went into partnership with another native of Scotland, Philadelphia merchant John Ross. Together they established a plantation near Baton Rouge in the present state of Louisiana, then part of British-held West Florida.

Dunbar and his partner suffered financial reverses in 1775, losing much of the plantation's labor force in a slave uprising. The outbreak of the American Revolution brought additional losses. Continental troops sacked their plantation in 1778, and soon afterward, marauding Spanish forces further depleted their holdings.

Dunbar and Ross founded a new plantation in 1792, near present-day Natchez, Mississippi. With his background in science, Dunbar instituted such innovations as an improved cotton gin and a technique to pack cotton in bales by means of a screw-press. He was also instrumental in promoting the manufacture of cottonseed oil. These advancements helped him recover his earlier losses; he eventually bought out his partner and became the sole proprietor of the Natchez plantation, which he called "The Forest."

In 1798, Dunbar took part in a boundary survey to determine the demarcation line between Spanish and U.S. territory along the lower MISSISSIPPI RIVER. Although he acted as the Spanish representative, his findings resulted in Natchez becoming part of the newly established U.S. territory of Mississippi. He soon became a U.S. citizen and was appointed surveyor general of Mississippi. In addition to operating his plantation, Dunbar continued his scientific re-

search, and in 1799, he made the first meteorological observations in the Mississippi Valley.

Dunbar's scientific work came to the attention of Thomas Jefferson, under whose sponsorship he was elected to the American Philosophical Society. With the acquisition of the Louisiana Territory in 1803, Jefferson commissioned Dunbar to undertake a survey of its southwestern boundary and explore the Red River to its source. Accompanied by chemist George Hunter and a detachment of 17 men, Dunbar set out from Natchez in October 1804 and explored the Red River in what is now Arkansas and Louisiana. Near the border of Spanish-held Texas, they received word that their expedition would be unwelcome to the Spanish, so they turned their attention to the Ouachita River. On that river, Hunter examined natural mineral springs, where he made the first extensive chemical analysis of the phenomenon. The site—present-day Hot Springs, Arkansas—later became a national park and health resort. Dunbar submitted a report of his explorations, entitled *Documents Relating to the Purchase and Explorations of Louisiana*. It was published in 1904, to commemorate the centennial of the Louisiana Purchase.

Dunbar continued to undertake scientific studies at his Natchez plantation, including work on the Mississippi Delta and an examination of fossil bones he uncovered in Louisiana. In his time, he was considered the leading scientist in the lower Mississippi region, and many of his scientific papers were published by the American Philosophical Society. He also later served in the Mississippi territorial legislature. Significant to the history of exploration was a technique he developed that enabled him to single-handedly determine longitude without the aid of a timepiece. He was known as Sir William Dunbar by virtue of a hereditary title.

Sir William Dunbar undertook one of the earliest U.S. government-sponsored explorations into the frontier regions acquired in the Louisiana Purchase of 1803. Other expeditions into the new territory during the same period included one led by MERIWETHER LEWIS and WILLIAM CLARK and another led by ZEBULON MONTGOMERY PIKE.

Duperrey, Louis-Isadore (1786–1865) *French naval officer, scientist in the Pacific, the South Atlantic, and South America*

Born in Paris, Louis-Isadore Duperrey entered the French navy when he was 17. In 1809, he took part in a French naval cruise along the coast of Italy, during which he produced charts of the waters between Tuscany and the island of Corsica.

Promoted to second lieutenant in 1817, Duperrey sailed the Pacific Ocean on the *Uranie* under the command of LOUIS-CLAUDE DE SAULCES DE FREYCINET. Following

the wreck of that vessel in the Falklands in February 1820, he returned to France.

In 1821, Duperrey cruised the eastern MEDITERRANEAN SEA with JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE. Later that year, he presented the French government with a plan for an expedition around the world to complete the work left incomplete by Freycinet's 1817–20 voyage.

Duperrey won approval for his expedition directly from French monarch Louis XVIII. Promoted to lieutenant commander, he departed Toulon on August 11, 1822. His second in command was Dumont d'Urville. After stopping at the CANARY ISLANDS, Duperrey sailed westward across the Atlantic Ocean to the island of Santa Catarina, off the coast of Brazil, arriving just in time to witness a popular uprising against Portuguese rule. The expedition then visited the Falkland Islands, viewing the wreckage of the *Uranie*. On East Falkland Island, the expedition's naturalists made a study of birds.

Duperrey then returned to the South American mainland, sailing southward along the coast of Patagonia to Tierra del Fuego. After rounding CAPE HORN, he headed up the Pacific coast of Chile, putting in at Concepción, where a military coup was under way. With some other scientists, he made several expeditions into the interior to make a study of the Araucanian Indians. The *Coquille* then continued on to Peru, visiting the ports of Callao and Paita. Situated on the north coast of Peru, Paita was the site of Duperrey's scientific observations relating to terrestrial magnetism near the EQUATOR.

From Peru, Duperrey and the *Coquille* sailed across the Pacific, stopping first in the Tuamotu Archipelago, where he charted several islands. He and his crew were the first Frenchmen to visit Tahiti since LOUIS-ANTOINE DE BOUGAINVILLE in the late 1760s. Duperrey's subsequent report revealed that Tahitian social mores had become more conservative after 40 years of British missionary influence. While in the Society Islands, he charted the region around Bora Bora, correcting the errors of previous navigators and cartographers.

In the western Pacific, Duperrey explored around the north coast of New Guinea, reconnoitering the volcanic island of Waigeo, one of the Moluccas.

After a visit to the British colony at Sydney, Duperrey sailed northward into the Carolines, where he located and named the island of Ualan. He then returned to France by way of Java, Mauritius, and the CAPE OF GOOD HOPE.

Duperrey and the *Coquille* arrived in Marseilles on March 24, 1825. His account of the voyage, as well as the published reports of the expedition's scientists, began to appear the following year.

In the years following his voyage on the *Coquille*, Duperrey turned his attention to producing scientific works

on physics and geography. He was made an officer of the Legion of Honor and went on to become president of the French Academy.

One of the most notable discoveries of the 1822–25 expedition was made by Louis-Isadore Duperrey himself. By observing the variations in the movements of a pendulum at different latitudes, he was able to determine that the surface of the Earth flattened near the NORTH POLE and SOUTH POLE. His later published works included a map of the movements of OCEAN CURRENTS throughout the world. He was the first to show how the Atlantic Ocean current, resulting from the outflow of South America's Río de la Plata, was divided into two distinct streams; and he identified the source of the Humboldt Current, which caused low ocean temperatures in the coastal waters of Peru.

Dupetit-Thouars, Abel-Aubert (1793–1864)

French naval officer in the South Pacific

Abel-Aubert Dupetit-Thouars was born in La Fessardier, in the Loire Valley of France, near the town of Saumur, the son of a French naval captain. His uncle was the botanist and plant physiologist Charles-Marie Dupetit-Thouars.

In his early teens, Dupetit-Thouars entered the French navy as a midshipman, sailing with the fleet based at Boulogne. In 1829–30, he took part in the French conquest of Algeria.

By 1830, Dupetit-Thouars was commanding French warships; that year, as captain of the *Griffon*, he cruised the west coast of South America. The expedition's goals, unlike those of earlier French naval forays into the Pacific Ocean, were less scientific than political. At Callao, Peru, he met with the nation's leaders, to whom he voiced his country's concern over possible British encroachment in that newly independent nation.

In 1836, Dupetit-Thouars commanded the *Venus* in a three-year French naval expedition around the world. On this voyage, while stopping in Tahiti in September 1838, he was joined by fellow French navigator JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE and his expedition. In an audience with Pomare, queen of Tahiti, Dupetit-Thouars and Dumont D'Urville expressed the French government's displeasure over her having recently expelled two French Catholic missionary priests, which, as it turned out, had been done at the urging of rival Protestant missionaries on the island.

Dupetit-Thouars was made a rear admiral in 1841; the following year, in command of the *Reine Blanche*, he led an expedition to Tahiti and the Marquesas that brought those islands under French domination. Appointed a vice admiral in 1849, he went on to serve as a representative in the French legislature.

Starting in 1840, and continuing for the next 24 years, Abel-Aubert Dupetit-Thouars wrote and published an 11-volume account of his CIRCUMNAVIGATION OF THE WORLD. His diplomatic efforts in 1842–43 were vital in establishing France's colonial presence in Tahiti and the south-central Pacific, and marked the culmination of French exploration in the Pacific begun by LOUIS-ANTOINE DE BOUGAINVILLE in the 1760s.

Dupuis, Jean (1829–1912) *French trader in China and Southeast Asia*

A native of France, Jean Dupuis traveled to China in the early 1850s to make his fortune. He soon established himself as a trader at Shanghai; he expanded his operations to include Hankow (now part of Wuhan) after 1862, with the opening of that inland YANGTZE RIVER (Chang) port to foreigners.

Dupuis dealt mainly in armaments, and his contacts in the Chinese civil government and the military provided him with extensive knowledge of the vast country's interior. In the 1860s, French colonial interests were seeking a navigable water route from the coast of Southeast Asia into southeastern China's Yunnan province. One expedition, led by ERNEST DOUDART DE LAGRÉE and MARIE-JOSEPH-FRANÇOIS GARNIER, had attempted, without success, to find such a route by ascending the Mekong River. Dupuis had met with that party when it stopped at Hankow in 1868.

In 1871, Dupuis, in an attempt to establish the route on his own, traveled down the Red River from Yunnan province and reached the coast of northern Vietnam. His subsequent written account included the earliest descriptions by a European of that part of Southeast Asia.

Two years later, Jean Dupuis attempted to repeat his earlier exploit in reverse; his efforts met with resistance from Vietnamese officials. His arrest and detention at Hanoi provided French colonial leaders with a motive to mount an invasion of northern Vietnam and extend their colonial influence throughout the entire country.

Jean Dupuis's trading and exploring expeditions laid the foundation for French colonial influence in that part of Southeast Asia.

Duveyrier, Henri (1840–1892) *French explorer in North Africa*

Henri Duveyrier was born in Paris, the son of noble parents from the Languedoc region of southern France. His father, a follower of the French philosopher Claude Saint-Simon, was an active supporter of socialism.

At the age of 14, Duveyrier was sent to a school in southern Germany's Allgau region, where he studied medieval dialects of France and Germany. After a year, he went

on to a business college at Leipzig. He continued his independent studies of languages, in particular Arabic and the Berber dialects of North Africa.

Duveyrier was only 17 in 1857 when he made his first trip to North Africa. He traveled a short distance southward into the SAHARA DESERT from Algiers, as far as the northernmost oasis, where he befriended Ikhenouken of the Tuareg tribe, a nomadic Berber people who roamed the south-central desert regions of Algeria.

During his brief visit, Duveyrier was invited to visit the Tuareg homelands, but his plans precluded such an expedition. Later in 1857, after his return to Europe, his dictionary of the Berber language, published by the Oriental Society of Berlin, came to the attention of the German explorer of Africa HEINRICH BARTH. Duveyrier met with Barth at his home in London and became the veteran explorer's protégé. Back in France, Duveyrier perfected his knowledge of Arabic and Berber, studied the principles of ethnology, and learned how to establish his geographic position with navigational instruments.

In 1859, Duveyrier set out on his second expedition into North Africa. Traveling by camel, he left Biskra, southeast of Algiers, and headed southwestward into the Grand Erg Occidental Desert. He visited the Arab city of Ghardia, then went on to the El Golela Oasis. He had planned to continue his journey southward to the Touat Oases in south-central Algeria, but hostile treatment by Muslims forced his sudden departure and return to Algiers.

Duveyrier set out across the Sahara again in 1860, starting from the southwestern Libyan cities of Ghat and Ghadames. He headed westward and entered the homeland of the northern Tuareg. Adopted by one band, he traveled with them for over a year, crossing the Ahaggar Mountains and entering the Tassili region, territory that had not yet been visited by Europeans. Duveyrier's expedition was directly supported by Napoleon III, who hoped that the

young explorer would establish friendly relations with the warlike Tuaregs and advance French colonial interests in the isolated regions of south-central Algeria.

Upon his return to France in 1861, Duveyrier was awarded a gold medal by the Geographical Society of Paris and was inducted into the Legion of Honor. As a result of his efforts, Tuareg leader Ikhenouken visited Paris and was royally received by Napoleon III.

Soon after his return from Africa in 1861, Duveyrier was stricken with typhus and suffered a temporary memory loss. Nevertheless, he recovered sufficiently to write an account of his explorations in the Sahara, known in English as *The Tuareg of the North*, which was published in 1864.

Duveyrier became a professor at the Sorbonne. He later served as a captain of the French army in the Franco-Prussian War of 1870, during which he was taken prisoner at the Battle of Sedan.

Duveyrier made several more trips to North Africa, including one in 1884 in which he accompanied the sultan of Morocco on a journey from Tangier to Meknes and explored the Er Rif Mountains of Morocco. He also traveled extensively in Tunisia.

In his later years, Duveyrier became increasingly disillusioned by French colonial policies in North Africa. His despondency over the ensuing conflicts between the French and the Berbers may have led to his suicide in the Bois de Boulogne outside Paris in 1892.

Henri Duveyrier was recognized as the foremost authority on the people, vegetation, and geographic conditions of the Saharan regions beyond the Atlas Mountains, and his geographic reports aided in the establishment of the first modern travel routes into the interior of Algeria. His studies of the culture and language of the Tuareg complemented Barth's earlier work. Through his efforts, the French were able to establish a vast colonial empire that encompassed most of the Sahara by the end of the 19th century.

E



Eannes, Gil (Gil Eanes) (ca. 1395–ca. 1445)

Portuguese explorer on the west coast of Africa

Gil Eannes was a wealthy Portuguese courtier under HENRY THE NAVIGATOR, prince of Portugal. Few details exist of his origins or early life. In the early 1430s, he held the title of Shield Bearer in Prince Henry's retinue.

Although not an experienced mariner or navigator, Eannes was commissioned by Prince Henry to command a seaward expedition to sail around Cape Bojador on the west coast of Africa. In the early 15th century, Cape Bojador (bulging cape), located just south of the CANARY ISLANDS and the jutting African coastline, was considered the farthest limit of navigation along that continent. Superstitious sailors believed that beyond it the sea became boiling hot and white men were turned black by the extreme temperatures. Less fanciful theories held that the prevailing winds and currents would make a return from south of the cape impossible.

Eannes sailed to Tenerife in the Canary Islands in 1433. After the sighting of Cape Bojador, the crew, fearing certain death from what appeared to be the fabled boiling waters, demanded that he return to Portugal. Prince Henry was not pleased with Eannes's hasty retreat and admonished him for abandoning the enterprise so close to the cape. Henry also explained to the inexperienced mariner that the appearance of the boiling sea was actually surf running over coastal shoals at ebb tide.

Eager to redeem himself in the eyes of the prince, Eannes sailed again from Portugal in 1434 with a different

crew. Although apprehensive about the waters beyond Cape Bojador, he nevertheless rounded it and explored the coast below for a few miles. He soon discovered there was no truth to the legendary terrors associated with Cape Bojador, and that the much feared current was not strong enough to prevent his ship from returning northward. After briefly exploring the shore, Eannes returned to Portugal with a type of flower from the African coast that became known as St. Mary's Rose.

Well rewarded for his achievement, Eannes undertook a third voyage in 1435, accompanied by the prince's Cup Bearer, AFONSO GONÇALVES BALDAYA. With the purpose of extending trade contacts to African people beyond Muslim domination, the expedition sailed along the West African coast to a point beyond Cape Bojador, north of the TROPIC OF CANCER, and reached a bay Eannes named Angra dos Rivos. Although he saw no human inhabitants, he sighted footprints of people and camels.

Eannes later commanded expeditions sponsored by the merchants of Lagos, Portugal, exploring as far south as the mouth of the Rio de Oro.

Gil Eannes was the first European to sail around Cape Bojador and return to describe it. His 1434 voyage dispelled the superstitions concerning exploration of the African coast and inspired subsequent Portuguese expeditions. Encouraged by Eannes's reports of signs of human inhabitants near Angra dos Rivos, Prince Henry soon sent Baldaya on an expedition exploring still farther southward

along the west coast of Africa. Portuguese exploration along that route culminated in VASCO DA GAMA's voyage around Africa to India in 1497–99.

Eberhardt, Isabelle (Si Mahmoud Essadi)

(1877–1904) *Swiss traveler, writer in North Africa*

Isabelle Eberhardt was born in Geneva, Switzerland. Her Russian-born father, a former Russian Orthodox priest, was a political activist and convert to Islam, and he encouraged his daughter's Arab language studies. Her mother, from an aristocratic German family, converted to Islam at the same time that Eberhardt did—on a trip to North Africa when Eberhardt was 20. After the death of her mother, she made her home in northern Algeria.

For the next seven years, Eberhardt traveled widely in North Africa, including expeditions on horseback to the SAHARA DESERT. In order to gain access to Arab society, including the secret Sufi brotherhood known as Qadriya, Eberhardt regularly dressed as a man and went by the name of Si Mahmoud Essadi. In 1901, she married an Algerian, Slimane Ehnni. She died in a flashflood at Aïn Sefra, Algeria, three years later.

In her books, written in French, including *Nouvelles algériennes* (Algerian news, 1905), *Dans l'ombre chaude de l'Islam* (In the hot shadow of Islam, 1906), and *Les journaliers* (The day laborers, 1922), Isabelle Eberhardt described places and situations forbidden to both Europeans and women.

Egede, Hans (1686–1758) *Norwegian missionary in Greenland*

Hans Egede was born in Harstad on the Atlantic coast of Norway, north of the ARCTIC CIRCLE. In 1707, he became a pastor in the Lutheran Church, and, over the next seven years, he served at Drontheim and Vaagen.

In 1717, Egede gave up his post at Vaagen and sought backing from merchants in Bergen, Norway, for a missionary expedition to GREENLAND. At that time, it was thought that Norse settlers were still living in Greenland as Roman Catholics, and Egede intended to convert them to Lutheranism. Finding little interest for his project in Bergen, Egede went on to the Danish capital at Copenhagen. At that time, Denmark ruled Norway, and it was Danish monarch Frederick IV who finally agreed to organize a trading company to support Egede's proposed expedition.

Egede and a party of 46 colonists sailed on the *Haabet* in May 1721, landing two months later at the site of present-day Nuuk (also known as Godthaab) in southwestern Greenland. Although he was welcomed by the Inuit, he saw no European descendants of the early Norse settlers as he had expected. After establishing a settlement with a church,

Egede ministered to the Inuit for several years, winning many converts and learning their language. In 1724, he preached his first sermon in the Inuit language.

Additional settlers from Denmark arrived at Egede's Greenland colony in 1728, and, within several years, Egede was joined by more missionaries. In 1736, two years after his wife's death in Greenland, he returned to Copenhagen with her remains. He established a seminary in Denmark for future missionaries to Greenland, and, in 1740, he was named a bishop and superintendent of the Greenland Mission, headquartered in Copenhagen. In 1741, his authoritative account, *A Description of Greenland*, was first published. After his retirement in 1747, Egede spent his remaining years on the island of Falster near Copenhagen. His son, Paul Egede, followed his father into the ministry and also served as a missionary in Greenland, producing the first edition of the New Testament in the Inuit language.

Known as the "Apostle of Greenland," Hans Egede established the first European settlement in Greenland since the days of the VIKINGS. Some sources suggest that he may have come into contact with the descendants of Norse settlers who had intermarried with the Inuit. Yet most historians believe the last original Norse colonists of Greenland died out 200 years before Egede's arrival.

Eiríksdottir, Freydis (fl. early 1000s) *Norse colonist in North America, daughter of Eric the Red, half sister of Leif Ericsson and Thorvald Ericsson*

As related in the traditional Norse sagas, Freydis Eiríksdottir was the illegitimate daughter of ERIC THE RED, and presumably was born and raised near Brattahlíð, his home on the southwest coast of GREENLAND.

In about 1010, Freydis joined her husband, Thorvard, in THORFINN KARLSEFNI's colonizing expedition to the shores of VINLAND, a land that had been visited several years earlier by her half brother LEIF ERICSSON, and believed to be what is now Newfoundland. After wintering at a landlocked bay called Hop, the Norse colonists established trading contacts with the Inuit or Indians, whom they called the Skraelings. At one point, a bull that had been brought from Greenland broke loose, and the Skraelings, never having seen such an animal, fled in terror. About a month later, the native people responded by attacking the Norse settlement with bows and arrows. Freydis, enraged by her male companions' hesitation in launching a counterattack, recovered a sword from a fallen Viking and, although at that time pregnant, slapped it against her bared breasts and screamed at the attackers, driving them off. In about 1013, following another winter in Vinland, she returned to Greenland with Karlsefni's colonists.

Soon afterward, Freydis reportedly took part in another Norse expedition to Vinland. In about 1014, she convinced

two brothers, Helgi and Finnbogi, recently arrived from Norway with their own ship, to join her in a voyage to Vinland, hoping to return with a cargo of wild grapes, wheat, and other goods. Leif Ericsson granted permission for them to use a house he had built on what may have been the northeast coast of Newfoundland at a site later known as L'Anse aux Meadows.

Freydis, with her husband, Thorvard, and a party of colonists on one ship, and the brothers Helgi and Finnbogi on their own ship with additional colonists, sailed from Brattahlid, Greenland, to Vinland, arriving in summer 1014. Conflicts soon developed between Freydis and the brothers. She would not permit them the use of Leif's house and eventually caused an open dispute when she accused them of making improper advances upon her. Her husband became incensed and, with his companions, killed the brothers and their colonists in a surprise raid. Freydis reportedly took part in the attack, slaughtering the female members of the brothers' party herself. She and Thorvard then appropriated the murdered brothers' ship and sailed back to Greenland with a load of foodstuffs.

Freydis had attempted to cover up the murders by saying that the brothers and their colonists had opted to remain on Vinland. Nevertheless, Leif soon learned what had really happened. Although outraged, he was unable to bring himself to punish his half sister and her husband, although he did denounce them and put a curse on their offspring. No record exists of Freydis's later life.

The Vinland expedition undertaken by Freydis, Thorvard, and the other Greenlanders in about 1014 marked the end of early European explorations of North America, as depicted in the Norse sagas. In the context of the traditional accounts contained in the sagas, Freydis was one of the few women to play a significant role in the voyages of the Vikings to North America.

Elias, Ney (1844–1897) *British official in central Asia*
British-born Ney Elias was of Jewish ancestry. He pursued a career as a civil servant and found work in a foreign office in China.

In September 1872, with plans to return to England, Elias set out across the GOBI DESERT from Kuei Hua Cheng in China, accompanied by a Chinese servant, an interpreter, and a camel driver, plus camels and ponies. Two months later, he reached the frontier post of Uliastay in Mongolia. Continuing northwestward along the river Dzavhan Gol, he crossed the frozen lake Har Us Nuur and reached the village of Hovd. From there, he crossed the Altai Mountains into SIBERIA, reaching Biysk on the Ob River. His winter-time journey across Siberia was by way of horse-drawn sled. Elias crossed the Ural Mountains and finally reached Nizniy Novgorod east of Moscow. He continued westward through

Europe, now by train, eventually reaching England after a total of some 4,800 miles.

Elias was later hired by India and sent on diplomatic missions throughout central Asia. He also explored the passes in the Pamirs. In 1885–86, he became the first Englishman to cross this range.

Ney Elias carried out eight expeditions throughout central Asia in the course of his career, thus becoming one of the greatest British explorers of the region in that period. In 1873, he received the Founder's Medal of the ROYAL GEOGRAPHICAL SOCIETY for his first trek across central Asia.

Ellsworth, Lincoln (1880–1951) *American aviator, polar explorer*

Lincoln Ellsworth was born in Chicago into an affluent family. After attending Columbia and Yale Universities, he left school to work as a surveyor and engineer in the construction of a transcontinental railroad in Canada. He later engaged in prospecting and worked as a mining engineer in northwestern Canada. In World War I, he was trained as an aviator, although illness kept him from overseas service.

In 1924, Ellsworth organized and led a scientific expedition to Peru for Johns Hopkins University, in which he made a geological survey of the ANDES MOUNTAINS from the Pacific coast to the headwaters of the AMAZON RIVER.

In 1925, Ellsworth contacted Norwegian polar explorer ROALD ENGELBREGT GRAVNING AMUNDSEN during his lecture tour in the United States, offering to provide financing for a proposed airplane flight over the NORTH POLE. Amundsen soon agreed to a joint expedition with Ellsworth, who, with \$85,000 of his own money, acquired two German Dornier "Whale" seaplanes, equipped with Rolls-Royce engines.

As navigator on one of the planes, Ellsworth took off from Spitsbergen (present-day Svalbard) in May 1925. Mechanical problems forced one of the planes down, and the other landed to rescue the passengers. The expedition had reached as far as 87°43' north latitude, which, although short of the North Pole, was a new record for air travel in the Arctic.

The next year, 1926, Ellsworth purchased an Italian AIRSHIP and renamed it the *Norge*. Ellsworth and Amundsen, along with Italian aviator UMBERTO NOBILE as pilot, used it for the first transpolar flight. They set out across the Arctic Ocean from Spitsbergen, passed over the North Pole, and landed at Teller, Alaska. (RICHARD EVELYN BYRD had succeeded in crossing over the Pole in an airplane several days before.)

In 1931, Ellsworth was an official observer on the German airship *Graf Zeppelin* in flights over Franz Josef Land and Northern Land. Also in the early 1930s, he provided



Lincoln Ellsworth (Library of Congress)

backing for SIR GEORGE HUBERT WILKINS's early attempts at exploration of the Arctic by SUBMARINE.

Starting in 1933, Ellsworth began the first of a series of expeditions aimed at making the first flight across the Antarctic continent. Planning to fly from the Ross Sea to the Weddell Sea, Ellsworth, Sir Hubert Wilkins, and Bernt Balchen arrived at the Bay of Whales on the icebreaker *Wyatt Earp*. The aircraft intended for the project was damaged while being unloaded from the ship, however, and the expedition had to be delayed until the following year. In fall 1934, Ellsworth established a base at Deception Island in the Weddell Sea region, planning for a flight across Antarctica to the Ross Sea, but, before he could set out, he was again delayed a year because of engine problems.

Finally, on November 20, 1935, Ellsworth took off from Dundee Island in the Weddell Sea. His aircraft, the *Polar Star*, was piloted by Herbert Hollick-Kenyon. Ellsworth planned to survey the region between the Weddell and Ross Seas and determine whether Antarctica was a single landmass or two large islands. He also wanted to learn if the mountain ranges of central Antarctica was a continuation of the ANDES MOUNTAINS, extending southward from South America.

Ellsworth's plane was forced down four times by bad weather, including one severe blizzard. With their fuel sup-

ply gone, Ellsworth and Hollick-Kenyon made a landing about 15 miles from the abandoned American base, Little America, near the Bay of Whales on the Ross Sea, which they soon reached by foot. The *Wyatt Earp* arrived three weeks later and picked up the two men.

Ellsworth's 2,200-mile flight across Antarctica yielded much new geographic information. He charted the Sentinel Range, which included the highest peaks in Antarctica, and named one Mount Mary Louise Ulmer, after his wife. He also sighted a mountain range that appeared to be a continuation of Graham Land. He called these mountains the Eternity Range and named three of its peaks Mount Hope, Mount Faith, and Mount Charity. His aerial survey included 400,000 square miles of previously unexplored territory between Hearst Land and Marie Byrd Land, which he claimed for the United States and named James W. Ellsworth Land after his father.

In 1939, Ellsworth undertook further aerial reconnaissance of Antarctica, this time approaching the continent from its Indian Ocean side, surveying an additional 81,000 square miles of previously unknown territory east of the Ross Sea.

Lincoln Ellsworth's early aerial explorations yielded much new geographic information, providing the earliest accounts of large and previously unknown areas of the Arctic Ocean. With Amundsen, he authored *Our Polar Flight* (1925) and *First Crossing of the Polar Sea* (1927). During his 1935 flight, he not only made the first crossing of the Antarctic continent, but also demonstrated that a plane could safely land and take off again in remote parts of the Antarctic interior.

Emin Pasha, Mehmed (Dr. Eduard Schnitzer)

(1840–1892) *German physician, government official in East Africa*

The man later known as Mehmed Emin Pasha was born Eduard Schnitzer in the city of Oppeln (Opole) in what is now central Poland, the son of German-Jewish parents. He studied medicine in addition to natural sciences, becoming a practicing physician. In 1865, he became a physician with the Turkish army. Five years later, he was appointed governor of northern Albania, which at that time was a province of the Ottoman Empire. Over the next several years, he adopted a Turkish way of life.

In 1876, Emin Pasha, as he chose to be known, journeyed into the Sudan region south of Egypt, where he became a physician with Anglo-Egyptian armed forces at Khartoum, under the command of British general Charles "Chinese" Gordon. Two years later, he was appointed governor of the Egyptian province of Equatoria, which included much of what is now Uganda and the southern Sudan.

Emin Pasha took up his post at Lado on the White Nile River. From there, he undertook explorations into the for-

mer Unyoro region of present-day Uganda and made botanical and ornithological studies, periodically sending collections of rare central African plants and birds back to scientists in Europe. His travels during the late 1870s took him into the region northwest of Juba in the Sudan, as well as southwest into the watershed region between the NILE RIVER and the CONGO RIVER (Zaire River). He also explored south of Juba to the north shore of Lake Victoria.

With the outbreak of the revolt of the Mahdi in 1881, Emin Pasha found himself isolated from the support of the besieged Anglo-Egyptian forces to the north. In 1883, he withdrew up the Nile with his garrison of 10,000 men, women, and children, settling in at a remote position on Lake Albert, northwest of Lake Victoria. Following the massacre of General Gordon and his troops at Khartoum in 1885, Emin Pasha commanded the last stronghold against the Egyptian rebel forces.

An expedition to relieve Emin Pasha and his garrison was organized in 1887 under SIR HENRY MORTON STANLEY. After an arduous journey from the mouth of the Congo, Stanley arrived at Emin Pasha's outpost and succeeded in evacuating the Lake Albert garrison back to Bagamoyo on the Indian coast of present-day Tanzania, opposite Zanzibar.

In Bagamoyo, in what was then German East Africa, Emin Pasha entered the service of the German government in 1890, as the leader of an official expedition that sought to explore the many lakes in the region and claim the source of the Nile for Germany. On reaching Tabora in what is now central Tanzania, he raised a German flag. After leading his expedition to Lake Albert, he pushed westward into what is now northeastern Democratic Republic of the Congo. In October 1892, at Kinena, about 100 miles south of Stanley Falls, he was murdered in his encampment by Arab slave traders, probably in retaliation for his previous efforts to stamp out the SLAVE TRADE during his British service in the Sudan. His journals were later recovered by Belgian authorities and sent back to Europe.

Emin Pasha's explorations in the Sudan and in East Africa resulted in new geographic and scientific knowledge of the Congo and upper Nile region. On his trek with Stanley from Lake Albert to the Indian Ocean coast in 1889, he was among the first Europeans to sight the Ruwenzori Range, the fabled MOUNTAINS OF THE MOON, and also joined Stanley in his exploration of the Semliki River connecting Lake Edward with Lake Albert.

Emmons, George Foster (1811–1884) *U.S. Navy officer in the Pacific Northwest*

Born in Clarendon, Vermont, George F. Emmons entered the U.S. Navy as a midshipman in 1828. Following his maritime training at the New York Naval School, he cruised the MEDITERRANEAN SEA from 1830 to 1833. In 1836, he took part in a hydrographic survey.

In 1838, Emmons joined the U.S. South Seas Surveying Expedition under the command of CHARLES WILKES. He served on the *Porpoise*, one of the main ships of the expedition, from mid-August 1838 until July 1841, when the vessel was wrecked off the mouth of the COLUMBIA RIVER on the Oregon coast. He then led an exploring expedition inland investigating the region south of the Columbia River to the headwaters of the Sacramento River in northern California. The scientists and topographers, including JAMES DWIGHT DANA, obtained a great deal of new data on the natural history and geography of the Pacific Northwest. After a visit to Sutter's Fort, Emmons led his party to San Francisco and rejoined Wilkes's fleet. The expedition sailed for the South Pacific Ocean, exploring until August 1842.

Emmons's next assignment was with U.S. naval forces off the coast of Brazil. In the U.S.-Mexican War of 1846–48, he took part in actions on the California coast, including several forays into the Sierra Nevada. After the war, he served in Washington, D.C., in several administrative naval posts. In 1850–53, he wrote a definitive, ship-by-ship history of the U.S. Navy, entitled *The Navy of the United States, from the Commencement, 1775 to 1853, with a Brief History of Each Vessel's Service and Fate* (1853).

In the Civil War, Emmons commanded U.S. warships in the Gulf of Mexico, capturing a number of Confederate blockade-runners. He also commanded the ship that took American and Russian officials to Alaska in 1867, when the sale of that region to the United States was finalized. Promoted to commodore on his return, he was subsequently named commander of the navy's hydrographic office. Emmons retired from the navy in 1873, at the rank of rear admiral.

The information acquired by George F. Emmons and his scientific team in their 1841 explorations of what is now western Oregon and northern California was of great assistance to the U.S. government in its subsequent negotiations with England over the Oregon Country.

Emory, William Hemsley (1811–1887)

U.S. Army officer, topographical engineer in the American Southwest

William H. Emory was born in Queen Annes County, Maryland, to a prominent family descended from Maryland's colonial founders. He entered West Point in 1827; among his classmates were Jefferson Davis and Henry Clay, Jr., who nicknamed him Bold Emory. He graduated four years later as a second lieutenant in the artillery. He left the army in 1836, and, two years later, he married Matilda Wilkins Bache, a great-granddaughter of Benjamin Franklin.

In 1838, Emory returned to active duty as a first lieutenant in the U.S. Army Corps of Topographical Engineers.

In 1844, he took part in the Northeastern Boundary Survey along the U.S.-Canadian border. He also produced a map of Texas, marking its claims as far as the Rio Grande.

At the outbreak of the U.S.-Mexican War in 1846, Emory was attached to General STEPHEN WATTS KEARNY's forces. Starting from Fort Leavenworth, Kansas, he surveyed the army's route through the Arkansas River Valley to Bent's Fort, Colorado, along the Santa Fe Trail, and across Arizona's Gila River region. He made thousands of astronomical observations determining the route's exact location in terms of LATITUDE AND LONGITUDE. In addition, through hundreds of barometric readings, he accurately determined elevations. Based on the information, he created the first scientific map of the region to the west of the American Southwest, from the Gulf of Mexico to the Pacific Ocean.

While traveling through the Southwest with Kearny's forces, Emory and his party came upon the ruins of Casa Grande Pueblo, as well as other Indian ruins that had not been visited by non-Indians since Father FRANCISCO TOMÁS HERMENEGILDO GARCÉS explored the region in 1776. He also determined the exact location of the junction of the Gila River and COLORADO RIVER through astronomical sightings.

Emory was brevetted a major in the California campaign. After the war's conclusion, from 1849 to 1855, he



William H. Emory (Library of Congress)

commanded the 1,500-mile survey of the U.S.-Mexican Border for the Mexican Boundary Commission. During this project, he was one of the leading proponents for the Gadsden Purchase of 1853, citing the region as feasible for a proposed transcontinental railroad's southwestern link.

After 1855, Emory was attached to the Second Cavalry regiment and supervised the construction of wagon roads in New Mexico and present-day Arizona.

At the onset of the Civil War in 1861, Emory was in command of U.S. forces in the Indian Territory (present-day Oklahoma). By successfully withdrawing his troops to Fort Leavenworth, Kansas, he was credited with preventing Missouri from joining the Confederacy.

Emory retired from the army in 1876 as a brigadier general after 45 years of service.

William H. Emory's report on his 1846 topographic expedition across the Southwest, *Notes of a Military Reconnaissance from Fort Leavenworth in Missouri, to San Diego in California, Including Parts of the Arkansas, Del Norte, and Gila Rivers*, was published by the government in 1849. His description of the Southwest as unsuitable for slave-based agriculture had bearing on the sectional disputes that resulted in the Compromise of 1850. The report included a map of the Southwest detailing trails that had previously been known only to Indian peoples and fur trappers.

Entrecasteaux, chevalier d' See BRUNI, ANTOINE-RAYMOND-JOSEPH DE.

Eratosthenes (Eratosthenes of Cyrene, Beta, Pentathlos) (ca. 276–ca. 195 B.C.) *Greek mathematician, astronomer, geographer*

Born in Cyrene, in present-day Libya, Eratosthenes studied under well-known scholars of his age, including the philosopher Ariston and poet-critic Callimachus. After living in Athens, Greece, he became head of the library at Alexandria, in North Africa, in about 240 B.C.

Eratosthenes's interests were wide ranging. He wrote poetry and works about literature, theater, and philosophy, as well as about history, producing a chronology of events since the siege of Troy by the Greeks. He also pursued the sciences, including mathematics and astronomy. He measured the circumference and tilt of the Earth and the sizes and distances from the Earth of both the Sun and Moon. He is also said to have created a catalog of 675 fixed stars.

Eratosthenes also made major contributions to the field of geography. He drew a map of the world, the first known map to use a grid pattern, and wrote a treatise on geography. The route he presented of the NILE RIVER to

Khartoum, showing two Ethiopian tributaries, was fairly accurate. He also suggested that lakes were the source of the Nile and that heavy rainfall near the source created flooding downriver.

Eratosthenes is said to have committed suicide by starvation after becoming blind. Because of his many accomplishments he was given the nickname Beta, in reference to being second only to Alpha (that is, second only to the gods). Another nickname was Pentathlos, in reference to an athlete who consistently takes second prize. He is considered the first systematic geographer.

Erauso, Catalina de (Alonso Díaz Ramírez, Antonio de Erauso) (1585–1650) *Spanish woman soldier in South America*

Catalina de Erauso was born into a noble Basque family of San Sebastián in the Spanish province of Guipúzcoa. At age four, she was placed in a convent by her parents. Often at odds with the nuns, she determined to escape and did so at the age of 15, on the night before she was to take her vows. She managed to avoid capture by cutting her hair and wearing boy's clothing—transgressions punishable by death. Her deception worked, and she supported herself with odd jobs, such as tending horses.

In 1603, at the age of 18, Erauso, still hiding her womanhood and using the name Alonso Díaz Ramírez, worked as a cabin boy on a ship bound for South America. In Peru, she trained in the use of a sword and enlisted as a soldier in the Spanish army. She served for 13 years, stationed near the present border between Peru and Chile, seeing action against the Araucanian Indians of the region. She later spent time in mining towns in northern Chile and Argentina but reenlisted in 1620. One day, when taking refuge in a church after a sword fight, Erauso decided to confess. Rather than being punished, she was celebrated by many of her fellow soldiers and was granted a pension by the army. She returned to Spain four years later.

Deciding to make a pilgrimage to Rome, Erauso traveled through France, where she was held for a time as a spy. She finally was allowed to proceed on her travels and gained an audience with the pope. She returned to the Americas in 1630, where she spent the rest of her life as a tradesperson and mule driver under the name Antonio de Erauso.

Catalina de Erauso wrote about her escape from the nunnery and her experiences in South America in a memoir, which has been translated into several languages; a recent volume in English is entitled *Lieutenant Nun* (1996). Her story of adventure and exploration, that of a woman disguised as a man, is unique in regard to the Spanish conquest of South America.

Ericsson, Leif (Leifr Eiríksson, Leif Eriksson, Leif Erikson, Leif Ericson, Leif the Lucky)

(ca. 975–ca. 1020) *Norse mariner in North America, son of Eric the Red, brother of Thorvald Ericsson, half brother of Freydis Eiríksdóttir*

Leif Ericsson was the son of Viking leader ERIC THE RED. Ericsson was probably born in ICELAND, but it is possible he was born in GREENLAND. In any case, in about A.D. 981, his father was exiled from Iceland for three years for killing a neighbor. He and his family explored to the south and west of Iceland, reaching the coast of Greenland.

In about 985, after his return to Iceland, Eric the Red led a group of Norse colonists to the southwest coast of Greenland, where he established a colony at Brattahlid. Also about this time, BJARNI HERJULFSSON, another Norse seaman, sailed still farther to the west and south, returning with reports of lands unknown in Europe, possibly the coast of what is now Labrador or Baffin Island.

According to Norse folk tradition, contained in *Eiríks saga*, or the *Saga of Eric the Red*, Leif Ericsson, in 999, sailed from Greenland for Norway with his wife, Thorgunna. On the way, their ship was blown off course, and the couple landed in the Hebrides, the island chain off the northwest coast of Scotland. After spending some time there, they finally reached Norway and the court of King Olaf I.

King Olaf commissioned Ericsson to introduce Christianity to the Norse colonists on Greenland. In about the year 1000, Ericsson supposedly sailed westward from Norway, intending to reach Greenland, but was blown off course to the coast of North America. The party went ashore at a site on the eastern seaboard, probably somewhere between Nova Scotia and Chesapeake Bay. After wintering there, they returned to Greenland in the spring with samples of wheat and grapes. On the return journey, Ericsson reportedly rescued some Norse seamen who had been shipwrecked on the North American coast. For this, he earned the nickname Leif the Lucky.

Ericsson's adventures in North America are described differently in another Norse folk narrative, *Groenlendinga*, or the *Saga of the Greenlanders*. According to this source, Ericsson was in contact with Herjulfsson, who told him of the wooded lands he had found 15 years earlier across the Davis Strait, west of the Greenland settlement. At that time, timber for building and fuel was scarce in the North Greenland settlement. Ericsson purchased Herjulfsson's ship, intending to use it to bring back much needed timber from these lands to the west.

Also according to the *Saga of the Greenlanders*, in about 1001, Ericsson and a crew of 35 Norsemen sailed westward from what is now Godthaab on the southwest coast of Greenland and soon reached the coast of possibly either southern Baffin Island or Labrador. He may also have explored the Ungava Bay region of what is now extreme northern Quebec.

Ericsson named this northernmost region Helluland, meaning “land of flat rocks,” after its rugged terrain. He then followed the coastline southward to present-day eastern Labrador and named the region Markland, which in Norse means “land of woods.” Continuing southward, Ericsson and his men came to a region rich in self-sowing wheat. He made a landing there and sent a reconnaissance party to explore inland, led by a German named Tyrkir. When Tyrkir returned to the coast, he brought back samples of wild grapes. The region was later dubbed VINLAND, for “wine-land” or, more likely, “meadowlands.”

The *Saga of the Greenlanders* goes on to relate how Ericsson and his crew built shelters and continued their explorations, at one point traveling up a river. At the end of winter, probably in 1002, they returned to Greenland with a cargo of wood, as well as samples of the region’s plants.

Several years later, Leif’s brother, THORVALD ERICSSON, led a colonizing expedition to Vinland. The settlement met with resistance from native North Americans, possibly Beothuk, Micmac, or Inuit (Eskimo), called Skraelingar or Skraelings by the Norse. In one encounter, Thorvald was killed. Soon afterward, the Norse settlers abandoned their colony and returned to Greenland.

Ericsson did not return to North America. He inherited his father’s landholdings in Greenland, remaining there until his death in about 1020.

Archaeological investigations at L’Anse aux Meadows in northern Newfoundland indicate actual Norse settlements existed about the time of Ericsson’s reported voyage, believed by many historians to be the site where he wintered in about 1001. The Norse sagas also mention subsequent colonizing attempts in Vinland by THORFINN KARLSEFNI in about 1010 and Ericsson’s half sister, FREYDIS EIRÍKSDOTTIR, in 1014–15.

Several hundred years after Ericsson’s voyage, the Norse colony on Greenland disappeared, its remaining members possibly intermarrying with Inuit.

No recorded information about Leif Ericsson’s explorations of North America exist other than what is contained in the Norse sagas, which were not written down until the 13th and 14th centuries. Nevertheless, by the early 1400s, English fishermen from Bristol were regularly visiting Iceland and may have brought back reports of lands west of Greenland that may have influenced JOHN CABOT. During the 1470s, CHRISTOPHER COLUMBUS reportedly visited Iceland, where he too may have obtained knowledge of lands across the Atlantic Ocean.

Ericsson, Thorvald (Thorvald Eiríksson, Thorvald Ericksson, Thorvaldr Erikson, Torvald Ericson) (unknown–ca. 1007) *Norse mariner in North America, son of Eric the Red, brother of Leif Ericsson, half brother of Freydis Eiríksdottir*

Thorvald Ericsson, a son of ERIC THE RED, was possibly born at his family’s homestead, Brattahlid, on the southwest coast of GREENLAND; other sources indicate he was born in ICELAND.

According to one account in the Norse sagas, in about 1005, Thorvald undertook a voyage westward from Greenland to VINLAND, a land his brother, LEIF ERICSSON, had reached several years earlier. With a group of about 50 Vikings, he arrived on the shore of Vinland, somewhere between Labrador and New England, and located Leif’s former settlement, where they spent the winter. The following summer, they explored southward and may have reached Long Island Sound. The next year, while exploring to the east, Thorvald encountered a group of about eight natives, either Indians or Inuit (Eskimo) referred to in Norse writings as Skraelingar or Skraeling. A conflict arose in which the Vikings killed all but one of the native people. Soon afterward, the natives counterattacked, and Thorvald was fatally wounded by an arrow. His men buried him on the coast of Vinland, then returned to Greenland.

A different account of Thorvald’s exploits in Vinland appears in another of the sagas. In that version, he accompanied THORFINN KARLSEFNI and his half sister FREYDIS EIRÍKSDOTTIR on an expedition of 1010 to Vinland, also encountered natives, and was subsequently killed in an attack by a one-legged, human-like creature.

The traditional Norse literature about Thorvald Ericsson’s exploits in Vinland depicts the first known contacts between European, and Native Americans.

Eric the Red (Erik the Red, Eirík Thorvaldsson) (ca. 950–1010) *Norse mariner and colonizer in Greenland, father of Leif Ericsson, Thorvald Ericsson, and Freydis Eiríksdottir*

Eric the Red (his nickname derived from the color of his hair) was born in Jaeren in southwestern Norway, the son of a Viking nobleman named Thorvald Aswaldsson. In about A.D. 950, his father, having been exiled from Norway for killing a man, took Eric and the rest of his family to ICELAND, settling on the island’s northwest coast.

Growing up in that part of Iceland, the young Eric may have heard accounts of new lands to the west, known as Gunnbjorn’s Skerries, that had been sighted years earlier by a Norse mariner named Bjarni Gunnbjorn. From the heights of local mountaintops in northwestern Iceland, he may have also caught sight of GREENLAND 120 miles across the Denmark Strait.

In about 981, Eric killed one of his neighbors in a feud and was banished for three years from Iceland. The next year, he sailed with his family from Bredifjord on the west coast of Iceland, planning to spend his exile exploring the lands reported by Gunnbjorn. In addition to his wife

and children, Eric brought several neighboring families, as well as livestock and other essentials for a farming settlement.

Eric and his party soon reached the southeast coast of Greenland, near what is now Angmagssalik, and made a landing at a site they called Blaserk (“Blue Shirt”). The coast here was choked with ice. Seeking a region more suitable for settlement, they headed southward along the coast and rounded Cape Farewell, although some sources suggest they passed around the southern end of Greenland by way of Prins Christian Sound, north of Cape Farewell. On the southwest coast, Eric and his party made a landing at what is now Julianehaab, at an inlet he called Ericsfjord.

Eric and his companions established a small farming settlement at Ericsfjord. Over the next two years, they explored northward along Greenland’s west coast as far as Disko Island.

In about 985, Eric, having completed his sentence of exile, returned to Iceland, and he soon organized a colonizing expedition to what he called Greenland. According to the Norse *Eiríks saga*, or the *Saga of Eric the Red*, he hoped that people would be drawn there if the land had an attractive name.

Eric’s colonists, numbering over 1,500 men, women, and children, sailed from Iceland in 985 or 986, on 25 vessels. Eleven of the ships were lost or returned to Iceland. The remaining 14 ships, with about 500 colonists, arrived on the southwest coast of Greenland and soon established a settlement around Eric’s homestead, called Brattahlid. In the following years, Norse mariners explored westward from the colony, known as the Western Settlement, and they may have sailed across the Davis Strait to the south coast of Baffin Island.

Between 1000 and 1015, Eric’s sons, LEIF ERICSSON and THORVALD ERICSSON, and his daughter, FREYDIS EIRÍKSDOTTIR, sailed westward from the Greenland settlements and reached the coasts of North America.

Eric the Red made the first reported European sighting of Greenland, the world’s largest island. His colony on the southwest coast of Greenland endured until the early 1400s, when the outbreak of the bubonic plague in Europe cut off communication with Norway. Soon afterward, the last European settlers died out. Some historians speculate that a “mini ice age” or of conflicts with Inuit in Greenland contributed to the decline of the Norse settlement. Eric’s journey led to the establishment of the first regular sea routes from Europe, across the North Atlantic, to waters west of Iceland. His exploits, preserved in the Norse sagas, may have influenced CHRISTOPHER COLUMBUS.

Ermak See YERMAK.

Escalante, Francisco Silvestre Vélez de

(ca. 1745–1780) *Spanish missionary in the American Southwest*

Originally from Spain, Francisco de Escalante arrived in Mexico City in 1768. He had studied for the priesthood and was ordained a Franciscan missionary at Mexico City’s Convent of San Francisco in early 1769. Escalante was assigned to northern Mexico’s Sonora province to proselytize to the Indians, then to New Mexico, where he worked among the Zuni and other Pueblo Indians.

In 1775, Spanish colonial authorities were seeking an overland route to supply the newly established missions on the California coast between San Diego and Monterey. They feared encroachment from the north by Russian and British trade interests. Supplying these California coastal settlements by sea had proved impractical. In February 1775, Escalante, who had by this time become prominent among the Zuni, was ordered to locate an overland route between Sonora and California by way of New Mexico.

On June 22, 1775, Escalante, accompanied by Mayor Cisneros and about 20 Christianized Indians, departed Zuni Pueblo in what is now western New Mexico, passed through the lands of the Hopi Indians, and attempted to trace a route across the COLORADO RIVER in the Grand Canyon region of present-day north-central Arizona.

Despite two weeks of searching, the expedition was unable to find a crossing of the Colorado River’s wide canyons, and they returned east. Later that year, Escalante submitted a report and a map of his explorations of northern Arizona to Governor Mendingueta, the chief Spanish colonial administrator of New Mexico.

Escalante was then assigned to establish an overland route from the Spanish settlements north of Santa Fe to the mission at Monterey, California. He also was to make contact with the Indians north and west of the Colorado River and convert them to Christianity.

Escalante’s second expedition left Santa Fe on July 29, 1776. Earlier that year, Franciscan missionary FRANCISCO TOMÁS HEMENEGILDO GARCÉS had explored in present-day western Arizona, also seeking an overland route from the California coast to Sonora and Santa Fe. Escalante’s party included Father FRANCISCO ATANASIO DOMÍNGUEZ, his superior in the Franciscan order, as well as eight soldiers and about 20 Mission Indians. Also part of this expedition was the multi-talented Don Bernardo Miera y Pacheco, who served as the expedition’s cartographer, artist, and engineer. Miera was adept at determining latitude by the use of a COMPASS and helped in the preparation of a detailed map of the expedition.

Traveling northwest from Santa Fe, the Escalante-Domínguez expedition traveled to Abiquiu and followed the western slopes of the San Juan Mountains part of the ROCKY MOUNTAINS. They traveled through western Colorado

along the Dolores River, a tributary of the Colorado River. At the edge of the Uncompahgre Plateau, their Indian guides lost the trail westward. Escalante and Domínguez then decided to head eastward to find more knowledgeable guides among the Ute Indians.

A Ute guide known as Silvestre led them north to the Colorado River, which they were able to cross near the site of the modern city of Collbran, Colorado. They continued northwestward, crossing into the Uinta Basin of northeastern Utah, becoming the first Europeans to enter that region. Heading westward, they crossed the Green River, then continued to Utah Lake and Utah Valley, just south of the Great Salt Lake. Although the Spanish heard reports from the Indians about the lake, they did not see it. Instead, near what is now Provo, Utah, they headed southward into the Sevier Desert, traveling along the western edge of the Wasatch Mountains. Crossing the Great Basin of western Utah from north to south, they entered a region of southwestern Utah known today as the Escalante Desert. Their Indian guides led them along a difficult route rather than the more easily traversed ridges because of Comanche Indian war parties in the region.

By early October 1776, the Escalante-Domínguez expedition believed it had reached the latitude of Monterey. But a severe snowstorm held them back. After drawing lots, they decided not to attempt to cross the snow-covered passes of the Sierra Nevada to the west, instead heading eastward back to Santa Fe. They traveled southeastward into what is now northern Arizona. Near present-day Lees Ferry on the Utah-Arizona border, they searched for a place to cross the wide Colorado River. At a site later named the Crossing of the Fathers, they forded the river and ascended the high canyon walls by chiseling steps into the rocky buttes. The steps, carved into a cliff that came to be known as Domínguez Butte, were visible for nearly two centuries until the building of Glen Canyon Dam and the creation of Lake Powell Reservoir.

For the next three months, Escalante and Domínguez made their way across what is now northeastern Arizona to lands of the Zuni in western New Mexico. They arrived back in Santa Fe on January 2, 1777.

Afterward, Escalante was assigned to the mission of San Ildefonso, north of present-day Los Alamos, New Mexico. He died while on a journey in 1780.

Although the Escalante-Domínguez expedition failed to find an overland route to California, it explored lands in Utah previously unknown to non-Indians and produced a fairly accurate map of the region of central Utah, which remained in use through the mid-1800s. Moreover, with Father Domínguez, Francisco de Escalante kept a detailed diary of their travels. The expedition's route northwestward from Santa Fe into the Green River region of Utah—known as the Escalante Trail—came to be used by fur traders in the early 1820s.

Escandón, José de (1700–1770) *Spanish colonial governor, colonizer in southeastern Texas*

In 1746, José de Escandón, a veteran Indian fighter in Mexico, was appointed Spanish governor of Nuevo Santander province, which had been established that year in the Seno Mexicano, a sparsely inhabited region stretching northward from the mouth of the Panuco River at Tampico, along the Gulf Coast, to Matagorda Bay, Texas.

Escandón had been instructed to colonize the new province and establish a series of missions and presidios (military posts) in the region as a buffer against French encroachment along the northeastern frontier of New Spain.

Setting out from Querétaro in south-central Mexico in December 1748, Escandón led 2,500 settlers and 750 soldiers along the eastern slopes of the Sierra Gorda Mountains, establishing ranches and missions as well as several garrisons. Among the settlements he founded was Laredo, which straddled the Rio Grande at the present U.S. border with Mexico. In all, 23 new towns, along with 15 new missions, were founded over the next several years throughout the Lower Rio Grande Valley.

In addition to serving as governor until his death in 1770, Escandón was given the title Count of Sierra Gorda, in recognition of his efforts in southeastern Texas, particularly for establishing peaceful relations with the region's Native Americans.

José de Escandón extended Spanish colonial influence northeastward from Mexico into Texas, checking French encroachment onto the southern plains from New Orleans and St. Louis. In 1763, the transfer of French Louisiana to Spain ended the threat to New Spain's northeast frontier, and the settlement of Texas became less strategically important.

Eschscholtz, Johann Friedrich (J. F. von Eschscholtz) (1793–1831) *Estonian physician and naturalist in the Pacific*

Johann Friedrich Eschscholtz was born in the Estonian city of Dorpat (now Tartu). His family was of German descent. Trained in medicine at Dorpat, he joined OTTO VON KOTZEBUE's Russian-sponsored expedition to the South Pacific Ocean and BERING STRAIT in 1815, serving on the *Rurik* as naturalist and doctor.

Over the next three years, with fellow naturalist LOUIS-CHARLES-ADÉLAÏDE CHAMISSO DE BONCOURT, Eschscholtz made studies of marine animal life, including a survey of jellyfish. While exploring Chamisso Island on the west coast of Alaska, he discovered tusks and teeth of mammoths. In California, near San Francisco Bay, he undertook a study of the region's salamanders, identifying three new species.

In 1823–26, Eschscholtz sailed again with Kotzebue on his second expedition to the Pacific and Alaska, aboard the *Predpriyatiye*. On this voyage, he collected several new species of birds; in his second scientific investigation of the Alaskan

coast, he concentrated on marine life, especially mollusks and jellyfish.

On his return to Russia in 1826, Johann Friedrich Eschscholtz began work on his *Zoological Atlas*, the last volumes of which appeared posthumously in 1833, two years after his death at the age of 38. The California poppy, a wildflower found on the West Coast of the United States, is also known as *Eschscholtzia californica* in honor of his early scientific work in California. Eschscholtz Bay in Alaska's Kotzebue Sound was named after him.

Espejo, Antonio Estevan de (fl. 1580s)

Spanish merchant, prospector, explorer in New Mexico and Arizona

Antonio de Espejo was reportedly born in Córdoba, Spain, although some sources suggest he may have been born in London, England. Few details of his early life are known.

By 1582, Espejo had achieved some degree of wealth as a merchant. That year, he was engaged in prospecting in the San Bartolomé Valley of north-central Mexico. One year earlier, a Franciscan missionary expedition, led by Friar Agustín Rodríguez, had set out from San Bartolomé for the north and soon had disappeared in the lands of the Pueblo Indians in present-day New Mexico. Espejo, at his own expense, organized an expedition to find them, including 15 mounted soldiers and another Franciscan priest, Friar Bernardino Beltrán. Diego Perez de Luxán chronicled the expedition.

Espejo led his party down the Conchos River to the Rio Grande into what is now southern New Mexico. On learning from the Indians that Friar Rodríguez and his companions had been killed, Beltrán and the soldiers returned to Mexico, while Espejo continued exploring and prospecting in the regions to the east and north. Over the next nine months, he traveled throughout much of New Mexico, visiting regions as far north as the Sangre de Cristo Mountains around Taos and venturing into the plains to the east. In addition to some of the more remote pueblos, he visited Acoma, a pueblo of the Keres Indians, and Hawikuh, a pueblo of the Zuni in western New Mexico. At Hawikuh, he encountered several Spaniards who had remained there since FRANCISCO VÁSQUEZ DE CORONADO's expedition of 1540.

Espejo also explored westward across what is now Arizona, becoming the first European to visit the Little Colorado River. Near what is now known as the Bill Williams River, he discovered rich deposits of valuable mineral ores.

While returning to Mexico, Espejo came upon a stream he named the Río de las Vacas (river of cows) after the cattle he saw along its banks. Traveling by way of the Pecos River, he reached its confluence with the Rio Grande, then returned to San Bartolomé by ascending the Conchos, arriving there on September 20, 1583. He brought with him more than 4,000 cotton blankets he had obtained from the Hopi Indians.

Antonio de Espejo's reports of mineral wealth in the region north of Mexico led to an influx of prospectors and other settlers, culminating in the colonizing efforts of JUAN DE OÑATE, starting in 1598. Although the region now comprising Arizona and New Mexico had been visited by Coronado and his army of CONQUISTADORES in 1540–41, it was Espejo's later explorations that provided the Spanish with the first detailed information concerning the region's geographic features and indigenous peoples. His written account of his explorations of 1582–83, *Relación del viaje al Nuevo Mexico* (An account of travels in New Mexico), was published in 1636.

Estevanico (Estebanico, Estevanito, Estevan, Esteban, Black Stephen, Stephen the Moor)

(ca. 1500–1539) *North African traveler in the American Southeast and Southwest, guide*

Estevanico was a slave held by the Spanish. Some scholars have theorized that he was Moorish, but he was probably a black from North Africa who had been owned by Moors there. During the 1520s, he came into the service of the Spaniard Andrés Dorantes. With Dorantes, he left Spain in 1527, as part of PÁNFILO DE NARVÁEZ's abortive expedition to Florida.

When the expedition was shipwrecked in the Gulf of Mexico in 1528, Estevanico and Dorantes were among the few survivors to reach the coast of southern Texas. They were enslaved by Indians, with whom they traveled throughout central Texas. In spring or summer 1533, they met up with another survivor of the expedition, ÁLVAR NÚÑEZ CABEZA DE VACA. The following summer, Estevanico, Dorantes, Cabeza de Vaca, and another expedition member named Alonso del Castillo Maldonado met at a site near present-day San Antonio, Texas, and attempted to reach the safety of Spanish settlements in Mexico. They wandered through what is now New Mexico, Arizona, and possibly southeastern California for the next two years. In early 1536, Estevanico and the others reached Culiacán in the northern Mexican province of Sonora, where they were rescued by a party of Spaniards slave-hunting among the Indians.

With Cabeza de Vaca, Estevanico arrived in Mexico City in July 1536. Spanish colonial governor ANTONIO DE MENDOZA, hearing tales from the travelers of gold-laden Indian settlements to the north—the fabled Seven Cities of CIBOLA—organized an expedition under Franciscan missionary, Father MARCOS DE NIZA. Estevanico was purchased by Mendoza and sent along as a guide.

Estevanico, Niza, and a small party of soldiers set out northward from Culiacán in March 1539 and soon crossed into the present-day United States somewhere near the modern town of Lochiel, Arizona. Niza sent Estevanico ahead with an advance party of Mission Indians in search of Indian cities.

In May 1539, Estevanico reached the Zuni pueblos of what is now western New Mexico. He was undoubtedly the first black man the Indians had ever seen, and his unique appearance led many of the natives to believe he was the incarnation of a god. The Indians gave him gifts of turquoise and other semi-precious stones; Estevanico used them to decorate his clothing, along with bells and multicolored ribbons.

At one Zuni pueblo, either Hawikuh or Kiakima, Estevanico is thought to have offended the ruling chiefs and medicine men because of his overbearing manner and his popularity with the women. He also reportedly brandished a medicine rattle he had obtained several years earlier from enemies of the Zuni. Zuni warriors took him captive and killed him.

On learning of Estevanico's death, Niza retreated to Mexico. He had espied Hawikuh from a distance and, believing the reflection of the sun on the adobe walls to be gold, he carried this misinformation back to Spanish colonial authorities. His reports inspired the later expedition of FRANCISCO VÁSQUEZ DE CORONADO.

Estevanico's striking appearance and the Indian response to it is thought to have played a major part in the survival of some from the Narváez expedition. His not-so-successful relations with the Zuni Indians delayed Marcos de Niza's search for the Seven Cities of Cibola and indirectly led to Coronado's expedition.

Etholén, Arvid Adolf (Adolf Karlovich Etolin)

(1799–1876) *Finnish-born naval officer in Alaska, in service to Russia*

Arvid Adolf Etholén was born in Finland to a family of Swedish descent. In 1817, soon after he had entered the Russian maritime service, he sailed from St. Petersburg, halfway around the world, to the RUSSIAN-AMERICAN COMPANY's colonies in Alaska.

Etholén arrived in Alaskan waters in 1818. During this voyage, he participated in a coastal survey of the American coast of the BERING STRAIT.

In 1821, accompanied by another employee of the Russian-American Company, Etholén explored the west coast of Alaska, including Hagemeister Strait and Hagemeister Island, Good News Bay, and the mouth of the Nushagak River in Bristol Bay, north of the Alaska Peninsula. To the north, they traveled part way up the Kuskokwim River. Their subsequent reports to the Russian-American Company included geographic data as well as observations on the natives.

Etholén rose to prominence in the Russian-American Company; by 1840, he had been appointed chief manager of the firm's fur-trading posts in Alaska. During the next five years, he undertook several explorations along the coast of the Gulf of Anadyr on the Siberian side of the Bering Sea. He left the maritime service of the Russian-American Com-

pany at the rank of rear admiral. Following his return to St. Petersburg in 1847, he was appointed to a high administrative post in the company's headquarters in that city.

Arvid Adolf Etholén traveled to Alaska soon after the Russian-American Company began sailing its ships directly to Alaska, avoiding the costly overland journey across SIBERIA. His survey of the Alaskan coast of Bering Strait provided the Russians with knowledge of the region north of their original settlements on the Alaskan Peninsula and the Gulf of Alaska.

Eudoxus (Eudoxus of Cyzicus) (fl. 120s–110s B.C.)

Greek mariner in coastal Africa and India, in service to Egypt
Eudoxus was born in the Greek city of Cyzicus, on the Sea of Marmara, in what is now northwestern Turkey. Becoming a skilled navigator in the eastern MEDITERRANEAN SEA and RED SEA, he entered the maritime service of the Egyptian king Ptolemy Euergetes II.

In about 120 B.C., the king commissioned Eudoxus to undertake a voyage across the Arabian Sea to India. Guided by an Indian mariner who had been shipwrecked on the Red Sea, Eudoxus succeeded in making one of the earliest direct voyages from Egypt to India. He soon returned to Egypt with a cargo of gems and spices.

Soon afterward, Eudoxus made a second voyage to India. On the return trip, he was blown far to the south and east by monsoon winds. He eventually made a landing on the coast of East Africa, where he established friendly relations with some natives and made a study of their language. He also found the front end of a ship, which the natives told him was from the west.

With the coming of favorable winds, Eudoxus sailed back to Egypt with the remains of the wrecked ship. In Egypt, he learned the vessel was the type that usually sailed along the West African coast from the western Mediterranean. His discovery of a western European ship on the east coast of Africa led Eudoxus to speculate that a circumnavigation of the African continent was possible.

To test his theory, Eudoxus traveled to the port of Gades (Cádiz), on the southwest coast of Spain. From there, he set out to sail around Africa. The voyage ended when his ship ran aground on the coast of Morocco. On a subsequent attempt, Eudoxus and his vessel disappeared, and it is not known how far southward he may have sailed along the coast of West Africa.

As recorded in the writings of the first-century A.D. geographer STRABO, Eudoxus made one of the earliest known sea voyages from Egypt to India, establishing direct coastal trade links between India and the cities of Greece, Asia Minor, and Egypt. His voyages from Spain were the first attempts to circumnavigate Africa from western Europe. Some sources suggest that Eudoxus actually succeeded in sailing around Africa in an east-to-west voyage, which began in the

Red Sea and ended with his arrival at Gades on the Spanish coast.

Everest, Sir George (1790–1866) *British surveyor in India*

British-born George Everest, ranked a lieutenant though only 16, began serving with the BRITISH EAST INDIA COMPANY and saw action in India. In 1814, he carried out a survey of the island of Java. In 1816–17, he oversaw the clearing of navigational obstacles along the lower GANGES RIVER and tributaries.

The Great Trigonometrical Survey of India—as it came to be known under the direction of the British government, which assumed control of it from the British East India Company—had, since 1802, the purpose of triangulating the Indian subcontinent on a gridiron plan. In 1819, Everest led his first surveying mission as assistant to Colonel William Lambton, mapping about 70 miles between Hyderabad in south-central India and the Godavari River. Both men worked under Colin Mackenzie, surveyor general of India. Everest became superintendent of the survey in 1823, applying a new level of efficiency to the project, planning a series of trigonometrical triangulations on a grid covering the subcontinent, and building observation towers to accomplish this.

Everest was elected to the ROYAL SOCIETY in 1827. Three years later, he became surveyor general of India. In 1841, he conducted surveys in the HIMALAYAS. He retired in 1843. Four years later, he published *An Account of the Measurement of Two Sections of the Meridional Arc of India*. He was knighted in 1861.

In 1856, George Everest's former assistant, Andrew Waugh, surveying in the Himalayas, named its highest peak—and highest peak in the world—MOUNT EVEREST after his predecessor. Work continued on the Great Trigonometrical Survey in the subsequent decades, involving Indian explorers—the PUNDITS—such as NAIN SINGH, KISHEN SINGH, and KINTUP.

Evliya, Çelebi (Evliya ibn-Dervis Mehmed Zilli, Ewliya Efendi) (1611–1684) *Turkish traveler, writer in the Ottoman Empire*

Çelebi Evliya was born into a wealthy Turkish family with close ties to the sultan of the Ottoman Empire. His early education included training in calligraphy, music, and art. He also wrote poetry.

Starting in 1640, Evliya began a career of travel into the far reaches of the Ottoman Empire, which at that time stretched from Hungary in the north to Egypt and the Sudan in the south. Over the next 40 years, he visited much of eastern Europe and the Balkans, as well as the Middle East and North Africa.

Çelebi Evliya wrote a 10-volume account of his journeys, *Seyahatname* (travel book), in which he described the diverse regions of the Ottoman Empire, as well as the cultures of the many different subject peoples living within it. Writing in a style that conformed to contemporary Turkish, his work had great popular appeal among 17th-century Turkish readers, enlightening many about the diverse lands and people then under Turkish rule.

Eyre, Edward John (1815–1901) *British sheep farmer, explorer in Australia, colonial administrator*

John Edward Eyre was born in Whipsnade, in Bedfordshire, England, the son of a clergyman. In 1833, after attending school at Louth, Lincolnshire, he applied for a commission in the British army but was turned down. That same year, at the age of 18, Eyre immigrated to Australia.

In his first years in Australia, Eyre engaged in sheep farming around present-day Canberra near the east coast, south of Sydney. He also worked as an “overlander,” taking part in cattle drives out of Sydney southwestward to the newly established settlements around Adelaide on the south coast.

By 1838, Eyre had established a sheep ranch 150 miles north of Adelaide. Soon afterward, he was appointed a magistrate for the Murray River region and was also named “Protector of Aborigines.” In search of new grazing lands, he began to explore northward into the Flinders Range. In May 1839, he followed the Flinders Range eastward as far as Mount Arden, which he climbed, and from its peak he became the first non-Aborigine to see Lake Torrens, a large shallow body of saltwater north of the head of Spencer Gulf.

Eyre attempted to circle north and west around Lake Torrens, but the harsh desert conditions, and lack of water and other supplies, forced him to turn southward for the coast. He crossed what later became known as the Eyre Peninsula and reached Port Lincoln, west of Adelaide. In August 1839, Eyre left Port Lincoln to explore along the coast of the Great Australian Bight, reaching as far as Streaky Bay. On the way, he sighted and named Mount Deception and Mount Hopeless.

In 1840, Eyre took part in a cattle drive from Albany, on Australia's southwest coast, northwestward to settlements at Swan River, near Perth. Later that year, he organized an expedition to make a south-to-north crossing of the Australian continent, from Adelaide to Port Essington.

In June 1840, Eyre and his assistant, John Baxter, and a number of Aborigines headed northwestward from Adelaide in an effort to travel around Lake Torrens. From a high peak in the Flinders Range, he sighted what he took to be a northern extension of Lake Torrens, which led him to wrongly conclude that Lake Torrens was a large horseshoe-shaped lake, running east to west, blocking any direct route into the center of Australia. Eyre did not realize then that

he had actually seen an entirely different lake to the north of Lake Torrens; this lake later was named Lake Eyre.

With progress to the north blocked by the salt lakes, Eyre headed back to the coast, arriving at Fowlers Bay, several hundred miles west of Adelaide. Although he was met there by a ship with word from the Australian governor requesting that he return to Adelaide, Eyre nevertheless decided to continue his explorations by making an attempt at an east-to-west crossing of the continent, along the coast of the Great Australian Bight.

Accompanied by Baxter and three Aborigines, Eyre set out from Fowlers Bay in February 1841. Heading westward, they were forced to travel between the coast and the edge of the completely arid Nullarbor Plain. The livestock he took along to test the viability of the route for future cattle drives soon died. In late April, two of the Aborigines killed Baxter and made off with most of the supplies of food and water. With the remaining Aborigine, a boy named Wylie, Eyre struggled on, pushing westward along the inhospitable coast of the Great Australian Bight. In early June, Eyre met up with a French whaling ship, the *Mississippi*, at a place he named Rossiter Bay after the ship's captain, an Englishman named Rossiter.

After Eyre and Wylie recuperated on the *Mississippi* for 12 days, they completed the journey to Albany on King George Sound, arriving there on July 7, 1841, after a four-month trek of more than 750 miles. From Albany, they crossed the southwesternmost corner of Australia to Fremantle, south of Perth.

Eyre returned to England in 1845, accompanied by two native boys, whom he presented to Queen Victoria. Later

that year, he published an account of his expeditions, *Discoveries in Central Australia*.

In 1846, Eyre began a career as colonial administrator, serving first in NEW ZEALAND as lieutenant governor until 1853. In 1854, he was appointed governor of the island of St. Vincent in the Caribbean Sea, a post he held until 1860. Following a short visit to England, he became acting governor of Jamaica in 1861, and, in 1864, he was named governor. In 1865, a rebellion broke out in Morant Bay, Jamaica, which Eyre put down with great severity. Among the rebel leaders he ordered executed was a prominent Jamaican mulatto and member of the colonial legislature, George William Gordon. Amid popular outcry against his brutality in suppressing the insurrection, the British government recalled Eyre from Jamaica in 1866. Over the next few years, he was the center of a great controversy when a group known as the "Jamaica Committee" attempted to prosecute him for murder. Cleared of any wrongdoing in the affair, he retired on his government pension to an estate in Devon, England.

Edward John Eyre succeeded in completing the first east-to-west crossing of Australia, an accomplishment for which he was awarded a medal by the ROYAL GEOGRAPHICAL SOCIETY in 1843. The reports from his explorations north of Spencer Gulf led geographers to characterize the fertile region near Adelaide as surrounded by a vast inland desert. He also popularized the idea that further attempts to explore into the interior of Australia would be blocked by the presence of numerous shallow lakes and salt plains. Lake Eyre, of which he made the European discovery in 1840, is Australia's largest lake.

F



Fadlan, Ahmad ibn See IBN FADLAN, AHMAD.

Fa-hsien (Faxian, Fa Hsien, Fu-hsien, Fa-hien)
(319–414) *Chinese Buddhist monk, traveler in central Asia and northern India*

Fa-hsien was originally from the city of Ch'angan (present-day Xi'an) in east-central China. By A.D. 399, he had become a Buddhist monk and scholar. That year, accompanied by three other monks, he set out for India in search of Buddhist texts in the original Sanskrit, from which he planned to make accurate Chinese translations.

Traveling westward across China, Fa-hsien followed the ancient SPICE ROAD across central Asia. He visited the ancient lands of Tartary and crossed the Takla Makan desert to the Pamirs in what is now Tajikistan. After crossing the HIMALAYAS into what is now Afghanistan, he followed the Kabul River into the Punjab region of present-day northern Pakistan. He reached the upper INDUS RIVER then made his way eastward across northern India to the present-day city of Patna, where he spent three years copying and translating Buddhist texts.

While in India, Fa-hsien visited many Buddhist shrines and sites where important events in Buddha's life had taken place. After two more years at a seaport near present-day Calcutta, he sailed to the island of CEYLON (present-day Sri Lanka) and continued his Buddhist studies for two more years.

In about 413, Fa-hsien began his journey back to China by sea. On a course eastward from Ceylon across the Indian Ocean, his ship went aground near the south coast of Java. Then, while heading for Canton (Guangzhou), the ship was lost at sea for 70 days. It eventually reached Shantung on the coast of China. Fa-hsien traveled from there to Nanking (Nanjing), arriving in 414, after 15 years of travels.

Fa-hsien settled at the Buddhist monastery in Nanking, where he completed his Chinese translations of the Sanskrit texts. He also wrote an account of his experiences in central Asia and India entitled *Fo kuo chi* (Memoirs of the Buddha realms). He was the first Chinese known to have traveled from north-central China into southern Asia, then to have returned to China by sea.

Fallam, Robert (fl. 1670s) *English colonist in Virginia, the Appalachian Mountains, and West Virginia*

In September 1671, Robert Fallam joined Captain THOMAS BATTs in an expedition westward. They were sponsored by Major General ABRAHAM WOOD, a leading Virginia colonist, who hoped to locate new sources of furs west of the Piedmont region.

Batts and Fallam left Fort Henry, now the site of Petersburg, Virginia, and followed the Roanoke River into the Blue Ridge. Crossing the mountains, they reached the Kanawha and New River Valleys of present-day West Virginia, then returned to the English post.

Fallam kept a journal of the expedition, which was the first recorded English crossing of the APPALACHIAN MOUNTAINS to the watershed of the Ohio River.

Fanning, Edmund (1769–1841) *American mariner in the South Pacific*

Edmund Fanning was born in Stonington, Connecticut. After several years of schooling, he embarked on a seafaring career, shipping out as a 14-year-old cabin boy on a coastal trading vessel. By 1790, he was a ship's officer; that year, he married Sarah Sheffield, also of Stonington.

In 1792, Fanning made his first voyage to the South Atlantic on a sealing expedition to the vicinity of CAPE HORN. The next year, he took command of his own ship and undertook a number of commercial voyages to and from the WEST INDIES.

Fanning began his first CIRCUMNAVIGATION OF THE WORLD out of New York in 1797. He rounded CAPE HORN and stopped at the Juan Fernández Islands on the coast of Chile, where he obtained a large cargo of sealskins from Native Americans in exchange for inexpensive trinkets and cheap trade-goods. Heading westward across the Pacific Ocean, he visited the Marquesas Islands.

On June 11, 1798, Fanning reached a previously uncharted island, 1,200 miles south of the HAWAIIAN ISLANDS, known today as Fanning Island, and, several days later, he came upon two other islands to the northwest, which he named Palmyra and Washington Islands. This group became known as Fanning's Islands.

At the port of Canton (Guangzhou), China, Fanning traded the sealskins for a valuable shipment of tea, silk, and other Oriental commodities. Upon his return to New York by way of the Indian Ocean and the CAPE OF GOOD HOPE, Fanning and his investors sold the Chinese merchandise for more than \$120,000, yielding an astounding net profit, considering that they outfitted the ship for about \$8,000.

Fanning settled in New York. During the next 30 years, he organized and promoted American trading expeditions to the South Pacific and the Far East. In addition to obtaining sealskins in the southernmost islands of the Atlantic, Pacific, and Indian Oceans, his ships also engaged in trading with the South Sea islanders for pearls, tortoise shells, and sandalwood, items that also brought a handsome profit in China.

In 1804, Fanning organized an expedition captained by his brother Henry Fanning, during which the Crozet Islands were charted in the southern Indian Ocean to the south of Madagascar. They provided a rich source of seals.

In addition to the 1797–98 voyage during which he visited Fanning's Islands, Edmund Fanning sponsored more than 70 expeditions to the South Pacific, personally sailing on some of them. He made a study of modern navigational techniques and employed the most updated nautical designs

in his ships. Moreover, he studied the older charts of Dutch mariners in an attempt to clarify the true geography of the Pacific. Some of his expeditions included naturalists who made some of the first American scientific studies in the Pacific. He was one of the sponsors of NATHANIEL BROWN PALMER's 1829 voyage to the Antarctic waters south of Cape Horn. In 1833, Fanning published *Voyages Around the World*, an account of his seafaring career, which was widely read. His book reportedly influenced the U.S. government to allocate funds for its first official naval exploring expedition, which was commanded by CHARLES WILKES in 1838–42.

Fawcett, Percy Harrison (1867–ca. 1925)

British army officer, surveyor in South America

Percy Fawcett was born at Torquay in Devon, England. In his early teens, he embarked on a military career at the Royal Military Academy at Woolwich near London, graduating as an officer in the artillery with a background in surveying and cartography in 1886.

Over the next 20 years, Fawcett served with the British army in assignments in CEYLON (present-day Sri Lanka), Malta, and Ireland. In 1906, on extended leave from the military, he was engaged by the Bolivian government to undertake a boundary survey of that country's borders with Brazil.

Landing on the Peruvian coast at Mollendo in 1906, Fawcett traveled inland into the ANDES MOUNTAINS to Lake Titicaca. In northern Bolivia, he surveyed along the Alto Acre and Abunã Rivers, the sources of the Madeira River, which were seldom visited by non-Indians. On Bolivia's eastern border with Brazil, he explored the Río Verde to its source in the Sierra de Huanchaca, and he penetrated the remote Mato Grosso region of southwestern Brazil.

In 1908, Fawcett explored the interior of South America from Buenos Aires on the east coast. He ascended the Paraná and Paraguay Rivers to the Chapada dos Parecis, a watershed region that drains into both the AMAZON RIVER and Paraguay River, on the frontier between Brazil and Bolivia. Two years later, he traveled again to Lake Titicaca in the Peruvian Andes, where he surveyed the mountains southeastward to La Paz, Bolivia.

Fawcett returned to England in 1914 to serve in World War I. After the war, he retired from the military at the rank of colonel.

In 1920, Fawcett began a search in South America for a fabled lost city. During his earlier explorations, he had reportedly come across documentary evidence indicating that, in 1753, before their disappearance in the Amazon Basin, a group of Portuguese explorers had come upon an Indian civilization with cities containing buildings and statues made of quartz. Fawcett also claimed to have encountered what he



Percy Fawcett and an exploration party in Brazil (*Library of Congress*)

described as “white Indians,” natives with red hair and blue eyes. From this evidence, he speculated that a continent across the South Atlantic Ocean had once connected South America with Europe and Africa, and he believed the Inca and other, yet-to-be-determined tribes had been in contact with non-Indians since pre-Columbian times.

In 1920, Fawcett traveled westward into Paraguay from Rio de Janeiro, then headed northward into the interior of Brazil, by way of the Cuibabá River. The next year, he explored the region of northern Brazil, inland from Salvador and Vitoria da Conquista.

Four years later, with the backing of a U.S. newspaper syndicate, Fawcett made another attempt to find the lost civilization in the interior of Brazil. Accompanied by his son John and his son’s friend Raleigh Rimell, Fawcett set out from Cuibabá, in the Brazilian state of Mato Grosso in late April 1925, and headed northward toward the Paranatinga River. He planned to descend that 1,200-mile stream by CANOE to the Amazon Delta, then explore the Tocantins and Araguaia Rivers, and eventually reach the São Francisco River.

Fawcett, his son, and Rimell reached Dead Horse Camp, at about 10° south latitude, near the headwaters of the Xingu River in central Brazil, after which nothing more was heard of them. They became the subject of international search expeditions, including one led by George Dycott in 1928 and another in 1933. It is assumed they were killed by native tribesmen.

Percy Fawcett’s experiences in South America were recounted in his posthumously published book, *Exploration Fawcett* (1968). One of the first 20th-century explorers of the Amazon Basin and the central Andes, his exploits mirrored those of Spanish and Portuguese explorers who, 300 years earlier, had sought the fabled city of EL DORADO.

Fedchenko, Aleksey Pavlovich (1844–1873)

Russian naturalist in central Asia, husband of

Olga Fedchenko

Aleksey Fedchenko was educated at Moscow University, where he studied anthropology and zoology. Starting in 1868, he led a series of scientific expeditions into central

Asia, exploring the Pamirs, a mountainous region in what is now Tajikistan.

Fedchenko's explorations into the Pamir coincided with the Russian military conquest of the region. In 1871, while exploring the Altai and Turkestan Mountains, he became the first European to locate a previously uncharted range, the Trans-Altai (Zaalai). He named its highest peak Mount Kaufman after the commander of Russia's forces in central Asia, Konstantin Petrovich Kaufman. Subsequently renamed Lenin Peak, at 23,377 feet it is the second highest mountain in the Pamirs.

Fedchenko's wife, OLGA FEDCHENKO, a botanist, accompanied him in his explorations of the Pamir. Fedchenko was killed in 1873 in a climbing accident on a glacier near Mount Blanc in the Alps.

Aleksey Fedchenko contributed to the geographic and scientific knowledge of the Pamirs, where a large glacier was named in honor of his work.

Fedchenko, Olga (1845–1921) *Russian botanist in central Asia, wife of Aleksey Pavlovich Fedchenko*

Olga Fedchenko, a Russian botanist, joined her husband, ALEKSEY PAVLOVICH FEDCHENKO, in his explorations of the Pamir region in south-central Asia from 1868 to 1871.

Following her husband's death in 1873, Fedchenko supervised the publication of his scientific findings in the Pamirs and organized his collections of animal and plant specimens from the region.

In the 1890s and early 1900s, Fedchenko continued her botanical fieldwork with subsequent expeditions of her own into the Pamirs. She also explored the region around the Caspian Sea, including the Crimea, the Caucasus Mountains, and the Ural Mountains.

Olga Fedchenko was one of the few early female botanists to work in uncharted regions of the world.

Federmann, Nikolaus (Nicolás Federman) (1501–1542) *German official in northern South America*

Nikolaus Federmann was born in Ulm, in the southern German principality of Württemberg. In his early 20s, he went to work for the banking business of the Welser family in the Bavarian city of Augsburg.

In 1530, the Welsers sent Federmann to the north coast of South America to help administer their newly acquired colony in what is now Venezuela. Two years earlier, Charles I, king of Spain (Holy Roman Emperor Charles V), had granted most of present-day Venezuela to the Welsers as repayment for loans that he was unable to repay in cash and they had sent out a colonizing expedition under AMBROSIUS ALFINGER.

Federmann landed at Coro as acting governor of the colony. Soon after his arrival, he led one of the earliest ex-

plorations into the interior of Venezuela, seeking the legendary riches of the fabled land of EL DORADO.

Following a brief visit to Europe, Federmann returned to Venezuela in 1533. Soon afterward, he undertook another search for El Dorado, reaching as far southward as the foothills of the Colombian ANDES MOUNTAINS, and the next year he explored the prairie region of the eastern Colombian llanos (plains).

Federmann and his party of CONQUISTADORES and Indians wandered for three years in southern Venezuela and eastern Colombia. Near present-day Bogotá, Federmann encountered two different armies of Spanish conquistadores, one under the command of SEBASTIÁN DE BENALCÁZAR and the other led by GONZALO JIMÉNEZ DE QUESADA. Federmann and the leaders of the other two armies agreed to a truce until the matter of who had a rightful claim to the newly explored region of what is now Colombia could be resolved. Meanwhile, GEORG HOHERMUTH VON SPEYER, who had superseded Federmann as governor of the colony, also sought El Dorado in an expedition in 1535–38.

Some sources suggest that Quesada may have paid Federmann a large sum of money to drop any claim the Germans had on the region. In any case, Federmann, Benalcázar, and Jiménez de Quesada sailed to Spain in 1539 or 1540, where the Council of the Indies ultimately granted New Granada to Alonso Luis de Lugo since he had inherited the governorship of nearby Santa Marta upon his father's death.

Federmann remained in Madrid, where the Welser family initiated a legal proceeding against him, charging that he had given up their claim to New Granada without authorization. Federmann in turn accused the Welsers of defrauding the emperor, Charles V, an accusation that he later recanted shortly before his death in Madrid in 1542.

Nikolaus Federmann was one of the few northern Europeans to play a decisive role in the early exploration of northern South America. His expeditions in what is now southern Venezuela and eastern Colombia yielded much new geographic information on the upper ORINOCO RIVER and the Colombian Highlands. His second journey southward from Coro in 1536 took him across the Arauca and Meta Rivers and, by way of passes 13,000 feet high, across the Andes, making him the first European to cross the mountains from east to west.

Fernandes, Álvaro (fl. 1440s) *Portuguese navigator on the west coast of Africa*

Álvaro Fernandes was a nephew of João Gonçalves Zarco, a seafarer and captain of the island of Madeira, who, in 1441, established the Portuguese SLAVE TRADE on the coast of West Africa.

By 1445, Fernandes was an accomplished navigator and sea captain. That year, he commanded a ship in a Portuguese

fleet on a punitive naval expedition against the Moorish-held island of Tider. Instead of returning to Portuguese waters after the attack, Fernandes sailed his vessel southward along the coast of West Africa, reaching a point several hundred miles beyond Cape Verde. On a strip of land there, he sighted palm trees on the shore as tall as a ship's mast, and called it the Cape of Masts.

In 1446, Fernandes was commissioned by HENRY THE NAVIGATOR, prince of Portugal, to lead another expedition along the coast of West Africa. He was urged by Zarco to push even farther southward along the coast during this endeavor, and not be deterred by lure of the slave trade. On this voyage, he explored part way up the Gambia River, but he was forced back when natives attacked his men with poisoned arrows. Before returning to Portugal in 1447, Fernandes had progressed as far south as Conakry on the coast of Guinea, just north of present-day Freetown, Sierra Leone.

Álvaro Fernandes's voyages along the coast of West Africa in the mid-1440s were important stages in Prince Henry's plan to learn the true geography of the African continent and expand Portuguese trade beyond the barriers imposed by the Muslims in North Africa and the Middle East. The Cape of Masts, which he sighted in 1445, became an important landmark for Portuguese navigators sailing southward along the African coast.

Fernandes, João (unknown—ca. 1501)

Portuguese mariner in Greenland and possibly Newfoundland
Portuguese-born João Fernandes lived on the island of Terceira in the AZORES. Little is known of his life other than that he was a landowner (*lavrador*) and that in 1499, he received a royal patent to explore islands in the Atlantic Ocean to the west of Europe. Portuguese interest in this region to the west had been prompted by Spanish expeditions to the Americas by CHRISTOPHER COLUMBUS and British expeditions by JOHN CABOT in the 1490s. The Portuguese had already carried out numerous expeditions around Africa to Asia in the 15th century. Some scholars, however, theorize that Portuguese mariners reached Newfoundland before Cabot did.

The exact number of Fernandes's expeditions is not known, nor is it known whether he even reached North America, but it is believed that in association with two other Portuguese living in the Azores, Francisco Fernandes and João Gonçalves, Fernandes undertook a voyage to the west in 1500, reaching at least as far as GREENLAND, which he called Tiera del Lavrador. The name later came to be applied to Labrador in North America. Afterward, Fernandes joined a commercial syndicate operating out of Bristol, England, and he is thought to have died at sea on a subsequent voyage to the Americas in 1501.

João Fernandes sought to develop Portuguese interests in North America at the same time as GASPAR CÔRTE-REAL and MIGUEL CÔRTE-REAL. His peers, Francisco Fernandes and João Gonçalves, made a series of subsequent voyages in 1502–05, with the purpose of exploring the Newfoundland fishery.

Fernández de Córdoba, Francisco **(Francisco Hernández de Córdoba, Francisco** **Hernandes de Cordova)** (unknown–1518)

Spanish conquistador on the Yucatán Peninsula

Francisco Fernández de Córdoba was among the first Spanish settlers on Cuba, arriving soon after the Spanish conquest in 1511. He was an hidalgo, a member of the landed gentry, having received one of the original land grants on the island.

On February 8, 1517, Fernández de Córdoba sailed from Cuba in command of three ships, commissioned by Cuba's colonial governor, DIEGO VELÁSQUEZ, to undertake a slave-hunting expedition to the nearby Bahama Islands to the northeast. On encountering heavy gales, his ships were driven far to the west. After three weeks, the expedition landed on the northeasternmost corner of the Yucatán Peninsula, at what is now Cape Catoche.

In the course of their explorations inland, Fernández de Córdoba and his men encountered Mayan-speaking Indians. These Maya had dwellings constructed of stone and masonry materials, unlike the reed huts of the Caribbean island natives. Their agriculture also was more advanced than that of the Arawak (Taino) and Carib Indians, and they wore clothes of woven cotton. Their gold ornaments were the first indication the Spanish had of the Aztec civilization inland. At one point, the Indians asked Fernández de Córdoba if he and his men had come from the east, indicating that news of the Spanish arrival in the WEST INDIES had reached the mainland by 1517.

The Spaniards explored westward along the northern Yucatán coast. The Maya proved more warlike than their island counterparts and launched repeated attacks. In one skirmish, Fernández de Córdoba himself was wounded 12 times. By the time the Spanish had reached the east shore of the Bay of Campeche and departed for Cuba, half the expedition members had been killed and all the survivors had been wounded.

Upon reaching Cuba, Fernández de Córdoba reported his findings to Governor Velásquez, who immediately organized a follow-up expedition. Two Indians Fernández de Córdoba had taken to Cuba to train as interpreters related the fabulous wealth to be found in the Yucatán, fueling Spanish enthusiasm to explore these lands to the south and west.

Soon after his return, Fernández de Córdoba died of his wounds. Velásquez's nephew JUAN DE GRIJALVA was

appointed to command a second expedition, which reached Cozumel Island and the Mexican mainland in the spring of 1518.

Francisco Fernández de Córdoba's explorations provided the Spanish with the first reports of the Aztec civilization and ultimately led to the 1519 expedition of HERNÁN CORTÉS and the subsequent conquest of Mexico. He is also credited with naming the peninsula he explored. According to some accounts, when Fernández de Córdoba asked some Indians what they called their country, they replied, "*Tectetan*," meaning "I do not understand you." This was misinterpreted to denote their name for the region and evolved into *Yucatán*.

Fernández de Córdoba, Francisco
(Francisco Hernández de Córdoba, Francisco
Hernández de Cordova) (ca. 1475–ca. 1526)

Spanish conquistador in Panama and Nicaragua

Francisco Fernández de Córdoba took part in the consolidation of Spanish rule in Panama, arriving there in 1514 with Spanish forces under the command of PEDRO ARIAS DE ÁVILA.

In 1522, Arias de Ávila put Córdoba in command of a seaward expedition to occupy Nicaragua in CENTRAL AMERICA. A few years earlier, a rival conquistador, Gil González de Ávila, had reached the Lake Nicaragua region and had claimed the country for himself before withdrawing in the face of Indian hostility.

Fernández de Córdoba sailed from Panama northward along the Pacific coast of Central America to the Gulf of Nicoya, in what is now northwestern Costa Rica. He then led his expedition inland into Nicaragua, exploring the regions around Lake Managua and Lake Nicaragua. In 1523, he established León near Lake Managua, and Granada along Lake Nicaragua.

In 1524, Fernández de Córdoba suffered a military defeat at the hands of troops under González de Ávila, who had returned from Hispaniola (present-day Haiti and the Dominican Republic) in command of a military expedition to reassert his claims on Nicaragua. Córdoba retained control of the region around León, renouncing his allegiance to Arias de Ávila and attempting to establish his own colonial domain. In response, Arias de Ávila led his forces into Nicaragua. After a year of fighting, he forced Fernández de Córdoba to surrender at León. Soon afterward, Fernández de Córdoba was put to death on the orders of his former leader, who then installed himself as governor of Nicaragua.

Although Francisco Fernández de Córdoba's efforts to colonize Nicaragua were short-lived, he nonetheless founded León and Granada, which endured as the first permanent European settlements in Nicaragua. Both settlements even-

tually became important centers of political power and commerce.

Fernández de Oviedo y Valdez, Gonzalo

(1478–1557) *Spanish colonial official, historian, naturalist in Panama and the West Indies*

Gonzalo Fernández de Oviedo was born in Madrid, Spain. As a youth, he served as a page in the court of Prince John, son of Spanish rulers Queen Isabella I and King Ferdinand II, and, as part of the royal household, he took part in the final victory over the Moors at Granada in 1492.

With Prince John's death in 1497, Fernández de Oviedo entered the service of Frederic of Aragon, ruler of the southern Italian kingdom of Naples. In 1513, Fernández de Oviedo was appointed as warden of the gold mines of Castilla de Oro on the Isthmus of Panama, and the following year, he sailed with PEDRO ARIAS DE ÁVILA to the newly established Spanish settlement of La Antigua on the Atlantic coast of Panama.

In Panama, Fernández de Oviedo supervised the smelting and shipment of gold back to Spain and also served on the colony's ruling council. He began his comprehensive history of the Spanish exploration and colonization of the Americas in 1515, returning to Spain that same year to report on economic and political conditions in the colony.

Fernández de Oviedo returned to Panama as governor of La Antigua and nearby Cartagena in 1526. By 1532, he was back in Spain, and King Charles I (Holy Roman Emperor Charles V) made him the official historian of the Americas. Three years later, he sailed to Hispaniola (present-day Haiti and the Dominican Republic), having been named governor of the island's chief settlement at Santo Domingo.

In 1535, the first volumes of Fernández de Oviedo's *Historia general y natural de las Indias Occidentales* (General and natural history of the West Indies) were published in Seville. He remained in Santo Domingo until 1545, at which time he returned to Spain to complete his history of Spanish exploration in the Americas. His work was completed in 1548, and publication continued until his death in 1557.

The publication of Gonzalo Fernández de Oviedo's *Historia* was not resumed until 1851, nearly 300 years after his death, under the sponsorship of the Spanish government's Royal Academy of History. Partial editions did appear from 1550 to 1577, from which translations were made into Italian and English. His work is considered to be the earliest historical account of Spanish exploration in the Western Hemisphere, and it included one of the first descriptions of the natural history of the Americas, illustrated with Fernández de Oviedo's own drawings.

Ferreira, Alexandre Rodrigues (1756–1815)*Brazilian naturalist on the Amazon River*

Born in Bahia, Brazil, Alexandre Rodrigues Ferreira studied at the University of Coimbra in Portugal and became a teacher there. In 1778, he began working at the Real Museu da Ajuda in Lisbon, cataloging its collection, and was later elected to the Academy of Sciences.

Ferreira was commissioned by the Portuguese government to undertake a journey of scientific exploration into the interior of Brazil and returned to his homeland in 1783. For the next nine years, he studied its natural history, first on the island of Marajó, then in the coastal region of Pará and along the AMAZON RIVER and its tributaries, among them the Tocantins, Negro, Içana, Uaupés, Branco, Tacutu, Surumu, Uraricoera, Araça, Solimões, Madeira, Guaporé, Cuiabá, Paraguay, and Jauru. The artists José Joachim Freire and Joaquim José Codina worked with him, producing 912 drawings and prints of fauna and flora. Ferreira also conducted studies of Brazil's native peoples.

After his return to Lisbon in 1793, Alexandre Rodrigues Ferreira continued his relationship with the Museu da Ajuda and was also appointed director of the Gabinete de Historia Natural and of the Jardim Botânico. His work helped in the classification of wildlife of the Brazilian rain forest and in determining the topography of the Amazon watershed. He has been referred to as the Brazilian ALEXANDER VON HUMBOLDT.

Ferrello, Bartolomé (Bartolomé Ferrer)*(1499–1548) Spanish mariner on the Pacific coast of Mexico, California, and Oregon*

Bartolomé Ferrello was born in Bilbao, Spain. He became a skilled mariner and navigator, and in 1542, he served as a pilot in JUAN RODRÍGUEZ CABRILLO's voyage northward along the Pacific coast of Mexico and California. The expedition planned to search for the fabled STRAIT OF ANIAN, which it was thought would provide a seaward route through North America from the Pacific Ocean to the Atlantic Ocean.

Cabrillo's two ships embarked from Navidad, near Manzanillo, Mexico, on June 27, 1542, in an expedition that had been organized by Mexican governor ANTONIO DE MENDOZA. In early January 1543, Ferrello assumed command of the expedition following Cabrillo's death on an island in the Santa Barbara Channel. He continued the search for the Strait of Anian, reaching as far as Cape Blanco on the Pacific coast of Oregon, which he sighted and named. Problems with the ships, food shortages, and severe weather led Ferrello to end his explorations and head back to Mexico. While sailing southward along the coast of what is now northern California, he sighted a strip of land, which he named Cape Mendocino in honor of Mendoza. Ferrello and

the expedition arrived back at Navidad, Mexico, on April 14, 1543.

The eleven-month cruise, begun by Cabrillo and completed by Bartolomé Ferrello, demonstrated to Spanish geographers and navigators that the coastline from Mexico to California was unbroken. Although Ferrello brought no news about the Strait of Anian, he had gone farther north along the Pacific coast of North America than any other European had up to that time, making the first recorded sighting of the Oregon coast.

Ferris, Warren Angus (1810–1873)*American fur trapper, cartographer, writer in the West*

Warren Ferris was originally from Glens Falls, New York. His family, who were Quakers, later moved to Erie, Pennsylvania, before settling in Buffalo, New York.

Following his early education, Ferris studied civil engineering. At the age of 19, he made his way westward, arriving in St. Louis, Missouri, in 1829. He soon joined an AMERICAN FUR COMPANY expedition from St. Louis to the upper MISSOURI RIVER and the northern ROCKY MOUNTAINS. While working under Joseph Robidoux, brother of ANTOINE ROBIDOUX, Ferris became acquainted with some of the best-known fur trappers and MOUNTAIN MEN of that time, including JOSEPH REDDEFORD WALKER, JAMES BRIDGER, and THOMAS FITZPATRICK.

In about 1835, Ferris left the FUR TRADE on the Missouri and headed southward for Texas. Along with his brother, Charles, he took part in the Texas War of Independence of 1836, then settled in the east Texas county of Nacogdoches, serving as county surveyor. He later settled with his family in Dallas, where his wife and all his children died of disease. Ferris eventually moved on to Reinhardt, Texas, where he started a second family.

In 1836, Warren Ferris produced his "Map of the Northwest Fur Country," depicting most of what is now Oregon, Idaho, Montana, and Washington. Six years later, he published an account of his career in the fur trade, *Life in the Rocky Mountains*. His map and his written memoirs both provide some of the earliest published accounts of the Yellowstone region, identifying locations and natural features with the original names used by fur traders of the 1820s and 1830s.

Fiennes, Celia (1662–1741) *English writer, traveler in England*

Celia Fiennes was born in Newton Toney in Salisbury, England. Her grandfather William Fiennes, first viscount Saye and Sele, an English nobleman, served in the House of Lords and was active in the Puritan cause against the monarchy from 1628 to 1642.

In 1685, Fiennes began to travel throughout England with her servants, partly as a way of regaining her health through exercise and exposure to fresh air. Her first travels, through 1696, were in southern England. She embarked on what she called a “northern journey” in 1697. The next year, she made forays into Scotland and Wales. In 1701–03, she explored London environs. Fiennes kept a journal of her experiences, entitled *Through England on a Side-Saddle* (another title *The Journeys of Celia Fiennes, 1685–c. 1712*). First published in 1888, it provides descriptions of many different aspects of contemporary life in the places she visited, from narrow wilderness lanes to the great estates to mines and quarries and manufacturing centers.

Celia Fiennes was one of the first women known to have traveled for the express purpose of seeing and experiencing new places at a time when most overland journeys were difficult, with public transportation being rare or nonexistent, and the means of transport having to be provided by the traveler.

Filchner, Wilhelm (1877–1957) *German army officer, geophysicist in central Asia and the Antarctic*

Wilhelm Filchner was born in Munich, Germany. Following his education as a geophysicist, he entered the German army as an officer.

Filchner made several explorations into the Balkans and Russia. Then, in 1900, he made a crossing by horseback of the Pamirs, the mountainous region of central Asia in what is now Tajikistan. Three years later, in 1903, accompanied by his wife and Albert Tafel, he undertook a two-year survey of eastern Tibet and southern China, exploring the upper YELLOW RIVER (Huang He) and visiting the Szechwan (Sichuan) region to the south, including Shensi, Shansi, Langchow, and Kansu. On this expedition, he conducted his first studies of terrestrial magnetism in Asia.

Filchner led the Second German Antarctic Expedition of 1910–12. His ship, the *Deutschland*, reached Coats Land on the Weddell Sea coast about the same time that ROBERT FALCON SCOTT and ROALD ENGELBREGT GRAVNING AMUNDSEN were involved in separate attempts to reach the SOUTH POLE from the Ross Sea on the opposite side of the continent. Filchner’s main scientific purpose was to learn whether the Weddell Sea and the Ross Sea were connected, and determine whether two distinct landmasses made up the continent. Filchner and his team on the *Deutschland* penetrated farther into the Weddell Sea than had any previous explorers. His progress was eventually stopped by an ice barrier, similar to the Ross Ice Shelf, in which his ship became icebound in March 1912. After establishing a base camp on the ice, his men explored the region and came upon a new strip of Antarctic mainland adjacent to Coats Land, which



Wilhelm Filchner (Library of Congress)

Filchner named Luitpold Land (now the Luitpold Coast), after the prince regent of Bavaria. The ship survived the Antarctic winter without being crushed in the PACK ICE and, after drifting northward several hundred miles, managed to break free in November 1912.

Filchner returned to central Asia as the head of German scientific surveys during 1925–28. On these expeditions, he mapped the terrain and established a series of stations to study terrestrial magnetism. In 1939–40, he undertook a magnetic survey in Nepal.

Wilhelm Filchner’s Antarctic explorations of 1910–12 helped scientists develop a true geographic image of the ice-shrouded continent. The ice barrier at the head of the Weddell Sea that Filchner located was named the Filchner Ice Shelf in his honor. In the course of the INTERNATIONAL GEOPHYSICAL YEAR of 1957–58, scientific bases were established between the Ross Ice Shelf and the Filchner Ice Shelf, enabling seismologists to determine that the Ross Sea and the Weddell Sea were actually closer to each other than previously thought, separated by an isthmus less than 700 miles wide. From this finding, Antarctica was henceforth depicted as composing two major regions: Greater Antarctica and Lesser Antarctica.

Finley, John (John Findley) (1722–ca. 1769)*American frontiersman in Kentucky*

Born in northern Ireland, John Finley immigrated with his family to Pennsylvania when in his early 20s. In 1744, he was granted a license to trade with the Indians on the upper Ohio River, and in the following years, he ranged throughout present-day eastern Kentucky and southern Ohio.

In 1752, Finley was taken captive by Shawnee Indians near the Falls of the Ohio. He was taken to the Indian villages in the Kentucky lowlands, where he was one of the first non-Indians to see the fertile forests and prairies that later became known as the Bluegrass country of Kentucky. Although he was at first unsure of where he was in relation to the settled regions to the east, Finley soon learned from other itinerant traders that the region was readily accessible from western North Carolina and what is now eastern Tennessee, by way of the CUMBERLAND GAP.

Within a short time, the Shawnee released Finley, and he made his way back to the settlements on the Pennsylvania frontier. Although there was a growing demand for new lands to settle, his reports of the Bluegrass country were not followed up due to the outbreak of the French and Indian War in 1754. In that conflict, Finley served as a wagon driver in General Edward Braddock's unsuccessful 1755 campaign against Fort Duquesne, near present-day Pittsburgh. In that campaign, Finley befriended frontiersman DANIEL BOONE.

After the war's end in 1763, Finley became a peddler of wares to frontier housewives. In 1768, he arrived in western North Carolina's Yadkin Valley, where Boone had settled. While wintering with Boone in 1768–69, Finley related accounts of a possible route north and west from the Yadkin Valley into the fertile Kentucky lands he had visited in 1752. By spring 1769, Boone had organized a small expedition to explore westward from the Yadkin Valley, hoping to locate new lands to settle west of the APPALACHIAN MOUNTAINS.

Accompanied by Boone and three of his hunting companions, and equipped by frontier land developer Judge Richard Henderson, Finley set out from the Yadkin Valley settlement on May 1, 1769. Traveling on horseback, Finley, Boone, and the others traveled into the valleys of the upper Tennessee River, then down the Watauga and Holston Rivers into a region known as the Clinch. From there, they reached Powell's Valley, then found an ancient north-south route used by the Cherokee Indians, known as the Warriors' Trace. Following the Warriors' Trace, they passed through the Cumberland Gap and, having crossed the Cumberland River, arrived in the rich country Finley had reached 18 years earlier from the Ohio River.

While the other members of the party set out on their own to hunt, Finley explored the region with Boone. In December 1769, the two frontiersmen were captured by Shawnee but managed to escape. Soon afterward, Boone

and his companions returned to North Carolina and the Yadkin Valley, where Boone soon organized a colonizing expedition through the Cumberland Gap into what is now Kentucky. Finley subsequently returned to his life as a frontier trader, but he died in the wilderness not long after his 1769 explorations with Boone.

John Finley was one of the first non-Indians to travel into the trans-Appalachian frontier in the years prior to the French and Indian War of 1756–63. His trip through the Cumberland Gap with Boone in 1769 helped establish a regular route for the subsequent wave of emigrants who began to settle on the Kentucky frontier in the 1770s.

Fitch, Ralph (ca. 1550–1611) *English merchant, traveler in India and the Far East*

Ralph Fitch was a merchant in London in the final decades of the 16th century. In 1583, he took part in a commercial expedition that planned to establish trade contacts with India and China by means of an overland route from the eastern MEDITERRANEAN SEA.

On February 12, 1583, Fitch sailed from London on the ship the *Tiger*, part of a group of six merchants from the London-based LEVANT COMPANY. Along with JOHN NEWBERRY, who had only recently completed a trip to Persia (present-day Iran), the other travelers included William Leeds, a jeweler; J. Story, a painter; and J. Eldred, a merchant. In May 1583, after landing at the port of Tripolis (present-day Tripoli, Lebanon), the English merchants traveled inland to Aleppo in present-day Syria, where they joined a camel caravan across the desert to Bir on the Euphrates River. They purchased a boat there and sailed down the Euphrates to Felujah, then made their way overland to Baghdad. From Baghdad, they descended the Tigris River in a flat-bottomed boat, to Basra at the head of the Persian Gulf, where Eldred remained to trade.

In Hormuz, at the entrance to the Persian Gulf, Fitch and his companions were arrested by Portuguese authorities on the instigation of Venetian commercial interests, who feared English encroachment into their trading domain. Taken in custody to Goa, the Portuguese colony on the southwest coast of India, they were held as prisoners until late December 1583, when their release was secured with the help of an English Jesuit in India, THOMAS STEVENS.

From Goa, Fitch decided to head inland for the capital of the Mogul empire at Agra in north-central India. Newberry headed back to England by way of Lahore, but he vanished soon afterward in the Punjab in what is now northern Pakistan, probably murdered by bandits. Fitch made his way across the Deccan Plateau to the newly established Mogul capital, Fatehpur Sikri, near Agra, where he met with the Mogul emperor, Akbar, to whom he presented diplomatic letters from Queen Elizabeth I.

While no commercial treaty was established between India and England, Fitch did initiate the earliest diplomatic ties between the two countries. William Leeds, the jeweler, remained in service to the court of Akbar, and J. Story returned to Goa, where he married an Indian woman and settled down as a foreign trader. Fitch, meanwhile, resolved to reach China in order to establish diplomatic and commercial contacts with that country.

From Agra, Fitch went by boat along the Jumna River to Allahabad, then traveled along the GANGES RIVER. He visited Benares and soon entered what is now Bangladesh. He headed northward to Cooch Behar, seeking a route into China. Failing to find one, he headed back southward down the Ganges to the ancient city of Sunargon. In November 1586, he traveled to Burma (present-day Myanmar) by ship, then ascended the Irrawaddy River to Rangoon and the ancient Burmese capital at Pegu. From Burma, he traveled into what is now Thailand, Vietnam, and Cambodia. In January 1588, he sailed from Pegu in what is now southern Burma, to Malacca at the tip of the Malay Peninsula.

Fitch was unable to book passage into China as he had hoped, and, in 1590–91, he made his way back to London by way of the southwest coast of India, the Persian Gulf, the Euphrates, and the Mediterranean, returning on April 29, 1591, after a journey of more than eight years.

Ralph Fitch was among the first Englishmen to reach India by way of an overland route. The main purpose of the expedition—to develop an overland trade route to India that would favorably compete with the long seaward passage around the CAPE OF GOOD HOPE—proved to be impractical. Nonetheless, Fitch gained invaluable experience in his travels. He later played an active part in the organization of the BRITISH EAST INDIA COMPANY, serving as a consultant in the preparation of its first voyage to India in 1601. In 1598, RICHARD HAKLUYT published an account of Fitch's journey to India and the Far East.

Fitzpatrick, Thomas (ca. 1799–1854) *Irish fur trader, trapper, guide in the American West*

Thomas Fitzpatrick, a native of County Cavan in north-central Ireland, first traveled to the American West in spring 1823, when he joined WILLIAM HENRY ASHLEY's fur-trading expedition to the upper MISSOURI RIVER, out of St. Louis. Following a raid by the Arikara Indians on Ashley's supply boats about 200 miles north of Fort Kiowa in north-central South Dakota, Fitzpatrick joined Colonel HENRY LEAVENWORTH's men in a counterattack.

With continuing Indian attacks threatening the FUR TRADE on the upper Missouri, Ashley decided to send a party of his trappers westward across the plains to explore for new sources of beaver pelts in the region west of the Continental Divide, beyond the Wind River Mountains of pre-

sent-day Wyoming. Fitzpatrick, JEDEDIAH STRONG SMITH, JAMES CLYMAN, WILLIAM LEWIS SUBLETTE, and others made up this expedition, which departed Fort Kiowa on the Missouri in fall 1823.

Snowstorms prevented Fitzpatrick and his party from crossing the ROCKY MOUNTAINS through Union Pass. They wintered with the Crow Indians and, in February 1824, they headed southward for the Sweetwater River. Following this stream into the Rockies, they made their way across the Continental Divide via the SOUTH PASS, a 50-mile-wide plateau through the Wyoming Rockies, to the upper reaches of the Green River by March. They found beaver in great abundance and soon had amassed a small fortune in furs.

Fitzpatrick hoped to navigate the Sweetwater and reach St. Louis by way of the Missouri, but his boats sank. After hiding his furs, he walked 500 miles across the plains to Fort Atkinson on the Missouri near present-day Omaha, Nebraska. Before returning with horses to retrieve his cache by way of the Platte River, he wrote to Ashley in St. Louis to report his finding of a land rich in beaver on the western slopes of the Wind River Mountains, just west of the South Pass.

In fall 1824, Fitzpatrick accompanied Ashley's expedition, which included ROBERT CAMPBELL, from Fort Atkinson up the Platte River across the Laramie, Medicine Bow, and Front Mountains, a route later approximated by the Union Pacific Railroad. The Ashley party traveled along the edge of south-central Wyoming's Red Desert, then headed southward to the North Platte. They reached the South Pass and finally the Green River. In June 1825, Fitzpatrick attended the first annual trappers' rendezvous at Henrys Fork of the Green River in present-day northeastern Utah.

During the late 1820s and early 1830s, Fitzpatrick was among the most successful fur traders of the upper Missouri. He eventually became a principal of the ROCKY MOUNTAIN FUR COMPANY.

In 1831, Fitzpatrick joined a trade caravan from St. Louis, Missouri, to Santa Fe, New Mexico, then still part of Mexico. On reaching Santa Fe, he organized a group of trappers to head northward into the Rockies, thus expanding the geography of the fur trade. Among the Santa Fe personnel was frontiersman CHRISTOPHER HOUSTON CARSON (Kit Carson).

During the 1830s, Fitzpatrick's fur-trading activities took him all over the West, from Santa Fe across the Great Basin to what is now Idaho and eastern Oregon. In 1835, he purchased Fort Laramie from William Sublette and Robert Campbell. In 1836, he used the knowledge gained from his years as a mountain man to guide the Presbyterian missionary MARCUS WHITMAN across the plains to the Oregon Country. In 1838, accompanied by JAMES BAKER, Fitzpatrick led an AMERICAN FUR COMPANY expedition along the Oregon Trail. By the late 1830s, the fur trade had de-

clined, and Fitzpatrick sold out his shares in the business to the American Fur Company.

In 1841, along with the Jesuit missionary PIERRE-JEAN DE SMET, Fitzpatrick served as a guide for the Western Emigration Society, the first large wagon-train migration across the Rockies. The Bidwell-Bartleson wagon train traveled from Independence, Missouri, westward through what is now Topeka, Kansas, along the Platte River to Fort Laramie. After passing Independence Rock, the emigrants followed the Sweetwater River, through the South Pass, to the Green River Valley, then headed northward to Soda Springs, near present-day Pocatello, Idaho. At a point north of the Great Salt Lake on the Bear River, Fitzpatrick led part of the wagon train northwestward, while the rest of the party opted to head south and west across Nevada's Humboldt Desert. He left his group at Fort Hall, Idaho, from where they safely traveled to Oregon. The next year, he guided a wagon train to Oregon for Methodist missionary Elijah White.

In 1843–44, Fitzpatrick, along with Kit Carson, served as a guide for JOHN CHARLES FRÉMONT's second expedition across the Rockies, from Westport, Missouri, up the Arkansas River. Frémont dispatched Fitzpatrick to lead an advance party to the South Pass, while he sought a more southerly route through the eastern Rockies. Fitzpatrick led his contingent westward across the Green River Valley to Fort Hall in what is now southwestern Idaho, where he rejoined Frémont.

Starting in 1845, Fitzpatrick served as the Indian agent to tribes living between the Arkansas and Platte Rivers, with his headquarters at Bent's New Fort in what is now southeastern Colorado.

In 1845–46, Fitzpatrick served as a guide for both STEPHEN WATTS KEARNY and JAMES WILLIAM ABERT in military explorations of the Canadian River and Arkansas River regions of what is now northern Texas and southern Oklahoma. Soon afterward, he was a guide for Kearny and his invasion force as it crossed the southern plains from Kansas into New Mexico at the outbreak of the U.S.-Mexican War of 1846–48. Kearny subsequently sent Fitzpatrick to Washington, D.C., with military dispatches.

In 1851, at Fort Laramie in present-day Wyoming, Fitzpatrick participated in a peace conference with tribal leaders of the northern plains. In 1853, he held a subsequent conference with tribal leaders of the southern plains near present-day Dodge City, Kansas. The next year, on a trip to Washington, D.C., to oversee the implementation of the resulting Indian treaties, he became ill and died.

Thomas Fitzpatrick's early expeditions in the fur trade during the 1820s led to the first westward crossing of the Rockies through the South Pass. His pioneering a route to the Green River widely expanded the fur trade. As a guide to the earliest wagon trains, Fitzpatrick established the overland route that led to settlement of Oregon and California. His efforts as a guide for the government-sponsored explorations

of the 1840s helped in charting the wide region that the United States was to acquire in Oregon in 1846, as well as in the Southwest and Far West with the Mexican Cession of 1848.

Fitzroy, Robert (1805–1865) *British naval officer, meteorologist in South America, the Pacific, and the Indian Ocean*

Robert Fitzroy was born at Ampton Hall in Suffolk, England. A direct descendant of Charles II and his mistress Barbara Villiers, he was the son of a lord, the grandson of a duke, and the nephew of Robert Stewart, Viscount Castlereagh, the British foreign minister at the close of the Napoleonic Wars.

In 1819, Fitzroy entered the Royal Naval College, eventually joining the British navy. By 1824, he had reached the rank of lieutenant. In 1826, after serving in the MEDITERRANEAN SEA, he accompanied Commander PHILLIP PARKER KING, aboard the *Adventure*, on a four-year hydrographic survey of the coasts of South America. In 1828, Fitzroy was given command of the expedition's other ship, the *Beagle*, when Captain Pringle Stokes committed suicide.

In 1831, Fitzroy, at the rank of lieutenant commander, was again given charge of the *Beagle* for a scientific expedition to continue the coastal survey of South America and to make a series of chronometric measurements at various points around the globe in order to establish meridians of longitude. CHARLES ROBERT DARWIN accompanied the expedition as naturalist.

Fitzroy sailed from Portsmouth, England, in December 1831. He cruised along the coast of Brazil and Uruguay, putting in at Buenos Aires in September 1832. He sailed to the Falkland Islands, then surveyed the coast of Patagonia, south to Tierra del Fuego. On his earlier voyage with King, Fitzroy had taken three native Patagonians back to England, where he had paid for their education. The two men, Jemmy Button and York Minster, and a woman, Fuegia Basket, returned to Tierra del Fuego with Fitzroy on the *Beagle* in January 1833. They went ashore at Ponsonby Sound, along with a missionary named Mathews. Their arrival in European garb was met with some hostility by other natives; the missionary, fearing for his life, soon returned to the ship. Despite some difficulties, the three decided to remain in their homeland.

Fitzroy carried on the survey of the Atlantic and Pacific coasts of the southern part of South America for most of 1833, while Darwin undertook scientific expeditions into the interior of Chile and Argentina. In April 1834, Fitzroy and Darwin ascended the Santa Cruz River of southern Argentina in whaleboats, reaching a point 60 miles from the Pacific coast of South America, before heading back to the *Beagle* in the Atlantic.

Fitzroy navigated through the STRAIT OF MAGELLAN, then visited Chiloé Island off the coast of southern Chile. After a month in the Galapagos, the expedition headed across the Pacific, reaching Tahiti in September 1835. From there, Fitzroy went to NEW ZEALAND, then to Sydney, Australia, and finally to TASMANIA. Throughout the voyage across the Pacific, Fitzroy made chronometric observations at various points and succeeded in establishing accurate readings of longitude. After a stopover at the western Australian settlement at King George Sound, the *Beagle* headed into the Indian Ocean. Off the Cocos Islands, in the mid-Indian Ocean, Fitzroy and Darwin explored coral atoll formations. From Cape Town, Fitzroy sailed northwestward to Ascension Island and on to the Brazilian coast, where he continued his chronometric measurements. He reached England in October 1836.

Fitzroy spent the next few years preparing an account, with Darwin, of his 10 years of world explorations. It was first published in 1839 with the self-explanatory title, *Narrative of the Surveying Voyages of H. M. Ships Adventure and Beagle between the years 1826 and 1836, describing their Examination of the Southern Shores of South America, and the Beagle's Circumnavigation of the Globe*. The ROYAL GEOGRAPHICAL SOCIETY awarded Fitzroy a gold medal in 1837.

Fitzroy was elected to the House of Commons in 1841, serving until 1843, when he accepted an appointment as governor of New Zealand. Because he sided with the native Maori in a dispute with colonists involving land claims, he was recalled to England in 1845.

In 1854, Fitzroy became head of the Meteorological Department of the British Board of Trade. In this capacity, he introduced many innovations, including a system of storm warnings that developed into daily weather forecasts. He also wrote and published a classic treatise on meteorology, *The Weather Book* (1861), and developed a new and inexpensive type of barometer that came to be known as the Fitzroy Barometer. Promoted to rear admiral in 1857, he was made a vice admiral in 1863.

Fitzroy was prone to mental instability; he reportedly had informed Darwin during the *Beagle* voyage of 1831–35 that insanity ran in his family. In April 1865, he committed suicide in Surrey, England, by cutting his throat.

Robert Fitzroy's 1831–36 scientific expedition on the *Beagle*, through Darwin's subsequent theoretical conclusions, changed the course of scientific and social thought worldwide. Ironically, he was one of the first to criticize Darwin's findings on religious grounds. In 1832, Fitzroy, who was an adherent of literal interpretation of Scripture, challenged Darwin's speculations about the age of fossils uncovered in Patagonia because the naturalist's views seemed to contradict the biblical account of the Great Flood.

Fitzwilliam, William See MILTON, VISCOUNT.

Flatters, Paul-Xavier (1832–1881) *French army officer in North Africa*

A colonel in the French army, Paul-Xavier Flatters was directed, in 1879, to organize and lead a survey for a proposed railroad route from the coast of Algeria on the MEDITERRANEAN SEA southward to a point on the southern edge of the SAHARA DESERT, between Lake Chad and the NIGER RIVER. At that time, France was developing its colonial empire in North Africa, and, fearful of German encroachment into its sphere of influence, hoped to use the railroad to link its colonies in West Africa with the Mediterranean ports of Algeria and Tunisia.

In command of a small party of soldiers, Flatters set out from the Algerian coastal town of Skikda, between Tunis and Algiers, in 1880. He headed southward to the oasis at Biskra, then advanced another 400 miles beyond Ouargla, to a point northeast of the Tassili n' Ajjer Mountains. Flatters's expedition had not been intended as a military operation, and he had been instructed to avoid conflict with the Tuareg tribes who ranged across the Ahaggar, the high desert plateau region of southeastern Algeria. Nevertheless, on the northern edge of the Ahaggar, Flatters and his men encountered open opposition from the Tuareg and were forced to withdraw northward to the Mediterranean coast.

In 1880–81, Flatters again attempted to survey southward for a railroad route across the Sahara. He started out from Algiers with a group of soldiers that included a Lieutenant Dianous as second in command. The expedition reached Ouargla, then penetrated the Ahaggar as far as the TROPIC OF CANCER. Soon afterward, Flatters and some of his men were killed in a Tuareg ambush at a desert waterhole. Lieutenant Dianous led the surviving members of the expedition back to a French military post in the Grand Erg Oriental to the north.

For 30 years after the ill-fated expeditions in 1880–81 of Paul-Xavier Flatters, subsequent official French expeditions into the Sahara were usually military operations, aimed at bringing the Tuareg tribes of the Ahaggar region under control.

Fleuriot de Langlé, Paul-Antoine-Marie (1744–1787) *French naval officer in the South Pacific*

Paul Fleuriot de Langlé was a native of Quimper-Guezenec, in the Lower Brittany region of northwestern France. His early maritime career took him to Santo Domingo in the WEST INDIES. In 1778, he took part in the naval battle against the British off the island of Ushant, on the French coast.

In 1782, Fleuriot de Langlé commanded the French warship *Astrée* in JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse's attack on the British in HUDSON BAY.

Fleuriot de Langlé was named director of the Royal Naval Academy in 1783. Two years later, he joined La

Pérouse on his voyage of exploration to the South Pacific. In command of the *Astrolabe*, he left Brest on August 1, 1785, with the *Boussole* under La Pérouse. While exploring Sakhalin Island in June 1787, La Pérouse sighted a bay that he named after Fleuriot de Langlé.

In December 1787, the expedition arrived in the eastern Samoa islands. On one of them known as Tutuila, Fleuriot de Langlé led a party ashore to replenish his ship's water supply. A group of natives, massed on the beach, suddenly turned hostile and attacked Fleuriot de Langlé and the 61 men with him. Fleuriot de Langlé and 11 other men were killed, and 20 were wounded. Three months later, La Pérouse and both of his ships vanished after leaving Botany Bay, Australia, en route to the Friendly Islands.

News of the violent incident in which Paul Fleuriot de Langlé and the other Frenchmen lost their lives reached France by way of reports sent by La Pérouse from Australia. The site on the Samoan island of Tutuila where the event occurred has since become known as Massacre Bay.

Flinders, Matthew (Mathew Flinders)

(1774–1814) *British naval officer in Australia and Tasmania, cousin of Sir John Franklin*

Born in Donington, in Lincolnshire, England, Matthew Flinders was the son of a doctor. He attended Donington Free School and Horbling Grammar School. Inspired to embark on a life of travel and adventure from his reading of *Robinson Crusoe*, he entered the British navy as a 15-year-old midshipman in 1789.

Flinders served under Captain WILLIAM BLIGH on the *Providence* in a 1791–93 voyage that succeeded in taking live breadfruit trees from Tahiti in the South Pacific Ocean, to Jamaica in the WEST INDIES.

In 1794, serving under Admiral Richard “Black Dick” Howe on the *Bellerophon*, Flinders took part in the British naval victory over the French at Brest. The next year, he sailed to Port Jackson (part of present-day Sydney), Australia, on the *Reliance*. Also aboard was the newly appointed governor of New South Wales, Captain John Hunter, and the ship's surgeon, GEORGE BASS.

During the next three years, with Hunter's support, Flinders and Bass undertook explorations along the Australian coast south of Port Jackson. They investigated the Georges River at the head of Botany Bay, just south of Port Jackson; farther south they located another bay, which they named Port Hacking. In late 1798, Flinders and Bass sailed the sloop *Norfolk* westward around the southeastern corner of Australia. They then circumnavigated TASMANIA, conclusively showing that it was an island separated from the mainland by a strait, which Flinders named Bass Strait.



Matthew Flinders (Library of Congress)

Back in England in 1800, Flinders sought SIR JOSEPH BANKS's support for his plan to explore the uncharted portions of the Australian coasts. Banks, president of the Royal Society, used his influence to win the approval of the British Admiralty. At that time, the British government was alarmed over possible French designs on Tasmania and Australia, as indicated by the expedition of THOMAS-NICOLAS BAUDIN, which sailed in October 1800.

Flinders, at the rank of frigate captain, was given command of the *Investigator*. Among the crew of officers, seamen, scientists and artists was a 15-year-old midshipman and cousin of Flinders, the future polar explorer SIR JOHN FRANKLIN.

Although on the brink of war with Great Britain in 1801, Napoleon granted the British a written promise of safe conduct for Flinders and the *Investigator*, in exchange for a similar British pledge in regard to the ongoing Baudin expedition. The *Investigator* embarked from the British naval port at Spithead on July 18, 1801, and navigated around the tip of Africa and through the Indian Ocean. By late November, Flinders sighted the west coast of Australia at Dirk Hartogs Island. Sailing southward, he rounded Cape Leeuwin at the southwestern corner of the continent, then sailed eastward along the uncharted coastline of the Great Australian Bight.

When the coast angled sharply northward, Flinders thought he had reached the entrance to either a strait that

led through the continent to the north coast, or the outlet of a great sea in the interior of Australia. Upon further exploration, he learned that it was a gulf leading 200 miles into the continent. Exploring in a small boat with FERDINAND LUCAS BAUER, ROBERT BROWN, and artist WILLIAM WESTALL, Flinders made a landing at present-day Port Augusta at the head of what he named Spencer Gulf (after the first lord of the Admiralty), and climbed Mount Brown in what came to be known as the Flinders Range.

Proceeding eastward on his survey of Australia's south coast, Flinders soon came upon another, smaller gulf, Gulf St. Vincent, around which the city of Adelaide later developed. At the mouth of Gulf St. Vincent, across what came to be known as Investigator Strait, a large island was sighted. Upon landing there, Flinders and his crew discovered it to be teeming with seals and kangaroos. The kangaroos, unfamiliar with humans, were easy prey for the British and provided the expedition with an ample supply of fresh meat. Flinders later named the place Kangaroo Island.

On April 8, 1802, soon after the stop at Kangaroo Island, at a place later known as Encounter Bay, Flinders met up with the French expedition under Nicolas Baudin on the *Géographe*. At a friendly meeting aboard the French ship, Flinders related to Baudin the details of his explorations along the south coast of Australia, providing the French commander with a copy of a map of his recent survey.

Leaving the French at Encounter Bay, Flinders decided to put in at Port Jackson, his crew then beginning to suffer from SCURVY. By the time he had reached Port Jackson in May 1802, he had completed his examination of the entire south coast of Australia and determined that the coastline was continuous, thus indicating that Australia was of continental proportions, and not a group of large islands, as some geographers then believed. In addition, Flinders and his party had some contact with Aborigines of the south coast, and noted that their language was different from that spoken by the Aborigines indigenous to New South Wales on the southeast coast.

Flinders resupplied his expedition at Port Jackson, then sailed northward along the east coast of Australia. While negotiating a passage through the northern end of the Great Barrier Reef, he made some of the earliest correct observations on the origins of these coral formations. Beyond Cape York, the *Investigator* sailed through Torres Strait, where Flinders found a new entrance into the Gulf of Carpentaria by way of Prince of Wales Strait.

From November 1802 to March 1803, Flinders charted the entire length of the Gulf of Carpentaria, from Cape York on the east to Cape Arnhem on the west. This survey determined that the Gulf was closed, with neither a transcontinental strait nor an inland sea opening up in that part of Australia's north coast.

By March 1803, the only segment of the Australian shore that remained for Flinders to chart was the north-

western Indian Ocean coastline. However, more signs of scurvy, and the deteriorating condition of the less than seaworthy *Investigator*, led Flinders to call an end to his survey and head for the Dutch settlement on Timor. Contrary winds compelled him to return to Port Jackson from Timor by sailing counterclockwise around Australia, thus completing a circumnavigation of the continent.

In Port Jackson, Flinders obtained three vessels from the BRITISH EAST INDIA COMPANY fleet to take his expedition back to England, where he hoped to find a replacement for the *Investigator* and complete his explorations of the Australian coastline. Sailing on the *Porpoise*, he left Port Jackson on August 10, 1803. A week later, the *Porpoise* went aground on a sandbar off the Great Barrier Reef. Flinders then commanded a 14-man party in one of the ship's small open boats and returned to Port Jackson, covering the 700 miles in less than two weeks.

Flinders soon sailed again from Port Jackson on the *Cumberland*, accompanied by two other ships that picked up the crew of the *Porpoise* at what later became known as Wreck Reef Bank.

Flinders, in command of the *Cumberland*, sailed northward to Timor, then headed across the Indian Ocean for England. Near the French-held island of Île de France (present-day Mauritius), it became apparent to Flinders that the ship was in no condition to make the voyage around the CAPE OF GOOD HOPE. With supplies of food running low, he made for Port Louis on Île de France, where he was arrested by the French governor, Charles Decaen.

Although Flinders presented Napoleon's letter of protection, the French governor held that it only applied to the *Investigator*. Not long before Flinders had arrived on Île de France, war had been declared between France and England, and Decaen strongly suspected Flinders of being a spy.

Flinders was held prisoner on Île de France for the next six and a half years. His captivity was protested by many leading figures, both French and British, and became a cause célèbre, known in France as "L'Affaire Flinders." Finally, in June 1810, following a British naval blockade of Île de France, Flinders was released. He arrived back in England in October 1810, where he began to work on an account of his expedition.

While Flinders had been detained on Île de France, the French had published the reputed findings of Baudin's expedition to Australia, giving him credit for Flinders's actual accomplishments in exploration. These false claims were exposed by the publication of Flinders's *A Voyage to Terra Australis* in 1814. Flinders had lost his health during the years of imprisonment and he died in 1814 at the age of 40, reportedly on the very day his book appeared. Although his work was not a big seller, it popularized the name "Australia" for the continent.

The explorations undertaken by Matthew Flinders from 1795 to 1803 established the true outlines of Australia and

Tasmania, putting to rest some erroneous notions. Flinders Island off the coast of Tasmania, Flinders Bay at the southwestern tip of Australia, and the Flinders River on the Gulf of Carpentaria were all named in recognition of his efforts in the exploration of Australia.

Fontenelle, Lucien (ca. 1800–ca. 1840)

American fur trader on the Missouri and Platte Rivers

Lucien Fontenelle was born on his family's plantation in southern Louisiana. Orphaned at an early age when both his parents were killed in a hurricane, he was taken in by an aunt. In rebellion against her strictness, he eventually ran away from home. Arriving in St. Louis, he embarked on a career as a fur trader.

Fontenelle went on to become a brigade leader on fur-trading expeditions to the upper MISSOURI RIVER region and into the ROCKY MOUNTAINS of present-day Colorado, Wyoming, Idaho, and Montana. In the late 1820s, he established a trading post at Bellevue on the Missouri River, south of what is now Omaha, Nebraska, and north of the mouth of the Platte River.

In 1830, Fontenelle became a subcontractor for JOHN JACOB ASTOR'S AMERICAN FUR COMPANY, organizing and leading fur-trading expeditions into the Rockies and northern plains.

Fontenelle's post at Bellevue on the Missouri served as the staging area for MARCUS WHITMAN and Samuel Parker in their missionary expedition to the Oregon Country in 1836. That same year, he went into partnership with THOMAS FITZPATRICK, JAMES BRIDGER, and Milton Sublette, starting a firm known as Fontenelle, Fitzpatrick & Co. Soon afterward, Fontenelle and his associates expanded their operations westward up the Platte River and purchased Fort Laramie in what is now southeastern Wyoming.

Fontenelle had an Indian wife, the daughter of an Omaha chief, who bore him four children. He died in 1839 or 1840 at Fort Laramie under circumstances that are still not clear, possibly from natural causes, although some sources suggest he committed suicide while drunk.

Lucien Fontenelle was a leading figure in the Rocky Mountain FUR TRADE during its peak years in the 1820s and 1830s. Around his post at Bellevue developed the earliest non-Indian settlement in what later became the state of Nebraska. After 1835, Fort Laramie, an important way station for emigrants traveling along the Oregon Trail, was also known as Fort Lucien.

Forbes, Edward (1815–1854) *British naturalist,*

marine biologist on the British Isles and in the Mediterranean Sea

Edward Forbes was born on the Isle of Man in the Irish Sea between England and Ireland. He attended the University of

Edinburgh in Scotland, during which time he studied the flora and fauna of the waters around the Isle of Man and off Norway. He also spent time in Paris, taking classes at the Jardin des Plantes.

In 1841–42, Forbes served as naturalist on a surveying expedition to the MEDITERRANEAN SEA on the *Beacon*, under the command of Captain Graves. He then ran the botany department at King's College, part of the University of Cambridge. He was elected to the Linnean Society in 1843 and to the ROYAL SOCIETY in 1845. He also served as secretary and curator of the Geological Society and professor of natural history at the University of Edinburgh.

In the course of his studies, Forbes collected samples from the deep seabed of the Irish and Aegean Seas. He determined that the amount of marine life varied the greater the depth and defined eight, what he called, "zones of abundance." He mistakenly concluded, however, that all aquatic life ceased below 300 fathoms. He also drafted a geological and paleontological map of the British Isles.

Edward Forbes's pioneering work in marine biology set the stage for later studies in the field, as well as for oceanographic work. He has been referred to as the father of marine biology.

Forrest, Alexander (1849–1901) *Australian explorer in Western Australia and Northern Territory, brother of John Forrest*

Born in Perth, on the west coast of Australia, Alexander Forrest was a younger brother of Australian explorer JOHN FORREST.

In 1871, Forrest explored up the Swan River from Perth into the interior of Western Australia and as far as the GREAT VICTORIA DESERT. On the return journey, he followed Australia's south coast back to Perth. Forrest joined his brother John in his historic west-to-east crossing of Western Australia in 1874, from Perth to Adelaide.

In 1879, Forrest turned his attention to the northwestern region of Australia. In February of that year, he sailed northward from Perth and landed at the mouth of the De Grey River. His expedition then headed inland, northeastward across Dampier Land, to the Fitzroy River. After an unsuccessful attempt to traverse the King Leopold Range, Forrest returned to the Fitzroy River and explored the southwestern part of the Kimberley Plateau. In July 1879, Forrest decided to leave the Fitzroy and travel overland eastward to the Daly River in Australia's Northern Territory. He soon came upon the Central Overland Telegraph Line, which led him to a settlement on the north coast of present-day Darwin.

Alexander Forrest's 1879 explorations of northwestern Australia resulted in the opening of land for grazing in the upper Fitzroy River region, south of the King Leopold Range. His journey from the Fitzroy River to the Daly River

and the coast was one of the earliest non-Aborigine crossings of a large area of northern Australia, west of the Gulf of Carpentaria.

Forrest, John (Baron of Bunbury) (1847–1918)

Australian surveyor in interior Australia, statesman, brother of Alexander Forrest

John Forrest was born in Bunbury, Western Australia, and educated at Bishop's School in Perth. At the age of 18, he joined Western Australia's Survey Department.

Three years later, in 1869, Forrest led an expedition eastward into the interior of Western Australia from Perth, in search of traces of the German FRIEDRICH WILHELM LUDWIG LEICHHARDT, who had disappeared with his party 20 years earlier during an attempt to cross the continent from east to west. From Perth, Forrest traveled northeastward to Lake Moore, then continued eastward beyond the northern end of Lake Barlee to Lake Raeside. No sign of Leichhardt or his expedition was found. The skeletal remains discovered by Aborigines, which had prompted the search, were identified as those of stray horses from an 1854 expedition. Nevertheless, Forrest continued his explorations, surveying new pastoral lands as far as Mount Weld, on the western edge of the Great Victoria Desert. The expedition covered 2,000 miles, revealing much new territory suitable for raising livestock.

In 1870, Forrest commanded a coastal survey expedition eastward along the Great Australian Bight to Adelaide. His west-to-east journey to the Spencer Gulf and the Yorke Peninsula covered in reverse the territory explored by SIR EDWARD JOHN EYRE in 1841.

Forrest's next expedition started out from Perth in March 1874. He sailed 250 miles northward along the west coast of Australia, landing at Geraldton. From there, with four others, including his brother ALEXANDER FORREST, and equipped with 18 pack horses, he set out northwestward to explore the headwaters of the Murchison River. The group then went eastward to Weld Spring and Fort Mueller. After traversing the Gibson Desert, they explored southward into the Petermann Ranges of southwestern Northern Territory, and into the Tomkinson Ranges of northwestern South Australia. They followed the Alberga River to Lake Eyre, then traced the Central Overland Telegraph line southward to Adelaide, arriving in early November 1874.

With his arrival in Adelaide, Forrest had completed the first west-to-east crossing of the interior of Western Australia, and had traversed much of the continent's largely unexplored central region as well. The journey had been extremely difficult, with much hardship caused by shortages of food and water and the loss of all but four horses. For his efforts, Forrest was rewarded with a land grant of 5,000 acres, and, in 1876, he was made deputy surveyor general of Western Australia.

In 1878, Forrest led an expedition to the region around Western Australia's Ashburton River, and, in 1882, he surveyed the Fitzroy River region to the north. The next year, he was named surveyor general of Western Australia.

Forrest went on to become one of Western Australia's leading statesmen. He was elected its first premier in 1890, and, after 1901, he represented the newly organized state in the Australian federal parliament. In 1918, he was made the first baron of Bunbury, the first native-born Australian to be admitted to the British nobility. He died later that year while returning from England.

John Forrest recounted his exploits in his 1875 book *Explorations in Australia* and the 1884 work *Western Australia*. In addition to completing the first west-to-east crossing of the state of Western Australia in 1874, he created maps used to plot the first overland telegraph lines between Perth and the settlements of New South Wales, Victoria, and Queensland.

Forster, Johann Georg Adam (Georg Forster)

(1754–1794) *German naturalist in the South Pacific, in service to Great Britain, son of Johann Reinhold Forster*

Born in the East Prussian town of Nassenhuben, near present-day Gdańsk, Poland, Georg Forster was the son of German naturalist JOHANN REINHOLD FORSTER. At the age of 10, he accompanied the elder Forster on a botanical and zoological expedition to Russia as his assistant. After attending school in St. Petersburg, Russia, he moved to England with his family, where he continued his education.

Forster and his father served as the naturalists on JAMES COOK's second voyage of 1772–75. Sailing on the *Resolution* to the islands of the South Pacific Ocean, they collected specimens of plants and animals in NEW ZEALAND, Tahiti, and newly explored Norfolk Island, between New Zealand and New Caledonia.

When the expedition returned to England in July 1775, Forster set to work on his account of the voyage. Although Forster's father lost out to Cook in his bid to write the official account of the voyage, the British Admiralty did allow the publication of the younger Forster's unofficial account, *A Voyage Round the World*, published in 1777, which presented scientific information in the form of a popular travel narrative.

In 1778, Forster accepted an appointment as professor of natural history at Kassel in present-day Germany, where he remained for the next six years. In 1784, he moved to Vilnius, in what is now Lithuania, where he taught natural history and obtained a degree as doctor of medicine.

Catherine the Great of Russia invited Forster to take part in a proposed Russian voyage of exploration in the late 1780s, but plans for the expedition were abandoned with the outbreak of war with Turkey.

Forster then accepted the post as librarian to the Elector of Mainz in present-day Germany in 1788. Two years later, he accompanied the young ALEXANDER VON HUMBOLDT on a three-month expedition down the Rhine River through Belgium and Holland.

In 1792, when French forces occupied Mainz, Forster, who had rallied to the cause of the French Revolution, won an appointment as the city's official representative to the National Convention, the French revolutionary government in Paris. He traveled to the French capital in March 1793, hoping to secure the annexation of Mainz into the newly established French Republic. Not only were his efforts unsuccessful, but also he soon found himself without adequate means of support. His poverty led to malnutrition, and, in January 1794, he died in Paris of scorbutic fever, a disease with SCURVY-like symptoms.

Georg Forster, along with his father, carried on the scientific work in the South Pacific begun by SIR JOSEPH BANKS and greatly inspired the subsequent explorations of Alexander von Humboldt.

Forster, Johann Reinhold (1729–1798)

German naturalist in the South Pacific, in service to Great Britain, father of Johann Georg Adam Forster

Johann Reinhold Forster was born at Dirschau in what is now northern Poland, the descendant of a Yorkshire family that had left England and settled in Prussia soon after the overthrow of Charles I in 1649. Although his primary interest was in natural history, he became a minister of the Reformed Church at his father's behest, heading a congregation at Nassenhuben, south of present-day Gdańsk.

In 1765, Forster went to St. Petersburg, where he took part in a Russian scientific expedition. The next year, he moved with his family to England; at Warrington, near Liverpool, he taught French, German, and the natural sciences.

With the help of geographer Alexander Dalrymple, Forster tried, without success, to secure an appointment with the BRITISH EAST INDIA COMPANY in 1770. In London over the next two years, he translated into English LOUIS-ANTOINE DE BOUGAINVILLE's account of his recent CIRCUMNAVIGATION OF THE WORLD.

In 1772, Forster sailed on the *Resolution* as the naturalist on JAMES COOK's second voyage of exploration to the South Pacific Ocean. Serving as his assistant on the expedition was his son JOHANN GEORG ADAM FORSTER. While en route to the Pacific, the elder Forster made a study of antelopes and seals around Cape Town, South Africa. Over the next three years, he collected specimens of plants and birds in NEW ZEALAND, Tahiti, and other South Pacific islands visited by Cook. In Australia, Forster made the earliest identification of the Australian sea lion; on Norfolk Island, between New Zealand and New Caledonia, he cataloged a previously unknown variety of palm tree. In the waters

around Antarctica, Forster collected specimens of the region's birds, among them the snow petrel and the king and emperor penguins.

By the time the expedition had returned to England in 1775, differences had developed between Forster and Cook over who would write the official account of the voyage. The British Admiralty interceded on Cook's behalf and forbade Forster from publishing such a work in England, although his son published an account, using some of his manuscripts. Forster soon returned to Germany and, at Göttingen, wrote an account in Latin of his scientific work while on Cook's second voyage. In 1778, Forster's *Observations Made During a Voyage Round the World* was published in England.

In 1780, Forster accepted an appointment from Prussian king Frederick II to become director of the botanical gardens at Halle and teach natural history at that city's university. His book covering the history of exploration in the Northern Hemisphere was published in 1787.

While with Cook on the 1772–75 voyage, Johann Reinhold Forster, in addition to his studies of wildlife, undertook some of the earliest oceanographic studies. In his experiments at sea, he revealed the disparity between surface and subsurface ocean temperatures and conducted deep-sea soundings in which he collected blue mud from the floor of the Pacific at depths of 4,200 feet. Forster also undertook some of the earliest research in comparative anthropology, becoming one of the pioneers of that discipline. He made studies on the various racial types of the South Pacific islanders, noting the differences between natives of Polynesia and Melanesia in both their physical traits as well as their cultures.

Foureau, Fernand (1850–1914) *French engineer in North and central Africa*

Fernand Foureau was born in Barbant, a town in west-central France. Trained as an engineer, he traveled to Algeria to take part in well-drilling projects in the SAHARA DESERT.

Starting in 1888, Foureau began to explore into the Algerian interior. On his eighth such expedition in 1895–96, he explored the desert region south of Biskra known as the Grand Erg Oriental. The next year, he went to Paris and succeeded in getting some support from the French government in the form of a military escort for a proposed railroad survey expedition from the Mediterranean coast of Algeria to Lake Chad on the northern edge of central Africa.

Known as the Sahara Mission, Foureau and his party, accompanied by a French military unit under a Major L. Lamy, left Ouargla, Algeria, in 1900 and made a north-to-south crossing of the Sahara, threading their way between the Tassili n' Ajjer and Ahaggar Mountains of southern Algeria, into present-day Niger. At Zinder, they went eastward to Lake Chad. At Kousseri, south of Lake Chad, the

expedition was attacked by Bornu tribesmen. Although the French drove off the attackers, Lamy was killed in the battle.

Before long, Foureau joined up with two other ongoing French expeditions, the Congo-Chad Mission and the Central African Mission. He then proceeded overland southward to the Hari and Ubangi Rivers, ultimately reaching the CONGO RIVER (Zaire River), which he followed to the Atlantic Ocean.

Fernand Foureau went on to become governor of Mayotte and the nearby Comoro Islands in the Indian Ocean, west of Madagascar. His 1900–01 expedition succeeded in traversing the Sahara, establishing direct overland communications links between French colonies in North and central Africa, and completing the mission begun by PAUL-XAVIER FLATTERS 20 years earlier.

Fowler, Jacob (Major Fowler) (1765–1850)

American fur trader, trapper, guide on the southern plains and in southern Rocky Mountains

Originally from New York, Jacob Fowler moved to the northeastern Kentucky frontier while in his early twenties, settling in Covington, just south of what is now Cincinnati, Ohio. Known as Major Fowler, he was an accomplished surveyor, and, in the years immediately before and after the War of 1812, he took part in U.S. government survey expeditions to the Great Plains and the foothills of the ROCKY MOUNTAINS, accompanied at times by his wife Esther.

Fowler, together with Cincinnati trader Hugh Glenn, undertook several supply expeditions to army posts in the Old Northwest, the upper Mississippi Valley, and the eastern edge of the southern plains. By 1821, Glenn had established a trading post near Fort Gibson in what is now northeastern Oklahoma, and, that year, he organized a fur-trapping and hunting expedition into the southern Rockies.

In September 1821, with Fowler as guide, Glenn and a party of 18 trappers and hunters set out from what later became Fort Smith, Arkansas. The Fowler-Glenn Expedition, as the venture was later known, followed the Verdigris River northward into present-day Kansas and, at the site of what is now Wichita, they headed westward along the Arkansas River across the Kansas plains, and into eastern Colorado. By November 13, they had reached the mouth of the Purgatory River, where one member of the party, Lewis Dawson, was killed in an attack by a grizzly bear. Soon afterward, they reached the Arapaho and Kiowa Indian settlements near what is now Pueblo, Colorado, where they planned to spend the winter.

At the end of December 1821, a group of Mexican traders visited the Fowler-Glenn encampment. They informed the Americans that, with Mexican independence declared earlier that year, they were now free to go southward

into the Taos region to pursue the FUR TRADE. Soon afterward, Fowler led the trappers through the Sangre de Cristo Mountains to Taos. Following a brief stay there, he and the group explored and trapped northward into the San Juan Mountains and the upper Rio Grande, as far as what is now Del Norte, Colorado.

Fowler and Glenn set out on their return trek across the southern plains in spring 1822. In Santa Fe, they joined up with another party of American traders under Thomas James, and the combined expedition headed eastward, south of the Arkansas River and the Santa Fe Trail, through the Chico Rico Mesa of eastern Colorado and along Two Butte Creek, reaching the Arkansas River on the present-day Colorado-Kansas stateline. In their eastward trek across Kansas, they made for the Whitewater and Verdigris Rivers, reaching the Missouri River at Fort Osage, near present-day Kansas City. The expedition arrived in St. Louis on July 17, 1822, having completed one of the first American fur-trapping forays into what was then Mexican territory.

The Fowler-Glenn Expedition of 1821–22 pioneered the route into Taos, New Mexico, through the Sangre de Cristo Mountains of southern Colorado, a pathway that came to be known as the Old Taos Trail. On the return journey, the expedition did not follow the Santa Fe Trail, but instead took a more direct route to the Arkansas River between the Cimarron Cutoff and Raton Pass. Along with WILLIAM BECKNELL and Thomas James, Jacob Fowler was one of the first American traders to enter the Mexican province of New Mexico in 1822, soon after it was opened to American trade. He led the first expedition known to have reached Pueblo, in present-day eastern Colorado, by way of the Verdigris and Arkansas Rivers, and also was one of the earliest Americans to explore the upper Rio Grande. The Old Taos Trail, which Jacob Fowler pioneered southward from Pueblo into Taos, did not become popular among trappers and traders until the 1840s. His account of the expedition into the southern Rockies was published in 1898 as *The Journal of Jacob Fowler*.

Foxe, Luke (Luke Fox) (1586–1635)

English mariner in Hudson Bay and the Canadian Arctic

Luke Foxe was born in Hull, a seaport on the northeastern coast of England. The son of a master mariner, he was largely self-educated, developing an early interest in the history of explorations into the Arctic regions.

Foxe became an accomplished seaman and coastal pilot, taking part in voyages between England and France. As early as 1606, he had become interested in the possibility of a NORTHWEST PASSAGE to the Orient. In 1629, with the help of SIR THOMAS ROE and a group of London merchants known as Trinity House, Foxe won the support of King Charles I for

a proposed voyage to HUDSON BAY in search of the Northwest Passage.

On May 5, 1631, Foxe's expedition left Deptford on the *Charles*, carrying a crew of 23 men and provisioned for an 18-month voyage. Anticipating that he would find a route to the Far East by sailing northwestward, he carried a letter from King Charles for the emperor of Japan. After sailing along the east coast of England, he arrived at the Orkney Islands, then headed westward across the North Atlantic Ocean, reaching Hudson Strait on June 22, 1631.

In his quest for the Northwest Passage, Foxe sailed along the west coast of Southampton Island, exploring a channel he dubbed Sir Thomas Roe's Welcome Sound, then headed southward along the west shore of Hudson Bay. In late August, at the entrance to James Bay, he encountered a rival expedition from Bristol, England, under the command of THOMAS JAMES. He conferred with James off Cape Henrietta Maria, then headed northward to complete his explorations. He entered the strait east of Southampton Island, later known as Foxe Channel, and surveyed the southeasternmost coast of Baffin Island, which he named "Fox His Farthest" (known later as the Foxe Peninsula). He explored north of Southampton Island into the Foxe Basin, almost as far north as the ARCTIC CIRCLE.

Although he was equipped with enough supplies to spend the winter in Hudson Bay, Foxe decided to head back to England when his progress northward was blocked by DRIFT ICE and his crew began to show early signs of SCURVY.

Foxe returned to England at the end of October 1631, after a voyage of six months, and without the loss of a single crew member. Nevertheless, some of his backers were less than pleased with the short duration of his expedition; in response, Foxe set down his findings in his account *Northwest Fox, or Fox from the Northwest-Passage*, published in 1635. The work summarized all known Arctic explorations up to that time and detailed the survey of the west shore of Hudson Bay, stating that no outlet suggested a passage to the Pacific. Considered a classic account of Arctic exploration, it includes observations on the northern lights, ice formations, and Arctic flora and fauna. It also reports on tides around Southampton Island, which indicated that a westward passage might exist north of Hudson Bay. The book also includes a circumpolar map by Foxe.

Luke Foxe's voyage of 1631, along with that of Thomas James that same year, confirmed that the west shore of Hudson Bay was continuous and did not provide an outlet to the west, a finding that discouraged further British maritime exploration of the Canadian Arctic over the next two centuries. Foxe is additionally credited with being the first mariner known to have used in his navigations the newly devised logarithmic tables of one of his patrons, English mathematician Henry Briggs.

Fraeb, Henry (Old Frapp) (unknown–1841)

American fur trader, mountain man in the Rocky Mountains

There are few details of Henry Fraeb's origins or life prior to 1826, except that he was probably a German or Dutch emigrant. That year, he was exploring and trapping the Great Salt Lake region of present-day Utah with JAMES CLYMAN.

In 1830, Fraeb entered into a partnership with THOMAS FITZPATRICK, JAMES BRIDGER, Milton Sublette, and Jean B. Gervais to purchase the ROCKY MOUNTAIN FUR COMPANY from JEDEDIAH STRONG SMITH and his associates. Over the next four years, he led the company's fur-trapping brigades into the ROCKY MOUNTAINS, ranging across a wide area of the West, from northwestern Idaho to northern Arizona.

Competition from JOHN JACOB ASTOR'S AMERICAN FUR COMPANY, as well as problems in obtaining supplies, led Fraeb and his partners to sell the company to WILLIAM LEWIS SUBLETTE at the 1834 fur traders' rendezvous at Hams Fork of the Green River in present-day southwestern Wyoming.

In 1837, Fraeb founded a fur-trading post on the South Platte in eastern Colorado known as Fort Jackson, which he sold the following year to CHARLES BENT and CÉRAN DE HAULT DE LASSUS ST. VRAIN. He joined with James Bridger, again in 1840, in a fur-trading enterprise into the Green River region of western Wyoming. The two mountain men founded a fur-trading fort on the west branch of the Green River. In summer 1841, while leading a brigade of his trappers southeast of the fort, Fraeb was killed in an attack by Cheyenne, Arapaho, and Sioux (Dakota, Lakota, Nakota) Indians.

Henry Fraeb, known by his contemporaries as "Old Frapp," worked alongside some of the most famous fur traders and MOUNTAIN MEN of the 1820s and 1830s. His own career as a mountain man and trapper in the Rockies coincided with the heyday of the fur trade in the West, and the trading posts he established in present-day Colorado and Wyoming went on to serve as important way stations for emigrant parties headed for California and Oregon.

Franchère, Gabriel (1786–1863) *Canadian fur trader in the Pacific Northwest*

Gabriel Franchère was a native of Montreal, Canada, and spent his early adulthood involved with his father's mercantile business. In 1810, he joined JOHN JACOB ASTOR'S fur-trading expedition to the Pacific Northwest.

Franchère and a party of nine VOYAGEURS, left Montreal in a birch-bark CANOE on the first leg of their voyage to the West. From the St. Lawrence River, they paddled and portaged southward by way of the Richelieu River, Lake Champlain, and the Hudson River, to Brooklyn and the port of New York. On September 6, 1810, Franchère and

his companions embarked from New York on Astor's ship, the *Tonquin*, and, after a seven-month voyage by way of the CAPE HORN route, along with ROBERT STUART, arrived on the Oregon coast in February 1811.

Franchère soon became one of the directors at Astoria, the fur-trading fort he helped establish near the mouth of the COLUMBIA RIVER. He acquired a knowledge of Indian languages and, after the post was sold to the British-owned NORTH WEST COMPANY in October 1813, he remained there for another five months, serving the new owners as an interpreter. Franchère left for the East in April 1814, traveling overland with a brigade of trappers. By the following September, he was back in Montreal.

Over the next 20 years, Franchère was the Montreal agent for the AMERICAN FUR COMPANY. In 1834, he was Astor's agent at Sault Sainte Marie in northern Michigan. Franchère lost his position when the American Fur Company went out of business in 1842. He then joined PIERRE CHOUTEAU, JR.'s firm in New York and took over that company in 1857.

Gabriel Franchère's account of his adventures in the Oregon fur trade, entitled *Narrative of a Voyage to the Northwest Coast of America in the Years 1811, 1812, 1813, and 1814 or the First American Settlement on the Pacific*, was originally published in French in 1820. In 1846, U.S. senator Thomas Hart Benton used translated passages from it to buttress his arguments for an American takeover of the Oregon Country. The English version of Franchère's book was published in 1854.

Francis Xavier See XAVIER, FRANCIS.

Franklin, Jane (Lady Franklin, Jane Griffin)

(1792–1875) *British world traveler, sponsor of expeditions to the Canadian Arctic, wife of Sir John Franklin*

Lady Jane Franklin was born Jane Griffin, the daughter of John Griffin of London, England. In the years before her marriage, she traveled widely with her father on trips throughout England and Europe.

She married British polar explorer SIR JOHN FRANKLIN on November 5, 1828. It was her first marriage and his second; his first wife, the poet Eleanor Anne Porden, had died three years earlier.

In the first years of her marriage, Lady Franklin traveled throughout Syria, Asia Minor (present-day Turkey), and Egypt, regularly joining up with Sir John, who was then in command of a British navy frigate in the eastern MEDITERRANEAN SEA. Starting in 1837, she resided for six years in Van Diemen's Land (present-day TASMANIA), while her husband served as the colony's governor. She campaigned for improved conditions for women convicts consigned to the

island's penal colonies. She also traveled to Australia and NEW ZEALAND.

In 1848, three years after Sir John had disappeared on his final polar expedition in search of the NORTHWEST PASSAGE, Lady Franklin offered a reward of £2,000 sterling for his rescue or for information about his fate. She also began to raise support for privately funded search expeditions, undertaken at times in conjunction with the British navy's relief efforts.

Lady Franklin gained the support of Henry Grinnell, a New York City businessman, who sent out an American search expedition commanded by EDWIN JESSE DE HAVEN in 1850.

Later, with her own funds, Lady Franklin organized a search expedition on the steam schooner *Isabel*. She had planned to send the *Isabel* into the Arctic by way of the BERING STRAIT but was unable to engage a crew for such a long and hazardous mission. In July 1852, the *Isabel*, under Captain Edward Augustus Inglefield, sailed to Greenland and Baffin Island, seeking traces of Franklin and his men and taking supplies to SIR EDWARD BELCHER's expedition, which was then involved in the British navy's search efforts in the Canadian Arctic. Inglefield and his crew searched the west coast of GREENLAND because of rumors that Franklin's expedition had been massacred by Inuit there. They explored Baffin Island, then entered Lancaster Sound in the Canadian Arctic, where they met up with Belcher. The expedition returned to England later in 1852 with little encouraging news about Franklin, although it had made some geographic findings in Smith Sound. She sponsored other expeditions as well during these years.

In 1854, when traces of the Franklin expedition were recovered by JOHN RAE of the HUDSON'S BAY COMPANY during an exploration of the Boothia Peninsula, Rae also heard reports from Inuit of their death. Yet Lady Franklin mounted another search effort for her husband. She outfitted the *Fox*, which sailed for the Canadian Arctic in 1857 under the command of SIR FRANCIS LEOPOLD MCCLINTOCK. After two icebound winters, McClintock and his command located places on King William Island and Beechey Island where the Franklin expedition had been more than 10 years earlier and found written accounts of what had happened to its members. He learned that Sir John Franklin had died in June 1847, and the other members of the expedition had most likely perished on their attempted southward trek to the Back River the following year.

For her efforts in support of polar exploration, and her commitment to discovering what had happened to her husband in the Canadian Arctic, Lady Jane Franklin was awarded the ROYAL GEOGRAPHICAL SOCIETY's Founder's Medal in 1860, the first woman ever to be so honored. Moreover, based on evidence recovered by McClintock, she established that before his death, her husband had proved



Lady Jane Franklin (Library of Congress)

the existence of a Northwest Passage between Bering Strait and Victoria Strait. In the 1850s, when the search efforts for her husband were at their peak, she continued to travel, visiting such widely diverse parts of the world as Japan and the American West. Along with the official search expeditions, those supported by Lady Franklin also made important discoveries regarding the geography of the islands and channels of the Canadian Arctic. The voyage of the steam schooner *Isabel*, which she financed in 1852, demonstrated the advantages of steam-powered navigation in the ice-choked waters of the Arctic Ocean.

Franklin, Sir John (1786–1847) *British naval officer in the Canadian Arctic, husband of Lady Jane Franklin, cousin of Matthew Flinders*

Sir John Franklin was born in Spilsby in Lincolnshire, England. He entered the Royal Navy at the age of 14, soon serving aboard the *Polyphemus* at the Battle of Copenhagen in April 1801.

Three months later, in July 1801, Franklin sailed from England as a midshipman on the *Investigator* under the command of his cousin, Captain MATTHEW FLINDERS. Over the next three years, he took part in the exploration of the western Australian coastline. On the continent's south coast, he traveled with Flinders and a small party to the head

of Spencer Gulf, where he officially claimed a large portion of what is now South Australia for Great Britain.

In August 1803, on the return voyage, Franklin was among the crewmen left on Wreck Reef Bank off the northeast coast of Australia. They were picked up by one of the relief vessels sent from Port Jackson, Australia; Franklin and most of the expedition reached England one year later. In late 1804, he returned to sea in Britain's naval war against Napoleon. He took part in the Battle of Trafalgar on the *Bellerophon* in October 1805. While serving on the *Bedford* off the coast of South America in 1808, Franklin was promoted to lieutenant. He also served aboard that warship in the Battle of New Orleans in January 1815.

In spring 1818, Franklin began his career as an Arctic explorer in a British navy expedition that attempted to sail from Spitsbergen (in Svalbard), across the Arctic Ocean, to the BERING STRAIT. In command of the *Trent*, Franklin sailed to Magdalenefjorden, on the northwest coast of Spitsbergen, accompanied by Captain DAVID BUCHAN, commanding the *Dorothea*. Both vessels were nearly crushed by PACK ICE. They became icebound, breaking free and returning to England after a voyage of only a few months. FREDERICK WILLIAM BEECHEY served as official painter on this expedition.

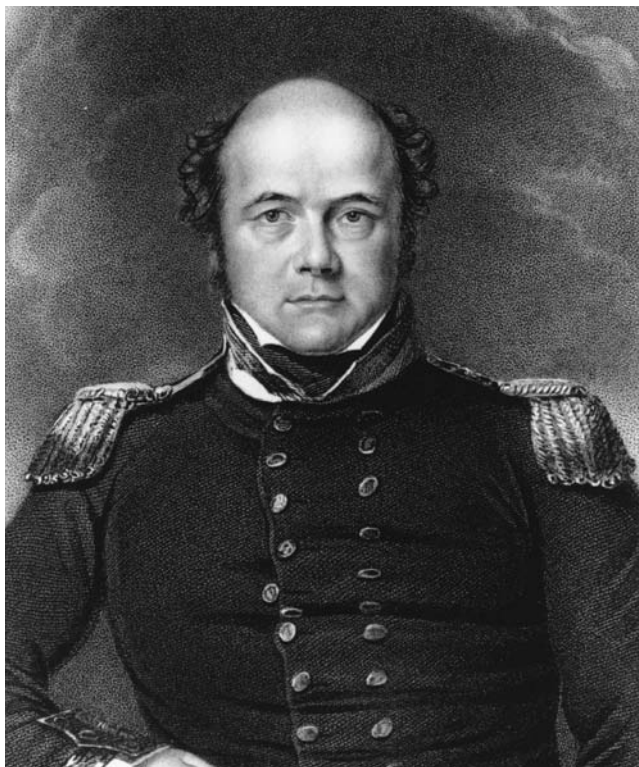
In 1819, the British navy put Franklin in command of an overland expedition to the Canadian Arctic to chart the north coast of North America in conjunction with a seaward search for the NORTHWEST PASSAGE. On May 23, 1819, he sailed from England on a HUDSON'S BAY COMPANY supply ship to York Factory on the southwest shore of HUDSON BAY. Joining him were midshipmen GEORGE BACK and ROBERT HOOD, along with naturalist SIR JOHN RICHARDSON. Franklin followed the overland fur traders' route to Great Slave Lake. North of Great Slave Lake, he established a base camp, Fort Enterprise, from which he set out in July 1821 to descend the Coppermine River. Traveling by CANOE and guided by Copper Indians under Chief Akaitcho, he came upon Bloody Falls, the site of an attack on Inuit by Chipewyan Indians under MATONABBEE, as recorded by SAMUEL HEARNE. They reached the Arctic Ocean, and, after determining the correct geographic coordinates of the mouth of the Coppermine River, set out to explore eastward, hoping to meet up with ships under SIR WILLIAM EDWARD PARRY and SIR JAMES CLARK ROSS, then on a planned voyage westward from Lancaster Sound.

Franklin and his expedition, which included about 20 VOYAGEURS hired from the NORTH WEST COMPANY and the Hudson's Bay Company, managed to explore the entire coastline of Coronation Gulf, as far as Bathurst Inlet. By the time they had reached Turnagain Point on the Kent Peninsula, supplies of food were running dangerously low. In addition, the canoes had become so damaged from traveling along the rough coast that they had to be abandoned.

With the approach of winter, and with no sign of Parry or Ross, whose ships had become icebound, Franklin was forced to head back overland across the Barren Grounds to Fort Enterprise. The return trek was fraught with hardships. Nearly half of the voyageurs died of starvation, and Franklin had one of them executed for killing Midshipman Hood, a crime in which cannibalism was suspected as a motive.

After wintering in the Great Slave Lake region, Franklin returned to Hudson Bay, then headed for England, arriving in fall 1822. He was promoted to the rank of captain and made a member of the ROYAL SOCIETY for his maps of unknown coastline in Arctic Canada. In August 1823, he married the poet Eleanor Anne Porden.

Franklin's second expedition to the Canadian Arctic set out from New York in spring 1825. Traveling overland, and accompanied by British naval personnel, as well as the fur trader PETER WARREN DEASE, he reached Great Bear Lake, on which he established Fort Franklin. In June 1826, again with Back and Richardson, Franklin descended the Mackenzie River to its delta on the Beaufort Sea. While Richardson led part of the group eastward to the mouth of the Coppermine River, Franklin and Back explored westward along the coast, hoping to meet up with a supply vessel under Captain Frederick William Beechey at Icy Cape on the north coast of Alaska. In the trek along Alaska's



Sir John Franklin (Library of Congress)

North Slope, fog and ice hampered progress. At Return Reef, after sighting and naming Prudhoe Bay, Franklin turned back. Meanwhile, Beechey and his ship were unable to proceed beyond Point Barrow, about 200 miles west of Prudhoe Bay.

Franklin, Back, and Richardson returned to England in September 1827. In his expeditions of 1819 and 1825, Franklin had charted most of the Arctic coast of the Canadian mainland. He recounted these exploits in his books *Narrative of a Journey to the Shores of the Polar Sea* (1823) and *Narrative of a Second Expedition to the Shores of the Polar Sea* (1828). In April 1828, Franklin was honored with a knighthood. In November of that year, he married his second wife, JANE FRANKLIN. He also received the gold medal of the Geographical Society of Paris that year.

Franklin returned to sea duty in command of the *Rainbow*, serving in the eastern Mediterranean from 1830 to 1834. In 1836, he was appointed governor of Van Diemen's Land (present-day TASMANIA), a post he held until 1843.

Back in England in 1844, Franklin accepted the British Admiralty's commission to lead a seaward expedition through the Canadian Arctic archipelago, and, by way of the Northwest Passage, to reach the Bering Strait. In command of the *Erebus*, he was joined by Lieutenant FRANCIS RAWDON MOIRA CROZIER on the *Terror*. They sailed from London on May 29, 1845. The ships were reported last seen in late July 1845, by a Scottish whaling vessel in upper Baffin Bay, west of GREENLAND, and near the approach to Lancaster Sound.

Concern began to mount in 1847, when no word of Franklin or his ships had been received in England. Search efforts were undertaken by the British navy: Ships were dispatched into the Canadian Arctic from the east and west, and overland expeditions were undertaken from the south. Over the next decades, numerous ships and nearly 2,000 men took part in the search. Among those involved were such leading figures of Arctic exploration as Sir John Richardson, Sir James Clark Ross, SIR JOHN ROSS, SIR RICHARD COLLINSON, SIR ROBERT McCLURE, EDWIN JESSE DE HAVEN, SIR EDWARD BELCHER, ELISHA KENT KANE, CHARLES FRANCIS HALL, and FREDERICK SCHWATKA.

In 1854, JOHN RAE of the Hudson's Bay Company, while exploring the Boothia Peninsula, recovered relics of the Franklin expedition from local Inuit, including silver dinnerware bearing Franklin's crest. In 1859, an expedition sponsored by Lady Jane Franklin and led by SIR FRANCIS LEOPOLD MCCLINTOCK found notes on King William Island and the mainland relating that Franklin had died on June 11, 1847, of natural causes, probably heart failure, aboard the *Erebus* while icebound in Victoria Strait.

Before Franklin's death, his ships had succeeded in navigating westward through Lancaster Sound, but progress in that direction had been blocked by ice in Barrow Strait. After a turn to the north into Wellington Channel, he had circumnavigated Cornwallis Island. He then had made his way southward through Peel Sound and what is now known as Franklin Strait, heading for the Boothia Peninsula and a possible ice-free channel to the west along the mainland. Late in 1846, the ships had become trapped in ice floes off the coast of King William Island in Victoria Strait. The notes also revealed that 23 other members of the expedition had succumbed to starvation and SCURVY by April 1848, and the surviving 105 crewmen had abandoned the ships and attempted to reach the mainland. All had subsequently perished, according to Inuit eyewitnesses, dying where they fell in their abortive attempt to reach the Hudson's Bay Company post, Fort Resolution, on the Back River. Skeletal remains of some of the crew were recovered on the Boothia Peninsula, with indications that the men had resorted to cannibalism in their last, desperate days.

Historians have speculated that the tragic end of Franklin's last Arctic expedition may have been caused in part by his mistaken belief that King William Island was a peninsula, as it was erroneously depicted on Sir John Ross's 1829 map of the Canadian Arctic. Ironically, the only ice-free channel around King William Island was to the south and east. Franklin, unaware that the strait existed, attempted to pass along the ice-choked west coast of the island, where his ship became trapped. The ensuing search for Franklin and his expedition resulted in major findings in the Canadian Arctic, including the successful negotiation of the Northwest Passage by Robert McClure in 1853–54. Nonetheless, based on evidence recovered by McClintock, Lady Franklin subsequently established that in entering Victoria Strait from the north and east, her husband had been the first to demonstrate the true location of the Northwest Passage. Arctic explorers continued to search for more clues to the fate of the Franklin expedition for decades, including aerial surveys of the King William Island and Victoria Strait region in the 1930s.

The British navy posthumously promoted Sir John Franklin to the rank of rear admiral in 1854, shortly after the end of the last official search effort. Franklin Island, a volcanic island in the Antarctic, was located and named in his honor by Sir James Clark Ross in 1841. At Prudhoe Bay, Alaska, which Franklin had first sighted in 1826, the largest reserve of petroleum in North America was discovered in 1968. Prior to Franklin's expeditions of 1819–22 and 1825–27, the only two charted points on the Arctic coast of North America were the mouths of the Mackenzie and Coppermine Rivers. Franklin's explorations resulted in new

geographic knowledge of territory between Hudson Bay and Point Barrow.

Fraser, Simon (1776–1862)

American-born Canadian trader in western Canada

Originally from Bennington, Vermont, Simon Fraser moved with his Loyalist family to Cornwall, Ontario, shortly after the American Revolution. In about 1793, he began working as a clerk for the British-owned fur-trading concern, the NORTH WEST COMPANY, and, by 1801, he had become one of the company's partners.

In 1805, Fraser traveled to Fort Chipewyan on Lake Athabasca, the North West Company's outpost in what is now northeastern Alberta. He was commissioned to establish fur-trading posts west of the ROCKY MOUNTAINS and to seek a river route to the Pacific Ocean.

Fraser followed the route of SIR ALEXANDER MACKENZIE and explored the upper reaches of the Peace and Parsnip Rivers into what is now western British Columbia. He crossed the Rockies and the Continental Divide and established settlements at present-day Hudson Hope, Fort St. James, and Stuart Lake. He became the first non-Indian to visit McLeod Lake; he also established the first non-Indian settlement west of the Canadian Rockies, Fort McLeod.

In 1808, Fraser explored from the Peace River to its confluence with the Parsnip River at the southern end of Williston Lake. He followed the Parsnip to what is now Prince George, British Columbia.

From Prince George, Fraser continued along a river he mistakenly believed was a tributary of the COLUMBIA RIVER, traveling south, then west. On July 2, 1808, he and his party of about 20 fur traders and VOYAGEURS reached the river's Pacific outlet at the Strait of Georgia near present-day Vancouver, British Columbia.

The Fraser River, as it came to be known (despite the fact that it was explored by Mackenzie in 1792–93), flows southward through British Columbia and is unnavigable until a point about 80 miles upriver from Vancouver. At one point, it cuts through a gorge whose rock walls are more than 3,000 feet high. Fraser called the region of central British Columbia "New Caledonia," because it resembled the lands of northern Scotland where his ancestors had lived.

After 1811, Fraser was assigned to the North West Company's trading posts near the Red River in southern Manitoba. In 1816, he was implicated in an attack on the HUDSON'S BAY COMPANY's post, Seven Oaks. Although acquitted of any wrongdoing, he retired from the FUR TRADE in 1820, spending the rest of his life in Ontario.

Fraser's explorations west of the Rockies opened British Columbia to the fur trade and to non-Indian settlement. Although he failed to find a route to the Columbia, he located a previously uncharted outlet to the Pacific. The Fraser River

became an important conduit for furs from the interior of British Columbia to the Pacific coast. In the mid-19th century, the Queen's Highway was built along the Fraser River Gorge to provide a wagon route to the goldfields of eastern British Columbia's Cariboo Mountains.

Freeman, Thomas (unknown–1821) *Irish surveyor, engineer in the American Southwest*

Born in Ireland, Thomas Freeman arrived in the United States in 1784. Although details of his early life and education are few, he apparently received extensive training as a topographical engineer and astronomer.

In March 1794, Freeman joined the federal survey team assigned to plot the boundaries of the newly established U.S. capital. By June 1795, he had completed a survey of the northern limits of Washington, D.C., establishing its boundary with Maryland. He next initiated the first topographic survey of the District of Columbia, leaving that project in July 1796 when appointed to survey the U.S. border with the Spanish-held territory to the west.

Joining Freeman in the project, and apparently in charge, was Andrew Ellicoot, with whom he left Washington, D.C., in mid-September 1796. They traveled down the MISSISSIPPI RIVER to Natchez, at that time part of Spanish territory, arriving in late February 1797. Disagreements developed between the two men during the downriver boat trip, reportedly stemming from Freeman's objections to a female companion Ellicoot had brought along on the expedition. Freeman also criticized Ellicoot's slow progress in getting the survey under way. Ellicoot, responding with accusations of his own, dismissed Freeman from the project.

Cleared of the charges lodged against him, Freeman returned to government survey work in 1804. That year, President Thomas Jefferson appointed him to lead an expedition to chart the Red River to its source and explore the headwaters of the Arkansas River. The United States had just purchased the Louisiana Territory from France, and the United States' border with Spanish territory to the west was in dispute, with Spain maintaining that it was determined by the Red River and the United States claiming all the territory up to the Rio Grande.

Reports of Spanish opposition to any American encroachment into territory west of the Red River delayed the start of Freeman's expedition until April 1806. He then set out from Fort Adams, in what is now southwestern Mississippi, with a party that included naturalist Peter Custis and a contingent of 34 soldiers under the command of Captain Enoch Humphreys. Freeman and his expedition traveled up the Red River in two flatboats, establishing diplomatic contacts with several Indian tribes. By mid-July 1806, they had reached a point near what is now Texarkana, Texas,

about 600 miles upriver from Fort Adams, where they were met by a large Spanish army from Texas. Unable to persuade the Spanish commander to allow them to continue, and outnumbered, Freeman withdrew, returning down the Red River to Fort Adams.

Freeman continued his survey work on the southern frontier in an 1807 expedition that mapped out the boundary between Alabama and Tennessee. The next year, he led an investigation of land speculators who were unlawfully encroaching on U.S. lands in the Southeast, and, in 1811, he accepted a federal appointment as surveyor of public lands south of Tennessee, headquartered at Washington, Mississippi, near Natchez. He held that post until November 1821, when he died suddenly while on government business in Huntsville, Alabama.

Thomas Freeman's 1806 expedition up the Red River coincided with other federally funded explorations then being undertaken in the North and West by MERIWETHER LEWIS and WILLIAM CLARK, as well as by ZEBULON MONTGOMERY PIKE. It was also the second attempt organized by President Jefferson to explore the newly established southwestern U.S. frontier along the Red River, an earlier expedition under SIR WILLIAM DUNBAR having also been turned back by Spanish forces. Although Freeman was unable to reach the source of the Red River, his explorations in 1806 yielded the first accurate map of the river's lower course, a region previously known only through the accounts of Spanish and French traders.

Frémont, John Charles (The Pathfinder)

(1813–1890) *U.S. Army officer, American surveyor, explorer in the American West, senator, territorial governor*

Born in Savannah, Georgia, John C. Frémont was the son of French-royalist émigré Charles Frémon and Virginia socialite Ann Beverly Whiting (the *t* was added to his last name by the late 1830s). After his father's death in 1818, he and his mother settled in Charleston, South Carolina. In 1829–31, Frémont studied science at the College of Charleston; because of a reported amorous escapade, he was expelled before his graduation.

In 1833, Frémont taught mathematics to naval cadets aboard the U.S. warship *Natchez*. In 1836, he engaged in a survey for the proposed Charleston & Cincinnati Railroad. During the same period, he also undertook a survey of Cherokee Indian lands in the western Carolinas.

In 1838, Frémont won an appointment as second lieutenant in the army's Corps of Topographical Engineers through the help of a family friend, U.S. congressman Joel Poinsett. He was assigned that same year as assistant to scientist JOSEPH NICOLAS NICOLLET. Nicolle's party started from Fort Snelling at the junction of the MISSISSIPPI RIVER and Minnesota River near present-day Minneapolis,

Minnesota. Traveling southwestward, they followed the Minnesota River to Red Pipestone Quarry in what is now southwestern Minnesota.

The next year, 1839, Frémont accompanied Nicollet on a topographic and scientific survey of the upper MISSOURI RIVER, from present-day Pierre, South Dakota, north to the Canadian border, then east to Lac Qui Parle, Minnesota, and back to the Mississippi. Nicollet's expeditions yielded the first accurate maps of the upper Mississippi and Missouri regions.

In 1841, Frémont commanded a detachment of the Corps of Topographical Engineers on an expedition that charted the course of the lower Des Moines River, flowing through what is now southeastern Iowa to the Mississippi. Frémont was in Washington, D.C., in October of that year and eloped with the daughter of Thomas Hart Benton, the influential Missouri senator with expansionist sentiments.

Through Benton's influence, Frémont, instead of Nicollet, was placed in command of a government-sponsored scientific and surveying expedition to the northern ROCKY MOUNTAINS in 1842. The objective of Frémont's first western expedition was to explore the region between the Missouri River and the Rockies and determine the exact longitude of the SOUTH PASS through the range along the Oregon Trail in what is now southwestern Wyoming. Frémont was also to survey the best sites for military posts. An expansionist faction in Washington, headed by Benton, also hoped to generate American settlement in the Oregon Country, which at that time was jointly held by the United States and Great Britain, by demonstrating an overland route to the Pacific Northwest.

Frémont and his party of about 21 Creoles and French-Canadian VOYAGEURS, plus the cartographer and artist Charles Preuss, left Westport, Missouri, on June 1, 1842. While traveling up the Missouri, Frémont met frontiersman CHRISTOPHER HOUSTON CARSON (Kit Carson) and hired him as a guide. The expedition reached the Kansas River, followed it for a distance, then crossed over to the Platte. In early July 1842, at the forks of the Platte near present-day North Platte, Nebraska, Frémont divided his men into two groups. Carson led most of the party up the North Platte River to Fort Laramie in what is now southeastern Wyoming. Frémont and four others explored the South Platte as far as Fort St. Vrain, not far from the site of present-day Denver, Colorado. Along the way, they sighted Longs Peak in the Colorado Rockies. He then headed northward to meet Carson and the rest of the men at Fort Laramie.

Despite reports of raids by Sioux (Dakota, Lakota, Nakota), Cheyenne, and Blackfeet war parties, Frémont led his expedition toward South Pass in August 1842. He reached the pass, then explored the headwaters of the Green River in what is now western Wyoming. Frémont turned eastward to explore the Wind River Mountains and

climbed one of that range's highest mountains, Frémont Peak, on August 15, 1842. Soon afterward, he began the return journey eastward by way of the Platte River to its outlet into the Missouri at Omaha. He reached Westport, Missouri, on October 1, 1842, then headed to Washington, D.C., where he and Preuss submitted their reports and maps of their expedition.

Frémont's mission on his next government-backed survey in the West was to complement the findings of CHARLES WILKES's 1838–42 explorations of the Pacific coast. He was also to penetrate into northern California and evaluate the status of American settlers living under Mexican rule, perhaps in anticipation of a planned move by the United States to acquire California from Mexico.

Frémont's party of 39 voyageurs, MOUNTAIN MEN, cartographers, and scientists left Westport in early May 1843. THOMAS FITZPATRICK was the chief guide for this expedition. The party traveled northwestward across Nebraska toward the Oregon Trail. Frémont wanted to find a route through the Rockies that was more southerly than the South Pass. Accordingly, he headed southward from the Oregon Trail to the Arkansas River, followed it for a time, then crossed over to Fort St. Vrain, which he reached in early July 1843.

Heading westward to Pikes Peak, Frémont encountered Christopher "Kit" Carson and again hired him as a guide.



John C. Frémont (*Library of Congress*)

Near Pueblo, Colorado, he sent Carson and some of his men to Bent's Fort for supplies. Fitzpatrick and another group headed northward to the South Pass, while Frémont went southward to explore for a new southern route through the mountains. This mission led him into the Medicine Bow Mountains of south-central Wyoming.

Frémont, unable to locate a pass through the Rockies, headed northward to rejoin Fitzpatrick and the others at South Pass. The group divided again at Soda Springs, Idaho. Frémont and his men proceeded southward to the Great Basin and the Great Salt Lake, which he explored in a rubber boat.

Frémont also explored the Uinta and Wasatch Ranges of Utah, then headed northward into what is now Idaho, rejoining Fitzpatrick and the rest of his party at Fort Hall. He followed the Snake River to the Columbia, then on to Fort Vancouver, opposite the site of present-day Portland, Oregon, where he obtained a map of the Great Basin from the HUDSON'S BAY COMPANY'S JOHN M'CLOUGHLIN.

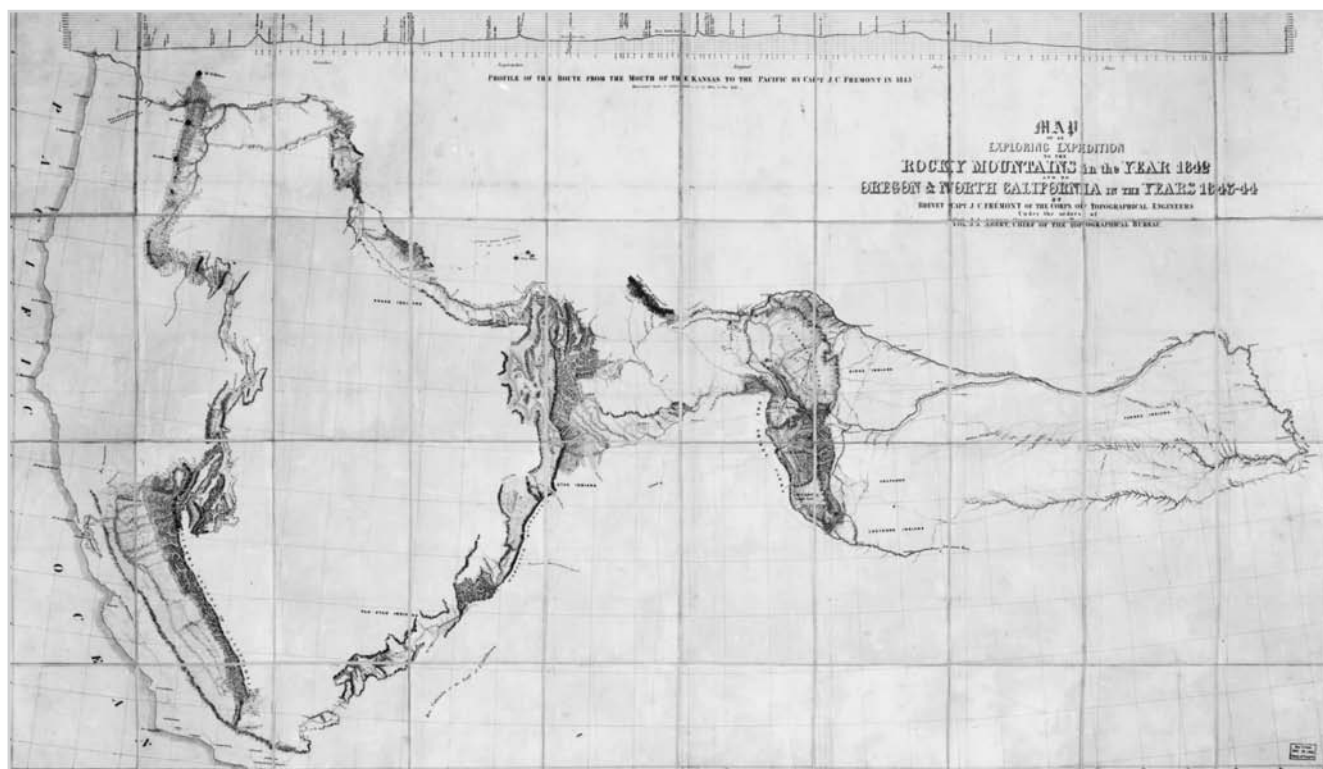
Frémont's party proceeded southward along the eastern slopes of the Cascade Mountains and entered northwestern Nevada, reaching Pyramid Lake on January 10, 1844. They camped near the site of present-day Reno, Nevada, then followed the Truckee River through the Sierra Nevada, crossing into California during severe snowstorms. Washo

Indian guides led them into the Sacramento Valley to Sutter's Fort on the American River.

In March 1844, Frémont led his men southward into California's San Joaquin Valley, then crossed the southern Sierra Nevada via the Tehachapi Pass. He followed the Old Spanish Trail across Nevada and the Great Basin region of western Utah, exploring Utah Lake and the Wasatch Mountains. On this leg of the journey, he located the Muddy Pass through the Rockies. He then headed southward around Pikes Peak to present-day Pueblo, Colorado, and followed the Arkansas River to Bent's Fort in southeastern Colorado, reaching it in July 1844. From there, he went to the Missouri River and returned to the East.

Frémont's third western expedition started out from Fort Leavenworth, Kansas, in summer 1845. It was part of Colonel STEPHEN WATTS KEARNY's military expedition to the southern plains. Frémont's contingent consisted of 62 men, including Kit Carson, artist EDWARD MEYER KERN, and mountain man JOSEPH REDDEFORD WALKER.

From Bent's Fort, Frémont traveled northward to the South Pass, then entered the Great Basin, reaching the Great Salt Lake. He used the Hastings Cutoff from Fort Bridger to Walker Lake in the eastern Sierra Nevada. Frémont and part of the group traveled northward to Pyramid Lake, crossed into California, and arrived at Monterey in fall 1845.



Detail of map of the Rocky Mountains by John C. Frémont (1842–44) (*Library of Congress*)

The Mexican authorities, suspicious of Frémont's presence, granted him permission to winter in the mountains above Salinas, but, in spring 1846, they ordered him to leave California. After a brief standoff with the Mexican army, Frémont headed northward into southern Oregon's Klamath Lake region. While there, he received orders from Washington, D.C., through an official messenger, Marine Lieutenant Archibald Gillespie, to return to California to oversee a possible revolt by American settlers.

In summer 1846, Frémont and his men played an active role in the Bear Flag revolt in northern California; they also became involved in securing California for the United States in the U.S.-Mexican War of 1846–48.

In January 1848, Frémont was court-martialed for disobeying orders while embroiled in a power struggle between Kearny and Commodore Robert Stockton in California. He was found guilty, but he was reinstated on orders of President James Polk.

Frémont resigned from the army in protest against the guilty verdict. He soon resumed his explorations of the West with private funding from Senator Benton and several St. Louis businessmen, who hoped to promote a central route for a proposed transcontinental railroad.

In October 1848, Frémont and a party of 35 men set out from Westport Landing (now in Kansas City, Missouri) to survey a route along the 38th parallel for the planned railroad from St. Louis to San Francisco. Accompanying the expedition were Edward Meyer Kern and his brothers, BENJAMIN JORDAN KERN and RICHARD HOVENDON KERN, who served as topographers, artists, and naturalists. Frémont and his party traveled westward along the Kansas River, then crossed southward to the Arkansas River, which they followed upstream into the Colorado Rockies.

By December 1848, Frémont had led his expedition as far westward as Pueblo in what is now central Colorado. From there, they traveled southwestward through the Sangre de Cristo Mountains by way of the Robidoux Pass, and entered the San Luis Valley, near the headwaters of the Rio Grande. He then pushed westward in search of a year-round pass through the San Juan Mountains. In order to find out if the route ahead through Wagon Wheel pass remained open even in the severest weather, he now intended to attempt a winter crossing of the mountains.

Frémont's guide was frontiersman WILLIAM SHERLEY WILLIAMS, who reportedly was familiar with the largely uncharted San Juan Mountains. While ascending the eastern slopes of the mountains, the expedition encountered a blinding snowstorm and became lost among the range's towering ridges. Unable to find shelter from the storm's hurricane-force winds, Frémont and his men were forced to turn back down the mountains and head southward to Taos. The retreat was disorganized, with Frémont reportedly leaving his men behind to find their own way to safety. Eleven of

them, one-third of the expedition, died in the extreme cold, high winds, and blizzard conditions on the trip down from the mountains. Eventually the survivors straggled into Taos in small groups a few days behind Frémont.

Among the survivors were the Kern brothers who, when they reached Taos, accused Frémont of abandoning them in the mountain snowstorm, and quit the expedition. The following March, Benjamin Kern and William Sherley Williams returned to the mountains to retrieve some papers and other items that had been left behind in December. En route, they were killed by a Ute war party.

Meanwhile, Frémont and his expedition, blocked by winter weather from continuing westward along the central route, traveled southward part way down the Rio Grande before heading westward again along a more southerly route. They followed the Gila River across present-day southern Arizona to the lower COLORADO RIVER, then continued across the Sierra Nevada to Los Angeles. Frémont then traveled back East to report to Benton that his expedition was a success, despite the disastrous outcome of his abortive attempt at a winter crossing of the San Juan Mountains. Benton would later cite Frémont's findings to support his call for the construction of a railroad through the southern Rockies.

In 1850–51, Frémont served as one of the first two U.S. senators from California. He conducted his fifth and final western exploring expedition in 1853. Again commissioned by Benton and his associates, he undertook another survey in support of the proposed western railroad route. From Kansas City, Missouri, he went westward to the Green River and Wasatch Mountains of present-day northern Utah. He then headed southwestward to Parowan in southwestern Utah, where he turned westward and, after traveling across the Great Basin of what is now central Nevada, crossed the Sierra Nevada into central California.

Frémont unsuccessfully ran for president in the election of 1856 as the first Republican Party candidate. In the early Civil War, he was commissioned a general and served as military commander in Missouri, also participating in the Virginia campaign. He left the army in 1862. In the ensuing years, he became involved in railroad and mining ventures in California. From 1878 to 1883, he served as territorial governor of Arizona. He died of ptomaine poisoning in 1890, while on a trip to New York.

John C. Frémont's western expeditions earned him the popular name the Pathfinder, even though, for the most part, he followed trails long established by Indians, Spanish missionaries, and mountain men. He contributed to the history of exploration through his extensive reports on geography as well as wildlife. He is credited with dispelling the notion that the Great Plains stretching from the Missouri River to the Rockies were a "Great American Desert," as reported earlier by STEPHEN HARRIMAN LONG. His report on the fertile regions of present-day Nebraska, Kansas, and Ok-

lahoma helped open that area to future agricultural settlement. Frémont also publicized an accessible route to California and Oregon, thus helping inspire the Great Migration of the early 1840s. His survey of Utah's Great Salt Lake region in 1843 came to the attention of Mormon leader BRIGHAM YOUNG, whose efforts prompted the settlement there of tens of thousands of Mormons after the U.S.-Mexican War of 1846–48. Frémont's wife, Jessica Benton Frémont, became a literary figure in the late 19th century. She is credited with editing Frémont's reports of his first two expeditions, published in 1845 by the U.S. government, entitled *Report of the Exploring Expedition to the Rocky Mountains in the year 1842, and to Oregon and Northern California in the Years 1843–44*.

Freycinet, Louis-Claude de Saulces de (Louis-Claude Desaulces de Freycinet)

(1779–1842) *French naval officer in the South Pacific*

Louis-Claude de Freycinet was born at Montelimar in southeastern France. In 1794, at the age of 15, he entered the French navy as a midshipman, serving with his older brother Louis-Henri de Saulces, baron de Freycinet, aboard the *Hepreaux*; he subsequently took part in engagements in the MEDITERRANEAN SEA in the course of the French Revolutionary Wars of 1792–1802.

Promoted to ensign in 1800, Freycinet sailed on the *Naturaliste* in NICOLAS BAUDIN's 1800–04 expedition to the coasts of Australia and TASMANIA. He was present at Dirk Hartogs Island on the west coast of Australia when a plaque left in 1697 by the Dutch navigator Willem de Vlamingh was discovered. In Sydney, Freycinet, having been appointed lieutenant commander, was put in charge of the *Casuarina*, a schooner, which he sailed to Kangaroo Island on the south coast of Australia, then to Île de France (present-day Mauritius).

Upon his return to France in 1804, Freycinet was given command of the *Voltigeur*, on which he served for a year before being transferred to the French navy's map and chart department. In 1811, soon after the death of FRANÇOIS PÉRON, he assumed the task of completing the naturalist's account of the Baudin voyage, which he completed in 1816 and published as *Journey to the Southern Lands*.

In August 1816, Freycinet first proposed his plan for a scientific voyage around the world to the minister of the navy. He planned to conduct experiments with an invariable pendulum at various locations around the globe to determine accurately the shape of the Earth. Studies of the flora and fauna of the South Pacific islands, as well as anthropological studies of the people of the South Pacific Ocean, were also planned. Within a few months, Freycinet won the approval of the newly installed French monarch, Louis XVIII,

who was eager to reestablish French prestige overseas in the wake of the 1815 defeat of Napoléon and the loss of most French colonial possessions.

In command of the *Uranie*, named in honor of the muse of music, astronomy, and geometry, Freycinet sailed from Toulon on September 17, 1817. Members of the scientific team included the artist and writer JACQUES ARAGO, hydrographer LOUIS-ISADORE DUPERREY, and naturalists JOSEPH-PAUL GAIMARD, CHARLES GAUDICHAUD-BEAUPRÉ, and JEAN-RENÉ-CONSTANT QUOY. Freycinet's wife, Rose Pinon de Freycinet, also was aboard, despite regulations to the contrary, having boarded the *Uranie* disguised as an ordinary sailor.

After stopping first at the CANARY ISLANDS and Rio de Janeiro, Freycinet reached Cape Town, where he met with the Russian expedition on the *Rurik* under the command of OTTO VON KOTZEBUE. He then headed eastward across the Indian Ocean, reaching the west coast of Australia at Shark Bay in September 1818. Some contact was made with the region's Aborigines. At Dirk Hartogs Island, Freycinet recovered the Dutch plaque he had located 15 years earlier with Baudin, intending to take it to France.

From Australia's west coast, Freycinet sailed northward to Timor and the Moluccas. En route, the expedition had a threatening encounter with Malay pirates, who were persuaded to withdraw without a violent confrontation. After exploring around the northern end of Timor, he sailed out into the Pacific, visiting the Carolines and Guam in the Marianas. In August 1819, the expedition reached the HAWAIIAN ISLANDS, where the Hawaiian king's prime minister, Kalanimoku, was baptized as a Christian, with Freycinet acting as godfather in the ceremony aboard the *Uranie*.

While sailing from Hawaii to southeastern Australia, Freycinet came across a previously uncharted island in the Navigators' Islands, which he named Rose Island in honor of his wife. It is now part of the territory of American Samoa.

In November 1819, Freycinet reached the port of Sydney, where expedition members set up an observatory; over the next three months, the scientific team conducted experiments in atmospheric refraction and terrestrial magnetism. The *Uranie* set sail for the homeward voyage in February 1820. Less than two months later, the ship encountered a hurricane as it approached Tierra del Fuego, and, driven into the Atlantic Ocean, it ran aground on a reef off the Falkland Islands. With the ship damaged beyond repair, Freycinet and his expedition were stranded near Penguin Island until picked up by a passing American vessel, the *Mercury*, two months later.

The *Mercury* took Freycinet and his party to Montevideo, where he purchased the ship from its captain, renamed it the *Physicienne*, and sailed with the expedition to France,

arriving at Le Havre in November 1820, completing a *CIRCUMNAVIGATION OF THE WORLD*.

Promoted to captain soon after his return, Freycinet set to work on what turned out to be a 13-volume account of his voyage plus four atlases. It was published over the next 24 years, the final volumes appearing posthumously in 1844.

Freycinet was a founding member of the Geographical Society of Paris in 1821; five years later, he was inducted into the French Academy of Sciences. He retired from the service in 1832 as director of the French navy's department of maps and charts.

Louis-Claude de Freycinet's 1817–20 expedition to the South Pacific was one of the great scientific voyages of the French Restoration era, as were the voyages of Duperrey and JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE. Among the many new species discovered by his scientific team was a freshwater fish with bulging eyes that slithered in the mud, which they named "Freycinet's mudskipper" in his honor. The plaque left by the Dutch navigator Vlamingh, which Freycinet took back to France in 1820, was returned to a museum in Perth, Western Australia, in the years after World War II. Rose de Pinon de Freycinet wrote her own account of the 1817–20 voyage around the world, first published in 1927.

Freydis See EIRÍKSDOTTIR, FREYDIS.

Fritz, Samuel (ca. 1659–1725) *Bohemian missionary in the upper Amazon Basin of Ecuador, Peru, and Brazil*

Samuel Fritz was born in the former kingdom of Bohemia, in what is now western Czech Republic. In 1685, having been educated by the Jesuits and ordained a priest, he traveled to Quito, then part of Peru, where he embarked on a career as a missionary to the Indians of the upper AMAZON RIVER.

Fritz spent a year studying at the Jesuit college at Quito, and, in 1686, he made an eastward crossing of the ANDES MOUNTAINS into the Napo River region of northeastern Peru. During the next three years, he explored down the Napo to its junction with the Amazon, making contacts and winning converts among upper Amazon tribes. In the region inhabited by the Omagua, he established the San Joachim mission, and then he founded another mission farther down the Amazon among the Jurimaguas.

Among the native peoples, Fritz earned a reputation as a champion of their welfare in his efforts against Portuguese slave hunters. In 1689, his health failed, and for medical attention he was taken 3,000 miles downriver to the mouth of the Amazon at Pará, arriving at the Portuguese settlement on September 11, 1689. Portuguese colonial officials in Pará,

suspicious of any travelers entering from the Spanish-held territory to the west, believed Fritz was a Spanish spy and held him prisoner for the next two years.

Released from custody in July 1691 on direct orders from the king of Portugal in Lisbon, Fritz was escorted back up the Amazon to his mission at San Joachim. In 1692, he set out to report on his Amazon explorations to Spanish colonial officials in Lima, Peru. After ascending the Huallaga and Parapura tributaries of the Amazon, he reached Cajamarca, then headed southwestward to Lima on the Pacific coast.

Fritz presented an account of travels in the upper Amazon to the Spanish viceroy at Lima, relating how the Portuguese were steadily encroaching up the Amazon into Spanish territory, beyond the boundary line established by the Treaty of Tordesillas in 1494. He returned to his missionary work on the Napo River in 1693, traveling widely on the Pongo, Jaen, and other Amazon tributaries, expanding his contacts with the Indians and acquiring knowledge of parts of the upper Amazon that had not yet been explored by non-Indians.

In the early 1700s, Fritz became the superior general for all the Jesuit missionaries on the upper Amazon. Over the next 10 years, he made frequent journeys between Quito and northeastern Peru. He became an accomplished carpenter and architect and directed the construction of church and mission buildings. Fritz also developed his skills as an artist, using his own religious pictures to decorate the churches he founded.

Starting in 1714, Fritz ventured into the lands of the Jívaro Indians of the Marañón River region of northern Peru, a tribe notorious for their raids on distant villages and their practice of ritualistic head-shrinking.

Father Samuel Fritz ended his work among the Jívaro in 1724. In his more than 40 years among the Indians of the upper Amazon and its tributaries, Fritz traveled through many regions largely unknown to the Spanish in Peru or the Portuguese in Brazil. His large-scale map of the Amazon River system, depicting for the first time the entire course of the great river, was reproduced at Quito in 1707. In 1743, 15 years after Fritz's death, French explorer CHARLES-MARIE DE LA CONDAMINE consulted this map while in Quito for his scientific voyage down the length of the Amazon.

Frobisher, Sir Martin (ca. 1535–1594)

English mariner in the Canadian Arctic

Martin Frobisher was born in Doncaster, near Wakefield, in Yorkshire, England, into a well-off country family. While he was still very young, his father died, and his mother sent him to be raised by his uncle, Sir John York, a London merchant who promoted trading voyages to the coast of Africa.

In 1553, through his uncle's influence, the young Frobisher joined a trading expedition to the coast of West Africa under the command of Thomas Wyndham. Frobisher was among the few survivors to return to England from the Gulf of Guinea, two-thirds of the men, including the commander, having succumbed to tropical fever.

In 1562, Frobisher served on another English voyage to West Africa, in which he was taken captive by Africans and turned over to the Portuguese. He eventually made his way back to England, where he became one of England's PRIVATEERS, preying on Spanish and French shipping. On one privateering voyage, he mistakenly attacked a ship carrying a cargo of wine to London, leading to a brief imprisonment in England.

In about 1570, while serving on blockade duty off the Irish coast, Frobisher befriended SIR HUMPHREY GILBERT, who had by then developed a theory regarding the NORTHWEST PASSAGE. Gilbert had concluded that North America was actually an island, which could be circumnavigated. He reasoned that the STRAIT OF MAGELLAN at the southern tip of South America had as its counterpart the STRAIT OF ANIAN across the top of North America, a passage that led to China, then known as Cathay. Gilbert, along with other geographers of the day, speculated that the Asian mainland extended eastward toward northernmost North America, and a Northwest Passage would therefore provide a far shorter route to Asia than either the CAPE OF GOOD HOPE or the Strait of Magellan.

Frobisher, with Gilbert's support and connections, including London merchant Michael Lok, organized an expedition to find the Northwest Passage. In the spring of 1576, Frobisher sailed from London for the Shetland Islands, in command of two small vessels, the *Gabriel* and the *Michael*, both equipped with the latest navigational instruments. A small sailboat known as a pinnace, also part of the expedition, was soon lost in heavy seas in the Shetlands. Frobisher on the *Gabriel*, accompanied by the *Michael*, then sailed north by northwest, to the east coast of GREENLAND. The captain of the *Michael* began to have doubts about the project, however, and slipped back to England.

Left with only the *Gabriel* and a crew of 18, Frobisher pushed on to the west, rounding the tip of Greenland, and came upon what he called Queen Elizabeth's Foreland, now known as Resolution Island, off the southeasternmost cape of Baffin Island. He headed northwestward, entering what he took to be a westward-leading strait and sailed northwestward through it. Frobisher was convinced that he had found the Strait of Anian, believing that the continent on his right was Asia, and the land on his left was North America.

Frobisher explored as far as Butcher's Island, about 180 miles above the mouth of what was later called Frobisher



Sir Martin Frobisher (New York State Library, Albany)

Bay, before he was turned back by ice floes. He encountered Inuit (Eskimo), with whom he traded. When five of his men went ashore and failed to return, Frobisher believed them kidnapped. He took an Inuit man hostage to force the return of the missing men, but without success. Severely shorthanded, he sailed back to England.

Frobisher reached London in October 1576. During the expedition, a landing party on an island at the mouth of Frobisher Bay had collected a small rock that seemed to be heavy enough to be a valuable metal, possibly gold. The ore sample was examined by assayers, and although it was actually pyrite, or FOOL'S GOLD, they erroneously identified it as gold. This announcement generated great support for Frobisher's second expedition the following year. In addition, the Asian appearance of the kidnapped man, who created a sensation before his death from illness, encouraged hopes that Frobisher had found a route to the Orient. A joint-stock company was formed called the CATHAY COMPANY, with an official charter from Queen Elizabeth I. The Queen, a major investor herself, provided a large naval vessel, the *Aid*, to accompany the *Gabriel* and the *Michael*. Frobisher was appointed as high admiral of the expedition, with a commission to govern all the uncharted lands he might locate in the name of the Crown.

In May 1577, from Blackwall near London, Frobisher and his fleet sailed northward to the Orkney Islands off the coast of Scotland, then headed westward for Greenland. Among the crew were miners recruited in Cornwall to recover the ore from the newly explored land, named *Meta Incognita* (destination unknown) by Queen Elizabeth. Frobisher's primary objective was to obtain a large amount of ore to bring back to England for refining, the search for the Northwest Passage now being of secondary importance.

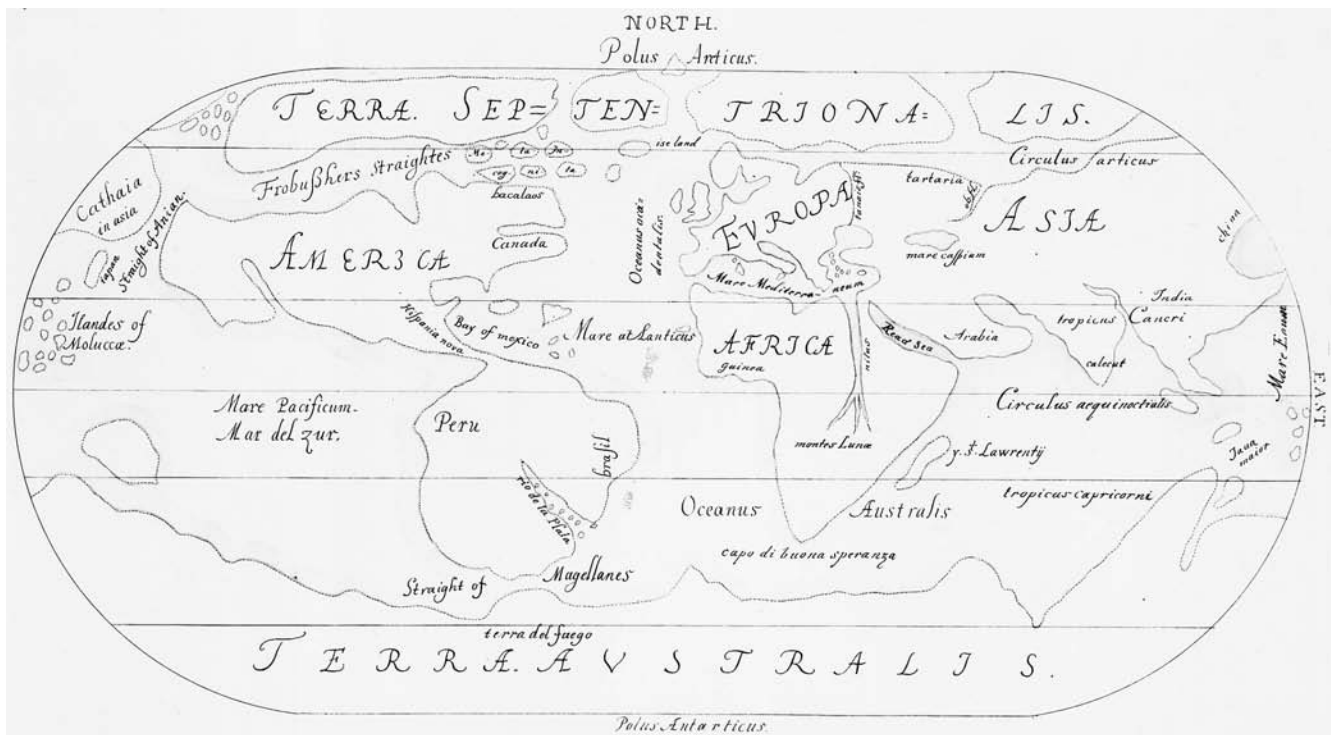
Frobisher's second expedition landed in Baffin Island's Frobisher Bay. In summer 1577, 200 tons of ore were loaded onto the *Aid*. He explored the islands at the mouth of the bay, claiming them for England and the queen. Three more captured Inuit were taken back to London in the fall—a man, a woman, and her infant child. In London, they demonstrated their skills, but all three died of European diseases within less than two months of their arrival.

A third expedition was planned for the following year, in which Frobisher was instructed to undertake some limited exploration for the Northwest Passage and establish a colony, as well as continue mining operations. Along with the three vessels of the 1577 voyage, he was given command of 12 other ships. Sailing on his flagship, the *Aid*, Frobisher and his fleet embarked from Harwich on the east coast of England in spring 1578. Heading westward from the north of Ireland, they made a landing on Greenland's south coast

in late June 1578, where Frobisher formally took possession of the region in the name of the queen, calling the land "West England." Although no subsequent English claim over southern Greenland was ever exercised, Frobisher's visit there was the first one known to have been made by Europeans since the days of the Vikings.

On reaching the entrance to Frobisher Bay, he found his way blocked by ice. The fleet, struck by gale-force winds, separated. Frobisher and the *Aid* were blown south and west into what is now Hudson Strait, which he subsequently explored westward during a period of three weeks. Reaching a point 200 miles west of the entrance to Hudson Strait, and just missing HUDSON BAY, Frobisher decided to head back to resume mining operations. He later called Hudson Strait, the passage he had been unable to explore thoroughly, the "Mistaken Strait."

By late July, Frobisher and the fleet had regrouped at the mouth of Frobisher Bay. The digging of the ore began, with over 1,300 tons being loaded on the ships and taken to England. One of his ships made a landing to the south, at the northern tip of Quebec's Ungave Peninsula. Winterlike weather arrived in late summer, and the bay started to freeze over. Frobisher abandoned the plans for establishing a colony when a ship carrying housing material and equipment for the proposed settlement struck an iceberg and sank. With the early onset of severe weather, Frobisher decided to call an end to the mining operations and return to England.



Map of the world by Sir Martin Frobisher (1578) (Library of Congress)

It was finally determined that the ore that Frobisher brought back from Baffin Island was pyrite with trace amounts of gold. Michael Lok, depending on the anticipated mineral wealth to cover his investment, was financially ruined and thrown into debtors' prison when the subscribers to the venture refused to honor their pledged support. The ore from Frobisher Bay was discarded in Bristol and later was used as paving stones.

Frobisher returned to privateering, joining SIR FRANCIS DRAKE in 1585 in raids on Spanish ships and ports in the WEST INDIES and on the north coast of South America. He took part in the battle against the Spanish Armada in the English Channel in 1588, for which he was honored with a knighthood. In 1592, he accompanied SIR WALTER RALEIGH in a raid on the coast of Spain. Two years later, while attacking the port of Brest, France, he suffered a wound in the leg, which became infected on the homeward voyage, causing his death soon after his arrival in Plymouth.

Sir Martin Frobisher undertook the first English voyage of exploration in search of the Northwest Passage. Although the gold rush he instigated led to financial disaster for many of his backers, his findings in the waters west of Greenland inspired the subsequent Northwest Passage expeditions of JOHN DAVIS and HENRY HUDSON. For the next three centuries Frobisher Bay was identified on Arctic maps as Frobisher Strait, bisecting the southeastern part of Baffin Island. Its true extent as a closed bay was determined in 1860 by American polar explorer CHARLES FRANCIS HALL, while searching for traces of SIR JOHN FRANKLIN's expedition. Hall also may have learned the fate of the five sailors kidnapped from Frobisher's 1576 expedition. From an old Inuit woman at Frobisher Bay, he was told a traditional story about the five whites who had been held captive until Frobisher had departed. They attempted to improvise a boat and sail away, but all froze to death before they could embark. George Best, who served as an officer on all three of Frobisher's Arctic expeditions, published his account, *The Three Voyages of Martin Frobisher*, in 1578. English artist JOHN WHITE, who subsequently took part in Raleigh's colonizing venture in Virginia in the 1580s, was with Frobisher on his second voyage in 1578, during which he produced the first European paintings of Inuit.

Fuca, Juan de (Apostolos Valerianos, Phokus Valerianatos) (1536–1602) *Greek mariner on the west coast of North America, in service to Spain*

Juan de Fuca was born in Valeriano, a village on the Ionian island of Cephalonia, off the west coast of Greece. Few details of his life are known before 1556, when, by his own account, he entered the service of Spain as a navigator and

pilot. For the next 40 years, he sailed the coastal waters of the Spanish possessions in the Americas.

Fuca claimed that he was directed by the Spanish viceroy of Mexico to undertake a voyage northward along the coast of California in an attempt to locate the STRAIT OF ANIAN, the fabled waterway that geographers believed provided a connection through the North American continent between the Atlantic and Pacific Oceans. In 1592, he followed the west coast of North America to a point lying between 47° and 48° north latitude, near the entrance to Puget Sound that now bears his name, where he reportedly located an eastward passage into the continent. He explored eastward into the strait until he reached what he identified as the "North Sea" (denoting either the Arctic Ocean or the North Atlantic), then headed back to the Pacific and returned to Mexico.

In 1596, Fuca's claims came to the attention of London merchant Michael Lok, who, 20 years earlier, had been one of the principal sponsors of SIR MARTIN FROBISHER's expeditions in search of the Northwest Passage. According to an account by 17th-century travel historian Samuel Purchas, Lok was in direct contact with Fuca in 1596 and believed that Fuca had explored the western outlet to the NORTHWEST PASSAGE sought by Frobisher in the late 1570s. He tried, without success, to raise English sponsorship for the Greek mariner to undertake additional explorations for the Strait of Anian. Fuca instead returned to his Greek homeland, where he spent his remaining years.

Juan de Fuca's explorations of the Pacific coast of North America are without documentation other than his own statements to Lok. Nevertheless, they inspired Spanish and English expeditions over the next two centuries, from SEBASTIÁN VISCAÍNO in the early 17th century, to JAMES COOK and GEORGE VANCOUVER in the latter part of the 18th century. In 1787, a Captain Charles William Barkley, while exploring along the coast of Vancouver Island, found a southern entrance to Puget Sound at the approximate location where Fuca had also reported an entrance in 1592, and named it the Strait of Juan de Fuca, by which it is known today.

Fuchs, Sir Vivian Ernest (Bunny Fuchs)

(1908–1999) *British geologist, explorer in Greenland, Africa, and the Antarctic*

Vivian "Bunny" Fuchs, born on the Isle of Wight, was the son of Ernest Fuchs, who had emigrated from Germany as a child, become a successful farmer, and married an Englishwoman, Violet Watson. He studied at the University of Cambridge, earning an M.A. degree in 1929. That same year, Fuchs served as geologist with the Cambridge East Greenland Expedition, headed by Sir James Wordie, who had accompanied SIR ERNEST HENRY SHACKLETON on the

Imperial Trans-Antarctic Expedition of 1914–16, when the ship *Endurance* was stranded in the Weddell Sea.

In 1930–32, Fuchs participated in Cambridge expeditions conducting survey, geological, and archaeological work in East Africa. In 1933, he headed an expedition to Lake Rudolf (Kenya). In 1935, he completed his doctoral thesis on the geology of the Rift Valley. The next year, he returned to Africa to study the geology of Lake Rukwa (Tanzania).

Fuchs was commissioned a second lieutenant in the British army in World War II and rose to the rank of major, serving in West Africa and northwestern Europe. In 1947, Fuchs directed the Falkland Islands Dependencies Survey, which included surveying Antarctica. In 1961, the project became known as the British Antarctic Survey, which he headed until his retirement in the 1970s.

Fuchs, as director of the survey, decided to revive Shackleton's plan of a crossing of the Antarctic continent and organized the Commonwealth Trans-Antarctic Expedition to be carried out in 1957 in connection with the INTERNATIONAL GEOPHYSICAL YEAR. In November of that year, after extensive training, Fuchs led a 12-member team, equipped with dogsleds and snow tractors, from Shackleton Base on the Weddell Sea. Meanwhile, SIR EDMUND PERCIVAL HILLARY headed a five-man team of New Zealanders who set up supply bases, traveling in the other direction from Scott Base on the Ross Sea. The two teams met at the U.S. station at the SOUTH POLE, Fuchs's group arriving on January 19, 1958, 15 days after Hillary's group. They then crossed to the Ross Sea together, arriving in March 1958. Fuchs's journey of 2,158 miles had taken 99 days. These were the first overland trips to the South Pole since the expeditions of ROALD ENGLEBREGT GRAVNING AMUNDSEN and ROBERT FALCON SCOTT in 1910–12.

Fuchs earned a knighthood in 1958. He also served in the International Glaciological Society, the ROYAL GEOGRAPHICAL SOCIETY, the British Association for the Advancement of Science, and the ROYAL SOCIETY. The Royal Geographical Society, which he headed in 1982–84, awarded him a Special Gold Medal for the trans-Antarctic journey. Fuchs's books include *The Crossing of Antarctica* (1960), which he wrote with Hillary; *Of Ice and Men* (1982), about the work of the British Antarctic Survey; and *A Time to Speak* (1985), his autobiography.

Fuchs's first wife, Joyce Connell, accompanied him on some of his expeditions to East Africa. In 1991, after her death the previous year, Fuchs married Eleanor Honnywill.

Sir Vivian Fuchs's trans-Antarctic crossing has been referred to as "the last great journey in the world." In addition to the expeditionary feat of traveling under extreme conditions, it contributed to knowledge of Antarctica through its scientific studies, which included experiments in seismology and gravity.

Furneau, Tobias (1735–1781) *British naval officer in the South Pacific and Antarctic*

Tobias Furneau was born at Swilly in Devon, England, not far from the port of Plymouth. In his early maritime career, he served in ships on the coasts of France and Africa and saw naval service in the WEST INDIES in 1760–63.

In 1766–68, Furneau served on the *Dolphin* under the command of his cousin, Captain SAMUEL WALLIS, traveling to the South Pacific Ocean and around the world. As a second lieutenant on the expedition, Furneau was the highest ranking officer fit enough to make an official landing on Tahiti on June 24, 1767, since Wallis and the other ranking officers were too ill to take part. He claimed Tahiti for Great Britain, naming it King George Island.

Back in England in 1771, Furneau was promoted to commander, and, the next year, he sailed with JAMES COOK's second expedition to the South Pacific as captain of the *Adventure*. In January 1773, along with Cook on the *Resolution*, he made the first crossing of the ANTARCTIC CIRCLE. Soon afterward, Furneau's ship was separated from Cook in the Antarctic ice and fog. Having arranged to meet up with Cook at Queen Charlotte Sound (Cook Strait) in NEW ZEALAND, he headed northward, touching first at TASMANIA.

Furneau's visit was the first European visit to Tasmania, then known as Van Diemen's Land, since the island's European discovery by Dutch navigator ABEL JASZON TASMANN in 1642. Furneau explored its south coast and reached Adventure Bay, naming it after his ship. Sailing northward, he attempted to determine if Tasmania were separated from the Australian mainland, incorrectly concluding that it was not.

Furneau and the *Adventure* met up with Cook and the *Resolution* in Queen Charlotte Sound, New Zealand, in May 1773. The two ships then made for Tahiti, where Furneau took aboard a Tahitian man named Omai, who wanted to visit England. After sailing to numerous South Pacific islands, the ships returned to New Zealand. In Queen Charlotte Sound, a storm drove them apart once again. Furneau, after searching in vain for Cook's ship, decided to sail back to England. Before embarking, he sent a 10-man landing party ashore on New Zealand to gather edible plants. When they failed to return, he sent out a search party, who discovered that the men had been killed and eaten by the Maori.

Furneau arrived back in England in July 1774, a year before Cook returned. He turned Omai over to the care of SIR JOSEPH BANKS; the young man subsequently made a sensation in London society, being the first South Pacific Islander to visit England.

Promoted to captain in 1775, Furneau took part in the British attack on the French at New Orleans two years later. He later returned to his home in Swilly, where he died in 1781.

Tobias Furneaux took part in the earliest British voyages to Tahiti. From his explorations of southern Tasmania in 1773, he produced the first charts of that part of the island and is credited with the European discovery of Adventure Bay. His mistaken conclusion that Tasmania was part of Australia was not rectified until the explorations of GEORGE BASS and MATTHEW FLINDERS in 1798. While cruising the various island groups of the South Pacific, Furneaux had

some success in his attempts to introduce domestic animals and European vegetables, especially potatoes, to the islands. On his third voyage of 1776–80, Captain Cook named the islands off the northeast coast of Tasmania the Furneaux Islands, in honor of the former captain of the *Adventure*. Cook also named a series of coral islets in the Low Archipelago after Furneaux.

G

Gagarin, Yury Alekseyevich (Yuri Alexeyevich Gagarin) (1934–1968) *Soviet cosmonaut, first human in space*

Yury Gagarin, the son of a Russian carpenter, was born in the Smolensk region west of Moscow in the former Union of Soviet Socialist Republics (USSR, or Soviet Union). He grew up on a collective farm, then studied at a manufacturing trade school in Lyubertsy and an industrial technical school in Saratov. While in Saratov, he joined a flying club and learned to pilot airplanes. Upon the recommendation of his flight instructor, he was recruited by the Soviet air force. In 1955–57, he attended the air force's cadet training school at Chkalov (present-day Orenburg), in Russia. Proving himself as a fighter and test pilot, he was selected to train as one of the first Soviet cosmonauts (*see* ASTRONAUTS).

Gagarin was selected for the VOSTOK PROGRAM's first mission just four days before the scheduled launch and was promoted to the rank of major. At 9:07 A.M., on April 12, 1961, with a shout of "*Poyekhali!*" ("Let's go!"), he took off from the Baikonur Cosmodrome and became the first human in space. After separation from the rocket, the capsule, controlled from Earth, circled the planet at an average altitude of about 150 miles in an elliptical orbit. The flight, consisting of one orbit, lasted 108 minutes. The capsule landed in a field near Saratov. Since the breakup of the Soviet Union, released documents indicate that Gagarin bailed out of the capsule at an altitude of about four miles and descended separately by parachute.

After the mission, Gagarin was appointed a deputy of the Supreme Soviet, awarded the Order of Lenin, and named Hero of the Soviet Union. In the ensuing years, he



Yury Gagarin (*Library of Congress*)

helped train other cosmonauts, including the first woman in space, VALENTINA VLADIMIROVNA TERESHKOVA. He eventually reached the rank of colonel. Gagarin served on the backup crew for the *Soyuz 1* mission of the SOYUZ PROGRAM and was a candidate for a planned lunar landing. He was killed in a MiG-15 plane crash near Moscow in 1968. The town of Gzhatsk, his birthplace, is now known as Gagarin; Gagarin Crater on the far side of the Moon and the Gagarin Cosmonaut Training Center at Star City also commemorate him.

Yury Gagarin's mission began the modern era of space flight with human participation. That and a subsequent Soviet mission in 1961, in which Gherman Titov remained in space for more than 24 hours, spurred the U.S. manned space program. Later in 1961, the Americans ALAN BARTLETT SHEPARD, JR., and Virgil Grissom each accomplished suborbital space flights, and in 1962, JOHN HERSCHELL GLENN, JR., became the first American to orbit the Earth.

Gaimard, Joseph-Paul (1796–1858) *French naval surgeon, zoologist in the South Pacific*

Joseph-Paul Gaimard was born in St. Zacharie, in the Provence region of southeastern France. He entered the French navy's medical service and served as assistant surgeon and zoologist in LOUIS-CLAUDE DE SAULCES DE FREYCINET's scientific voyage on the *Uranie*, sailing around the world in 1817–20.

On this expedition, Gaimard worked along with naturalist JEAN-RENÉ-CONSTANT QUOY in the study of marine and land animals. En route to Cape Town from Toulon, France, Gaimard obtained several giant albatrosses that had been following the ship, and, from his examination of the carcasses, determined what type of marine life they ate. At Shark Bay on the west coast of Australia, he collected several rare species of marsupials, including a kangaroo rat and a bandicoot. On Dorre and Bernier Islands at the mouth of Shark Bay, Gaimard and Quoy captured a striped kangaroo and several types of parakeets. Later in the voyage, while exploring Boni in the Moluccas and on Tinian in the Mariana Islands, Gaimard came upon a variety of chicken previously unknown to science, which he called megapodes. His work on the voyage also included a study of the birds in the HAWAIIAN ISLANDS. CHARLES GAUDICHAUD-BEAUPRÉ served as pharmacist and zoologist on this expedition.

Back in Europe in the early 1820s, Gaimard visited naval scientific teams in Holland and England. In 1826, he embarked on a second French scientific expedition to the South Pacific Ocean, as surgeon and naturalist on the *Astrolabe* under the command of JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE, working again with Quoy. Among the places visited on the three-year voyage was New Guinea,

where he obtained an Aru scrub wallaby, a type of kangaroo. In NEW ZEALAND, he made a study of marine animal life, including mollusks, and identified a type of dolphin unique to that region. He also collected birds in New Zealand, including a quail native to the islands as well as a new type of plover.

In November 1828, while the *Astrolabe* headed back across the Indian Ocean on its homeward voyage to France, Gaimard became ill with SCURVY and had to be left on the French island of Bourbon. After several weeks, he regained his health and secured passage to Marseilles on a French vessel, arriving in March 1829.

Gaimard concentrated on medical matters during the early 1830s. He took part in the French Academy of Sciences' study of an 1831–32 cholera epidemic in Central and Eastern Europe. He returned to other scientific work in an 1835–36 voyage to GREENLAND aboard the *Recherche*. In 1836, Gaimard was named president of the Scientific Commission of Iceland, and, over the next several years, he took part in scientific voyages to Scandinavia. He became a leading member of a French commission that promoted exploration of the Arctic and Antarctic regions in 1839. His published accounts of his scientific work and travels in Iceland, Sweden, and Spitsbergen (present-day Svalbard) first appeared in 1844 and 1847.

Joseph-Paul Gaimard took part in two of the major scientific expeditions undertaken by the French navy in the first part of the 19th century. The zoological work he undertook with Quoy on Dumont d'Urville's 1826–28 voyage brought back the largest collection of animal specimens from the South Pacific to reach France until that time.

Galaup, Jean-François de (comte de La Pérouse) (1741–ca. 1788) *French mariner on the coasts of Alaska and northeastern Asia and in the South Pacific*

Jean-François de Galaup, comte de La Pérouse, was born at his family's chateau near the southern French city of Albi. In 1756, at the age of 15, he became a marine with the French navy. Soon afterward, he took part in campaigns in the Seven Years War of 1756–63 on the east coast of North America. He was promoted to ensign in 1767; three years later, he was given command of his own ship. In the early 1770s, he served in the Indian Ocean in French naval operations off the east coast of India as well as in the waters off China.

La Pérouse took part in French naval actions against the British in the American Revolution. In August 1782, he commanded a small French fleet in HUDSON BAY, which captured and destroyed the HUDSON'S BAY COMPANY'S Fort Prince of Wales and York Factory. The governor of Fort Prince of Wales, SAMUEL HEARNE, was taken prisoner and transported to France; it was at La Pérouse's insistence that

Hearne's journal of his explorations in northwestern Canada was finally published.

In 1783, La Pérouse married Louise-Eleonore Broudou a Creole woman he had met while stationed at Île de France (present-day Mauritius) in the Indian Ocean eight years earlier.

By 1785, La Pérouse was recognized as one of the foremost naval commanders and navigators in France. That year, he was selected by King Louis XVI to lead a French scientific expedition to the Pacific Ocean. Louis, well acquainted with the voyages of JAMES COOK, wanted La Pérouse to complete the British navigator's work by exploring the western Pacific and continuing the search for the NORTHWEST PASSAGE on the coast of Alaska. He also directed La Pérouse to investigate the extent of Russian colonization on the northwest coast of North America, with the idea of expanding French fur-trading interests into the region.

La Pérouse's expedition was equipped with two former French naval storeships recommissioned as frigates: the *Astrolabe*, commanded by PAUL-ANTOINE-MARIE FLEURIOT DE LANGLÉ, and the *Boussole*, captained by La Pérouse. Among the crew was a complete scientific staff planning to undertake studies of geography, physics, and natural history. The British Admiralty provided La Pérouse with scientific equipment to measure variations in magnetic compass readings, and with the latest instruments for determining longitude.



Jean-François de Galaup, comte de La Pérouse (Library of Congress)

La Pérouse and his ships sailed from the port of Brest on August 1, 1785. After stopovers in the CANARY ISLANDS and on the island of Santa Catarina off the coast of Brazil, the expedition rounded CAPE HORN and entered the Pacific in April 1786. The ships visited Concepción, Chile, then sailed to Easter Island, where some of the scientific team made measurements of the island's mysterious ancient monuments. From there, the expedition headed northward across the Pacific, visiting Maui in the Hawaiian Islands.

La Pérouse then directed the ships for the coast of the Gulf of Alaska, reaching a point near Mount St. Elias on June 23, 1786. Sailing eastward along the coast, he located a previously uncharted inlet that he named Port des Français (present-day Lituya Bay). Although some effort was made to find a Northwest Passage linking the Pacific with Hudson Bay or the Atlantic Ocean, La Pérouse soon came to the same conclusion that Cook had in the previous decade, that no such waterway existed in those latitudes. The scientific team undertook studies on the formations of icebergs and made studies of marine life, especially whales. From Alaska, the expedition sailed southward along the North American coast to the Spanish settlement at Monterey Bay, California, arriving on September 14, 1786.

La Pérouse and his men remained in California for 10 days, then set sail across the Pacific. They reached the Portuguese colony of Macao, near Hong Kong, on January 2, 1787, where they sold a quantity of furs acquired in trade with Alaskan Natives. They also sent back some exceptionally fine pelts to the queen of France, along with geographic data and an account of the voyage to that point.

The expedition then embarked on an exploration of the western rim of the Pacific, sailing first to Manila in the Philippines, then to Formosa (present-day Taiwan) and the Ryukyu Islands, south of Japan. In the strait between Korea and Japan, La Pérouse verified the existence of Cheju Island, then explored Sakhalin Island, north of the Japanese island of Hokkaido. From accounts of the natives, he learned that Sakhalin was actually separated from the northernmost Japanese island and located a strait between them.

After visiting the Kuril Islands, La Pérouse entered the Sea of Okhotsk and sailed to the eastern Siberian port of Petropavlovsk on the Kamchatka Peninsula, arriving on September 6, 1787. An updated record of the voyage was sent back to France overland across SIBERIA with the expedition's interpreter, JEAN-BAPTISTE-BARTHÉLEMY DE LESSEPS, who reached Paris in mid-October 1788. While in Petropavlovsk, La Pérouse received word from France directing him to investigate a newly established British colony on the southeast coast of Australia.

From Kamchatka, La Pérouse continued his explorations into the western Pacific, attempting to locate the Solomon Islands, an archipelago that had been incorrectly charted by Spanish mariner ÁLVARO DE MENDAÑA in 1568

and misidentified by Dutch, French, and English navigators over the next two centuries. A landing was made at Tutuila in what is now American Samoa, where 12 of the crew were killed in a native attack. Among those killed were the commander of the *Astrolabe*, Fleuriot de Langlé, and one of the naturalists, Robert de Paul, chevalier de Lamanon.

La Pérouse made for Botany Bay, part of present-day Sydney, Australia, which he reached on January 26, 1788, just as the British were in the process of setting up their penal colony. While anchored in the harbor, several of the recently transported British convicts escaped and tried to seek refuge on La Pérouse's ships, but the French commander returned them to their jailers. Records of his voyage from Kamchatka to Australia were carried back to France aboard a British vessel.

La Pérouse sailed from Botany Bay on March 10, 1788, planning to explore the north coast of Australia around the Gulf of Carpentaria, and perhaps claim some of the island continent for France. It took years to find out what happened to the La Pérouse expedition after that date. In 1791, two years after his ships had failed to arrive in France in 1789 as planned, a search expedition, led by ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux, was sent to the Pacific but found no sign of the vanished expedition. It was not until 1828 that another French expedition, under JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE succeeded in locating relics of the *Astrolabe* near the Melanesian island of Vanikoro in the Santa Cruz group. It is believed that La Pérouse's ships were wrecked on the island's reefs, after which the survivors may have attempted to sail for Australia on a boat made from the wreckage, although no trace of La Pérouse or any of his men was ever found.

Comte de La Pérouse attempted to complete the extensive scientific exploration of the Pacific Ocean originally undertaken by James Cook. Because he sent back navigational and scientific data before the expedition disappeared, some of the results did manage to reach geographers in Europe. Among these was his finding that Sakhalin Island was separated from the northern Japanese island of Hokkaido; the channel between them was subsequently named La Pérouse Strait in his honor. His disappearance inspired a series of French search expeditions, which led to extensive exploration of the South Pacific. One small irony of history is that among the cadets who applied to join the voyage in 1785, but were rejected by La Pérouse, was a 16-year-old student of a Paris military academy named Napoléon Bonaparte.

See also SEARCHES FOR MISSING EXPLORERS.

Galinée, René de Brehant de See BREHANT DE GALINÉE, RENÉ DE.

Gallus, Gaius Aelius (fl. 20s B.C.) *Roman army officer in Egypt and Arabia*

Gaius Aelius Gallus was a Roman officer in Egypt soon after it was annexed by Rome under the emperor Augustus.

In about 25 B.C., Gallus left Cleopatra, a port on the site of present-day Suez at the northern end of the RED SEA, in command of an expedition to the land of Saba and its principal city, Marib, on the southwestern corner of the Arabian Peninsula.

The Sabaeans were the descendants of the people ruled in biblical times by the queen of Sheba. During the first century B.C., they were a major commercial power, acting as intermediaries in the spice and incense trade between India and Egypt. Geographically insulated on the Arabian Peninsula, they had never come under the influence of the Persian Empire to the east or the Roman Empire to the west. With the incorporation of Egypt into the Roman Empire, Roman domination of the Sabaeans became a prerequisite for the opening of direct trade contacts with the Orient.

Gallus led his expedition along the eastern bank of the Red Sea and, near the present northern border of the Yemen Arab Republic, headed inland to the Sabaean trade center at Marib.

Although unsuccessful in his attempt to subjugate the Sabaeans, Gaius Aelius Gallus managed to return to Roman Egypt with some new geographic knowledge about the territory east and south of the Red Sea, a region then largely unknown to the Romans.

Galton, Sir Francis (1822–1911) *British geographer, scientist in southwestern Africa, cousin of Charles*

Robert Darwin

Francis Galton was born in Sparkbrook, near Birmingham, England. He was a cousin of CHARLES ROBERT DARWIN. He studied medicine at General Hospital in Birmingham and at King's College in London, and mathematics at Cambridge University. On inheriting his father's estate, he was able to live the life of a country gentleman and travel casually in Europe, the Middle East, and North Africa as a tourist and hunter. In 1850, he decided to undertake an exploration to southwestern Africa and pursue geography in a scientific manner.

In 1850, Galton, accompanied by amateur naturalist Karel Johan Andersson, landed at Walvis Bay in present-day Namibia. His original intention had been to follow DAVID LIVINGSTONE'S route of the previous year north from Cape Town in the Cape Colony to Lake Ngami, but, because of unrest between Boer settlers and Bantu, he decided to approach from the west along the Swakop River. Galton and Andersson had contact with the Khoikhoi (called the Hot-tentots by European settlers) and at Otjimbingwe negotiated a peace with the chief Jan Jonker Afrikaner, preventing fur-

ther Khoikhoi raiding against European missions. Instead of continuing westward to Lake Ngami, they traveled from the region known as Damaraland northward into Ovamboland, mostly unexplored by Europeans, in the hope of reaching the Cunene River, which they failed to do. Galton returned to England in 1852, while Andersson stayed in Damaraland, operating a store at Otjimbingwe and continuing his studies in natural science. (He carried out later expeditions through the Kalahari Desert to Lake Ngami and to the Kubango River in Bechuanaland.)

Following a written report to the ROYAL GEOGRAPHICAL SOCIETY, Galton published an account of his trip for the general public entitled *Narrative of an Explorer in Tropical South Africa* (1853), which was widely read. The society awarded him a gold medal for African exploration. He also wrote *The Art of Travel, or Shifts and Contrivances Available in Wild Countries* (1855), a handbook for explorers. Galton later worked in a variety of disciplines: meteorology, statistics, psychology, fingerprint identification, and heredity, including a discipline he invented, eugenics. He was knighted in 1909.

Sir Francis Galton's contributions to the field of exploration include, in addition to his geographic studies in Africa and his book *The Art of Travel*, the pioneering use of weather maps based on the charting of air pressure data.

Gama, Vasco da (ca. 1460–1524) *Portuguese naval officer in the Indian Ocean*

Vasco da Gama was a native of Sines, a small seaport on the coast of southern Portugal; his father, Estevão da Gama, was the provincial governor. The younger da Gama went to sea at an early age and, while serving in the Portuguese navy, acquired a knowledge of mathematics and navigation.

Soon after BARTOLOMEU DIAS had rounded the CAPE OF GOOD HOPE in 1487, da Gama's father was chosen by King John II of Portugal to command a follow-up expedition to India. Portugal's internal political problems, along with conflicts with Spain, delayed the start of the voyage for almost a decade. News of CHRISTOPHER COLUMBUS's explorations of 1492–93, and the Treaty of Tordesillas of 1494, giving Portugal dominion over an eastern sea route to India, rekindled interest in the enterprise. In 1495, Manuel I became king of Portugal. With the death of the elder da Gama two years later, command of the expedition went to his son, by then a high-ranking naval officer and a member of the new king's personal staff.

Da Gama's fleet of four ships was constructed and outfitted under the supervision of Dias. Along with the flagship, the *St. Gabriel*, the expedition included the *St. Raphael*, captained by da Gama's brother Paolo; the *Berrío*, under the command of Nicola Coelho; and a supply vessel. Da Gama's chief pilot was Pedro de Alemquer, a veteran of Dias's voyage of 1487. The combined crews totaled about 170 men, in-

cluding a number of convicts who were taken along for deployment in especially hazardous situations.

Da Gama, at the rank of captain major, sailed with his fleet from Lisbon on July 8, 1497. After a stopover in the CANARY ISLANDS, he continued to the Cape Verde Islands. Dias served as his pilot for this initial leg of the voyage. Following instructions from Dias, da Gama sailed south and west from the Cape Verde Islands in order to avoid the DOLDRUMS in the Gulf of Guinea. His course took him within 600 miles of the coast of Brazil, where he picked up favorable winds. They carried him to the south coast of Africa at St. Helena Bay, about 125 miles north of the Cape of Good Hope.

In late November 1497, da Gama and his expedition rounded the Cape of Good Hope, landing on the south coast of Africa at Mossel Bay, where they claimed the territory for Portugal by erecting the traditional *PADRÃO*, or stone pillar. (He would erect four more on the expedition.) There his men made the earliest European contacts with the southern African people later identified by the Dutch as the Khoikhoi (Hottentot). At Mossel Bay, the supply ship's stores were distributed among the fleet, after which that vessel was dismantled.

By mid-December 1497, da Gama's expedition was sailing northward along the east coast of present-day South Africa, beyond the farthest point Dias had reached 10 years earlier. On Christmas Day 1497, da Gama sighted and named Natal.

In early March 1498, after exploring a river he called the Rio Cobre (the "copper river," after the copper ornaments worn by the region's natives), da Gama reached Mozambique, at that time the southernmost point of Muslim influence on the east coast of Africa. There he met armed opposition from Muslim rulers, who feared Portuguese intrusion into their trading empire. His men fought off attacks at Mombasa as well.

At Malindi on the coast of what is now Kenya, da Gama was well received by the local Muslim ruler, who hoped to forge an alliance against his enemies to the south. In Malindi, da Gama engaged one of the foremost navigators of the Indian Ocean at that time, an Arab seafarer named Ahmed ibn Majid. In just 23 days, Ibn Majid piloted da Gama's fleet across the Arabian Sea to southwestern India's Malabar Coast by way of the Laccadives Islands.

On May 20, 1498, da Gama arrived at the Indian port of Calicut. He attempted to establish relations with the local Hindu ruler, known as the Zamorin, but met opposition from Arab merchants who dominated the Malabar Coast cities. In addition, da Gama had taken mostly cheap trade goods to India, suitable for dealing only with the less sophisticated people of the west coast of Africa, and his attempt to do business in Calicut was met with derision. Nevertheless, after three months, he managed to obtain a modest shipment of pepper.



Vasco da Gama (Library of Congress)

Da Gama's return voyage from India to the coast of Africa took three times longer than the outward trip because of unfavorable winds. So many of his crew had succumbed to SCURVY by the time the expedition reached Malindi that da Gama decided to reduce the fleet and burned the *St. Raphael*. The expedition rounded the Cape of Good Hope again in late March 1499, then followed the coastline of West Africa for the remaining voyage to Portugal. Coelho and the *Berrío* arrived in Lisbon in July 1499. Da Gama meanwhile had sailed to the AZORES, seeking care for his brother Paolo, who had become ill on the homeward voyage. His brother soon died on Terceira. Da Gama reached Lisbon in early September 1499, where he was named admiral of the Indian Sea in recognition of his successful navigation of the sea route to India.

In 1502, following PEDRO CABRAL's 1500–01 voyage, Da Gama commanded Portugal's third major expedition to India. His new fleet numbered 20 ships, including squadrons under his uncle and nephew. He raided Muslim trading centers along the east African coast and undertook a campaign against Muslim shipping off the southwest coast of India. In one attack, the Portuguese captured and burned a Muslim ship, the *Meri*, killing more than 400 men, women, and children, mostly pilgrims returning from Mecca. After attacking Calicut with artillery, da Gama went

on to Cochin and brought that port under Portuguese control. On the return voyage along the east African coast, da Gama established Portuguese trading settlements at Sofala and Mozambique.

Back in Portugal by September 1503, da Gama was richly rewarded by the Portuguese government. In 1519, he was named Count of Vidigueira; five years later, he was appointed Portuguese viceroy of India. He sailed again to Cochin, but he died there soon after his arrival in December 1524. His body was sent back to Lisbon. His son, Cristoval da Gama, subsequently participated in Portuguese campaigns in East Africa, supporting the Ethiopian Christians against the Muslims.

Vasco da Gama commanded the first European expedition to reach India by sea, the successful realization of a plan initiated more than 70 years earlier by HENRY THE NAVIGATOR, prince of Portugal. He also pioneered the sea route to the Orient by sailing far to the west before rounding the Cape of Good Hope. On that leg of the voyage, the expedition was out of sight of land for more than 13 weeks, much longer than Columbus had been on his first voyage, and probably the longest stretch of open-sea sailing undertaken by Europeans until that time. The lack of adequate fresh food supplies also led to an outbreak of scurvy at sea. By rounding southern Africa, da Gama showed that the In-

dian Ocean, with an outlet to the Atlantic Ocean, was not a landlocked sea as many European geographers believed. Da Gama's first voyage of 1497–99, which covered 24,000 miles, took the first European ships into the Indian Ocean. On his second expedition to India, he left behind the first permanent European naval force in Asian waters. Commercially, da Gama's expeditions had a profound impact in Europe. Lisbon became a center of the SPICE TRADE, especially in pepper, becoming more important than Venice. In the years that followed, Portugal established an overseas empire that dominated trade in East Africa, the southwestern ports of India, and present-day Indonesia. Da Gama's first voyage was the subject of the Portuguese epic poem, *Os Lusíadas* (*The Lusíads*), by Luíz Vaz de Camões, published in 1572.

Gamboa, Pedro Sarmiento de See SARMIENTO DE GAMBOA, PEDRO.

Garay, Juan de (ca. 1528–1583) *Spanish conquistador, colonial leader in Peru, Bolivia, Paraguay, and Argentina, father-in-law of Hernando Arias de Saavedra*

Juan de Garay traveled to Peru in 1544, as a teenager, accompanying the royal viceroy Blasco Núñez Vela and helped repress the colonial revolt led by GONZALO PIZARRO, which lasted until 1548.

In the early 1560s, Garay helped found Santa Cruz de la Sierra in Upper Peru (present-day Bolivia). Threats from the indigenous population and lack of food supplies prompted Garay to lead Spanish settlers to Asunción, in present-day Paraguay, in 1568. Five years later, he sought a route from there through the Paraná Valley to the Pacific Ocean.

In the 1570s–80s, Garay served as lieutenant governor of the provinces of the Río de la Plata. In 1573, he founded the settlement of Santa Fe, in present-day Argentina, and, in 1580, he founded Buenos Aires for the second time (the original settlement of 1536 had been abandoned in 1541). That same year, Garay explored the coast around Mar del Plata to the south of Buenos Aires in the hope of finding the fabled native city of LOS CÉSARES, rumored to contain precious metals and jewels. Three years later, he was killed by Indians at the confluence of the Carcarañá and Coronada Rivers.

Juan de Garay, as a military leader and colonizer, helped open up central South America to Spanish settlement. His son-in-law, HERNANDO ARIAS DE SAAVEDRA, continued his efforts and reorganized and expanded the Spanish colonies.

Garcés, Francisco Tomás Hermenegildo (1738–1781) *Spanish missionary in the American Southwest* Francisco Garcés was born in Villa Morata del Conde in the Aragón region of northeastern Spain. At the age of 16, he entered the Franciscan order, and nine years later, in

1763, he was ordained a priest. That year, he traveled to Mexico to study at the College of Santa Cruz de Querétaro.

In 1768, soon after the Jesuits were expelled from New Spain, Father Garcés began his missionary work among the Indians at the mission of San Xavier del Bac, near present-day Tucson, Arizona. Later that year, he set out on a series of explorations along the Gila River and COLORADO RIVER to the lands of the Pima (Akimel O'odham) Indians. In 1771, he traveled westward to the Yuma Indian villages on the COLORADO RIVER. From there, he explored the northernmost mountains of Baja California, then traversed the deserts of what is now southern California, as far as the San Jacinto Mountains, near present-day Palm Springs, California.

In 1774, Garcés and Friar Juan Díaz joined JUAN BAUTISTA DE ANZA, commander of the Spanish garrison at nearby Tubac, in an expedition intending to establish an overland route to the Spanish settlements in California. They set out from Tubac on January 8, 1774, accompanied by a small military escort. They crossed the Colorado near its junction with the Gila River, and, continuing westward, made the European discovery of the Cocopas Mountains, which they crossed. On March 22, 1774, Anza, Garcés, and the others arrived at the San Gabriel mission, not far from present-day Los Angeles.

The next year, Garcés accompanied Anza on his large-scale colonizing expedition from Tubac. At the confluence of the Gila and Colorado Rivers, he separated from the main party. Exploring on his own, he descended the Colorado River to its mouth, then traversed the Mojave Desert and the San Bernardino Mountains to the San Gabriel mission. From there, he attempted to blaze a trail overland to Monterey on the Pacific coast. After passing through present-day Bakersfield, California, he reached as far as Tulare Lake, where he decided to head back eastward to the Colorado, hoping to win converts among the Hopi Indians of what is now northern Arizona.

Garcés established initial contacts with the Hopi Indians, then returned to the San Xavier del Bac mission by way of the Colorado and Gila Rivers. In 1776, he set out again for the land of the Hopi, this time planning to reach the region from the west. He ascended the Colorado River to the Mojave Indian villages near present-day Needles, California, where he engaged several Indian guides, who led him eastward across what is now northern Arizona, until he came upon Cataract Canyon, not far from the Grand Canyon. Following a narrow trail that appeared to be carved into the canyon's wall, he made a dangerous descent to the floor of the canyon, and there came upon the Havasupai Indians, a tribe unknown to the Spanish. Garcés stayed with the Havasupai for five days, after which the Indians guided him out of Cataract Canyon by a less hazardous route, leading him to a point near the southern rim of the Grand Canyon. Soon afterward, he saw the Grand Canyon itself, then headed

eastward into the country of the Hopi in the Little Colorado River region.

In 1780, Garcés returned to the Yuma villages on the Colorado, near the site of the future Fort Yuma, California, where he established the mission of La Purísima Concepción on the California side of the river. Relations with the Yuma began to deteriorate when presents, which Garcés had promised, failed to arrive. In spring 1781, Spanish settlers began coming to the mission, which also included a garrison, as well as provisions for a settlement, or pueblo. The influx of the settlers further antagonized the Indians, who, on July 17, 1781, rose up against Garcés, his church people, and the military detachment. Garcés was clubbed to death. The Indian uprising effectively shut down direct overland communication between Spanish settlements in California and those in present-day Arizona, New Mexico, and northern Mexico for the next 40 years.

Father Francisco Garcés was the first European to cross the San Bernardino Mountains of southern California. On his 1776 explorations into what is now Arizona, he was the first non-Indian to see the Grand Canyon since 1540, when GARCÍA LÓPEZ DE CÁRDENAS and his men had come upon it in conjunction with the expedition of FRANCISCO VÁSQUEZ DE CORONADO. After Garcés, the next recorded sighting of the Grand Canyon was in 1857–58, when it was explored by JOSEPH CHRISTMAS IVES of the U.S. Army Corps of Topographical Engineers. Garcés's journals of his travels and experiences in the American Southwest were edited by Elliot Couse and published in 1900 as *On the Trail of a Spanish Pioneer*.

García, Alejo (Aleixo García) (unknown–ca. 1526)
Portuguese castaway, explorer along the Paraguay River in South America

Portuguese-born Alejo García is thought to have been a member of the 1515–16 expedition of JUAN DÍAZ DE SOLÍS and one of the castaways following a shipwreck along the Brazilian coast on or near the island of Santa Catarina. He married a native woman and had a child by her.

At some point between 1522 and 1526, García reportedly made a journey inland in search of a “White King” who ruled over mountains of silver. With other Spanish castaways and a force of Indians, he reached the Paraguay River north of present-day Asunción, in Paraguay, and followed it as far as the foothills of the ANDES MOUNTAINS in what is now Bolivia, the domain of the Inca Indians. There, from unknown peoples, the Spaniards plundered a small amount of silver. García was killed on the return journey or soon after his arrival back on the coast. SEBASTIAN CABOT, who had landed on the estuary of the Río de la Plata in 1526, heard reports of García's exploits and obtained some of the booty. As a result, he abandoned his plans to continue from South

America to the Orient and spent three years looking for the legendary White King.

Alejo García's adventure, along with that of one of Cabot's lieutenants, Francisco César, contributed to growing myths of wealthy native kingdoms in South America, such as LOS CÉSARES, prompting further explorations of the Río de la Plata and the Paraguay and Paraná Rivers. The similar legend of EL DORADO also inspired expeditions into the next century.

Gardar Svarsson See SVARSSON, GARDAR.

Garnier, Marie-Joseph-François (Francis Garnier) (1839–1873) *French naval officer, colonial officer in Southeast Asia*

Francis Garnier was born in St.-Étienne, in the upper Loire Valley of southeastern France, the son of an army officer. He joined the French navy and, as a young officer in 1861, took part in the French conquest of what is now southern Vietnam. The next year, he was named governor of Saigon, present-day Ho Chi Minh City.

While serving in the French colonial administration of what was then Cochín China, Garnier sought government backing for an expedition to explore up the Mekong River to determine if it could be used as a trade route into the southwestern Chinese province of Yunnan to the north. The French colonial office agreed to his proposal and appointed Garnier as the expedition's inspector of indigenous affairs and second in command under ERNEST-MARC-LOUIS DE GONZAGUE DOUDART DE LAGRÉE, a veteran explorer of the Mekong River and Cambodia.

Garnier embarked upriver from Saigon with the Mekong Expedition in June 1866. While Doudart de Lagrée and the rest of the party proceeded into Cambodia and Laos, Garnier, accompanied only by one other French member of the expedition, explored separately into northeastern Cambodia, descending the Mekong's rapids in that region, then traveling overland 500 miles to the site of the ancient Khmer ruins at Angkor in western Cambodia.

Garnier returned to Laos, subsequently rejoining Doudart de Lagrée and the rest of the expedition farther up the Mekong in southwestern China's Yunnan province in late 1867. By this time, Doudart de Lagrée had fallen seriously ill with amoebic dysentery. Garnier meanwhile explored the upper Red River to see if it could be used as a commercial route southward to Hanoi.

Garnier assumed command of the Mekong Expedition when Doudart de Lagrée died at Tungchwan in March 1868. Instead of returning by the route they had come, he led the party from the upper YANGTZE RIVER (Chang), known in Yunnan as the Kinsa, downriver and eastward

across southwestern China to the port of Shanghai, from where they returned to Saigon in June 1868.

Garnier was back in Europe in 1870. That year, Great Britain's ROYAL GEOGRAPHICAL SOCIETY awarded him a medal in recognition of his explorations, which had yielded detailed geographic information about 3,100 miles of previously uncharted territory along the Mekong, Yangtze, and Red Rivers. He subsequently served in the Franco-Prussian War of 1870–71, taking part in the defense of Paris.

At the war's end, Garnier returned to the Far East, where he traveled into the interior of China in search of the source of the tea and silk trade, as well as a possible river route between Tibet and China. In 1873, in conjunction with JEAN DUPUIS's unauthorized Red River expedition, he took part in a military campaign against the kingdom of Tonkin in what is now northern Vietnam. He commanded French colonial forces in an action that temporarily brought the Red River delta near Hanoi under French control. After battling Chinese pirates in the Gulf of Tonkin, Garnier was killed in a skirmish outside Hanoi in December 1873. His account of the Mekong Expedition of 1866–68 was published in Paris in 1885 as *Voyage d'exploration en Indo-Chine* ("Journey of Exploration in Indo-China").

Francis Garnier's explorations with Doudart de Lagrée on the Mekong River in 1866–68 took him into remote parts of Southeast Asia seldom visited by Europeans. On the return journey, he charted portions of the upper Yangtze River that had not been visited by Europeans since the 13th-century travels of MARCO POLO.

Gaudichaud-Beaupré, Charles (1789–1854)

French naturalist in Australia, the South Pacific, and South America

Charles Gaudichaud-Beaupré was born in the city of Angoulême in western France. After studying botany at the Museum of Natural History in Paris, he joined the French navy's medical service, serving as a pharmacist at Antwerp from 1811 to 1814.

In 1817, Gaudichaud-Beaupré was recruited by LOUIS-CLAUDE DE SAULCES DE FREYCINET to serve as the pharmacist and botanist on a scientific voyage to the South Pacific Ocean aboard the *Uranie*. JOSEPH-PAUL GAIMARD served as assistant surgeon and zoologist. During the next three years, he collected thousands of live plants and a large number of dried plant specimens from a wide area of the Pacific, ranging from the west coast of Australia to the HAWAIIAN ISLANDS. On Dorre and Bernier Islands at the mouth of Western Australia's Shark Bay, he discovered a previously uncataloged type of shrub, which he named the Keraudren, after a French naval medical officer who had assisted in organizing the expedition.

In October 1818, while examining the flora on Timor in what is now Indonesia, Gaudichaud-Beaupré found a climbing species of the screw pine shrub unknown to science, which he named the freycinetia, after the expedition's commander. In his subsequent botanical investigations in the Hawaiian Islands the following August, he found a type of sandalwood tree, new to science, which he also named in honor of Freycinet, dubbing it *Santalum freycinetiana*.

On the homeward voyage, the *Uranie* stopped at Sydney, Australia, where Gaudichaud-Beaupré had the opportunity to explore the BLUE MOUNTAINS for botanical species. When the ship was subsequently wrecked in the Falkland Islands in February 1820, he managed to save most of his collection of dried plants. Before the party was rescued by a passing American ship two months later, he undertook a survey of the plant life of the Falklands, collecting several hundred species. In 1825, Gaudichaud-Beaupré published his botanical study of this South Atlantic Ocean island group, entitled "Flora des îles Malouines" (Flora of the Falkland Islands).

Gaudichaud-Beaupré's published account of his botanical work on the *Uranie* voyage appeared in 1826. After his appointment as a correspondent for the French Academy of Sciences in 1828, Gaudichaud-Beaupré took part in another French scientific expedition in 1830–32. As pharmacist and botanist on the *Herminie*, he sailed to South America, where he made a study of the flora of Brazil, Chile, and Peru. While the ship stopped at Rio, he traveled inland to the Mato Grosso region and explored the interior of Brazil's São Paulo province and collected more than 3,000 plants for the Museum of Natural History in Paris. In 1836–37, he accompanied the zoologist Fortuné Eydoux on the *Bonité*, under the command of Auguste-Nicolas Vaillant, and undertook additional botanical studies in the South Pacific.

Soon after his return from the *Bonité* voyage, Charles Gaudichaud-Beaupré was made a member of the French Academy of Sciences. In his voyages, he had amassed more than 10,000 plant specimens, more than 1,200 of which were wholly new to science. A red flowering grevillea plant he had discovered on the west coast of Australia in 1818 was named the *Grevillea gaudichaudi* in recognition of his contributions to botanical science.

Genghis Khan (Jenghiz Khan, Chingis Khan)

(ca. 1162–1227) *Mongol conqueror of central Asia*

Named Temuchin (or Temujin), which means "the finest steel" in the Mongol language, Genghis Khan (really a title, not a name) was the son of Yekusai, a chieftain of the nomadic Yakka Mongols who ranged across the northern GOBI DESERT from Lake Baikal in the west to Manchuria in the east. His mother was named Houlun, a woman captured from a neighboring tribe.

When Temuchin was 13, his father was murdered by tribal rivals, and the young man became chieftain of the Yakka clan. Although his leadership was challenged for a number of years, he eventually triumphed over his enemies, a confederation of Mongol tribes, completing the conquest of what is now Mongolia by 1206. On the advice of a soothsayer, he assumed the title Genghis Khan, which has been interpreted to mean “World Encompassing” or “Emperor of All Men.” In the northern Gobi, he established a military capital at Karakorum.

Over the next two decades, Genghis Khan led his highly mobile cavalry armies across the steppes of central Asia in a campaign of conquest that resulted in the creation of the largest empire ever to exist in human history. In 1215, he conquered the Jin Empire of what is now northern China, occupying its capital, Yen-King or Yen-ching (present-day Beijing), Genghis Khan subsequently led his Golden Horde, as his forces came to be known, westward across central Asia, bringing Turkistan, Transoxiana, Afghanistan, Persia (present-day Iran), and much of southern Russia under his domination. In 1221, Genghis Khan sent out Taoist sage CH’ANG-CH’UN on a voyage of exploration through central Asia.

At his death in 1227, Genghis Khan’s empire stretched from the Caspian Sea to the Pacific coast of China. In the two decades after his death, his successors pushed westward into Europe, extending the Mongol conquest into present-day Hungary and threatening to invade the rest of Christian Europe. It was these developments that prompted Pope Innocent IV in 1245 to dispatch Father GIOVANNI DA PIAN DEL CARPINI on a diplomatic mission to the Mongols, hoping to establish peaceful relations. The Italian priest also sought to investigate the possibility of forming an alliance with the Mongols against the Islamic Turks, who then controlled the trade routes through the Middle East.

Genghis Khan had a far-reaching influence on the history of European exploration. For centuries before his conquests, European culture had little direct contact with the East. Yet his rapid push westward across central Asia forcibly brought the East to Europe’s doorstep. The tight monopoly exercised over the SILK ROAD to and from the Far East by the Muslims was broken by his conquests. The perceived threat of future Mongol encroachment shocked western Europe out of its insularity and led to the first organized travels into uncharted lands undertaken by Europeans since the days of the Vikings. In addition to the diplomatic mission of Carpini, there was the journey of WILLIAM OF RUBROUCK in 1253–55. Traders followed, including MARCO POLO and his father and uncle in the late 1200s. News of the Far East began to filter back to Europe, and interest in direct trade with the Orient became a prime goal of Italian and Portuguese commercial interests.

Gerlache de Gomery, Adrien-Victor-Joseph de (comte de Gerlache) (1866–1934) *Belgian naval officer, polar explorer*

Adrien de Gerlache was born to a noble family in the town of Hasselt, in the eastern Belgian province of Limbourg. His educational background included the science of oceanography, a specialty that he put to use in his subsequent career as naval officer and polar explorer.

In 1895, Gerlache conducted a scientific expedition to remote Jan Mayen Island, which lies in the Greenland Sea midway between Norway and GREENLAND. He also undertook studies on the mainland of eastern Greenland.

In 1897, Gerlache commanded the Belgica Expedition, named for the *Belgica*, a former Norwegian sealer converted for scientific exploration in polar regions. Among his crew of 18 departing Antwerp that year were the first mate, ROALD ENGELBREGT GRAVNING AMUNDSEN, and the expedition’s medical officer, FREDERICK ALBERT COOK.

One of the objects of Gerlache’s scientific mission was to seek the SOUTH MAGNETIC POLE. Delays in getting under way caused Gerlache and his expedition to arrive in the Antarctic late in the summer season of 1897–98. He had planned to land a party on the Antarctic mainland to spend the winter while the ship withdrew northward to a temperate climate. The *Belgica* approached the coast of the Antarctic Peninsula, off Palmer Land, where a landing party went ashore in January 1898. By March 1898, the ship had become icebound, and it remained trapped for the next 13 months, drifting from Alexander Island along the coast of the Antarctic Peninsula to Peter I Island through 600 miles of frozen sea.

Over the next year, Gerlache and most of his crew were stricken with SCURVY. Command of the expedition then went to Amundsen, who, with Cook, helped the crew recover by providing them with fresh seal meat. Dynamite charges were used to free the ship in spring 1899, and the expedition then sailed back to Belgium.

In 1905, Gerlache returned to his study of Greenland, this time exploring its northeastern region. Two years later, he led an oceanographic research team into the Barents and Kara Seas north of Scandinavia and eastern European Russia. In 1909, he undertook additional oceanographic work in the Greenland Sea. Gerlache went on to play a role in the planning stages of ERNEST HENRY SHACKLETON’s abortive British Imperial Trans-Antarctic Expedition of 1914–17.

Comte de Gerlache’s ship, the *Belgica*, was the first to winter in the Antarctic. His 1897–99 expedition, the first scientific expedition to visit the Antarctic since that of SIR JAMES CLARK ROSS in 1841, marked the beginning of the revival of formal exploration there.

Gibault, Pierre (1737–1804) *French-Canadian missionary in the Mississippi Valley*

Pierre Gibault was born in Montreal; his family had originally emigrated from France to French Canada in the mid-1600s. Educated at the Seminary of Quebec, he was ordained a Catholic priest and served at the Cathedral of Quebec.

In 1768, Gibault was sent as a missionary to the frontier region of the central Mississippi Valley. Accompanied by his mother and sister, he traveled to the former French settlement at Kaskaskia on the MISSISSIPPI RIVER, in what is now southwestern Illinois, where his parish extended upriver to include Ste. Genevieve and St. Louis. The next year, he journeyed eastward to the Wabash River, where he extended his missionary work to the settlement at Vincennes in present-day southwestern Indiana.

In the American Revolution of 1775–83, Gibault was instrumental in gaining the support of the residents of Kaskaskia for the American cause, when the settlement was captured by Virginia militia forces under George Rogers Clark in July 1778. Soon afterward, he traveled from Kaskaskia to Vincennes, and, aided by French trader Francis Vigo, he again succeeded in winning the allegiance of the French settlers against the British at that strategic settlement on the Wabash.

In 1780, British officials in Quebec alleged that Gibault had committed treason for providing aid to the American forces in the Illinois country, although no steps were taken to prosecute him for this charge.

Gibault settled in Vincennes in 1785. Four years later, he again headed westward to the Mississippi River. He first attempted to establish a seminary at Cahokia in present-day Illinois. After failing to obtain a land grant from the territorial government, he crossed the Mississippi into Spanish territory, where he became a parish priest at New Madrid in what is now southeastern Missouri.

In 1804, the year of Father Pierre Gibault's death, the United States expanded across the Mississippi into the vast Louisiana Territory. His missionary career had spanned the years between the initial exploration of the central Mississippi Valley by the French and the subsequent forays westward into the continent made in the St. Louis-based FUR TRADE of the early 19th century.

Gilbert, Sir Humphrey (Sir Humfry Gilbert)

(ca. 1539–1583) *English geographer, colonizer in North America, half brother of Sir Walter Raleigh*

Humphrey Gilbert was born to a wealthy family at Greenway House, near Dartmouth, in Devon, England. His father died when he was eight years old, and his mother married the elder Walter Raleigh, by whom she had a son, Gilbert's half brother, the future SIR WALTER RALEIGH.

After attending Eton, Gilbert went on to study at Oxford University. He then obtained an appointment to the staff of Princess Elizabeth, continuing to serve her after her ascent to the English throne in 1558 as Queen Elizabeth I. In the early 1560s, Gilbert embarked on a military career, serving first in northern France on behalf of the Protestant Huguenots, and later in campaigns in Ireland under the command of Sir Henry Sidney. While serving in Ireland, Gilbert first became acquainted with English navigator SIR MARTIN FROBISHER.

Gilbert had become interested in geography while at Oxford, especially in the possibility of finding a NORTHWEST PASSAGE to the Far East. In 1565–66, he debated with the MUSCOVY COMPANY'S ANTHONY JENKINSON before Queen Elizabeth, on the feasibility of finding such a water route. Jenkinson maintained that, during his travels in Russia, he had heard reports from sailors on the Kara Sea that a NORTHEAST PASSAGE across the top of Asia was possible. Gilbert, on the other hand, argued that a Northwest Passage across the top of North America was far more practical. He held that the coast of North America ran southward west of Labrador, and was therefore likely to be free of ice. In addition, Gilbert declared that the Northwest Passage to the Far East was a much shorter route than the one proposed eastward around Europe and Asia. For authority, he cited the first-century A.D. Roman naturalist PLINY THE ELDER who had reported the appearance of East Asian Indians on the coast of Germany in classical times. Since there was no account of their journey across Europe in that period, Gilbert asserted that they could only have come across the sea by way of the Northwest Passage.

Gilbert buttressed his arguments with an account of a large inland sea north of Mexico as reported by David Ingram, a sailor left on the Gulf Coast of Mexico by SIR JOHN HAWKINS in 1567, who had later returned to England after traveling overland across North America to the shores of what is now Maine. Gilbert further theorized that North America was actually the lost island of ATLANTIS, and that a strait ran across its northern end, complementing the STRAIT OF MAGELLAN at the tip of South America. He firmly believed in the existence of the STRAIT OF ANIAN, a supposed water route that led from the Pacific Ocean into the Atlantic Ocean. Although most of the ideas put forth in his written work on the subject, *A Discourse of a Discoverie for a New Passage to Cataia*, were based more on fable than on fact, he was the first geographer to speculate correctly that a Continental Divide existed within the interior of North America.

In recognition of his military exploits in Ireland, Gilbert was knighted in 1570. He went on to aid the Dutch in their revolt against Spain in 1572. Although he had written his *Discourse* in 1566, it was not published until 1576, when it was used to help promote financial support for Frobisher's

expeditions to find the Northwest Passage, of which Gilbert was a principal backer.

In 1578, Gilbert obtained a royal patent from Queen Elizabeth to explore and colonize new lands for the Crown. Soon afterward, he undertook two expeditions, one with his half brother Walter Raleigh. On both occasions his ships were driven back by storms off the coast of Ireland. Other misadventures soon followed, and the enterprise was abandoned.

Undaunted, Gilbert tried again in 1583, this time planning to establish a colony in North America to which to send England's undesirables, as well as to provide a way station for ships en route to China and Japan through the Northwest Passage, the imminent discovery of which he was certain. He assembled a fleet of five ships and, with about 260 colonists, sailed westward from Plymouth, England, on June 11, 1583. Soon after the departure, one of the ships deserted and returned to England. The rest reached the coast of Newfoundland on July 30, 1583. On August 5, at what is now St. John's Bay, Gilbert took formal possession of Newfoundland in the name of the queen. At that time, Newfoundland was well known to European fishermen, and, when Gilbert arrived there, he found several dozen fleets of fishing vessels and their crews from Portugal, Spain, France, and England, who accepted Gilbert as their new governor.

Over the next two weeks, Gilbert and his party explored the interior of Newfoundland, undertaking a survey for valuable minerals. He then sailed to the south and west, searching the coastline for the entrance to the Northwest Passage. Off Sable Island, near present-day Nova Scotia, Gilbert's largest ship and supply vessel, the *Delight*, was wrecked on a reef, with the loss of many of its crew. Earlier, another of his ships had been sent back to England with some members of the expedition who had fallen ill. Left with only two vessels, and short on food and other essentials, Gilbert decided to sail back to England at the end of August 1583.

Gilbert himself was aboard the smallest vessel of his fleet, the *Squirrel*, on the eastward crossing, accompanied by the other remaining ship, the *Golden Hind*. North of the AZORES in the mid-Atlantic, the ships ran into storms and heavy seas. The *Squirrel* disappeared in a heavy swell and was lost with all hands. The *Golden Hind* managed to return safely to England with the news of Gilbert's death.

The year after Gilbert's expedition to Newfoundland, his commission to explore and colonize was granted to Sir Walter Raleigh, who subsequently undertook three settlement attempts on the Virginia coast.

Sir Humphrey Gilbert was a major promoter of English explorations for the Northwest Passage, his geographic speculations giving impetus to the later voyages of JOHN DAVIS and HENRY HUDSON. Moreover, he was one of the first proponents of a permanent English colony in the New World.

Giles, Ernest (1835–1897) *British explorer in Western Australia*

Ernest Giles was a native of Bristol, England. He was schooled at Christ's Hospital in London and, in his 15th year, immigrated to Adelaide, South Australia, where his parents had settled earlier.

Giles worked for a time as a clerk in the goldfields of Victoria in southeastern Australia. From 1861 to 1865, he undertook a series of expeditions into the territory around the Darling River and its tributaries, seeking new grazing lands for Australia's rapidly expanding sheep-raising industry.

In 1872, a group of wealthy Victoria-based sheep farmers and other businessmen commissioned Giles to explore west of the recently completed Central Overland Telegraph Line traversing the continent from Adelaide in the south to Darwin on the north coast. In addition to seeking new pasture lands, Giles hoped to make the first east-to-west inland crossing of Australia.

Leaving Charlotte Waters, a frontier settlement on the Finke River in the south-central Northern Territory in August 1872, Giles followed the river westward to the Macdonnell Ranges, and into the desert region beyond. He proceeded as far as Lake Amadeus on the edge of desert country, where he was forced to turn back when it became apparent that some special means of transport was necessary to make any headway across the vast waterless tract.

Giles made another attempt at a westward crossing of Australia in 1873. On this expedition, he set out from Lake Eyre, several hundred miles south of his starting point the previous year. Accompanied by an assistant, Alfred Gibson, he headed northwestward across the Alberga River, then traveled around the Musgrave Mountains in an attempt to avoid the GREAT VICTORIA DESERT. Nevertheless, he soon came upon a greater expanse of desert as he entered Western Australia from the east. Gibson became lost, and Giles, unable to find him, was forced to abandon the attempt because of lack of water, returning to South Australia alone.

In 1875, Giles decided to undertake the crossing of the central Australian deserts with camels. In May of that year, he obtained 24 of the animals and set out from Port Augusta, near the head of South Australia's Spencer Gulf. After skirting Lake Torrens, he ventured once again into the Great Victoria Desert. With his camels able to carry reserves of water, and the animals themselves able to cover great distances with minimal amounts, he succeeded in crossing the desert. On one leg of the journey, he covered some 325 miles of territory devoid of any trace of water at all. After traveling for five months across 2,500 miles, he arrived at Perth on the west coast of Australia, having completed the first successful inland east-to-west crossing of the Australian continent.

After a two-month rest in Perth, Giles and his camels began the return trip, taking a more northerly route from the headwaters of the Gascoyne and Fortescue rivers of northwestern Australia. Traveling eastward, just south of the TROPIC OF CAPRICORN, he traversed the same desert region where Alfred Gibson had disappeared two years earlier. Giles searched the region for some trace of his missing companion but found nothing. After traveling southward into the Northern Territory, he reached Lake Amadeus and the Finke River settlements, from where he returned to Adelaide in August 1876.

Giles took part in explorations of southwestern Australia in 1882. He then settled in the goldmining regions around Coolgardie in Western Australia, where he spent his remaining years employed as a clerk.

Ernest Giles's 1875 crossing of Australia demonstrated that camels were indispensable for the exploration of the continent's central desert regions. He personally gained little from his explorations, having failed to locate the new pasture lands that his sponsors hoped for in the interior of Western Australia. His record as an accomplished desert explorer persists indirectly in the name of the great arid region of Western Australia, which Giles called the Gibson Desert, in honor of his lost assistant.

Giraudais, François Chesnard de la

See CHESNARD DE LA GIRAUDAIS, FRANÇOIS.

Gist, Christopher (ca. 1706–1759) *Colonial American trader, surveyor, guide in the trans-Appalachian region*

By 1745, Christopher Gist, a native of Baltimore County, Maryland, had moved with his wife and children to the Yadkin Valley of central North Carolina, where he was a trader to the Indians.

Gist was hired by the Ohio Company to explore and survey the region of what is now western Pennsylvania, southern Ohio, and northern Kentucky. The Ohio Company had been granted a half-million acres of land in a region bounded by the Ohio and Kanawha Rivers, west of the Allegheny Mountains, part of the APPALACHIAN MOUNTAINS. Gist was assigned to select lands there suitable for agricultural settlement.

In 1750, Gist explored the Ohio watershed as far west as the Falls of the Ohio, near the site of present-day Louisville, Kentucky. He also investigated the lands as far west as present-day Dayton, Ohio, near what is now the southeastern Indiana state line. That November, he reached the trading post at Logstown, on the Ohio River, about 30 miles above the Forks of the Ohio. Accompanied by the trader GEORGE CROGHAN, he headed westward to the Great Miami River and visited lands then

inhabited by the Shawnee Indians. Along the way, he explored the regions of the Great Miami and Scioto Rivers in what is now southwestern Ohio. On the western banks of the Ohio River, as he later reported, he saw herds of buffalo.

On the return journey, Gist traveled eastward across parts of present-day Kentucky and West Virginia. While traveling back along the Ohio River, he visited a site where there was a large number of mammoth bones. He headed southward to the Yadkin Valley, from where he went to Williamsburg, Virginia, and submitted his report and maps to the officials of the Ohio Company.

Gist's findings included a description of the fertile Great Meadows region between the western slopes of the Allegheny Mountains and the Monongahela River, across the mountains from the CUMBERLAND GAP.

In 1752–53, Gist blazed a trail from the Potomac River in western Maryland, through the Alleghenies, to the region west of the mountains at the mouth of Redstone Creek, a tributary of the Monongahela River, where he constructed a small settlement for the Ohio Company. THOMAS CRE-SAP later extended the trail.

In 1753–54, he was the guide for George Washington's expedition to the French post at the Forks of the Ohio, Fort Duquesne (present-day Pittsburgh). The purpose of this mission was to warn the French against further encroachment in western Pennsylvania. The ensuing skirmishes with the French led to the outbreak of the French and the Indian War of 1754–63.

In 1755, Gist was a guide for General Edward Braddock's abortive campaign against Fort Duquesne. He continued to serve as a scout and Indian diplomat for the British. In 1759, he was sent to the western Carolinas to gain the support of the Cherokee Indians against the French. While there, he contracted smallpox and died.

Christopher Gist's explorations of the trans-Appalachian frontier and his reports of potentially rich agricultural lands inspired many frontier farmers and hunters to travel westward across the Alleghenies, among them DANIEL BOONE, who led settlers into Kentucky in the 1770s.

Glass, Hugh (ca. 1780–1833) *American fur trader, trapper in the northern Rocky Mountains and on the southern plains*

Details of Hugh Glass's origins and early life are sketchy. He reportedly claimed to have been held captive first by Jean Lafitte and his Gulf Coast pirates, then by Pawnee Indians in present-day Nebraska.

In spring 1823, Glass went to work for WILLIAM HENRY ASHLEY and ANDREW HENRY in their fur-trading expedition to the upper MISSOURI RIVER region. While traveling up the Missouri in what is now central South Dakota, he was

wounded in the leg when Arikara Indians ambushed the traders.

Glass soon recovered and joined Andrew Henry in an expedition to Fort Henry at the junction of the Missouri and Yellowstone Rivers in present-day North Dakota. Indian hostilities farther up the Missouri necessitated an overland journey. In August 1823, while traveling along the Grand River in what is now South Dakota, Glass was attacked by a grizzly bear and severely injured. Henry left two of his men, JAMES BRIDGER and John Fitzgerald, to stay with him. Soon after Henry's departure, Bridger and Fitzgerald, believing Glass would soon die, abandoned him on the Grand River.

Glass survived, however, and, over the next month, managed to crawl more than 100 miles back to Fort Kiowa on the Missouri. He then traveled upriver with another party of trappers and reached Fort Henry. By this time, Ashley and Henry had abandoned their Yellowstone River post, so Glass set out westward to the company's new post in the Bighorn region of what is now Montana. Unable to reach that trading fort, he turned back down the Missouri. At Fort Atkinson near present-day Council Bluffs, Nebraska, he met up with Bridger and Fitzgerald, and despite his ordeal in the wilderness, he reportedly was reconciled with them.

During the mid-1820s, Glass took part in the trade caravans along the Santa Fe Trail between St. Louis and New Mexico.

In 1828, Glass returned to the upper Missouri FUR TRADE. That year, he was involved in a battle with the Indians at Bear Lake in the Green River region of what is now northern Utah and was wounded a third time.

In 1829, Glass attempted to involve the AMERICAN FUR COMPANY in the annual fur trappers' rendezvous at Pierre's Hole. In the following years, he worked out of the company's post on the Yellowstone River, Fort Union. During the 1832–33 trapping season, he was killed in an attack by Arikara Indians.

Although many of Hugh Glass's adventures are undocumented, his exploits in the fur trade of the 1820s indicate the perilous nature of the work undertaken by the mountain men, who were among the first non-Indians to explore west of the Missouri River into the ROCKY MOUNTAINS. Glass's remarkable survival after he was attacked by a bear on the Grand River inspired poet John G. Niehardt to write the 1915 epic poem, *The Song of Hugh Glass*.

Glazunov, Andrey (Andrei Glasunof)

(fl. 1830s–1840s) *Russian-American fur trader in western Alaska*

Andrey Glazunov was born in Alaska soon after the first Russian settlements were established there at the close of the 18th century.

In the 1830s, Glazunov, having entered the service of the RUSSIAN-AMERICAN COMPANY, the great Russian fur-trading enterprise in Alaska, was commissioned by the company's director (and Russian colonial governor of Alaska), Baron Ferdinand Petrovich von Wrangel, to explore inland along the west coast of Alaska, along the lower Yukon and Kuskokwim Rivers. Traveling by kayak, he surveyed the lower course of the Yukon River in 1834, charting the river's delta, south of Norton Sound. The next year, he undertook an exploration of the territory between the two rivers, resulting in the first charts of the inland regions to the north and east of Kuskokwim Bay.

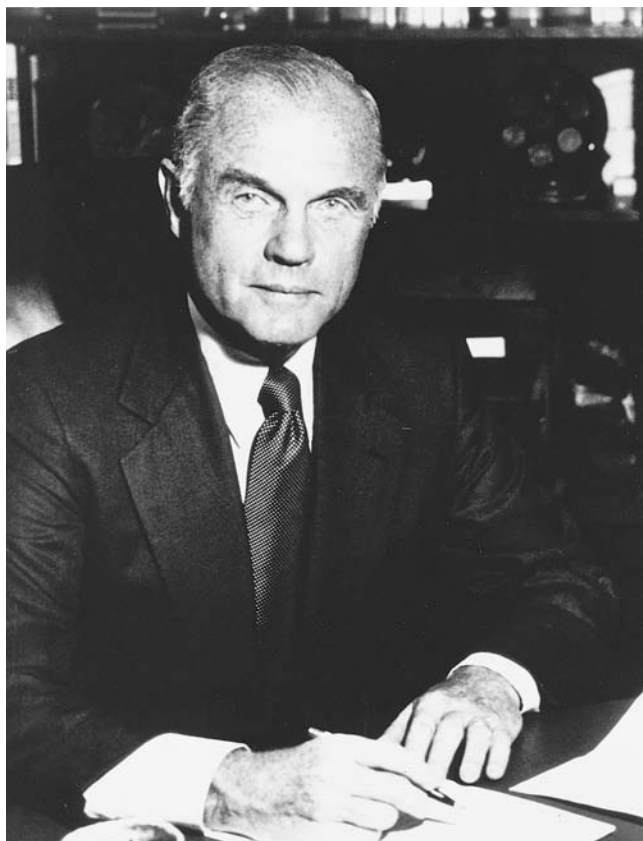
Andrey Glazunov went on to establish a new Russian fur trading post at Ikogmiut in 1842. His explorations provided the Russians, and later the Americans, with the first detailed descriptions of the coast of western Alaska south of Norton Sound and north of the earlier Russian settlements on Bristol Bay and the Alaska Peninsula. He was among the first Alaskan-born explorers of Russian America.

Glenn, John Herschell, Jr. (1921–)

American astronaut, first American to orbit Earth, politician
John Glenn, born in Cambridge, Ohio, attended Muskingum College in New Concord, Ohio, starting in 1939. With World War II, he left his junior year to join the Naval Aviation Cadet Program and became a pilot in the U.S. Marine Corps. He flew combat missions in both World War II and the Korean War. After service in Korea, Glenn became a test pilot. In 1957, he made the first supersonic flight from Los Angeles to New York City, setting a speed record.

In 1959, Glenn was selected as an ASTRONAUT, one of the original seven selected by the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA). He was also selected for the third manned spaceflight in the MERCURY PROGRAM, following the 1961 suborbital flights of ALAN BARTLETT SHEPARD, JR., and Virgil Grissom. On February 20, 1962, taking off from Cape Canaveral, Florida, Glenn reached an altitude of approximately 162 miles in the *Friendship 7* capsule. Traveling at a maximum orbital velocity of 17,545 miles per hour, he became the first American to orbit Earth, doing so three times, for a total of about 81,000 miles. (The Russian YURY ALEKSEYEVICH GAGARIN had orbited Earth once in the first manned spaceflight in 1961, and another Russian, Gherman Titov, had become the second man to do so that same year.) Technical problems forced Glenn to pilot the capsule manually during the second and third orbits and during reentry. The mission lasted four hours, 55 minutes, and 23 seconds, from launch to splashdown in the Atlantic Ocean.

Because of Glenn's fame and popularity following his first mission, NASA officials chose to use him for public relations rather than for additional spaceflights. Frustrated, he retired from NASA and the Marine Corps in 1965 and



John Glenn (Library of Congress)

pursued a career in business. He did, however, continue to act as a consultant for NASA. He entered politics and was elected U.S. (Democratic) senator from Ohio, serving four terms from 1974 to 1998. He was a member of the Special Intelligence Committee, the Governmental Affairs Committee, and the Armed Services Committee. In 1984, he unsuccessfully sought the Democratic presidential nomination.

Glenn lobbied NASA for another spaceflight, which was finally granted to him as part of the SPACE SHUTTLE program. In October 1998, at the age of 77, after extensive training, Glenn became the oldest person to fly in space. The nine-day mission, aboard the *Discovery*, included a study of the effects of space travel on aging.

In the course of his career as a navy pilot, astronaut, and politician, John Glenn received many awards. In addition to his accomplishments as the first American to orbit Earth and the oldest human in space, he helped put a human face on the U.S. space program.

Gmelin, Johann Georg (1709–1755)

German naturalist in Siberia, in service to Russia

Johann Georg Gmelin, a German-born botanist, entered the service of the Russian Academy of Sciences at St. Petersburg

in 1727. After an appointment to a professorship four years later, he joined the scientific team of the Second Kamchatka Expedition in 1733, under the general command of VITUS JONASSEN BERING.

From St. Petersburg, Gmelin, accompanied by STEPAN PETROVICH KRASHENINNIKOV, traveled eastward across European and Central Asiatic Russia, arriving at Yakutsk sometime in 1735. Along the way, he made an extensive study of the plant and animal life of the central Asian steppes, from the Ural Mountains to Lake Baikal. During the next two years, he undertook a scientific survey in the heart of SIBERIA, exploring along the Tunguska River and descending the Angara River to the settlement at Yeniseysk. He spent winter 1737–38 there, meeting up with another member of the expedition's scientific staff, fellow German naturalist GEORG WILHELM STELLER.

In spring and summer 1738, Gmelin followed the Yenisey River northward almost as far as the ARCTIC CIRCLE. In subsequent explorations of Siberia, he went as far east as the Lena River, before beginning the homeward journey to European Russia in 1741. Along the way, he undertook studies of the flora and fauna of the steppe region between the Yenisey and Ob Rivers, as well as the territory around the Caspian Sea.

Gmelin returned to St. Petersburg early in 1743, following nearly 10 years of scientific work in Siberia. In 1749, he was back in Germany, where he spent his remaining years as a professor of natural history at the University of Tübingen in the principality of Württemberg.

In his published account of his scientific work in Siberia, *Flora Sibirica* (1747–69), Johann Georg Gmelin described more than 1,100 plant species and provided nearly 300 illustrations. In addition to his botanical work, he undertook geological studies in which he attempted to ascertain the depth limits of the permafrost in eastern Siberia. His observations on the Caspian Sea revealed that its level was lower than both the MEDITERRANEAN SEA and Black Sea. Although most geographers had traditionally regarded the Ural Mountains as the boundary between Europe and Asia, Gmelin's observations determined that the Yenisey River provided a natural demarcation between the two regions because of the distinct differences in the animal and plant life to the east and west of it.

Godin des Odanais, Isabela (Isabel Grandmaison y Bruno) (1729–1792)

Peruvian traveler on the Amazon River

Isabela Godin des Odanais, née Grandmaison y Bruno, was the daughter of a prominent citizen of Riobamba in what is now Ecuador. In 1743, although only 13 at the time, she married Jean Godin des Odanais, who was the assistant of the French scientific team, led by CHARLES-MARIE DE LA CONDAMINE, that was then undertaking a geodesic survey

in the Peruvian ANDES MOUNTAINS and the upper Amazon Basin.

At the end of the equatorial survey in 1743, Jean Godin had planned to join La Condamine in a descent of the AMAZON RIVER from Peru to the Atlantic coast at Pará. His departure was delayed by his wife's four pregnancies over the next six years. Finally, in March 1749, he set out from Riobamba alone and made his way to Lagunas in northeastern Peru, the head of navigation of the western tributaries of the Amazon. After a year of traveling, he finally reached Pará, from where he went to the port of Cayenne on the coast of French Guiana.

Once at Cayenne, Godin attempted to obtain the assistance of the Portuguese colonial government of Brazil for a trip up the Amazon to bring his wife to Pará, then sail to France. Yet permission for his upriver voyage was long in coming from the Portuguese due to international rivalries among France, the Spanish government in Upper Peru (now Ecuador), and Portugal. He waited at Cayenne for 15 years, petitioning La Condamine and the French government for help. Meanwhile, news of the Godins had reached France, and Isabela's long separation from her husband had made her a heroic figure in French intellectual circles.

Finally, in April 1765, a Portuguese riverboat and a crew arrived at Cayenne with instructions to take Godin back up the Amazon to Lagunas, where he could meet his wife and family, then return with them to Pará. He was suspicious of the motives of the Portuguese, however, fearing they had learned of his secret letters to the French government in which he had suggested the feasibility of a French takeover of the Amazon as a route through the Americas to the Pacific Ocean. He suspected that the Portuguese would arrest him once he was in Brazilian territory. Instead of returning upriver himself on the Portuguese vessel, he sent a trusted friend with letters to his wife, instructing her to travel from Riobamba to meet the boat at Lagunas, then travel down the Amazon and join him at Cayenne.

Finally, in 1769, Isabela Godin received word of the travel plans. By that time, all four of her children had died of tropical diseases, including her youngest, then aged 19, born soon after Jean Godin had left in 1749.

The journey proved to be a nightmarish experience for Isabela. Her father, Pedro Grandmaison y Bruno, had gone on ahead to arrange for local Indians to convey his daughter overland and by CANOE to Lagunas. She left Riobamba in late 1769, accompanied by her two brothers, a nephew, about 30 Indians, and several French travelers. Mishaps, coupled with disease, eventually claimed the lives of everyone in the party but Isabela. Left alone in the upper Amazon rainforest, she wandered for nine days along the Bobonaza River before she was rescued by local Indians, who took her safely to Lagunas and the waiting Portuguese riverboat.

The rest of Isabela Godin's journey down the Amazon was relatively uneventful. She was reunited with her hus-

band at Cayenne in spring 1770. They remained in the French Guiana colony for another three years, then sailed to France, settling in Godin's ancestral home at Saint-Amand, Montrand, south of Paris.

Isabela Godin was the first woman known to have descended the entire length of the Amazon River. In May 1988, the people of Saint-Amand dedicated a statue of her near the Godin home in recognition of her forbearance in her long separation from her husband, her heroic solo trek through the jungle, and her pioneer Amazon journey.

Gões, Bento de (Benedict de Goes)

(1562–1607) *Portuguese missionary in India and China*

Bento de Gões was a lay brother at the Portuguese Jesuit mission at Agra in north-central India during the early 1600s.

In 1603, Gões set out northward from Agra, intending to reach China by way of an overland route from the west. Although Portuguese mariners had been regularly voyaging to the Pacific coast of China, European geographers were still not certain whether this was the same land identified as Cathay by MARCO POLO and other medieval travelers more than 300 years earlier. Gões hoped to resolve this question by reaching Peking (Beijing) and making contact with Jesuit missionary MATTEO RICCI, who, several years earlier, had established himself in that city after arrival by sea.

From Agra, Gões traveled to Lahore in what is now Pakistan, then entered Afghanistan, visiting Kabul before passing through the Hindu Kush range and crossing the Pamirs into the westernmost provinces of present-day China. By 1605, he was in Yarkand on the western edge of the Takla Makan desert. After making a visit to the jade mines at Khotan, at the southern end of the desert, he arranged to continue his travels with a caravan heading eastward.

Over the next year, Gões traversed the entire width of northern China. In 1605, he reached Suchow, about 500 miles south of Peking and 200 miles inland from the Yellow Sea. Although government officials in Suchow barred him from traveling to Peking to join Father Ricci, he was permitted to contact the Jesuit missionary by messenger.

It was not until April 1607 that Gões finally received direct word from Ricci in Peking. Gões died at Suchow several days later. Ricci sent the news back to Europe by sea that Gões had succeeded in making the overland journey from India to China, and, by doing so, had demonstrated that the land identified as Cathay in medieval times, and the China known to 17th-century European sea voyagers, were one and the same.

Bento de Gões's journey was the first overland trip made by a European into China since the early 1300s. Traveling alone and following a circuitous route northward around the HIMALAYAS, he had solved one of the great geo-

graphic puzzles of the Middle Ages. On his grave at Suchow, the following epitaph was inscribed: "Seeking Cathay he had found heaven."

Golovnin, Vasily Mikhailovich (Vasili Golovnin)

(1776–1831) *Russian naval officer in Alaska and the North Pacific*

Vasily M. Golovnin began his maritime career as a midshipman in the Russian navy, serving on warships in the North Sea from 1795 to 1800. He was promoted to lieutenant by 1801, then was attached to the British navy for five years, sailing the MEDITERRANEAN SEA, Atlantic Ocean, and Caribbean Sea.

Golovnin returned to Russian naval service in 1807. In command of the sloop *Diana*, he left the Baltic port of Kronstadt, planning on rounding CAPE HORN and sailing on to Kamchatka, on the Pacific coast of SIBERIA. As he approached the tip of South America, unfavorable winds caused him to alter his course and attempt to reach the Pacific by way of the CAPE OF GOOD HOPE around Africa. British authorities detained him and his expedition at Cape Town. After spending a year at the South African port of Simonstown, Golovnin, under cover of darkness, eluded the British fleet guarding the harbor.

Golovnin reached Kamchatka by late 1809. The next year, he explored the coast of Alaska, then known as Russian America. In 1811, he sailed south to survey the Kuril Islands, north of Japan. On Kunashiri, an island just northeast of the northernmost Japanese island of Hokkaido, he made a landing with a small party. Taken prisoner by the Japanese, he was held for more than two years. In 1813, Golovnin's shipmates on the *Diana* managed to secure his release. Golovnin sailed back to Kamchatka, then set out for St. Petersburg in an overland journey westward across Siberia and European Russia.

In 1817, Golovnin embarked on a CIRCUMNAVIGATION OF THE WORLD in command of the sloop *Kamchatka*. Over the next two years, he undertook additional explorations along the coasts of Alaska and Kamchatka.

Golovnin was promoted to the rank of vice admiral in the Russian navy in 1830. The following year, he was stricken with cholera and died in St. Petersburg.

Vasily M. Golovnin's account of his experiences as a prisoner was published in 1816 as *Narrative of My Captivity in Japan, 1811–1813*. In addition, he left published accounts of his 1807–10 voyage to Kamchatka, as well as a narrative of his 1817–19 voyage in which he circumnavigated the world. He also wrote an account of famous shipwrecks.

Gomery, Adrien-Victor-Joseph, Gerlache de

See GERLACHE DE GOMERY, ADRIEN-VICTOR-JOSEPH DE.

Gomes, Diogo (Diego Gomez)

(ca. 1440–ca. 1482) *Portuguese mariner on the coast of West Africa*

In the late 1450s, Portuguese navigator Diogo Gomes undertook the last voyages of exploration along the coast of West Africa sponsored by HENRY THE NAVIGATOR, prince of Portugal.

From 1458 to 1460, the year of Prince Henry's death, Gomes explored the African coast as far south as Cape Palmas, the westernmost point on the Gulf of Guinea on the coast of present-day Liberia. At times he was accompanied by Venetian explorer ALVISE DA CADAMOSTO. In 1458, Gomes explored up the Gambia River, where he made friendly contacts with a native king named Nomi-Mansa, whose interest in becoming a baptized Christian inspired the first Portuguese missionaries to venture into West Africa. Gomes returned from the lower Gambia River region with a quantity of gold, as well as reports of gold mines beyond the Sierra Leone Mountains, prompting subsequent Portuguese expeditions to West Africa in search of commercial gain as well as geographic knowledge.

In 1462, Gomes sailed again to Africa, and, after landing at Cape Verde, headed westward and made the European discovery of Sao Tiago in the Cape Verde Islands. He also visited the AZORES.

Diogo Gomes's findings on the coast of West Africa were later incorporated into MARTIN BEHAIM's 1492 world globe. In addition, Gomes was the first European to bring back reports of a great inland city in Africa—TIMBUKTU—a place that attracted European explorers to West Africa well into the 19th century.

Gomes, Estevão (Esteban Gómez, Stephen Gomez)

(ca. 1474–ca. 1538) *Portuguese or Spanish mariner on the east coast of North America and in the Río de la Plata and Gran Chaco region of South America*

Some sources indicate that Estevão Gomes was born in Oporto, Portugal, in 1474, or as late as 1483, while others state that he was born in Cádiz, Spain, in 1478. He became a seaman, serving with Portuguese ships sailing to India and the EAST INDIES.

In 1518, with a reputation as a skilled navigator and pilot, Gomes entered the service of Spain and the next year sailed as a pilot on the *San Antonio* with FERDINAND MAGELLAN's expedition. On this voyage, in January 1520, he was among those who openly rebelled against Magellan's authority along the coast of South America. Magellan managed to quell the uprising, putting to death some of the rebels but sparing Gomes because of his much-needed skills as a navigator. Nonetheless, Gomes soon incited another mutiny on the *San Antonio*, while the fleet was exploring what came to be known as the STRAIT OF MAGELLAN. He was instrumental in leading the crew of

that vessel to desert the expedition, returning to Spain in March 1521.

On his arrival in Spain, Gomes was imprisoned for his role in the mutiny, but he was soon released. In 1523, he was a member of a council of pilots that attempted to settle disputes between Portugal and Spain over conflicting claims to the newly explored possessions in the Western Hemisphere as well as the new sea routes to India and the Far East. That year, he won the support of Spanish king Charles I (Holy Roman Emperor Charles V) for his plan to resolve the conflict by finding a westward passage for Spain somewhere along the east coast of North America between Florida and Newfoundland. Gomes believed that the new route would be far shorter than the one established on Magellan's 1519–22 expedition.

For Gomes's expedition, a CARAVEL-type ship, *La Anunciada*, was built at Bilbao. On September 24, 1524, he sailed from the port of La Coruna in northwestern Spain with a crew of 29 men. His first stop was the port of Santiago in Cuba, from where he headed northward to the Florida coast, which he sighted in January 1525. Sailing northward along the east coast of North America, he made an extensive survey of all bays and inlets sighted, hoping to find the one that might provide a passage to the Far East. According to his navigational records, he explored what is now Chesapeake Bay, then continued along the coast as far as Cape Race, Newfoundland. He then returned southward. Not wanting the expedition to be a total loss, he captured about 60 Indians along the coast of Maine or Nova Scotia for the SLAVE TRADE in Spain.

After a voyage of almost a year, Gomes returned to Spain, reaching Coruna in August 1525. King Charles was not pleased with the enslavement of Indians, whom he soon freed. Many died of disease, however.

Gomes won the support of Spanish merchants for another voyage in search of a low-latitude NORTHWEST PASSAGE in 1530. Equipped with two ships, he sailed from Spain that year, and, according to some accounts, he was never heard of again, although some sources indicate that he died in Toledo, Spain, in 1534.

Varying accounts of Gomes's life relate that he sailed to the Rio de La Plata region of South America as chief pilot under the command of PEDRO DE MENDOZA in 1535. In February 1537, he reportedly accompanied JUAN DE AYOLAS and a party of Spaniards on an exploration of South America's Gran Chaco region in search of gold and silver. When the group returned to the Paraguay River, Gomes, Ayolas, and the others were killed by Indians, probably in 1538.

In the decades after the initial explorations of the Spanish and Portuguese in the Americas, Estevão Gomes was among the first navigators to seek a low-latitude Northwest Passage to the Far East. With the Portuguese monopoly on the trade route around Africa, and, with the Spanish in control of the sea lanes into the Pacific from the Strait of Mag-

ellan, interest in a northern passage to the Far East continued only among the Dutch, English, and French. Gomes's diary of his 1524–25 expedition was published in Spain in 1529. It included a map that depicted the coastline of what is now New England and Nova Scotia as the "Land of Esteban Gómez, discovered by him in 1525, by order of his Majesty; abundance of trees, game, salmon, turbot, and soles, but no gold is found." After his 1524–25 voyage, Spanish maps of North America showed a continuous coastline extending from Florida to Newfoundland.

Gomes, Fernão (Ferdinand Gomes) (fl. 1470s)

Portuguese merchant, trader on the coast of West Africa

Fernão Gomes, a wealthy Lisbon merchant, was one of the first to take part in the trade along the newly explored regions of the coast of West Africa. In 1469, he entered into a commercial agreement with King Alfonso V of Portugal and was granted exclusive trading rights on all lands beyond Cape Verde. In return, Gomes agreed to give the king a percentage of his profits and committed himself to exploring at least 100 leagues (about 400 miles) per year beyond Cape Palmas, the farthest point reached by previous navigators under Alfonso's uncle, HENRY THE NAVIGATOR, prince of Portugal.

By 1475, Gomes's expeditions had revealed most of the south coast of the great bulge of West Africa, reaching as far as the Bight of Benin, Point St. Catherine, and the shores of present-day Nigeria. He also located the island of Fernando Po at the eastern end of the Gulf of Guinea.

Although Gomes had fulfilled his contract, the agreement was not renewed. Instead, the monopoly on exploration and trading rights along the Guinea Coast went to King Alfonso's son, Prince John, who, in the 1480s, as King John II of Portugal, sponsored the expeditions of DIOGO CAO and BARTOLOMEU DIAS. Their voyages resulted in the determination of the southernmost extent of the African continent.

Fernão Gomes's voyages marked the resumption of the program of organized exploration along the coast of West Africa begun by Prince Henry in 1430, which had come to a halt with his death in 1460. During his contract of 1469–75, Gomes discovered as much of the African coast as had Prince Henry's navigators between 1430 and 1460.

González de Clavijo, Ruy See CLAVIJO, RUY GONZÁLEZ DE.

Gordon, Robert (fl. 1770s) *Scottish explorer in South Africa*

Originally from Scotland, Robert Gordon arrived in Cape Town, South Africa, in about 1770. He undertook some of the first explorations beyond the settled areas along the south coast.

In 1777, Gordon and a small party explored inland along a route eastward from Cape Town to Algoa Bay, near present-day Port Elizabeth. He then traveled northward, penetrating the interior as far as the grasslands of the 6,000-foot-high plateau region known as the High Veld, reaching the confluence of the Groote and Vaal Rivers before returning southward to Cape Town.

Gordon set out again in 1779 with a small Dutch and British group, including Scottish botanist William Paterson, exploring northward from Cape Town, along South Africa's Atlantic coast into Namaqualand, just below present-day Namibia. Locating the Groote River at its mouth, he ascended it eastward across most of what is now South Africa into the High Veld country of what later became the Orange Free State. Along the way, Gordon and his party explored the lands north of the Groote, which he subsequently renamed the Orange River.

Robert Gordon's explorations into both the western and eastern regions of South Africa revealed much about the previously uncharted territory north of the Cape Town settlement. He was one of the first Europeans to trace the course of the Orange River, and, in so doing, almost completed the first west-to-east crossing of the African continent south of the SAHARA DESERT. The reports he brought back of lands suitable for grazing in the interior north and east of Cape Town inspired the Boer migration into the region and the establishment of the Orange Free State in the years following the British takeover of the Cape Colony in 1806.

Gore, John (1730–1790) *British naval officer in the Pacific*

John Gore was born in the British North American colonies. Entering the British navy in 1755, he went on to serve as an assistant master on the *Dolphin* in a 1764–66 expedition, under the command of Commodore JOHN BYRON, which explored the South Pacific Ocean and completed a CIRCUMNAVIGATION OF THE WORLD.

Three months after his return to England in 1766, Gore sailed to the South Pacific Ocean on the *Dolphin* again, as midshipman under the command of SAMUEL WALLIS. On the voyage with Wallis, he was among the first Englishmen to visit Tahiti.

Gore returned to England from his second voyage to the South Pacific in May 1768. The next August, he sailed from Plymouth as a lieutenant on the *Endeavour* on JAMES COOK's first voyage. During this expedition, he revisited Tahiti. On the east coast of Australia, he shot a kangaroo, a creature then unknown to most European zoologists. The expedition's naturalist, SIR JOSEPH BANKS, had the creature stuffed and took it back to Great Britain.

Gore did not sail with Cook on his second voyage in 1772. Instead, he sailed with Banks on a scientific expedition to ICELAND that year.

On Cook's final voyage of 1776–80, Gore was a first lieutenant aboard the *Resolution*. In the south-central Pacific archipelago that came to be known as the Cook Islands, he was among the party that explored Atiu Island and Hervey Island. When the expedition was sailing along the coast of southeastern Alaska in spring and summer 1778, Gore briefly explored Prince William Sound. He suggested to Cook that a river emptying into Prince William Sound could actually be the NORTHWEST PASSAGE, leading into Baffin or HUDSON BAY. Convinced he could reach England by this route in only three months, Gore offered to lead an expedition of 20 crew members up the supposed passage in two of the ship's open boats, a proposal that Cook prudently declined.

With Cook's death in the HAWAIIAN ISLANDS in February 1779, command of the expedition went to CHARLES CLERKE, and when Clerke died in the North Pacific the following August, command went to Gore. He sailed to Petropavlovsk on the Kamchatka Peninsula of eastern SIBERIA, then headed southward to the Kuril Islands and Japan. He followed the Asian coast, stopping at Macao and what is now Vietnam, then entered the Indian Ocean by way of Sunda Strait between Java and Sumatra. He returned to the British Isles by way of the CAPE OF GOOD HOPE, although he first landed in the Orkneys, off the coast of Scotland, having been blown northward by gale-force winds. Gore and the expedition finally reached London on October 4, 1780, after a voyage of more than four years.

Back in England, Gore assumed Cook's former position as captain of Greenwich Hospital, a post he held until his death in 1790.

During his naval career, in which he circled the world three times in 16 years, John Gore participated in the first British scientific expeditions to the South Pacific. In the Bering Sea in 1778, Cook sighted an island, which he named Gore Island, after his first lieutenant. Unknown to him, it was actually the island of St. Matthew, visited over 30 years earlier by Russian navigators sailing to North America.

Gosnold, Bartholomew (ca. 1572–1607)

English mariner in New England, colonizer of Virginia

Bartholomew Gosnold attended Cambridge University before going to sea in the late 1590s. By 1602, he had become an accomplished sea captain and navigator. That year, fellow Cambridge graduate Henry Wriothlesley, the third earl of Southampton and chief patron of William Shakespeare, sponsored Gosnold to lead an expedition to the coast of North America to obtain sassafras bark, which was selling in London at premium prices.

After the 1588 British victory over the Spanish Armada, English maritime endeavors regained their momentum. Also by that time, syphilis had become widespread throughout Europe. There was great demand for a medicine made from

sassafras bark. Expeditions sponsored by SIR WALTER RALEIGH to North America in the 1580s had reported sassafras to be growing in abundance.

In command of a small vessel, the *Concord*, Gosnold sailed westward from England in 1602, crossed the North Atlantic Ocean, and reached the coast of what is now southeastern Maine. Accompanying Gosnold on this trip was Bartholomew Gilbert, son of Raleigh's half brother, explorer SIR HUMPHREY GILBERT. Earlier maritime expeditions by Portuguese, English, and French explorers had reached New England only after stopping along the east coast of Canada to the north, or the Chesapeake Bay region to the south. Gosnold's 1602 expedition marked the first direct transatlantic crossing to what became known as New England.

The English anchored off the Maine coast and received some Native Americans who visited the ship in a small sailboat. Gosnold reported that their boat appeared to be of European origin, a "French shalop." The Indians, according to Gosnold's account, also wore some European garments and could speak a few words of either French or English, indicating that Gosnold and his crew were not the first Europeans they had met.

Gosnold sailed the *Concord* southward along the Maine coast to Cape Cod, a name he chose because of the great number of codfish caught by his men. Gosnold and a party put ashore there, thus making the first recorded European landing in present-day Massachusetts. After trading for sassafras with Indians, the English sailed around Cape Cod and explored islands off the southeast coast of Massachusetts, including Martha's Vineyard, which Gosnold named in honor of his eldest daughter as well as for the abundant grapevines. In his official report, Gosnold also reported seeing large numbers of "penguins," actually giant auks, then flourishing on islands off Massachusetts.

Gosnold next headed eastward into the mouth of Buzzards Bay and made the European discovery of Cuttyhunk Island, where he established a small military post. He also explored Narragansett Bay and traded with some other New England coastal Indians, probably Wampanoag or Narragansett. The expedition returned to England that same year, with a cargo of lumber, furs, and sassafras.

Through the Earl of Southampton's influence, Gosnold was appointed vice admiral, with CHRISTOPHER NEWPORT as admiral, of the newly chartered VIRGINIA COMPANY'S merchant fleet in 1606. The Virginia Company had been sanctioned by King James I to reassert English sovereignty over North America.

Three of the company's ships, the *Susan Constant*, the *Discovery*, and the *Godspeed*, the last commanded by Gosnold, set sail from London in December 1606 to establish a colony on the Virginia coast. JOHN SMITH was military commander of this colonizing expedition.

On April 25, 1607, Gosnold and the fleet reached Chesapeake Bay and made a brief landing at Cape Henry at the north end of present-day Virginia Beach, Virginia. In early May, the English traveled about 30 miles up the James River, where they established James Fort, later known as Jamestown. Gosnold objected to this site because, although it was on a defensible position on a peninsula in the river, it was swampy and mosquito-infested, thus conducive to fever. Less than four months later, in August 1607, Gosnold was afflicted with malaria and died.

Bartholomew Gosnold's 1602 voyage was not only the first direct European crossing of the Atlantic to New England, but also one of the earliest expeditions to the Americas with a specific commercial motive. Eighteen years later, the Pilgrims retraced Gosnold's route when they established Plymouth Colony. Additionally, Gosnold played a key role in establishing Jamestown, the first permanent English settlement in North America.

Gosse, William Christie (1842–1881)

Australian surveyor, explorer in Australia's Northern Territory

In the early 1870s, William Gosse, a surveyor for the government of South Australia, was commissioned to attempt the first east-to-west crossing of Australia from the center of the continent.

In July 1873, Gosse, equipped with horses, set out from Alice Springs and headed southwestward across the Macdonnell Ranges, intending to reach Perth, 1,500 miles distant on the Indian Ocean coast. Beyond the Macdonnell Ranges, he became the first non-Aborigine to see Ayers Rock, a single block of sandstone towering 2,845 feet above the surrounding flat country.

Gosse was unable to bypass the Musgrave Mountains, which form a natural east-to-west barrier at the northwestern corner of South Australia. The rugged terrain and thorny vegetation all but crippled his horses, forcing him to abandon the expedition and turn back to Alice Springs.

William Gosse undertook one of three separate expeditions that attempted to cross Australia westward from the Central Overland Telegraph line in 1873. The others were led by ERNEST GILES and Colonel PETER EGERTON WARBURTON, who did reach the west coast after almost dying in the attempt. Although Gosse's expedition failed in its primary goal, he brought back news of Ayers Rock, one of Australia's most spectacular natural wonders.

Grant, James Augustus (1827–1892) *British army officer in East Africa*

James Grant was born in Nairn on the north coast of Scotland. Entering the British army at the age of 19, he served in India as an officer, where he took part in the Sikh War of

1848–49. While in India, Grant became friends with fellow British officer JOHN HANNING SPEKE, with whom he traveled into the Himalayas on hunting expeditions.

Wounded in the siege of Lucknow in the Sepoy Mutiny of 1857–58, Grant returned to England. In 1860, he was recruited by Speke to participate in his second attempt to find the source of the NILE RIVER.

Sailing from England at the end of April 1860, Grant and Speke arrived in Zanzibar the following October, after stopping in Cape Town to recruit porters and armed escorts for the expedition. They proceeded westward across what is now Tanzania, reaching the capital of the native kingdom of Karagwe on the southwest shore of Lake Victoria, in November 1861. While Speke went on to explore Lake Victoria, which he had reached several years earlier while in East Africa with SIR RICHARD FRANCIS BURTON, Grant was compelled to remain behind at Karagwe, incapacitated by his old leg wound.

Grant rejoined Speke on August 19, 1862, near Uronogani at the northern end of Lake Victoria, where, less than a month earlier, Speke had reached Ripon Falls emptying from Lake Victoria into what he firmly believed was the Nile. The two then headed northward into what is now Uganda, intending to descend the river into the Sudan and Egypt and thereby establish for certain that it was indeed the Nile, and that Lake Victoria was its ultimate source. Tribal warfare and problems with native chieftains in Bunyoro delayed their journey and forced them to leave the river at times. In February 1863, between Juba and Gondokoro on the White Nile River, in what is now southern Sudan, they met up with SIR SAMUEL WHITE BAKER and FLORENCE BAKER. Reprovisioned by the Bakers, they traveled downriver to Khartoum, and from there returned to England, arriving in June 1863.

With Speke's death in a shooting accident in September 1864, Grant became the principal supporter of his late partner's conviction that Lake Victoria was the true source of the Nile. Recording his experiences in East Africa in his 1864 book *A Walk Across Africa*, he came to be regarded as one of Great Britain's leading authorities on Africa. In 1868, he returned to Africa as an intelligence officer with the British Abyssinian Expedition, and he represented Great Britain at an international conference on African exploration convened by King Leopold of Belgium in the mid-1870s. Grant was also a member of an expedition sent to relieve MEHMED EMIN PASHA, under siege in the southern Sudan during the late 1880s.

Grant retired from the British army at the rank of lieutenant colonel and spent his last years at his home in Scotland. He was a talented painter, as well as a zoologist and botanist, and his volume of the botanical collection acquired in his 1860–63 exploration of East Africa, illustrated with his own watercolors, was published by the Linnean Society

in 1872. He also wrote an account of the southern Sudan region, entitled *Khartoum As I Saw It in 1863*, published in 1885.

In his explorations with Speke, James Grant was among the first Europeans to enter what is now Uganda. Although not present when Speke explored Lake Victoria's Ripon Falls, he played a vital supporting role in the expedition that determined that Lake Victoria was a principal source of the Nile, a finding verified with the explorations of SIR HENRY MORTON STANLEY in the 1870s.

Gray, Robert (1755–1806) *American mariner, fur trader in circumnavigation of world, explorer of mouth of Columbia River*

Robert Gray, a native of Tiverton, Rhode Island, spent his early seafaring career with the Continental Navy during the American Revolution of 1775–83.

In 1787, Gray was commissioned by a group of Boston, Salem, and New York merchants to undertake a voyage from Boston to Nootka Sound, on the Pacific coast of what is now British Columbia, to trade for sea otter pelts. Two ships were used in this expedition, the *Columbia Rediviva*, commanded by American sea captain John Kendrick, and the smaller sloop, the *Lady Washington*, commanded by Gray.

The ships sailed from Boston and headed first for the Cape Verde Islands off western Africa. They then headed southward, rounded CAPE HORN, and sailed northward up the coast of the Americas, arriving at Nootka Sound in September 1788. Unable to obtain sea otter pelts at that time of year, they spent the winter of 1788–89 anchored off Vancouver Island. During this time, Gray and his command witnessed the confrontation between the Spanish and British that gave rise to the Nootka Sound controversy of 1789.

The Americans exchanged trade goods for sea otter pelts with the Nootka Indians in spring and summer 1789. Gray was then placed in charge of the larger ship, the *Columbia*, and sent across the Pacific Ocean to trade the furs for a cargo of tea in Canton, China, while Kendrick remained on the Northwest Coast with the *Lady Washington*.

Gray sailed westward across the Pacific, stopping at the HAWAIIAN ISLANDS, then continuing to Canton. After selling the furs and obtaining tea, he sailed south and west into the Indian Ocean. He rounded the CAPE OF GOOD HOPE and returned to Boston on August 10, 1790. He was greeted with great celebration, having completed the first CIRCUMNAVIGATION OF THE WORLD aboard an American vessel. The trip had taken more than three years and had covered over 49,000 miles.

Gray soon sailed from Boston on the *Columbia* for a second voyage around CAPE HORN to the Pacific Northwest, reaching his destination in spring 1791. To the south of

Nootka Sound, at Clayoquot Sound, he constructed a temporary settlement, Fort Defense, where he wintered in 1791–92. While at Fort Defense, he had his men construct a small sloop, the *Adventure*.

In spring 1792, Gray sent the *Adventure* northward up the coast to trade for sea otter pelts at the southern tip of Alaska. Gray himself headed southward along what is now the coast of Washington and Oregon. On the way, he noticed breakers and a strong current coming from the mainland. He attempted to cross the breakers to investigate this phenomenon, believing that it indicated a river flowing westward into the Pacific. Since the early 1770s, fur traders in the Great Lakes region had reported Indian accounts of a great western river, known as the Oregon. Geographers at the time speculated that such a river would connect the upper Missouri with the Pacific.

In late April 1792, Gray decided not to cross the sand bar beyond the breakers into what was referred to as Deception Bay. Soon afterward, he conferred at sea with the British naval officer GEORGE VANCOUVER. He headed northward to the Strait of Juan de Fuca, south of present-day Vancouver Island.

Gray and the *Columbia* soon returned southward, and on May 11, 1792, he crossed the sand bar and entered Deception Bay. It turned out to be the estuary of a great river. Gray sailed the *Columbia* up the river about 36 miles, then returned to its outlet to the Pacific. He named the river Columbia's River, after his ship. It subsequently became known simply as the COLUMBIA RIVER. At this time, he also explored and named Grays Harbor on the central coast of what is now the state of Washington.

Gray sailed from the mouth of the Columbia to China, again traded for tea, and returned to Boston on July 31, 1793, having completed his second circumnavigation of the globe.

Gray continued as a merchant captain until his death in Charleston, South Carolina, in 1806.

Robert Gray's circumnavigation of the world inspired other U.S. seafaring voyages of exploration. His exploration of the Columbia River provided the basis for U.S. claims to the Oregon Country, which would be challenged by Britain and Spain for the next 40 years, and gave impetus to the overland expedition of MERIWETHER LEWIS and WILLIAM CLARK to the Pacific Ocean in 1804–06. Moreover, Gray's successful fur-trading enterprise influenced JOHN JACOB ASTOR's decision to develop direct trade between the Pacific Northwest and China and sponsor expeditions to the region in 1810–11.

Greely, Adolphus Washington (1844–1935)

U.S. Army officer in the Canadian Arctic

Adolphus W. Greely was born in Newburyport, Massachusetts, the descendant of a family that had settled in New England in the first half of the 17th century. Upon his

graduation from Newburyport's Brown High School in 1860, he enlisted in a Massachusetts volunteer regiment, serving in the American Civil War alongside future Supreme Court justice Oliver Wendell Holmes. Greely was wounded three times, including twice at the Battle of Antietam in 1862. Rising rapidly through the ranks, he was a brevet major of volunteers by the war's end.

Greely remained in the military after the war, reverting to the rank of lieutenant in the regular army. He took part in actions against Indians on the northern and southern plains in the late 1860s. Then, during the 1870s, he went on to serve in the U.S. Army Signal Corps. In 1876–79, he supervised the construction of more than 2,000 miles of telegraph lines in Texas, the Dakota Territory, and Montana.

In 1881, Greely was commissioned to lead the U.S. Army's Lady Franklin Bay Expedition in conjunction with the proposed International Polar Year of 1882–83. At an international geographic conference held in Hamburg in 1879, 13 circumpolar scientific observation stations were proposed to study various natural phenomena around the Arctic regions of the world, and the northernmost of these bases, the Lady Franklin Bay station, was assigned to the United States.

Greely and his team of 24 army officers and enlisted men (later joined by American physician OCTAVE PAVY) sailed from St. John's, Newfoundland, on July 7, 1881, aboard the *Proteus*, a sealing ship specially equipped for the Arctic. They reached Lady Franklin Bay on the northeast coast of Ellesmere Island, above Smith Sound, on August 12. Greely and his men established Fort Conger at nearby Discovery Harbor. The *Proteus* returned to Newfoundland, leaving Greely and his men with a portable house, scientific equipment, and enough supplies to last for the next 27 months. Although relief expeditions were planned for the following two years, Greely had been directed to start back on his own if no relief vessel arrived by the end of summer 1883.

Throughout the winter season of 1881–82, Greely and his expedition undertook hundreds of weather observations as well as studies of gravity and tides. Exploring expeditions were also sent out. On May 15, 1882, a small party led by Lieutenant J. B. Lockwood and Sergeant D. L. Brainard explored the north coast of GREENLAND, reaching 83°24' north latitude, thereby setting a new record for the northernmost point reached until that time. Several weeks later, Greely himself proceeded by sledge and on foot westward across Ellesmere Island, exploring 60-mile long Hazen Lake, which he named after the commander of the U.S. Army Signal Corps, General William B. Hazen. In May 1883, he traversed the northern end of Ellesmere Island to a long inlet on its west coast, which was named Greely Fjord in his honor. In addition, he sighted a mountain range in the interior of northern Ellesmere Island, naming



Adolphus W. Greely (Library of Congress)

its highest peak Mount Arthur, after President Chester A. Arthur.

Relief vessels were dispatched in spring 1882 but were unable to break through the ice of Smith Sound and reach Greely's base. Over the next winter at Fort Conger, rations were cut back, and the expedition supplemented its food supply by hunting polar bears and seals and fishing for shrimp. By summer 1883, it became apparent to Greely that ice conditions to the south would again prevent the supply vessel from arriving. In mid-August 1883, the expedition headed southward into Smith Sound, traveling in small boats and a small steam launch. They managed to reach as far as Cape Sabine, where progress southward was blocked by DRIFT ICE. They set up a temporary base, Camp Clay.

Conditions at the new base soon became critical for Greely and his men. SCURVY broke out, and the men began to die of starvation. Greely was forced to take drastic measures to conserve what rations remained, and even ordered the death by shooting of a Private Henry, who had been caught repeatedly stealing food. By spring 1884, expedition members had been reduced to eating their sealskin clothing and leather shoes, in addition to the shrimp they

managed to catch and the lichens they found growing on rocks.

On June 22, 1884, a relief ship, the *Thetis*, under the command of Captain Winfield Scott Schley, arrived at their encampment at Cape Sabine. By that time, only Greely and six others remained alive; on the homeward voyage, at a stopover at Godhavn, Greenland, one of them died.

On his return to the United States, allegations were made against Greely for his mismanagement of the expedition. However, the army commended Greely for leading the survivors through their ordeal. In 1885, both the ROYAL GEOGRAPHICAL SOCIETY and the Geographical Society of Paris honored Greely with gold medals. The next year, he was promoted to captain. In 1888, he was one of the principal founders of the NATIONAL GEOGRAPHIC SOCIETY in Washington, D.C. Greely was named commander of the U.S. Army Signal Corps in 1887 by President Grover Cleveland, and was made a brigadier general.

From 1898 to 1902, Greely directed the construction of telegraph lines in Puerto Rico, Cuba, the Philippines, and China. In Alaska in 1904, he supervised the construction of 3,900 miles of telegraph and ocean cable and established the first regular commercial wireless radio service, with stations at Nome and St. Michael.

Toward the end of his military career, Greely suppressed an uprising of the Ute Indians without resorting to armed force. That same year, he directed relief operations in the aftermath of the great San Francisco earthquake. He retired from the army in 1908 at the rank of major general.

Greely became embroiled in the controversy surrounding FREDERICK COOK's claim of having been the first man to reach the NORTH POLE, resigning from the Explorers Club in 1909 when that organization refused to recognize Cook's achievement.

Subsequent reports about General Adolphus W. Greely's 1881–84 expedition to the Arctic regions of Ellesmere Island and northwestern Greenland revealed the extent of the hardships he and his men faced, including evidence that in the last months before the rescue, they had resorted to cannibalism. Nevertheless, Greely retained his stature as one of the greatest American explorers of the Arctic. He was honored with the National Geographic Society's Charles P. Daly Medal in 1923 for having undertaken observations on the earth's gravity at a point closer to the North Pole than ever before, as well as for his copious meteorological and glacial studies on Ellesmere Island. In 1935, at the age of 91, Greely was awarded the Congressional Medal of Honor by special act of Congress. He died later that year in Washington, D.C., the first volunteer private of the Civil War to have reached the rank of major general. His own account of the Lady Franklin Bay Expedition, *Three Years of Arctic Service*, was published in 1886. He also wrote many articles on the Arctic for *National Geographic* magazine and published

other books, including *Handbook of Alaska* (1925) and *The Polar Regions in the Twentieth Century* (1928).

Greenwood, Caleb (1763–1850) *American fur trader, trapper, hunter, guide in the American West*

Although details of Caleb Greenwood's early life are sketchy, it is known that in 1810–11 he worked as a hunter for JOHN JACOB ASTOR's fur-trading enterprise in the northern ROCKY MOUNTAINS. The next year, he hunted for MANUEL LISA's operation on the upper MISSOURI RIVER and Yellowstone River. In 1823, he joined WILLIAM HENRY ASHLEY's fur-trading expedition into the Arikara Indian lands in present-day South Dakota, and, in 1825, he attended the first fur trappers' rendezvous on the Green River, at Henrys Fork, near the present Wyoming-Utah state border. He was later associated with KENNETH MCKENZIE of the AMERICAN FUR COMPANY and worked with JAMES PIERSON BECKWOURTH.

In 1826, at the age of 63, Greenwood married the mixed-blood daughter of a French trader and an Indian woman, who bore him five children. At the age of 81, he worked as a guide, leading the first wagon train across the Sierra Nevada into California in 1844. Three years later, he took part in the rescue of the survivors of the Donner Pass party. A few years before his death in 1850, he went to California to prospect for gold.

Although Caleb Greenwood was unable to read or write, his adventures as a mountain man in the American West were well documented in the journals and reports of those who knew him. Few MOUNTAIN MEN of his day covered as much territory. What is even more noteworthy is the duration of his career, which spanned the entire pre-Civil War era of westward expansion in the United States, from the opening of the Appalachian frontier in the 1770s, to the American settlement of California in the late 1840s. By the time he was working for Ashley in the 1820s, he was already in his sixties, and he was known by his contemporaries even then as "Old Greenwood."

Gregory, Sir Augustus Charles (1819–1905)

British surveyor, government official in Australia, brother of Francis Thomas Gregory

Augustus Gregory was born in Farnsfield in Nottinghamshire, England, the elder brother of FRANCIS THOMAS GREGORY. When he was 10, he moved to Western Australia with his family, where his father, a former British army officer, had been granted a tract of land upon his retirement.

In 1841, Gregory entered the service of the Western Australia government as a surveyor. Five years later, he joined his brothers Francis and Henry in an attempt to cross the Australian continent. The three set out from Perth and traveled northeastward to the Irwin River, where they lo-

cated coal deposits. Progress eastward was blocked by a large salt lake, and they headed back to Perth along a route that took them southward and closer to the west coast of Australia.

Gregory was in command of the Settlers' Expedition when it headed northward from Perth in 1848, in search of new grazing lands inland from Shark Bay. Upon reaching the Murchison River, about 350 miles north of Perth, he discovered traces of more mineral resources, this time evidence of minable quantities of lead ore. His explorations in the region east of Shark Bay also revealed additional grazing land for Australia's sheep and cattle industry.

In 1855, both the British government and the ROYAL GEOGRAPHICAL SOCIETY commissioned Gregory to undertake his most ambitious exploration of Australia's interior. The government was eager to find new lands in what is now the Northern Territory suitable for more agricultural development; the Royal Geographical Society also hoped to find some trace of the explorer FRIEDRICH WILHELM LUDWIG LEICHHARDT, who had vanished during his expedition of 1848.

Gregory traveled by sea to the mouth of the Victoria River, on the northwest coast of Australia, at the easternmost corner of Joseph Bonaparte Gulf. From there, he first went south and west, soon locating Sturt Creek. Following its course, he came upon Gregory Lake, a seasonal lake at the eastern edge of the Great Sandy Desert. At this point, he retraced his route eastward back to the Victoria, then followed that river's course into the region south of Arnhem Land.

Gregory continued along a route that approximated the one taken by Leichhardt in his expedition of 1844–45 across northern Australia, although in the opposite direction. Along the way, he charted thousands of square miles of new lands suitable for grazing.

Having traveled eastward along the entire southern end of the Gulf of Carpentaria, Gregory reached the Gilbert River at its southeastern corner and followed that stream eastward across the southern portion of the Cape York Peninsula. He eventually found the Burdekin and Belyando Rivers, which he followed as far south as the TROPIC OF CAPRICORN. Traveling eastward, he crossed the Mackenzie and Dawson Rivers, made his way through the GREAT DIVIDING RANGE, and reached the Pacific coast of what is now Queensland at Bustard Head, near the present-day city of Rockhampton.

Gregory next undertook an expedition into the central region of the Australian continent. Leaving Brisbane on Moreton Bay in 1858, he made a westward crossing of the Great Dividing Range and explored the upper Dawson River and Warrego River region, where he found some relics of Leichhardt's ill-fated expedition of 10 years earlier. His examination of the Barcoo River revealed that it was the same stream as Cooper's Creek, which CHARLES STURT had ex-

plored in 1845. The extremely harsh conditions of the Sturt Desert forced Gregory to abandon his search for further traces of Leichhardt. Instead, he headed southward around Lake Eyre to Lake Frome and the Flinders Range, continuing onward to Adelaide on the south coast.

In 1859, about a year after making his epic crossing from northeastern Australia to the south coast, Gregory was appointed surveyor general of Queensland, which had been established as a British colony. He settled in Brisbane, where he went on to hold additional government positions and continued to undertake explorations into western Queensland. In 1903, Gregory was knighted for his contributions to the knowledge of the geographic and geological characteristics of the interior of Australia.

Sir Augustus Gregory's explorations resulted in the charting of more than 5,000 square miles of territory in northern and central Australia. He also located much new usable land north of Perth in Western Australia as well as in the regions south and west of the Gulf of Carpentaria, and in the interior of Queensland. His 1858 expedition from Brisbane southwestward took him across a largely unexplored region north of Lake Eyre, conclusively demonstrating that central Australia did not contain a large horseshoe-shaped lake that barred colonial expansion northward from Adelaide, as had been believed. It also revealed that many of the rivers of south-central Australia drained into Lake Eyre.

Gregory, Francis Thomas (Frank Gregory)

(1821–1888) *British surveyor in Western Australia, brother of Sir Augustus Charles Gregory*

Born in Nottinghamshire, England, Frank Gregory, the younger brother of SIR AUGUSTUS CHARLES GREGORY, moved to Western Australia with his family when he was eight years old. Both brothers became surveyors for the government of Western Australia.

At times accompanied by Augustus and another brother, Henry, Frank Gregory took part in a number of explorations in the territory north of Perth. In addition to attempting the west-to-east crossing of the continent with his brothers in 1846, he explored the Lake Moore region north-east of Perth that same year.

In 1857, Gregory investigated the course of the Murchison River as far as Impey. He then crossed the Macadam Plains to the Gascoyne River, following it downstream to its mouth in Shark Bay. The next year, he surveyed the territory around Mount Augustus westward to the Gascoyne and Lyons Rivers.

In 1861, Gregory undertook a series of explorations in search of new grazing lands around the Nickol Bay region in the northern portion of Western Australia. He ascended the Fortescue River to its upper reaches, then crossed the

Hammersley Range and explored inland, undertaking surveys of the Yule, Ashburton, Shaw, De Grey, and Oakover Rivers before returning to the coast at Nickol Bay.

Although Frank Gregory's explorations were not continental in scope, as were those of his brother Augustus, by locating the region's few areas of arable land, his survey work had a great impact on Western Australia's subsequent inland settlement.

Grenfell, George (1849–1906) *British missionary in central Africa*

George Grenfell was born in Sancreed, a small town near Penzance, in Cornwall, England. In 1874, after completing his education in Birmingham, he entered the service of the Baptist Missionary Society, which sent him to the Cameroons on the west coast of central Africa.

At the time of Grenfell's arrival in the Cameroons in 1874, Germany and Belgium were beginning to assert their colonial presence in the Congo region. In his first years in central Africa, Grenfell surveyed the river systems of the Cameroons. In 1884–87, when King Leopold II of Belgium was consolidating his rule over the newly established Congo Free State, Grenfell undertook a series of expeditions along the lower course of the CONGO RIVER (now known as the Zaire River), exploring southward as far as the EQUATOR.

Grenfell's travels in the Congo brought him into contact with colonial as well as tribal leaders, to whom he became a familiar and trusted figure. In 1891, his influence in central Africa earned him an appointment as the Belgian government's representative in negotiations over the Congo River border between the Portuguese colony of Angola and the Congo Free State.

Grenfell settled near Basoko in what is now north-central Zaire, from where he extended his explorations into the northeastern Congo, exploring the Aruwimi River and the region between Lake Albert and the Congo River in 1900–02.

Along with SIR HENRY MORTON STANLEY, George Grenfell was among the first Europeans to venture into the interior of central Africa, one of the last regions of the continent to be explored by Europeans.

Grenville, Sir Richard (1540–1591) *English naval officer, colonizer on the Carolina coast of North America, cousin of Sir Walter Raleigh*

Sir Richard Grenville was born at Buckland Abbey, in Cornwall, England, the son of a poet and former courtier to the court of Henry VIII. A cousin of SIR WALTER RALEIGH, he was a member of the House of Commons, as well as a military leader, taking part in battles against the Turks in Hungary in 1566–67, and, the next year, in the suppression of a

peasant revolt at Munster, Ireland. In 1573–75, he sought sponsorship from Queen Elizabeth I for a CIRCUMNAVIGATION OF THE WORLD, a plan later carried out by SIR FRANCIS DRAKE in 1577–80.

Grenville commanded the British warship the *Tiger* in naval actions against the Spanish in the Caribbean in the early 1580s. In 1585, he sailed the *Tiger* with six other ships to the Carolina Coast, transporting a group of 108 settlers for Raleigh's first colonizing venture to Roanoke Island. Upon approaching the mainland, the fleet rode out a storm and was nearly wrecked in the shoals off a point of land, which Grenville, in consequence, dubbed Cape Fear. With the colony established on Roanoke Island, he explored the Carolina coast, including Pamlico Sound, visiting Indian villages at Secoton and Aquascogoc. At Aquascogoc, when an Indian stole a silver cup from the explorers' party, Grenville retaliated by having the Indian village and all its crops destroyed.

After eight days, Grenville sailed from Roanoke. Upon his return the following year, he found the Roanoke settlers gone and from a captured Indian learned that the colonists had departed a few weeks earlier with Drake, who had stopped by while engaged in privateering along the southeast coast of North America. Leaving a small contingent of his crew to maintain English possession of the colony, Grenville sailed back to England, intending to return with additional colonists, but the English were subsequently killed by the Indians, possibly in retaliation for Grenville's earlier harsh treatment. A second colony on Roanoke was founded in 1587, but it had disappeared when relief vessels under JOHN WHITE finally arrived in 1590, becoming known as the LOST COLONY.

In 1591, while serving as a vice admiral in command of the *Revenge*, Grenville was involved in a prolonged sea battle with the Spanish fleet off the AZORES. His ship was sunk in the engagement, and Grenville was gravely wounded and was taken prisoner. He died three years later.

Sir Richard Grenville was one of the first English navigators to explore the southeast coast of North America, and his colonizing efforts along the Carolina coast laid the basis for the first attempted permanent English settlement in what is now the United States.

Grey, Sir George (1812–1898) *British colonial administrator in Australia and New Zealand*

Born in England, George Grey embarked on a military career in his late teens, and, by 1836, he was a captain in the British army. That year, he sailed to Perth, the newly established colony on the west coast of Australia, and over the next few years, he explored the interior regions to the north.

In 1837, accompanied by a Lieutenant Lushington, Grey sailed northward along the coast from Perth, round-

ing North West Cape. He landed at Brunswick Bay, then traveled inland and explored the King Leopold Range. Although Grey had planned an overland trek southward to Perth, a distance of 1,200 miles, he instead returned to the settlement by ship.

Grey followed the course of the Swan River northeastward from Perth in 1838, and the next year, he undertook a second expedition. He sailed to Shark Bay and, during his survey of the territory to the north and east, made the European discovery of the Gascoyne River. On the return voyage to Perth, the ship was wrecked off the mouth of the Murchison River, and Grey was compelled to lead his expedition on a southward march along the coast.

Grey went on to a long career as a British colonial administrator, serving as governor of South Australia from 1841 to 1845 and governor of NEW ZEALAND from 1845 to 1854. In 1854, he moved to South Africa, where he was governor of the Cape Colony until 1860, and he then returned to his former post in New Zealand, where he remained until 1868. After a brief stay in England, he returned to New Zealand, and in 1877–79, he served as premier.

Sir George Grey's explorations of Western Australia in the late 1830s were notable for, in addition to the European discovery of the Gascoyne River, one of the most interesting archaeological finds on the continent. In the King Leopold Range, he discovered a series of cave paintings of human figures, one of them depicting a man 10 feet high and dressed in a red robe. Although first thought to have been left by early visitors from the Malay Peninsula, archaeologists later determined that they had been painted by Aborigines, probably members of the Wondjina people, who lived in the nearby Kimberley Ranges. According to Aborigine legend, the images, known as the Wondjina Figures, were impressions left in the rocks by the spirits of departed members of the tribe. Grey, a student of Pacific anthropology as well as an explorer, wrote *Polynesian Mythologies*, published in 1855.

Grijalva, Juan de (Juan de Grijalva)

(ca. 1489–1527) *Spanish conquistador in Cuba, Mexico, and Nicaragua, nephew of Diego Velásquez*

Born in the town of Cuellar, in what is now the Spanish province of Segovia, Juan de Grijalva was a member of a noble family, well connected to the royal government of Castile. He arrived in Cuba soon after its conquest in 1511, joining his uncle, DIEGO VELÁSQUEZ, Cuba's first colonial governor, at Santiago.

In 1518, Grijalva was commissioned by his uncle to further investigate FRANCISCO FERNÁNDEZ DE CÓRDOBA's reports of gold and an advanced Indian civilization in the lands west of the newly explored Yucatán Peninsula. Sail-

ing from Santiago de Cuba on May 1, 1518, in command of a fleet of four ships with 200 soldiers and crew, he initially followed the north coast of Cuba westward, then crossed the Yucatán Channel, making his first landing on the island of Cozumel, off the northeasternmost tip of the Yucatán Peninsula.

Grijalva and his fleet soon reached the mainland and, sailing eastward along the north coast of the Yucatán, passed into Campeche Bay. He frequently made landings along the shore, coming upon the river that now bears his name, where he encountered Maya Indian chieftains who presented him with gold plates fashioned into armor. Although he met some armed resistance from the Indians on the mainland, he was better equipped than the earlier Fernández de Córdoba expedition and sustained only minimal losses.

All along the coast, Grijalva saw evidence of the advanced architecture of the Maya, by then a subject people of the Aztec Indians. The huge stone crosses that the Indians had erected for religious purposes reminded Grijalva of his homeland, and he was the first to apply the name “New Spain” to the Mexican mainland.

Proceeding northward along Campeche Bay, Grijalva came upon the mouth of another river, which he dubbed the Río de las Banderas (river of banners) after the many colored pennants displayed by a delegation of Aztec he found on its banks. He established friendly contacts with the Aztec emissaries, trading some inexpensive European trinkets for a fortune in gold and jewels. Although his men urged him to establish a colony in order to continue bartering with the natives, Grijalva declined, having been ordered by his uncle, Velásquez, only to trade and explore. Instead, he dispatched PEDRO DE ALVARADO to sail one of the vessels back to Cuba and report what he had found.

Grijalva then continued his exploration northward along the Mexican coast, reaching as far as present-day Tuxpán, south of the Pánuco River. Along the way, he made the European discovery of the island of San Juan de Ulúa, off present-day Veracruz. A second island he located he called the Isla de los Sacrificios (island of sacrifices) after the large quantity of human remains he found in temples there (the first evidence that the native religion included the practice of human sacrifice).

Without receiving further instructions from his uncle, he decided to sail back to Cuba. Upon his arrival at Santiago, he found that Velásquez was already outfitting an even larger expedition to search for him and establish a permanent Spanish presence in Mexico. Although Grijalva had more than fulfilled his mission by confirming Fernández de Córdoba’s findings and returning with a treasure of gold and jewels acquired in trade with the Indians, Velásquez nonetheless rebuked his nephew for not

founding a colony on the Mexican mainland while he was there.

Grijalva returned to Mexico in 1523, following the conquest of the Aztec under HERNÁN CORTÉS. He subsequently took part in the Spanish conquest of Nicaragua, where, in 1527, he was killed in an Indian attack along with 19 other conquistadores.

Juan de Grijalva’s expedition of 1518 led directly to the Spanish conquest of Mexico, which was launched almost as soon as he returned to Cuba. He and his men were the first Europeans to venture into the territory of the Aztec Empire and the first to have direct contact with the Aztec and learn of their ruler, Montezuma. Many members of his expedition sailed with Cortés in 1518, including Pedro de Alvarado and BERNAL DÍAZ DEL CASTILLO, who both played critical roles in the conquest of Mexico.

Groseilliers, sieur de See CHOUART DES GROSEILLIERS, MÉDARD.

Grueber, Johann (John Grueber) (1623–1680)

Austrian missionary in China, Tibet, and India

Johann Grueber was born in Linz, an Austrian city on the Danube River. Educated as a mathematician, he entered the Jesuit order as a missionary priest.

In 1656, Grueber left Rome for the Far East, accompanied by Father Bernard Diestel. They traveled through the eastern MEDITERRANEAN SEA and made their way to Hormuz, at the mouth of the Persian Gulf. From there, they sailed to Surat on the west coast of India, north of Bombay. They continued their journey aboard an English ship that took them to the Portuguese colony of Macao, off the coast of China.

At that time, Portuguese shipping from Macao was being preyed upon by Dutch privateers from Batavia (present-day Jakarta, Indonesia), and, in order to circumvent this threat, Portuguese colonial officials encouraged Grueber to seek a westward overland route back to India and Europe.

After arriving at Peking (Beijing) in 1658, Grueber undertook missionary work. In Peking, he was met by a Flemish Jesuit priest, Father ALBERT D’ORVILLE, who was studying geography and surveying while in the Chinese capital.

In search of a westward overland route back to India, Grueber and Orville left Peking in April 1661, traveling westward to the Yellow River (Chang) and the city of Hsining (Xining), at that time the western limit of the Chinese Empire. They continued across the Ordos desert to Koko Nor, the great salt lake in northeastern Tsing-Hai (Qinghai) province. After skirting the rim of the desolate salt swamps of the Tsaidam region, they crossed the Burkan,

Buddha, and Shuga Mountains, at elevations sometimes exceeding 15,000 feet, and entered Tibet. They reached its capital city, LHASA, in October 1661.

Grueber and Orville remained in Lhasa for a month, where they were the first Europeans to observe the use of prayer wheels and other practices unique to Tibetan Buddhism.

In November 1661, Grueber and his companion continued their trek to India, crossing the HIMALAYAS into Nepal, where they visited Katmandu. From there they traveled across the plain of the upper GANGES RIVER. They arrived in Agra in north-central India in March 1662, nearly a year after they had started out from Peking. Orville soon died in Agra, and Grueber continued alone. He went first to Delhi, then crossed into what is now Pakistan. From Lahore, he descended the INDUS RIVER to its mouth on the Arabian Sea, then made an arduous trek westward across Baluchistan and the Makran desert country into Persia (present-day Iran).

From Hormuz, Grueber sailed to the head of the Persian Gulf, then followed the Tigris and Euphrates Rivers northward through what is now Iraq and Syria, to the Mediterranean coast. He arrived back in Rome in February 1664.

In his later years, Grueber served as a chaplain with the Austrian army in Transylvania. He later settled at Tyrnau (present-day Trnava, Slovakia), where he died in 1680. (Some accounts relate that he died in Italy or Hungary in 1665.) An account in Latin of Grueber's journey from China was written by the German Jesuit archaeologist and orientalist Athanasius Kircher, and was first published in Amsterdam in 1667.

Johann Grueber and Albert d'Orville were the first Europeans to visit Lhasa. The next European to do so was IPOLITO DESIDERI in 1716. In addition to a wealth of updated information about central Asia, and his reports about the little-known religion and culture of the Tibetans, Grueber returned to Europe with the first sketch of Lhasa's Potala palace and monastery, a focal point of Tibetan Buddhism.

Guancanagari (fl. 1490s) *Arawak tribal leader in the Caribbean*

Guancanagari was an Arawak (Taino) Indian chieftain, one of five kings, or caciques, who ruled the native people of Hispaniola (present-day Haiti and the Dominican Republic), when CHRISTOPHER COLUMBUS arrived on the island on December 5, 1492, in the course of his first voyage.

Guancanagari's people gave Columbus and his men a friendly reception when his ships landed at Puerto de San Nicolás on the eastern end of the island, and the Arawak leader soon invited Columbus to visit him at his village, where he received the admiral and his officers at his court.

From Guancanagari, Columbus learned that the island he had named Española (Hispaniola) was known to the natives as Haiti. The Spaniards also obtained gold from the interior of the island, a region the Arawak called Cibao. Columbus interpreted this as a reference to Cipangu, the name by which Japan was then known to Europeans; he was thus encouraged in his belief that he was near the mainland of Asia.

In late December 1492, Guancanagari helped Columbus salvage what he could from his flagship, the *Santa María*, after the vessel had become grounded on an offshore reef while the crew had been celebrating Christmas. The Arawak leader sent his men by CANOE to carry its contents ashore. Afterward, Guancanagari invited Columbus to reside at his home while the Spanish established their settlement, Villa de Navidad, near present-day Limonade, Haiti, on the island's north coast.

After Columbus had departed for Europe in mid-January 1493, Guancanagari attempted in vain to help defend the small Spanish garrison left at Navidad against an attack led by rival native rulers. All 43 of Columbus's officers and men were killed, and Guancanagari, who had been wounded in the battle, was forced to retreat with his people into the mountains.

Guancanagari greeted Columbus when he returned to Hispaniola in late November 1493, in command of a large-scale colonizing expedition. Over the next year, the other Arawak tribes united under the leadership of Caonabo and Manicaotex, who conspired to rise up against the European invaders and exterminate them. Guancanagari refused to lead his people in the planned uprising, instead warning Columbus of the impending attack. In March 1495, he allied himself with the Spanish in a military campaign against Manicaotex's faction in the Vega Real region of central Hispaniola.

Guancanagari's actions incurred the animosity of all the tribes on the island, forcing him to once more take refuge in the mountains, where he lived out the rest of his life in exile, stripped of his former status and authority.

Guancanagari was among the earliest native leaders of the Western Hemisphere to be known by name to Europeans and to help in their explorations. His efforts to gain the friendship of Columbus and the early Spanish settlers on Hispaniola led not only to his own downfall, but also to the eventual enslavement and extermination of his people, foreshadowing the dire impact that the process of European discovery was ultimately to have on Native Americans.

Gunnison, John Williams (1812–1853) *U.S. Army officer, American topographical engineer in the American West*
John W. Gunnison was a native of Goshen, New Hampshire, and received his early education at New Hampshire's Hop-

kinton Academy. He attended West Point from 1833 to 1837, graduating with honors as a second lieutenant in the artillery.

From 1837 to 1840, Gunnison served in Florida in the campaign against the Seminole Indians and assisted in the relocation of the Cherokee Indians, from Georgia to the Indian Territory (present-day Oklahoma). In 1838, he transferred to the U.S. Army Corps of Topographical Engineers.

During the 1840s, Gunnison took part in surveys in the Pacific Northwest, resulting in the region's first scientifically based maps. In 1849–50, he joined Captain HOWARD STANSBURY's expedition into present-day Utah's Great Basin and explored the country around the Great Salt Lake in search of a central route for a proposed transcontinental railroad.

On June 23, 1853, Gunnison led a company of topographical engineers in an expedition westward from Fort Leavenworth in what is now Kansas to explore and survey a possible route for a transcontinental railroad along the 38th parallel. Gunnison and his party went first to Bent's Fort, Colorado, via the Arkansas River Valley, then followed the Huerfano River into the Sangre de Cristo Mountains. He then dispatched part of his command southward to establish a road to Taos.

With the rest of his party, Gunnison headed north and west through Cochetopa Pass, across the Grand and Green Rivers, and found a little-known pass across the Wasatch Mountains that took him into Utah's Great Basin near Utah Lake.

On October 23, 1853, along the Sevier River south of Utah Lake, Gunnison and nine other members of his party, including artist-topographer RICHARD HOVENDON KERN, were killed in an attack by Ute Indians. Government officials suspected that Mormon settlers had incited the Ute to attack the party, but these allegations were never proven. Gunnison's survey in Utah was resumed the following spring under the command of Lieutenant EDWARD GRIFFIN BECKWITH.

Gunnison made a study of the Mormons while wintering in Salt Lake City in 1849–50. It was published in 1852 as *The Mormons, or Latter-Day Saints, in the Valley of the Great Salt Lake*, and was hailed at that time as one of the most comprehensive works on the subject.

Although Gunnison did not live to complete the survey of the 38th parallel, his explorations determined that a rail line through that part of Utah would require too many bridges and tunnels to be financially feasible. He also provided preliminary reports that led to the construction of military roads into Utah from the west and south.

Gutiérrez, Diego (unknown–1554)

Spanish cartographer

Diego Gutiérrez was a cartographer for Spain's House of Trade for the Indies (Casa de la Contratación de las Indias), the Spanish government's office that licensed mariners and

maintained updated maps of the world. In 1562, Gutiérrez produced the first map of South America detailing the continent's interior. Incorporating information gleaned from the explorations up the Río de la Plata undertaken by SEBASTIAN CABOT in 1526–30, as well as from FRANCISCO DE ORELLANA's journey down the AMAZON RIVER in 1542, his chart was the first to depict the extent of the river systems within South America.

By 1540, European mariners had revealed the outline of South America in their voyages. Diego Gutiérrez was the first to include information from inland explorations to show details of the interior of the continent. In contrast, it was not until the early 1800s that the North American interior was known to such an extent.

Guzmán, Nuño Beltrán de (Nuño de Guzmán; Núñez Beltrán de Guzmán)

(unknown–1544) *Spanish conquistador in Mexico*

Nuño de Guzmán was born in the city of Guadalajara, in the New Castile region of central Spain. Guzmán was one of the first Spanish magistrates to serve on the island of Hispaniola (present-day Haiti and the Dominican Republic) in the 1520s. In 1528, he was appointed as governor of the Mexican province of Pánuco on the central Gulf Coast region, near present-day Tampico. Soon after assuming office in May 1528, he began a program of exploitation of the Indians, enslaving many of them and transporting them to Hispaniola in exchange for livestock.

In December 1528, Guzmán was selected to succeed HERNÁN CORTÉS as head of the Spanish colonial administration of Mexico, known as the *audiencia*. He persisted in his cruel treatment of the native population while in that office, incurring the severe criticism of Catholic Church authorities, most notably Bishop Zumárraga.

Guzmán and an army of 500 Spaniards, along with as many as 10,000 Indian allies, marched from Mexico City in November 1529 and headed westward into the Jalisco region. He then launched a military campaign, which succeeded in subjugating the Tarascan, a tribe not under the domination of the Aztec. He soon extended his rule to the northwest with an expedition he sent out under the command of Cristobál de Oñate, which conquered much of what is now Sinaloa and Sonora on Mexico's northwest coast. He organized the new territory as the province of Nueva Galicia, and, on December 3, 1530, he founded its capital, which he named Guadalajara, after his hometown in Spain. Before long, he also established the city of Culiacán, as well as Tepic and Lagos.

By 1531, Guzmán had been replaced as head of the colonial government of Mexico, and the new governor sent an armed force into Nueva Galicia to arrest him on charges stemming from his previous abuses against the Indians.

During the next two years, he resisted efforts to capture him. As governor of Nueva Galicia, he also took steps that hampered Cortés's efforts at seaward exploration along Mexico's Pacific coast in 1532–33.

By 1536, Guzmán's political support had weakened, and he was compelled to surrender himself to the Spanish viceroy in Mexico City, ANTONIO DE MENDOZA. Although he was well received by the viceroy, a special commission for his prosecution ordered his arrest. He was held in a dungeon for more than a year and was sent back to Spain in 1538, where he spent his remaining years in obscurity and poverty.

Nuño de Guzmán was a leading figure in the second stage of the Spanish conquest of Mexico, following the destruction of the Aztec Empire. Because of his abuses in dealing with the Indians, he is usually regarded as one of the cruelest of the Spanish CONQUISTADORES. His exploits extended Spanish influence into western Mexico. Culiacán, which he established in the early 1530s, became the staging point for the explorations into the American Southwest undertaken by FRANCISCO VÁSQUEZ DE CORONADO, Guzmán's successor as governor of Nueva Galicia.



Hakluyt, Richard (ca. 1552–1616)

English geographer

Richard Hakluyt was born in Herefordshire, north of London. His family was of Welsh origin, with considerable wealth and influential ties to the English government.

Orphaned at an early age, the young Hakluyt was raised by an uncle, a lawyer whose name was also Richard Hakluyt, and whose client was the London-based MUSCOVY COMPANY. As the legal representative for the firm that had sponsored numerous voyages in search of both the NORTHEAST PASSAGE and NORTHWEST PASSAGE, the elder Hakluyt had a keen interest in geography and recent explorations, which he passed on to his nephew.

After attending Westminster School, Hakluyt entered Oxford University's Christ Church College in 1570, earning his baccalaureate degree four years later and his master's degree in 1577. That same year, he became a teacher at Oxford, and, in 1580, he became the university's first professor of modern geography.

In 1582, Hakluyt published his first major geographic work, *Divers Voyages Touching the Discovery of America and the Islands Adjacent*, which included accounts of the voyages and explorations of JOHN CABOT and SEBASTIAN CABOT and of GIOVANNI DA VERRAZANO. At the request of SIR WALTER RALEIGH, he wrote another work two years later, *A Discourse Concerning Western Planting*, promoting English overseas colonization in North America. Hakluyt argued that, in addition to countering Spanish commercial

and naval competition, English colonial expansion in North America would provide bases for the eventual discovery of the Northwest Passage. To support his position, he cited the explorations of Verrazano and JACQUES CARTIER 50 years earlier. Hakluyt went on to suggest that these colonies could be settled by the nation's unemployed and ultimately provide England with an exclusive overseas market. The work was privately circulated among Queen Elizabeth I and high government officials; a published edition did not appear until 1877.

In 1583, soon after his ordination as a priest in the Church of England, Hakluyt traveled to Paris, where he served for the next five years as chaplain to England's ambassador to the French court. During this time, Hakluyt had the opportunity to gather additional accounts of explorations undertaken by European navigators.

Hakluyt was largely responsible for the publication of JOHN WHITE's drawings and paintings of the Roanoke colony. On his recommendation, they appeared in German engraver Theodore de Bry's translations of THOMAS HARRIOT's *Briefe and True Report of the New Found Land of Virginia*, first published in Frankfurt in 1589.

On his return to England in 1589, Hakluyt published the first edition of his *Principal Navigations, Voyages, Traffics, and Discoveries of the English Nation*. This work was widely read and provided a basic source of geographic knowledge in England. An expanded version was published in three volumes from 1598 to 1600.

During the early 1600s, Hakluyt was a principal shareholder in the VIRGINIA COMPANY of London, which established the Jamestown colony in 1607, the first permanent English settlement in the present-day United States. In 1609, Hakluyt published *Virginia Richly Valued*, which detailed the explorations of HERNANDO DE SOTO in the 1540s and which fueled enthusiasm for English exploration and settlement in North America. He was also a member of the COMPANY OF MERCHANT ADVENTURERS DISCOVERERS OF THE NORTHWEST PASSAGE, founded in 1612.

Richard Hakluyt died in London in 1616. He played no active role in any voyage of exploration, and, in fact, traveled only a few hundred miles from his birthplace during his entire lifetime. Nevertheless, his writings helped raise support for many important English expeditions of the Elizabethan age, including those undertaken by JOHN DAVIS, SIR HUMPHREY GILBERT, and SIR RICHARD GRENVILLE. He was a financial backer of the English company that initiated the colonization of Virginia and New England. In contrast to the Portuguese and Spanish policy of secrecy in regard to geographic discoveries, Hakluyt made geographic knowledge widely available. His work had a great influence on subsequent explorations and illustrates how the rise of printing and book publishing in the 16th century accelerated all aspects of human endeavor, especially exploration. Since 1846, the HAKLUYT SOCIETY, established in his honor, has carried on his work, with the publication of firsthand accounts of exploration.

Hall, Charles Francis (1821–1871)

American journalist, explorer in northern Greenland and the Canadian Arctic

Charles Francis Hall was born in Rochester, New Hampshire, the son of a blacksmith. As a young man, he briefly took up his father's trade, then moved west to Cincinnati, Ohio, where he worked in the newspaper business, first as an engraver, then as a journalist.

Hall's interest in Arctic exploration was sparked in 1848 by the first reports of the disappearance of SIR JOHN FRANKLIN's expedition and the efforts undertaken by the British navy to find him. He resolved to take part in the search; in 1850, he tried, without success, to join EDWIN JESSE DE HAVEN's expedition. Nine years later, he was also turned down when he applied for a position with SIR FRANCIS LEOPOLD MCCLINTOCK's search expedition on JANE FRANKLIN's ship, the *Fox*.

Finally, in 1860, Hall won the support of Henry Grinnell, a New York merchant who had previously sponsored search expeditions under De Haven and ELISHA KENT KANE. Hall speculated that, if any of the Franklin party were still alive after more than 10 years in the Canadian Arctic, they could only have survived by adopting the Inuit way of life. He therefore decided to travel to the southeast coast of

Baffin Island and learn the Inuit language and their survival techniques. He planned to attempt a passage through Frobisher Bay (thought to be a strait) into Foxe Basin, and continue across the Melville Peninsula to the Boothia Peninsula and finally King William Island, where traces of Franklin's expedition had already been found.

Hall received free transport to Baffin Island aboard a New London-based whaling vessel, the *George Henry*, on which he sailed in May 1860. Outfitted by the ship's owners with sledges, a boat, and provisions, he spent the next two years exploring around Frobisher Bay among the Inuit. From them he heard a traditional story about earlier white visitors and realized it was a reference to SIR MARTIN FROBISHER's expeditions of the late 1570s. He learned that the five men who had disappeared from the expedition in 1576 had later perished when they attempted to sail back to England in a makeshift boat.

By summer 1862, Hall had learned Inuit language and survival skills. In his subsequent attempt to reach Foxe Basin, he discovered that what had been thought of as Frobisher Strait was actually a bay. At its closed western end, he named an island Frobisher's Farthest. He later located the remains of the house erected by Frobisher and his men in 1578.

With his route westward through Frobisher Bay to the Canadian Arctic blocked by impassable mountains and an icefield, Hall returned to lower Baffin Island. From there, he set out for the United States, arriving in August 1862.

With the Civil War raging, Hall volunteered to lead a naval expedition against Confederate coastal PRIVATEERS preying on Union shipping, an offer declined by President Abraham Lincoln. Hall then resumed his efforts to find the Franklin expedition, sailing in June 1864 to the north shores of HUDSON BAY aboard the whaling vessel *Monticello*. It took him nearly five years before he managed to reach Boothia Peninsula and King William Island. There, he heard Inuit accounts of how, 20 years earlier, the 79 survivors of the Franklin Expedition had died of exhaustion and starvation after abandoning the remaining vessel in Victoria Strait. From Inuit he obtained silverware and other relics of the expedition; he also managed to recover a skeleton of one of Franklin's men.

In his final expedition, Hall attempted to reach the NORTH POLE. In this project, funded by an act of Congress, he was provided with the *Polaris*, a vessel specially designed to withstand Arctic ice conditions. He sailed from New London, Connecticut, on July 3, 1871, and headed for Smith Sound, the narrow channel between Ellesmere Island and northwestern GREENLAND, the northernmost stretch of open water then known. The ship managed to negotiate the ice floes and passed north of Smith Sound into what was later called Hall Basin in his honor. In fall 1871, Hall explored farther to the north by sledge, reaching the north coast of Ellesmere Island and the entrance to the Lincoln

Sea. According to a geographic theory popular at that time, it was thought that an open, ice-free polar sea existed north of Greenland, providing access to the North Pole. The Smith Sound passage had been pioneered by Elisha Kent Kane and ISAAC ISRAEL HAYES. Upon reaching the northern limit of Ellesmere Island, however, Hall could see that seaward progress was blocked by ice. He returned to his expedition's winter quarters at Thank God Harbor, where he died of a stroke on November 8, 1871. The rest of the expedition continued explorations until 1873.

Hall's northernmost record endured only until 1876, when a British expedition led by SIR GEORGE STRONG NARES exceeded it. Officers from the Nares party visited Hall's grave at what had been named Polaris Peninsula after his ship, where they raised an American flag and left a commemorative plaque.

Charles Francis Hall helped facilitate subsequent Arctic exploration through his adaptation of Inuit survival techniques. His 1871 expedition revealed that both Ellesmere Island and Greenland extended much farther north than anyone had thought and helped put to rest the erroneous idea of an open polar sea. His earlier expedition to Prince William Island and the Boothia Peninsula provided more details of the final outcome of the ill-fated Franklin expedition and added significant information to geographic knowledge of the Canadian Arctic. His account of his 1860–62 expedition to eastern Baffin Island and Frobisher Bay, entitled *Researches and Life Among the Eskimaux*, was published in 1864.

Hall, James (unknown–1612) *English mariner in western Greenland, in service to Denmark and England*
James Hall was born in Hull, England, a seaport on the North Sea. Little is known of his early life, other than that he grew up to be an accomplished mariner and pilot.

In 1605, Hall joined an expedition organized by King Christian IV of Denmark to explore the west coast of GREENLAND. Encouraged by reports of the explorations of the 16th-century English navigator JOHN DAVIS, the Danish monarch hoped to reestablish contact, after a lapse of 200 years, with the Greenland colonies founded by Vikings. Like Hall, most of the officers with the Danish expedition were English, including its commander, John Cunningham.

Serving as pilot and first mate on one of the expedition's three ships, Hall sailed around the southern tip of Greenland into Davis Strait, then along Greenland's southwest coast, where the small fleet made landings at King Christian Fjord and other points. The expedition failed to locate European colonists; five Inuit (Eskimo) were captured and taken to Denmark, along with some rocks believed to contain traces of silver ore.

King Christian, encouraged by the possibility of mineral wealth on Greenland, sent out a second and larger ex-

pedition in 1606, with Hall serving as the pilot on the flagship of the five-vessel fleet. Upon reaching Davis Strait, ice conditions forced the ships westward, away from the Greenland shore. Although a sighting was made of land to the west, known later as Baffin Island, a landing was not attempted. Instead, the expedition continued northward as far as 66° north latitude and reached the Greenland coast. More Inuit were kidnapped and more rock samples gathered. The expedition then returned to Denmark.

Hall took part in a third expedition, sponsored by the Danish king in 1607, which failed to reach Greenland because of severe ice conditions. Danish interest in Greenland soon diminished when it was learned that the ore from the first two voyages contained no silver but only quartz, feldspar, and mica.

Soon after his 1607 voyage, Hall returned to England and succeeded in raising support among London commercial interests, led by Sir William Cockayne and Richard Bell, for his own expedition to Greenland in 1612. In command of two ships, the *Heartsease* and the *Patience*, he sailed from the port of Hull in April 1612. Accompanying Hall on the voyage as pilot was WILLIAM BAFFIN. After rounding Greenland's Cape Farewell, Hall sailed northward along the coast, exploring as far as a point just above the ARCTIC CIRCLE.

Turning southward, Hall anchored off present-day Holsteinborg, Greenland, known then as Rommel's Fjord, the very site where the Inuit had been abducted by Cunningham's men seven years before. On landing with some of the crew, Hall was recognized by a group of Inuit for his earlier complicity. One of the natives approached him and stabbed the Englishman with a harpoon. He died the following day and was buried on a nearby island. The expedition then returned to England.

James Hall's voyages to Greenland prompted other English explorations into Davis Strait, including those undertaken by William Baffin and ROBERT BYLOT in their search for the NORTHWEST PASSAGE. Soon after the 1605 voyage, James Hall prepared a report of the expedition for King Christian, which included the first charts of the west coast of Greenland.

Hamilton, William Thomas (Wildcat Bill)

(1822–1908) *American fur trader, trapper, guide in the American West*

Born in England, William Hamilton was brought to the United States as an infant by his parents in 1824. The family settled in St. Louis, Missouri, then the hub of the FUR TRADE on the MISSOURI RIVER and in the ROCKY MOUNTAINS.

As a youth in St. Louis, Hamilton had been plagued by health problems, probably respiratory in nature. His father, believing a long sojourn in the mountains would help in his son's recovery, provided financing for mountain man

WILLIAM SHERLEY WILLIAMS's fur-trading expedition into the Rockies on the condition that he take the younger Hamilton along.

Hamilton set out from St. Louis with Williams in 1842. During the next three years, they roamed the region between the Green River and the North Platte River in what is now southwestern Wyoming and northern Utah.

In 1849, Hamilton headed for California with the gold rush. From the northern California goldfields, he moved on to the Oregon Country, where he embarked on a career as an Indian fighter, taking part in the Rogue River War of 1855 and the Modoc War of 1856. He developed a reputation as a fierce and skilled opponent in these conflicts, becoming known as "Wildcat Bill."

Hamilton returned to the northern Rockies in 1857, where he assisted the U.S. Army in its efforts to subdue the Nez Perce, Blackfeet, and Crow Indians. In 1858, he established a trading post near the confluence of the Bitterroot and Clark Fork Rivers, and, in 1864, he moved his business to the upper Missouri settlement at Fort Benton in present-day Montana. While at Fort Benton, he became sheriff of surrounding Chouteau County.

With the outbreak of a major conflict with the Sioux (Dakota, Lakota, Nakota) and Cheyenne Indians on the northern plains in 1876, Hamilton returned to his former career as an Indian fighter. As a scout for General George Crook, he took part in the Battle of the Rosebud in June 1876.

In the late 1870s, Hamilton settled at Columbia, Montana, where he served as a guide for scientific expeditions into the Rockies. He spent his last years in Billings, Montana.

William Hamilton related his experiences on the frontier in his 1905 book, *My Sixty Years on the Plains, Trapping, Trading, and Fighting Indians*. The city of Missoula, Montana, developed around the post he had established in 1858 at the Bitterroot's junction with the Clark Fork.

Hanno (Hanno the Carthaginian) (fl. 470s B.C.)

Carthaginian admiral, colonizer on the coast of West Africa, possibly brother of Himilco

Hanno was a leading statesman and admiral of Carthage, the Phoenician city on the coast of North Africa, near the site of present-day Tunis. Some scholars believe he was the son of the Carthaginian military leader Hamilcar and brother of HIMILCO, the Carthaginian explorer of western Europe. In about 470 B.C., soon after the Carthaginians were defeated in their efforts to subjugate the Greek colony on neighboring Sicily, Hanno undertook a large-scale expedition of exploration and colonization along the northwest coast of Africa.

According to a Greek translation of Hanno's own report of the voyage (*see* PERIPLUS), he embarked from Carthage in command of a fleet of 60 oared GALLEYS, carrying as many as 30,000 men and women colonists, equipped with all essentials for establishing cities. After passing through the STRAIT OF GIBRALTAR, Hanno continued southwestward along the African coast. He established the first colony, Thymiaterium, on the site of present-day Mehdiya, Morocco. He then continued along the coast, founding the Phoenician cities of Agadir and Mogador on what is now the central Atlantic shore of Morocco.

After establishing six new colonies on the northwest coast of Africa, Hanno and his remaining ships and crew continued exploring southward along the coast of West Africa. He established an outpost on the island of Herne, known in ancient times as Cerne, at the mouth of the Senegal River. He reportedly continued southward to Cape Verde and the Gambia River, although some sources suggest he may have reached as far as the Gulf of Guinea.

Hanno recounted that, on what may have been one of the Bijagos Islands off the coast of the present-day West African nation of Guinea-Bissau, his men encountered small, hairy creatures—probably chimpanzees—and tried to capture some females. When the animals resisted, they were killed and taken back to Carthage, where their skins were displayed. This was the first contact the Mediterranean world had with these animals.

Hanno also reported that he sighted large portions of the shore ablaze in a region he named "Chariot of the Gods," probably a reference to the seasonal grass fires common to coastal Sierra Leone. He also described a mountain with fire spewing from it, suggesting that he had seen the active volcano Mount Cameroon on the south coast of the Gulf of Guinea.

Shortages of food and problems in making headway into contrary winds forced Hanno to sail back northward to the MEDITERRANEAN SEA and Carthage. On his return, he wrote his account on stone tablets and deposited them in the temple to the Phoenician god Melkarth.

Hanno is considered the first person known to have undertaken a voyage the primary objective of which was exploration and the expansion of geographic knowledge. His voyage was among those chronicled by RICHARD HAKLUYT in the late 16th century. Although the extent of Hanno's travels along the coast of West Africa is not certain, it is believed he reached at least as far as the shores of present-day Sierra Leone. Even if Cape Verde were his southern limit, Hanno reached within 15 degrees of latitude of the EQUATOR and covered a 3,000-mile stretch of the coast of West Africa. In contrast, Portuguese navigators of the 1400s would require nearly half a century of exploration to travel the same distance.

Hannu (Hennu) (fl. ca. 2450s B.C.) *Egyptian mariner on the Red Sea*

Hannu, also referred to as Henu, the name of a sacred boat in Egyptian mythology, was an Egyptian mariner during the Fifth Dynasty.

Based on hieroglyphics of the Egyptians, in about 2450 B.C. (although some sources indicate three decades earlier), Hannu and a force of some 3,000, sent by the pharaoh Sahure, traveled southward by way of the NILE RIVER, then overland, reaching the land of PUNT—possibly parts of what is now Sudan, Eritrea, Ethiopia, and Somalia—and the Arabian Peninsula. He reportedly returned to Egypt by the RED SEA with precious metals and spices, including gold and silver, as well as ebony and myrrh.

Hannu's journey is the first recorded expedition for the purpose of exploration.

Harpe, Bernard de la See LA HARPE, JEAN-BAPTISTE BÉNARD.

Harriot, Thomas (Thomas Hariot) (1560–1621)
English mathematician, naturalist on the Carolina coast of North America

Thomas Harriot was born in Oxford, England, where he went on to study at St. Mary's Hall, receiving his baccalaureate degree in early 1580. He then entered the service of SIR WALTER RALEIGH as a tutor of mathematics.

In 1585, Harriot was appointed geographer, surveyor, and naturalist for Raleigh's first colonizing expedition to North America. On his arrival with the other colonists on the coast of what is now North Carolina, he accompanied the expedition's commander, SIR RICHARD GRENVILLE, and a small party in an exploration of Pamlico Sound and helped in locating a site for the colony on Roanoke Island.

In summer 1585, Harriot conducted studies of the plants and animals around the colony, identifying more than 86 species of birds as well as many varieties of plants, trees, and shrubs then unknown to European naturalists. He also designed the fort erected by the colonists at the northern end of Roanoke Island and undertook a study of the Indians.

Harriot returned to England with the colonists aboard one of SIR FRANCIS DRAKE's ships in June 1586. He wrote an account of his observations of North America, entitled *A Briefe and True Report of the New Found Land of Virginia* and first published in 1588. He also wrote the text that accompanied JOHN WHITE's illustrated account of the Roanoke colony and environs, published in 1590.

In about 1600, Harriot won the support and patronage of Henry Percy, Earl of Northumberland, who provided him

with the financial means with which to carry on his scientific work. Harriot's later mathematical studies resulted in innovations in algebraic notations as well as several basic discoveries concerning equations. He also undertook astronomical observations with a telescope; in 1784, almost two centuries after his death, it was revealed that he had made discoveries of sunspots and studies of planetary orbits about the same time as those made by Galileo. He also corresponded with German scientist Johannes Kepler in connection with his study of optics.

Thomas Harriot's 1588 report on the Roanoke colony was the first critical study of North American flora and fauna undertaken by an Englishman. The work also contained observations on the Indians' reaction to the Europeans, citing that they regarded the English as supernatural beings. Also in regard to Indians, Harriot described their food crops and social customs and related how diseases such as measles and smallpox, first introduced by the English colonists in 1585, soon decimated the native population. Harriot's book, translated by German engraver Theodor de Bry into French, Latin, and German, became a principal source of scientific knowledge of North America for Europeans until the early 1700s.

Hartog, Dirk (Dirck Hartogszoon, Dirke-Hertoge) (fl. early 1600s) *Dutch mariner in Australia*

Dirk Hartog was a sea captain and navigator for the DUTCH EAST INDIA COMPANY. In 1616, he sailed from Amsterdam on a voyage to the Dutch EAST INDIES (present-day Indonesia) by way of the CAPE OF GOOD HOPE.

Hartog was instructed to round the tip of Africa, then to follow a course eastward, between 40° and 50° south latitude, across the southern Indian Ocean. Several years earlier, Dutch mariners had discovered that the constant, nearly gale-force westerly winds that blew along these latitudes, known as the "Roaring Forties," sailed their ships eastward in less than half the time it took them to travel along the more conventional northern route to the East Indies by way of Mauritius.

Sailing the *Eendracht* eastward beyond southern Africa and along the Roaring Forties, Hartog was driven southward. On October 25, 1616, the crew sighted an island lying off an unknown coastline, at the mouth of what later came to be known as Shark Bay. Hartog went ashore with a small party, claiming the island for the Dutch and naming it Dirk Hartogs Island. He commemorated the landing by leaving behind an inscribed pewter plate at the island's northern end, later known as Cape Inscription.

Hartog then followed the coastline northward, naming it Eendrachtland, after his ship, and eventually reached Batavia, the Dutch colony on Java.

Unknown to Dirk Hartog at the time, he and his crew were the first Europeans to sight and land on the west coast of Australia. Other Dutch navigators followed, and the western Australian mainland became known as New Holland. The next European to land on Dirk Hartogs Island was Captain Willem de Vlamingh in 1697, also a Dutchman. Vlamingh found Hartog's plate and replaced it with another, which was inscribed with details of both his and Hartog's landfalls. In 1801, French naval officer LOUIS-CLAUDE DE SAULCES DE FREYCINET landed on Dirk Hartogs Island while exploring Australia's west coast with THOMAS-NICOLAS BAUDIN's expedition. He found Vlamingh's plate and took it back to Europe, where it eventually found its way to the States Museum in Amsterdam.

Hatshepsut (Queen Hatshepsut, Hatchepsut, Hatshopsiti, Hatasu, Hashopsitu, Hatshopsiti, Hashepsowe) (1501–1479 B.C.) *Egyptian queen, organizer of trading expeditions to the coast of East Africa*

Hatshepsut was the daughter of Thutmose I, a pharaoh of the 18th Dynasty. She married her half brother, Thutmose II, who seized the throne from his ailing father. Hatshepsut, who had a claim to the throne by birth, shared the Egyptian monarchy with her husband/half brother until his death in 1504 B.C. She then assumed all power as pharaoh of Egypt, even going as far as wearing the traditional garb of a ruling male monarch.

As ruler of Egypt, Hatshepsut set about reviving the building program around the holy cities of Luxor, Karnak, and Thebes. To obtain the most luxurious materials for this project, she dispatched expeditions to distant places. On one of the first, she sent a party of EGYPTIANS up the NILE RIVER from the city of Memphis, near present-day Cairo, to the granite quarries at the First Cataract, near what is now the Aswan High Dam, to obtain a 350-ton stone obelisk.

In about 1492, Hatshepsut initiated her most ambitious trade expedition. She commissioned her lieutenant, Nehsi, to undertake an expedition of five ships down the RED SEA to PUNT, an ancient kingdom to the south, in the region of the Gulf of Aden, including parts of East Africa and possibly the Arabian Peninsula. The main object of the voyage was to acquire myrrh, cinnamon, frankincense, gold, ivory, and other items needed for Hatshepsut's grand temple of Deir al-Bahri, then under construction near Thebes. Both myrrh and cinnamon were essential for embalming and for use as incense in religious ceremonies, and Hatshepsut needed the gold to pay for the temple's lavish appointments.

Hatshepsut's enterprise to Punt was apparently a great success. Details of the voyage were later depicted on the walls of the temple of Deir al-Bahri, showing the Egyptians' arrival and the surprised reaction of the natives, who had lost

contact with the people north of the Gulf of Aden. In hieroglyphics and colored reliefs, her men are depicted returning with myrrh trees in tubs, with gold and silver, with ebony and ivory, and with live animals, including baboons, a panther, and dogs.

Upon Hatshepsut's death in 1479, her stepson, Thutmose III, became king, and he soon embarked on a great campaign of national conquest, extending the Egyptian empire into the Euphrates Valley. Yet the program of exploration by sea that she had initiated came to a halt, and Egyptian maritime enterprise did not resume for another 1,000 years.

Queen Hatshepsut's overseas trading ventures restored the flow of riches into Egypt and led to the first recorded, long sea journey in history. In addition, the pictorial representations of the expedition to Punt, which adorned the walls of her temple of Deir al-Bahri, constitute the earliest known illustrated account of travel and exploration. The hieroglyphic inscriptions also relate how the people of Punt, unable to understand that there was a place of which they had no knowledge, believed the visiting Egyptians were supernatural beings who had come from the sky.

Haven, Edwin Jesse de See DE HAVEN, EDWIN JESSE.

Hawkins, Sir John (1532–1595) *English mariner, slave trader in South America, the Caribbean, and Florida, cousin of Sir Francis Drake*

John Hawkins was born in Plymouth, England, into a family of prominent ship owners and seafarers. His father, William Hawkins, had been involved in trading expeditions between the east coast of Africa and Brazil.

In October 1562, Hawkins embarked from Plymouth with three or four ships and sailed to Sierra Leone, Africa, where he obtained a cargo of slaves from Portuguese traders. He then sailed his fleet to the Caribbean island of Hispaniola (present-day Haiti and the Dominican Republic), where he sold the slaves to Spanish colonists. He returned to England in 1563 with a cargo of WEST INDIES goods, including hides and sugar.

The financial success of Hawkins's first expedition led to the sponsorship of a more ambitious trade endeavor. Among his backers were Queen Elizabeth I and officials of the Royal Navy. On October 18, 1564, Hawkins left Plymouth in command of a fleet of four ships, including the queen's own vessel, the *Jesus of Lubeck*, as well as three ships owned by Hawkins's family, the *Solomon*, the *Tiger*, and the *Swallow*.

After obtaining slaves, gold, and ivory from Portuguese traders in Sierra Leone, Hawkins sailed to the island of

Trinidad in the Caribbean, using it as a base for trade with the Spanish colonies on the northeast coast of South America, known then as the SPANISH MAIN.

In summer 1565, Hawkins headed for England by way of the coast of Florida. That July, his fleet stopped at Fort Caroline, the French Huguenot colony at the mouth of Florida's St. Johns River under the command of RENÉ GOULAINÉ DE LAUDONNIÈRE. Hawkins sold supplies to the French, then returned to England, arriving in September.

In October 1567, Hawkins undertook a third slave-trading expedition to Africa and the Americas. With him on this trip, as on earlier voyages, was his younger cousin SIR FRANCIS DRAKE. At Sierra Leone, he took part in an intertribal war and obtained a shipment of slaves as a reward for his services. Hawkins then sailed for the Caribbean Sea and the Spanish Main, where he sold all the slaves as well as a cargo of English goods. His main vessel, the *Jesus of Lubeck*, suffered severe damage in stormy weather off the coast of Mexico, forcing repairs at San Juan de Ulúa, near present-day Veracruz, Mexico, in September 1568. While in port, the English were attacked by a Spanish squadron in an attempt to seize their ships for unauthorized trading in the Americas and for piracy in the Caribbean.

Hawkins managed to escape with one vessel, the *Minon*, and reached England in January 1569. Short of food supplies, he was forced to leave about 100 of his men on the Mexican coast near Tampico. Most either fell prey to the Indians or were captured and enslaved by the Spanish. Three of those left behind—David Ingram, Richard Browne, and Richard Twide—reportedly marched northward, eventually reaching Cape Breton, Nova Scotia, and obtained passage back to Europe aboard a French ship.

Back in England, Hawkins became a member of Parliament in 1572 and subsequently received an appointment as treasurer and comptroller of the Royal Navy. He was knighted for his efforts in the defeat of the Spanish Armada in 1588. In 1595, with Drake, he undertook a naval expedition against the Spanish in the Caribbean, but he died off the coast of Puerto Rico that November.

Sir John Hawkins, one of the first Englishmen to enter the lucrative SLAVE TRADE between Africa and the Spanish possessions in the Western Hemisphere, established the pattern of triangular trade between England, Africa, and the Americas. The accounts of his voyages to the Caribbean, South America, and Florida were published in Richard Hakluyt's *Principal Navigations* (1589). They relate early English impressions of Native American life, as well as a description of the short-lived French colony in Florida. An account by David Ingram, one of the three crew members who reportedly reached Nova Scotia, is also included in this work.

Hawqal, Abu al Qasim ibn Ali al-Nasibi ibn

See IBN HAWQAL, ABU AL QASIM IBN ALI AL-NASIBI.

Hayden, Ferdinand Vandever (1829–1887)

American geologist in the American West, physician

Ferdinand V. Hayden, a native of Westfield, Massachusetts, spent his early years in Rochester, New York. He attended Oberlin College in Ohio and received his M.D. degree from Albany Medical School in 1853.

Hayden, who was also an accomplished geologist and paleontologist, explored the Badlands of what is now southwestern South Dakota in 1853, while on a fossil-collecting field trip for the Smithsonian Institution.

In 1859, as a geologist with the WILLIAM FRANKLIN RAYNOLDS expedition, Hayden explored the upper Yellowstone River, as well as the Bighorn, Cheyenne, upper Platte, and Powder Rivers of present-day North Dakota, Montana, and Wyoming. Based on the geological investigations he undertook, he produced one of the first stratigraphical maps of the region comprising Montana, Idaho, and the Dakotas. He also wrote in 1860 his *Geological Report of the Yellowstone and Missouri Rivers*, one of the earliest scientific studies of the region between the MISSOURI RIVER and the ROCKY MOUNTAINS.

In 1867, following Civil War service as an army surgeon, Hayden was appointed head of the geological survey of Nebraska. In 1869, the project was expanded into the U.S. Geological and Geographical Survey of the Territories, sponsored by the Department of the Interior, including geological and ethnological studies of much of the Great Plains and Rocky Mountain region. In 1871–72, he conducted most of his work in what is now northwestern Wyoming, including what is now Yellowstone National Park.

In 1872–76, Hayden explored Colorado, sighting Mount of the Holy Cross in the west-central part of that state. This peak, designated a national monument in 1929, features snow-filled crevasses that form a large cross. Hayden also located ancient Indian cliff dwellings in Colorado.

In 1877, the Department of the Interior gave Hayden instructions to continue work on geographic and geological information. JOHN WESLEY POWELL, head of the simultaneous U.S. Geographical and Geological Survey of the Territories, was to specialize in ethnological and geological research. In 1879, the two surveys, plus two other surveys sponsored by the War Department under CLARENCE KING and GEORGE WHEELER, were organized into the U.S. Geological Survey. Hayden continued to collect specimens for the government until his death.

Ferdinand V. Hayden's published reports on the Yellowstone country brought the natural beauty of the area to national attention, eventually leading to the establishment of Yellowstone National Park in 1872.



Ferdinand V. Hayden (Library of Congress)

Hayes, Isaac Israel (1832–1881) *American physician, Arctic explorer*

Isaac Hayes was born in Chester County, Pennsylvania, just west of Philadelphia. Following his early education at Westtown Academy, he studied medicine at the University of Pennsylvania, graduating as a medical doctor in 1853.

Hayes joined ELISHA KENT KANE in his search for SIR JOHN FRANKLIN, as the expedition's surgeon. In spring 1853, the party sailed to the coast of northwestern GREENLAND aboard the *Advance*. After spending the first winter at the expedition's base at Van Rensselaer Harbor, on the Greenland side of Smith Sound, Hayes crossed over to Ellesmere Island in May 1854 and explored on his own from Dobbin Bay northward along the coast to Cape Frazier. Because of a broken sledge and a case of snow blindness, he ended his journey and returned to the ship at Van Rensselaer Harbor.

In August 1854, Hayes was among the expedition members who opted to leave Kane and the rest of the party on the *Advance* when the ship, becoming entrapped by DRIFT ICE, was unable to embark for home. Hayes, three other civilians, and five sailors tried to reach the Danish outpost at Upernavik, some 700 miles southward, taking with them a small boat and sledges. The attempt nearly cost them their lives. Beyond Littleton Island, they were stalled by storms. They broke up the wooden boat for fuel and constructed a makeshift hut. With their supplies running low,

they had to rely on the help of local Inuit, who provided them with food and guided them back to the ship. They reached it at the beginning of December 1854, after three months of trekking along the Arctic coast of northwestern Greenland.

Hayes returned with the expedition to New York in 1855. Despite his ordeal of the previous year, including the loss of several toes to frostbite, he was still enthusiastic about Arctic exploration. He was a strong proponent of the theory that there existed an open polar sea north of Ellesmere Island and Greenland, across which a passage could be made to the NORTH POLE. Over the next few years, he held lectures and made personal appearances to raise support for his own Arctic expedition. He also wrote an account of his earlier experience, entitled *An Arctic Boat Journey*, published in 1860.

With the financial backing of Henry Grinnell, the AMERICAN GEOGRAPHICAL SOCIETY, and others, Hayes was able to launch his attempt on the North Pole in 1860. He acquired a schooner, the *United States*, and, with a 14-man crew, sailed from Boston on July 9, 1860, heading for Baffin Bay and the Greenland coast. He recruited Inuit as hunters and dogsled handlers at Upernavik, then continued northward, hoping to reach Kane Basin and Smith Sound for a push to the polar sea before ice blocked his way. By the time he reached Hartstene Bay, however, it became apparent that further progress by ship would not be possible until the following spring. He put in at a harbor he called Port Foulke after one of his backers, and established winter headquarters.

Hayes and some of his party undertook inland explorations of the Greenland ice cap, examining a region that at one point proved to be at least 5,000 feet thick. Over the winter, disease killed most of the dogs. During an attempt to reach an Inuit village near what is now Thule Air Force Base for more dogs, two of his party perished, including the expedition's astronomer.

Despite the setbacks, Hayes set out with three other men in April 1861, in an attempt to reach a point above Kane Basin, where he was convinced he could find an entrance to the open polar sea. Equipped with dog sledges and a portable metal boat, the small party proceeded northward along the coast of Ellesmere Island and entered the southern end of Kennedy Channel, where the apparent southward drift of ice indicated an outflow of the polar sea. Hayes climbed a peak at Cape Josiah Good. He believed he could see open water far in the distance, but he probably saw the sky appearing to meet the frozen expanse to the north. He then continued up Kennedy Channel and, in May 1861, he reached a large inlet, which he called Lady Franklin Bay, after Franklin's widow JANE FRANKLIN. Because of the PACK ICE, the route northward was blocked. Although Hayes calculated this location to be 81°35' north latitude, he was unable to make an accurate determination because of the death of his astronomer

the previous winter. Subsequent explorers put his farthest point north at 80°14' north latitude, not quite the record for that time as Hayes's own reading indicated.

Hayes and his expedition left on the homeward voyage on July 14, 1861, surveying en route the west shore of Smith Sound around Cape Isabella. The party then headed southward into Baffin Bay. Following a stopover at Halifax, Nova Scotia, for repairs, Hayes arrived back in Boston in October 1861.

With the Civil War under way, Hayes donated his ship to the government and enlisted in the Union army as a surgeon, serving at a military hospital in Philadelphia. He reached the rank of brevet colonel by the war's end. Convinced that he had reached the edge of the polar sea, he set down his convictions in his 1867 book *The Open Polar Sea*.

Hayes undertook another Arctic trip in 1869; he accompanied the artist William Bradford on a voyage to Greenland, an experience Hayes described in his book *Land of Desolation*, published in 1871.

Passed over for command of the *Polaris* expedition in 1870 in favor of CHARLES FRANCIS HALL, Hayes settled in New York City. He later served in the New York State legislature, becoming an active proponent of the first Hudson River tunnel project.

Isaac Hayes's ideas about an open polar sea were proven erroneous when ROBERT EDWIN PEARY trekked across the frozen Arctic Ocean to reach the North Pole in 1909. Yet his techniques of establishing base camps and using Inuit hunters in order to survive several consecutive Arctic seasons were adopted by Peary and other explorers.

Hearne, Samuel (1745–1792) *British fur trader, explorer in northern Canada*

Born in London, England, Samuel Hearne entered the Royal Navy when he was just 11 years old and participated in the Seven Years War of 1756–63. In 1766, he joined the HUDSON'S BAY COMPANY and sailed to the company's post, Fort Prince of Wales (present-day Fort Churchill), on the southwest shore of HUDSON BAY.

In November 1769, Hearne led an expedition north from Fort Prince of Wales in search of a river that, according to Indian reports, emptied into the ocean. Indians of the region also described the area around the river as rich in copper deposits. Hudson's Bay Company officials hoped that the Coppermine River was the NORTHWEST PASSAGE through North America and would provide a shipping route to the Pacific Ocean.

Hearne abandoned his first attempt after three weeks because of problems with supplies and Indian guides. His second Coppermine expedition set out from Fort Prince of Wales in February 1770. Exploring northward from the Churchill River, Hearne and his party reached Dubawnt

Lake but were forced to return to Fort Prince of Wales after Hearne's navigational instrument was damaged.

Hearne's third attempt to find the Northwest Passage began in December 1770. Guided by the Chipewyan chief MATONABBEE, Hearne traveled northwestward from Fort Prince of Wales. He explored the Barren Grounds north of the lake and reached the Coppermine River. Following the Coppermine as it flowed northward, the expedition reached its outlet at Coronation Gulf on the Arctic Ocean on July 18, 1771. After claiming the coast for the Hudson's Bay Company, Hearne briefly surveyed the region around the river's mouth for copper, but found no significant deposits. The expedition returned southward along a different route, reaching Great Slave Lake in December 1771. Hearne became the first non-Indian to see this body of water. He reached Fort Prince of Wales on June 30, 1772.

In 1774, Hearne went westward from York Factory along the Saskatchewan River and established Cumberland House, the Hudson's Bay Company's first inland trading fort.

Hearne commanded Fort Prince of Wales from 1775 until 1782, when he was captured by the French under JEAN-FRANÇOIS DE LA GALAUB, comte de La Pérouse. After his release in Europe, he returned to the post, staying until 1787.



Samuel Hearne (Library of Congress)

Samuel Hearne's 1770–72 expedition traversed more than 3,500 miles of northern Canada's Barren Grounds. He was the first European to cross Canada overland from Hudson Bay to the Arctic Ocean; his explorations proved there was no short Northwest Passage west of Hudson Bay. Hearne's account of his expedition, *Journey from Prince of Wales Fort on Hudson's Bay to the Northern Ocean*, was posthumously published in 1795.

Hearsey, Hyder Jung (1782–1840) *British army officer in northern India, Nepal, and Tibet*

Hyder Jung Hearsey's father was an Englishman, and his mother a native of India. He entered the British army in India and, as a young officer, took part in the Great Trigonometrical Survey that had begun in 1802.

Hearsey first ventured into the western HIMALAYAS in 1808 on an expedition to the region north of Delhi and east of Dehra Dun. On the return journey, he explored the western frontier of Nepal, then headed southward and visited the city of Bareilly, east of Delhi.

In 1812, Hearsey accompanied British engineer WILLIAM MOORCROFT in an expedition that attempted to trace the GANGES RIVER to its source. They ascended the Ramganga River, a western tributary of the Ganges, and followed it northward to Dehra Dun. Disguised as wandering holy men, or *fakir*, they managed to enter Tibet through the 16,628-foot-high Niti Pass near Mount Kamet. Skirting the northern slopes of the Himalayas, they reached Lake Manasarowar and determined that it was not the source of the Ganges River, as European geographers then thought. On the return journey, Hearsey and Moorcroft were held captive in Nepal, but they were soon released and made their way back to Delhi.

Hyder Jung Hearsey's explorations of the western Himalayas and what is now northern Pakistan yielded much new geographic data for the British, who were then competing against Russian expansion southward into the Indian subcontinent. In their 1812 survey of Lake Manasarowar, Hearsey and Moorcroft became the first Europeans to explore that part of Tibet since IPPOLITO DESIDERI's visit nearly a century earlier.

Hecataeus of Miletus (Hekataios)

(fl. 520s–490s B.C.) *Ionian Greek author, traveler in the eastern Mediterranean and Egypt*

Hecataeus was a citizen of the ancient Ionian Greek seaport of Miletus on the mainland of present-day Turkey. He became known in his day as a historian and travel writer.

Some of Hecataeus's work was based on his own travels in the eastern MEDITERRANEAN SEA. In the sixth century B.C., he made a visit to Egypt in which he ascended the NILE RIVER as far as Thebes. Based on this trip, he later put forth

one of the earliest speculations about the source of the Nile, theorizing that it flowed from the great Ocean Stream, which the Greeks believed encircled the Earth.

With information from merchants and mariners, Hecataeus learned details about the Greek colonies of the western Mediterranean, as well as the neighboring regions in Spain and North Africa as far as the STRAIT OF GIBRALTAR. His geographic knowledge of the territory east of Asia Minor extended to the Caucasus Mountains and the Caspian Sea.

During the 490s, Hecataeus was one of a minority of Ionian Greeks aware of the great range and power of the Persian Empire to the east. In his geographic work *Periegesis* (translated as *Tour Round the World*), he attempted to warn his countrymen of the futility of rebellion against the Persians, who then dominated the Ionians; he also introduced into a European language the terms *India* and *Indus* as a reference to these far-off eastern lands recently conquered by the Persians.

With the defeat of the rebellion in 494, Hecataeus served as the Ionian ambassador and negotiated peace terms with the victorious Persian forces. Although Hecataeus's *Tour Round the World* has survived only in fragments, it was known to many ancient writers, including HERODOTUS, and is considered to be the earliest systematic description of the known world.

Heceta, Bruno (Bruno de Heceta, Bruno de Hezeta) (1751–1807) *Spanish naval officer on the northwest coast of North America*

Spanish naval officer Bruno Heceta commanded two ships in an expedition that explored the California coast north of San Francisco Bay in summer 1775. His mission had a two-fold purpose: to investigate how far southward Russian encroachment from Alaska had reached, and to seek the western entrance to the NORTHWEST PASSAGE, which had reportedly been discovered on the Oregon coast by JUAN DE FUCA in his 1596 voyage.

Heceta, sailing on the corvette *Santiago*, was accompanied on this expedition by JUAN FRANCISCO DE LA BODEGA Y QUADRA, who commanded the other vessel, the schooner *Sonora*. Upon reaching the latitude where Fuca had reportedly located the entrance to an inland passage leading to the Great Lakes, they found only a bay. Soon afterward, on July 14, 1775, they made a landing on the coast of what is now Washington State, at a point north of what later came to be called Grays Harbor, the first time Europeans had set foot on the shores of what is now the state of Washington. Once ashore, seven of Heceta's men were killed in an attack by Indians. Heceta claimed the region for Spain, naming the spot Point of the Martyrs (Punta de los Martires) in honor of the men he had lost. It was later renamed Point Grenville by British navigator GEORGE VANCOUVER.

Although Heceta and his expedition made other landings along the coast, they were deterred from exploring inland by Indian hostility and decided to continue the coastal reconnaissance northward by sea. While *Bodega y Quadra* managed to reach as far as the Gulf of Alaska, Heceta was forced to turn back off Vancouver Island, when his ship started to take on water and his crew was stricken with SCURVY. On the voyage southward, heavy fog hindered a close examination of the shoreline. On August 17, 1775, Heceta reached a large inlet at 46°17' north latitude, which he called Assumption Bay. By that time, his crew had become so weakened by scurvy that he dared not drop anchor, fearing they would not have the strength to raise it. He did remain in the bay long enough to detect strong currents, leading him to believe that he was opposite the mouth of a great river or passage to another great body of water. He named the points at the entrance to the bay Cape San Roque and Cape Frondoso (now known as Cape Disappointment and Cape Adams). The currents soon drove Heceta's ship out to sea, from where he headed southward to Mexico.

Bruno Heceta turned out to be correct in his speculations about the currents. What he had unwittingly detected was the mouth of what later came to be known as the COLUMBIA RIVER, the location of which was not confirmed until the explorations of ROBERT GRAY and WILLIAM ROBERT BROUGHTON in 1792.

Hedin, Sven Anders (Sven Anders von Hedin)

(1865–1952) *Swedish explorer in central Asia*

Sven Hedin was born in Stockholm, Sweden. In 1879, at the age of 14, he was inspired to dedicate his life to exploration, reportedly on witnessing the triumphant return of NILS ADOLF ERIK NORDENSKJÖLD to Stockholm after the completion of the first successful voyage through the NORTH-EAST PASSAGE.

Soon after his graduation from a Stockholm secondary school in 1885, Hedin made his first trip to central Asia, traveling to Baku, on the west shore of the Caspian Sea, where he had been engaged as a tutor for the son of a Swedish engineer working in the region's oilfields. The next year, he embarked on a series of overland journeys across Persia (present-day Iran), traveling by horseback southward from Teheran to the Persian Gulf, then heading northward to Baghdad before returning to Teheran and finally Europe the following year.

Hedin attended the University of Uppsala in Sweden, then completed his formal education in Berlin, studying under the German explorer of Asia FERDINAND PAUL WILHELM VON RICHTHOFEN. In addition to the geography, geology, and ethnology of central Asia, Hedin also studied central Asian archaeology. He became conversant in the Persian language, an ability that, in 1890, led to an appoint-

ment as interpreter for the Swedish diplomatic delegation to the court of the shah of Persia in Teheran.

Hedin remained with the Swedish embassy in Teheran for less than a year. In 1891, he embarked on a reconnaissance to the east, traveling across northern Persia into Russian Turkestan. He visited the ancient city of Samarkand and eventually reached the caravan trade center at Kashgar on the western edge of Chinese Turkestan. His journey also took him across the Kara-Kum desert to the city of Bukhara.

Hedin returned to Sweden in spring 1891. He soon organized his first scientific expedition into central Asia. He traveled across Russia to Tashkent, and, in winter 1893–94, he crossed the Pamir region. Along the way, he made several unsuccessful attempts to climb Mount Muztagh Ata. Returning to Kashgar in western Chinese Turkestan, he explored the Tarim Basin, then made a harrowing crossing of the Taklimakan desert, during which some of his guides died of thirst. On this expedition, he also came upon ruins of ancient settlements that had lined the old SILK ROAD. Hedin next explored Lop Nor, a large shallow lake in western China, its shifting location long a puzzle to European geographers. He went on to Peking (Beijing), then returned to Europe.

On his next scientific expedition into central Asia in 1899, Hedin descended the Tarim River to its outlet at Lop Nor, producing the first accurate charts of its course. On this journey, he determined that the lake had no fixed site, but shifted periodically as the course of its river sources moved from year to year. At the northern end of Lop Nor, he located the ruins of the ancient caravan way station at Loulan. He headed southward into Tibet but was turned back by Tibetan authorities as he approached the capital city of LHASA. He then headed westward and explored the Tibetan Plateau, becoming the first known European to sight the mountain range rimming its northern edge, which he named the Transhimalaya. Hedin's journey westward took him across these mountains eight times. He again traversed the Taklimakan and finally reached Kashgar. He then returned to Tibet and made an eastward crossing of northern India, descending the GANGES RIVER to Calcutta.

On his third expedition to central Asia in 1905, because of increasing international tensions, Hedin was unable to obtain permission to enter Tibet from British-held territory in northern India. He nonetheless proceeded with his venture, crossing the deserts of eastern Persia. He accurately recorded the LATITUDE AND LONGITUDE of his route, thus making the first geodetic survey of that region. He managed to reach Tibet from the northwest, through Ladakh, and made the first maps of the Transhimalaya region. On this expedition, he was able to locate with certainty the source of the INDUS RIVER, as well as that of the Brahmaputra and Sutlej Rivers. While in Tibet, he visited the Monastery of the Living Dead, produced maps, and made sketches depicting the panoramas of the Tibetan HI-

MALAYAS. He also collected a large number of geological and botanical specimens. In 1908, after three years in central Asia, Hedin returned to Sweden.

Hedin's explorations resumed after World War I with a 1923 expedition into western China's GOBI DESERT. In 1926, Lufthansa, the German airline, commissioned him to undertake a survey of western China in preparation for a proposed air route between Berlin and Peking. On this expedition, a meteorological team accompanying him established weather stations at regular intervals, including one alongside a previously uncharted river, which Hedin named the Edsingol.

From 1928 to 1933, Hedin was in charge of the Sino-Swedish Scientific Expedition. He led a large contingent of Swedish and Chinese scientists, including archaeologists, ethnographers, geologists, botanists, astronomers, and paleontologists, across a wide area of seldom-visited northwestern China. Their findings were published in a 50-volume work not completed until the 1970s. His last exploit in China was on behalf of the Chinese government, in which he attempted to survey an automobile route from Peking to the province of Sinkiang (Xinjiang) in the west in 1933–35.

Back in Sweden in the late 1930s, Hedin became a supporter of Nazism, notwithstanding his partial Jewish ancestry, and accepted an invitation to Munich in 1944, where he received an honorary doctorate. He continued to travel until his last years, undertaking a trip around the world when he was 82.

Sven Hedin's journeys in central Asia took him across a distance equal to that between the NORTH POLE and SOUTH POLE. He mapped more than 6,500 miles of previously uncharted territory, a total that approaches one-quarter of the earth's circumference. His archaeological findings in western China revealed much about the Silk Road, the caravan route that had linked China with the Mediterranean civilizations from ancient times until the early 20th century. Among his many books about his experiences in central Asia were *Transhimalaya* (1909–12), *Southern Tibet* (1917–22), and *The Silk Road* (1938).

Henday, Anthony (Anthony Hendry, Anthony Hende) (fl. 1750s–1760s) *British fur trader in central Canada*

Anthony Henday, a former smuggler from England's Isle of Wight, went to work for the HUDSON'S BAY COMPANY as a net mender in 1750. In June 1754, the company sent Henday westward from the York Factory post to search for the NORTHWEST PASSAGE and generate more trade with the Indians of central Canada. Traveling with a band of Cree Indians, Henday followed the Nelson and Hayes Rivers southwestward to Lake Winnipeg.

Henday crossed Lake Winnipeg and explored the region between the north and south branches of the Saskatchewan River. He traversed the prairies of Canada's midwest to a point within 40 miles of the eastern slopes of the ROCKY MOUNTAINS (although he did not mention seeing the peaks in his journals). He returned to York Factory in June 1755.

In 1759, Henday undertook a second expedition from York Factory and explored what is now northern Manitoba and Saskatchewan. Three years later, Henday left the Hudson's Bay Company and returned to England.

Anthony Henday explored the Canadian prairies and the Saskatchewan River system, increasing knowledge of the region west of HUDSON BAY to the Rockies. He also brought back the first reports of the buffalo-hunting Blackfoot Indians.

Hennepin, Louis (Jean-Louis Hennepin)

(ca. 1626–ca. 1705) *French missionary, explorer of the upper Mississippi Valley*

Louis Hennepin, a native of Ath (in present-day Belgium), was born in 1626, although some accounts give his birth date as 1640. Little is known about his early life other than that he studied at Ghent and later became a Franciscan missionary priest, passing his novitiate at the Récollet Monastery in Béthune in present-day France. In 1675, he sailed to French Canada as chaplain to RENÉ-ROBERT CAVELIER DE LA SALLE's expedition to the Great Lakes.

In 1676–77, Hennepin served as chaplain at La Salle's headquarters on the eastern end of Lake Ontario, Fort Frontenac. In 1678, he took part in La Salle's expedition to the western Great Lakes. Along the way, he made the earliest recorded European visit to Niagara Falls.

In 1679, Hennepin sailed on the *Griffon*, from the Niagara River, across Lake Erie and Lake Huron to Green Bay, on the west shore of Lake Michigan. On the passage between Lake Erie and Lake Huron, he sailed across and named Lake St. Clair.

Hennepin traveled with the La Salle expedition into the upper Mississippi Valley in 1680. That spring, from Fort Crèvecoeur (present-day Peoria, Illinois), La Salle sent Hennepin and MICHEL ACO to search for the source of the MISSISSIPPI RIVER. They also planned to establish a trading post at the mouth of the Wisconsin River. Hennepin and Aco descended the Illinois to the Mississippi, then followed that river into the Minnesota River, exploring parts of present-day Wisconsin and Minnesota.

While seeking the source of the Mississippi, Hennepin and Aco were captured by Sioux (Dakota, Lakota, Nakota) Indians. During his captivity, Hennepin visited the region of present-day Minneapolis, Minnesota, and named the Falls of St. Anthony.

In fall 1680, Hennepin and Aco were rescued by French explorer DANIEL GREYSOLON DULUTH at Mille Lacs Lake, Minnesota. From eastern Minnesota, they traveled with Duluth to Mackinac, where they spent the winter. In 1682, Hennepin returned to France. He died sometime after 1701.

Hennepin's 1683 book *Description de la Louisiane* includes the first written description of Niagara Falls. In his later literary efforts, Hennepin erroneously stated that he, and not La Salle, led the first successful expedition to the mouth of the Mississippi River. His writings, despite their inaccuracies and exaggerations, stimulated further European interest in the exploration of the upper Mississippi region.

Henry, Alexander (the elder) (1739–1824)

British-American fur trader in Canada, uncle of Alexander Henry (the younger)

Alexander Henry was a native of New Brunswick, New Jersey. He served under General Jeffrey Amherst in the French and Indian War of 1754–63. In 1761, he traveled to northern Lake Michigan to assume control of the former French fur-trading posts at Mackinac.

In 1763, during the rebellion of Great Lakes tribes under the Ottawa chief Pontiac, Henry was taken prisoner following an attack on Fort Michilimackinac. After a six-month captivity, he managed to escape and took part in the British battle against Pontiac's warriors at Detroit.

In 1775, Henry left the Great Lakes to pursue the FUR TRADE on the Saskatchewan River to the north. At Lake Winnipeg, he joined with fur traders PETER POND and Thomas and Joseph Frobisher. Henry and the Frobisher brothers traveled throughout the region between the Saskatchewan and Churchill Rivers via Portage du Traite, reaching Île-a-la-Crosse Lake in what is now northwestern Saskatchewan.

At Lake Île-a-la-Crosse, Henry heard reports from Athapascan Indians about the Peace River, the ROCKY MOUNTAINS, and another river that flowed north from Lake Athabasca into the sea.

Henry and Joseph Frobisher departed Lake Île-a-la-Crosse eastward in July 1776. They followed the Saskatchewan River to Lake Winnipeg and crossed to the Lake of the Woods. In October 1776, they reached Grand Portage on the northwest shore of Lake Superior. On returning to Montreal, they sold their year's catch of furs.

Henry continued in the fur trade at Montreal during the 1780s. He helped found the NORTH WEST COMPANY, one of the first collections of traders to challenge the monopoly of the HUDSON'S BAY COMPANY. His nephew ALEXANDER HENRY acquired his shares of that company in 1791.

Henry wrote about his life in the fur trade in his 1809 book *Travels and Adventures in Canada and the Indian Territories*.

Earlier, in 1781, Alexander Henry had contacted British scientist SIR JOSEPH BANKS, a veteran of JAMES COOK's first voyage, presenting Banks with a proposal for an overland expedition from Lake Athabasca to the Pacific coast of southern Alaska, which then was the focus of the lucrative trade in sea otter pelts. Although Banks is not known to have supported Henry's plan, he later encouraged JOHN LEDYARD to attempt to reach Alaska via an overland crossing of SIBERIA. Henry's speculations on the geography of northwestern Canada prompted SIR ALEXANDER MACKENZIE and other North West Company men to explore the river system of what is now British Columbia.

Henry, Alexander (the younger)

(unknown–1814) *American fur trader in the American West, nephew of Alexander Henry (the elder)*

Alexander Henry was a nephew of the fur trader ALEXANDER HENRY. Little is known of his early life.

In 1791, Henry acquired his uncle's shares in the NORTH WEST COMPANY. Over the next 23 years, he established several fur-trading posts in the Red River region of present-day northeastern North Dakota.

The younger Henry eventually managed North West Company posts from Lake Superior to the Pacific Ocean. He drowned while visiting Fort George (formerly Astoria) on the Oregon coast in 1814.

In 1897, Alexander Henry's journal was published with that of DAVID THOMPSON, as *New Light on the Early History of the Greater Northwest*. It contains descriptions of daily life at the Red River trading posts, as well as accounts of life among the Cree, Mandan, and Chippewa (Ojibway) Indians.

Henry, Andrew (Major Henry) (ca. 1775–1833)

American fur trader on the upper Missouri and in the Rocky Mountains

Andrew Henry was born and raised in York County, Pennsylvania. He settled for a time at Nashville, Tennessee, before moving to Ste. Genevieve, Missouri, where he operated a lead-mining business.

In March 1809, he became a partner in the ST. LOUIS MISSOURI FUR COMPANY. Along with MANUEL LISA, he departed St. Louis to the upper MISSOURI RIVER in June 1809. At the site of what is now Bismarck, North Dakota, he established Fort Mandan.

Henry embarked upriver from Fort Mandan in March 1810, accompanied by JOHN COLTER, GEORGE DROUIL-LARD, PIERRE MENARD, and EDWARD ROSE. At the Three Forks of the Missouri, Henry and his men constructed a

stockade, but they were driven away by Indian attacks. They headed southward to the Madison River, ascending it in June and July 1810, then crossed the Continental Divide along the valley of the Snake River into present-day Idaho. At the mouth of a tributary of the Snake River, known as Henrys Fork of the Snake, the party established a trading post.

Limited success in trapping beaver and repeated attacks by Blackfeet Indians made the venture unprofitable and dangerous. Henry left the Snake River and returned to St. Louis in spring 1811. During the War of 1812, he went into business with WILLIAM HENRY ASHLEY, supplying gunpowder to U.S. troops. Henry himself served in the Missouri militia as a major, becoming known as Major Henry.

In 1822, Henry and Ashley founded the ROCKY MOUNTAIN FUR COMPANY and undertook an expedition out of St. Louis up the Missouri. Henry established a post at the mouth of the Yellowstone, known as Fort Henry, where he spent the winter. In spring 1823, he headed farther upriver to the Great Falls of the Missouri with a party of trappers, JEDEDIAH STRONG SMITH among them.

In summer 1823, Henry headed down the river to aid Ashley, whose party had been attacked by the Arikara Indians. He then returned to his fort at the mouth of the Yellowstone. When that region's Indians declined to trade, he headed westward from Fort Henry to the mouth of the Bighorn River in present-day western Montana.

In spring 1824, Henry followed Jedediah Smith and another trapper, THOMAS FITZPATRICK, through the ROCKY MOUNTAINS via the SOUTH PASS, and supervised his company's trapping operations in the Green River Valley to the west in present-day Wyoming.

Henry returned to St. Louis with a load of furs in late summer 1824, whereupon he gave up the FUR TRADE to concentrate on his lead-mining interests at Ste. Genevieve, Missouri.

Andrew Henry played a key role in the first two major fur-trading enterprises to the upper Missouri River and Rocky Mountains. His exploits took him into uncharted parts of what is now western Montana and southern Idaho. His 1810–11 expedition to the Snake River resulted in the first fur-trading operation west of the Rockies undertaken by Americans.

Henry the Navigator (Henry the Navigator, prince of Portugal; Prince Henry the Navigator; Infante Dom Henrique) (1394–1460) *Portuguese sponsor of voyages of exploration*

Prince Henry was born in Oporto (Porto), the seaport on the northwest coast of Portugal. His father was King John I of Portugal and his mother was Philippa of Lancaster, the daughter of the English duke of Lancaster, John of Gaunt.

Henry's early education gave him a background in science, mathematics, and astronomy. In August 1415, he joined with his father and brothers in a crusade against the Moors on the North African coast, taking part in the Portuguese victory at Ceuta, the Muslim stronghold in present-day Morocco, opposite Gibraltar.

Appointed as military governor of the city soon afterward, Henry learned from its Arab inhabitants that it was the terminus for caravans laden with gold, spices, and other valuable commodities then being traded in Europe. By that time, the revival of commercial enterprise in Europe had given rise to a great demand for gold, and Henry saw an opportunity to advance Portugal's prestige and influence by seizing the source of the North African gold trade. The inhabitants of Ceuta told him that the gold originated in the region south of the SAHARA DESERT, along the upper Senegal River. Realizing that his Portuguese forces were not large enough to launch a successful military campaign of conquest southward beyond North Africa's Atlas Mountains, he resolved instead to circumvent the Arab monopoly on the African gold trade with a program of seaward exploration to the regions south of the Sahara along the coast of West Africa.

As a further reward for his valor in the victory at Ceuta, Henry was made a knight, granted the title Duke of Covilhã, and made governor of the Algarve, Portugal's southernmost province. In 1416, he established a naval depot at Sagres near Cape St. Vincent, Europe's southwesternmost point, and began sending out voyages of exploration to the west and south from the nearby port of Lagos. At Sagres, he also founded an observatory and a school of navigation and brought together astronomers, chartmakers, and highly skilled mariners. Among them was the Spanish-Jewish cartographer Judah Cresques, son of ABRAHAM CRESQUES of Majorca.

In one of the first expeditions organized by Henry, two of his mariners, João Gonçalves Zarco and Tristão Vaz Teixeira, discovered the island of Porto Santo in 1418, in the Atlantic Ocean about 700 miles southwest of Portugal. The next year, Zarco and Bartolomeu Perestrelo reached nearby Madeira Island. Portuguese colonization of the Madeira Island soon followed, providing bases for future explorations.

In addition to reaching the sources of the African gold trade, Henry wished to make contact with PRESTER JOHN, a fabled Christian king with a large and wealthy domain in the interior of Africa. It was the hope of many Christian monarchs that an alliance with Prester John would enable them to drive the infidels from the Holy Land, as well as eliminate the Arab middlemen in the eastern MEDITERRANEAN SEA, who then dominated trade with India and the Far East.

At Sagres, Henry's work included the development of improved navigational instruments, such as the ASTROLABE

and CROSS-STAFF, along with the necessary mathematical tables. One of the most important developments he helped foster was a program of shipbuilding, which produced the CARAVEL, a type of vessel ideally suited for long sea voyages.

In 1420, the pope appointed Henry as grand master of the Order of Christ, a post that gave him access to great revenues, which he could use to carry on his explorations for the ostensible purpose of extending Christianity. Starting in 1431, GONÇALO VELHO CABRAL and other mariners under Henry's sponsorship, located and colonized the AZORES, making the first recorded long voyages out of sight of land. Henry's program of exploration along the coast of West Africa was initially delayed by the fears many European sailors had about going beyond Cape Bojador (the "bulging cape"), the southernmost limit of the African coast known by Europeans. After 15 expeditions, Cape Bojador was finally rounded by GIL EANNES in 1434. A subsequent attempt to conquer the nearby CANARY ISLANDS ended in 1436, when the pope recognized Spain's claim to them.

Under Henry's sponsorship, AFONSO GONÇALVES BALDAYA also sailed beyond Cape Bojador in 1435–36, reaching Cape Blanco. The next year, Henry suffered a military defeat in a failed campaign against Tangier in which his brother Ferdinand was taken prisoner and died in Arab captivity. Henry then returned to Sagres, where he dedicated the rest of his life to his program of exploration.

In 1441, Antão Gonçalves, who was part of an expedition with NUÑO TRISTÃO, returned from a point near Cape Blanco with a number of black African slaves. They were presented to Henry along with a quantity of gold in return for his freeing of several Moorish captives. This event marked the beginning of Portugal's entry into the SLAVE TRADE, and a slave-trading depot was soon established on the island of Arguin, along the north coast of what is now Mauritania.

In 1444–45, DINIZ DIAS reached the mouth of the Senegal River and Cape Verde, Africa's westernmost point. An exploring party was sent up the Senegal, in accordance with Henry's desire to make contact with Prester John, marking the first European penetration of the African interior below the Sahara.

In 1455, Henry forbade the kidnapping of black Africans as slaves and restricted his mariners to buying slaves from Arab and native dealers. That same year, ALVISE DA CADAMOSTO explored the Gambia River, and the next year, he reached the Cape Verde Islands.

The last voyages undertaken with Henry's support were made shortly before his death in 1460. In 1458, DIOGO GOMES sailed beyond Cape Verde, and in 1460, Pedro de Sintra went as far as the coast of Sierra Leone, which he named after the roaring sound of thunderstorms he encountered there, as well as the "lionlike" appearance of the mountains. Soon afterward, Cape Palmas, on the coast of

what is now Liberia, was reached, the farthest point explored by Henry's sailors. In 1469, Henry's nephew, King Alfonso V, continued his uncle's work by engaging FERNÃO GOMES to explore the coast of West Africa; during this expedition, a point well into the Gulf of Guinea was attained.

Prince Henry's efforts mark the beginning of the great EUROPEAN AGE OF EXPLORATION. He was not known as "Henry the Navigator" until 1868, when the title was bestowed upon him by his British biographer, Richard Henry Major. Known also as "the explorer who stayed home," he was a progressive thinker who emerged from the shadows of medieval dogmatic belief to apply science and practical techniques to the advancement of knowledge about the world around him. The explorations he financed and encouraged had far-reaching results. Not only did his efforts initiate the slave trade, with its great impact on Africa and eventually in the Americas, but his work gave rise to the Portuguese overseas empire that developed after the voyages of VASCO DA GAMA. The advances in ship design and navigational techniques he fostered contributed to the success of CHRISTOPHER COLUMBUS in his 1492 voyage to the Americas.

Henson, Matthew Alexander (1866–1955)

American explorer in the Arctic

Matthew Henson was born in Charles County, Maryland, the son of a farmer. His family moved to Washington, D.C., when he was still very young, and there he attended elementary school. He then worked for a time in a restaurant, and, in 1878, at the age of 12, he embarked on a career as a merchant seaman.

Aboard the *Katie Hines*, Henson served first as a cabin boy, then went on to become a seaman. He sailed throughout the world, visiting ports in China, Japan, the Philippines, North Africa, and Europe.

Henson returned to Washington, D.C., after six years at sea. He held a variety of jobs, including one as a clerk in a Washington hat store. In 1887, he met ROBERT EDWIN PEARY, then a U.S. naval lieutenant and civil engineer. Peary soon hired Henson as his valet.

Henson accompanied Peary on his travels for the next 22 years, including a surveying expedition to Nicaragua, as well as several Arctic explorations. In 1908, he sailed to Greenland with Peary and took part in a trek across the frozen Arctic Ocean that brought him, Peary, and four Inuit (Eskimo) to the NORTH POLE on April 6, 1909.

Because he was an African American, racial prejudices led the public to overlook Henson's contributions to the first expedition to reach the North Pole. Nonetheless, he eventually won some recognition through the efforts of his supporters, and, in 1913, he was granted a position as clerk at the U.S. Customs House in New York City upon the direct recommendation of President William Howard Taft.



Matthew Henson (Library of Congress)

Henson retired from his civil service job in 1933. In his 88th year, he finally received full recognition for his polar exploits with honorary degrees from Morgan State College and Howard University. The Explorers Club made him a member shortly afterward, and, in 1944, Congress included him in a joint medal granted to Peary's Arctic team. He was honored by President Harry S. Truman in 1950 and was received at the White House by President Dwight D. Eisenhower in 1954.

Within five years of his death in 1955, some historians began to suggest that Matthew Henson had played a larger role in attaining the North Pole in 1909 than had previously been thought, some even proposing that he had arrived there as much as an hour before Peary. Others have shed doubts on this speculation, maintaining that Henson had no knowledge of navigation and that only Peary was equipped to determine the exact location of the North Pole. Henson's account of the expedition, *A Negro Explorer at the North*

Pole, was first published in 1912. A later work, *Dark Companion*, written by Henson with Bradley Robinson, first appeared in 1947.

Herbert, Thomas (fl. 1620s) *English traveler, writer in Persia*

In 1627, Englishman Thomas Herbert undertook a journey to Persia (present-day Iran) accompanied by England's ambassador to the shah, Sir Dodmore Cotton, and the shah's own ambassador to England, Robert Sherley, an Englishman in Persian service and younger brother of SIR ANTHONY SHERLEY. Five years earlier, a combined English and Persian force had driven the Portuguese from the port of Hormuz. With increased English commercial interest in India in the early 17th century, Persia, with its strategic position midway between lands of the eastern MEDITERRANEAN SEA and India, was becoming a center of interest for English traders and diplomats.

Both of Herbert's English traveling companions died at Qazvin in northwestern Persia, soon after their arrival in the country. Yet Herbert continued on by himself, traveling throughout Persia, from Bandar Abbas, near Hormuz, to the capital city at Esfahan in the center of the country.

Thomas Herbert's travels in Persia took him across large expanses of territory unknown to Europeans. He remained in Persia until 1629, and upon his return to England he recounted his experiences in the book *Description of the Persian Monarchy* (also known as *A Relation of Some Years Travaile*). First published in 1634, it was widely read and became a basic sourcebook for information on Persia.

Herjulfsson, Bjarni (Bjarni Herjolfsson, Bjarne Herjolfsson) (fl. 980s) *Norse mariner in Iceland, Greenland, and North America*

Bjarni Herjulfsson was the son of Herjulf, who with ERIC THE RED was one of the original Norse settlers on the southwest coast of GREENLAND.

According to Norse oral tradition, as written down in *Groenlendinga*, or the *Saga of the Greenlanders*, Herjulfsson set out from southwestern ICELAND in the summer of A.D. 985 or 986 to visit his father at his farm, known as Herjolf-snes, at the Greenland settlement. Sailing southwestward, his ship became enveloped in fog and was driven off course to the south and west, probably carried by the Greenland and Labrador currents.

Once out of the fog, Herjulfsson determined his latitude by solar observations, and, realizing that he had reached a point far south of Greenland, sailed northward. To the west, he reportedly sighted three distinct coastlines. The first of these appeared to be flat and wooded, the second was also wooded but with hills, and the third he later described as mountainous and capped by a glacier. This last he deter-

mined to be an island. Although he had come close enough to make these observations, he made no landings. He subsequently sailed northward to what is now Frobisher Bay on southern Baffin Island, then crossed Davis Strait, reached southern Greenland, and rounded its southern tip, returning to Iceland.

Herjulfsson next appears in the Norse sagas in connection with the voyages of LEIF ERICSSON. Although there is no written record, he may have described to Leif Ericsson the western lands he had reached on his earlier voyage. It is recorded that Ericsson purchased Herjulfsson's ship and, in 1001–02, he used it to sail to the shores of what he later identified as VINLAND, Markland, and Helluland.

Historians have speculated that Bjarni Herjulfsson may have sailed along the coast of northeastern North America, and that the lands he sighted were present-day Long Island, Nova Scotia, Newfoundland, and Labrador. In the context of the Norse sagas, he was the first of the VIKINGS, and the first European, to see the North American continent.

Herkhuf (Harkhuf, Harkhaf) (fl. 2270s B.C.)

Provincial governor in ancient Egypt

Herkhuf held the position as governor of one of ancient Egypt's southernmost provinces during the reign of the pharaoh Mernera of the Sixth Dynasty. In about 2270 B.C., Herkhuf undertook a trading expedition up the Nile into equatorial East Africa, which brought back a cargo of ebony, ivory, and frankincense, the latter commodity being highly valued for embalming and for use in religious ceremonies.

Under Herkhuf's command, additional expeditions ventured into the regions south of Egypt, returning with more valuable items from the tropics. He also reportedly brought a native captive from the upper Congo River (Zaire River) region.

Herkhuf's trading enterprises constitute some of the first long voyages to be undertaken by EGYPTIANS and provide an early record of the earliest known contacts between the ancient civilizations of the eastern MEDITERRANEAN SEA and those in the interior of Africa.

Hernandez, Juan Josef Pérez See PEREZ

HERNANDEZ, JUAN JOSEF.

Herodotus (Herodotus of Halicarnassus)

(ca. 490–420 B.C.) *Greek historian, geographer in the Mediterranean region*

Herodotus was a native of the Greek city of Halicarnassus on the east coast of Asia Minor, now the site of Bodrum, Turkey. Starting in about 457 B.C., Herodotus began his travels around the MEDITERRANEAN SEA, heading northward

along the coast of Asia Minor to the Greek colonies on the shores of the Black Sea. He also traveled into the western parts of Scythia in eastern Europe and western Asia, as well as Syria, Palestine, and Egypt. In Egypt, he ascended the NILE RIVER as far as the First Cataract and visited Memphis, Heliopolis, and Thebes.

In about 447, he went to Athens. In 443, Herodotus traveled westward to the southern part of the Italian peninsula, where he took part in establishing with other Greeks the colony of Thurii on the Gulf of Taranto.

Settling permanently at Thurii, Herodotus undertook the writing of his great *History* (the Greek word for “inquiry”), chronicling the wars between Persia (present-day Iran) and Greece of 500–479. As a background to historical events, he described the geography and culture of the Mediterranean and surrounding regions, based on his own travels, reports from traders, and information from the writings of HECATAEUS OF MILETUS.

Herodotus wrote in detail about the great Persian Empire to the east, stretching as far as the INDUS RIVER. He described the great interior highway system, the Persian Royal Road, which connected the cities of the empire. The lands beyond the INDUS RIVER, he believed, were not inhabited by people, but by giant animals and birds. Herodotus also related accounts of Persian explorations, including one of a voyage made by SCYLAX, a Greek mariner in the service of Persian ruler Darius I, who descended the Indus and sailed along the coast of the Persian Gulf and Arabian Sea to the mouth of the RED SEA.

Concerning Africa, Herodotus told the story of five North African Berber princes who journeyed southward across the SAHARA DESERT and came upon a great eastward-flowing river, probably the NIGER RIVER, although Herodotus wrote that it was the source of the Nile in the region around Lake Chad. Herodotus also related that, in about 600, NECHO II, pharaoh of Egypt, had commissioned Phoenicians to undertake a voyage from the Red Sea, southward around Africa. After three years, they had returned to Egypt by way of the STRAIT OF GIBRALTAR, thus completing a circumnavigation of the continent. Herodotus also wrote of another voyage undertaken by a Persian prince who, after passing westward through the Strait of Gibraltar, explored the coast of West Africa and returned with reports of the trade in gold among the natives south of the Sahara.

Among other peoples, Herodotus identified the Scythians, the early nomadic dwellers of the central Asian steppes, and may have made one of the earliest Western references to the Chinese beyond. He also correctly identified the Caspian Sea as a landlocked lake.

Herodotus's writings had a great influence on classical thinking. A century after his death, his *History* helped inspire ALEXANDER THE GREAT's campaign of conquest eastward across Persia and western India. With only limited

sources, Herodotus presented a remarkably accurate view of the world. He correctly put forth the idea that the Earth was a sphere, rather than a flat disk, as many of his contemporaries believed. He also correctly surmised that there was a southern limit to Africa. He is sometimes referred to as the “father of history.”

Heyerdahl, Thor (1914–2002)

Norwegian anthropologist, zoologist in the Pacific and Atlantic

Thor Heyerdahl was born in Larvik, Norway. At the University of Oslo, he specialized in zoology and geography.

In 1937–38, while studying marine life and its transoceanic origins in Polynesia, specifically on Tahiti and Fatu Hiva of the Marquesas Islands, Heyerdahl became interested in the origins of the Polynesians. Because of easterly OCEAN CURRENTS and winds, he became convinced that the islands' inhabitants had arrived from North America, like the flora and fauna, as opposed to paddling against the current from Southeast Asia to the west. In 1940–41, he spent time in British Columbia and studied Native Americans of the Pacific coast. He developed his theory that the South Pacific islands had been reached by two waves of peoples: The first had arrived at Polynesia from Peru via Easter Island by balsa RAFT; the second, centuries later, had arrived at the HAWAIIAN ISLANDS by large double-CANOE from British Columbia.

Heyerdahl's studies were interrupted by World War II in which he served with the Free Norwegian forces as a parachutist. Afterward, along with five companions, he built the balsa raft *Kon-Tiki*, based on an ancient South American design and in 1947, sailed across 4,300 miles of the Pacific Ocean from Callao, Peru, to the Tuamotu Archipelago of Polynesia in 101 days. In 1954, Heyerdahl led the Norwegian Archaeological Expedition to the Galapagos Islands and examined Inca and pre-Inca Indian artifacts. In 1955–56, he led an archaeological expedition to Easter Island, further developing his eastern migration theory.

Continuing his study of ancient navigation, Heyerdahl also developed the theory that ancient Egyptians traveled across the Atlantic Ocean to South America and perhaps founded cultures there or passed on knowledge. He built a papyrus boat made of reeds based on an ancient Egyptian design. In 1969, in an attempt to follow currents from North Africa to the Americas, the *Ra I* broke up and sank after 2,000 miles. In 1970, Heyerdahl and a crew of six aboard the *Ra II* set out from Safi, Morocco, and reached the island of Barbados in 57 days.

In the late 1970s, Heyerdahl began a 6,200-mile journey from Iraq to the Indian Ocean in a reed boat, the *Tigris*, to demonstrate a possible route used by the Sumerians of Mesopotamia (making up parts of present-day Iraq and



Thor Heyerdahl (Library of Congress)

Syria) some 5,000 years ago, but warfare in Ethiopia prevented him from passing the port of Massawa. He participated in an expedition to the Tigris River in the Middle East in 1977, as well as three expeditions to the Maldive Islands in the 1980s.

Heyerdahl's books include *American Indians in the Pacific* (1952), *Kon-Tiki* (1948), *Aku-Aku, the Secret of Easter Island* (1957), *Sea Routes to Polynesia* (1967), and *The Ra Expeditions* (1967). His documentary film of the *Kon-Tiki* voyage won an Academy Award in 1951.

Thor Heyerdahl's theories on Pacific migrations are now supported by many scholars. Moreover, his *Ra* expeditions proved that vessels built in ancient times, long before the EUROPEAN AGE OF EXPLORATION, could have made Atlantic crossings.

Hillary, Sir Edmund Percival (1919–)

New Zealander mountain climber on Mount Everest in the Himalayas, explorer in the Antarctic

Born and raised in Auckland, NEW ZEALAND, Edmund Hillary served in the Royal New Zealand Air Force during World War II. A beekeeper by profession, he pursued MOUNTAIN CLIMBING as a hobby in New Zealand's Southern Alps. He also climbed peaks in the Alps of Europe.

In 1951 and 1952, Hillary participated in two British reconnaissance expeditions to the HIMALAYAS. Afterward, Colonel John Hunt invited him to join the British Mount Everest Expedition, sponsored by the Joint Himalayan Committee of the Alpine Club of Great Britain and the ROYAL GEOGRAPHICAL SOCIETY, as one of the chief climbers. On May 29, 1953, Hillary and the Nepalese mountaineer TENZING NORGAY, with the help of teammates, became the first men to reach the summit of MOUNT EVEREST, the highest peak in the world at 29,028 feet above sea level. They reached the top via the southeast. The climb back down the peak was as treacherous as the ascent. Hillary and Hunt earned knighthoods that same year for their accomplishment; Tenzing received a commendation, the highest possible citation for a non-British national.

In 1955, Hillary was appointed leader of the New Zealand party of the Commonwealth Trans-Antarctic Expedition, headed by the Englishman SIR VIVIAN ERNEST FUCHS. In 1957, he led a five-man team from the Ross Sea across Antarctica by dogsled and snow tractors and reached the SOUTH POLE on January 4, 1958, 15 days before Fuchs's team, which was traveling from the Weddell Sea. These were the first overland journeys to the South Pole since the simultaneous expeditions of ROALD ENGELBREGT GRAVNING AMUNDSEN and ROBERT FALCON SCOTT in 1910–12. Hillary and Fuchs's teams crossed to the Ross Sea together, arriving in March 1958.

Hillary returned to the Himalayas for other expeditions. He climbed Mount Herschel at 10,941 feet in 1967. Ten years later, he led an expedition up the GANGES RIVER to find its source in the Himalayas. His books include *High Adventure* (1955); *The Crossing of Antarctica* (with Vivian Fuchs, 1959); *No Latitude for Error* (1961); *High in the Thin Cold Air* (with Desmond Doig, 1962); and *Nothing Venture, Nothing Win* (1975). In May 2003, Hillary traveled to Katmandu, Nepal, to participate in the 50th anniversary of his Everest climb with Tenzing, choosing to do so there instead of in London with Queen Elizabeth II. The Nepalese royal family sponsored parades, parties, exhibitions, and a symposium on the Himalayan environment and mountaineering. Hillary, who was granted honorary citizenship for his services to the Sherpa community, and Jamling Norgay—the son of Tenzing and also an Everest summiteer—spoke out against the desecration of Mount Everest as a result of commercialized mountaineering.

Sir Edmund Hillary is assured his place in the history of world exploration as one of the two men first to reach the top of Mount Everest, as well as for his overland journey to the South Pole. He is also known for his work on behalf of the Nepalese people and the protection of Nepalese lands.



Edmund Hillary (Library of Congress)

Himilco (fl. 450s B.C.) *Carthaginian mariner on the Atlantic coast of western Europe, possibly brother of Hanno*
 Himilco was a Carthaginian seafarer and, according to some sources, the son of Hamilcar, who invaded Sicily, and the brother of HANNO, who explored the coast of West Africa. In about 450 B.C., the same period as Hanno's voyage, Himilco commanded a fleet that sailed westward in the MEDITERRANEAN SEA from Carthage, near present-day Tunis on the coast of North Africa, then passed through the STRAIT OF GIBRALTAR to the Carthaginian colony at Gades (Cádiz) in southernmost Spain.

Himilco sailed northward in the Atlantic Ocean along the Spanish and French coasts seeking to obtain tin, which was then mined in northwestern Spain and in southwestern Britain. While some scholars believe he reached only as far as Cape Finisterre, the northwestern tip of the Iberian Peninsula, others speculate that he made landings on the Brittany coast of northern France and visited Britain and Ireland.

Himilco returned to Carthage after a voyage of four months. While no contemporary account of the expedition survived, the details of it were later incorporated by the Roman poet Avienus in his *Ora Maritima*, written in about A.D. 400. According to Avienus, the Carthaginians traveled

through becalmed waters thick with seaweed, leading some scholars to suggest that Himilco had traveled as far as the Sargasso Sea, south of the AZORES. The Roman poet goes on to describe Himilco's encounters with sea monsters, which many believe were actually whales sighted in the Bay of Biscay. At that time, the Carthaginians maintained a monopoly on trade beyond the Strait of Gibraltar, and, in order to discourage Greek shipping from entering the Atlantic Ocean, circulated tales about monsters and other imaginary dangers west of Gibraltar. These fanciful accounts, surviving into the Middle Ages, may have contributed to the fears most European sailors had about sailing into the Atlantic until the end of the 1400s.

Himilco is thought to have pioneered the overseas trade routes between the western MEDITERRANEAN SEA and the British Isles centuries before the Romans invaded Britain and is credited with having made the first recorded sea exploration into the North Atlantic.

Hind, Henry Youle (1823–1908) *Canadian geologist in central and eastern Canada*

Henry Hind was born in Nottingham, England. He studied geology and natural sciences in Germany and France, as

well as at Cambridge University in England, before arriving in North America in 1846.

Following a tour of Mexico and the southeastern United States, Hind settled near Toronto, Canada. He taught at a provincial school in Toronto, where he also attended nearby Trinity College, receiving his master's degree in 1851. He joined Trinity's faculty as a professor of chemistry in 1853.

In 1857, Hind served as a geologist with the British government's Red River Exploring Expedition. The party, which included Simon Dawson, who was assigned the task of studying transportation possibilities, surveyed the CANOE and portage route between Lake Superior and the Red River Settlement, on the site of present-day Winnipeg, Manitoba.

The next year, Hind led the Assiniboine and Saskatchewan Exploring Expedition. His party first explored the region around the Assiniboine and Qu'Appelle Rivers. The group then ascended the South Saskatchewan River to its junction with the North Saskatchewan and explored Lake Winnipegosis as well as the Souris and Assiniboine Rivers, investigating reports of the discovery of coal deposits. A simultaneous expedition under JOHN PALLISER also studied the region.

Hind next sought additional government funding for an exploration of the passes in the Canadian ROCKY MOUNTAINS. Failing to gain support for that project, he undertook an investigation of Labrador's inland river network in 1861, accompanied by his brother, the artist William G. Hind.

In 1864, Hind became professor of chemistry and natural history at Nova Scotia's King's College. That year, he undertook a geological survey of New Brunswick. Five years later, he embarked on two years of mineralogical research in eastern Canada, first in the goldfields of Nova Scotia, then in northeastern Labrador. While in Labrador, he located previously unknown cod fisheries. In 1890, he became president of a newly organized secondary school at Edgehill, Nova Scotia.

Henry Hind's comprehensive multivolume reports on his exploration and geological surveys of Labrador and central Canada were published by the government in 1860–63. In 1860, he was elected as a member of the ROYAL GEOGRAPHICAL SOCIETY.

Hippalus (fl. A.D. 40s) *Greek mariner in the Indian Ocean, in service to Egypt*

Hippalus was a Greek seafarer and pilot in service to the rulers of Egypt, then under Roman domination, in the early years of the first century A.D. At that time, Egypt and the rest of the Mediterranean world carried on trade with India either through the Sabaeans of the southwestern Arabian Peninsula, or by long and perilous sea voyages along the coast of Persia (present-day Iran) and the Arabian Sea.

Hippalus had knowledge that India was a peninsula jutting southward into the Indian Ocean, and, with favorable wind conditions, could be reached by ship in a direct voyage eastward across the Arabian Sea, although out of sight of land. In about A.D. 45, he determined that the wind blowing across the Arabian sea, known as the monsoon, changed direction seasonally: southwestward from May to October, and northeastward from November to March. Putting this finding to use, he sailed directly from the mouth of the RED SEA to the Indus Delta and southward to the Indian ports on the Malabar Coast. The spring and summer monsoons then carried his ship back to Egypt, laden with a valuable cargo of exotic goods.

Hippalus's journey was chronicled in the anonymous first century A.D. geographic account, the *Periplus of the Erythraean Sea* (see PERIPLUS), and also by PLINY THE ELDER. His route across the Arabian Sea enabled merchants to circumvent the middlemen of the Arabian Peninsula and the coastal points in between, revolutionizing commercial ties between the Roman Empire and India. The southwestern monsoon that carried ships from the Red Sea to India came to be called the "Hippalus," after him. Centuries later, knowledge of these regularly changing winds became critical in the voyages of VASCO DA GAMA and other early European seafarers who ventured around Africa and into the Indian Ocean on their way to southwestern India.

Hipparchus (Hipparchus of Bithynia, Hipparchus of Nicaea, Hipparchus of Rhodes)

(ca. 190–ca. 120 B.C.) *Greek astronomer, mathematician*
Little is known of Hipparchus's early life other than that he was born in Nicaea, Bithynia (an ancient country on the south shore of the Black Sea), now Iznik, Turkey. He became an influential mathematician and astronomer. He made celestial observations from the city of Alexandria in Egypt in 146 B.C. and from the island of Rhodes in about 127–126. The hellenized Egyptian PTOLEMY, who worked out of Alexandria in the second century A.D., was greatly influenced by Hipparchus and preserved much of his research. The only surviving writings attributed directly to Hipparchus are commentaries on Eudoxus of Cnidus, an astronomer of the fifth century B.C., and Aratus, a Greek poet of the third century B.C.

Among his many accomplishments, Hipparchus, according to Ptolemy, determined the distance of the Earth from the Moon, the size and paths of the Sun and the Moon, the length of the year, and the precession of the equinoxes (see TROPIC OF CANCER and TROPIC OF CAPRICORN); created a chart of about 1,000 stars and organized them by magnitude; and devised an early system of LATITUDE AND LONGITUDE. He was also one of the earliest mathematicians to use trigonometry. According to some texts, he invented the ASTROLABE.

Although Hipparchus believed in an Earth-centered solar system, his mathematical procedures resulted in remarkable accuracy in his astronomical observations. His discoveries were important in both navigation and cartography.

Hoehnel, Ludwig von (Baron Hoehnel, Ludwig von Höhnel) (1857–after 1905) *Hungarian explorer in East Africa*

A member of a noble Hungarian family, Ludwig von Hoehnel was born at Bratislava on the Danube River in what is now Slovakia. His early professional career was as a naval officer.

Inspired by the expeditions of HENRY MORTON STANLEY and the interest in African exploration generated by the international geographic conference convened by Belgian king Leopold II at Brussels in 1876, Hoehnel undertook a series of explorations into the regions above the lake country of present-day Uganda and Tanzania. From 1886 to 1889, he and fellow Hungarian nobleman Count SAMUEL TELEKI traveled into what is now northwestern Kenya, where they made the European discovery of Lake Rudolf, a 200-mile-long lake surrounded by volcanic mountains. They also explored the Orno River. In nearby southern Ethiopia, they became the first Europeans to visit Lake Stefanie.

Hoehnel continued his African explorations with American William A. Chanler; they made a south-to-north crossing of Kenya from Zanzibar and Mombasa in 1892–93. In 1905, Hoehnel traveled to Australia and the Far East, subsequently settling in NEW ZEALAND.

Baron Ludwig von Hoehnel's explorations penetrated the African continent north of the usual route from Zanzibar, revealing much about the geography of northern Kenya's Great Rift Valley region.

Hohermuth von Speyer, Georg (Jorge Hohermuth, Jorge de Espira) (unknown–1540) *German official in northern South America*

German-born Georg Hohermuth was chosen by the Welser banking family as governor of the colony of Coro on the coast of present-day Venezuela, land that had been granted to the Welsers by Charles V, king of Spain and Holy Roman Emperor. Soon after his arrival in 1534, Hohermuth organized an expedition to the region of Los Llanos (the plains) to the south in search of the legendary land of EL DORADO and its supposed riches.

Hohermuth's party of 400 men departed Coro in May 1535 and proceeded southward. He explored the tributaries of the Río Meta on the plains of modern-day Colombia. In August 1537, the expedition reached as far south as the site where San Juan de los Llanos would be founded near the Ariari River. From Native Americans, Hohermuth had heard reports of riches in the highlands to the west, part of the

ANDES MOUNTAINS. Not finding a route of ascent and facing the hostility of the Choque Indians, he led the expedition back to Coro, arriving in 1538. Of the 400 men, only 90 had survived the trip, and Hohermuth lost the backing of the Welsers and lived out his life in disgrace. The man whom Hohermuth had replaced as leader of the colony, NIKOLAUS FEDERMANN, carried out a simultaneous expedition for the Welsers and managed to cross the Andes from east to west.

Georg Hohermuth, like fellow Germans Federmann and AMBROSIOUS ALFINGER, was one of the few northern Europeans to play a part in the exploration of South America and provided Europeans with geographic knowledge of the plains and rivers to the east of the Andes. He is part of the story of the search for the legendary land of El Dorado and the resulting journeys of exploration.

Hollywood, John (John of Holywod, John of Halifax, Johannes de Sacrobosco)

(ca. 1200–ca. 1250) *English mathematician, astronomer*

Originally from Yorkshire, England, John Hollywood was a mathematician and, after 1221, a professor in Paris. Known professionally as Johannes de Sacrobosco, Hollywood was among the first medieval European scholars to study the mathematical works of MUSLIMS. In 1230, he produced *De sphaera (Treatise on the Sphere)*, in which he applied Arabic mathematics to a study of astronomy. His account of the movement of the planets and the perceived movement of the stars presupposed an idea of the Earth as a GLOBE and challenged the traditional medieval view that the world was flat.

John Hollywood's theories on celestial movement and the spherical shape of the world provided a basis for the principles of modern navigation and geography that developed in Europe during the RENAISSANCE.

Hood, Robert (ca. 1800–1821) *British naval officer in the Canadian Arctic*

Robert Hood, a midshipman in the British navy, served under SIR JOHN FRANKLIN in his first overland expedition into the Canadian Arctic. In 1819, under Franklin's command, Hood, along with fellow midshipman GEORGE BACK, naturalist SIR JOHN RICHARDSON, and a team of VOYAGEURS hired from the ranks of the HUDSON'S BAY COMPANY and NORTH WEST COMPANY, traveled westward across Canada from York Factory to Great Slave Lake.

In summer 1821, Hood accompanied Franklin and the rest of the party in a journey down the Coppermine River to the Arctic coast of Canada along Coronation Gulf. On the trip back to Great Slave Lake, supplies of food ran out, and one of the voyageurs, driven to cannibalism, murdered Hood. Franklin had the man executed soon afterward.

An account of Robert Hood's experiences in the Canadian Arctic survives in his book, published posthumously,

Narrative of the Proceedings of an Expedition of Discovery in North America. Hood was also an artist, and his paintings of northern Canada's native peoples and wildlife were taken back to England by Franklin in 1822.

Hooker, Sir Joseph Dalton (1817–1911)

British botanist in New Zealand, Tasmania, Antarctica, the Himalayas, and the Rocky Mountains

Joseph Dalton Hooker was born in Halesworth, in Suffolk, England, the son of botanist Sir William Jackson Hooker. He studied medicine, and, by the late 1830s, he had established himself as a medical doctor in Glasgow. He was a friend of CHARLES ROBERT DARWIN, whose views on evolution he later supported.

Hooker shared his father's passion for botany; in 1839, he accepted an appointment as botanist and assistant surgeon with SIR JAMES CLARK ROSS's expedition to the waters around Antarctica. In the course of his four years on the *Erebus*, Hooker conducted botanical research over a wide area of the southwestern Pacific Ocean. On the outward voyage, he visited the Kerguelen Islands in the southern Indian Ocean, midway between South Africa and Australia, where he studied giant sea algae, some measuring over 150 feet long.

Stopping over at NEW ZEALAND's Bay of Islands, Hooker collected 1,700 plant specimens, and, on a subsequent visit to TASMANIA, he made a comprehensive inventory of the island's plant life, collecting more than 1,200 species and greatly supplementing the earlier work of naturalist ROBERT BROWN. One of Hooker's more notable discoveries on Tasmania was a unique species of eucalyptus tree. Hooker also made observations on the vegetation of islands in southern waters, and, one year after his return to England in 1843, he began to publish a comprehensive multivolume scientific report, *Flora Antarctica* (1844–47).

Hooker went on to a long scientific career that took him all over the world. In 1846–47, he was the botanist for the Geological Survey of Great Britain. He was elected as a member of the ROYAL SOCIETY in 1847. In 1847–51, he undertook a botanical expedition into the HIMALAYAS of eastern Nepal, as well as similar research in the eastern Bengal region of India, now Bangladesh.

From 1853 to 1860, Hooker published botanical studies based on his work in Tasmania and New Zealand. In 1855, he became assistant director of Kew Gardens, for which he undertook a scientific expedition to the Middle East in 1860. He succeeded his father as director of Kew Gardens in 1865, and, in 1873, he became president of the Royal Society. His exploration of the Atlas Mountains of Morocco in 1874 was followed by an 1877 expedition to the United States, where he toured the ROCKY MOUNTAINS in search of botanical specimens.

Sir Joseph Dalton Hooker retired in 1885, spending his remaining years at Sunningdale in Berkshire, England. A

close associate of Darwin, he applied data drawn from his explorations to support his colleague's conclusions about the origins of species.

Hornemann, Friedrich Conrad (1772–1801)

German explorer in North and West Africa

Friedrich Hornemann was born in the north German town of Hildesheim, near Hanover, the son of a minister. His interest in traveling to uncharted lands had begun in his early teens through reading about the exploits of the French, Spanish, and English explorers of the Americas.

In 1791, Hornemann entered the University of Göttingen, where he studied theology, intending to carry on his father's work as a minister. However, in 1795, just before he was to complete his degree, he asked his professor of natural history, Dr. Johann Friedrich Blumenbach, to recommend him to his colleague in London, SIR JOSEPH BANKS, hoping that Banks could use his influence with the AFRICAN ASSOCIATION to gain support for Hornemann's plan to explore Africa.

Hornemann met with Banks in London, and, by summer 1797, he had succeeded in winning the sponsorship of the African Association for an expedition across the SAHARA DESERT from Cairo to determine the source and ascertain the flow of the NIGER RIVER. He hoped also to locate TIMBUKTU, the fabled trading center of West Africa.

While Hornemann was making preparations for his departure from Cairo, MUNGO PARK, who had also been exploring on behalf of the African Association, was about to leave West Africa for London, having completed his first expedition in search of the Niger and Timbuktu.

In September 1797, soon after Hornemann had arrived in Cairo, an outbreak of plague led to the city being quarantined for almost a year. Unable to leave, he studied Arabic and became acquainted with another German, Joseph Frendenburgh, who had converted to Islam and settled in Egypt. Frendenburgh, who spoke fluent Arabic, agreed to accompany Hornemann as his interpreter.

Although the quarantine on Cairo had been lifted by September 1798, Hornemann's departure was further hampered when, due to the French invasion of Egypt, he was unable to draw funds on his British letter of credit from the local French bank. Finally, with the help of the leader of the French forces, Napoleon Bonaparte, Hornemann was able to leave Cairo in December 1798.

Disguised as Muslim merchants, Hornemann and Frendenburgh traveled westward from Cairo to the Siwa Oasis, at the northwestern edge of the Great Sand Sea straddling the present-day border between Egypt and Libya. They eventually reached the caravan trade center at Murzuq in the Fezzan region of southwestern Libya, where Frendenburgh died of fever.

Instead of setting out immediately southward in search of the Niger in the Bornu region below the Sahara, Hornemann traveled northward to the Libyan port of Tripoli, which he reached in August 1799. From there, he sent back a report to London detailing his progress. After four months, he set out southward with a caravan across the Sahara, and he was never seen again.

Subsequent African Association expeditions established that Hornemann had entered the land of the Hausa in present-day Niger, and had possibly sighted Lake Chad. He had then followed the Kano River northwest to Katsina, and, in 1801, at Bokani in the Nupe region of what is now Nigeria, he had died of dysentery, just short of reaching his ultimate goal, the Niger.

Although he did not live to tell about it, Friedrich Hornemann was probably the first European to see Lake Chad, and, in any event, was the first European to complete a crossing of the Sahara since the time of the Romans. He had made his journey under the mistaken notion that the distance to the Niger River from Cairo was about the same as from Tripoli. It soon became apparent to later explorers that Tripoli, and not Cairo, was the closer and more feasible starting point for an expedition across the Sahara to the source of the Niger and Timbuktu. Hornemann's diary was later recovered and published in Europe. His journeys of 1799–1801 constituted one of the earliest scientific explorations of northeastern Africa.

Houghton, Daniel (ca. 1740–1791) *British army officer in West Africa*

In 1790, Daniel Houghton, a major in the British army, was engaged by SIR JOSEPH BANKS and his London-based AFRICAN ASSOCIATION to undertake an exploration into West Africa to locate the source of the NIGER RIVER and determine in which direction it flowed.

Houghton sailed from England to the mouth of the Gambia River on the coast of West Africa. He arrived at the British trading post at Pisania, on the Gambia, where he made contact with John Laidley, a British doctor who ran the post and who subsequently relayed Houghton's reports from the interior back to England.

Houghton ascended the Gambia River from Pisania. In order to facilitate his relations with the natives, he traveled with a quantity of trade goods. He had also become conversant in the region's principal native language, Mandingo.

Upon reaching Medina, the capital of the Woollli kingdom, Houghton lost a large part of his equipment when a fire struck the city. Nevertheless, he pushed onward to the Senegal River, into the kingdom of Bondou, where he was robbed of more of his possessions by the local rulers. Despite these setbacks, he sent back word to England in September 1791, by way of Laidley at Pisania, that he was near the Niger and had heard reports that it flowed from west to east.

He also learned that the Niger was navigable and soon made plans to travel by ship along it to TIMBUKTU.

North of Bambouk, Houghton joined up with a Moorish trade caravan with which he planned to reach the Niger. The traders soon stole his remaining possessions and abandoned him in the desert region of what is now southwestern Mali, east of the upper course of the NILE RIVER.

In 1795, MUNGO PARK, who had also been sent by the African Association on a similar mission, learned from the natives that Houghton had died near Nioro in western Mali, less than 200 miles from the Niger.

Daniel Houghton was the first European to report accurately on the flow of the Niger River in modern times. The looping nature of the river's course through West Africa had long puzzled European geographers, leading many to believe erroneously that it flowed from east to west.

Houtman, Cornelius (Cornelis de Houtman)

(ca. 1540–1599) *Dutch mariner, trader in the East Indies, brother of Frederik Houtman*

Cornelius Houtman was born in Gouda in the western Netherlands. He was the older brother of FREDERIK HOUTMAN.

In 1592, the Houtman brothers were commissioned by a group of nine Amsterdam merchants to journey to Portugal and learn what they could about the newly developed sea routes to the EAST INDIES. Because the ports of the Iberian Peninsula, notably Lisbon, had been closed to Dutch trade after the declaration of Dutch independence from Spain in 1584, the merchants of Amsterdam needed to find a new and direct way of obtaining spices from the East Indies.

In Lisbon that year, Houtman and his brother attempted to acquire classified Portuguese navigational charts detailing the sailing routes to the Indies. They were arrested and briefly held in a Portuguese jail when they were caught trying to smuggle the charts back to Holland.

By 1595, a Dutch trading concern, the Vierre Company, had been organized to trade directly with India and the SPICE ISLANDS (the Moluccas). Its first expedition, consisting of four vessels, was commanded by Houtman, who sailed later that year with his brother from the Dutch port of Texel, having acquired the necessary sailing instructions from Dutch navigator JAN HUYGHEN VAN LINSCHOTEN.

In 1596, Houtman and his fleet arrived at Bantam, on the island of Java, where they succeeded in establishing trade relations with the local ruler. He founded Dutch trading posts on Sumatra and Bali before returning to the Netherlands. On the homeward voyage in 1596–97, Houtman pioneered a new sea route that followed the north coast of Java eastward into the Bali Strait. The expedition was costly with regard to human life, however, with two-thirds of the crew succumbing to SCURVY.

Houtman led a second Dutch trading expedition to the East Indies in 1598. On the way, he stopped in Madagascar and in Cochin China (present-day Vietnam), where he was able to establish additional Dutch overseas bases for foreign trade.

In Sumatra in 1599, Houtman ran afoul of a local ruler, the sultan of Atjeh, and was killed in an attack by his Malay subjects. His brother Frederik was taken prisoner.

Cornelius Houtman opened the East Indies to Dutch trade, laying the foundation for the great Dutch overseas empire that supplanted the Portuguese in the southwestern Pacific Ocean by the beginning of the 17th century. His imprisonment in 1592 for attempting to acquire navigational data is indicative of how secretive the Portuguese were about their geographic information long after the voyages of VASCO DA GAMA, FRANCISCO DE ALMEIDA, and AFONSO D'ALBUQUERQUE.

Houtman, Frederik (Frederik de Houtman)

(1571–1627) *Dutch mariner, colonial administrator in East Indies and coastal Australia, brother of Cornelius Houtman*

Born in Gouda, the Netherlands, Frederik Houtman was the younger brother of CORNELIUS HOUTMAN, the founder of the Dutch overseas trading empire in the EAST INDIES. Houtman joined his brother on a visit to Lisbon in 1592, where their attempts to acquire classified navigational information concerning the sea routes to the Far East landed them in a Portuguese jail. In 1595 and 1599, he accompanied Cornelius on the first two Dutch trading voyages to Java, Sumatra, and Bali.

In 1599, his brother Cornelius was killed in a conflict with the Malayan sultan of Atjeh on Sumatra. Frederik was one of eight Dutchmen taken prisoner whom the sultan did not have beheaded. He was held for two years, during which he studied astronomy and the Malayan language. On his release in 1601, he returned to Holland, and, in 1603, he published the first known dictionary of that language.

Houtman returned to the East Indies in 1605, where he served for the next six years as the first Dutch governor on the island of Amboina in the SPICE ISLANDS (the Moluccas). He later served as colonial administrator for all Dutch settlements in the Moluccas from 1621 to 1623.

In addition to his administrative work in the East Indies, Houtman undertook explorations south of the Moluccas. In a 1619 voyage, in command of two ships, the *Dordrecht* and the *Amsterdam*, he made one of the earliest sightings of the coast of western Australia near what is now the city of Perth. Afterward, while following the coast northward, he encountered a group of hazardous rocks lying about 50 miles offshore, subsequently named Houtman's Abrolhos in his honor.

Frederik Houtman spent his final years at Alkmaar in the Netherlands. Along with his brother Cornelius, he was

one of the founders of the Dutch colonial presence in the southwestern Pacific Ocean, which endured until the years after World War II and the establishment of the nation of Indonesia.

Hovell, William Hilton (1786–1875)

British explorer of southeastern Australia

English-born William Hovell was a sea captain. In the early 1820s, he gave up his career and moved to Australia, settling near Sydney.

In October 1824, Hovell traveled southward from Sydney to Lake George, northeast of the present-day Australian capital city of Canberra, where he joined HAMILTON HUME, a native-born New South Wales settler, in an exploration of the region to the south in search of new grazing lands.

Hovell and Hume, accompanied by six convict laborers, headed southwestward from Lake George in a covered wagon. They soon reached the Murrumbidgee River, which they crossed by improvising a raft from the wagon, then continued to the upper reaches of the Murray River. South of that point, they made the European discovery of the Australian Alps, the continent's highest mountain range. They continued along its inland slopes to the Goulburn and Murray Rivers, where they found large tracts of usable grazing lands. Beyond the Goulburn River, they had to trek through rough and wet country, infested with leeches, before reaching the southeast coast at Geelong on Port Phillip Bay, near present-day Melbourne.

William Hovell returned to Lake George in January 1825, where he announced his findings of country suitable for settlement on the southeast coast. Although skilled as a navigator, he erred in determining the exact location of Geelong, mistakenly citing its geographic coordinates as those of Western Port, which is just east of Port Phillip Bay. When the colonial government of New South Wales sent settlers into the region around Western Port, they found not the fertile lands described by Hovell, but a region totally unsuitable for agricultural development. As a result, the settlement of what later became the state of Victoria was put off for a number of years. Furthermore, Hovell expressed support for the idea that the rivers of southeastern Australia drained into a large inland lake or sea in the interior of the continent, a concept that was not dispelled until after the 1850s.

Hsüan-tsang (Hsüan Tsang, Hsüan-chuang, Hiouentang, Yuan Chang, Xuanzang, Tripitaka, Master of the Law) (ca. 600–664) *Chinese Buddhist monk in central Asia*

Hsüan-tsang was native to the eastern Chinese city of Luoyang. Educated in Confucianism and Daoism, he converted to Buddhism and was ordained as a monk in A.D. 620, becoming a well-respected philosopher and religious thinker among the Chinese, known as "The Master of the Law."

As a Buddhist monk, Hsüan-tsang was aware of the need for accurate Buddhist texts from India to settle doctrinal disputes and fill in gaps in religious knowledge; he planned a journey to obtain them. More than two centuries earlier, another Chinese monk, FA-HSIEN, had traveled great distances with the same purpose. In 629, Hsüan-tsang requested permission to travel to India from the Tang emperor but, in keeping with a general ban on travel outside of China, his request was denied. Yet he set out secretly from Lanzhou, at the western end of the Great Wall of China, and headed westward across the GOBI DESERT. Abandoned by his guide, Hsüan-tsang followed a trail of animal bones across the desert. Weakened by thirst, he was saved when his horse scented water and carried him to an oasis. Turfan tribesmen then escorted him into the Sinkiang (Xinjiang) province of western China.

Hsüan-tsang crossed the Tian Shan mountain range and followed the south shore of Issyk Kul, the high mountain lake in the Kirghiz region of central Asia, into the lands of the western Turks, north of Kashgar, where he was welcomed by the Great Khan. He proceeded to Tashkent and Samarkand, into the lands southeast of the Aral Sea, where he crossed the Oxus (Amu Darya) River, then made his way through the Hindu Kush mountain range into Afghanistan.

For the next two years, Hsüan-tsang remained at a monastery near Balkh in Afghanistan, studying sacred Buddhist texts and making copies and translations into Chinese. He then headed southward, entering northern India by way of the KHYBER PASS and the Swat Valley, arriving at Peshawar in present-day northern Pakistan. He traveled across the plains of northern India, and, following the valley of the upper GANGES RIVER to Patna and Benares, he reached the Nalanda, the Buddhist university in Baragaon, where he devoted the next five years to studying more Buddhist texts and acquiring sacred relics, including a hair from Buddha's head, one of his fingernails, and his begging bowl.

Hsüan-tsang next traveled to the mouth of the Ganges and along the east coast of India to Madras. He intended to visit Buddhist shrines on the island of CEYLON (present-day Sri Lanka), but political turmoil led him to change his plans. Traveling inland, he reached the Deccan table land of southwestern India, where he visited sites sacred to Buddhism. In 642, he arrived at Kannauj, the capital of the northern Indian principality ruled by Emperor Harsha, who welcomed Hsüan-tsang as a great religious scholar. He presented the Buddhist monk with many additional sacred texts, as well as an elephant with which to make his homeward journey to China.

On his return, Hsüan-tsang followed the valley of the INDUS RIVER northward into the Pamirs, then traveled with a trade caravan to Kashgar and Khotan. En route, in the foothills of the Pamirs, the party was attacked by bandits, and his elephant hurled itself into a river, resulting in the loss of about 50 sacred texts. Hsüan-tsang had to wait two months for additional copies to be made. Afterward, he fol-

lowed the southern edge of the Taklimakan desert to the southern rim of the Tarim Basin; he reached the Tang capital of Chang'an (Xi'an) in 645.

Although Hsüan-tsang had defied the official ban against foreign travel, the Chinese emperor T'ai-tsung (Taizong) warmly welcomed him, regaling his 16-year pilgrimage as a heroic accomplishment. He was given a private residence at the Hung-Fu monastery where, over the next 20 years, he translated the Buddhist scriptures he had brought back from India and prepared an account of his great journey, later known as *Memoirs of Western Countries*. He died in 664 from the effects of a bad fall.

Hsüan-tsang's epic journey took him through more than 40,000 miles of central Asian territory. He became known in his later years as Tripitaka, or "Three Bags Full," in recognition of the wealth of religious, cultural, and geographic knowledge he brought back to China. His travel experiences and contacts with the non-Chinese people to the west and south were later chronicled by his disciples, and his adventures became the subject of a classic 16th-century Chinese novel *Hsi Yu Chi*, known in the West as *Monkey*. His efforts also laid the basis for the spread of Buddhism in China and Japan after that religion's decline in India during the early Middle Ages.

Huc, Évariste-Régis (Abbé Huc) (1813–1860)

French missionary in Mongolia and Tibet

Évariste-Régis Huc was born in Caylus, near Toulouse, in southeastern France. In 1836, he entered the Lazarist (also known as Vincentian) order, and he was ordained a priest three years later.

In 1839, soon after his ordination, Huc embarked on a career as a missionary, sailing to the Portuguese colony of Macao on the south coast of China. He then traveled across China to Mongolia, where he spent the next five years ministering to the native Tartar people and learning their language.

Accompanied by a fellow Lazarist missionary, Joseph Gabet, Huc traveled from Mongolia with a diplomatic caravan in early 1845, and, journeying westward along the Great Wall of China, crossed the Ordos desert and the swamps of the Tsaidam region to the western Chinese lake known as Koko Nor.

Huc and Gabet remained at the Kun Bum monastery near Koko Nor for eight months, studying the Tibetan language while waiting to continue their journey. Their opportunity came when a large caravan transporting Tibetan ambassadors on their way back from Peking (Beijing) arrived at the monastery in October 1845, and the two missionaries, disguised as Tibetan monks, or lamas, joined it for the final leg of the trip into Tibet. They reached the capital city of LHASA on January 29, 1846, and, despite the ban on foreign visitors, were at first permitted to stay. After two months, however, the Chinese ambassador, fearing that Huc

and Gabet would begin preaching, had them expelled. On their return trip eastward through southern China, they crossed the headwaters of the Mekong and other major rivers of Southeast Asia, and, by the end of 1846, they had reached Macao. Huc was compelled by poor health to return to Europe in 1852, and he left the Lazarist order the following year.

Évariste-Régis Huc was one of the few Europeans to visit Lhasa during the 18th and 19th centuries. His account of his experiences, *Travels in Tartary, Thibet and China, 1844–46*, was first published in 1850.

Hudson, Henry (ca. 1550–ca. 1611) *English mariner in Greenland, the European Arctic, and eastern North America, in service to England and the Netherlands*

There are no records of Henry Hudson's origins or early life other than that he was English and probably from London. By the early 1600s, he was known in England as an accomplished mariner and navigator.

In 1607, a group of London merchants, the MUSCOVY COMPANY, hired Hudson to lead an expedition in search of a NORTHEAST PASSAGE to the Orient. Hudson, commanding the *Hopewell*, sailed from London to the Shetland Is-



Henry Hudson (New York State Library, Albany)



Discovery of the Hudson River by Henry Hudson (*Library of Congress*)

lands, then west to ICELAND. He explored the east coast of GREENLAND and made the European discovery of Jan Mayen Island. Sailing eastward from Greenland, Hudson reached Spitsbergen (in Svalbard), north of Norway. Icebergs prevented further exploration to the east, and Hudson and the *Hopewell* returned to England.

The next year, 1608, Hudson embarked on a second expedition in search of the Northeast Passage. He sailed northward and rounded North Cape at the northern end of Norway, then entered the Arctic Ocean and explored the Novaya Zemlya archipelago. Again, progress eastward was blocked by ice, and Hudson returned to England.

The DUTCH EAST INDIA COMPANY soon commissioned Hudson to lead another expedition in search of the Northeast Passage. In the ship, the *Half Moon*, he left Amsterdam on March 25, 1609, sailing northward along the coast of Norway and rounding North Cape.

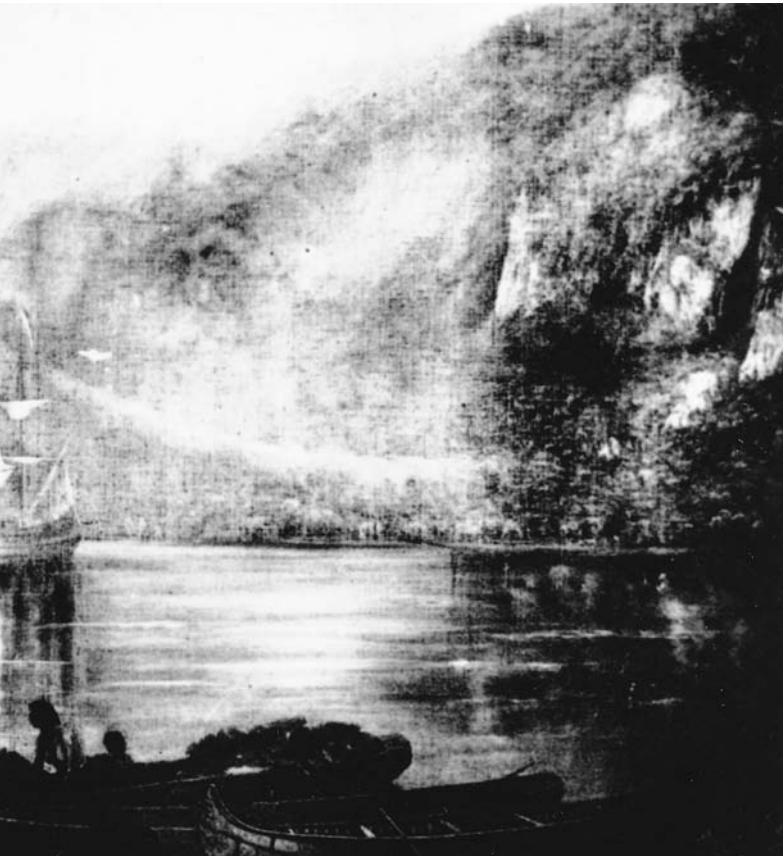
Near Novaya Zemlya, ice threatened to strand the *Half Moon* in the Arctic Ocean. To quell a possible mutiny, Hudson changed course and sailed southwestward into the Atlantic Ocean. He decided instead to locate a NORTHWEST PASSAGE through North America to the Pacific Ocean, which his friend JOHN SMITH had described in a letter and map.

Hudson reached the coast of Newfoundland and headed southward along North America's east coast as far as Chesapeake Bay. He explored both Chesapeake Bay and Delaware Bay, vainly searching for an inland water route to Asia.

On September 11, 1609, Hudson sailed into what is now New York Bay. He explored the bay and entered the south-flowing river that now bears his name. He continued upstream as far as present-day Albany, where he determined that the river would not provide a navigable route through North America.

After three weeks of exploring the Hudson Valley and trading with the Algonquian-speaking Indian tribes, Hudson sailed the *Half Moon* back to Europe. He stopped at Dartmouth, England, planning to continue to the Netherlands, but was barred from doing so by English officials. Nonetheless, his findings reached his backers in Amsterdam, who established a Dutch colony in the Hudson Valley the next year.

In 1610, Hudson was still in England, where he again obtained the support of London merchants. He was placed in command of the *Discovery* and was commissioned to seek a Northwest Passage somewhere beyond Greenland and the Davis Strait.



Hudson and the *Discovery* left England in April 1610. He sailed beyond Greenland, and, on June 25, 1610, he explored Hudson Strait. Sailing through the strait, he entered a large inland sea now known as HUDSON BAY.

Hudson explored southward along the east coast of the bay, reaching what is now James Bay, where he and the *Discovery* crew spent the winter of 1610–11. The crew mutinied on learning that Hudson had been hoarding scarce supplies of food. On June 23, 1611, Hudson, his young son John and some ailing crew members were set adrift in a small boat. They were never seen again. The *Discovery* now navigated by his second in command ROBERT BYLOT, whom Hudson had demoted, sailed back to England with news of Hudson Strait and Hudson Bay, which the expedition's sponsors believed for a time was the Northwest Passage to the Pacific. The mutineers were imprisoned. Bylot, however, went on to participate in subsequent expeditions, which also failed to locate the Northwest Passage.

Hudson's explorations of Spitsbergen and the Russian Arctic soon took English whaling operations there. His exploration of the Hudson River region led to the establishment of the Dutch New Netherland colony. Moreover,

English claims to the entire Hudson Bay region were based on Hudson's 1610–11 voyage.

Humboldt, Alexander von (Baron Friedrich Wilhelm Karl Heinrich Alexander von Humboldt)

(1769–1859) *German naturalist, geographer in South America, Cuba, Mexico, and central Asia*

Alexander von Humboldt was born in Berlin, the son of a Prussian army officer. From an early age, he had a keen interest in natural sciences, collecting specimens of plants and rocks around his family's home. He was educated at universities in Frankfurt, Berlin, Jena, Hamburg, Freiburg, and Göttingen, concentrating on languages, biology, astronomy, and geology. It was at Göttingen that he became acquainted with naturalist JOHANN GEORG ADAM FORSTER, who had sailed with JAMES COOK on his second voyage in 1772–75. Forster inspired the young Humboldt to undertake scientific explorations into little-known parts of the world.

Following his formal education, Humboldt worked for the Prussian government as an assessor of mines in the Bayreuth region near Freiburg. In 1796, he came into an inheritance that provided him with the financial means to pursue his scientific interests in distant places.

While in Paris, Humboldt became acquainted with the French botanist Aimé Bonpland, and together they planned to journey to Egypt. They were about to embark from Marseilles in 1798, when news of Napoléon's invasion of Egypt caused them to cancel the trip. Instead, they traveled to Spain, where Humboldt undertook a geological survey of the country's central plateau region. Humboldt's family connections led to a meeting with the Spanish king Charles IV, who granted Humboldt and Bonpland permission to conduct a scientific expedition throughout the Spanish possessions in the Americas.

Humboldt and Bonpland sailed from the northern Spanish port of La Coruña in early June 1799. At a stop in Tenerife in the CANARY ISLANDS, they went ashore and climbed the 12,200-foot-high volcanic mountain Pico de Teide. In mid-July 1799, they landed at Cumana on the Caribbean coast of what is now Venezuela. That November, following preliminary scientific work along the coast, Humboldt and Bonpland set out to explore the ORINOCO RIVER from Caracas.

Over the next year, Humboldt made astronomical observations to clarify the geographic discrepancies found on many maps of South America. He also toured the savannahs of the Calabozo region and visited the natural hot springs of the Mariara region. Among the animals Humboldt studied in his Orinoco explorations was the large, swimming, rat-like animal called the capybara, the largest known rodent in the world. He also made observations of

the electric eels of the lower Amazon Basin and noted the mass egg-laying carried on by up to a million turtles on the banks of one of the Orinoco's tributaries. Throughout 1800, Humboldt explored and charted the upper Orinoco and Río Negro. His canoe journey along the Casiquiare River from the Orinoco to the Río Negro, a tributary of the AMAZON RIVER, conclusively demonstrated that the Casiquiare linked the Amazon River system with the Orinoco, the only known connection between two major river systems in the world.

At the end of 1800, Humboldt and Bonpland went to Cuba, where they continued their botanical work. They assembled as many as 60,000 plant specimens, 6,300 of which were new to science, sending them back to Europe.

In spring 1801, Humboldt and Bonpland returned to the South American mainland, landing at Cartagena in present-day Colombia. From there, they ascended the Magdalena River into the interior and reached the eastern slopes of the ANDES MOUNTAINS. In his subsequent explorations of the Andes, Humboldt studied the effects of high altitude on the boiling point of water. In present-day Ecuador, Humboldt and Bonpland made an attempt to climb Mount Chimborazo, which, at 20,577 feet, was one of the world's highest peaks. They reached a point about 1,500 feet from the summit, where the thin atmosphere made them weak and forced them to turn back. Nevertheless, they had

reached a height of over 19,000 feet, a record not broken for another 30 years. English mountaineer EDWARD WHYMPER made the first successful ascent to the summit of Mount Chimborazo in 1880.

In his explorations of the Andes into Peru, Humboldt crossed the mountain range five times. He made geomagnetic observations and plotted the line of the magnetic equator, proving that the Earth's magnetic field decreases as one approaches the EQUATOR.

Humboldt and Bonpland followed the ancient Inca road southward to Cajamarca and Trujillo. They then sailed from the port of Guayaquil, Ecuador, and from there to Acapulco, Mexico. In his climatological study of the desert along the Pacific coast of Peru, Humboldt detected the strong, low-temperature ocean current that was later named the Humboldt Current in his honor.

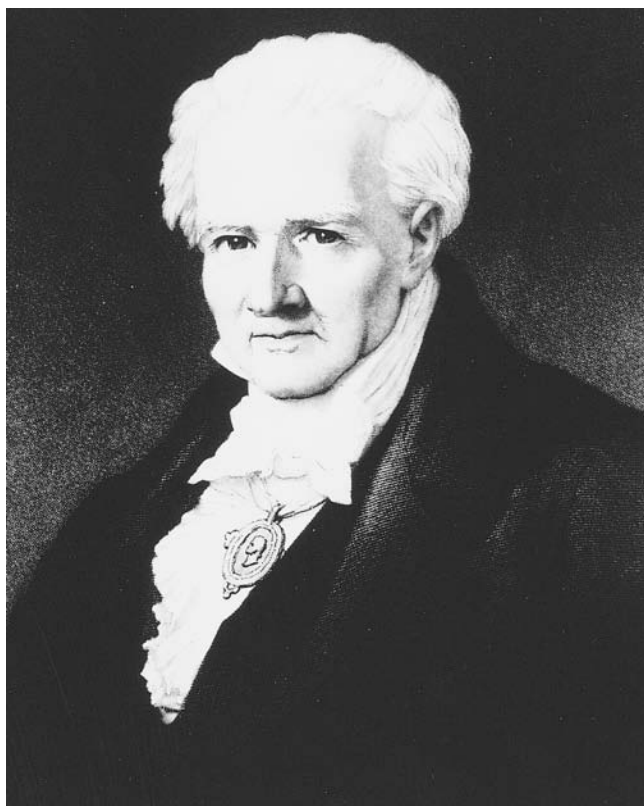
In 1803, Humboldt carried out more scientific studies in Mexico, then sailed to the United States. He visited President Thomas Jefferson in Philadelphia, with whom he conferred on the planned expedition of MERIWETHER LEWIS and WILLIAM CLARK. In 1804, he returned to Europe. His explorations in South America, Cuba, and Mexico had covered more than 6,000 miles.

Humboldt resided in Paris from 1808 to 1827. He worked on his 23-volume *Personal Narrative of Travels to the Equinoctial Regions of America*, published from 1805 to 1834. In addition, he undertook diplomatic work in various European capitals on behalf of the Prussian government and served as the tutor of the Prussian crown prince.

It was not until 1829 that Humboldt made his next scientific expedition. Commissioned by Czar Nicholas I of Russia, he traveled across Russia and SIBERIA to survey Russia's mineral resources in central Asia. His journey took him across 10,000 miles in six months, as far as the Yenisey River and the Chinese frontier at Naryn. One result of the survey was Humboldt's correct prediction that diamonds would be discovered in the Ural Mountains.

In his later years, Humboldt wrote his five-volume *Kosmos* (1845–62), in which he attempted to formulate a uniform concept of nature based on the known scientific facts about the universe.

Alexander von Humboldt was called by CHARLES ROBERT DARWIN "the greatest scientific traveler who ever lived." His explorations were carried out not for commercial or political gain, but for the advancement of scientific knowledge about the world. His studies in South America were among the first to employ advanced meteorological techniques, including the use of isotherms. His geomagnetic observations expanded scientific knowledge about the Earth's magnetic field and contributed to an understanding of the actual shape of the planet. His contributions as the "father of modern geography" were recognized by explorers such as JOHN CHARLES FRÉMONT, who named the



Alexander von Humboldt (New York State Library, Albany)

Humboldt River and the Humboldt Sink in the American West in his honor.

Hume, Hamilton (1797–1873) *Australian explorer in New South Wales and Victoria*

Hamilton Hume was born in Parramatta, now a suburb of present-day Sydney, Australia. His father was among the original settlers of New South Wales, an administrator of convicts deported to the colony. In 1812, the family moved farther outside Sydney to Appin.

In 1814, at the age of 17, Hume undertook his first exploration into the Australian bush, examining the nearby Wingecarribee region. In 1817, he extended his surveys to Sutton Forest and the lands south and west of Sydney. The next year, in an exploration west of the colony, he charted Lake Bathurst.

Hume joined JOHN JOSEPH WILLIAM MOLESWORTH OXLEY in an 1819 exploration of the coast south of Sydney, in the course of which they surveyed the region around Jervis Bay. Two years later, Hume explored on his own into the lands southwest of Sydney, now known as the Yass Plains, north of the Australian capital city of Canberra.

Hume's exploration of the Clyde River in 1822 was followed two years later with an expedition across the southeastern corner of Australia with WILLIAM HILTON HOVELL, during which the two sighted the Australian Alps and reached the coast near the site of present-day Melbourne. Soon afterward, the New South Wales colonial government granted Hume a 1,200-acre tract of land near Yass, where he settled. In 1828, Hume helped blaze a road through the BLUE MOUNTAINS, and, in 1828–29, he accompanied CHARLES STURT in his exploration of the Macquarie and Castlereagh Rivers.

Hamilton Hume was one of the first native-born explorers of Australia. His investigations of the region southwest of the original New South Wales settlements ultimately led to the expansion of the colony into what is now Victoria. With Hovell in 1824, he made the first crossing of the continent's southeastern corner. His initial reports on the flow of the rivers of southeastern Australia later prompted Charles Sturt and others to seek their source in a large inland lake or sea.

Hunt, Wilson Price (ca. 1782–1842) *American fur trader, leader of the Overland Astorians, traveling to Pacific Northwest*

Wilson Price Hunt was a native of the Trenton, New Jersey, area. By 1804, he was a fur trader in St. Louis.

In 1810, Hunt was hired by JOHN JACOB ASTOR to undertake an expedition from St. Louis, up the MISSOURI RIVER, to the Oregon coast. Astor had initiated an earlier expedition by ship to the Pacific Northwest, during which As-

toria had been founded at the mouth of the COLUMBIA RIVER in March 1811.

Hunt engaged a party of Canadian VOYAGEURS in Montreal. He took the group to St. Louis via Mackinac, Green Bay, and the Fox and Wisconsin Rivers to the MISSISSIPPI RIVER.

In St. Louis, Hunt hired PIERRE DORION, JR., as an interpreter and his Ioway Indian wife MARIE DORION as a guide. DONALD MACKENZIE, formerly of the NORTH WEST COMPANY, joined the expedition. EDWARD ROSE also joined as an interpreter and guide.

The Overland Astorians departed St. Louis in March or April 1811 and took their boats up the Missouri, stopping first at Fort Osage, then at the Arikara Indian villages of north-central South Dakota. English scientist JOHN BRADBURY and American botanist THOMAS NUTTALL traveled with Hunt's voyageurs for the earlier part of the journey.

During this leg of the journey, Hunt had been in direct competition with a group led by MANUEL LISA. At the Arikara villages, Hunt decided to leave the Missouri. He traded his boats to Lisa for horses, obtained additional mounts from the Arikara, and headed overland southwestward along the Cheyenne River, around the Black Hills.

By September 1811, Hunt and his party had reached the southern end of the Bighorn Mountains. They continued westward into the Wind River Mountains, then traveled through Teton Pass into the Snake River Valley.

Hunt explored the Snake as he made his way through what is now western Idaho, partly following the route of ANDREW HENRY to Henrys Fork. The expedition proceeded by CANOE until the rapids proved too dangerous, claiming boats and lives. On foot, the surviving Astorians followed the Snake to the Salmon River, then crossed the Blue Mountains to the Columbia River. Following the Columbia to the Pacific Ocean, they reached Astoria in February 1812.

Hunt explored the Pacific Northwest coast as far as southern Alaska. When the Astoria post was sold to the British-held NORTH WEST COMPANY in 1813, he returned to the East by ship around CAPE HORN, and he soon resumed his business career in St. Louis. The Astorians' 1811–12 overland expedition from St. Louis to the Oregon coast led by Wilson Price Hunt was the first since that of MERIWETHER LEWIS and WILLIAM CLARK. The Astorians made the first known crossing of the Continental Divide by way of the Snake River route. The final leg of Hunt's expedition pioneered the frontier thoroughfare that, 30 years later, developed into part of the Oregon Trail.

Huon de Kermadec, Jean-Michel (1748–1793) *French naval officer in the South Pacific*

Jean-Michel Huon de Kermadec was born in Brest, at that time the site of France's main naval station. He was

descended from a long line of Breton seafarers and carried on the family tradition by going to sea and serving in the French navy.

By 1786, Huon de Kermadec was a senior naval officer. That year, he sailed to China aboard the *Resolution*, under the command of ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux. Huon de Kermadec served again under d'Entrecasteaux in a voyage to the South Pacific Ocean in search of JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, and his expedition, missing since 1788. In command of the *Espérance*, Huon de Kermadec accompanied d'Entrecasteaux and the *Recherche*, embarking from Brest in September 1791. In December 1792, they reached the west coast of Australia at Cape Leeuwin, where a gale soon drove the ships eastward. While d'Entrecasteaux was driven into an island group he later named the Recherche Archipelago after his vessel, Huon de Kermadec found shelter in a bay, which he also named after his ship, calling it Esperance Bay.

The next spring, Huon de Kermadec and the d'Entrecasteaux expedition sailed into Adventure Bay in TASMANIA. By that time, SCURVY and dysentery had begun to take their toll on the crews, and, in early May 1793, while his ship was anchored at Balade Bay in New Caledonia, Huon de Kermadec died of these ailments.

Two months after Huon de Kermadec's death in New Caledonia, the expedition's commander, d'Entrecasteaux, also succumbed to scurvy and dysentery while en route to Batavia, the Dutch colony on Java. Neither ship returned to France, both having been seized by the Dutch in October 1793 soon after news of the outbreak of war between France and Holland had reached Java.

Jean-Michel Huon de Kermadec, one of the many French naval officers to participate in the exploration of the South Pacific, is considered the European discoverer of Esperance Bay.

Hutten, Philip von (1511–1546) *German soldier in northern South America*

German-born Philip von Hutten was a cousin of the noted scholar and humanist Ulrich von Hutten. In 1534, he arrived at the Spanish colony of Coro, which had been granted to the Welser family by Charles V, king of Spain and Holy Roman Emperor, in present-day Venezuela; he was accompanying the newly appointed governor GEORG HOHERMUTH VON SPEYER. In 1535–38, Hutten participated in Hohermuth's expedition to the south.

Hohermuth's and other German-led expeditions on behalf of the Welsers in the 1530s, those of AMBROSIUS ALFINGER and NIKOLAUS FEDERMANN, searched for the Indian riches rumored to exist in the fabled land of EL DORADO in Los Llanos (the plains) east of the ANDES MOUNTAINS as well as in the mountains themselves. In August 1541, Hutten led another such expedition of 100 horsemen from Coro, including a son of the director of the Welser banking firm sponsoring the expedition. Hutten retraced the earlier path he had taken with Hohermuth, as well as the 1537–39 path of Federmann, southward across the plains, further exploring the Río Meta and its tributaries and the Río Ariari in present-day eastern Colombia. Hutten's exact route beyond the Río Ariari is not known. The expedition returned to Coro in February 1546. Although it had had contact with numerous Indian peoples, it had discovered no wealthy civilization that could be exploited. Hutten was killed the following April in a dispute over the colony's governorship.

Philip von Hutten's expedition was the last German-led expedition in South America. The myth of El Dorado would continue to spur explorations in lands to the east into the next century.



Ibarra, Francisco de (ca. 1530–1575)

Spanish conquistador, colonial governor in Mexico

A native of Spain, Francisco de Ibarra was among the first generation of settlers to arrive in Mexico after the conquest. As a young man, he entered the military and took part in the subjugation of the Indian people north of Mexico City who had not yet come under Spanish domination.

In 1554, Ibarra set out with a small party of Spaniards to explore the lands above Zacatecas, spurred on by Indian reports of silver mines. During the next several years, he managed to establish Spanish control over the region, and, by 1562, he had established a series of settlements to exploit the territory's rich resources of silver and other minerals. These included the towns of Sombrerete, Durango, and Nombre de Dios. He also expanded Spanish influence westward, founding the town of Sinaloa, north of Culiacán and inland from the Gulf of California.

The territory that Ibarra had explored and colonized was organized in 1562 as the province of Nueva Viscaya, with Ibarra as its first governor. From his settlements in Nueva Viscaya, Ibarra led and sponsored additional exploring parties into the north in search of new sources of mineral wealth, reaching the Sonora River Valley.

Francisco de Ibarra's expeditions extended the northern frontier of Spanish-held territory in Mexico as far as southern Chihuahua.

Iberville, sieur de See LE MOYNE, PIERRE.

Ibn Battutah, Abu Abd Allah Muhammad

(Ibn Batuta, Ibn Battuta, Abu Abdullah

Muhammed ibn Battuta, Muhammed ibn

Abdallah ibn Battuta, Mohammed ibn Abdullah

ibn Battuta, Abu Abdulla ben Batuta Lahuati,

Sheik Muhammad ibn-Abdullah, Abu Allah

Muhammed ibn Abd Allah al-Lawati at-Tanji ibn

Battutah) (1304–1378) *Arab scholar in the Middle East,*

East Africa, central Asia, India, China, North Africa,

and Spain

Abu Abd Allah Muhammad ibn Battutah was born in Tangier, Morocco, the son of a *qadi*, or Muslim judge. Educated in Islamic theology, he supplemented his studies with readings of texts about far-off places, which inspired him to take up a life of travel.

In 1325, at the age of 21, Ibn Battutah left Tangier on a pilgrimage to the holy city of Mecca. He made his way eastward by way of Tripoli and Misurata on the coast of Libya. From Alexandria, he continued to Cairo, then sailed down the NILE RIVER as far as Syene at present-day Aswan.

Ibn Battutah next journeyed to the RED SEA coast, where he planned to board a ship for Jidda, Arabia, the port of entry for Muslim pilgrims to Mecca. At the Egyptian port of Aidhab, he learned that no ships were sailing across the Red Sea to Jidda because of political turmoil in Arabia. He returned northward through Egypt and toured the lands of Syria and Mesopotamia, visiting Damascus and Hebron, where he saw the cave of Machpelah, the burial place of Abraham and Sarah and a site sacred to both Islam and Judaism.

After traveling southward from Damascus and across northern Arabia, Ibn Battutah finally reached Mecca. He then sailed to the Persian Gulf and ascended the Tigris and Euphrates Rivers to Baghdad. From there, he returned to Mecca, where he remained for three years, studying Islamic law. From the Gulf of Aden, he voyaged southward along the coast of East Africa to the ports of Kilwa and Mombasa, then once again returned to Mecca.

Ibn Battutah soon undertook a journey across Persia (present-day Iran) to Esfahan and Shiraz. He again visited Baghdad, from where he traveled to Constantinople (present-day Istanbul, Turkey), then went northward to the Black Sea, stopping at the port of Kaffa, a Genoese trading settlement in the Crimea and one of the few Christian places he visited. He attempted to travel northward into Russia from Bulgaria, but was turned back by cold weather.

Heading eastward, Ibn Battutah crossed the central Asian steppes, into the lands of the Mongolian Tartars, to Samarkand and the country of the Uzbeks. He reached Afghanistan by way of the Hindu Kush range, stopping at Kabul and Herat before making his way by the upper INDUS RIVER into India. At Delhi, he entered the service of Sultan Mohammed Tuglaq, for whom he worked as judge and legal scholar for seven years. He then was commissioned as the sultan's ambassador to the court of the Mongol emperor of China. He left Delhi with gifts for the emperor, but before he could embark from the Malabar Coast port of Goa, he was robbed. Afraid to return to Delhi without the gifts, he sailed for the Maldive Islands in the Indian Ocean, where he obtained another official post and several wives.

After less than two years in the Maldives, Ibn Battutah visited CEYLON (present-day Sri Lanka), then returned to the mainland of southeastern India at Madras. From there, he sailed to the Far East, stopping in Malaya and Sumatra, before finally reaching China.

Ibn Battutah began his homeward voyage in about 1346. Returning by ship from Canton (Guangzhou) to the Malabar Coast of southwestern India, he crossed the Arabian Sea and traveled up the Persian Gulf to Damascus, where he arrived in 1348 in the midst of an outbreak of bubonic plague, known as the Black Death. He arrived back in Tangier in 1350, where he was welcomed by the local ruler, or wazir, who provided him with a secretary, Ibn Juzayy, to whom he dictated an account of his epic journey.

In 1352, Ibn Battutah was commissioned by the sultan of Morocco to undertake a diplomatic mission southward across the SAHARA DESERT to TIMBUKTU in the kingdom of Mali. He crossed the Atlas Mountains and eventually reached the NIGER RIVER, on which he sailed to Timbuktu, later reporting on the river's east-flowing

course. His return to Tangier took him across the Ahaggar Mountains.

In a subsequent journey, Ibn Battutah crossed the Strait of Gibraltar from Tangier and visited the Muslim cities of Spain. He also traveled throughout the lands of the western MEDITERRANEAN SEA, including a visit to the island of Sardinia.

Ibn Battutah's travels took him across 75,000 miles in Africa, Asia, and Europe, in the course of which he visited nearly every country in the Islamic world. In the east he reached as far as China, and to the south as far as Mali and the coast of East Africa. In the north, he traveled as far as the edge of the steppes of SIBERIA, and in the west he visited Spain. He was one of the first known explorers of the Sahara. His travel account, *Rihla* (Journey), completed in 1357, became known outside of the Arabic world after the French occupation of North Africa in the 19th century. The record of his travels provides a vivid description of the Middle East, East and West Africa, India, and China in the century before the onset of the age of European exploration. In it, he makes the first written reference to the mountains known as Hindu Kush.

Ibn Fadlan, Ahmad (Ahmad ibn Fodhlan)

(fl. 920s) *Islamic scholar, traveler in early medieval Russia and eastern Europe*

Ahmad ibn Fadlan lived in the region around Baghdad in what is now Iraq during the early 900s. All that is known of his early life is that he was a non-Arab and established a reputation as an Islamic scholar.

In 921–22, Ibn Fadlan served as a religious adviser on a diplomatic mission sent by the Abbasid caliph of Baghdad, al-Muqtadir, to the lands of the Eastern Bulgars, located near the confluence of the Volga and Kama Rivers.

Starting out from Baghdad, the delegation traveled into western Persia (present-day Iran), then headed northward into the Caucasus, west of the Caspian Sea. They continued westward into eastern Europe, territory that is now part of eastern Poland and Russia. Contact was made not only with the Eastern Bulgars, but also with other Turkic peoples, including the Khazars, who by that time had embraced Judaism. Ibn Fadlan also had the opportunity to observe the culture of the region's Scandinavian settlers, descended from the Vikings. Known as the Rus or Ruser, they had brought their Norse culture with them from the north and were ancestral to some modern Russians.

On his return to Baghdad some time after 922, Ibn Fadlan prepared an account of his travels. Entitled *Kitab* (Book), it details the life and culture of the early pagan Russians and the Turkic people of eastern Europe and western central Asia and provides the earliest record of the region in pre-Christian times.

Ibn Hawqal, Abu al-Qasim ibn Ali al-Nasibi (Abul Qasim ibn Hauqal, Abul Qasim ibn Haukal)

(fl. 940s–970s) *Arab traveler, merchant, and geographer in Europe, Middle East, and Africa*

Abu al-Qasim ibn Ali al-Nasibi ibn Hawqal, of Arab descent, was originally from the Mesopotamian city of Nasibin in what is now Iraq. He was known as a merchant as well as a religious scholar.

In 943, Ibn Hawqal embarked on what turned out to be a 30-year journey taking him through many of the Islamic lands of the Middle East, Europe, and North Africa. He visited Muslim cities from Armenia to Spain, as well as on the island of Sicily in the western MEDITERRANEAN SEA.

In North Africa, known to medieval Muslims as the Maghreb region, Ibn Hawqal journeyed across the SAHARA DESERT, reaching its southern edge, and entered the city of Kumbi in what is now the West African nation of Ghana. He later wrote about the trade in gold there. While in West Africa, he saw the NIGER RIVER; noting its apparent eastward flow, he thought it to be a western tributary of the NILE RIVER.

On his return to Mesopotamia in about 973, Ibn Hawqal wrote a geography, *Image of the Earth*, which revised an earlier geographic study made by the Muslim scholar al-Istakhri. Also known as *Of Ways and Provinces*, the work includes a map of the known world, as well as an account of the culture and economy of the lands he visited. Although mainly describing the Islamic people around the Mediterranean Sea and in eastern Europe, it also provides details on the non-Muslim nations adjacent, including the first account of the lands of West Africa, south of the Sahara.

Ibn Jubayr, Abu al-Hasan Muhammad

(Mohammed ibn Jubair) (1145–1217) *Islamic official and scholar in the eastern Mediterranean and Middle East*

Born in Valencia, on the Mediterranean coast of Spain, Abu al-Hasan Muhammad ibn Jubayr belonged to a well-established Muslim family; his father was a government official. Following an education in Arabic grammar and literature, in addition to Islamic theological studies, he went on to become the secretary to the Moorish governor of Granada.

In accordance with Islamic practice, Ibn Jubayr undertook a pilgrimage to Mecca and Medina in 1182. On his eastward journey across the MEDITERRANEAN SEA, he visited Sardinia and Crete before landing at Alexandria. He then continued to Cairo, from where he followed the usual pilgrim route to the holy cities on the RED SEA coast of the Arabian Peninsula.

Ibn Jubayr remained in Arabia for almost a year. He then traveled into what is now Iraq and returned to Spain by way of Sicily after an absence of three years. He made additional journeys to the Middle East in 1189 and 1191.

In 1217, while in Alexandria on his fourth trip to the eastern Mediterranean, Ibn Jubayr died. He left behind a written account of his 1182–85 journey to Arabia and Iraq, detailing his experiences as a pilgrim to Mecca. Known as the *Rihla* (Journey), the traditional Arabic title for travel writings, it includes a description of life and culture in the Middle East at a time when European influence was beginning to be felt as a result of the CRUSADES against Muslims. It also provides an account of the techniques of seamanship and navigation as practiced by medieval Arab seafarers on the Mediterranean. Ibn Jubayr's career in the government of Granada coincided with the last decades of Moorish domination of Spain.

Ibn Rusta, Abu Ali Ahmad (Ibn Rosteh)

(fl. early 900s) *Arab merchant in eastern and central Europe and Southeast Asia*

As an Arab merchant in the early 900s, Abu Ali Ahmad ibn Rusta traveled throughout much of the Islamic world. His business took him across southern Asia, as far as Malaya and the islands of present-day Indonesia. He also visited the lower Volga region of eastern Europe, where he observed the trade carried on between the Rus, a Viking people of Scandinavia, and the Volga Bulgars, with the Khazars acting as middlemen.

Ibn Rusta left an account of his travels, entitled *Kitab al-A'laq al-Nafisa*, in which he details the geography and culture of both the Islamic and non-Islamic lands he visited. His writings provide one of the earliest glimpses of life and commerce in eastern and central Europe during the early medieval period. They include a description of a Viking burial.

I-ching (Yijing, I-tsing) (634–ca. 700)

Chinese religious scholar in Indonesia and India

I-ching, a Buddhist scholar in China, inspired by the travels of HSÜAN-TSANG, set out in 671 on a journey to India to acquire authentic Sanskrit texts of Buddhist religious writings.

Unlike his contemporary Hsüan-tsang and his predecessor FA-HSIEN, I-ching was compelled to embark for India by ship from Canton (Guangzhou). The usual overland route across the HIMALAYAS and central Asia had become unsafe for Chinese travelers because of turmoil in Tibet and the Muslim conquests of the Pamir region and Afghanistan.

Sailing on a Persian vessel, I-ching first went to Palembang, the capital of the Srivijaya kingdom on the island of Sumatra and a center for Buddhist studies in Southeast Asia. He spent the next six months in Palembang learning Sanskrit, then traveled to the western end of Sumatra, beyond

the Strait of Malacca, where he found passage on a Sumatran ship bound for the Bay of Bengal and India. Following a visit to the Nicobar Islands northwest of Sumatra, he sailed to the port of Tamralipiti at the mouth of the Hooghly River, near present-day Calcutta.

After an additional year of Sanskrit studies at Tamralipiti, I-ching set out to tour the sites sacred to Buddhism in the lower Ganges Valley. He reached Magadha, the place where Buddhism had first developed, where he remained for 10 years, studying and collecting Buddhist texts, including as many as half a million Sanskrit stanzas.

In about 682, I-ching returned to Palembang on Sumatra and began to translate the wealth of religious writings he had acquired. In 689, he sailed to Canton to recruit assistants to help him with the task. He returned with a staff of Buddhist scholars to Palembang, where he remained until 695, completing his work and preparing a detailed geographic study based upon his travels in India and what is now Indonesia.

I-ching had spent a considerable amount of time at the eastern terminus of the SPICE ROUTE. In his written account, which survives, he provides a description of the life and culture of the EAST INDIES and the coast of the Malay Peninsula as it was prior to the influx of Portuguese and Dutch explorers and traders in the 1500s. His travels carried on the tradition of Chinese explorations undertaken in the pursuit of religious knowledge established by Fa-hsien and Hsüan-tsang.

Idrisi, Abu Abd Allah Muhammad ash-Sharif al- (Abu Abdullah al-Shari al-Idrisi, al-Sharif al-Idrisi al-Qurtubi, Abu Abdullah Muhammed ibn Muhammed ibn Abdullah ibn Idris ash-Sharif, Abu Abd Allah Muhammed ibn Muhammed ibn Abd Allah ibn Idris al-Hammudi al-Hasani al-Edrisi, Dreses) (1099–ca. 1165) *Arab cartographer in Europe, North Africa, and the Middle East*

Abu Abd Allah Muhammad ash-Sharif al-Idrisi was probably born in Ceuta, in North Africa, although some sources cite Spain as his place of birth. He was a member of a noble Arab family, the Idrisids, who claimed descent from the prophet Mohammed and ruled the region around Fez, Morocco, and Malaga, Spain.

As a young man, Idrisi traveled widely in Europe, North Africa, and the Middle East, ranging over a wide area from England to Asia Minor. In 1145, he became court cartographer and geographer to Roger II, the Norman king of Sicily.

At Palermo, Idrisi set to work on a series of geographic projects for King Roger, including a PLANISPHERE, which projected an image of the celestial sphere onto a flat surface. He supplemented this work with his book *The Stroll of One*

Wishing to Traverse the Horizons of the Globe, completed in 1154. Known also as *The Book of Roger*, in honor of his royal patron, it contains a series of 70 maps depicting the known world, as well as a narrative of Idrisi's travels and accounts of other world travelers. In addition to geographic data, it provides extensive details on the social and economic conditions of Europe and the Middle East in the 12th century.

The maps of the world drafted by Idrisi were considered to be the finest made in the Middle Ages. They showed the Earth as divided into seven climatic zones, in accordance with Islamic belief. With these maps, he introduced the use of the grid system into European mapmaking, enabling him to show geographic locations as they corresponded to celestial coordinates. This innovation originated in China and was taken to Europe and the Middle East by Arab navigators returning from Canton (Guangzhou).

Al-Idrisi's cartographic works presented a practical image of the world. Unlike existing maps of the time, which were based more on scriptural teachings than on geographic facts, his works could be used by mariners to determine the relative position of geographic points, laying the basis for the development of modern navigational charts.

Indicopleustes, Cosmas (Cosmas of Alexandria) (fl. 540s) *Egyptian merchant, monk, geographer in Ethiopia and India*

Originally a merchant of Alexandria, Egypt, Indicopleustes, whose name means "Indian Navigator," was a coastal trader along the shores of the Indian Ocean. In the course of his commercial travels, he visited ports south of the RED SEA in Ethiopia and east of the Persian Gulf as far as western India and Ceylon (present-day Sri Lanka).

In about 548, Indicopleustes converted to Christianity and became a monk, retiring to a monastery on Mount Sinai. He then undertook a 12-volume illustrated work entitled *Topographia Christiana* (Christian topography), in which he attempted to reconcile Christian religious teachings with concepts about world geography.

Although non-Christian writers had previously described the Earth as a sphere, Indicopleustes refuted these ideas, putting forth the belief that the world is a rectangular plane upon which rests the sky and the heavens. Basing his views on St. Paul the Apostle, who had written in the Bible that the Tabernacle of Moses is a true model of the world, Indicopleustes concluded that the world must be flat, like a table. He went on to describe the four great rivers of the Earth—the INDUS RIVER, NILE RIVER, Tigris River, and the Euphrates River—as all flowing from Paradise, and dividing the world into symmetrical quadrants. He supported his theological view of a flat Earth with a map of the world, one of the first Christian maps produced in the early Middle Ages.

Indicopleustes described the trade between India, Ceylon, and China. He was one of the first Westerners to present China as reachable by sea, identifying that country as the ultimate source of silk. He also mentioned Christian churches in India, a report that may have inspired later European missionaries and explorers to seek new routes to the East.

Irateba (ca. 1814–1878) *Mojave Indian chief, guide to U.S. government expeditions in Arizona and California*
Irateba was a leader of the Huttoh-pah band of the Mojave Indian tribe. He was born near present-day Needles, California.

During the early 1850s, Irateba guided a series of U.S. Army expeditions through western Arizona and southeastern California. This area, comprising the lower Colorado Basin and the Mojave Desert region, was newly acquired from Mexico and remained unexplored by non-Indians.

In 1851, Irateba guided Captain LORENZO SITGREAVES in his expedition across then uncharted parts of Arizona to San Diego, California.

Three years later, in 1854, Irateba guided Lieutenant AMIEL WEEKS WHIPPLE and a group of the U.S. Army Corps of Topographical Engineers across the Mojave Desert during the last leg of their expedition from Fort Smith, Arkansas, to Los Angeles, California. Irateba also accompanied Lieutenant JOSEPH CHRISTMAS IVES on his 1858 exploration of the COLORADO RIVER.

In 1859, Irateba became chief of his tribe following the end of the Mojave Uprising. In 1862–63, he made an official visit to Washington, D.C., where he met with President Abraham Lincoln.

Irateba's efforts as a guide for the U.S. Army Corps of Topographical Engineers in the Mojave Desert and lower Colorado Basin resulted in the first accurate maps of the region. The route he helped blaze across the southwestern desert soon led to the establishment of stagecoach and wagon routes providing more direct access to California for settlers and prospectors.

Irving, John Treat (1812–1906) *American traveler, writer in Kansas and Nebraska*

John Treat Irving was born in New York City, the son of an attorney and judge and nephew of the author Washington Irving. He was educated in preparatory schools in New York, and, in 1828, he graduated from Columbia College.

Irving, like his uncle, was interested in Indian life on the frontier, and it was with Washington Irving's influence that he was appointed a member of Henry Leavitt Ellsworth's expedition west of Fort Leavenworth in 1833.

In September 1833, Irving left Fort Leavenworth with Ellsworth who, as U.S. Indian Treaty Commissioner, had

been assigned to establish diplomatic ties with the Otoe and Pawnee Indians of the Republican River and Platte River regions. On the return journey across the plains, Irving became separated from the rest of the expedition while hunting and traveled alone to Fort Leavenworth. He returned to New York City toward the end of November 1833.

In New York, Irving went on to study law and was admitted to the New York State Bar. He became a practicing attorney and leading real estate entrepreneur in the city, and also carried on a literary career, recounting his frontier experiences in his 1835 book *Indian Sketches*, followed by *The Hunters of the Prairie*, published in 1837.

In his written descriptions of the Indians who inhabited the prairies of what is now Kansas and Nebraska, John Treat Irving provides a glimpse of life on the frontier as it appeared to the first trappers and explorers.

Ives, Joseph Christmas (1828–1868) *U.S. Army officer, American topographical engineer in the American Southwest*

Born in New York City, Joseph C. Ives later lived in New Haven, Connecticut, where he attended Yale College. He went on to West Point, graduating as a second lieutenant in the ordnance department in 1852.

Ives transferred to the U.S. Army Corps of Topographical Engineers in 1853. That year, under the command of Lieutenant AMIEL WEEKS WHIPPLE, he took part in the government's survey for a proposed Pacific railroad route along the 35th parallel. Ives, in command of an auxiliary force, joined up with Whipple and the main column at Albuquerque in present-day New Mexico. The expedition then explored from the Zuni Indian villages of western New Mexico, to the COLORADO RIVER at Needles, and continued across the Mojave Desert along a wagon road to San Bernardino, California.

In 1857, Ives was placed in command of an expedition to determine the navigable limits of the Colorado River. Faced with an impending conflict with the Mormons in Utah's Great Basin, the army needed to know the feasibility of sending troops up the Colorado and Virgin Rivers to the Great Salt Lake.

Ives and his expedition assembled at San Francisco in October 1857. His group included geologist JOHN STRONG NEWBERRY, cartographer Baron F. W. Egloffstein, and artist Heinrich Baldwin Möllhausen. While most of the party traveled overland to the Colorado at Fort Yuma, Ives and a small detachment sailed from San Francisco to the head of the Gulf of California. Aboard the ship were parts for a small prefabricated shallow-draft steamboat, the USS *Explorer*, which Ives and his party assembled near Montague's Island at the mouth of the Colorado River.

Ives and his party traveled up the Colorado on the *Explorer*, joining the rest of his expedition at Fort Yuma in early January 1858. From there, he and his men steamed northward through Purple Hill Pass, Canebrake Canyon, the Red Gates of the Chocolate Mountains, and into the Great Colorado Valley, where they come upon Monument Mountain.

Proceeding farther upriver, Ives and his men reached the Mojave villages at Needles, where they were joined by the Indian IRATEBA, who agreed to act as their guide. At Black Canyon, about 500 miles up the Colorado, Ives determined that the river was no longer navigable and sent half his party back to Fort Yuma on the steamboat. After exploring Black Canyon in a small boat, he led a party overland to find a connection with the Mormon Road.

In April 1858, Ives and his party reached the floor of the Grand Canyon at Diamond Creek, where barometric readings indicated the canyon was more than a mile deep. They ascended the towering walls of the Grand Canyon by following dangerous Indian trails to the Colorado Plateau. Crossing the Painted Desert, they reached the Hopi Indian pueblos on May 11, 1858.

Ives and the expedition then attempted to head northward into Colorado, but they were unable to cross the desert. Instead, they went eastward across Arizona, through hostile Navajo (Dineh) Indian territory, and arrived at Fort Defiance on May 23. Ives returned to Fort Yuma by stagecoach, then went to San Francisco, where he boarded a steamer for Washington, D.C.

In the years just prior to the Civil War, Ives was an architect on the Washington Monument and took part in surveys in California, Nevada, and Oregon. In 1861, he resigned from the U.S. Army and became captain of engineers for the Confederacy, serving as chief aide to Confederate president Jefferson Davis. After the war, he settled in New York City, where he spent his remaining years.

In his 1858 exploration of the Colorado River, Joseph C. Ives and his party became the first non-Indians known to have set foot on the floor of the Grand Canyon. His route from Black Canyon to the Hopi pueblos traced that taken by Father FRANCISCO TOMÁS HERMENEGILDO GARCÉS in

1776. John Strong Newberry, the expedition's geologist, made stratigraphic studies of the Grand Canyon, which greatly increased the geologic understanding of the entire American West. Cartographer Baron F. W. Egloffstein subsequently created the first relief map of the Grand Canyon and the Colorado Plateau. The expedition's artist, Heinrich Möllhausen, produced the earliest pictorial representations of the canyon. In addition to determining the navigable limits of the Colorado River, Ives found a connection to the Mormon Road, which opened the lower Colorado to direct contact with the Great Basin. His official account, *Report Upon the Colorado River of the West* (1862), included one of the earliest detailed navigational studies of the Colorado River.

Izmailov, Gerasim Alekseyevich

(fl. 1770s–1790s) *Russian mariner in Siberia and Alaska*

Gerasim A. Izmailov was a Russian seafarer who sailed the Pacific coast of SIBERIA in the last half of the 18th century. In 1771, he was caught up in a mutiny at Bolsheretsk on the Kamchatka Peninsula along with DMITRY IVANOVICH BOCHAROV.

Izmailov returned to Kamchatka in 1775 on a voyage in which he explored the west and northeast coasts of the peninsula.

From 1783 to 1786, Izmailov served under GRIGORY IVANOVICH SHELIKOV in an expedition to Alaska during which he took part in the establishment of the first Russian fur-trading post on Kodiak Island.

In 1788, Izmailov again sailed with Bocharov, joining him in a voyage to Alaska on the *Three Saints*. They explored the north shore of the Gulf of Alaska and, in a series of landings, left marker plates laying Russian claim to the territory.

Izmailov returned to the northern Gulf of Alaska region in 1789 in an exploration of the Kenai Peninsula, the region around present-day Anchorage and Seward. He continued to explore the coastal regions of southern Alaska until 1797.

Gerasim A. Izmailov's explorations revealed many geographic details and provided navigational data important to subsequent Russian settlement.



Jackson, David E. (unknown–1837) *American fur trader, mountain man in northern Rocky Mountains*

David E. Jackson began his career as a fur trader with WILLIAM HENRY ASHLEY's first expeditions up the MISSOURI RIVER from St. Louis in the early 1820s.

By 1826, Jackson was a brigade leader in the northern ROCKY MOUNTAINS, and, at the rendezvous held that summer south of Bear Lake, near what is now the Utah-Idaho stateline, he entered into a partnership with JEDEDIAH STRONG SMITH and WILLIAM LEWIS SUBLETTE. They purchased Ashley's trade goods and took over management of the ROCKY MOUNTAIN FUR COMPANY's fur-trading brigades. The next fall, while Smith undertook his epic trek across the Southwest into the Sierra Nevada, Jackson and Sublette led a brigade into the Yellowstone country, where they witnessed the spectacular geysers in what is now Yellowstone National Park, among the first non-Indians to do so.

In 1831, Jackson again teamed up with Smith and Sublette as an investor in a wagon caravan transporting trade goods across the southern plains by way of the Santa Fe Trail. In the course of this expedition, Smith lost his life in an Indian attack in the Cimarron River region of what is now southwestern Kansas.

Jackson turned his attention to the Far West, journeying to California with EWING YOUNG in 1832, where he bought mules for resale to westward-bound settlers.

David E. Jackson was an associate of some of the most well-known MOUNTAIN MEN in the peak years of the FUR TRADE in the northern Rockies. His career, first as a fur

trader, then as an entrepreneur in goods and livestock, reflected the rapid changes in the economic and social character of the American frontier of the 1820s and 1830s. Jackson Lake and Jackson Hole in Wyoming were named after him.

Jackson, Frederick George (1860–1938)

British explorer in Russian Arctic

British-born Frederick Jackson's earliest venture into the polar regions was a whaling expedition in 1886–87. Six years later, in 1893, Jackson undertook a scientific expedition into the Russian Arctic. He explored the tundra region that lies between the Pechora River and the Ob River, south of the Barents and Kara Seas. Traveling by sledge, he explored more than 3,000 miles of territory, across the Ural Mountains to the western edge of SIBERIA. He carried out additional explorations westward into Lapland.

Starting in 1894, and under the sponsorship of London newspaper publisher Alfred Harmsworth (Viscount Northcliffe), Jackson led a British scientific team on a three-year expedition to Franz Josef Land. Explored 20 years before by the Austrians KARL WEYPRECHT and JULIUS VON PAYER, the island chain lies at the northeastern rim of the Barents Sea and consists of the northernmost points of land in the Eastern Hemisphere.

On June 17, 1896, while exploring Cape Flora in Franz Josef Land, Jackson met up with Norwegian explorers FRIDTJOF NANSEN and Hjalmar Johannsen, who had

wintered there after an unsuccessful attempt at reaching the NORTH POLE. Jackson took the two explorers back to his main camp and arranged for their return to Hammerfest, Norway, aboard his ship, the *Windward*.

After 1897, Jackson continued to explore the regions of the world still relatively unknown to Europeans, including parts of Africa and the deserts of Australia.

Jackson wrote of his experiences in the Russian tundra in his 1895 book *The Great Frozen Land*. His *A Thousand Days in the Arctic*, published in 1899, provides a detailed account of the Jackson-Harmsworth Arctic Expedition. His 1935 book, *Lure of the Unknown Lands*, recounts all his wide-ranging explorations.

The Jackson-Harmsworth Arctic Expedition of 1894–97 undertook the first major scientific study of Franz Josef Land. Moreover, Frederick Jackson's team was the first to use ponies in Arctic exploration.

Jacquinet, Charles-Hector (1796–1879)

French naval officer in the South Pacific and Antarctica

Born in the Loire Valley town of Nevers in central France, Charles-Hector Jacquinet entered the French navy when young. At the age of 19, he sailed, along with LOUIS-ISADORE DUPERRÉ, as an ensign on the *Uranie*, under the command of LOUIS-CLAUDE DE SAULCES DE FREYCINET in an 1817–20 expedition to Australia, New Guinea, and the South Pacific Ocean.

In 1822–25, Jacquinet served as an ensign under Duperrey on the *Coquille*. On this official French scientific voyage to the South Pacific, he was also the expedition's astronomer.

Starting in 1826, Jacquinet began his long association with JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE. That year, he was promoted to the rank of lieutenant commander and was appointed second in command aboard the *Astrolabe* on Dumont d'Urville's expedition to the South Pacific in search of traces of the expedition of JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, which had disappeared nearly 40 years earlier. By March 1828, the wreckage of La Pérouse's ship was located at Vanikoro Island. Jacquinet, standing in for Dumont d'Urville, who was ailing from fever, officiated at a ceremony to dedicate a monument to the lost French navigator.

In 1837, after an eight-year period of routine naval assignments, Jacquinet joined Dumont d'Urville on his final voyage of exploration. With the rank of corvette captain, he commanded the *Zélée*, accompanying Dumont d'Urville on the *Astrolabe*, in an effort to locate the SOUTH MAGNETIC POLE.

Jacquinet returned from the voyage in 1840. Soon afterward, he was given command of the ship *Genereux*. He gave up this post later that year after Dumont d'Urville's

death in a railroad mishap near Versailles, and assumed the responsibility of producing an account of Dumont d'Urville's 1837–40 expedition, a task that occupied him until 1854. Entitled *Voyage to the South Pole and Oceania*, it was published in 23 volumes with seven atlases.

Made a rear admiral in 1852, Jacquinet later commanded a French naval expedition against Piraeus, Greece, during the Crimean War of 1853–56. For this service, he was made a vice admiral. On retiring, he made his home near the French naval base at Toulon.

In the course of his naval career, Charles-Hector Jacquinet took part in some of the most important French scientific expeditions to the South Pacific and played a key supporting role in Dumont d'Urville's voyage of 1837–40, one of the earliest official explorations along the Antarctic mainland.

James, Thomas (ca. 1593–ca. 1635) *English mariner in Hudson Bay*

Born in Bristol, England, Thomas James was the son of a prominent citizen of that seaport, who served two terms as the city's mayor in the early 1600s. Trained for the law, he went on to become a wealthy Bristol attorney while still a young man. He was also drawn to a career to sea, acquiring to that end knowledge of mathematical navigation.

There is some evidence to suggest that James may have taken part in SIR THOMAS BUTTON'S 1612 voyage to HUDSON BAY. Little is known of his exploits before 1631, the year in which he was commissioned by the Merchant Venturers' Society of Bristol to command an expedition to explore Hudson Bay. At that time, hope was still high for the discovery of the much-sought-after NORTHWEST PASSAGE, a water route that reportedly opened up on the fabled STRAIT OF ANIAN and led into a Western Ocean, across which lay the riches of China and Japan. By 1631, a rivalry had developed between Bristol and London commercial interests, both groups sponsoring voyages of exploration to ensure their respective trading rights for any routes or lands that might be found.

James, in command of the *Henrietta Maria*, sailed from Bristol on May 3, 1631, two days before LUKE FOXE, who had been commissioned to undertake a similar expedition to Hudson Bay, embarked from Deptford. More than two months later, the expedition, after negotiating the DRIFT ICE of Davis Strait, made its way through Hudson Strait, and, by mid-July, had sailed southwestward as far as Hubbert's Hope at present-day Churchill, Manitoba.

James continued to explore the coastline south of Cape Churchill. He named the southwestern mainland the New Principality of South Wales, and, on July 26, he located the estuary of a river that he dubbed the New Severn, now known as the Severn River in Ontario. Three days later,

James met up with Foxe off a point of land James had named Cape Henrietta Maria, in honor of both his ship and the wife of England's King Charles I. The commanders of the two rival expeditions met cordially for the next two days, exchanging information on their respective explorations of the west shore of Hudson Bay. Both had concluded that that part of Hudson Bay had no navigable western outlet.

James and his expedition then explored southward along the coast below Cape Henrietta Maria, into an arm of Hudson Bay that he named James Bay (although it had been first explored by HENRY HUDSON in 1610–11). Meanwhile, Foxe sailed back to England in fall 1631, fearing the onset of SCURVY and the prospect of being icebound for the winter. Failing to find a passage along the west shore of Hudson Bay, James probed southward to the foot of James Bay, hoping to find at least a route into the St. Lawrence River if not the Northwest Passage itself.

In early October 1631, James deliberately beached his ship on Charlton Island at the southern end of James Bay, in an effort to secure it against storms. He had his men then built shelters on Charlton Island, where they spent the winter. Four of them died of scurvy; all the survivors greatly suffered from that disease as well as from the severe cold. Despite the ordeal, James was able to record the effects of the extreme winter conditions, making the first scientific observations of the phenomenon of continuous low temperatures.

On June 24, 1632, James took formal possession of Charlton Island in the name of King Charles I. A week later, he sailed northward into Hudson Bay, stopping first at Danby Island, where he found what he believed to be traces of Hudson and his companions, who had been marooned in James Bay more than 20 years earlier.

James did not sail directly to England, but continued to explore northward into Hudson Bay for the Northwest Passage. He investigated Foxe Channel, explored by Luke Foxe the previous year, reaching as far as 65°30' north latitude before ice conditions forced him to return southward to Hudson Strait, and from there to England.

James and the *Henrietta Maria* arrived back in Bristol on October 22, 1632. Soon afterward, he was appointed commander of the British Navy's Bristol Channel Squadron.

With the support of King Charles, James wrote an account of his voyage to Hudson Bay. Published in 1635 as *The Strange and Dangerous Voyage of Captain Thomas James*, the work graphically describes the first planned wintering undertaken by Europeans in the Hudson Bay region. It was an immediate literary success. James's vivid account reportedly influenced Samuel Taylor Coleridge in his descriptions of the icebound ship in *The Rime of the Ancient Mariner*, written in 1798. Moreover, James's scientific data on the effects of extreme cold were later used by 17th-century En-

glish chemist Robert Boyle in formulating his conclusions on the relationship between temperature and pressure, later known as Boyle's Law.

Thomas James correctly surmised that no navigable outlet from Hudson Bay existed below 66° north latitude. This report, coupled with his harrowing account of the winter he spent at James Bay in 1631–32, served to discourage further exploration of Hudson Bay for decades afterward. Not until 1668 was the next major expedition into Hudson Bay made, that of MÉDARD CHOUART DES GROSELLIERS, a fur-trading enterprise. The next explorer after James who actively sought the Northwest Passage in Hudson Bay was JAMES KNIGHT in 1719.

Jansz, Willem (Willem Janz, Willem Janszoon, Willem Janstzoon) (fl. early 1600s) *Dutch mariner in Australia*

An inhabitant of Amsterdam, Willem Jansz became a navigator for the DUTCH EAST INDIA COMPANY. About 1605, he sailed from the Netherlands to the East Indies, following the southern route across the Indian Ocean to the port of Bantam on Java. From there, he sailed his ship, the *Duyfken*, to New Guinea, hoping to locate the mainland of the GREAT SOUTHERN CONTINENT, or Terra Australis, then believed to exist in the high southern latitudes south of the EAST INDIES.

Sailing eastward, Jansz explored the south coast of New Guinea, as far as 140° east longitude. At that point, he turned southward and came upon the mainland of Australia's Cape York Peninsula. Cruising along the north Australian coast into the Gulf of Carpentaria as far as 13° south latitude, he wrongly concluded that the land, which he called New Holland, was a southern extension of New Guinea. He made at least one landing on the Australian mainland, where some of his men were killed in an encounter with Aborigines.

Just a few months after Jansz's voyage of 1605, Spanish navigator LUIS VÁEZ DE TORRES, sailing westward from Peru, charted the strait, now known as Torres Strait, separating New Guinea from Australia.

William Jansz made the European discovery of Australia. His name for the continent, New Holland, identified it on maps until MATTHEW FLINDERS explored it in the early 1800s and gave it its current name. Jansz's meeting with the Aborigines was the first recorded contact between the natives of Australia and Europeans.

Jenkinson, Anthony (unknown–1611) *English trade representative in Russia and central Asia*

In his early business career, Anthony Jenkinson was involved in trade between England and lands of the eastern MEDITERRANEAN SEA.

In 1556, Jenkinson succeeded RICHARD CHANCELLOR as chief trade agent of the London-based MUSCOVY COMPANY, organized to seek a NORTHEAST PASSAGE across the top of Europe and Asia to China. By that time, the company had succeeded in establishing trade relations with Russia under Ivan IV (also known as Ivan the Terrible).

In 1557, Jenkinson sailed from England to Archangel on the White Sea, then made his way overland to Ivan's court at Moscow, hoping to continue from Moscow to China on the first such journey ever attempted by an Englishman. After obtaining from Ivan letters of safe conduct and permission to explore the Russian-dominated region to the east, Jenkinson left Moscow accompanied by two English assistants—a pair of brothers named Johnson—and headed for the Kazan region and the Volga River. He descended the Volga to its mouth on the Caspian Sea at Astrakhan, then sailed along the northeast coast of the Caspian, beyond the mouth of the Ural River, landing finally at Mangyshlak.

At Mangyshlak, Jenkinson and his companions traveled eastward with a large camel caravan across the northern Kara-Kum Desert to the south shore of the Aral Sea and the Oxus River (the present-day Amu Darya). Ascending the Oxus, they reached the kingdom of Bukhara in present-day Uzbekistan. It became apparent to the Englishmen that the Mongols would block their progress eastward toward China; they decided to return to Moscow over the same route they had followed on the outward journey.

Jenkinson returned to England in 1559. He produced a map based on his first journey to Russia and central Asia; it was published in England in 1562. Although a direct overland trade route to China had proved unfeasible, Jenkinson saw the possibilities of crossing Russia southward and establishing trade contacts with Persia (present-day Iran), a region that was then emerging from Mongol domination. He soon organized follow-up trade expeditions to Persia, none of which met with much success due to the hazards of travel in the regions east of the Volga. In 1561, again with the backing of the Muscovy Company, he sailed to the White Sea coast, and from there traveled overland to Moscow and the Volga River.

Upon reaching the Caspian Sea, Jenkinson this time sailed southward along its west shore to Baku, where he traveled overland into northern Persia, arriving at the city of Qazvin, which at that time was the capital of Persian ruler Shah Tahmasp I. Jenkinson obtained commercial privileges for English traders from the shah, then returned to England by way of Russia and the White Sea, arriving in 1564.

While in Russia, Jenkinson heard reports on the disposition of the northern coastlines of Europe and Asia and surmised that an ice-free Northeast Passage to the Far East might be located. His conclusions were challenged by his contemporaries, among them SIR HUMPHREY GILBERT, who

still adhered to the idea of a NORTHWEST PASSAGE to the Orient across the top of the newly explored North American continent. During winter 1565–66, Jenkinson and Gilbert openly debated the issue before Queen Elizabeth I.

Anthony Jenkinson's travels into central Asia were an extension of English efforts to locate the Northeast Passage. His overland journeys resulted in the first direct contacts between England and Persia. On his 1557–59 journey, he and his companions became the first Englishmen to visit Bukhara.

Jiménez de Quesada, Gonzalo

(Gonzalo Ximenes de Quesada) (ca. 1509–1579)

Spanish conquistador in South America

Gonzalo Jiménez de Quesada was a native of either Granada or Córdoba, Spain. In about 1533, following his education at the University of Salamanca, he settled in Granada and practiced law.

In about 1535, Jiménez de Quesada embarked for the Americas as a member of a large expedition commanded by Pedro Fernández de Lugo, the newly appointed governor of the colonial province of Santa Marta on the Caribbean coast of present-day Colombia. Reports of the fabulously rich Indian city, known as EL DORADO, soon reached Lugo. Jiménez de Quesada was placed in command of an expedition along the Magdalena River into the interior. In addition to finding El Dorado, he was to locate a route connecting Santa Marta with Peru.

Jiménez de Quesada left Santa Marta on April 5, 1536, with 600 men. Rather than ascend the Magdalena River from its mouth west of Santa Marta and risk meeting Indian resistance along the river's lower course, the Spaniards chose to head eastward across the Sierra Nevada de Santa Marta mountains into what is now Venezuela. They would then head overland to the Magdalena and meet up with supply ships at its junction with the Cesar River. Following the Cesar River, Jiménez de Quesada stopped at Chiriguana before continuing to the rendezvous point at Tamalameque.

After a period of waiting, Jiménez de Quesada received word that the ships had been unable to ascend the river. The expedition continued along the Magdalena, hindered by the dense jungle as well as dwindling supplies. A second group of supply vessels managed to reach the Spaniards before they arrived at present-day Barrancabermeja, Colombia. At that point, attracted by reports of an advanced Indian civilization believed to exist on the eastern slopes of the ANDES MOUNTAINS, Jiménez de Quesada led his men away from the Magdalena and into the lands of the Chibcha Indians.

Starting in March 1537, Jiménez de Quesada began his two-year conquest of the Chibcha. He claimed the territory as the New Kingdom of Granada (New Granada); on Au-

gust 6, 1538, he founded his capital, Santa Fe de Bogotá, derived from the name of the Chibcha tribal leader, Bacata, and known today as Bogotá.

By early 1539, Jiménez de Quesada had subjugated the natives and had acquired from them a fortune in gold and precious stones. At about that time, two other European exploring expeditions appeared in the Bogotá region. One, led by the Spaniard SEBASTIÁN MOYANO DE BENALCÁZAR, had arrived from Ecuador. The other, commanded by the German NIKOLAUS FEDERMANN, had traveled from the Welser family's colony in Venezuela. Although all three claimed the territory as their own, they agreed to allow the Council of the Indies in Spain to mediate the issue and decide who should govern New Granada.

Later in 1539 or early in 1540, Benalcázar, Federmann and Jiménez de Quesada sailed to Spain from Santa Marta. While awaiting the Spanish government's decision, Jiménez de Quesada traveled in France and Portugal, returning to Spain in 1545. The governorship of New Granada was awarded to Alonso Luis de Lugo, the son of his former commander in Santa Marta; Jiménez de Quesada was named marshal of the new province and councillor of Bogotá, to which he returned in 1551.

Jiménez de Quesada served as a colonial administrator in Bogotá over the next two decades. In 1569, although nearly 70 years of age, he set out on another attempt to find El Dorado. At his own expense, he outfitted a large expedition and led it across the Andes into the llanos, or plains region of eastern Colombia, as far as the junction of the ORINOCO RIVER and the Guaviare River. After three years, he returned to Bogotá without having found the fabled Indian city of great wealth.

In his final years, Jiménez de Quesada was afflicted with a skin malady, possibly leprosy. Nonetheless, although nearing the age of 80, he mounted a military campaign to put down an Indian revolt, during the course of which he was carried to the scene of the action on a stretcher.

Gonzalo Jiménez de Quesada was one of the few well-educated CONQUISTADORES. His eyewitness written account of the conquest of Colombia, although long since lost, was reportedly of literary value as well as accurate and objective. Some scholars suspect that a contemporary, Miguel de Cervantes, modeled his fictional hero, Don Quixote, after the life of Jiménez de Quesada, whose character was thought to embody the archetype of the gallant Spanish nobleman of the 16th century.

Jogues, Isaac (Saint Isaac Jogues) (1607–1646)

French missionary, explorer of the Great Lakes and Lake George
Isaac Jogues was born in Orléans, France, into one of that city's leading families. In 1624, he was ordained a Jesuit priest and became a teacher of literature at the university in

Rouen. In 1636, the Jesuit order sent him to Canada as a missionary to Native Americans. Soon after his arrival in Quebec, he traveled westward to Lake Huron and the Jesuit mission on Georgian Bay.

In 1641, Jogues explored north and west from Georgian Bay. From Lake Huron, he reached St. Marys River and followed it to the falls and rapids that empty into Lake Superior. Jogues named the falls Sault Sainte Marie (Saint Mary's falls). He also explored the north shore of Lake Michigan, becoming the first European missionary to visit that region.

In 1642, on the St. Lawrence River en route to Quebec, Jogues was captured by Mohawk Indians, who took him south into their lands in present-day New York State. The following year, Jogues was ransomed by Dutch officials and released to Fort Orange (present-day Albany, New York). He made his way to the Dutch colony of New Amsterdam (now New York City), from where he returned to France.

In Europe, Jogues was honored by both the French royal court and Vatican officials. He returned to Canada in 1644.

During the next two years, as a peace emissary to the Mohawk, Jogues made several trips to their territory south of Quebec. In 1646, tribal members took him to the southern end of Lake Champlain and through a narrows that



Isaac Jogues (Library of Congress)

led to a lake unknown to Europeans. Jogues named the body of water Lac du Sacrement. (Sir William Johnson re-named it Lake George in 1755, in honor of the English king.)

In October 1646, Mohawk again took Jogues captive. He was tortured and killed at the Caughnawaga Indian village near present-day Amsterdam, New York. He was subsequently named a Jesuit Martyr of North America, and he was canonized as Saint Isaac Jogues in 1930.

Isaac Jogues's explorations north and west of Georgian Bay established the locations of Lake Superior and Lake Michigan in relation to the known region of Lake Huron. His report of the location of Lake George and its connection to Lake Champlain provided geographic knowledge helpful to the French in their campaigns during the French and Indian Wars from 1689 to 1763.

John of Carpini See CARPINI, GIOVANNI DA PIAN DEL.

John of Marignolli See MARIGNOLLI, GIOVANNI DE.

John of Montecorvino (Friar John of Monte Corvino, Giovanni da Montecorvino) (1247–1328)
Italian missionary in India and China

An Italian Franciscan friar, John of Montecorvino undertook his earliest diplomatic assignment in the 1270s, as the emissary of the newly restored Byzantine emperor Michael VIII Palaeologus to Pope Gregory X.

In 1289, Pope Nicholas IV appointed John as his representative to the Persian capital at Tabriz. Two years later, the Italian priest set out on a journey through Persia (present-day Iran) to the mouth of the Persian Gulf. He sailed across the Arabian Sea and rounded the southern tip of India, landing near present-day Madras, where he established the first Catholic missions on the Indian subcontinent.

From India, John sailed southeastward, through the Strait of Malacca and into the South China Sea, then followed the coast of the Yellow Sea northward, landing on the mainland of China just east of Cambaluc, later known as Peking (Beijing). He made his way inland to the court of Kublai Khan in Cambaluc, where, in 1294, the Chinese emperor welcomed him and gave him permission to continue his missionary work in China.

Across from the emperor's palace in Cambaluc, John established a cathedral and church school, the first permanent Christian settlements in China. Over the next 30 years, he reportedly converted more than 6,000 Chinese to Christianity, although Kublai Khan himself resisted John's proselytizing efforts.

In 1307, John of Montecorvino was named the first Catholic archbishop of Peking, as well as patriarch of the Orient. The letters he sent back to Vatican officials in Rome provided a contemporary account of life in the Chinese capital in the early 14th century. Along with the writings of MARCO POLO, his reports made Europeans aware of China and inspired additional European travelers and traders to the Far East.

Johnston, Sir Harry Hamilton (1858–1927)

British diplomat, colonial official in Africa

Harry H. Johnston, from Kensington, England, attended London's King's College as well as the Royal Academy. In 1878, he toured Europe.

At the age of 21, Johnston visited the North African nation of Tunisia, where he spent eight months sketching scenes of native life and writing articles on North African affairs for British newspapers.

In 1882, Johnston undertook his first trip to sub-Saharan Africa, accompanying the seventh earl of Mayo on a hunting expedition to Angola. After a year in the Portuguese colony, he was given permission to explore the CONGO RIVER (Zaire River) on his own. In the course of this journey, he visited with the Anglo-American explorer and journalist SIR HENRY MORTON STANLEY.

Johnston's experience in Africa, together with his proven ability as a scientific reporter, led to his appointment as leader of the British Kilimanjaro Expedition of 1884. Sponsored jointly by the ROYAL SOCIETY and the British Association, Johnston and his team explored the region around Africa's highest peak. He also conducted diplomatic meetings with indigenous leaders, resulting in the first treaties between the British government and the tribes of what is now Tanzania.

Johnston formally entered the British Consular Service in 1885, and, over the following years, served in a variety of diplomatic and colonial posts throughout Africa. In 1889, he explored the country east of Lake Nyasa in what is now Malawi; two years later, he was instrumental in bringing the region under colonial rule as the Central Africa Protectorate. In 1899, after two years as British consul general at Tunis, Johnston helped organize the Uganda Protectorate, where he was appointed special commissioner.

Johnston's disagreements with British Foreign Office policy in regard to Africa, together with health problems, led to his retirement in 1901. He returned to England and continued to write, concentrating on linguistic studies of the Bantu languages and other subjects relating to African culture.

Johnston went on to help found the African Society and establish a school of Oriental and African studies. His works on Africa include *British Central Africa* (1897), *Uganda Pro-*

tecorate (1902), and an account of the Kilimanjaro Expedition. He was also the author of several novels.

In addition to exploring central Africa and serving as a diplomat with tribal leaders, Sir Harry H. Johnston furthered African studies in England.

Jolliet, Louis (Louis Joliet) (1645–1700)

French explorer on the Mississippi River

Born at Beaupré, Quebec, Louis Jolliet entered the Jesuit college in Quebec in 1656, where he studied navigation and hydrography, as well as music. He took minor orders in 1662, but he left the priesthood in 1667 and traveled to France. Upon his return to Canada the following year, he entered the FUR TRADE.

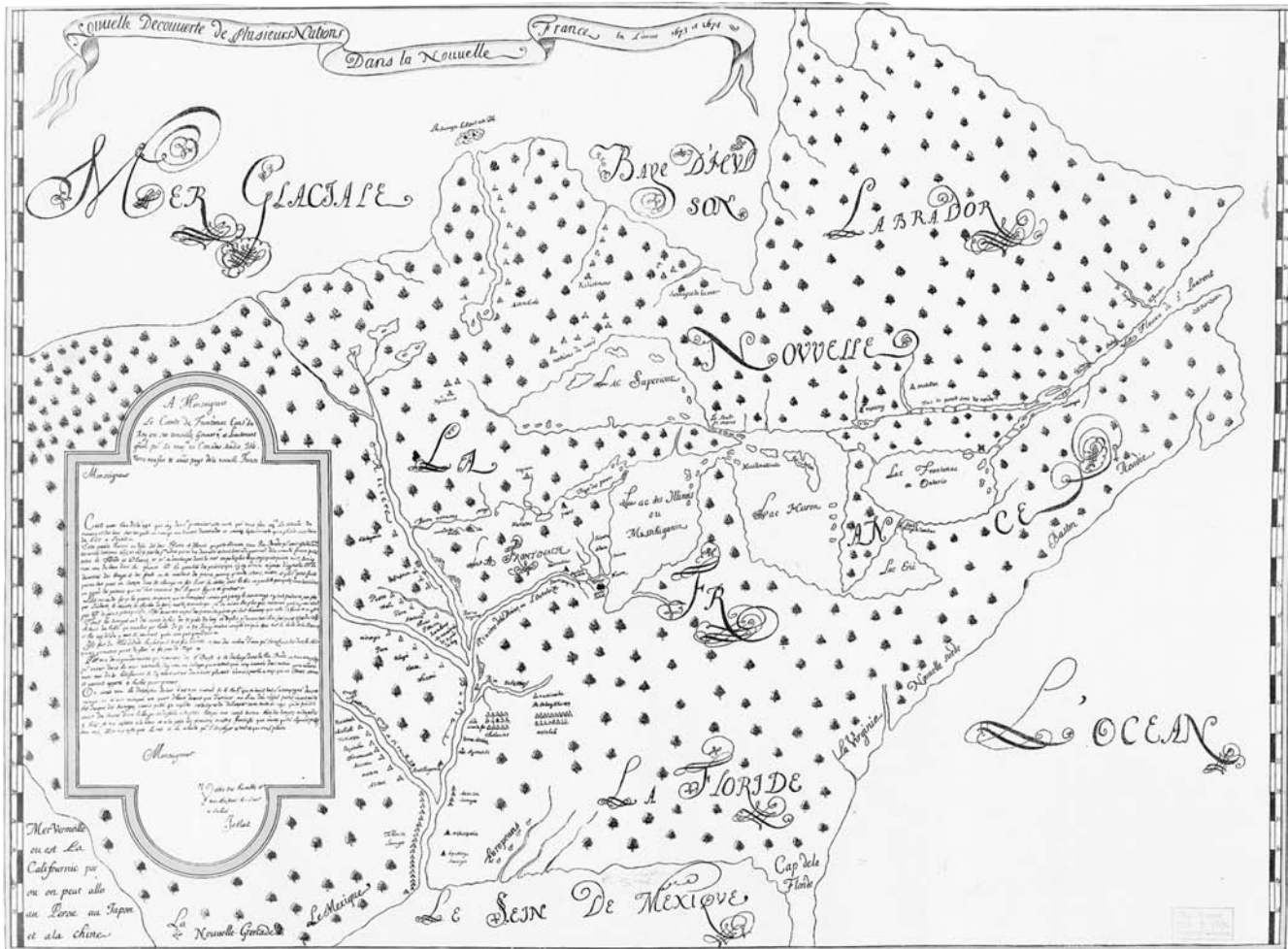
In 1669, Jolliet traveled westward from Quebec by way of the CANOE and portage route to the Great Lakes, taking supplies to an expedition in search of copper deposits on Lake Superior. On the return trip, he pioneered a new portage route from Lake Huron to Lake Erie by way of the

St. Clair River, Lake St. Clair, and the Detroit River. Jolliet then crossed overland to western Lake Ontario. At the Jesuit mission near Niagara Falls, he first met Father JACQUES MARQUETTE.

Jolliet established a trading settlement at Sault Sainte Marie in 1670. Two years later, he was commissioned by Jean Talon, the governor of New France, to investigate Indian reports of a great river to the west. The French were interested in learning if this great south-flowing river drained into the Atlantic Ocean, the Gulf of California, or the Gulf of Mexico. Jolliet was also instructed to entice Indian tribes living beyond the Wisconsin River into the French fur trade.

Jolliet reached the Jesuit mission at St. Ignace on northern Lake Michigan's Mackinac Straits, where he was joined by Father Marquette. Well-versed in several Native American languages, Marquette was to serve as interpreter on the expedition.

Jolliet, Marquette, and a small party of VOYAGEURS and Miami Indian guides left St. Ignace on May 17, 1673, and



Map of eastern North America by Louis Jolliet (1674) (Library of Congress)

took their boats south to Green Bay on the west shore of Lake Michigan. From Green Bay, they followed the Fox River into Lake Winnebago, then crossed to the Wisconsin River, and descended it to its mouth on the MISSISSIPPI RIVER on June 17, 1673, near present-day Prairie du Chien.

The Jolliet-Marquette expedition descended the Mississippi to the mouth of the Arkansas River, midway between present-day Memphis, Tennessee, and Vicksburg, Mississippi. Quapaw Indians warned them that they faced monsters and hostile tribes if they ventured farther southward. Using his navigational skills, Jolliet determined that the river had taken them to a point far enough south that it must drain into the Gulf of Mexico. Heeding the Indians' advice, the expedition headed back upriver.

On the northward journey back to the Great Lakes, Jolliet led the group back up the Mississippi as far as its confluence with the Illinois River, about 25 miles north of present-day St. Louis, Missouri. At that point they left the Mississippi and ascended the entire length of the Illinois River to its junction with the Des Plaines River, near the present-day city of Joliet, Illinois, which was named for the explorer.

Jolliet then blazed a 50-mile portage through the site of present-day Chicago to the south shore of Lake Michigan. (A portion of Jolliet's route on this part of the journey was designated as the Chicago Portage National Historic Site in 1952.) In September 1673, after a five-month journey, Jolliet and his companions arrived at Green Bay, from where Marquette returned to St. Ignace.

Jolliet hurried back to Quebec with the results of his expedition. In January 1674, while he was negotiating the Lachine Rapids above Montreal, his CANOE capsized and most of his written records of the Mississippi journey were lost. However, he was able to reproduce his journals from memory and soon presented them to the French governor.

Jolliet returned to the fur trade after 1674, concentrating in the eastern St. Lawrence River region. Soon granted a trade monopoly on Anticosti Island, he explored the Gulf of St. Lawrence, producing navigational charts for the French government. Starting in 1679, he explored overland from Montreal to HUDSON BAY, where he established several trading posts. British raids, however, drove him from Hudson Bay after 1692.

In 1694, Jolliet explored the coast of Labrador for the French navy and produced one of the earliest scientifically accurate charts of that part of Canada. In recognition of his findings, he was appointed Royal Hydrographer in 1697.

Louis Jolliet and Jacques Marquette's four-month, 2,500-mile exploration of the Mississippi inspired the later expedition of RENÉ-ROBERT CAVELIER DE LA SALLE, who succeeded in reaching the river's delta in 1682. Jolliet also established important portage routes between the Great Lakes and the Illinois and Mississippi Rivers, which helped to ex-

pand French trade and settlement from the Great Lakes, along the Mississippi Valley to the Gulf of Mexico. His findings resulted in Green Bay and Prairie du Chien becoming key centers for the trade between Montreal, the Great Lakes, and the Mississippi.

Jørgenson, Jørgen (1780–1841) *Danish mariner in Tasmania and Iceland*

Born in Copenhagen, Denmark, Jørgen Jørgenson pursued a career as a mariner and found employ on British ships, working as a sealer and whaler in the waters around NEW ZEALAND, Australia, and Van Diemen's Land (TASMANIA) in the early 1800s. He may have participated in MATTHEW FLINDERS's expedition of 1801–03.

Jørgenson returned to Denmark in about 1805. He visited ICELAND in the next years, perhaps exiled there for debt or other crimes, but also claiming to liberate it, which led to his being known as the "king of Iceland." He also reportedly sailed with British PRIVATEERS and served as a spy for England in the Napoleonic Wars.

In 1825, because of debt, Jørgenson was transported to the penal colony at Hobart on Van Diemen's Land. He eventually earned a "ticket of leave," which allowed him to move about the island freely, and was hired by the Van Diemen's Land Company to explore the central and northern parts of the island and make contact with Aborigines, which he did in the Oyster Bay and Big River regions through 1832, it is thought. Jørgenson is known to have returned again to England, where he died in 1841.

Although some of Jørgen Jørgenson's activities may have been exaggerated in his own writings, his expeditions—as those of the Englishmen Thomas Laycock in 1807, John Helder Wedge in the 1820s, and George Augustus Robinson in the 1830s—contributed to the opening of Tasmania to non-Aboriginal settlement and development.

Jourdain, John (unknown–1619) *English mariner in the Indian Ocean, India, and the East Indies, cousin of Silvester Jourdain*

An English sea captain, John Jourdain was among the first members of the Council of India, the governing board of the BRITISH EAST INDIA COMPANY. He was the older cousin of seafarer SILVESTER JOURDAIN.

On March 25, 1608, Jourdain commanded the ship *Ascension* on the company's fourth expedition to India and the EAST INDIES. Sailing by way of the CAPE OF GOOD HOPE, he entered the Indian Ocean and stopped at the Seychelles, the first Englishman ever to do so.

Proceeding northward along the coast of East Africa, Jourdain next went to Socotra off the Horn of Africa and stopped at the port of Aden on the southwestern tip of the

Arabian Peninsula. He also made a trip inland, becoming the first Englishman to visit in Yemen.

By summer 1609, Jourdain had established trade contacts for the British East India Company at these strategic ports at the mouth of the RED SEA. He then sailed to India. At the Gulf of Cambay on the northwest coast of India, the *Ascension* was wrecked on some shoals; the crew survived, however, reaching the mainland in the ship's boats. From there, Jourdain made his way to the port of Surat, where he assumed command of the British East India Company's operations.

Following a visit to Agra in 1610–11, Jourdain sailed from Surat in the British East India company vessel *Trade's Increase*. On this voyage, he returned to the Red Sea ports, stopping at Mocha in Aden. He then undertook a voyage to the East Indies, establishing trade centers for his firm on Sumatra and at Bantam on Java. He also expanded the British East India Company's operations to include the islands of Ceram and Amboina off New Guinea. In 1612, while on a stopover in the SPICE ISLANDS (the Moluccas), Jourdain received a smuggled letter from British navigator WILLIAM ADAMS, who was being detained in Japan. Included with Adam's letter was a map of Japan, a land then little-known to the English.

Jourdain returned to England in summer 1617. The following November, he entered into a five-year contract with the British East India Company, receiving an appointment as president of the Council of India. He returned to Java the next year. Soon afterward, open hostilities broke out with the DUTCH EAST INDIA COMPANY. Despite these difficulties, Jourdain established a lucrative trade for the British East India Company, obtaining cloves from the Moluccas and pepper in Sumatra.

In July 1619, Jourdain embarked on a voyage to Pattani on the Malay Peninsula in what is now Thailand. En route, his vessel was attacked by Dutch ships and he was killed.

John Jourdain's trading expeditions resulted in the earliest British commercial presence in India and the East Indies as well as the first direct contacts for British merchants in the SPICE TRADE. His efforts helped break the trade monopolies held by the Dutch and the Portuguese over that part of the world and provided the basis for the eventual British domination of India.

Jourdain, Silvester (Silvester Jourdan)

(unknown–1650) *English seafarer in Bermuda, cousin of John Jourdain*

Silvester Jourdain was a native of Lyme Regis, a small English port town on the English Channel coast of Dorset. He came from a family of seafarers and merchants, among them his older cousin JOHN JOURDAIN, one of the original directors of the BRITISH EAST INDIA COMPANY.

Although few details exist of Jourdain's early life, business records indicate he was involved in the export business, shipping goods from the Dorset port of Poole as early as 1603.

In 1609, Jourdain sailed from England for Virginia, accompanying CHRISTOPHER NEWPORT and three of the Jamestown colony's newly appointed deputy governors. En route to America, the ship was wrecked on the island of Bermuda.

Although it had been explored by Spanish navigator Juan de Bermudez in 1515, the island was uninhabited when visited by Jourdain and his companions. Since no European nation had yet claimed it or the neighboring islands, the castaways took possession of the island group in the name of England.

Silvester Jourdain made his way back to England later in 1609. Soon afterward, he wrote an account of his voyage entitled *Discovery of the Buarmudas, otherwise Called the Isle of Devils*. Published in London in 1610, his descriptions soon appeared in the works of the period's leading playwrights. William Shakespeare included a direct reference to Bermuda as "Bermoothes" in *The Tempest*, produced only a few years after Jourdain's voyage. John Fletcher's *Women Pleas'd* and John Webster's *The Duchess of Malfi* also drew on Jourdain's image of Bermuda as the haunt of witches and other supernatural phenomena.

Joutel, Henri (ca. 1645–ca. 1730) *French soldier, colonizer in Texas and the lower Mississippi Valley*

Henri Joutel was born in Rouen, France. Although from a family of modest means, he was well educated and became a skilled journalist. His father was a gardener for an uncle of RENÉ-ROBERT CAVELIER DE LA SALLE.

By 1684, Joutel had served as a soldier in the French army for nearly 17 years. That year, while Joutel was at his family's home in Rouen, La Salle recruited him as his personal aide in a colonizing venture to the mouth of the MISSISSIPPI RIVER, which he had reached two years earlier.

In July 1684, Joutel sailed from La Rochelle with La Salle's fleet of four ships, carrying settlers and supplies for a colony on the lower Mississippi River. After a four-month voyage from France, during which one ship was captured by the Spanish, they reached the north coast of the Gulf of Mexico. Due to navigational errors, the three remaining vessels missed the mouth of the Mississippi and sailed westward, finally making a landing at Matagorda Bay, Texas, where La Salle and his expedition established a temporary base, Fort St. Louis.

Joutel was given command of the Matagorda Bay colony while La Salle and a small party searched in vain for the Mississippi River. In charge for three years, Joutel had to suppress several attempted uprisings.

In January 1687, Joutel joined La Salle on what turned out to be his final effort to reach the Mississippi from the Gulf Coast. From Matagorda, the party headed northeastward, reaching the Brazos River. In mid-March 1687, at an encampment near what is now Navasota, Texas, La Salle was shot to death by several of his own men. Joutel, who had been away from the camp, returned to find his commander murdered. As one of La Salle's most trusted assistants, he expected that he would also be killed, but he was instead allowed to escape, along with La Salle's brother and nephew.

Guided by sympathetic Indians, Joutel and his companions made their way eastward across what is now Arkansas to the lower Arkansas River. At the site of present-day Arkansas Post National Memorial on the Arkansas River, Joutel and his party met up with HENRI DE TONTI, who was heading a relief expedition from his post at Starved Rock on the Illinois River in search of La Salle along the lower Mississippi.

In May 1688, Joutel, escorted by Tonti, traveled up the Illinois, then followed the Great Lakes and Ottawa River route to Quebec, from where he sailed to France later that same year.

Joutel, who lived in Rouen the rest of his life, converted the extensive notes he had made of his experiences in Texas and the Mississippi Valley into an eyewitness account of La Salle's final expedition. The first English edition was published in London in 1714 as *A Journal of the Last Voyage Perform'd by Monsr. de la Sale to the Gulph of Mexico to Find out the Mouth of the Mississippi River*.

Henri Joutel's 1687–88 journey took him across little-known regions of present-day eastern Texas and western Arkansas. His subsequent voyage from Texas northward to Quebec was itself one of the earliest such journeys undertaken by a non-Indian. In his published account, Joutel was the second European, after JACQUES MARQUETTE, to report sighting the giant Indian paintings of legendary beings that adorn the steep cliffs of the east bank of the Mississippi River near present-day Alton, Illinois.

Jubayr, Abu al-Hasan Muhammad ibn

See IBN JUBAYR, ABU AL-HASAN MUHAMMAD.

Junker, Wilhelm Johann (William Junker)

(1840–1892) *German explorer on the upper Nile River and in East Africa*

Johann Wilhelm Junker was born in Moscow to a German family. In 1869, at the age of 29, he embarked on a career of travel and exploration, sailing to ICELAND. In 1873, he made his first trip to Africa, traveling in Tunisia for almost a year before journeying to Egypt and the Sudan region to the south.

Starting in 1876, Junker undertook a two-year exploration of the White Nile River, ascending the river as far as Malakal. He then headed overland into the region to the southwest, eventually reaching the Ubangi and Uele Rivers, both important as navigable northern tributaries of the CONGO RIVER (Zaire River).

In 1883, Junker headed eastward into the region around Lake Albert and Lake Victoria in present-day Uganda and Tanzania. He had intended to head northward and return to Khartoum by way of the White Nile, but the outbreak of the Mahdi Revolt two years earlier made that route too hazardous. Instead, he led a relief expedition to MEHMED EMIN PASHA, who was besieged at his headquarters at Lado in what is now southern Sudan.

Junker himself was forced to remain at Lado for several years, prevented by the Mahdi threat from venturing northward. Finally, in 1886, he undertook a journey to the coast of East Africa, arriving later that year at Zanzibar.

Back in Europe, Junker published an account in 1889–91 of his 11 years in North and East Africa, entitled *Reisen in Afrika* (Travels in Africa).

Johann Wilhelm Junker's explorations of the then little-known watershed region between the upper tributaries of the Congo River and NILE RIVER were made during a period of great political upheaval in northeastern Africa. He was among the first Europeans, after GEORG AUGUST SCHWEINFURTH, to visit the Uele River region in what is now northeastern Democratic Republic of the Congo.

Jusseume, René (ca. 1789–ca. 1830)

French-Canadian interpreter, guide on the upper Missouri River

Little is known of French Canadian René Jusseume before 1789, when he first came to live among the Mandan Indians of the upper MISSOURI RIVER in present-day North Dakota.

In November 1797, Jusseume was hired as interpreter and guide by DAVID THOMPSON of the Canadian-based NORTH WEST COMPANY. With Thompson's party of voyageurs, he traveled southward on the Souris River in southern Saskatchewan into present-day North Dakota. They proceeded overland to the Mandan villages near the site of present-day Verendrye, North Dakota. While Thompson made a study of the Mandan, Jusseume concentrated on convincing the tribe to break off with the Spanish traders from St. Louis and Santa Fe and to trade exclusively with the North West Company.

In winter 1804–05, Jusseume was hired by MERIWETHER LEWIS and WILLIAM CLARK as an interpreter to the upper Missouri tribes. Jusseume's ability as an Indian interpreter was often called into question, but he did provide the Corps of Discovery with valuable information on Indian customs.

When the expedition left for the ROCKY MOUNTAINS the following spring, Jusseaume remained among the Mandans and arranged for a delegation of the tribe's leaders to visit U.S. government officials in Washington, D.C. In his role as a liaison to Native American leaders, he traveled on occasion with PIERRE DORION, SR. In 1806–07, Jusseaume escorted Mandan chief Big White to Washington, D.C., where the tribal leader met with President Thomas Jefferson. On the journey back to the upper Missouri, Jusseaume was wounded in an attack by Sioux (Dakota, Lakota, Nakota) warriors, near the Arikara villages south of present-day Bismarck, North Dakota.

In 1809, Jusseaume apprenticed one of his sons to Meriwether Lewis. Jusseaume himself took part in MANUEL LISA's fur-trading expeditions into the northern plains and northern Rockies from 1809 to 1820.

In 1833–34, Jusseaume worked briefly for Missouri River explorer, ALEXANDER PHILIPP MAXIMILIAN, who later wrote disparagingly about Jusseaume's frontier abilities.

René Jusseaume's career as a guide and interpreter along the upper Missouri River, like those of other explorers and traders, helped open the region to non-Indian development.

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Kaempfer, Engelbrecht (Engelbert Kampfer)

(1651–1716) *German, physician, diplomat in Asia*

Born in the northern German town of Lemgo, Engelbrecht Kaempfer was trained as a medical doctor, with a background in the natural sciences. In 1683, Kaempfer began a 10-year period of travel in Asia as a member of a Swedish diplomatic and trade mission. Starting from Moscow, he went first to the capital of Persia (present-day Iran) at Esfahan, at that time regarded as an international hub of commercial and diplomatic dealings between Europe and Asia. There he met diplomats representing the significant European powers of the time, including Russia, Poland, France, and the papacy. Also present were emissaries from all parts of Asia, including Arabia, central Asia, and the Far Eastern kingdom of Siam (present-day Thailand).

From Persia, Kaempfer continued his travels in southern Asia, visiting the island of CEYLON (present-day Sri Lanka), then sailing to Java in the EAST INDIES. In 1690, after a visit to Siam, he embarked for Japan, where he stayed two years. Although Japan had been closed to Europeans for decades, the Japanese government allowed Kaempfer freedom to travel throughout the country because of the services he could provide as a skilled physician.

Engelbrecht Kaempfer returned to Germany in 1694. He wrote of his experiences in the Far East in *History of Japan and Siam*. Published posthumously in 1728, it provided Europeans with one of the earliest accounts of the culture and geography of Japan.

Kane, Elisha Kent (1820–1857) *American physician, naval officer in the Arctic regions of Greenland*

Elisha Kent Kane was born in Philadelphia. His father was one of that city's leading attorneys; his mother was active in Philadelphia high society.

Following his early education, Kane entered the University of Virginia in 1838, planning a career in engineering. Later that year, he was stricken with rheumatic fever, which left his health in a weakened state. As a result, he changed his field of study to medicine (then considered a less physically demanding profession), graduating as a medical doctor from the University of Pennsylvania in 1842.

Following a short period as a medical researcher, Kane entered the U.S. Navy as an assistant surgeon in 1843. Despite his chronic health problems, he maintained an interest in traveling to distant places, and he accompanied the U.S. diplomatic mission to China and toured much of Asia.

After serving with a U.S. naval squadron off the coast of Africa, Kane was sent home because of a bout of tropical fever. In 1846, he saw action in Mexico in the U.S.-Mexican War; he was wounded and suffered from typhus.

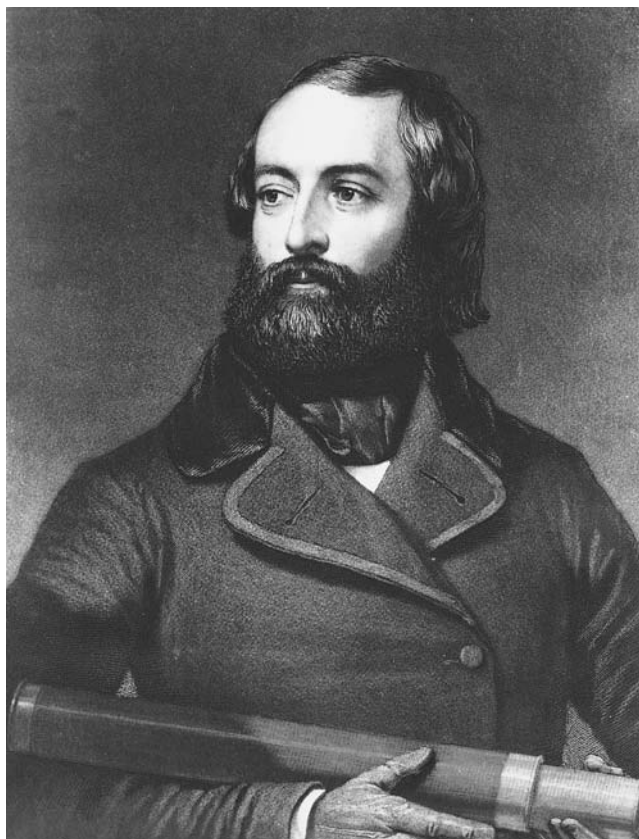
After more than a year, Kane returned to active duty as a medical officer with a U.S. government survey in the Gulf of Mexico. He then sought and received an appointment as chief medical officer with the First U.S. Grinnell Expedition to the Arctic in search of SIR JOHN FRANKLIN and his expedition, who had been missing since 1845.

In 1850, under the command of Lieutenant EDWIN JESSE DE HAVEN, Kane sailed to Smith Sound, the southern end of the strait separating northern GREENLAND from the east shore of Ellesmere Island. After a year in the Arctic, Kane returned with the De Haven team to New York. He recounted his experiences in his book, *The U.S. Grinnell Expedition in Search of Sir John Franklin*. Published in early 1853, it was an immediate literary sensation, bringing Kane much renown as America's leading Arctic explorer, despite his limited experience.

Along with his book, Kane's series of lectures brought him public support for his next project. He was among the adherents of the existence of an ice-free polar sea north of the northernmost landmasses that would provide access to the NORTH POLE. Kane further speculated that Franklin had found a way northward through Smith Sound and that remnants of his expedition might still be located on the shores of the hypothetical polar sea.

With money raised by public subscription, and with the ship *Advance* donated by Henry Grinnell, the sponsor of the earlier De Haven voyage, Kane organized what came to be known as the Second U.S. Grinnell Expedition. Sailing from New York on May 31, 1853, the expedition was composed of a scientific team and a contingent of U.S. Navy men. On arriving in Smith Sound in summer 1853, Kane found its northern reaches frozen and unnavigable. He then sailed to the northeast, hoping to find an ice-free channel along the coast of northwestern Greenland. Another goal of the expedition was to explore northernmost Greenland to learn how far it extended northward and determine whether it could provide an overland route to the North Pole.

Kane and the *Advance* reached as far north as Rennselaer Bay on the Greenland coast, where the ship soon became icebound. Kane sent out several exploring parties, one of which discovered Greenland's Humboldt Glacier, the largest known glacier in the world. In May 1854, ISAAC ISRAEL HAYES, the expedition's chief medical officer, crossed the frozen expanse that came to be known as Kane Basin to Ellesmere Island. Another member of the expedition, William Morton, undertook a trek northward along the east coast of Greenland, reaching as far as Cape Constitution. At 80°10' north latitude, it was at that time a northern record in the Western Hemisphere. In addition, the scientific team made studies of tides and glacial formation in the Arctic and made observations relating to astronomy and terrestrial magnetism. Inuit (Eskimo) culture was also examined, as was Arctic animal life. Although Kane had planned to spend only one winter in Smith Sound, it became apparent by August 1854 that the ship would remain icebound for at least another year. A shortage of food and an outbreak of SCURVY led Hayes and eight other members of the expedition to attempt an overland trek to the Danish Greenland settlements to the south. Storms and lack of experience in Arctic travel forced



Elisha Kent Kane (Library of Congress)

Hayes and the others to abandon the journey. They returned to the ship in December 1854, where Kane employed his medical skill to nurse his men back to health.

In May 1855, Kane took the decisive step of abandoning the *Advance* and led his men southward along 1,300 miles of the coast of northern Greenland, arriving after 83 days at the Danish settlement of Upernavik. They were soon met by a U.S. government relief expedition under Lieutenant H. J. Hartstene.

Upon his return to New York in October 1855, Kane began work on another book, *Arctic Explorations: The Second Grinnell Expedition in Search of Sir John Franklin in the Years 1853, '54, '55*. Published in 1856, it soon became a bestseller.

Following a voyage to England, where he met with JANE FRANKLIN, Kane sought to recover his health with a trip to Cuba. He died in Havana in 1857. At his funeral in Philadelphia, he was buried with honors befitting a national hero. Soon after his death, his career was marked with scandal when the American medium and spiritualist Margaret Fox claimed that she had had a romantic liaison with Kane between his two Arctic expeditions, claiming his estate as common-law wife. She also adopted his name and published his love letters to her as *The Love Life of Dr. Kane* (1866).

Elisha Kent Kane's Arctic explorations revealed little about the fate of the lost Franklin expedition, and, a half century later, the idea of the open polar sea was proven erroneous. Nonetheless, Kane's investigations into the unknown waters north of Smith Sound into Kane Basin, named in his honor, revealed an ice-free route through Kennedy Channel, which was later utilized in explorations undertaken by Hayes, CHARLES FRANCIS HALL, and ADOLPHUS WASHINGTON GREELY. ROBERT EDWIN PEARY finally succeeded in reaching the North Pole in 1909 by making a preliminary voyage to northern Ellesmere Island via Kane Basin.

Kane, Paul (1810–1871) *Irish artist in western Canada*
Paul Kane, a native of County Cork, Ireland, moved with his family to Canada in 1828. They settled in York (present-day Toronto), where Kane attended Upper Canada College.

In 1836, Kane went to the United States and traveled over a wide area, from Detroit to New Orleans, working at odd jobs and saving money for art studies in Europe. Kane sailed for Europe in June 1841. He studied art on his own for the next four years, visiting museums in Paris, Rome, Venice, Milan, and London, where he viewed a display of GEORGE CATLIN's paintings of American Indians.

In 1845, Kane was back in Toronto. In June of that year, he embarked on a sketching trip to the Huron (Wyandot) and Chippewa (Ojibway) lands around Lake Huron.

The Indian drawings he brought back greatly impressed HUDSON'S BAY COMPANY governor, SIR GEORGE SIMPSON. Kane was commissioned by Simpson to produce a series of paintings of western Indians.

In spring 1846, Kane left Sault Sainte Marie, soon joining the Hudson's Bay Company riverboats headed for western Canada. He traveled along the Rainy River to Lake of the Woods, and along the Winnipeg River to Fort Alexander on Lake Winnipeg's southern end.

From Fort Alexander, Kane traveled into the Red River region, where he lived with the Métis, a group of mixed-bloods. He accompanied the Métis westward onto the plains and took part in a buffalo hunt. During this trip, his party was attacked by Sioux (Dakota, Lakota, Nakota).

In late summer 1846, Kane returned to Lake Winnipeg and sailed to the northern end of the lake to Norway House. He traveled on Hudson's Bay Company riverboats westward along the Saskatchewan River to Carlton House, where his party of VOYAGEURS obtained horses and continued across the plains to Edmonton, Alberta.

Kane and the voyageurs crossed the ROCKY MOUNTAINS, traveling part of the way on snowshoes, then followed the COLUMBIA RIVER to Fort Vancouver, British Columbia, arriving on December 8, 1846.

Kane wintered on Vancouver Island, sketching scenes of Indian life. He set out for the East in July 1847. By December he was back in Edmonton. He spent the next several months sketching the natives and touring the region on a dogsled. Kane departed Edmonton in spring 1848, reaching Toronto by early October. He had produced hundreds of sketches as well as a journal of his western travels, and he subsequently produced more than 100 oil paintings based on these sketches. They were well received and launched him on a successful art career.

Paul Kane's account of this trip, *Wanderings of an Artist Among the Indians of North America*, was first published in 1849. His paintings were among the earliest to depict Native American life in the Canadian West.

Kan Ying (Gan Ying, Kan-ying) (fl. A.D. 90s)
Chinese diplomat in central Asia and the Middle East

Kan Ying was a diplomat in service to China in the last decades of the first century A.D. He may have been a native of the Turan Basin region in the Turkestan region of central Asia.

In A.D. 97, Chinese general Pan Ch'ao (Ban Chao) commissioned Kan Ying to undertake a diplomatic mission westward to the Roman Empire, known to the Chinese as Ta Ch'in (Daqin). At that time, China shared control of the 5,000-mile SILK ROAD, the vital trade route linking China with the Parthian and Kushana peoples of central Asia as well as with the Romans farther west. It was Pan Ch'ao's hope that Kan Ying could arrange a special agreement with the Romans to position China against its central Asian rivals.

Kan Ying's exact route westward is not known. He reached a seaport he called T'iao-chih, which may have been on the Mediterranean coast of present-day Syria. Other Chinese historical sources suggest he reached as far as the Parthian port of An-hsi (Anxi) on the Black Sea. Kan Ying reported that local seafarers warned him against making a crossing of the sea, because the return journey, if made under unfavorable winds, could take as long as two years, leading to death by homesickness. Heeding their advice, he returned to China, without having made any direct contact with the Roman Empire.

Kan Ying's diplomatic mission to Europe, although it fell short of its intended goal, marked the resurgence of Chinese control over its westernmost provinces and was among the first recorded journeys of a Chinese official to the Middle East.

Karlsefni, Thorfinn (Thorfinn Karlsevni)
(fl. 1010s) *Norse mariner, colonizer in North America*

Originally from ICELAND, Thorfinn Karlsefni was a Norse seafarer who engaged in the maritime trade between Norway and GREENLAND.

According to accounts in *Groenlendinga* (*Saga of the Greenlanders*) and in *Eiríks saga* (*Saga of Eric the Red*), Karlsefni visited the Norse settlement on the southwest coast of Greenland in about 1009, where he was hosted by the family of LEIF ERICSSON. While there, he met and married Gudrid, the widow of Leif's brother Thorstein, who had died in about 1003 on a reported voyage to what the Vikings referred to as VINLAND, somewhere in North America.

In about spring 1010, Karlsefni reportedly organized a large colonizing expedition planning to sail from Greenland and establish a permanent settlement in Vinland. Accounts in the sagas vary as to the number of colonists involved. One source relates that there were 60 men and five women, while another mentions that the colonizing expedition included as many as 160, with "all kinds of livestock." FREYDIS EIRÍKSDOTTIR was one of the women.

Karlsefni and his expedition sailed from Greenland's Western Settlement, eventually reaching sites on the coast of North America they identified as Helluland and Markland. At one of these, they located the keel of a ship left by THORVALD ERICSSON, who had been killed in an Indian attack on an earlier voyage.

At a site on the coast Karlsefni named Furdustarands (wonder strands), two Scottish slaves, a man and a woman, were sent ashore to reconnoiter. They returned after three days with wild grapes and wheat, evidence that the region had potential as an agricultural settlement.

Karlsefni and his colonists spent their first summer at the site of Leif Ericsson's former settlement on Vinland, where they collected grapes, fished, and hunted. A beached whale was discovered and slaughtered for food, although its blubber made many of the colonists ill.

In about 1011, Karlsefni's colony was visited by Native Americans, called Skraeling by the Norse (a derisive term meaning "wretches" or "uglies"). The Vikings traded with the Native Americans, bartering "milk" (which may have actually been mead, the intoxicating Norse beverage) and red cloth for furs. That spring, Karlsefni's wife, Gudrid, reportedly gave birth to a son, Snorri. If the account in the sagas is accurate, he is the first non-Indian child known to have been born in North America.

Although trade contacts with the natives had been initiated, relations soon deteriorated into open conflict, and Karlsefni decided to abandon his colony in spring, probably 1013. On the homeward voyage to Greenland, he stopped at Markland, believed by many to be present-day Labrador, where his men captured two native boys, who were taken to Greenland and taught the Norse language. They reportedly related to the Norse that an Irish monastic settlement had been established west of the Vinland settlement years earlier. From Greenland, Karlsefni, Gudrid, and their American-born son, Snorri, sailed to Norway and later settled in Iceland.

The only record of Thorfinn Karlsefni's expedition to North America is found in the Norse sagas, written several hundred years after the events described. Recent archaeological evidence suggests that the colony he established was located at present-day L'Anse aux Meadows, Newfoundland; some historians theorize, however, that geographic descriptions indicate territory along Cape Cod in present-day Massachusetts.

Thorfinn Karlsefni's expedition was the last major attempt by the Vikings to establish a permanent settlement in North America. He and his followers established what is possibly the earliest significant trading relationship between Europeans and Native Americans. A North American arrowhead found near the site of a farm owned by Karlsefni on Greenland provides credence to the story of the captured boys, who may have been the first Native Americans to be removed forcibly from their homeland by Europeans.

Kashevarov, Aleksandr Filippovich

(1808–1866) *Russian–Native American mariner in Alaska*
Aleksandr F. Kashevarov was born at the Russian fur-trading settlement on Kodiak Island in the Gulf of Alaska. His father, a Russian, was an employee of the RUSSIAN-AMERICAN COMPANY; his mother was a native Aleut woman.

While in his teens, the young Kashevarov was sent, at the Russian-American Company's expense, to St. Petersburg, where he underwent training as a navigator. In 1828–30, he sailed around the world on the Russian-American Company's ship *Elena*, stopping at the company's fur-trading bases in Alaska.

In 1832, Kashevarov returned to Alaska from Russia on the military transport *Amerika*. During the next 10 years, he took part in coastal surveys north of the Alaskan Peninsula. In 1838, aboard the *Polifem*, he explored Norton Sound on the west coast of Alaska, then sailed through BERING STRAIT, continuing along the coast to Cape Lisburne. At that point, he carried on his survey in an Aleut *baidarka*, a small open boat made of skins, reaching as far north as 30 miles beyond Point Barrow.

In 1845, after returning to St. Petersburg overland across SIBERIA, Kashevarov was appointed to a post in the Russian Naval Ministry's Hydrographic Department. His navigational findings contributed to the Russian navy's *Atlas of the Eastern Ocean Including the Okhotsk and Bering Seas*, published in St. Petersburg in 1850.

Starting in 1850, Kashevarov began six years of active duty in the Russian navy as a captain-lieutenant in command of *Ayan*, a seaport on the coast of SIBERIA in the Sea of Okhotsk. He returned to the Hydrographic Department in St. Petersburg in 1857, where he remained until 1862.

Aleksandr F. Kashevarov was one of the few native-born Alaskans to take an active part in the Russian exploration of

Alaska. His explorations above Norton Sound were among the first Russian attempts to investigate the territory north of their original settlements on the Gulf of Alaska.

Kearny, Stephen Watts (1794–1848)

U.S. Army officer, American explorer on the southern plains

Stephen Watts Kearny was a native of Newark, New Jersey. He attended Columbia College for one year, leaving to join the army at the outbreak of the War of 1812. He was commissioned a lieutenant and, after his capture and release at Niagara Falls, he was promoted to captain.

After the war, Kearny remained in the army. In 1819–25, he served under Colonel HENRY ATKINSON, during which time he helped establish Fort Atkinson on the MISSOURI RIVER near present-day Omaha, Nebraska. From Fort Atkinson, Kearny undertook official U.S. government explorations of the Great Plains west of the Missouri River.

In 1837, Kearny was promoted to colonel and placed in command of the First Dragoon Regiment. He led his mounted troops on patrols of the Indian Territory (present-day Oklahoma) and the known regions of the northern plains. During the early 1840s, he commanded the U.S. Third Military Department and oversaw posts throughout the Great Plains.

In spring 1845, Kearny left Fort Leavenworth, Kansas, in command of a small American force and explored the upper Platte and Arkansas Rivers. Mountain man THOMAS FITZPATRICK served as guide for part of the expedition. Kearny reached Fort Laramie and from there the SOUTH PASS. His expedition then headed southward to the Arkansas River in Colorado, as far as Bent's Fort in the eastern Rocky Mountains. Heading back eastward, he reached Fort Leavenworth in August 1845. The 2,200-mile journey had taken Kearny and his men 99 days. JOHN CHARLES FRÉMONT and JAMES WILLIAM ABERT led parties under Kearny's command during this expedition.

Kearny was promoted to brigadier general at the outbreak of the U.S.-Mexican War in 1846. He led 2,000 troops westward from Fort Leavenworth, along the Santa Fe Trail to New Mexico. WILLIAM HEMSLEY EMORY served under him and drafted maps of the Southwest. Arriving at Santa Fe in mid-August 1846, Kearny took the city. With about 300 men, he headed southward from Santa Fe along the Rio Grande River to Albuquerque. Along the way, he met up with CHRISTOPHER HOUSTON CARSON (Kit Carson), who was carrying military dispatches to the East. Kearny drafted Carson as a guide, then proceeded westward along the Gila River, across the southern Arizona desert, to San Diego, California.

Kearny played a decisive role in the conquest of California. Afterward, he became embroiled in a controversy with Frémont, which resulted in Frémont's court-

marial. Toward the close of the U.S.-Mexican War, Kearny became military governor of Veracruz. After contracting yellow fever, he returned to St. Louis, where he soon died.

Stephen Watts Kearny's explorations of the Platte and Arkansas Rivers in 1845 provided valuable topographical information. His trek from Santa Fe to San Diego the following year helped establish the Gila River route across southern Arizona, which developed into a major trail for migrants heading for California during and after the gold rush of 1849.

Kelsey, Henry (Boy Explorer) (ca. 1670–1729)

British trader on Canadian Prairies

Born in England, probably near Greenwich, Henry Kelsey joined the HUDSON'S BAY COMPANY while in his teens. In about 1690, he was sent to York Factory, the company's main trading post on the southwest shore of HUDSON BAY.

In 1690–92, Kelsey explored the interior of Canada, hoping to expand the company's business to the Indians west of Hudson Bay. He traveled with Indian guides southwest from York Factory into present-day Manitoba and Saskatchewan. Crossing Lake Winnipeg, he spent the winter of 1690–91 near The Pas, Manitoba. In spring 1691, he traveled along the Assiniboine and Saskatchewan Rivers and became the first European known to have visited the Canadian Prairies.

Kelsey covered a vast area of central Canada, exploring west of the Touchwood Hills around present-day Saskatoon, Saskatchewan. He joined the Indians in a buffalo hunt, the first non-Indian to do so in this region. He reached as far as Red Deer in present-day Alberta, then returned to Hudson Bay in 1692.

Kelsey remained with the Hudson's Bay Company for the next 30 years. He became a governor of trading posts on Hudson Bay and for a time at Albany, New York. In 1719, aboard the ship *Prosperous*, he explored northward from York Factory along the west coast of Hudson Bay, as far as Marble Island. His mission was to search for the NORTHWEST PASSAGE, investigate reports of mineral deposits, and follow up the earlier expedition of JAMES KNIGHT. Kelsey made two later expeditions to the Marble Island region, in 1720 and 1721.

Henry Kelsey was the first European to see the Canadian prairies. His 1690–92 explorations of the Canadian West were the last undertaken by Hudson's Bay Company traders until the 1750s. His account of this expedition, written partly in verse, was not discovered until 1926. Kelsey's explorations of western Canada, undertaken when he was relatively young, earned him a reputation as the "Boy Explorer."

Kennedy, Edmund (1818–1848) *Australian explorer in Queensland*

Edmund Kennedy was born on Guernsey, one of the Channel Islands in the English Channel. He began his career as an explorer of eastern Australia as an assistant to THOMAS LIVINGSTONE MITCHELL, the surveyor-general of New South Wales, with whom he explored the Barcoo River region of what is now Queensland in 1845–46.

In 1847, Kennedy was sent by the Australian government back into the interior of Queensland to determine the course of a river previously located and named the Victoria by Mitchell. Kennedy's investigations revealed that the Victoria and the Barcoo rivers were one and the same. He further determined that the Barcoo followed a southwestward course into the interior of Australia; it was later proven that it flowed into Lake Eyre.

The next year, Kennedy led a team of 12 others on an expedition northward from Rockingham Bay, on the coast of Queensland, in an attempt to reach Cape York on the Torres Strait. They soon ran short of food, and Kennedy went on ahead of the main party northward in search of help. Along the way, he was killed in an attack by Aborigines. Of the 13 members of the expedition only three survived. They were picked up south of Cape York at Port Albany by a ship that had been sent to meet them.

Edmund Kennedy's explorations into the interior of Queensland helped shed light on the mystery of Australia's westward-flowing river. His final expedition into Queensland was the last attempt to explore northward to the Cape York region until the mid-1860s.

Kenton, Simon (1755–1836) *American explorer in Kentucky and the Ohio Valley*

Simon Kenton was born in Fauquier County, northeastern Virginia. In 1771, under the mistaken impression that he had killed a man in a fist fight over a woman, he fled to the upper Ohio River frontier. (For the next 10 years, he went under the assumed name of Samuel Butler.) Later that same year, Kenton traveled down the Ohio River on a hunting expedition with frontiersmen George Yeager and John Strader. For the next two years, Kenton and his two companions hunted and explored along the upper Ohio River, in search of a region known to the Indians as Kaintuckee, "the land of canes" or "meadow lands"—the modern Kentucky.

Indian attacks forced Kenton and his party out of the upper Ohio region in 1773. The next year, he served as a colonial scout in Lord Dunmore's War, during which he became friends with Kentucky pioneer DANIEL BOONE.

In 1775, after Lord Dunmore's War, Kenton established a temporary settlement at the confluence of the Ohio River and Limestone Creek (present-day Maysville, Kentucky). He then traveled to Boonesborough, where he joined Boone

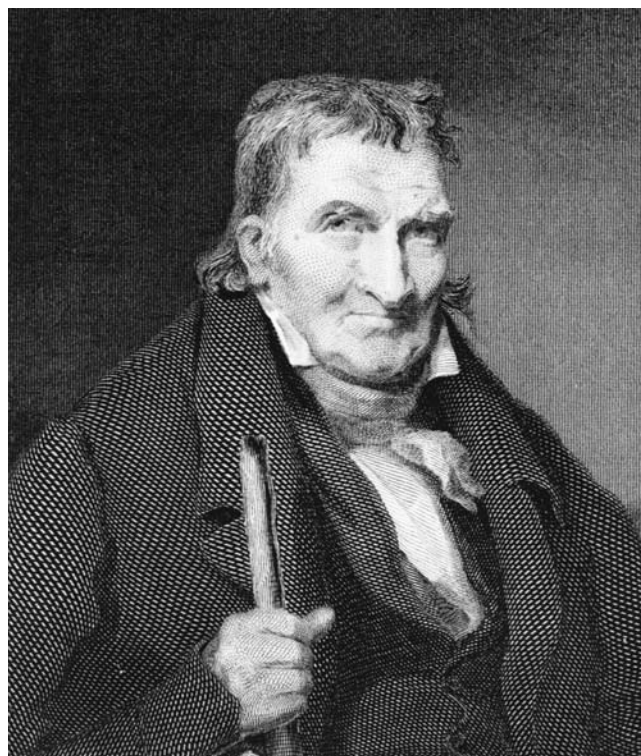
in defending the settlement against attacks by Shawnee Indians during the American Revolution. In 1778, Kenton joined Colonel George Rogers Clark's expedition from the Falls of the Ohio to the Illinois country and took part in attacks against the British and their Indian allies. In 1782, he participated in a military expedition against the Indians on the Great Miami River in what is now western Ohio.

Kenton then returned to his Virginia home and learned he had not killed the man he had fought with 10 years before. With his name cleared, he moved with his family to his original encampment in Kentucky at the mouth of Limestone Creek.

During the early 1790s, Kenton returned to fighting Indians in the Old Northwest under General "Mad" Anthony Wayne. In 1798, he moved with his family to Urbana, Ohio. He later took part in the War of 1812, fighting in the Battle of the Thames.

After 1820, Kenton lost most of his Kentucky and Ohio lands due to legal and financial problems.

Simon Kenton was one of the original settlers of Kentucky and western Ohio. His settlement at Limestone Creek on the Ohio River, like the CUMBERLAND GAP, became an important entry point for the influx of settlers into the Ohio Valley after the American Revolution. As an Indian fighter, hunter, and settler, he explored much of the Old Northwest, from present-day Louisville, Kentucky, to the MISSISSIPPI RIVER in southern Illinois.



Simon Kenton (Library of Congress)

Kerguélen-Trémarec, Yves-Joseph de
(Yves-Joseph de Kerguélen de Trémarec, Yves-
Joseph de Kerguélen-Trémec) (1734–1797)

French mariner in the southern Indian Ocean

Yves-Joseph de Kerguélen was a native of the seaport of Quimper in the Brittany region of northwestern France. In 1772, Kerguélen embarked from Île de France, present-day Mauritius, on a government-sponsored voyage in search of the hypothetical GREAT SOUTHERN CONTINENT, believed to exist in the high southern latitudes. With two ships, the *Fortune* and the *Gros-Ventre*, he sailed into the southern reaches of the Indian Ocean. On February 13, 1772, he sighted land (actually the largest of a group of about 300 islands), which he believed was the coast of the long-sought-after continent, also known as Terra Australis.

Claiming the region for France, Kerguélen sailed home, where he announced the discovery of what he called “la France Australe.” His findings generated hopeful speculation that in the new lands would be found a race of men living in a “state of nature,” a belief consistent with the myth of the noble savage prevalent at that time among French intellectuals. Kerguélen also fostered the hope that the newfound territory in the Indian Ocean would provide France with a source of mineral wealth and serve as an exclusive base for a French-dominated sea route to Asia and the Americas.

In 1773, on a second voyage to the Indian Ocean with the ships *Rolland* and *Oiseau*, Kerguélen had an opportunity to explore his earlier findings in greater detail. He soon determined that the island was barren and uninhabitable and devoid of any colonial value because of the severity of the climate. In response, he renamed the region the “Land of Desolation.”

Kerguélen’s voyages of 1772 and 1773 were undertaken at about the same time that British navigator JAMES COOK was engaged in his own explorations of the high southern latitudes in search of the Great Southern Continent. While on a stopover at Cape Town in November 1772, Cook learned the results of Kerguélen’s first expedition, prompting him to carry on explorations for the fabled landmass in that part of the southern Indian Ocean. In February 1773, Cook searched the area but missed finding the lands Kerguélen had reported by five degrees of longitude. Three years later, in December 1776, while on his third voyage, Cook did manage to find Kerguélen’s Land of Desolation, at which time he determined it was not a landmass but part of an island group.

In 1774, following his second reconnaissance of the land he had found in the southern Indian Ocean, Kerguélen returned to France. The French government, which had sponsored his expeditions, now charged him with fraud for his early favorable description of the lands he explored. Al-

though convicted and sentenced to 20 years imprisonment, he was released in 1778 after serving four years.

The archipelago explored by Yves-Joseph de Kerguélen in 1772 is known today as the Kerguelen Islands, in honor of the French navigator, with the largest island of the group named Kerguelen Island. A unique variety of wild cabbage native to the islands was identified as the Kerguelen cabbage by British scientist SIR JOSEPH DALTON HOOKER while on a visit there with SIR JAMES CLARK ROSS’s expedition in 1840.

Kermadec, Jean-Michel Huon de See HUON DE KERMADEC, JEAN-MICHEL.

Kern, Benjamin Jordan (1818–1849) *American artist, physician, naturalist in the southern Rocky Mountains, brother of Richard Hovendon Kern and Edward Meyer Kern*
 Benjamin Kern was born in Philadelphia, where he studied medicine, art, and natural science. He was a practicing doctor in Philadelphia in 1848, when he joined his younger brothers EDWARD MEYER KERN and RICHARD HOVENDON KERN in JOHN CHARLES FRÉMONT’s ill-fated fourth expedition into the upper Rio Grande and southern ROCKY MOUNTAINS.

Kern and his brothers survived a blizzard in the San Juan Mountains northwest of Taos, New Mexico, despite being abandoned by Frémont at the height of the storm. They eventually made their way to Taos.

Soon afterward, Kern returned to the mountains, accompanied by Frémont’s guide WILLIAM SHERLEY WILLIAMS. The two were killed by a band of Ute Indians.

Benjamin Kern was one of the many naturalists who helped record the non-Indian exploration of the West.

Kern, Edward Meyer (1823–1863) *American artist, topographer in the southern Rocky Mountains and the North Pacific, brother of Richard Hovendon Kern and Benjamin Jordan Kern*

Edward Kern was born in Philadelphia to a prominent family. He studied art and draftsmanship and became an accomplished painter and topographer.

In 1845–47, Kern served as topographer with JOHN CHARLES FRÉMONT’s third expedition from eastern Colorado to the California coast. At the Great Salt Lake, Kern and guide JOSEPH REDDEFORD WALKER led part of the group along a section of the Hastings Cutoff into northern Nevada’s Humboldt River region, then to Walker Lake. They crossed the Sierra Nevada into California through Walker Pass, rejoining Frémont and the rest of the group north of Monterey. The U.S.-Mexican War soon erupted,

during which Kern took part in the California campaign under Frémont.

Kern was with Frémont on his fourth expedition to the upper Rio Grande and southern ROCKY MOUNTAINS during 1848–49, along with his older brothers, RICHARD HOVENDON KERN and BENJAMIN JORDAN KERN. In the aftermath of this trip, Benjamin Kern was killed by Indians in the San Juan Mountains northwest of Taos, New Mexico, while attempting to retrieve equipment left behind in a blizzard.

Based in Taos during 1849–51, Edward and his brother Richard worked as topographers with the U.S. Army's Corps of Topographical Engineers. In 1849, under Lieutenant JAMES HERVEY SIMPSON, they explored the Navajo (Dineh) Indian country around the Four Corners region of Colorado, Arizona, Utah, and New Mexico, accomplishing the first U.S. government survey of Canyon de Chelly.

In summer 1851, Edward Kern accompanied Lieutenant JOHN B. POPE on an expedition in search of an alternate route between Fort Leavenworth, Kansas, and Santa Fe, New Mexico.

From June 1853 to October 1855, Kern sailed the North Pacific with the Ringgold-Rodgers naval expedition to Japan, during which he produced maps of the Japanese coast.

For three years, starting in September 1857, Kern again explored the Pacific, this time with Lieutenant John M. Brook's expedition to China.

In March 1860, Kern returned to the United States, and he served with Frémont in the first year of the Civil War. Leaving the army in 1861, he returned to teach art in Philadelphia, where he died two years later from an attack of epilepsy.

The Kern brothers made valuable contributions to the scientific surveys of the American Southwest undertaken in the years immediately following the U.S.-Mexican War of 1846–48. Edward Kern's subsequent Pacific explorations provided the U.S. Navy with important data on sea routes between California and the Far East. The Kern River, north of present-day Bakersfield, California, was named by Frémont in honor of Edward Kern.

Kern, Richard Hovendon (1821–1853)

American artist, topographer, and naturalist in the southern Rocky Mountains, brother of Edward Meyer Kern and Benjamin Jordan Kern

Richard Kern, an artist and topographer from Philadelphia, joined his brothers EDWARD MEYER KERN and BENJAMIN JORDAN KERN on JOHN CHARLES FRÉMONT's disastrous 1848–49 expedition into the Sangre de Cristo Mountains of northern New Mexico.

Kern served as a topographer and naturalist on this expedition, which sought a year-round pass for a railroad route

through the southern ROCKY MOUNTAINS. After Kern and his brothers were abandoned by Frémont in the midst of a severe snowstorm, they managed to make their way to safety in Taos. Soon afterward, Benjamin Kern and WILLIAM SHERLEY WILLIAMS were killed by Ute Indians when they returned to the mountains to pick up some equipment that had been left behind.

Richard Kern, with his surviving brother Edward, subsequently took part in several surveys of the Southwest with the U.S. Army Corps of Topographical Engineers. In 1849, the brothers explored the Navajo (Dineh) country around Canyon de Chelly, Arizona, with Lieutenant JAMES HERVEY SIMPSON. In 1851, Richard Kern explored the Little Colorado River with Lieutenant LORENZO SITGREAVES, while his brother explored the southern plains with Lieutenant JOHN B. POPE.

Richard Kern took part in JOHN WILLIAMS GUNNISON's 1853 survey for a proposed transcontinental railroad along the 38th parallel. Both Gunnison and Kern were among those killed in an attack by Ute Indians near Lake Sevier, Utah, on December 23, 1853.

Richard Kern produced sketches of the Southwest, many of which appeared in Simpson's 1850 report *Journal of a Military Reconnaissance from Santa Fe*. Kern also made archaeological and ethnological studies of the Navajo and Zuni Indians.

Khabarov, Yerofey Pavlovich (fl. 1650s)

Russian fur trader, explorer in southeastern Siberia

Originally from Ustyug in European Russia, Yerofey P. Khabarov settled in SIBERIA in 1636. After establishing himself in fur-trading and farming enterprises, he set out from Yakutsk in 1649 to explore south and east to the valley of the Amur River, a region unknown to European Russians. In command of an expedition of 150 men, he followed the Olekma and Tungir Rivers southward, then traversed southeastern Siberia's Yablonovy Range to the Amazar River, which eventually led him to the Amur. He returned to Yakutsk in early 1650.

At that time, the region north and south of the Amur was claimed by China; to avoid an international conflict, Khabarov decided to withdraw to Yakutsk. He later reported to government leaders in Moscow on the feasibility of a military campaign to take the Amur Valley region; the proposed military action, although planned, was never carried out.

Khabarov embarked on a second Amur River expedition later in 1650. He and his men settled at Albazin, a village on the Amur, and, in spring 1651, they continued downriver. They established a base called Achansk, where they spent the winter of 1651–52. Manchus from northern China launched an attack against the Russians in spring 1652, compelling Khabarov to withdraw with his men up

the Amur, along which they founded a series of forts. Soon afterward, he was recalled to Moscow to face charges of cruelty to his men. Cleared of any wrongdoing, he was given command of another Siberian frontier post at Ilimsk.

Yerofey P. Khabarov was a pioneer in the expansion of Russia into what later became its Far Eastern Territory. Russia's Khabarovsk Territory, acquired from China in 1858, was named in his honor, as was the Amur River city of Khabarovsk, founded that same year.

Khan, Genghis See GENGHIS KHAN.

King, Clarence (1842–1901) *American geologist, surveyor in the American West*

Clarence King was born in Newport, Rhode Island. He studied geology at Yale College's (now Yale University) Sheffield Scientific School, graduating in 1862.

King soon spent time in California, participating in the state's geological survey of 1863–66. He explored much of the Sierra Nevada. In 1864, he determined its highest peak to be Mount Whitney, at 14,494 feet above sea level.



Clarence King (Library of Congress)

King was largely responsible for persuading Congress to fund the Fortieth Parallel Survey of 1867–72, which King himself directed. King's geological investigations in northwestern Colorado exposed a supposed diamond strike as a fraud (the Great Diamond Hoax of 1872).

In 1879, King organized the government-sponsored U.S. Geological Survey, and he served as its first director until 1881. Under his leadership, explorations were made of the silver deposits at Virginia City, Nevada, and Leadville, Colorado.

King left the U.S. Geological Survey in 1881, succeeded by JOHN WESLEY POWELL. King later became a mining engineer.

Clarence King's scientific explorations of the 1860s and 1870s yielded the first comprehensive portrait of the geology of the American West. His 1872 book, *Mountaineering in the Sierra Nevada*, made him one of the fathers of American mountaineering.

King, James (1750–1784) *British naval officer, astronomer in the South Pacific*

James King was born at Clitheroe in Lancashire, England, a town on the Ribble River, northwest of Liverpool. His father was an Anglican churchman.

At the age of 12, King entered the British navy. In his early years as a midshipman, he served with the Newfoundland fleet; during this time, he made the acquaintance of JAMES COOK, who was undertaking a survey of the Newfoundland coast.

In 1771, after serving in the Mediterranean Sea, King was promoted to the rank of lieutenant. Three years later, he moved to Paris to study scientific subjects, including astronomy. In about 1775, he joined his brother Walker King, who was then teaching at Corpus Christi College in Oxford. King's ability as an astronomer came to the attention of British scientist Thomas Hornsby, who recommended him to Cook for his planned third voyage.

In July 1776, King, as second lieutenant on the *Resolution*, sailed the South Pacific Ocean with Cook. Throughout the voyage, he conducted astronomical observations, including that of a solar eclipse on Eua in the Friendly Islands in July 1777, and another on Christmas Island in December of that year.

In February 1779, at the time Cook was killed in a skirmish with natives in the HAWAIIAN ISLANDS, King was ashore with some of the crew undertaking astronomical sightings. Isolated from the rest of the expedition, the party fought off the Hawaiian islanders for two hours until they were rescued by additional crew members.

In August 1779, King was given command of the *Discovery*, under the new expedition commander JOHN GORE, following the death of Cook's successor, CHARLES CLERKE.

On his return to England in August 1780, King was promoted to captain. Soon afterward, he commanded a convoy of 500 merchant vessels to the WEST INDIES.

Stricken with tuberculosis, King traveled to Nice, France, in 1783 to try to regain his failing health. He died there the following year.

James King's astronomical studies made on Cook's third voyage were published by the British navy's Board of Longitude in 1782; for that work he was made a fellow of the prestigious British scientific association, the ROYAL SOCIETY. King also completed Cook's journal of his last expedition, published in 1783.

King, Philip Parker (1793–1856) *British naval officer in Australia and South America*

Philip Parker King was born in the British colony on Norfolk Island in the South Pacific, about 1,000 miles northeast of Sydney, Australia. He was the son of Captain Philip Gidley King, the settlement's first governor.

At the age of 14, the younger King entered the British navy. Throughout the Napoleonic Wars of 1803–15, he served in Europe, seeing action in the Bay of Biscay, the North Sea, and the MEDITERRANEAN SEA. In 1814, he was promoted to the rank of lieutenant.

In 1817, King was sent to Australia to conduct a survey of the continent's northern and western coastlines. From 1817 to 1822, along with ALLAN CUNNINGHAM, he explored and charted the region between Arnhem Land, in what is now Australia's Northern Territory, westward to North West Cape on the central coast of present-day Western Australia. His main objective was to locate a gulf or river that led into the interior of Australia, and possibly a passage that cut through the continent all the way to the Pacific Ocean. The idea that such a passage existed had first been suggested by WILLIAM DAMPIER in the early 1700s; he had speculated that a water route into the interior of Australia might be found behind the island group on Australia's west coast that now bears his name. SIR JOSEPH BANKS had also theorized that there was a river system leading deep into the continent.

In four voyages, the first three on the *Mermaid* and the last on the *Bathurst*, King undertook a detailed hydrographic survey of the north shores of Australia. Yet he found no gulf or river providing passage inland, although he did establish a safe route from Sydney to the Torres Strait within the hazardous Great Barrier Reef. He also undertook a detailed survey of the coast of TASMANIA. Storms prevented him from studying the shoreline along the Eighty Mile Beach and the Buccaneer Archipelago on Australia's northwest coast, and King later speculated that the inland passage might exist in that uncharted region.

King returned to England in 1823, where he prepared the charts and written account of his explorations, first published in 1827 as *Narrative of the Survey of the Intertropical and Western Coasts of Australia*. For his efforts in exploring Australia, he was made a fellow of the ROYAL SOCIETY in 1824.

Given command of the *Adventure* in 1825, he joined Captain Pringle Stokes and ROBERT FITZROY on the *Beagle* (the ship on which CHARLES ROBERT DARWIN later undertook his scientific voyage of 1831–36) in a survey of the southern part of South America. In 1826–30, the expedition made an exhaustive survey from the mouth of the Río de la Plata on the east coast of South America, around the continent's southern tip, to Chiloé Island on the Pacific coast of Chile.

Returning to England in 1831, King presented his findings to the ROYAL GEOGRAPHICAL SOCIETY; then, in 1832, he published them as *Sailing Directions to the Coasts of Eastern and Western Patagonia, including the Straits of Magalhaen and Seacoast of Tierra del Fuego*. A less technical account of his South American voyage was published in 1839 as part of Fitzroy's *Voyages of the Adventure and Beagle*.

Leaving active service in the British navy after 1832, King settled in Australia, where he became a member of the legislative council of New South Wales as well as manager of the Australian Agricultural Society. In these capacities, he promoted additional explorations northward from Sydney into what is now Queensland. In 1855, a year before his death, he was promoted to rear admiral on the retired list.

In his earlier explorations of Australia's north coast, Philip Parker King had noted the possibilities of developing Port Essington, the northernmost point of Arnhem Land, as a base for maritime trade with Asia. To this end he dispatched several expeditions in search of an overland route there from Sydney and from the coast of Queensland, including those undertaken by THOMAS LIVINGSTONE MITCHELL and EDMUND KENNEDY in the late 1840s. His friend the geologist SIR PAUL EDMUND STRZELECKI named Lake King in southeastern Australia after him.

Kingsley, Mary Henrietta (1862–1900)
British traveler, writer in West and central Africa

Born in London, Mary H. Kingsley was the daughter of British doctor and travel writer George H. Kingsley and a niece of novelist Charles Kingsley. She was educated at Cambridge University in sociology.

Soon after her father's death in 1892, Kingsley resolved to travel to Africa to study native fetish religions and collect specimens of fish. In 1893, she reached the Gulf of Guinea, and, after a visit to the island of Fernando Po, she landed on the mainland at Calabar in present-day Nigeria, from where she explored inland, visiting the region between the



Mary Kingsley (Library of Congress)

Cross River and NIGER RIVER. She then headed southward to the lower CONGO RIVER (Zaire) region of northern Angola, before returning to England in 1894.

Kingsley made her second visit to Africa late in 1894. She traveled to what was then French Equatorial Africa, now Cameroon and Gabon. Ascending the Ogowe River by steamer, she reached Lambarene, where Dr. Albert Schweitzer would establish his medical mission 20 years later. She continued up the river in a CANOE, accompanied by native guides and porters. She reached a region known as the Great Forest, where she observed the life and culture of the region's Fan people. Most of the territory she traversed in Gabon and Cameroon was then largely unknown to Europeans. She stayed with an agent of the French colonial government, then returned to the coast of Cameroon by way of the Rembwe River. Before leaving French Equatorial Africa, Kingsley climbed 13,350-foot Mount Cameroon, the region's highest peak.

Back in England in 1895, Kingsley wrote and lectured extensively on her travels. She became an outspoken critic of the practices of missionaries in West and central Africa, maintaining that European traders were a far more positive influence on the natives. Her first book on Africa, *Travels*

in West Africa, was published in 1897 and was followed by two other works, *West African Studies* and *The Story of West Africa*, both published in 1899.

Although Kingsley had planned a third expedition to West Africa, the outbreak of the Boer War in 1899 led her to change her plans. She sailed to South Africa and worked as a nurse. At the age of 38, she died of typhoid fever, which she contracted while caring for Boer prisoners of war at Simonstown, just south of Cape Town.

In honor of Mary H. Kingsley's achievements as both an explorer of West and central Africa and a champion of native rights, her admirers in England established the Mary Kingsley Society, which later became known as the Royal African Society.

Kino, Eusebio Francisco (Eusebius Francisco Kino) (ca. 1645–1711) *Italian missionary in northern Mexico, southern Arizona, and Baja California*

Eusebio Francisco Kino was born near the northern Italian city of Trento. After studies in astronomy and mathematics, he was ordained a Jesuit priest in Germany in 1669.

Kino traveled to Mexico as a missionary in 1681. Two years later, he became the Spanish royal cosmographer for a colonizing expedition to Baja California, led by Admiral Isidro Atondo y Antillón.

In about 1687, the Baja California colony was abandoned, and Kino traveled to the Pimeria Alta region of what is now northern Mexico and southern Arizona. From 1691 to 1706, he established a series of missions and explored northward to the Gila River.

Kino searched unsuccessfully for a land route between Arizona and the Pacific coast. On one expedition, he explored the Gila River to its confluence with the COLORADO RIVER. The route was later known as El Camino del Diablo (the devil's highway). Kino also explored southern Arizona's San Pedro and Santa Cruz Rivers. In 1694, he located the Casa Grande Indian ruins near present-day Florence, Arizona.

In 1698, Kino explored the Colorado River to its mouth in the Gulf of California. Based on his observations at the northern end of the Gulf, he proved Baja California was not an island, as earlier explorers had believed.

After 1706, Kino worked out of his missionary headquarters, Nuestra Señora de los Dolores, in present-day Sonora, Mexico. He undertook more than 50 expeditions throughout the region south of the Gila River. He traveled more than 20,000 miles in his 25 years of exploring, establishing missions and producing the first accurate maps of southern Arizona and northern Mexico.

Eusebio Francisco Kino coordinated his geographic findings with other explorations and helped create the first comprehensive maps of the region between the Colorado River and the Gulf of Mexico. He is credited with naming



Statue of Eusebio Francisco Kino (*Library of Congress*)

the Colorado River. Kino's charts were the basis for maps of the American Southwest that were used until well into the 19th century. He also made the first astronomical observations in the American West.

Kintup (Kinthup) (fl. 1880s) *Indian surveyor in Tibet, in service to Great Britain*

Kintup was a native of Sikkim, a northeastern state of India nestled in the HIMALAYAS between Nepal and Bhutan.

During the 1870s, Kintup was recruited by British colonial authorities to take part in the Great Trigonometrical Survey of India, begun in the early part of the 19th century under SIR GEORGE EVEREST and others. The purpose of this project was to map and chart much of India and establish the heights and locations of the peaks of the Himalayas of northern India and Tibet. With European travel into Tibet restricted, the British relied on native explorers to venture into the region to obtain geographic information for the survey.

Kintup, although limited in his educational background and reportedly illiterate, was trained as one of the PUNDIT (Hindi for "learned expert") explorers by the British. In 1879, he was sent into Tibet, disguised as a Buddhist pilgrim and accompanied by a Mongolian lama. Kintup's main objective was to determine the connection, if any, between Tibet's major navigable river, the Tsangpo, and the Brahmaputra River of northeastern India. To accomplish this mission, he attached messages in metallic tubes to specially marked logs, which he then floated downstream.

Kintup was betrayed by his Mongolian lama companion, who sold him into slavery. He was held against his will for two years before managing to escape and return to India's northeastern Ganges Delta region in 1884. While there, he discovered that some of the logs he had sent down the Tsangpo River in Tibet several years earlier had reached the GANGES RIVER and Brahmaputra River outlets into the Bay of Bengal, thus establishing that the stream known as the Tsangpo in Tibet is in fact identical to the Brahmaputra River of the Bengal region, ultimately emptying into the Bengal bay.

Kintup, like NAIN SINGH and KISHEN SINGH, was among those few native explorers who worked independently of the Europeans who had hired them. His efforts contributed to the geographic knowledge of isolated regions forbidden to Europeans.

Kishen Singh See SINGH, KISHEN.

Kittson, Norman Wolfred (1814–1888)

Canadian-born fur trader in the Red River of the North region

Norman Kittson was born in Chambly, Quebec, a small town near Montreal. His family background was English; his grandfather reportedly had served under General James Wolfe in the British victory over the French at Quebec in 1759.

Kittson received his only formal education at a grammar school in Sorel, Quebec. At the age of 16, he embarked on a career in the FUR TRADE, inspired by the tales of ad-

venture related to him by retired fur trader William Morrison. He became an apprentice with JOHN JACOB ASTOR'S AMERICAN FUR COMPANY and served at the company's posts in present-day Wisconsin, Minnesota, and Iowa.

Kittson's abilities came to the attention of Henry Hastings Sibley, Astor's chief agent at the company's main upper Mississippi River post near Fort Snelling on the site of present-day St. Paul, Minnesota. In 1843, appointed as a special partner in Sibley's operations, Kittson was sent to trade with the Indians of the upper Minnesota and Red Rivers. Although the boundary north of Minnesota and the Dakotas between Canada and the United States had been established 25 years earlier, British-backed HUDSON'S BAY COMPANY traders were regularly making unlawful incursions into the region. To counter this competition, Kittson established an American Fur Company post at Pembina on the Red River, near the common border of present-day North Dakota, Minnesota, and Manitoba, Canada. He then set up outlying posts 300 miles east and west of Pembina in an effort to bring the first organized American presence into the region.

Over the next several years, Kittson took part in a ferocious trade war with the Hudson's Bay Company, sharing his profits as well as his losses with Sibley and the American Fur Company. During this period, Kittson began to organize his first transportation enterprises—ox-cart caravans carrying furs, hides, and other Indian products overland from Pembina to Sibley at the Fort Snelling post. Competition with the Hudson's Bay Company became so intense that Kittson resorted to purchasing from the Indians furs smuggled into the United States from Canada.

In 1851, a flood forced Kittson to move his headquarters in the Red River Valley from Pembina to nearby Walthalla. Three years later, when it became apparent that the Hudson's Bay Company was unwilling to buy him out and could continue the trade war indefinitely, he closed the business and settled in St. Paul, the territorial capital of Minnesota.

Kittson served as a delegate to the Minnesota territorial legislature in 1852–55, at times traveling to legislative sessions from his wilderness trading post by dogsled. In 1858, he was elected as a Democrat to the office of mayor of St. Paul. A few years later he began one of the earliest steamboat lines on the Red River of the North. He also served as the Hudson's Bay Company's forwarding agent at St. Paul. In 1872, Kittson entered into a partnership with James J. Hill that resulted in the formation of the Kittson Red River Transportation Company, a major steamboat line on the Red River. Six years later, along with Hill and several Canadian investors, he became one of the founders of the St. Paul, Minneapolis, and Manitoba Railroad, an enterprise that made him enormously wealthy. He retired in the early 1880s to raise horses.

Norman Kittson's fur-trading enterprise in what is now northwestern Minnesota and northeastern North Dakota helped assert U.S. control over the region at a time when the territory had only a handful of non-Indian settlers. Minnesota's northeastern Kittson County was named in honor of his pioneering efforts.

Knight, James (ca. 1640–ca. 1721) *British fur-trader in Hudson Bay*

Originally from London, James Knight worked as a shipwright's apprentice at the dockyards near Deptford. In 1676, he entered the service of the HUDSON'S BAY COMPANY as a staff carpenter, sailing to HUDSON BAY later that year.

By 1682, Knight had been promoted to chief factor at Fort Albany, the Hudson's Bay Company post on the west shore of James Bay. Following his return to England, he was dismissed from the company amid charges that he had engaged in unauthorized trading with the Indians for his personal gain.

Knight's separation from the Hudson's Bay Company proved temporary. In 1692, he was rehired to lead an expedition to retake the Fort Albany post, which had fallen into the hands of the French. Sailing from England with a fleet of four ships and 213 men in June 1692, he quickly reoccupied Fort Albany and served there as governor. In 1697, he returned to England as a principal shareholder of the Hudson's Bay Company, and in 1711, he was named as one of the directors of the firm's ruling council, the London Committee.

Knight returned to Hudson Bay in 1713 to accept from the French the surrender of York Factory at the mouth of the Hayes River in what is now northern Manitoba. Assuming the management of the post, he sent out fur-trading expeditions to the north and west in response to increased competition from French traders on the Albany River to the south. These expeditions, led by William Stuart, eventually made contacts with the Chipewyan Indian bands around Great Slave Lake. One woman, Thanadelthur, known as "the Slave Woman" because she had been held captive by Cree Indians, became a trusted guide and interpreter for Knight in his dealings with the Indians. In addition, she told the English fur trader tales of her homeland to the northwest of York Factory, where she said there were abundant mines of what sounded like gold, as well as a strait that opened up to a "Great Western Sea." Knight became convinced that these were references to the valuable mineral deposits reported by Indians and that the strait she spoke of might prove to be the NORTHWEST PASSAGE, or STRAIT OF ANIAN, which led to the coast of Asia.

Encouraged by this news, Knight sailed to England in 1718, where he succeeded in obtaining the Hudson's Bay Company's support for a seaward expedition to the northwest coast of Hudson Bay.

In June 1719, Knight sailed from London with two small vessels, the *Albany* and the *Discovery*, with a combined crew of 27 men and 10 passengers. Later that summer, he met up with supply vessels near York Factory, then sailed northward along the west coast of Hudson Bay. His expedition was never seen again.

Nearly 50 years later, in 1767, SAMUEL HEARNE, exploring Marble Island off the northwest coast of Hudson Bay, came upon the wreckage of Knight's ships and heard reports from local Inuit (Eskimo) that Knight's expedition had been wrecked in a storm on the island. The survivors had built shelters on the island, but in winter 1720–21, the last two men had perished. Three expeditions headed by Hudson's Bay Company factor HENRY KELSEY had explored the Marble Island region but found no evidence of Knight.

James Knight's 1719 voyage was one of the first seaward expeditions in search of the Northwest Passage undertaken by the Hudson's Bay Company, an endeavor called for under the terms of its original charter of 1670. Although his final effort was ill-fated, his earlier work led to the establishment in 1717 of Fort Prince of Wales at the mouth of the Churchill River on the southwest coast of Hudson Bay, which became a gateway for explorers of western Canada, including PETER POND and SIR ALEXANDER MACKENZIE.

Knight, John (unknown–1606) *English seafarer in Labrador*

Little is known of John Knight's origins or early life. By 1606, he was known as an accomplished mariner, and that year he was commissioned by Sir Thomas Smith, governor of the BRITISH EAST INDIA COMPANY, to command a voyage of exploration westward in search of the NORTHWEST PASSAGE. Smith had been involved in the earlier voyages of London's MUSCOVY COMPANY. Knight's 1606 voyage was to follow up the earlier explorations of MARTIN FROBISHER and JOHN DAVIS and the more recent explorations of GEORGE WEYMOUTH in 1602.

In command of the ship *Hopewell*, Knight sailed from England in spring 1606. By June 26, he had arrived off the coast of northern Labrador. While his ship underwent repairs for rudder damage from an iceberg, Knight went ashore with a surveying party that included his brother. They ventured inland and climbed over a hill, after which they were never seen again. With the loss of its commander and the other crew members, the *Hopewell* returned to England.

John Knight's ill-fated voyage in 1606 was one of the many prompted by the search for the elusive Northwest Passage. Four years later, in 1610, HENRY HUDSON found what came to be known as HUDSON BAY, fueling additional hopes that a direct sea route to the Orient through North America might soon be located.

Koldewey, Karl Christian (1837–1908)

German explorer in Spitsbergen and Greenland

Karl Christian Koldewey was born in Bücken, near the German city of Hanover. Going to sea at the age of 16, he visited many parts of the world over the next 20 years.

In 1868, Koldewey led the first German expedition into the Arctic region north of Spitsbergen (in Svalbard), in an unsuccessful attempt to find a passage across the Arctic Ocean to the BERING STRAIT. At that time, the still-popular "open polar sea" theory of German geographer AUGUST HEINRICH PETERMANN posited the existence of an ice-free passage to the NORTH POLE in the region north of Scandinavia and eastern Russia, between Spitsbergen and Novaya Zemlya.

Koldewey followed up his Spitsbergen explorations with a second German expedition to GREENLAND in 1869–70. On the ship *Germania*, he advanced along the east coast of Greenland as far north as 77° north latitude before being forced back by the PACK ICE. He was accompanied by JULIUS VON PAYER.

Following his Arctic exploits, Koldewey was appointed to a high German government post in Hamburg dealing with navigation.

One significant result of Karl Christian Koldewey's Greenland expedition of 1869–70 was his discovery of a type of Siberian wood known as larchwood, which had washed ashore on the east coast of Greenland. This finding later provided Norwegian polar explorer FRIDTJOF NANSEN with evidence of the drifting patterns of ice in the frozen Arctic Ocean between SIBERIA, Alaska, and Greenland.

Kotzebue, Otto von (1787–1846) *Russian naval officer in Alaska and the South Pacific*

Otto von Kotzebue was born in the Baltic seaport city of Revel, present-day Tallinn in Estonia. His father, August von Kotzebue, was a German in service to the Russian government who went on to become an internationally acclaimed playwright.

The younger Kotzebue attended a military school in St. Petersburg until 1803, when, at the age of 15, he was recruited as a naval cadet for ADAM IVAN RITTER VON KRUSENSTERN'S CIRCUMNAVIGATION OF THE WORLD. Aboard the expedition's lead vessel, the *Nadezhda*, he and his 14-year-old brother Moritz Kotzebue served as naval cadets in a three-year voyage that took them across the North Pacific to Kamchatka and along the western rim of the Pacific to Japan and China.

Kotzebue's next great maritime endeavor occurred in 1815 after the Napoleonic Wars. That year, Count Nicholas Romanzof, who at that time held the office of chancellor of the Russian Empire, personally financed and organized an expedition to explore the South Pacific Ocean and search

the coasts of SIBERIA and Alaska for the NORTHEAST PASSAGE or NORTHWEST PASSAGE—an outlet connecting the North Pacific with Baffin Bay and the Atlantic. Kotzebue, by then a lieutenant commander in the Russian navy, was placed in charge and given command of the ship *Rurik* and its crew of 32. Among them were the naturalists LOUIS-CHARLES-ADÉLAÏDE CHAMISSO DE BONCOURT and JOHANN FRIEDRICH ESCHSCHOLTZ, and the draftsman LOUIS CHORIS.

Sailing from the Baltic port of Kronstadt, near St. Petersburg, at the end of July 1815, Kotzebue first stopped at the Canary Islands before continuing to the south coast of Brazil. He entered the Pacific by way of CAPE HORN and reached Concepción on the coast of Chile in February 1816. After a short stay in the Chilean port, he headed for Easter Island and located several previously uncharted islands nearby.

After a cruise that took him through the Gilbert and Marshall Islands of the Central Pacific, Kotzebue headed northward for the Kamchatka Peninsula on the Pacific coast of Siberia. In June 1816, he made a brief stopover at the port of Petropavlovsk Bay on Kamchatka, then sailed eastward across the Bering Sea. He visited Bering Island and St. Lawrence Island and finally reached the coast of Alaska. Arriving too late in the season to commence any extensive explorations, he remained only long enough to survey the coastline south of BERING STRAIT for suitable anchorages. He then sailed southward to spend the winter of 1816–17 in the HAWAIIAN ISLANDS and the Marshall Islands.

Kotzebue embarked on his second attempt to locate a northern sea route from the Pacific to the Atlantic in spring 1817. He returned to Alaskan waters, stopping at Unalaska Island, where he received equipment from employees of the RUSSIAN-AMERICAN COMPANY. He also took aboard several Aleut natives and their small skin boats, known as *baidarkas*, for the exploration of the coastline to the north. In July 1817, he came upon a promising inland arm of the sea, which he hoped would lead into an open-water passage to the Atlantic. It turned out to be Goodhope Bay on the south shore of an adjoining large inland gulf that Kotzebue named after himself: Kotzebue Sound.

Kotzebue had planned to sail northward through Bering Strait, but he decided to turn back in mid-July 1817. He later reported that concerns about his own health (possibly angina), as well as uncertainties about the ice conditions ahead, led to his decision to withdraw. On the return southward through the Bering Strait, he coasted along the Asian mainland, visiting with the Inuit of the Chukchi Peninsula. He again entered the Pacific. In his subsequent explorations, he located more uncharted atolls and islands in the Marshall, Mariana, and Gilbert groups.

Kotzebue arrived back in St. Petersburg in August 1818, having sailed around the CAPE OF GOOD HOPE in his second

circumnavigation of the world. He was immediately promoted to the rank of captain lieutenant in the Russian Marine Guards.

Five years later, Kotzebue was directly commissioned by Czar Alexander I to command another Russian voyage to the Pacific. This expedition was intended as a political and scientific exercise, aimed partly at keeping an eye on Spanish, British, and American encroachment on Russian possessions in Alaska and the Pacific Northwest. He was also to patrol the Gulf of Alaska in an effort to protect the Russian-American Company's fur monopoly from the activities of smugglers. On the sloop *Predpriyatiye* (enterprise), he returned to the Pacific. After duty off the coast of North America, he once again cruised the islands of Oceania, making the European discovery of islands in the Tuamotu, Society, and Marshall groups.

Kotzebue and the *Predpriyatiye* returned to St. Petersburg in 1826, having completed his third round-the-world voyage. His account of his 1815–18 voyage was first published in 1821 as *A Voyage of Discovery into the South Sea and Bering Strait*. His third circumnavigation was recounted in his 1830 work *A New Voyage Round the World in the Years 1823–26*. He retired from active naval service in 1829, settling with his family in Estonia.

In the course of his South Pacific explorations in 1815–18 and 1823–26, Kotzebue charted more than 300 islands and atolls. Among them were a group of 36 islets in the Marshall chain, which he located in 1817 and called the Eschscholtz Islands, after the naturalist JOHANN FRIEDRICH ESCHSCHOLTZ. One of them later became known as Bikini Atoll and was made famous as the site of U.S. atomic bomb tests in 1946.

Krapf, Johann Ludwig (1810–1881)

German missionary in East Africa

J. Ludwig Krapf is thought to have been born in the Württemberg region of southwestern Germany. He attended the Basel Missionary Institute in Switzerland and eventually joined the Church Missionary Society, an Anglican organization.

Krapf's first missionary assignment was in Abyssinia (present-day Ethiopia), where he arrived in about 1837. He tried without success to establish a missionary presence in the country and he was expelled by government officials in 1842. He then headed southward to the port of Mombasa on the Indian Ocean coast of present-day Kenya. After establishing a mission, Neu-Rabai, he began preparations for a string of missions across the interior of central Africa in the hope of countering the SLAVE TRADE carried on by the Arabs.

Krapf decided that before founding any more missions, he had to explore the interior of the region inland from

Mombasa, still uncharted by Europeans. He learned the Swahili language and gathered geographic information from Arab traders passing through Mombasa on their slaving expeditions inland. Krapf learned of great mountains capped with a substance that he correctly deduced to be snow and ice. He also heard reports of great inland lakes, possibly Lake Victoria and Lake Tanganyika, filled with freshwater from these mountains. From these tales, Krapf speculated that he was hearing about the legendary MOUNTAINS OF THE MOON, the peaks mentioned by the ancient geographer PTOLEMY as the ultimate source of the NILE RIVER.

Before he could set out, Krapf was stricken with malaria. In about 1847, JOHANN REBMANN arrived at his mission as an assistant. The next year, while Krapf was still recovering, Rebmann undertook a journey into the interior, becoming the first European to see MOUNT KILIMANJARO, Africa's highest mountain.

Krapf regained his health, and, in 1849, he set out with a small band of Nyika and Swahili tribesmen. He had also been given a letter of safe conduct by the sympathetic Seyyid Said, the sultan of Oman and Zanzibar. In December 1849, after following a route northwestward from Mombasa, and also sighting Mount Kilimanjaro, he reached Nairobi and there made the first sighting by a European of Mount Kenya, Africa's second highest mountain. Like Kilimanjaro, it too was covered with ice and snow, confirming Krapf's earlier speculations about the interior lakes and the source of the Nile. From local natives he heard reports of the upper Congo River (Zaire River) and its course to the coast of West Africa.

In 1855, Krapf's map of the interior of eastern and central Africa appeared in the journal of the London Missionary Society. It sparked immediate controversy among professional geographers, with its clear delineation of interior high mountain ranges covered with snow lying nearly on the EQUATOR, and its suggestion that vast inland freshwater lakes were the source of the Nile. In 1856, the ROYAL GEOGRAPHICAL SOCIETY dispatched SIR RICHARD FRANCIS BURTON and JOHN HANNING SPEKE on an expedition to investigate these reports.

About that time, Krapf returned to Europe and published his account of his years in East Africa entitled *Travel, Researches, and Missionary Labours During Eighteen Years Residence in Eastern Africa*. In 1867, he returned to Africa as an interpreter for a British expedition to Abyssinia, and he subsequently introduced original Abyssinian manuscripts into Great Britain and Germany.

J. Ludwig Krapf was one of the first Europeans to venture into the interior of East Africa from the Indian Ocean coast. In his explorations, which included the European discovery of Mount Kenya, he relied on his ability to deal with natives in their own language and less on elaborate equipment or extensive supplies and an army of porters. His re-

ports on the interior of East Africa led to the European discovery of Lake Tanganyika and Lake Victoria and ultimately helped solve the mystery of the source of the Nile. In his 1849 expedition to Mount Kenya, he blazed a trail that was developed into a railroad route between Mombasa and Nairobi in 1902.

Krasheninnikov, Stepan Petrovich (1711–1755)

Russian naturalist in eastern Siberia

Stepan Krasheninnikov was born in Moscow. At the age of 13, he entered the Moscow Slavonic-Greek-Latin Academy, which he attended until 1732, before going on to the Academic University in St. Petersburg.

In 1733, Krasheninnikov left his studies to take part in the Great Northern Expedition. Organized that year by the Russian monarch, Empress Anna, and commanded by VITUS JONASSEN BERING, the expedition planned to make the first extensive exploration of central and eastern SIBERIA, which had only recently come under Russian control. From 1733 to 1737, as part of this undertaking, Krasheninnikov accompanied German naturalist JOHANN GEORG GMELIN and his scientific team in a survey of the natural history of Siberia.

By 1737, Krasheninnikov was on the Kamchatka Peninsula, along Siberia's Pacific coast, where, over the next three years, he took part in an extensive survey of the region's natural history, conducting comprehensive studies of Kamchatka's wildlife and geology. Krasheninnikov traveled throughout Kamchatka, observing the culture of the peninsula's native inhabitants. In 1741, Krasheninnikov returned to St. Petersburg. Under the sponsorship of the Academy of Sciences, he prepared a complete account of his findings and travels in the easternmost parts of the Russian Empire. Originally published in Russian in 1751, it was translated into English in 1972 as *Explorations of Kamchatka, North Pacific Scimitar*.

Stepan Krasheninnikov undertook one of the earliest anthropological studies of the native people of Kamchatka in the years just before their culture underwent dramatic changes as a result of increased contact with European Russia.

Krenitsyn, Pyotr Kuzmich (unknown–1770)

Russian navigator in the Aleutian Islands

Pyotr Krenitsyn was an officer in the Russian navy in the 1760s, during the first years of the reign of Catherine the Great, empress of Russia.

In 1768, Krenitsyn sailed from the mouth of the Kamchatka River on the Pacific coast of SIBERIA, in command of an expedition sent to explore the Aleutian Islands. Assisted by Mikhail D. Levashev, he cruised and charted the islands nearest the North American mainland, including Umnak,

Unalaska, and Unimak, as well as the western end of the Alaska Peninsula.

Soon after his return to Kamchatka in 1770, Pyotr Krenitsyn drowned in the Kamchatka River, near the port of Kamchatsk. Levashev, his assistant, returned to European Russia in 1771 with the expedition's geographic findings. Based on this information, cartographers in St. Petersburg were able to produce one of the earliest maps of the Aleutian chain. The Krenitzin Islands, which lie between Unalaska and Unimak Islands, were named in his honor.

Kropotkin, Peter (Prince Pyotr Alekseyevich Kropotkin) (1842–1921) *Russian geographer in Siberia, Finland, and Manchuria*

Peter Kropotkin was born in Moscow into a wealthy family of the Russian nobility. As a young prince, he served as a page at the court of the Russian czar; at about age 20, he became an army officer.

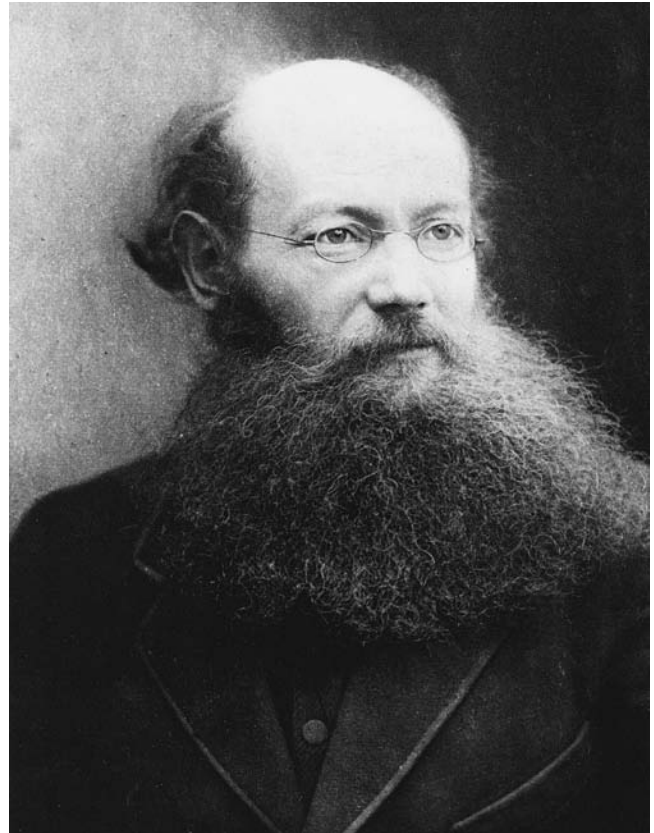
In 1862–65, as an officer, Kropotkin first traveled into SIBERIA, where he applied his background in geology and geography to develop theories on the development of Asia's mountain ranges.

Leaving the army in 1865, Kropotkin went on to high posts in the Russian government. He also actively pursued his interest in geography; by 1870, he had become secretary of the physical geography section of the Russian Geographical Society. In 1871–73, Kropotkin undertook a series of scientific expeditions into northern Finland, Siberia, and Manchuria in northeastern China, during which he made additional studies in the geography, natural history, and native culture of these regions.

Starting in 1872, Kropotkin began to concentrate his efforts in promoting the cause of revolutionary anarchism. He dropped his royal title, and for this action he was imprisoned by the czarist government. Soon afterward, he escaped to France, where his radical views again landed him in prison, from 1883 to 1886. His release came about as the result of a pardon secured through French statesman Georges Clemenceau.

During the 1890s, Kropotkin settled in England and continued to write and theorize about the anarchist cause. He made several lecture tours to the United States, appearing at Harvard University and Wellesley College. After the Russian Revolution of 1917, he returned to his native land, where the new Soviet government honored him as a hero.

Although chiefly known as the father of "anarchist communism," Peter Kropotkin was also an astute geographer. In 1870, he speculated that shifts in the ice of the frozen Arctic Ocean north of Siberia would eventually lead to the European discovery of uncharted lands. Soon afterward, in 1873, Austrian polar explorer JULIUS VON PAYER located Franz Josef Land north of the Siberian mainland, and, 40



Peter Kropotkin (Library of Congress)

years later, in 1913, Boris Andreyevich Vilkitsky discovered the Severnaya Zemlya archipelago, northeast of Novaya Zemlya.

Krusenstern, Adam Ivan Ritter von (Adam Johann von Krusenstern, Ivan Federovich de Krusenstern, Ivan Fyodorovich Krusenshtern) (1770–1846) *Russian naval officer in the South Pacific, Japan, and Alaska*

Adam Ivan von Krusenstern was born in Haggud, Estonia, then part of the Russian Empire, into a family of the Baltic German aristocracy. In 1785, he entered the Russian navy as a cadet, soon taking part in actions in the Russo-Swedish War of 1787–90.

At the outbreak of the French Revolution in 1793, Krusenstern served for a year aboard a British warship in the waters off Africa, Asia, and North America. In 1797, he sailed to the Orient on a British merchant ship, witnessing in Canton (Guangzhou) the trade in sea otter skins brought from northwestern North America by British and American ships.

Upon his return to St. Petersburg in Russia in 1799, Krusenstern presented to the Ministry of Trade his plan for

a Russian CIRCUMNAVIGATION OF THE WORLD. His main reason for the expedition had grown out of his observations of the FUR TRADE, from which he had concluded that the Russian settlements on the Kamchatka Peninsula, in the Aleutian Islands, and in Alaska could only prosper by being supplied by sea from the Baltic ports, rather than by the expensive and time-consuming overland trek across SIBERIA from European Russia. He also wanted to carry American furs directly to Chinese markets from Alaska instead of trans-shipping them from the Kamchatka Peninsula.

With the help of Count Nicholas Romanzof, the Russian minister of trade, Krusenstern received a commission from Czar Alexander I to command a voyage to the northwest coast of North America and to the Far East. In London, he obtained two ships; in Germany, he recruited a small scientific team for the voyage, which included German naturalist GEORG HEINRICH VON LANGSDORFF.

Promoted to the rank of captain lieutenant, Krusenstern sailed on the *Nadezhda* from the Baltic port of Kronstadt, near St. Petersburg, in August 1803, accompanied by the *Neva*, under YURY FYODOROVICH LISIANSKY. Sailing as cadets aboard the *Nadezhda* were 15-year-old OTTO VON KOTZEBUE and his 14-year-old brother Moritz. After



Adam Ivan von Krusenstern (Library of Congress)

stopovers in the CANARY ISLANDS and on Santa Catarina Island off the south coast of Brazil, the expedition rounded CAPE HORN into the Pacific Ocean in March 1804. Although storms soon separated the two vessels, Krusenstern made for the Marquesas Islands, a prearranged rendezvous in case of such an event, and, in May 1804, he was reunited with Lisiansky. He befriended the native king of Nuku Hiva, Tapeya Kettenovie, and in his subsequent written account of the voyage he commented on the extensive tattoos that distinguished the nobility of the Marquesas. The next stopover was in the HAWAIIAN ISLANDS, where Krusenstern tried without success to buy supplies from native peoples. Lacking sufficient trade goods, he was compelled to head for Kamchatka to reprovision the *Nadezhda*, while Lisiansky and the *Neva* sailed to the Gulf of Alaska and the RUSSIAN-AMERICAN COMPANY'S trading posts on Kodiak Island.

After obtaining supplies at Petropavlovsk on the Kamchatka Peninsula, Krusenstern headed southward for Japan. Traveling with Krusenstern was the czar's chamberlain, N. P. Rezanov, who planned to establish Russian trade relations with the Japanese at Nagasaki. Also aboard were some Japanese sailors who had been shipwrecked in the Aleutians and were now being returned to their homeland as a goodwill gesture.

On the voyage from Kamchatka to Japan, Krusenstern surveyed and charted the east coast of Kamchatka, the Kuril Islands, and Sakhalin Island. In October 1804, the *Nadezhda* arrived in Nagasaki, at that time the only Japanese port open to Europeans. Krusenstern remained there for the next five months, while Rezanov waited to see Japanese officials from whom he hoped to obtain trading privileges for Russian ships. Finally, in early April 1805, Krusenstern was told by the Japanese that the czar's representative would not be received by government officials and was advised to leave Nagasaki as soon as possible. Despite this setback, Krusenstern used the return voyage to Kamchatka as an opportunity to further explore the islands of northern Japan, where his men had contact with the non-Japanese aboriginal inhabitants of Hokkaido, known as the Ainu. He also stopped at the northern part of Sakhalin Island and visited with the native Tartar people. During this part of the voyage, he examined the Asian mainland opposite Sakhalin Island and there located the mouth of the Amur River.

Returning to Kamchatka in summer 1805, Krusenstern sent a courier overland across Siberia to St. Petersburg with a report of his expedition. He then sailed to Macao, where he rejoined Lisiansky and the *Neva* in December 1805. The two ships went on to Canton and sold the Russian furs to Chinese merchants. In February 1806, both ships set out on the homeward voyage. Sailing by way of Indonesia's Sunda Strait and the CAPE OF GOOD HOPE, they arrived in Kronstadt in August 1806, having circumnavigated the world in just over three years.

From 1810 to 1814, Krusenstern completed his multi-volume account of the expedition, first published in English in 1813 as *Voyage Around the World in the Years 1803, 1804, 1805, and 1806*. In 1815, Krusenstern sailed again to the North Pacific in an expedition exploring BERING STRAIT for the NORTHWEST PASSAGE. His comprehensive charting of the Pacific led to his *Atlas of the Pacific Ocean*, published in 1824–27. Named a rear admiral in 1826, he became director of Russia's naval cadet academy the next year. He carried on his navigational studies with the St. Petersburg Academy of Sciences and as a member of the scientific committee of Russia's naval ministry, and was promoted to vice admiral in 1829 and admiral in 1841. Krusenstern eventually settled on his estate near what is now the Baltic port of Tallinn.

In his 1803–06 voyage, Adam Ivan von Krusenstern commanded the first official Russian circumnavigation of the world and succeeded in establishing direct maritime links among European Russia, the Russian colonies in Alaska, and the fur markets in Canton, China. His successful expedition inspired Otto von Kotzebue's voyage of 1815–18. In recognition of his achievements as one of the foremost Russian navigators of his day, Cape Krusenstern, at the entrance to Alaska's Kotzebue Sound, was named in his honor.

Kupe (fl. ca. 950) *Polynesian seafarer in the South Pacific and New Zealand*

According to the Maori people, Kupe, a chieftain of the Polynesians, set out on a westward voyage from a central Pacific island by OUTRIGGER across some 2,000 miles of the Pacific Ocean in the mid-10th century. He and his followers reportedly reached two large mountainous islands, which later came to be known as North Island and South Island of NEW ZEALAND. According to the tale, Kupe and his followers eventually returned to their home island in OCEANIA known as Hawaiki—thought to be Rarotonga in the Cook Islands—where Kupe described his discovery of what the Polynesians called *Tiritiri o te moan* (the land shrouded in high mist). The account was passed down over subsequent generations. This oral tradition includes a recitation of the route taken and comprises the Polynesian settlement of New Zealand.

The tale has fantastic elements. Kupe supposedly set out on the journey to capture the Squid King who had stolen fish from his nets, when he eventually caught and killed in the waters between North Island and South Island (now called Cook Strait). It is taken as fact that the Polynesians settled New Zealand and were ancestral to the Maori people, who lived there long before its European discovery by the Dutchman ABEL JANSZON TASMAN in 1642.

The legendary account of Kupe's voyage is one of many tales of POLYNESIAN EXPLORATION of the Pacific. If true, it stands out as a remarkable feat of seamanship, requiring the crossing of an expanse of ocean with only basic techniques of navigation.

Kurz, Rudolph Friederich (Rudolf Friedrich Kurz) (1818–1871) *Swiss artist on the upper Missouri River*

Rudolph Kurz was born in Berne, Switzerland. He studied art in Paris, then came to America in 1847, settling first in St. Louis, Missouri.

That same year, Kurz traveled up the MISSISSIPPI RIVER from St. Louis and visited Indian lands to the west. During his travels he made sketches of western scenes and Ioway Indians. In 1848, Kurz went up the MISSOURI RIVER to Council Bluffs, then established an art studio at St. Joseph, Missouri.

In 1851, Kurz reached the Dakotas aboard a fur company steamboat, settling for a time at Fort Berthold, near present-day Garrison, North Dakota. While working as a clerk for a fur company, he made hundreds of sketches of the upper Missouri River Indians, including Mandan, Arikara, and Hidatsa.

Kurz left Fort Berthold when a cholera epidemic broke out, since the Indians believed his drawing had caused the sickness. He fled across the northern plains on horseback and reached Fort Union at the mouth of the Yellowstone River, where he stayed through the winter of 1851–52.

The following spring, Kurz left Fort Union and traveled down the Missouri to St. Louis and soon arranged passage to Europe. When back in Switzerland, Kurz taught art and produced paintings based on his sketches of the American frontier.

Rudolph Kurz's paintings are one of the earliest pictorial records of life on the upper Missouri frontier.

L



La Billardière, Jacques-Julien Houtou de
(1755–1834) *French naturalist in Australia, Tasmania,
and the South Pacific*

Jacques de La Billardière was born in the northern French city of Alençon. He attended the university at Montpellier in the south of France, where he was trained as a doctor and also studied botany. In 1780, he became a botanist at the French Royal Botanical Gardens; soon afterward, he spent time with SIR JOSEPH BANKS in London and undertook botanical studies at Kew Gardens. In 1786–88, he took part in a botanical expedition to the Middle East.

In 1791, La Billardière was recruited as a naturalist by ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux, for his voyage to the South Pacific in search of JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, whose expedition had been missing since early 1788. La Billardière sailed on the *Recherche* from Brest in September 1791. In spring 1792, he conducted a scientific exploration of TASMANIA. Among his scientific discoveries there were several varieties of eucalyptus trees, including the giant *Eucalyptus amygdalina*, capable of growing to a height of more than 300 feet.

In November 1792, La Billardière undertook a botanical survey of the southwest coast of Australia around Cape Leeuwin. Early in 1793, in an exploration of the coast of what was then known as Nuys Land on the south coast of Australia, he discovered several varieties of flowering bushes, as well as several types of fruit-bearing bushes.

When La Billardière and the d'Entrecasteaux expedition reached the Dutch colony at Batavia (present-day Jakarta, Indonesia) in early 1794, news had arrived of the French Revolution. La Billardière, who strongly supported the Republican cause, was imprisoned by the Dutch at the nearby port of Semarang, although he was permitted to send his natural history collections to England. He also managed to send several living breadfruit trees to Île de France (present-day Mauritius) in the Indian Ocean; they were transplanted and eventually were shipped back alive to Europe.

La Billardière was not released from Dutch custody until March 1795. He made his way back to France by way of Île de France, arriving in Paris in spring 1796. He soon recovered his botanical specimens from England, with the help of Sir Joseph Banks. In 1799, he published his *Account of the Voyage in Search of La Pérouse* and was made a member of the French Academy of Sciences.

La Billardière remained a strong supporter of the Republican cause and an opponent of the regime of Napoléon Bonaparte. He lived in semiretirement in Paris, engaged in botanical research until his death in 1834.

Jacques de La Billardière helped publicize the scientific results of the d'Entrecasteaux expedition. A midget kangaroo, which the expedition's zoologists had discovered in southern Australia in 1792, was named *La Billardiere thyllogale* in his honor; the Australian bushes he discovered were named *Billardiera* by British scientist ROBERT BROWN.

Lac, François-Marie Perrin du See PERRIN DU LAC, FRANÇOIS-MARIE.

Lacerda, Francisco de (Francisco José de Lacerda e Almeida, F. J. M. De Lacerda)

(1753–1798) *Portuguese colonial official in central Africa*
Francisco de Lacerda was a Portuguese (or possibly Brazilian) colonial official in central Africa in the latter part of the 18th century. The Portuguese had been pioneers in exploration and settlement along the east and west coasts of Africa since the days of HENRY THE NAVIGATOR, prince of Portugal, in the 1400s. Yet they had not penetrated very far into the interior, even after a presence of more than 300 years on the coastline of the African continent, south of the SAHARA DESERT.

In 1787, Lacerda undertook one of the first European explorations inland into Angola. Ascending the Cunene River from the Atlantic coast, he reached the western edge of the Bihe Plateau in central Angola.

Soon after this expedition, Lacerda was appointed as colonial governor of what is now Mozambique on the Indian Ocean coast of central Africa. While in Mozambique, he recognized the need for direct overland contact between Portugal's possessions on the west coast of Africa and its colonies on the Indian Ocean. In 1798, he set out with an expedition of 70 men from the settlement of Tete on the ZAMBEZI RIVER in western Mozambique and headed north-westward, hoping to accomplish the first east-to-west crossing of central Africa by Europeans and locate a river route between Angola and Mozambique.

Lacerda and his party ascended the Zambezi River to a point above the Quebrabasa Rapids, then entered the Luangwe River into what is now Zambia. Although he traveled close to both Lake Nyasa (Lake Malawi) and the smaller Lake Bangweulu, he missed sighting them. He died of exhaustion and fever after reaching as far north and west as Lake Mweru in the land of a tribal ruler named Cazembe, present-day northeastern Zambia. With their leader dead, Lacerda's men returned southeastward to Tete on the Zambezi.

Although Francisco de Lacerda failed in his attempt to traverse the African continent, his 1798 expedition was the most extensive European penetration of sub-Saharan Africa up to that time. He produced a map of the area between Tete and Lake Mweru. It can be said that his expedition marked the beginning of colonial expansion into central Africa. In the decade after his death, PEDRO JOÃO BAPTISTA and Amaro José succeeded in making the first recorded east-to-west crossing from Luanda, Angola, to the lower Zambezi River.

Laclede, Pierre Liguiste (Pierre Laclede Ligest) (1724–1778) *French fur trader, founder of St. Louis, Missouri*

Born in Bedous, France, Pierre Laclede was educated at the French military academy at Toulouse. He arrived in New Orleans in 1755 and soon established himself in the Indian trade on the MISSISSIPPI RIVER, operating upriver as far north as Kaskaskia in present-day Illinois.

Laclede became associated with the Chouteau family through Marie Thérèse Bourgeois Chouteau. Her son RENÉ AUGUSTE CHOUTEAU became his protégé. In 1763–64, Laclede established a settlement and trading post on the west bank of the Mississippi River above Kaskaskia and Fort de Chartres. With France's loss of much of its eastern North America territory at the conclusion of the French and Indian War, many French settlers on the east bank of the Mississippi relocated to the new settlement.

Laclede carried on a lucrative trade with the Indians for the next two years, until his official monopoly was revoked by French authorities in New Orleans. Nonetheless, after 1765, Laclede continued to operate independently of French New Orleans interests while the Louisiana Country was under Spanish rule, becoming a significant commercial force in the lower MISSOURI RIVER and the Mississippi River FUR TRADE throughout the 1770s.

Pierre Laclede called his fur-trading post on the Mississippi River St. Louis, in honor of the medieval French king, Louis IX, who had been canonized as a saint. By 1810, the original settlement, constructed on the rocky bluff overlooking the river on the site of present-day downtown St. Louis, Missouri, had grown to become the focal point for trading and trapping along the upper Missouri River and in the ROCKY MOUNTAINS. Strategically located just below the mouth of the Missouri River, St. Louis became the starting point for the first official U.S. explorers of the American West, including MERIWETHER LEWIS and WILLIAM CLARK in 1804, ZEBULON MONTGOMERY PIKE in 1806, and STEPHEN HARRIMAN LONG in 1819.

La Condamine, Charles-Marie de (1701–1774)

French scientist, cartographer in Peru, Ecuador, and the Amazon Basin

Charles-Marie de la Condamine was born in Paris to a fairly affluent family. He entered the French army when he was 18 but left after a year to pursue his interest in mathematics, cartography, astronomy, and natural history. After he took part in a scientific expedition to the Middle East, La Condamine's reputation as a scientist grew in France. In 1730, he was elected to the French Academy of Sciences.

In late 1734, with the support and influence of his friend the French author and philosopher François Voltaire, La Condamine was appointed to lead an official French scientific expedition to South America, the express purpose of which was to measure the arc of a section of a meridian of longitude at the EQUATOR and thereby determine the true shape of the Earth. At that time, a scientific controversy

was raging between the adherents of Sir Isaac Newton, who believed the planet to be flattened at the NORTH POLE and SOUTH POLE, and those who supported the contention of French-Italian mathematician Giovanni Cassini, who held that it flattened at the equator.

La Condamine was to head one of two expeditions involved in the Earth-measuring project. While one contingent went to Lapland to determine the variations in the curvature of the Earth near the Arctic Circle, La Condamine's group traveled to Quito in present-day Ecuador, then the most accessible point nearest to the equator, where they planned to make similar observations. Among his scientific team were French astronomer Louis Godin and his cousin Jean Godin des Odonais, who served as La Condamine's field assistant. A naval engineer by the name of Morainville, a doctor named Jean Seniergues, and the French botanist Joseph de Jussieu also participated. The expedition included a watchmaker, a man named Hugot, to maintain the project's scientific instruments, and two Spanish naval officers who were also mathematicians, Antonio de Ulloa and Jorge Juan y Santacilia.

Sailing from the French port of La Rochelle on May 16, 1735, La Condamine and his group first journeyed to the French Caribbean island of Martinique, then to Cartagena on the Caribbean coast of what is now Colombia. From there, they crossed the Isthmus of Panama, then headed southward along the Pacific coast of South America to the port of Manta in modern Ecuador, at that time part of northern Peru's Esmeraldas Province.

While traveling inland to Quito along the Rio Esmeraldas, La Condamine became one of the first Europeans to encounter the material we know today as rubber. Noting its resilient and elastic properties, he used it to fashion a protective casing for some of his most sensitive scientific instruments. Outside of Quito, on the Plain of Yarqui, the French scientists spent the next two years constructing observation posts and making calculations along a section of a meridian that measured an arc 3° north and south of the equator.

Difficulties with Spanish colonial authorities, who were suspicious of any foreigners in the region, caused extensive delays in La Condamine's scientific work. In 1736, he traveled to Lima with Juan y Santacilia for a meeting with the provincial governor to resolve these problems, a journey that took more than eight months. Soon after his return to Quito in 1737, word arrived from Europe that the French team in Lapland had finished its work, conclusively determining that Newton had been correct in his conclusions about the Earth flattening at the Poles.

Undaunted by this news, La Condamine and his associates continued their work, completing studies that later added to the understanding of the true shape of the Earth. Their research provided data on the variations in the readings of navigational instruments near the equator.

In 1738, La Condamine scaled Corazon in the ANDES MOUNTAINS. Two years later, he attempted unsuccessfully to reach the top of Chimborazo.

La Condamine also carried out scientific work in the area of natural history until 1743. By that time, most of the members of the French expedition had died or gone their separate ways. Jean Godin des Odonais had married a Peruvian, ISABELA GODIN DES ODONAIS. The doctor, Seniergues, had been killed in 1739 in a dispute arising out of his role as an intermediary in a jilted engagement between one of the members of the expedition and a local woman. The botanist, Jussieu, had a nervous breakdown when his collection of specimens was accidentally destroyed. The naval engineer, Morainville, was killed in a fall from a scaffold while helping to construct a church. The astronomer Louis Godin remained in Peru, having accepted a position at the University of San Marcos in Lima.

With his geodesic work completed in Quito, La Condamine decided to undertake a voyage down the Amazon Basin to the Atlantic coast of Brazil, rather than sail directly back to France. From Jesuit missionaries in Cuenca and Quito, he obtained maps of the AMAZON RIVER that had been prepared years earlier by Father SAMUEL FRITZ. In June 1743, he headed into the Andes, traveling across deep canyons and passes by way of rope bridges, of the type in use since the days of the Inca Indians. He reached the Marañón River, which he descended to its confluence with the Huallaga River, where he was joined by Pedro Maldonado, the governor of Esmeraldas Province. His downriver journey took him through the Pongo Pass, a narrow chasm through which the river surged in perilous rapids. Along the way, he made navigational calculations and studied the life of the Indians, noting for instance their hunting with arrows tipped with the poison curare.

On this journey, La Condamine was one of the first Europeans to hear reports of the link between the Amazon and the ORINOCO RIVER to the north—the Casiquiare Canal. He also investigated stories about the fabled women warriors and their matriarchal society (reported by FRANCISCO DE ORELLANA two centuries earlier), for whom the Amazon River was named. Among his findings was that the Rio Negro actually flowed into the Amazon from the northwest and not from the north as had previously been reported by Jesuit explorers. Near Pará (present-day Belem, Brazil), he explored Marajo Island. Before reaching the Atlantic coast, La Condamine used his geographic and mathematical skills to ascertain the coordinates of the demarcation line of the 1494 Treaty of Tordesillas separating Portuguese and Spanish possessions in South America, still in dispute as late as 1743.

After delays at Cayenne in French Guiana, La Condamine decided to sail to Europe from Paramaribo, a port in Dutch Guiana. Stopping over in Holland, he arrived back in Paris in February 1745. He immediately set to work on a map of his Amazon journey and a full account of his scientific work in Peru and Ecuador; it was published in

1751 as *Journal of a Voyage by Order of the King to the Equator*. La Condamine's later scientific efforts concentrated on trying, without success, to win acceptance of a universal unit of length based on his measurements with pendulum clocks near the equator.

Charles-Marie de la Condamine undertook the first scientific exploration of the Amazon. His work served as an inspiration for the expedition of ALEXANDER VON HUMBOLDT half a century later. He also introduced rubber to Europe, an event that would have a profound economic and social impact on the Amazon region 150 years after his visit.

La Cosa, Juan de See COSA, JUAN DE LA.

Lagrée, Ernest-Marc-Louis de Gonzague Doudart de See DOUDART DE LAGRÉE, ERNEST-MARC-LOUIS DE GONZAGUE.

La Harpe, Jean-Baptiste Bénard de (Bernard de la Harpe) (fl. early 1700s) *French trader in the American Southwest*

Bénard de La Harpe, a Frenchman from the Louisiana country, was involved in the Indian trade in the region west of the lower MISSISSIPPI RIVER. The onset of the War of the Quadruple Alliance, in which Spain was pitted against France, prompted several French expeditions westward from Louisiana into the Spanish territory of Texas. One of these, a trading venture, was led by La Harpe in 1719. On reaching the Red River, he traveled with a small party of traders overland to the Arkansas and Canadian Rivers and attempted, without success to open up trade contacts with tribes of the southern plains. When he reached Santa Fe, Spanish officials became alarmed and took steps to curb further foreign encroachment into the region.

Bénard de La Harpe's 1719 trip to Santa Fe prompted Spanish colonial authorities in Mexico and New Mexico to counter the French threat. The Spanish realized that the only permanent bulwark against French expansion from Louisiana, as well as English expansion from Georgia, was to undertake a program of widespread colonization in Texas, which was begun in 1748 under JOSÉ DE ESCANDÓN.

Lahontan, Louis-Armand de Lom d'Arce de (Baron de Lahontan, Baron de la Hontan et Hesleche) (ca. 1666–1716) *French army officer in the western Great Lakes region*

Baron de Lahontan was a captain in the French marines when he arrived in Montreal from France in 1683. During the next several years, he took part in the French campaign against the Iroquois (Haudenosaunee) Indians.

In 1687, Lahontan traveled westward into the eastern Great Lakes with DANIEL GREYSOLON DULUTH. Lahontan spent one year at Fort St. Joseph on the St. Clair River. In 1688, when this post was abandoned, he explored farther westward and reportedly reached Mackinac on Lake Michigan. He later claimed to have continued from there along the Fox and Wisconsin Rivers to the MISSISSIPPI RIVER.

Lahontan was back in Montreal in July 1689. He soon deserted from the military, returning to France in 1693.

In 1703, Baron de Lahontan's account of his travels, *New Voyages in North America*, was published in Holland. It relates his trip to the Mississippi and provides details about a great river flowing westward into a great inland salt sea with a highly advanced Indian civilization living on its shores. His accounts of North American geography were largely fictitious, but, until about 1750, his erroneous descriptions of the Mississippi country influenced map-makers. His tales of a salt sea to the west fueled hopes of later explorers in search of an inland route to the Orient. Lahontan's description of the western prairies as suitable for agricultural development were accurate, however. Ironically, 130 years later, STEPHEN HARRIMAN LONG characterized the same region as the Great American Desert.

Laing, Alexander Gordon (1793–1826) *British army officer in West Africa*

Gordon Laing was born in Edinburgh, Scotland, where he attended Edinburgh University before obtaining a commission as an officer in the British army's West India Regiment.

In 1822, Laing was stationed in the British West African colony of Sierra Leone. He commanded military expeditions into the Mandingo country northeast of Freetown in an effort to establish trade contacts with the native tribes as well as curtail the region's SLAVE TRADE. The next year, he took part in a military campaign to suppress an uprising of the Ashanti people in what is now the West African nation of Ghana. It was at this time, while commanding a patrol near the source of the NIGER RIVER north of the Ashanti region, that he first speculated on the true course of the NILE RIVER. From classical times to the beginning of the 19th century, most geographers had believed the Niger was a western tributary of the Nile, flowing eastward across Africa. From his observations of the low-lying terrain in what is now southern Mali, Laing concluded that this could not be the case, and he was one of the first to express the idea that the Niger was not connected to the Nile.

By 1824, Laing had been promoted to the rank of major, assigned as special assistant to Lord Bathurst, Great Britain's secretary of state for war and colonial affairs. With Bathurst's support, Laing was appointed to command an ex-

pedition to explore the interior of West Africa and determine the actual course of the Niger. Based on his earlier experience, Laing believed the best way to reach the Niger and descend it to its mouth was from the coast of West Africa. Bathurst was of the prevalent view that the most practical way to reach the region's interior was to head southward from the coast of North Africa, which Laing was compelled to do.

Laing arrived in Tripoli, Libya, in May 1825. He soon met and became enamored of Emma Warrington, daughter of the British consul in Tripoli, whom he married.

On July 18, 1825, Laing set out on his mission to explore the Niger. Accompanied by his West Indian servant, "Honest" Jack Le Bore, and two native West African carpenters who were to build a boat for the planned downriver journey once the SAHARA DESERT had been crossed, Laing headed southward from Tripoli. They soon reached the North African city of Ghadames, near the common border of present-day southern Tunisia, eastern Algeria, and northwestern Libya. Reportedly, Laing was the first European to visit this North African city.

While Laing's expedition was underway, another British group, led by HUGH CLAPPERTON, was also seeking to explore the Niger River, entering the region from the Bight of Benin on the coast of West Africa. From Ghadames, Laing and his three companions went southwestward across Algeria into the Fezzan region. Following a caravan route through the Grand Erg Oriental, they reached In Salah in the center of Algeria.

Laing and his party then skirted the western slopes of the Ahaggar Mountains and entered what is now Mali in early January 1826. An attack by Tuareg tribesmen in February left Laing severely wounded. By June 1826, his faithful servant, Le Bore, had succumbed to illness, and the two native boatbuilders had left him. Despite the hardships of traveling alone across the desert, he managed to reach the Niger River and the city of TIMBUKTU in Mali in August 1826.

Laing remained in Timbuktu for more than a month, until the local sheik, concerned about his safety amid a population outwardly hostile to non-Muslim visitors, convinced the Britisher to leave. Without a boat, Laing was forced to abandon his plan to sail down the river. He set out overland for the coast of West Africa on September 22, 1826, and was never seen alive again.

Two years later, French explorer RENÉ-AUGUSTE CAILLIÉ reached Timbuktu, where he learned that just two days after departing Timbuktu, Laing had been beaten to death by his Muslim guides, who believed him to be a Christian spy. A passerby had buried Laing in the desert. In 1910, French colonial authorities reburied his remains in Timbuktu.

Gordon Laing was the first European known to have visited the African cities of Ghadames and Timbuktu.

Lalemant, Gabriel (Saint Gabriel Lalement)

(1610–1649) *French missionary in the eastern*

Great Lakes region

Born in Paris into a noble French family, Gabriel Lalemant was the son of a lawyer. At the age of 20, he embarked on a religious career as a novitiate, following his uncles Charles Lalemant and Jérôme Lalemant, both prominent Jesuit missionaries in French Canada.

In 1632, the younger Lalemant entered the Jesuit order, committed to the idea of some day serving as a missionary in a foreign land. Nevertheless, he remained in France and nearby Belgium for the next 14 years, serving in a variety of academic positions at Jesuit schools in Moulins, Bruges, La Flèche, and Bourges.

Lalemant finally realized his goal of becoming an overseas missionary in 1646. In late September of that year, he arrived in French Canada, remaining in Quebec for two years. He then traveled to the southern Georgian Bay region of eastern Lake Huron, where he studied Indian languages at the Jesuit mission of Sainte-Marie-des-Hurons among the Huron (Wyandot). In February 1649, he joined Father JEAN DE BRÉBEUF at the St. Louis mission near the mouth of the Severn River at the southern end of Georgian Bay.

On March 16, 1649, Lalemant and Brébeuf were taken captive by the Iroquois (Haudenosaunee) who had overrun the mission with a force of 1,000 warriors. The two priests were led away and later killed by the Indians.

On June 29, 1930, both Gabriel Lalemant and Brébeuf were canonized by Pope Pius XI in a ceremony commemorating them and other missionary priests, including ISAAC JOGUES, as the Martyrs of North America. Along with fur traders, Lalemant was among the first Europeans to have extensive contact with the Indian population and explore the uncharted region of the eastern Great Lakes, west of the St. Lawrence and Ottawa Rivers.

La Mothe, Antoine Laumet de (sieur de

Cadillac) (1658–1730) *French official in North America, founder of Detroit*

Antoine de La Mothe was born in Laumont, a village in Gascony, to middle-class parents. He would later claim to be of nobility, his father being the "seigneur de Cadillac," although in reality his father was a minor official. He traveled to New France in 1683, staying first at Port Royal (present-day Annapolis Royal, Nova Scotia) and then along the Union River in present-day Maine. Soon after his marriage in 1687, he came to the attention of the minister of the French colonies, Louis Phélypeaux de Pontchartrain, who recommended him to governor Louis de Buade, comte de Frontenac.

In 1692, Cadillac and cartographer Jean-Baptiste Franquelin sailed along the Atlantic coastline. The following year, he assumed command of a company and also received

a ship's command. By the end of that year, he was given command of the frontier post Mackinac in the Great Lakes. His policies, including the distribution of alcohol, led to conflict with and among the area's Native American tribes and ended alliances that fur trader DANIEL GREYSOLON DULUTH had developed in the preceding years.

In 1698, in France, Cadillac won support for his plan of founding a colony on the Detroit River. In 1701, with 100 soldiers, missionaries, and colonists from Montreal, he founded Fort Pontchartrain on the site of present-day Detroit, Michigan. He did not assume full command of the post for another three years, but mismanagement of the post, including alleged trading with British interests, led to his being removed by Pontchartrain, who appointed him governor of French Louisiana in 1710, replacing JEAN-BAPTISTE LE MOYNE, sieur de Bienville. Cadillac did not travel to the southern territory until 1713. While governor, Cadillac sent French trader LOUIS JUCHEREAU DE ST. DENIS to Texas to open trade contacts with Indians, but his emissary was arrested by the Spanish.

Because of accusations of driving away colonists, Cadillac was recalled to France in 1716 and imprisoned for a time. Yet he again won royal favor and received the governorship of Castelsarrasin, a city near his native village. He lived the rest of his life in Gascony.

Antoine de La Mothe, despite the questions of character surrounding his career, is celebrated historically as the founder of Detroit.

Lancaster, Sir James (ca. 1554–1618)

English mariner, merchant in the Far East and South America, sponsor of expeditions in search of the Northwest Passage

Born in England, James Lancaster was a seafarer and merchant. In the early 1580s, he undertook commercial voyages to Portugal, where he first became acquainted with the great potential of direct trade with India and the EAST INDIES.

Lancaster was an associate of SIR FRANCIS DRAKE, with whom he served in England's great naval victory over the Spanish Armada in summer 1588. In 1591, he commanded Drake's ship, the *Edward Bonaventure*, in the first English trade expedition to the Far East. Sailing from Plymouth, he rounded the CAPE OF GOOD HOPE and entered the Indian Ocean. After a stopover at Zanzibar on the coast of East Africa, he visited ports on the west coast of India, as well as the island of CEYLON (present-day Sri Lanka). From there, he continued eastward to the Strait of Malacca and traded at Penang Island off the west coast of the Malay Peninsula. While in these waters, he operated as a privateer, preying on Spanish ships laden with valuable cargoes returning from the SPICE ISLANDS (the Moluccas of present-day Indonesia).

The voyage was cut short when his crew threatened to mutiny, and Lancaster and the *Edward Bonaventure* sailed back to England, arriving there in 1594. Later that year, he led an expedition of PRIVATEERS to South America, during which he succeeded in capturing the northeastern Brazilian port of Recife, as well as several Spanish and Portuguese ships. In 1595, he returned to England, his ship laden with a fortune in looted treasure.

In 1600, Lancaster's exploits as an overseas trader and mariner led to his appointment as one of the chief directors of the BRITISH EAST INDIA COMPANY, chartered that year by Parliament. On February 15, 1601, he sailed from Torquay on the southwest coast of England, in command of the British East India Company's first trading venture to the East Indies. The fleet of five ships included Lancaster's flagship, the *Sea Dragon*, piloted by English mariner JOHN DAVIS. On this voyage, Lancaster established trade with the kingdom of Atjeh on Sumatra, as well as with Bantam on Java.

Lancaster returned to England in 1603 with a valuable cargo of pepper. His subsequent reports suggested the existence of a NORTHWEST PASSAGE. This information sparked the interest of a group of leading English businessmen, who, in 1611, organized the COMPANY OF MERCHANTS OF LONDON DISCOVERERS OF THE NORTHWEST PASSAGE, with Lancaster as one of its directors.

Knighted by Queen Elizabeth I for his efforts in expanding both English seapower and overseas trade, Sir James Lancaster went on to sponsor and organize voyages in search of the Northwest Passage undertaken by WILLIAM BAFFIN, ROBERT BYLOT, and SIR THOMAS BUTTON. During their 1616 voyage, Baffin and Bylot briefly explored the strait between Baffin Island and Devon Island. They named the strait Lancaster Sound in honor of their chief patron, but they did not then realize that it led westward into the Barrow Strait and the Beaufort Sea, and ultimately to the Arctic coast of Alaska and the North Pacific Ocean. By the mid-19th century, however, British naval expeditions into the Canadian Arctic had established that Lancaster Sound was indeed the eastern entrance to the Northwest Passage.

Lander, Richard Lemon (1804–1834) *British explorer in West Africa*

Richard Lander was born at Truro in Cornwall, England, where his father was an innkeeper. At the age of 11, he traveled to the WEST INDIES as a merchant's apprentice, remaining there for three years. While in his teens, he worked as a servant to travelers, visiting many parts of Europe; he also served under a Major Colebrook on an expedition in South Africa.

In 1825, Lander won an appointment as an assistant with Captain HUGH CLAPPERTON's second expedition to

West Africa in search of the true course of the NIGER RIVER. That year, he sailed to the coast of what is now Nigeria with Clapperton, then traveled inland to Kano and Sokoto. When Clapperton died at Sokoto in April 1827, Lander was the only surviving European member of the expedition. Accompanied by Clapperton's Hausa guide, WILLIAM PASCOE, he made his way back to the coast despite great hardships. He finally reached England in 1828, where he edited Clapperton's journal, published in 1830 as *Records of Captain Clapperton's Last Expedition to Africa*.

Lander's African exploits came to the attention of the British Foreign Office. In 1830, under the sponsorship of Lord Bathurst, secretary of war and colonial affairs, Lander was sent again to West Africa to continue the search for the actual terminus of the Niger River. Sailing from Portsmouth on January 9, 1830, he was joined by his younger brother, John Lander. Lander's first stop on the Gulf of Guinea was Cape Coast in what is now Ghana, where he was reunited with the Hausa guide Pascoe, whom he recruited for the expedition. The group then continued to Badagri, near Lagos, in present-day Nigeria, where he disembarked for the trip into the interior. Traveling northward, he reached the Niger River at Bussa, where MUNGO PARK had drowned 24 years earlier.

Lander, his brother John, and Pascoe ascended the Niger from Bussa, exploring upriver without a compass for about 100 miles. They then headed downstream and soon reached the Niger's main tributary, the Benue. While investigating the myriad streams that make up the Niger's delta, Richard and John Lander were taken captive by Ibo tribesmen under King Obie. They were placed in the custody of another native trader, King Boy, with whom the Landers set out downriver, hoping to contact a European ship on the coast and obtain ransom for their freedom. With King Boy, the Landers eventually reached the Brass River, a southward-flowing branch of the Niger, and followed that stream to its outlet into the Bight of Benin, reaching the coast in mid-November 1830, thus determining the ultimate end of the Niger River.

While John Lander remained behind as a hostage at Brasstown on the coast, Richard attempted to obtain the ransom from a Captain Lake of the British ship *Thomas*. When Lander promised King Boy that Captain Lake would pay the ransom, the brothers were permitted to board the vessel. Although Captain Lake had actually refused to pay, Lander and his brother nonetheless sailed on the *Thomas*, leaving King Boy behind.

The Landers left the *Thomas* at the offshore island of Fernando Po in the Bight of Biafra, and found passage to Rio de Janeiro, Brazil, aboard the *Caernarvon*. From there, they sailed back to England, arriving in 1831, where they were hailed for having finally resolved the question of the course of the Niger River. Moreover, to redeem Richard

Lander's good name on the Niger Delta, the British Colonial Office later arranged for King Boy to receive the ransom he had been promised in the form of 135 slaves.

In 1832, Lander published a report on his African explorations, entitled *Journal of an Expedition to Explore the Course and Termination of the Niger*.

Lander's reputation as an African explorer aroused the interest of a group of Liverpool merchants, led by Macgregor Laird, who commissioned him to lead a trading venture to the Niger to exploit the region commercially. Returning to the lower Niger in 1832, he undertook trading expeditions upriver over the next year. Pascoe, who again accompanied him, died on one of these journeys, probably poisoned by a jealous tribal leader. In early 1834, Lander was wounded in an attack by natives at Angiama, about 100 miles upstream from the coast. He sought aid on Fernando Po, where he died on February 2, 1834. Of the 48 men who had started out on Lander's last expedition, only eight survived.

Richard Lander, although without formal education and of a modest social background, nonetheless solved one of the great geographic mysteries of West Africa. Soon after he returned to England in 1832, the newly formed ROYAL GEOGRAPHICAL SOCIETY awarded him its first cash prize for his finding that the Niger River, long thought to be a western tributary of the NILE RIVER, actually flowed southward, emptying into the Gulf of Guinea at the western edge of the Bight of Benin.

Landsborough, William (1825–1886)

Scottish colonist in Australia

Born in Saltcoats, Ayrshire, Scotland, William Landsborough migrated to New South Wales in 1841. In 1856–59, he explored central Queensland, especially the areas around the Comet and Nogoia Rivers, from Mount Nebo to Bowen Downs Station.

In 1861, departing from the Gulf of Carpentaria with a camel, at first traveling along the Albert River, Landsborough searched for the missing Englishmen ROBERT O'HARA BURKE and WILLIAM JOHN WILLS, who had perished in their attempt to cross the continent from south to north. Landsborough reached Melbourne in New South Wales in 1862, completing a north-to-south crossing within a week of the Scotsman JOHN MCDOUALL STUART's successful south-to-north crossing of the continent.

Landsborough later received extensive land grants from the Queensland government for his explorations and served in various official posts. He died in Caloundra, Queensland.

William Landsborough's explorations opened up many parts of Queensland to settlement. The town of Landsborough, Landsborough Creek, and Landsborough Highway in Queensland are named after him.

Langford, Nathaniel Pitt (1832–1911)
American politician in Montana, first superintendent of Yellowstone National Park

Nathaniel P. Langford was born in Westmoreland, New York. In 1854, along with some other family members, he migrated westward to St. Paul, Minnesota, where he worked as a bank cashier for the next eight years.

In 1862, suffering from ill health and hoping a western trip would restore him, Langford joined Captain James L. Fisk and his Northern Overland Expedition to the goldfields of eastern Idaho's Salmon River region. When the group was forced to winter in the Prickly Pear Valley of central Montana, Langford and several others pushed westward on their own, reaching Bannack.

Langford's arrival in Bannack coincided with a major gold strike in that part of southwestern Montana. Over the next few years, he became prominent as the leader of a vigilante group that maintained law and order amid the rapid influx of thousands of prospectors.

In 1864, with the organization of the Montana Territory, Langford became a federal tax collector. In 1868, President Andrew Johnson nominated him as Montana territorial governor, but his appointment was not confirmed by the U.S. Senate.

In 1869, Langford heard of the geological marvels of the Yellowstone Park region from his friend D. E. Folsom. Folsom had attempted to explore the region but had been turned back by Indian war parties. Langford soon succeeded in organizing an official expedition under the protection of U.S. Army troops. With the help of General Henry D. Washburn, Langford obtained the services of a military escort, and, in August 1870, with 19 other civilians, he left Helena, Montana, and explored the parts of Idaho, Wyoming, and Montana that now comprise Yellowstone National Park.

Immediately after the 1870 expedition, Langford embarked on a campaign for the preservation of the Yellowstone region as a national wilderness treasure. He lectured widely and wrote articles for leading magazines. When the park was created by an act of Congress in 1872, Langford became its first superintendent, serving until 1876 without compensation. He then returned to St. Paul, where he lived the rest of his life.

In 1905, Nathaniel P. Langford published his account of the Yellowstone region, entitled *Diary of the Washburn Expedition to the Yellowstone and Fire Hole Rivers in the Year 1870*. In his years as superintendent of America's first national park, he consistently protected the integrity of the park from commercial exploitation. His work greatly contributed to maintaining Yellowstone National Park as it was intended.

Langlé, Paul-Antoine-Marie Fleuriot de
See FLEURIOT DE LANGLÉ, PAUL-ANTOINE-MARIE.

Langsdorff, Georg Heinrich Ritter von (George Henry Langsdorff, Grigory Ivanovich Langsdorff) (1774–1852) *German naturalist, diplomat in the Pacific, Alaska, California, Siberia, and South America, in service to Russia*

Georg Heinrich von Langsdorff was born in the southern German town of Wollstein. In 1797, after studying medicine at the University of Göttingen, he became a physician in service to the Prince of Waldeck.

In August 1803, Langsdorff won an appointment as the naturalist for a Russian expedition to the Pacific Ocean, under the command of ADAM IVAN RITTER VON KRUSENSTERN. He met up with Krusenstern's ship, the *Nadezhda*, in Copenhagen; they sailed to Santa Catarina Island off the south coast of Brazil. On the voyage across the South Atlantic Ocean, he observed that the sea at times became phosphorescent as a result of tiny marine organisms, which he studied with a microscope.

Langsdorff traveled around CAPE HORN with the Russian expedition, which, after stopovers in the HAWAIIAN ISLANDS and other Pacific island groups, arrived in Petropavlovsk on the Kamchatka Peninsula of eastern SIBERIA. From there, the expedition sailed to Japan.

In late 1805, Langsdorff returned to Petropavlovsk. Leaving the Krusenstern expedition, he accompanied Russian naval officer GAVRILL IVANOVICH DAVYDOV and N. P. Rezanov, a founder of the RUSSIAN-AMERICAN COMPANY, on a tour of the Russian settlements in Alaska. In spring 1806, he traveled to Spanish California. Returning to the Pacific coast of Siberia in 1807, he traveled overland across Asiatic and European Russia, arriving in St. Petersburg in March 1808.

Langsdorff spent the next few years preparing an account of his sea and land journey around the world, published in English in 1813 as *Voyages and Travels in Various Parts of the World, during the years 1803, 1804, 1805, 1806, and 1807*.

In 1812, Langsdorff entered the Russian diplomatic service, returning to Brazil, where he served as Russia's consul general at Rio de Janeiro. During the next 10 years, he undertook studies of the region's plant and animal life, sending specimens back to the Russian Academy of Sciences in St. Petersburg. He also reported on the region's potential for colonization, publishing his findings in 1820 as *Memoirs on Brazil, A Guide for Those Who Wish to Settle There*. He returned to Russia in 1823, where he made a scientific tour of the Ural Mountains.

In 1825, Langsdorff returned to South America as head of a Russian scientific expedition that undertook explorations into the largely uncharted interior regions of the Amazon Basin and the Mato Grosso country of south-central Brazil.

Stricken with an illness that left him mentally incapacitated in 1829, Langsdorff was forced to return to Europe.

He spent his remaining years in the German city of Freiburg.

Georg Heinrich von Langsdorff's CIRCUMNAVIGATION OF THE WORLD was one of the first combining both sea and land. His reports on his travels greatly added to modern scientific knowledge on many diverse parts of the globe, including the islands of the South Pacific, the interior of Siberia, the northwestern parts of North America, and the jungles and plains of South America.

La Noué, Charles Edouard de See NOUÉ, CHARLES EDOUARD DE LA.

La Pérouse, comte de See GALAUB, JEAN-FRANÇOIS DE.

Larpenteur, Charles (1807–1872) *French-American fur trader on upper Missouri River, northern plains, and northern Rocky Mountains*

Charles Larpenteur, a native of Fontainebleau, France, moved to the United States with his family in 1818, settling on a farm in Maryland. When in his teens, he headed westward for Missouri, attracted by the burgeoning FUR TRADE centered in St. Louis.

Larpenteur gained frontier experience as an employee of Indian agent and fur trader Benjamin O'Fallon. In 1833, he joined an expedition to the upper MISSOURI RIVER, led by WILLIAM LEWIS SUBLETTE and ROBERT CAMPBELL, and served as the bartender at that year's fur trappers' rendezvous on the Green River in present-day southern Wyoming. He then joined Campbell on an expedition to the Yellowstone region, where he took part in the construction of Fort William, close to the AMERICAN FUR COMPANY's post, Fort Union, in the northwestern corner of present-day North Dakota.

After Campbell sold his operation to the American Fur Company in 1834, it was merged with Fort Union, where Larpenteur remained for the next 15 years, working for fur trader KENNETH MCKENZIE. In that time, he had extensive contacts with the tribes of the northern Dakota country and also undertook trade expeditions to the Indians of present-day Saskatchewan.

In 1848–49, Larpenteur set off on his own fur-trading enterprise among the Flathead Indians of western Montana's Bitterroot River Valley. Supply problems and severe winter weather soon led him to abandon the fur trade. In the early 1850s, he again entered the fur trade, operating for the rest of the decade among the upper Missouri tribes, including the Assiniboine.

In 1860–61, Larpenteur, in partnership with HENRY A. BOLLER, worked the Yellowstone River region. In 1864, the

American Fur Company commissioned Larpenteur to take charge of its operation at Fort Union, providing supplies for General Alfred Sully's military campaign against the Sioux (Dakota, Lakota, Nakota) Indians. He continued on as a merchant at Fort Buford in the Dakotas, until 1871, when he retired to a farm in Iowa.

Charles Larpenteur kept a journal of his life in the fur trade. This was later edited by Elliot Cous and was published in 1898 as *Forty Years a Fur Trader on the Upper Missouri: The Personal Narrative of Charles Larpenteur, 1833–1872*. Considered one of the most comprehensive accounts of the fur trade on the upper Missouri River, it provides everyday details of a frontier industry that contributed much to the exploration and settlement of the northern plains and northern ROCKY MOUNTAINS.

La Salle, René-Robert Cavalier de (sieur de La Salle) (1643–1687) *French fur trader on the Great Lakes, explorer on the Mississippi River*

René-Robert Cavalier de La Salle was born in Rouen, France to a prominent and influential family. As a youth, he studied for the priesthood, entering the Jesuit order in 1658. After several years, however, he left the Jesuits to enter the FUR TRADE in French Canada.

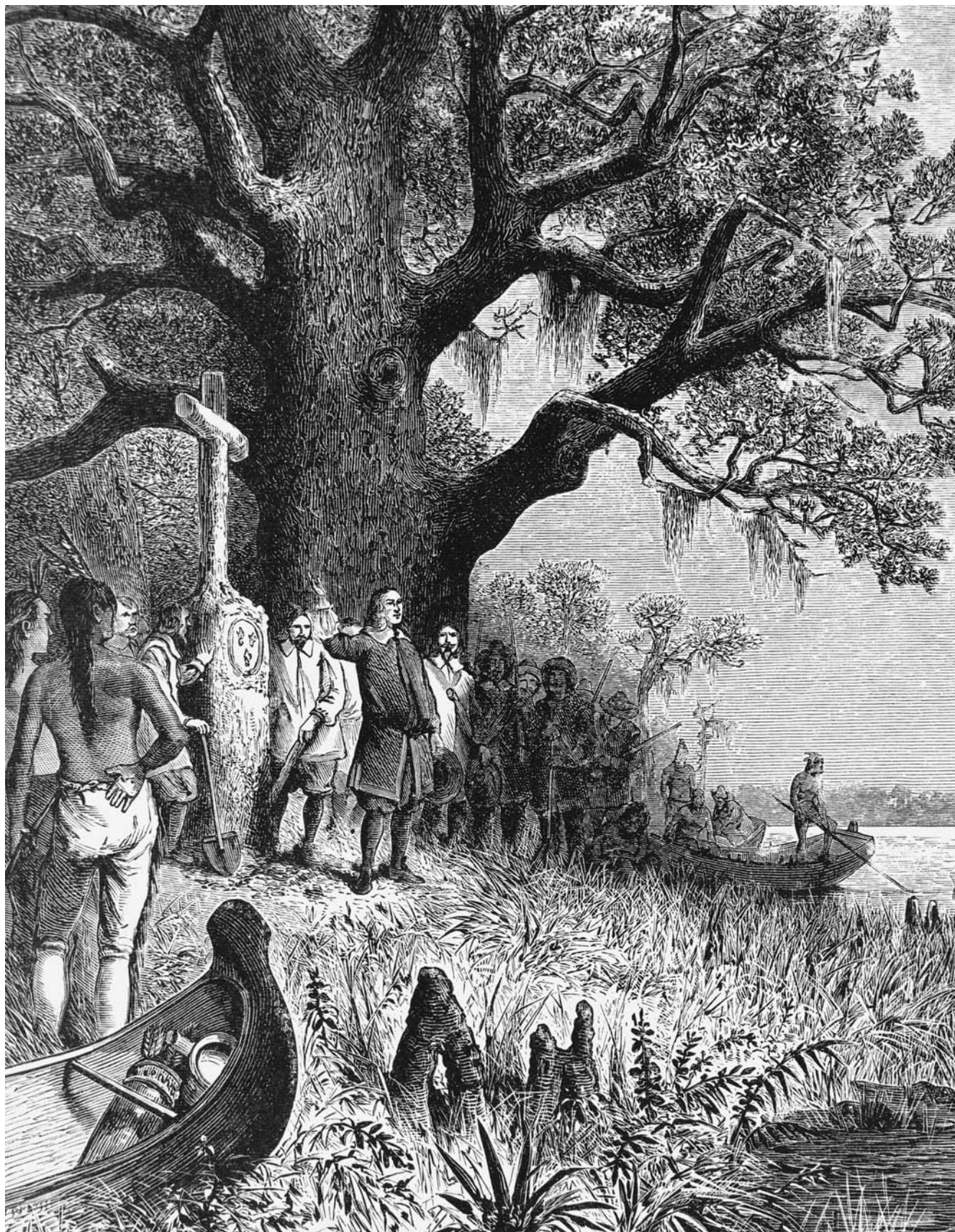
La Salle arrived in Quebec in 1666, where he soon secured a land grant near Montreal through family connections. From Indians who came to Montreal to trade, La Salle heard reports of a great river to the west that emptied into the sea. He speculated that this river flowed into the Gulf of California and, if found, would provide France with a water route from Canada to the Orient.

In summer 1669, La Salle made his first foray into the Great Lakes region. He departed Montreal with a group of missionaries and fur traders, including FRANÇOIS DOLLIER DE CASSON and RENÉ DE BRÉHANT DE GALINÉE, heading westward along the St. Lawrence River to Lake Ontario. He explored the south shore and inland regions of this body of water. At a Seneca Indian village near present-day Rochester, New York, a captive from an Ohio Valley tribe told him of great open prairie lands to the west.

Near Niagara Falls, La Salle encountered LOUIS JOLIET, returning from Lake Superior. La Salle left his companions and ventured southward into the Ohio Valley. According to his own account, he explored Lake Erie and located the Ohio River, which he explored as far as present-day Louisville, Kentucky. He may have reached as far west as the Illinois River.

In 1670, La Salle returned to Montreal and sought the French colonial government's support for his plan to establish a series of fur-trading posts between the Great Lakes and the upper MISSISSIPPI RIVER.

In 1673, Comte de Frontenac, the governor of New France, appointed La Salle commander of Fort Frontenac, a



René-Robert Cavelier de La Salle on the lower Mississippi River (*Library of Congress*)

post La Salle had established that year on the northeastern end of Lake Ontario, near the head of the St. Lawrence River (now the site of Kingston, Ontario). La Salle returned to France in 1674, where he received a grant of nobility from French king Louis XIV. Back in Canada, he developed the fur trade around Fort Frontenac. In 1677, La Salle made another trip to France and obtained royal authorization to explore the lands west of Lake Ontario and to develop the region's fur trade.

La Salle returned to Canada in 1678, accompanied by HENRI DE TONTI, who would become his chief lieutenant in subsequent explorations. In 1679, La Salle traveled to the eastern end of Lake Erie and established Fort Niagara (near present-day Buffalo, New York). He and Tonti directed the construction of the sailing ship the *Griffon*. Launched in August 1679, it was the first European-built sailing vessel to ply the Great Lakes west of Lake Ontario.

La Salle and his party sailed across Lake Erie to the Detroit River; northward to Lake St. Clair and the St. Clair River and into Lake Huron; then northward through the Straits of Mackinac into Lake Michigan. La Salle established a trading post at Green Bay on the west shore of the lake, then traveled by CANOE down Lake Michigan to its southern end and to the mouth of the St. Joseph River, where he established Fort Miami (present-day St. Joseph, Michigan).

Meanwhile, the *Griffon*, which had been sent back from Green Bay with a rich cargo of furs, failed to reach Fort Niagara. No trace of the ship has ever been found.

From Fort Miami, La Salle led the expedition across the Kankakee Portage to the Illinois River, where he established Fort Crèvecoeur (near present-day Peoria, Illinois). From Fort Crèvecoeur, La Salle dispatched the expedition's chaplain, Father LOUIS HENNEPIN, along with MICHEL ACO to explore the Wisconsin, Mississippi, and Minnesota Rivers to the north.

La Salle then undertook an early spring trek back to Fort Frontenac to obtain additional supplies, reaching the post after two months. In August 1680, he organized another expedition to Green Bay and Fort Crèvecoeur, this time traveling by canoe via Lake Simcoe to Lake Huron and Lake Michigan.

When La Salle finally reached Fort Crèvecoeur, he found it deserted. Tonti, who had been left in charge the year before, had fled with his men in the face of a new Indian uprising. La Salle met up with Tonti and the rest of his party at Mackinac in May 1681.

Early in 1682, La Salle was back at the Illinois River post, from where he launched an expedition to the Mississippi River. His party was delayed by ice and did not reach the Mississippi until February 1682. They descended the river, reaching the Gulf of Mexico on April 9, 1682. La Salle claimed the entire Mississippi Valley for France, naming the region Louisiana in honor of Louis XIV.

On the return trip up the Mississippi, La Salle initiated the construction of Fort St. Louis at Starved Rock on the Illinois River near what is now Ottawa, Illinois. He left Tonti in charge, then headed back up the Illinois River and returned to Montreal.

In 1683, La Salle traveled to France and reported his discoveries to King Louis. The king appointed La Salle viceroy of North America and authorized the founding of a fortress and colony at the mouth of the Mississippi River.

La Salle led a major colonizing expedition from France in late July 1684. He commanded four ships with more than 300 colonists, sailing from La Rochelle. One of the ships was soon captured by Spanish pirates. La Salle and his remaining three ships reached the Gulf Coast but missed the Mississippi Delta, landing instead at Matagorda Bay about 400 miles to the west, in present-day Texas, on February 20, 1685. Problems continued to plague the expedition. By the end of 1686, a second ship had been lost, and a third had departed for France with disenchanting colonists. In late winter 1686, the fourth ship, the *Belle*, was wrecked by a squall.

La Salle and his colonists established a settlement, Fort St. Louis. In 1685–86, he led several overland expeditions into central Texas, vainly looking for the Mississippi River. In March 1687, on still another third attempt to find the Mississippi from the Gulf Coast, his men mutinied. One of them killed him at an unknown site along the Brazos River. The Texas colony was abandoned, and the surviving settlers under HENRI JOUTEL returned on foot to Canada.

René-Robert Cavelier de la Salle's journeys to the western Great Lakes established an inland water route from the St. Lawrence River, leading to intensified exploration of the region and a new southern outlet for the French fur trade. Moreover, his exploration of the last 700 miles of the Mississippi River and his finding that it flowed into the Gulf of Mexico provided France with a southern base for its North American empire.

Laudonnière, René Goulain de (fl. 1560s)

French colonizer in South Carolina and Florida

René de Laudonnière was a French Huguenot who took part in JEAN RIBAUT's unsuccessful colonizing attempt on the South Carolina coast in 1562, along with artist JACQUES LE MOYNE DE MORGUES.

In 1564, Laudonnière abandoned the first site and commanded a second North American colonizing attempt on the St. Johns River, near present-day Jacksonville, Florida. They found Timucua Indians worshipping a stone monument that had been erected by Ribault when he had explored the region two years earlier. Laudonnière made an alliance with tribal leaders and enlisted their help in building his new settlement, Fort Caroline.

Hardship soon befell the French colonists. They declined to work or grow food, choosing instead to search for gold and precious stones. Laudonnière was forced to introduce rationing. The colonists mutinied and made two unsuccessful attempts on Laudonnière's life, first trying to poison him, then to blow him up with gunpowder.

Laudonnière's colony incurred the enmity of Spain when a group of colonists stole one of the ships, took it to Cuba, and attacked a Spanish GALLEON. The Spanish made plans for retaliation.

English privateer SIR JOHN HAWKINS visited Fort Caroline in August 1565; Laudonnière bought food supplies and a ship from him. That same month, Ribault arrived, with plans to take Laudonnière back to France to face charges of misconduct. In September, a large Spanish force under PEDRO MENÉNDEZ DE AVILÉS launched an attack against Laudonnière and his colony. Two-thirds of the colonists were killed. Laudonnière escaped by fleeing into the woods and was later rescued by an English ship. He returned to France in 1566, where he wrote an account of the French colonizing effort, *L'Histoire notable de la Floride* (Notable history of Florida), published in 1856.

Laudonnière's failed attempt at colonizing northern Florida put an end to French settlement on the east coast of the present United States. Spain continued to dominate the region for the next two centuries.

La Vérendrye, Louis-Joseph Gaultier de

(1717–1761) *French-Canadian fur trader on the upper Missouri River and northern plains, son of Pierre Gaultier de Varennes de La Vérendrye*

Son of French-Canadian explorer and soldier PIERRE GAULTIER DE VARENNES DE LA VÉRENDRYE, Louis-Joseph de La Vérendrye was born at Île aux Vaches on the St. Lawrence River in present-day Quebec.

In 1735, La Vérendrye joined his father in expanding the FUR TRADE westward into the Assiniboine River region of southern Manitoba, taking part in the establishment of Fort La Reine and Fort Maurepas. In 1738, he and his father traveled southward into present-day North Dakota, where they made the earliest fur-trading contacts with the Mandan Indians, visiting their villages on the MISSOURI RIVER (near modern Bismarck, North Dakota).

In 1739–40, La Vérendrye returned northward and circled Lake Winnipeg and reached the forks of the Saskatchewan River. In 1742, accompanied by his brother François and two other French fur traders, he set out south and west of the Mandan, hoping to locate a river leading to the Pacific coast. They possibly traveled as far west as the Black Hills in what is now western South Dakota or eastern Wyoming, before turning back along the Cheyenne and Bad Rivers. By late 1743, they were at an encampment near present-day Pierre, South Dakota.

La Vérendrye took part in French military actions against the Mohawk Indians in eastern Canada and northern New York in the last year of King George's War of 1744–48. He went on to fight in the French and Indian War of 1754–63, seeing action against the British and their Iroquois (Haudenosaunee) Indian allies in the Lake Champlain region. He died in a shipwreck off the north coast of Cape Breton Island in 1761.

Louis-Joseph de La Vérendrye led the first party of Europeans across the Missouri River and into the Great Plains, exploring what is now western Manitoba and western Minnesota, the Dakotas, Montana, Wyoming, and parts of the western Canadian provinces of Saskatchewan and Alberta. His western travels indicated to non-Indians the vast westward extent of the North American continent beyond the Great Lakes. On their return from the northern plains, the La Vérendrye brothers commemorated their western explorations by placing an engraved lead plaque on the prairie near the site of present-day Pierre, South Dakota. The plaque was found 270 years later, in 1913, by a group of schoolchildren on a field trip.

La Vérendrye, Pierre Gaultier de Varennes de (sieur de La Vérendrye) (1685–1749)

French-Canadian soldier and fur trader in central Canada and on the upper Missouri River, father of Louis-Joseph Gaultier de La Vérendrye

Pierre Gaultier de La Vérendrye was born at Trois Rivières in present-day Quebec, Canada, where his father, a French nobleman, served for a time as governor. At the age of 12, he entered the French army. He took part in that phase of the French and Indian Wars in North America known as Queen Anne's War of 1702–13, including the French raid on the English settlement at Deerfield, Massachusetts, in 1704.

La Vérendrye's military career then took him to Europe, where the conflict was known as the War of the Spanish Succession. At Flanders, in the Battle of Malplaquet in 1709, La Vérendrye was wounded and taken prisoner by the British. Released in 1710, he returned to Canada by 1712, where he married into a prominent French-Canadian family and settled on his wife's lands near Trois Rivières.

Starting about 1717, La Vérendrye operated out of Trois Rivières as a fur trader along the St. Maurice River to the north. In 1726, he went westward to join his brother, Jacques René, then in command of the fur-trading posts on the north shore of Lake Superior. La Vérendrye helped develop French influence over the FUR TRADE in the region around Lake Nipigon, and, by 1728, he had succeeded his brother as commander.

From Indians at Lake Nipigon, La Vérendrye heard reports of a west-flowing river that led into a "Western Sea," and he theorized that an inland gulf of the Pacific

Ocean could be reached by following this river westward. In 1729, he returned to Quebec and succeeded in gaining French governmental support to explore west of the Great Lakes in search of a NORTHWEST PASSAGE to the Pacific.

Starting in 1731, La Vérendrye, along with three of his sons (Jean-Baptiste, Pierre, and François) and a nephew (François-Christophe Dufrost de la Jémerais), undertook a series of expeditions from Lake Nipigon west to Rainy Lake, the Lake of the Woods, and the upper Red River. They established the first trading posts in this region and pioneered an improved CANOE route along the Pigeon River that became part of the Grand Portage, the gateway to the Canadian West.

La Vérendrye's eldest son, Jean-Baptiste, and a party of trappers were killed by Sioux (Dakota, Lakota, Nakota) Indians at Massacre Island on the Lake of the Woods in summer 1736. In 1738, La Vérendrye and his eldest surviving son, LOUIS-JOSEPH GAULTIER DE LA VÉRENDRYE, set out from Fort St. Charles, his post at the Lake of the Woods, and headed up the Red River to its junction with the Assiniboine River. There they established a post, Fort Rouge, near the site of what would become the city of Winnipeg, Manitoba. They explored Lake Winnipeg, then went south along the Red River into what is now North Dakota, reaching the Mandan Indian villages on the MISSOURI RIVER. On this expedition, they became the first non-Indians to cross overland west of the 100th meridian of longitude in what is now Canada. In 1739, while returning to Fort La Reine (Portage la Prairie), the La Vérendryes reportedly also became the first non-Indians to see Lake Manitoba.

After 1742, La Vérendrye organized and financed the expeditions of his sons across the Great Plains. In 1744, he gave up the fur trade and returned to Quebec. In 1749, the French government awarded him the Cross of St. Louis for his accomplishments as an explorer. His plans to set out again in search of the Western Sea were cut short by his death in Quebec.

Sieur de La Vérendrye's efforts to find the Northwest Passage and the Western Sea, while not successful in themselves, led to the development of fur-trading posts throughout southern Manitoba. He was among the first non-Indians to visit the Dakotas, and his explorations in that region led to the first maps of the upper Missouri River. La Vérendrye's sons, whose expeditions in the 1740s he supported, may have been the first non-Indians to explore what is now Wyoming and Montana.

Lawrence, Thomas Edward (T. E. Lawrence, Lawrence of Arabia, John Hume Ross, T. E. Shaw) (1888–1935) *British scholar, army officer in the Middle East* T. E. Lawrence was originally from Wales. At Oxford University, he studied Arabic literature and became interested in

Middle Eastern antiquities. In 1910, he first traveled to the Middle East and undertook a walking tour of Syria.

In 1911, Lawrence joined a British Museum archaeological expedition to the site of the ancient city of Carchemish, on the Euphrates River in what is now Syria, which he reached by ascending the Euphrates from the Persian Gulf. Two years later, in 1913, he began a year-long archaeological study of the northern part of the Sinai Peninsula, during which he learned much about the native bedouin way of life and learned to speak colloquial Arabic.

At the outbreak of World War I in 1914, Lawrence was attached to the British army's intelligence department in Cairo. In 1915, he undertook a mission up the NILE RIVER going as far as Asyut, where he evaluated the potential for an Arab uprising against Turkey, which was then allied with Germany and the Central Powers against Great Britain. The next year, he sailed across the RED SEA to the Arabian port of Jidda; soon afterward, he made contact with Hussein ibn Ali and his son Faisal ibn Hussein. Without direct British military support, he helped these Arab leaders raise an army, which waged a successful campaign against the Turks in the Hejaz region, the northwestern part of what is now Saudi Arabia. Arab forces under Lawrence destroyed vital links of the Turkish-run Hejaz Railroad and captured and occupied the strategically important port of Aqaba at the northern end of the Red Sea. While engaged in this campaign, Lawrence undertook explorations of the little-known Hejaz region, determining the longitude of important points along the railroad line and noting the territory's geological features.

For his efforts, Lawrence was promoted to major; by the war's end in 1918, he had been made a lieutenant colonel. That year, he rode into the Syrian capital of Damascus with the victorious Arab armies, and, in 1919, he attended the peace conference in Paris as a delegate representing Arab interests.

Lawrence served as an adviser on Arab affairs with the British Colonial Office in 1921–22. Although he had promised his Arab allies his support for their independence movement, when World War I ended, Turkish colonial rule was replaced with colonial rule by Great Britain and France.

Believing he had unwittingly betrayed his Arab comrades, Lawrence left public life and sought obscurity, enlisting in the Royal Air Force under the alias of John Hume Ross in 1922. He left that branch of the service after a year and entered the Royal Tank Corps, having legally changed his name to T. E. Shaw. In 1925, he transferred back to the Royal Air Force and was stationed at times on the northwestern frontier of India. In 1929, he proposed to the Royal Air Force a plan to use an AIRSHIP to explore the largely unknown Rub' al-Khali—the EMPTY QUARTER—of the southeastern Arabian Peninsula. Two years later, the desert was

explored by BERTRAM SYDNEY THOMAS, who crossed the region by camel.

Lawrence had written an account of his experiences in Arabia, *Revolt in the Desert*. Although the manuscript was first completed in 1919, Lawrence lost it in Paris that year and had to rewrite the entire work from memory. It appeared in 1927; an expanded version, *The Seven Pillars of Wisdom*, was published in 1935. That same year, Lawrence was killed in a motorcycle accident on an English country road.

Known as Lawrence of Arabia, T. E. Lawrence was one of the most enigmatic public figures of the first part of the 20th century. As an archaeological explorer turned military leader, he waged a victorious campaign on an all but forgotten front of World War I. His political dealings with the Arab leaders of what is now Iraq and Saudi Arabia had a long-range impact on relations between the people of the Middle East and the Western powers.

Lawson, John (unknown–1711) *British surveyor in the Carolinas*

The Englishman John Lawson arrived at Charleston in the Carolina colony in 1700. During the next several years, he explored the Santee River as far as present-day Columbia, South Carolina. From there, he traveled along Native American paths into North Carolina, as far as present-day Durham. In prior years, HENRY WOODWARD had opened up other trade routes to the west.

In 1708, Lawson was appointed surveyor general of North Carolina. Two years later, Lawson and Baron Christoph De Graffenried founded a settlement for Swiss colonists on the Neuse River called New Bern, in Tuscarora Indian country. In 1711, Lawson was captured and killed by Indians in the Tuscarora War.

John Lawson described his explorations in his 1709 book *A New Voyage to Carolina*. His penetration inland from the coast helped spark future settlement westward to the APPALACHIAN MOUNTAINS.

Lazarev, Mikhail Petrovich (1788–1851)
Russian naval officer in the South Pacific and Antarctica

In 1803, at the age of 15, Mikhail Petrovich Lazarev traveled to England, where, along with 30 other Russian naval cadets, he underwent five years of training with the British navy, serving on British warships in the Atlantic Ocean and in the Caribbean Sea.

Lazarev embarked on his first round-the-world voyage in 1813, sailing for the Russian fur-trading monopoly in Alaska, the RUSSIAN-AMERICAN COMPANY. Aboard the *Suvorov*, he sailed from the Russian Baltic Sea port of Kronstadt to the company's settlement of Sitka, off the coast of

Alaska's southeastern panhandle, and returned to Russia in 1816, completing a CIRCUMNAVIGATION OF THE WORLD.

Starting in 1819, Lazarev joined Russian navigator BARON FABIAN GOTTLIEB BENJAMIN VON BELLINGSHAUSEN on a voyage of exploration to the South Pacific Ocean and Antarctica in which he completed his second voyage around the world. In command of the *Mirny* (Peaceful), Lazarev accompanied Bellingshausen and the *Vostok* on a two-year expedition that reached as far south as 69° south latitude. With Bellingshausen, he made one of the earliest sightings of the Antarctic mainland and made the European discovery of two Antarctic islands, which they named after Russian monarchs Peter I and Alexander I. The Russian navigators later undertook an exploration of Antarctica's coastline during which they followed a course opposite to that taken by JAMES COOK in the 1770s, completing one of the earliest surveys of the Antarctic mainland.

In 1822, a year after he had returned from his voyage to Antarctica with Bellingshausen, Lazarev commanded the Russian frigate *Kreiser* on a third voyage around the world.

Lazarev went on to a distinguished career as a commander of Russian naval forces, taking part in naval operations against the Ottoman Empire in the Greek War of Independence, including the Battle of Navarino in 1827. He later commanded Russia's fleet in the Black Sea; in 1843, he was promoted to the rank of admiral.

Mikhail Petrovich Lazarev's career in exploration began with the FUR TRADE in Alaska and evolved into voyages of exploration in the South Pacific and Antarctica.

Leavenworth, Henry (1783–1834) *U.S. Army officer on the upper Mississippi frontier and southern plains*
Henry Leavenworth was born in New Haven, Connecticut. He spent his early years in Vermont, then moved to Delhi, New York, where he studied law. He was admitted to the New York State Bar in 1804, but he left his law practice for the army at the outbreak of the War of 1812. At the war's end, he resigned from the military at the rank of colonel.

After a brief period as a legislator in New York, Leavenworth rejoined the army in 1818. In 1819, he was sent to the upper MISSISSIPPI RIVER frontier, where he helped establish Fort Snelling at the confluence of the Mississippi and Minnesota Rivers, near present-day Minneapolis, Minnesota. For a time, it was the northwesternmost outpost of the United States.

In 1821, Leavenworth took command of Fort Atkinson on the MISSOURI RIVER near present-day Omaha, Nebraska. Two years later, he mounted a military expedition against the Arikara Indians on the Missouri, near the present-day border between North and South Dakota. In addition to regular army troops under Leavenworth, the operation included WILLIAM HENRY ASHLEY, JOSHUA PILCHER, and a

host of MOUNTAIN MEN known as the “Missouri Legion,” as well as about 400 Sioux (Dakota, Lakota, Nakota) warriors. In 1824, Leavenworth commanded U.S. troops on Lake Michigan at Green Bay. Three years later, he undertook a military expedition from St. Louis into what is now eastern Kansas, where he founded Fort Leavenworth on the Missouri River.

In 1834, Leavenworth was made a general and placed in command of the southwestern frontier. That year, in conjunction with Colonel HENRY DODGE, Leavenworth led an expedition of dragoons into the southern plains to establish peaceful relations with the Comanche and Kiowa Indians. He left Fort Gibson in the Indian Territory (present-day Oklahoma) and explored the upper Arkansas River and Red River region of what is now western Oklahoma and northern Texas. Traveling with this expedition was frontier artist GEORGE CATLIN.

During Leavenworth’s 1834 expedition to the southern plains, his men were stricken with “bilious fever.” Leavenworth himself became ill and died at an encampment on the Washita River in Oklahoma.

Henry Leavenworth’s military expeditions during the early 1820s were among the first organized explorations of the U.S. frontier following the War of 1812. He was instrumental in establishing the chain of frontier forts that ran from Fort Snelling on the upper Mississippi River in the north, to Fort Smith on the Arkansas River in the south. In addition, he established Fort Leavenworth in present-day Kansas, which became an important staging area for subsequent military explorations into the Southwest.

Lederer, John (fl. 1660s–1670s) *German physician, explorer of the Piedmont and Blue Ridge regions of the American Southeast, in service to colonial Virginia*

German physician John Lederer arrived in the Virginia colony in the 1660s. His interest in exploring the uncharted regions west of Virginia’s coastal plain soon came to the attention of the colonial governor, Sir William Berkeley.

With Berkeley’s support, Lederer embarked on three expeditions across the Virginia and Carolina Piedmont regions between 1669 and 1670. Berkeley, unsure of the extent of the North American continent, believed the Pacific coast and the gold and silver mines of Mexico were just beyond the western mountains, and he commissioned Lederer to find a route through the APPALACHIAN MOUNTAINS.

In March 1669, Lederer, with a small party, left Chickahominy, the English post near the headwaters of the York River, and traveled northwestward as far as the top of Eminent Hill, becoming the first non-Indians to see the mountains of the Blue Ridge.

In May 1670, Lederer’s second expedition left Fort Charles, the English settlement at present-day Richmond,

and followed the eastern slopes of the Blue Ridge southward into present-day North Carolina. The 21 non-Indians accompanying him turned back soon after leaving Fort Charles, but Lederer continued on with an Indian guide. He reportedly explored North Carolina as far as the Catawba River, near present-day Charlotte. According to his later account, Lederer crossed broad savannahs and a wide desert and came upon a large lake of brackish water.

In the course of his second expedition, Lederer had contact with displaced Erie Indians. From descriptions of their homeland, he wrongly deduced that they came from the Pacific coast of California, rather than from the eastern Great Lakes. In mid-July, he reached the Virginia frontier post, Fort Henry, on the Appomattox River.

Lederer’s third expedition started out from Talifer’s House, a settlement south of the Rappahannock River. With a party of 10 colonists and five Indians, he followed the Rappahannock River Valley northwestward, climbed the Blue Ridge, and sighted the Appalachians beyond the Shenandoah Valley.

In 1671, Lederer settled in Maryland. The next year, an account of his explorations was published in London, entitled *The Discoveries of John Lederer, in Three Several Marches from Virginia, to the West of Carolina, and Other Parts of the Continent*. . . . In addition to detailed descriptions of Southeast Indians, he included reports of an inland arm of the Pacific Ocean, or “South Sea,” which he believed could be reached by a pass through the Appalachians.

Although John Lederer failed to find a route through the Appalachians, he did ascertain the southern extent of the Blue Ridge into the Piedmont region of the Carolinas. His book, with its erroneous information on the geography of inland Virginia and the Carolinas, influenced mapmakers for the next century.

Ledyard, John (1751–1789) *American sailor in the South Pacific and South Atlantic, traveler in Siberia*

John Ledyard was born in Groton, Connecticut. He attended Dartmouth College in New Hampshire in 1772–73, but he left and lived with the Iroquois (Haudenosaunee) Indians for four months.

In 1774, Ledyard worked his way to England on a merchant ship. Two years later, as a British Royal Marine, he joined JAMES COOK’s third voyage of 1776–80. When the Cook expedition reached Unalaska Island in the Gulf of Alaska, Ledyard was sent ashore alone to meet with the Russian fur traders.

Ledyard returned to England in 1780, during the American Revolution. Two years later, he volunteered for service in America. Once there, he deserted from the British and hid out until the end of the war.

In 1783, Ledyard published one of the earliest accounts of Cook's third expedition, entitled *A Journal of Captain Cook's Last Voyage to the Pacific Ocean*.

Ledyard was among the first Americans to recognize the tremendous potential of the FUR TRADE with the Indians of the Pacific Northwest. Over the next several years, he tried unsuccessfully to get backing from New England merchants for a seaward expedition to the northwest coast of North America. He next traveled to England, then to France, where his plan was received with great enthusiasm by then U.S. foreign minister Thomas Jefferson and naval hero John Paul Jones. At Jefferson's suggestion, Ledyard revised his plan to include an overland journey from the Pacific coast of North America to the MISSISSIPPI RIVER, providing a transcontinental route for U.S. trade. Ledyard received some funding for his proposed journey through English naturalist SIR JOSEPH BANKS.

In December 1786, Ledyard left England for Hamburg, then walked across Scandinavia to St. Petersburg. Through the influence of Thomas Jefferson, he received official permission to cross Russia and traveled into SIBERIA with a Scottish doctor in the service of Russian empress Catherine the Great.

Ledyard reached Irkutsk, from where he traveled northward on the Lena River in a native boat. At Yakutsk, Russian officials arrested Ledyard, then deported him to Poland. His arrest and expulsion from Russia may have been at the prompting of Russian fur entrepreneur GRIGORY IVANOVICH SHELIKOV, who feared foreign encroachment in the Pacific coast fur trade. From Poland, Ledyard returned to London in 1788.

That year, the newly founded AFRICAN ASSOCIATION commissioned Ledyard to explore the SAHARA DESERT between Egypt and the NIGER RIVER. Ledyard reached Cairo, where he died of fever.

Ledyard was one of the earliest proponents of U.S. involvement in the lucrative Pacific Northwest fur trade. Fifteen years after his death, his writings and his unrealized plans gave impetus to the expedition of MERIWETHER LEWIS and WILLIAM CLARK organized by President Thomas Jefferson, as well as to JOHN JACOB ASTOR's enterprise to Astoria.

Legazpi, Miguel López de (Miguel López de Legaspi) (1510–1572) *Spanish mariner, conquistador in the Philippines*

Miguel López de Legazpi was born in Zubarraja, a town in the Basque province of Guipúzcoa on Spain's Atlantic coast. In 1545, after pursuing a career as a seafarer and navigator, he settled in Mexico, where he received an appointment as a minor official in the colonial government under Spanish viceroy Luis de Velasco.

In 1563, Legazpi was commissioned by King Philip II of Spain to command a small fleet on a voyage to the western Pacific Ocean, on the recommendation of a prominent Basque geographer and Augustinian friar, ANDRÉS DE URDANETA, who also accompanied him on the expedition. One of the principal objectives of the voyage was to locate new sources of spices in the EAST INDIES not yet under the control of Portugal. Another major aim was to assert Spain's dominion over islands explored on the earlier voyages of Spanish navigators FERDINAND MAGELLAN and JUAN SEBASTIÁN DEL CANO. Legazpi was also directed to find out at what latitude ships could regularly sail eastward across the Pacific. Until that time, the unfavorable winds in the known southern latitudes had made a passage eastward from Asian ports to the Pacific coasts of Spain's possessions in Mexico, CENTRAL AMERICA, and Peru nearly impossible for 16th-century sailing ships.

Legazpi and his fleet of five ships sailed westward into the Pacific from Navidad, Mexico, on November 21, 1564. He made landings in the Marianas (originally named the Ladrones, or "Thieves" Islands, by Magellan), where he declared formal Spanish possession of Saipan, Tinian, and Guam. He came upon some uncharted islands as well, including Los Barbudos (island of bearded men), known today as Mejit, in the Marshalls.

On February 13, 1565, Legazpi and his fleet arrived off the coast of Samar in the Philippines. Although it had been visited 44 years earlier by Magellan, who had been killed there in 1521, no permanent Spanish presence had yet been established. Without resorting to much armed force, Legazpi was soon able to bring the Filipino natives under Spanish colonial rule. The Spanish conquest of the Philippines was largely nonmilitary due to Legazpi's skill as a diplomat and because the Filipino natives did not have a strong central government with which to mount any organized resistance. San Miguel, the first permanent Spanish settlement and colonial capital, was established on the Philippine island of Cebu later in 1565.

On June 1, 1565, Legazpi sent one of his ships, the *San Pedro*, under the command of Felipe de Salcedo (with Urdaneta as navigator), back toward Mexico in an attempt to find out at what latitude a successful eastward crossing of the Pacific could be made. Unknown to Legazpi at that time, another one of his ships, the *San Lucas*, under the command of Alonso de Arellano, which had become separated from the fleet on the outward bound voyage, was already returning eastward across the Pacific. It arrived back in Navidad on August 8, 1565, having been greatly aided by the northeastward-flowing Japan Current. Salcedo and Urdaneta, who had also ridden the Japan Current, arrived one month later at San Miguel Island off the California coast, from where they soon reached Acapulco, Mexico.

Meanwhile, back in the Philippines, Legazpi continued to expand Spanish hegemony over the region and succeeded in bringing most of the islands under the control of his centralized colonial administration by 1571. That year, he occupied the large northern Philippine island of Luzon, where he established Manila as the new capital. He died there of a stroke the following year.

Miguel López de Legazpi completed the Spanish conquest of the Philippines in less than six years. His important role in the history of the Philippines is commemorated in the city on the southern end of Luzon that bears his name. Spain remained in control of the islands for the next 227 years, until forced to cede them to the United States at the conclusion of the Spanish-American War in 1898. Until that time, the Philippines served as Spain's most important link in its trade with Asia. The charting of an eastward sea route across the Pacific to California and Mexico enabled Spain to establish direct trade links with the Far East through its American colonies. By the 1580s, an annual commercial fleet known as the Manila Galleon was sailing eastward through the latitudes of the Japan Current, carrying valuable cargoes from the Orient to Mexico and Panama for trans-shipment to Spain.

Leichhardt, Friedrich Wilhelm Ludwig

(1813–ca. 1848) *German naturalist in northern Australia*
Ludwig Leichhardt was born in the northern German city of Trebatch, in what was then the Prussian province of Brandenburg. In 1831, he began two years of study at the University of Berlin, studying natural science, and in 1833, he attended the University of Göttingen. He returned to the University of Berlin in 1834 for two more years. Leichhardt soon entered the Prussian army, but he deserted sometime before 1842. That year, he arrived in Sydney, Australia, around which he studied rocks, animals, and plants. He also tried without success to obtain the support of SIR THOMAS LIVINGSTONE MITCHELL, surveyor general of New South Wales, for a proposed exploration into the northeastern part of Australia.

Leichhardt next sought backing from private sources. At that time, commercial interests in Sydney hoped to develop the natural harbor at Port Essington, on Australia's north coast, near present-day Darwin, in order to create a trade link with India. For Sydney businessmen to reap any benefit, an overland route northwest to the Gulf of Carpentaria first had to be established, and this was precisely what Leichhardt proposed to do. After receiving the financial support he needed for the project, he undertook a preliminary journey in 1843, traveling overland by foot from Newcastle, north of Sydney, 480 miles northward along Australia's east coast to Moreton Bay, near present-day Brisbane. In the course of this expedition, he undertook botanical and geological studies.

In August 1844, Leichhardt set out on his exploration of northern Australia. He first sailed from Sydney to Moreton Bay, where he met up with ornithologist John Gilbert, who was to be the expedition's naturalist. On October 1, he left Jimbour, in the Darling Downs region west of Brisbane, accompanied by Gilbert, two Aborigine guides named Charley Fisher and Harry Brown, plus four other men.

Since his small party could not carry a large supply of water, Leichhardt planned to travel along a route that took them no more than 10 miles from a river. Accordingly, they followed the Condamine River to its headwaters, then proceeded northwestward, along the eastern slopes of the GREAT DIVIDING RANGE, to the Burdekin and Warrego Rivers. They eventually reached the Cape York Peninsula, and, in June 1845, after descending the Mitchell River, they arrived on the shores of the Gulf of Carpentaria. It was during this part of the journey that John Gilbert was killed in an attack by Aborigines, and two other members of the party were wounded.

Although critically short on supplies and two of his expedition having been injured, Leichhardt pushed onward along the south coast of the Gulf of Carpentaria. After traversing the heart of Arnhem Land, he reached Van Diemen Gulf and Port Essington on December 17, 1845, where the expedition was met by a ship that took them back to Moreton Bay.

Leichhardt returned to Sydney in March 1846. The news of his successful 3,000-mile trek across northeastern Australia quickly brought him fame, and he soon received word that the king of Prussia, in recognition of his accomplishment as an explorer, had granted him a royal pardon for his earlier desertion. In addition, for making the first overland crossing from Queensland to the north coast, Leichhardt was awarded a sizable cash prize. Although he had followed a circuitous route, not feasible for commercial purposes, he had accomplished the European discovery of uncharted rivers and, more importantly, large tracts of fertile grazing lands in the interior of northern Queensland. His account of this exploit, *Journal of an Overland Expedition in Australia from Moreton Bay to Port Essington*, was published in 1847.

In December 1846, Leichhardt again left Moreton Bay on an expedition in which he hoped to explore the east, north, and west coasts of Australia. Within six months, after traveling northward about 500 miles as far as the TROPIC OF CAPRICORN, he was forced to turn back because of food shortages.

Undaunted by this setback, Leichhardt soon made another attempt at the first east-to-west crossing of the Australian continent. His eight-man expedition, including a relative named Adolf Classen, was equipped with 77 pack animals. They left McPherson Station west of Brisbane in April 1848, planning to follow a route that

Surveyor General Mitchell had previously taken into the Barcoo River region, then head southwestward and eventually reach the Swan River and Perth on the southwest coast. Leichhardt and his expedition were never heard from again.

The disappearance of Ludwig Leichhardt and his companions remains one of the great unsolved mysteries of Australian exploration. It inspired numerous expeditions, including one undertaken by SIR AUGUSTUS CHARLES GREGORY in 1855 and another by JOHN FORREST in 1869. Although his critics often cited his incompetence as a planner and leader as the reason behind the failure of his 1846 expedition, as well as the probable cause of his final failure, Leichhardt is nevertheless credited with making the first European crossing of northeastern Australia and revealing the region's great potential for agricultural development. The Leichhardt River in northern Queensland was named in his honor.

Leif Ericsson See ERICSSON, LEIF.

Le Maire, Jakob (Jacob le Maire, Jacques le Maire, James le Maire, Jacob la Maire)

(ca. 1565–1616) *Dutch mariner in the South Atlantic and South Pacific*

Born in Holland, Jakob Le Maire was the son of Amsterdam merchant Isaac Le Maire. The elder Le Maire was born in the city of Tournai in what is now western Belgium but, as a Jew, had been forced to flee to Amsterdam after the onset of the religious persecutions of non-Catholics instituted by Fernando Álvarez de Toledo, the duke of Alba, during the early 1570s.

In Amsterdam, Isaac Le Maire prospered as a merchant engaged in overseas trade, becoming the largest shareholder of the DUTCH EAST INDIA COMPANY by 1602. He soon became disenchanted with the Dutch East India Company's stranglehold on foreign commerce, which it exercised through its domination of the trade routes to the Far East by way of both the CAPE OF GOOD HOPE and the STRAIT OF MAGELLAN. In 1610, with the support of the Dutch legislature, the States-General, he formed a new firm, the Australian Company, chartered to engage in trade with China, Tartary (northeastern Asia), Japan, New Holland (Australia), and the islands of the South Pacific. In 1615, Isaac Le Maire organized an expedition to find an alternate route from Europe to the Pacific and Indian oceans, hoping to circumvent the Dutch East India Company's monopoly over both the Cape of Good Hope and Strait of Magellan sea routes to India and the Far East. Much of the financing for the enterprise came from leading businessmen of the city of Hoorn in northern Holland.

Jakob Le Maire, named director general of the enterprise, was joined in the voyage by his brother Daniel Le Maire and by WILLEM CORNELIS SCHOUTEN, a native of Hoorn and an experienced navigator. Based on reports of an earlier voyage to the South Atlantic undertaken by SIR FRANCIS DRAKE, Schouten believed that a passage into the Pacific could be found south of the Strait of Magellan.

Equipped with two ships, the *Eendracht* and the smaller *Hoorn*, Le Maire and Schouten set sail from Hoorn on June 15, 1615. They made a stop at Sierra Leone on the coast of West Africa, where they took on a cargo of lemons, used on the voyage to prevent SCURVY among the crew. They then sailed to Puerto Deseado on the Patagonian coast of southeastern South America to make repairs. While there, the *Hoorn* accidentally caught fire and burned to the waterline, whereupon the crew and salvageable supplies were transferred to the *Eendracht*.

Le Maire and Schouten continued southward along the east coast of South America, beyond the entrance to the Strait of Magellan. On January 25, 1616, they sighted what they believed was the coast of a large southern landmass, which they called Staten Landt, later known as Staten Island (Esla de los Estados) after its insularity was revealed by subsequent navigators. They soon located an eight-mile-wide strait separating Staten Island from the mainland of Tierra del Fuego, and passed through it. (It later became known as Le Maire Strait.) Proceeding westward, they rounded a point of land extending from an island. This they named Cape Hoorn (later modified to CAPE HORN) after Schouten's hometown, whose leading citizens had provided much of the financing for the expedition. The island became known as Horn Island.

Le Maire and Schouten, on finding that the mainland extended to the north, realized that they had indeed located an uncharted sea route into the Pacific. Off the coast of Chile, they made the European discovery of the Juan Fernandez Islands, and, unable to continue farther northward because of unfavorable winds, headed westward toward the Orient. On the transpacific voyage, they came upon some uncharted islands of the Tuamotu group, as well as the Horn Islands and the Coco Islands of what later came to be known as Samoa. After stops at Fiji, where they came into contact with natives, they continued westward into the islands of Melanesia. Le Maire and Schouten incorrectly surmised that the long, narrow island of New Ireland was an extension of Terra Australis, the much-sought-after GREAT SOUTHERN CONTINENT, thought by 17th-century geographers to exist in the extreme southern latitudes.

On September 17, 1616, the expedition reached the island of Ternate in the SPICE ISLANDS (the Moluccas) of present-day Indonesia; at the end of the following month it arrived at the Dutch East India Company port of Batavia (present-day Jakarta) on Java. Jan Pieterzoon Coen, the

Dutch East India Company governor at Batavia, discounted as untrue Le Maire and Schouten's account that they had located a passage into the Pacific south of the Strait of Magellan. Believing that they had actually used the Strait of Magellan without the company's permission, Coen confiscated the *Eendracht* and had Le Maire and Schouten sent back to the Netherlands under arrest.

Although Le Maire died on the homeward voyage, his brother Daniel and Schouten pleaded the case before the Dutch legislature, and, with the help of Isaac Le Maire, recovered their ship and its cargo from the Dutch East India Company. Subsequent expeditions proved that the channel located on their 1615–16 voyage indeed provided a new passage into the Pacific. It was named Le Maire Strait in his honor.

Jakob Le Maire commanded the second European expedition to round Cape Horn after Drake and successfully navigate through the maelstrom caused by the collision of waters flowing from the Pacific and Atlantic oceans and the Antarctic seas. His subsequent explorations in the western Pacific revealed the eastern extent of the large island of New Guinea. Most significantly, in rounding Cape Horn, he showed that South America was not contiguous with any landmass to the south and provided European mariners with a sea passage into the Pacific as an alternative to the winding and treacherous 370-mile-long Strait of Magellan. A Dutch mission in 1675 under the German SIGISMUND NIEBUHR thoroughly charted Le Maire Strait and made depth soundings.

Le Moyne, Jean-Baptiste (sieur de Bienville)

(1680–1768) *French colonizer of the lower Mississippi River, brother of Pierre Le Moyne, sieur d'Iberville*

Jean Baptiste Le Moyne, sieur de Bienville, was born in Ville-Marie near Montreal, Quebec. He was the son of French colonial leader Charles Le Moyne and brother of French naval commander PIERRE LE MOYNE, sieur d'Iberville.

Bienville served as a midshipman under his brother Iberville during King William's War of 1689–97, taking part in raids against British fur-trading posts on HUDSON BAY. In 1698, with his brother, he received a patent to colonize the lower MISSISSIPPI RIVER region and locate that river's mouth in the Gulf of Mexico.

The brothers set sail for the Gulf of Mexico in late 1698, leading an expedition of four ships with 200 colonists and soldiers. They landed at Dauphin Island in Mobile Bay in March 1699. From there, Bienville and Iberville left the main contingent of colonists and, with a company of 50 men traveling by CANOE and longboat, explored the Gulf Coast westward until they reached the actual mouth of the Mississippi. A group of Indians they encountered in the region showed them a letter written by explorer HENRI DE

TONTI and left for RENÉ-ROBERT CAVELIER DE LA SALLE, some 13 years earlier. (Tonti would later help in establishing settlements in the region.) Bienville and Iberville continued to explore the lower Mississippi for a distance of about 100 miles upriver before returning to the Gulf.

In 1700, the brothers established a permanent settlement on Dauphin Island in Biloxi Bay, then known as Massacre Island because of the large number of bleached human bones found there. Iberville returned to France for supplies and more colonists, leaving Bienville in charge.

In 1700–02, Bienville continued to explore the interior of the lower Mississippi Valley and also penetrated to the west into the Red River region of present-day northeastern Texas. During that time, Bienville moved the settlement from Dauphin Island to the mainland, where he founded Fort Maurepas on the site of present-day Ocean Springs, Mississippi. Other settlements were also established, including Fort de la Boulaye in 1707, the first permanent French settlement in what is now the state of Louisiana, south of what is now New Orleans; and Fort Louis, on the site of what is now Mobile, Alabama, at the head of Mobile Bay, in 1710 (renamed Fort Conde in 1720).

Iberville returned to the Mobile Bay colony briefly in 1702, but he soon left again for France to obtain support for



Jean-Baptiste Le Moyne, sieur de Bienville (Library of Congress)

a military campaign against the Spanish in Florida and the British along the southeast Atlantic coast. He never returned to the French Gulf Coast settlements, dying in Havana, Cuba, from yellow fever in 1706. Bienville assumed leadership of French Louisiana, as the area became known.

ANTOINE LAUMET DE LA MOTHE, sieur de Cadillac, was appointed to the governorship in 1712, but Bienville continued to serve in a leadership capacity. In 1714, he explored the Alabama River and established Fort Toulouse at the junctions of the Coosa and Tallapoosa Rivers, which developed into an important fur-trading center in the early 18th century.

As a military leader, Bienville conducted several campaigns against the Natchez and Chickasaw Indians. During one such campaign in 1716, he established Fort Rosalie on the site of what was to become the modern city of Natchez, Mississippi. He was appointed governor of Louisiana in 1717.

In 1718, Bienville realized his long-sought-after goal of establishing a permanent settlement at the Indian portage between Lake Pontchartrain and the Mississippi River. This settlement of New Orleans became the capital of French Louisiana three years later.

Administrative differences and internal conflicts with the colonists led to Bienville's recall as governor of Louisiana in 1725. He lived in France until he was eventually reinstated in 1732.

In 1736, back in North America, Bienville led a military expedition of 600 French soldiers, along with 1,000 Choctaw auxiliaries, northward along the Tombigbee River. His objective was to join up with another French force heading southward down the Mississippi to the Chickasaw stronghold in western Tennessee. But both French columns were defeated in separate engagements with the Indians. During this campaign, a settlement in the interior of Alabama, Fort Tombigbee, was established. In 1739, Bienville attempted yet another, larger invasion of Chickasaw lands, which was abandoned because of heavy rains.

In 1742, Bienville departed Louisiana for France, where he remained for the rest of his life. In 1763, he unsuccessfully lobbied against the cession of French Louisiana to Spain.

By establishing numerous forts and settlements along the Mississippi Gulf Coast, including the city of New Orleans, Jean-Baptiste Le Moyne, sieur de Bienville, helped open the way for French settlement into Alabama, Tennessee, and Arkansas. His influence also extended to the legal and governmental system of Louisiana, even after that region became part of the United States in 1803.

Le Moyne, Pierre (sieur d'Iberville) (1661–1706)

French naval officer on the lower Mississippi River, brother of Jean-Baptiste Le Moyne, sieur de Bienville

Pierre Le Moyne, sieur d'Iberville, was born in the Ville Marie section of Montreal to a prominent French colonial

family. In 1675, he was commissioned an officer in the French navy.

In September 1697, during King William's War of 1689–97, Iberville led French naval campaigns against the British throughout northeastern North America. He also undertook several overland military expeditions from Montreal through the wilderness to HUDSON BAY and James Bay.

In 1698, Iberville was granted a patent by French king Louis XIV to establish a French colony at the mouth of the MISSISSIPPI RIVER. RENÉ-ROBERT CAVELIER DE LA SALLE had failed to do so in his attempt 13 years earlier.

In October 1698, Iberville sailed from Brest, France, in command of the *Badine* and the *Marin*, plus two smaller vessels. His small fleet carried about 200 French colonists. Iberville's brother, JEAN-BAPTISTE LE MOYNE, sieur de Bienville, was second in command of the expedition.

Iberville and his fleet stopped first at Santo Domingo and, in January 1699, they landed at Pensacola Bay. He continued westward along the Gulf Coast and located and named Mobile Bay, where he established Fort Louis de Mobile. At the mouth of the bay, Iberville explored an island with piles of bleached human bones, and named it Massacre Island (later Dauphin Island). Off the coast of present-day Mississippi, he located and named Cat Island and Ship Island. He left the two larger ships and the colonists at Ship Island and continued his explorations with the two smaller vessels.

Iberville located the Mississippi's outlet to the Gulf of Mexico on March 3, 1699. He encamped at a place he named Mardi Gras Island, then explored upriver as far as the mouth of the Ohio River.

On Iberville's return to the Mississippi Delta, he established a settlement called Fort de la Boulaye, 40 miles below the future site of New Orleans. On the way to the Gulf, he made the European discovery of Lake Pontchartrain, which he named in honor of Louis Phelypeaux, comte de Pontchartrain, head of the French navy.

Iberville returned to the main body of his expedition at Ship Island and took the colonists to the mainland, where they established the first permanent French settlement in French Louisiana. Called Fort Maurepas or Old Biloxi, it was located at the present-day site of Ocean Springs, Mississippi.

Iberville sailed to France later in 1699, but he returned to the Gulf of Mexico in 1700 and 1701. He established additional settlements at Biloxi Bay, at present-day Mobile, Alabama, and on Dauphin Island.

At the outbreak of the War of the Spanish Succession in 1702, Iberville returned to active service in the French navy, whereupon Bienville assumed charge of the Louisiana colony. Iberville never returned to Louisiana. He contracted yellow fever while serving in the Caribbean and died aboard his ship in Havana harbor in 1706.

Pierre Le Moyne, sieur d'Iberville, along with his brother Bienville, made the first European approach to the mouth of the Mississippi River from the Gulf of Mexico, henceforth providing New France with another trade route to the sea. Iberville reestablished French sovereignty over Louisiana and the lower Mississippi Valley and founded the first permanent settlements along the Gulf Coast of what is now Alabama, Mississippi, and Louisiana.

Le Moyne, Simon (Ouane) (1604–1665)

French missionary in Quebec and upstate New York

Simon Le Moyne was born in the French cathedral town of Beauvais, north of Paris. After entering the Jesuit order at the age of 18, he undertook a course of study in philosophy at the College de Clermont in Paris. Starting in 1627, he taught for 10 years at the Jesuit college in Rouen, and, in 1637, he took holy orders, committing himself to a career as a Jesuit missionary priest.

In June 1638, Le Moyne arrived in Quebec; less than two months later, he headed westward into Huron (Wyandot) country with Indian guides. His guides soon deserted him, and he was left in the wilderness with another Frenchman. They wandered in the forest, surviving on whatever they could hunt, until, after about two weeks, a Jesuit associate, Father François du Peron, came upon them. With his party, they continued to the Huron villages on the east shore of Lake Huron's Georgian Bay.

Known as "Ouane" by the Huron, Le Moyne lived among them until 1649, when he was compelled to return to Quebec at the outbreak of war between the Huron and tribes of the Iroquois Confederacy. He served at the Jesuit center at Trois-Rivières, where he studied the Iroquoian and Algonquian languages.

Le Moyne's ability to deal with Indians was again called upon in 1654, when he led a diplomatic mission to the Iroquois (Haudenosaunee) Indians. Departing Quebec in early July of that year, he reached the headquarters of the Iroquois Confederacy in the lands of the Onondaga in present-day upstate New York, where he remained most of the summer. On his return to Quebec in September 1654, he reported having visited a saltwater lake fed by a salt spring near the Onondaga village, which the Onondaga believed to be inhabited by an evil spirit because of the strange taste of the water.

During the next seven years, Le Moyne made five more trips into the lands of the Iroquois, successfully establishing ties with some prominent tribal leaders and obtaining permission to send Jesuit missionaries into the region. He was also instrumental in winning the release of several dozen French captives, who otherwise would have been tortured and burned at the stake.

The saltwater lake that Simon Le Moyne visited on his 1654 journey is known today as Lake Onondaga; it spurred the development of the region's salt-making industry in the early 19th century and led to the growth of the adjacent central New York State city of Syracuse. Le Moyne College, a Jesuit-run institution in Syracuse, was named in his honor.

Le Moyne de Morgues, Jacques (Jacques le Moine) (d. 1588) *French artist, colonist in Florida*

French artist Jacques Le Moyne was a member of the French colonizing expedition under RENÉ GOULAIN DE LAUDONNIÈRE to North America. With Laudonnière, he helped establish Fort Caroline near present-day Jacksonville, Florida, in 1564. Over the next 15 months, he made drawings of the Indians, plants, and animals of northern Florida.

Le Moyne survived a Spanish attack under PEDRO MENÉNDEZ DE AVILÉS on the Fort Caroline settlement in September 1565, in which most of the inhabitants were massacred. He fled with the other survivors into the woods and was later rescued by an English ship. He sailed to England with his rescuers and subsequently settled there. He produced paintings of the unique animals and plants he had seen and sketched in Florida, as well as depictions of the Indians. Flemish artist Theodore de Bry made engravings from Le Moyne's watercolors, which appeared as illustrations for an account of the Fort Caroline colony, written by the expedition's carpenter, Nicolas le Challeux. In England, Le Moyne's paintings came to the attention of SIR HUMPHREY GILBERT and his half brother SIR WALTER RALEIGH, probably giving impetus to their later colonizing efforts in Virginia.

Jacques Le Moyne was the first European artist to paint scenes in what is now the continental United States. His work led to continuing European interest in the exploration of North America.

Lenz, Oskar (Oscar Lenz) (1848–1925)

German explorer in Africa

Oskar Lenz was born in the German city of Leipzig. Soon after completing his education, which included training as a geologist, he traveled to Africa, where, over the next 13 years, he undertook a series of expeditions that penetrated deep into the continent's little-known interior regions.

Lenz's first African expedition began in 1874 at the mouth of Gabon's Ogowe River on the Atlantic coast of central Africa. For three years, he traveled up the Ogowe, along a route that took him eastward, just south of the equator, toward the lower CONGO RIVER (Zaire River).

Lenz next turned his attention northward to the SAHARA DESERT. In 1879, he set out from the North African port of Casablanca in Morocco and traveled southward into

high country. He then made a southward crossing of the Sahara, reaching TIMBUKTU in what is now the West African nation of Mali in 1880, having traversed more than 1,500 miles of rugged mountain and desert terrain.

After a three-week stay in Timbuktu, Lenz began his return journey. He followed the NIGER RIVER westward, then made an overland crossing to the Senegal River, which he followed to the coast of West Africa.

Lenz's most extensive exploration of Africa began in 1885, when he set out from the mouth of the Congo River in command of a relief expedition sent to aid German explorer WILHELM JOHANN JUNKER and his companions, who were trapped in the southern Sudan region by the outbreak of the Mahdi revolt in Egypt. After ascending the Congo into the African interior, Lenz located its confluence with the Lualaba, which he followed to its headwaters. He then traveled overland to the northern end of Lake Tanganyika. Unable to reach Junker and his party, Lenz led his expedition to Lake Nyasa (Lake Malawi), and from there reached the coast of East Africa and the Indian Ocean in 1887.

Oskar Lenz spent his last years in the Austrian town of Sooz. In his 1879–80 Sahara expedition from Casablanca to Timbuktu, he duplicated in reverse the journey of RENÉ-AUGUSTE CAILLIÉ, who had reached the fabled city from the coast of West Africa a half-century earlier. Lenz's 1885–87 cross-continental expedition up the Congo River and across the width of Africa also partly retraced, in the opposite direction, the route taken by SIR HENRY MORTON STANLEY, who had descended the Congo in 1876–77. Lenz was among the few 19th-century African explorers to venture into both the Saharan and sub-Saharan regions of the continent.

Leo Africanus (Leo the African, John Leo de Medicis, Giovanni Leone, Johannes Leo, al-Hassan ibn Muhammed al-Wazzan al-Zaiyati, el-Hasen ben Muhammed el-Wazzan- ez-Zayyati)

(ca. 1485–ca. 1554) *Arab diplomat, traveler in Africa and Asia*

Leo Africanus was born al-Hassan ibn Muhammed in the Moorish city of Granada, Spain. After the reconquest of Spain by Christian forces in 1492, he fled with his Muslim family to Fez, Morocco, where he was educated.

Trained in law and science, Leo Africanus entered the diplomatic service of the sultan of Morocco in about 1507, and, in that capacity, he traveled widely throughout northern and central Africa. He also undertook diplomatic expeditions to the Middle East and central Asia, journeying as far as Armenia, according to his later account.

In 1512–14, Leo Africanus made several journeys across the SAHARA DESERT to TIMBUKTU on the NIGER RIVER in what is now Mali. On one trip to Timbuktu, he returned to

Egypt by way of Lake Chad, thus practically traversing the width of the African continent.

In 1518, while returning to Morocco from an official visit to the sultan of the Ottoman Empire in Constantinople (present-day Istanbul, Turkey), Leo Africanus was captured by the Sicilian pirate Pietro Bovadiglia and taken to Italy. In Rome, he was presented as a slave to Pope Leo X, who freed him on learning of his background. Leo Africanus remained near the Vatican, where for two years he was tutored by three bishops in Latin, Italian, and the basic principles of Catholicism.

In 1520, Leo Africanus was converted to Christianity in a ceremony at St. Peter's Church at the Vatican, during which he was personally baptized by Pope Leo, who bestowed his own Christian name upon him, Giovanni Leone (John Leo) de Medicis. Afterward, he was also known as Johannes Leo, but he was commonly referred to as Leo Africanus, Latin for "Leo the African."

Over the next nine years, Leo Africanus taught Arabic in Rome and wrote of his travels throughout Africa and Asia. In 1526, he published an account of his African travels, entitled *Descrittione dell' Africa et delle cose notabili che quivi sono* (published in English as *A Geographical Historie of Africa* in 1600, now commonly known as *Description of Africa*). In 1529, he was allowed to leave Italy and returned to Africa, eventually settling in Tunis, where he re-embraced the Islamic faith.

In 1559, an account by Leo Africanus was published of the wealth to be found in the West African caravan trading center of Timbuktu. Through his writings, Timbuktu soon earned a reputation in Europe as a city of fabulous riches.

An English edition of Leo Africanus's writings on Africa first appeared in 1600. For many years afterward, this work was the primary source of geographic knowledge of Africa south of the Sahara, a region known as the Sudan.

León, Alonso de (ca. 1640–1691) *Mexican army officer, colonial administrator in Texas, in service to Spain*

Alonso de León was a native of Mexico. He became a career officer with Spanish colonial forces in northern Mexico, rising to the rank of captain. In about 1680, he was named colonial governor of the northeastern province of Coahuila, just south of the Rio Grande. Over the next several years, he commanded a series of exploring expeditions into the neighboring Nuevo León region to the east.

In 1689, León was directed to investigate reports received by Mexico's chief colonial administrator, the Count of Galve, that the French were establishing settlements on the Gulf Coast, north of the Rio Grande, on lands claimed by Spain. He set out from Monclova, the provincial capital of Coahuila, in command of a small military force, and, after a northeastward trek across the desert region of what is

now southeasternmost Texas, he arrived on the Gulf Coast, about midway between Corpus Christi and Matagorda Bay.

At a site identified as San Bernardo Bay (known later as Lavaca Bay), León came upon a fort and, based on information provided by local Indians, soon located a party of Frenchmen nearby. His men managed to capture two of the French settlers, Jacques Grollet and Jean l'Archevêque, who were survivors of RENÉ-ROBERT CAVELIER DE LA SALLE's last expedition to North America. Placed under arrest, they were taken to Mexico City and later sent to Spain. Meanwhile, León burned the French base, Fort St. Louis, which had been established five years earlier by La Salle.

In 1690, under orders from the king of Spain, León commanded a second and larger expedition into eastern Texas, planning to set up additional presidios and missions to discourage further French encroachment from the lower Mississippi Valley. Later that year, León and Father Damian Massanet founded the San Francisco de los Tejas Mission in the Neches River region near Houston, and, in 1691, they established Santísimo Nombre de María nearby.

León's harsh treatment of the Tejas Indians soon provoked a native uprising against the Mexican colonists, and by 1693, nearly all the missions he had established were destroyed. That year, he was recalled from office. He went on to found the city of Cadereita in the newly organized Mexican province of Nuevo León.

In his earlier contact with the French in Texas in 1688, Alonso de León stemmed the short-lived attempt by French settlers to colonize the region, which had been inadvertently begun by La Salle in the course of his last expedition of 1684–87. Although León's own missions and presidios also were short-lived, they were among the earliest European attempts at settlement in the interior of eastern Texas.

León, Francisco de Montejo y See MONTEJO Y LEÓN, FRANCISCO DE.

León, Juan Ponce de See PONCE DE LEÓN, JUAN.

Leonard, Zenas (1809–1857) *American fur trader in the American West*

Zenas Leonard was originally from the central Pennsylvania town of Clearfield. In 1820, he left home to work at his uncle's store in Pittsburgh.

In 1830, Leonard headed westward for St. Louis; the next year, he joined a fur-trading expedition up the MISSOURI RIVER and into the northern ROCKY MOUNTAINS. He took part in the annual fur trappers' rendezvous at Pierre's Hole in the Teton Mountains in summer 1832, where he helped fight off an Indian attack on July 18.

At the summer 1833 rendezvous on the Green River, near the present Wyoming-Utah border, Leonard joined Captain BENJAMIN LOUIS EULALIE DE BONNEVILLE's expedition into the central Rockies. As part of a contingent of MOUNTAIN MEN led by JOSEPH REDDEFORD WALKER, Leonard explored the unknown regions of northern Utah and Nevada. The group traveled along the Humboldt River into northern California's Yosemite Valley. Along the way, they successfully repelled an Indian raid.

After reaching the Pacific coast, Leonard and the Walker party made an eastward crossing of the Sierra Nevada and the southern Rockies, rejoining Bonneville in July 1834 at the fur trapper's rendezvous on the Bear River in what is now northeastern Utah.

Leonard remained in the western FUR TRADE for another year, then returned to his home in Pennsylvania, where he wrote an account of his adventures with Bonneville and others in the Rockies, entitled *Narrative of the Adventures of Zenas Leonard*. It was published in 1839.

Soon afterward, Leonard settled at Sibley, Missouri, near Kansas City, where he was involved in trading with the Indians and the commerce of the Santa Fe Trail. He also operated a steamboat on the Missouri River.

As a member of Joseph Walker's expedition of 1833–34, Zenas Leonard was among the first non-Indians to cross the deserts of what is now Utah and Nevada, explore the Yosemite Valley of California, and see the giant sequoia trees of the Merced region.

Leonov, Alexei Arkhipovich (Alexey Leonov, Aleksei Leonov, Aleksey Leonov) (1934–)

Soviet cosmonaut, first human to walk in space

Born in Listvyanka, SIBERIA, Alexei Leonov attended the Kremenchug preparatory school for pilots and the Chuguyev Higher Air Force School in Ukraine, graduating in 1957. He served in East Germany as a pilot in the air force of the Union of Soviet Socialist Republics (USSR, or Soviet Union). In addition to aviation, he developed an interest in painting. In 1959, Leonov was a student at the Zhukovsky Air Force Engineering Academy when the USSR was recruiting cosmonauts (see ASTRONAUTS) for its space programs; Leonov was one of the first 20 selected. In 1962, he was selected to train for the first "walk" in space (or EVA, for "extravehicular activity") as part of the VOSKHOD PROGRAM.

On the *Voskhod 2* mission, Leonov flew with Pavel Belyayev as pilot on March 18, 1965. During the mission of 17 orbits, Leonov became the first human to walk in space, exiting his capsule through an inflatable airlock and floating outside for 10 minutes before attempting to reenter. His spacesuit had become rigid, however, because of the pressure difference between the air inside it and the vacuum

in space, and he was forced to bleed air from it, exposing him to the vacuum for an additional 10 minutes before he was safely inside. The mission later suffered a guidance control malfunction, forcing Belyayev to pilot the capsule manually. The parachuted landing was 600 miles off course in the deep snow at the foot of the Ural Mountains. Leonov and Belyayev spent two days and a night there, their capsule surrounded by wolves part of the time, before being rescued.

Because of his accomplishment—the first walk in space, beating American EDWARD HIGGINS WHITE II's spacewalk by three months—Leonov was named deputy commander of the cosmonaut program and helped train other cosmonauts in preparation for spacewalks. He and a copilot, Valerei Kubasov, trained for a 1969 lunar mission that never happened. They also trained for the Salyut SPACE STATION project and were assigned to the *Salyut 1* mission, but, when Kubasov became sick, a backup crew was assigned. The three cosmonauts on this mission died when an air valve failed during reentry.

It was not until 1975 that Leonov flew into space again, this time as commander of the *Soyuz 19* mission, part of the SOYUZ PROGRAM and the first Soviet-U.S. space endeavor, known as the Apollo-Soyuz Test Project in the United States. (It used existing Apollo spacecraft but was not part of the APOLLO PROGRAM.) Liftoff of both Soyuz and Apollo spacecraft occurred on July 15; the first international rendezvous and docking in space occurred two days later. While linked for 47 hours, Leonov and Kubasov conducted joint experiments with the *Apollo 18* crew—Thomas P. Stafford, Deke Slayton, and Vance DeVoe Brand.

After his second and final mission, Leonov served as commander of the cosmonaut team until 1982. He also served as deputy director of the Gagarin Cosmonaut Training Center until his retirement at the rank of major general in 1991. During this time, he became known as a painter; some of his works involving space themes are on display at the National Air and Space Museum in Washington, D.C. He has also worked as editor, designer, and cartoonist for *Apogee*, a newsletter for astronauts.

Alexei Leonov achieved two firsts in SPACE EXPLORATION: his spacewalk and his participation in the first U.S.-Soviet space mission. When he and Stafford met at the edge of the docking tunnel, the first international handshake in space occurred. For each of his missions, Alexei Leonov received the Hero of the Soviet Union award. When visiting the Johnson Space Center in Houston, Texas, in preparation for the Apollo-Soyuz mission, as well as during the mission itself and a subsequent international tour by both teams, he reportedly helped further goodwill by his warm personality and sense of humor.

Lesseps, Jean-Baptiste-Barthélemy de (baron de Lesseps) (1766–1834) *French interpreter, diplomat in the Pacific and Siberia*

Jean-Baptiste-Barthélemy de Lesseps was born in the French Mediterranean seaport city of Sète. His mastery of the Russian language came through his father, who was France's consul general to the Russian government in St. Petersburg. At the age of 18, the younger Lesseps entered the French diplomatic service with an appointment as vice consul at the Russian Baltic port of Kronstadt, near St. Petersburg.

In August 1785, Lesseps sailed from France on the *Astrolabe* as the Russian interpreter for an official French scientific voyage to the Pacific Ocean, commanded by JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse. In September 1787, he arrived with the La Pérouse expedition in Petropavlovsk, the Russian settlement on the Pacific coast of eastern SIBERIA's Kamchatka Peninsula.

After a month, when the *Astrolabe* and the expedition's other vessel, the *Boussole*, sailed for Botany Bay, Australia, Lesseps stayed behind in Petropavlovsk, directed to report back to France on the expedition's progress until its arrival on the Kamchatka coast. For the next year, he made his way westward, across the width of Siberia and European Russia. When he arrived in Paris on October 17, 1788, he had completed a combined sea and overland CIRCUMNAVIGATION OF THE WORLD. At Versailles, he conferred with the La Pérouse expedition's chief sponsor, King Louis XVI.

Lesseps resumed his diplomatic career with an appointment as French consul in Kronstadt in 1789. The next year, he published an account of his 1787–88 journey from Kamchatka to Paris.

In 1793, Lesseps was appointed French consul general at St. Petersburg, his father's former post, and five years later he became French chargé d'affaires in Constantinople (present-day Istanbul). Soon after taking this post in 1798, he was briefly imprisoned by the Ottoman government when French forces, under Napoléon, invaded Turkish-controlled Egypt. From 1802 to 1812, Lesseps served as France's chief official in charge of trade relations with Russia. His last diplomatic post was in 1814, as French chargé d'affaires in Lisbon.

Jean de Lesseps was one of the few survivors of the La Pérouse expedition still living when wreckage of the *Astrolabe* was finally discovered in the South Pacific and recovered by JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE in 1828, 40 years after the expedition had vanished. He identified the objects brought back by Dumont d'Urville as belonging to the *Astrolabe*, and, in 1831, he published an updated account of the 1785–88 voyage with new information on what probably had happened to La Pérouse.

Lesson, René-Primevère (1794–1849)*French naturalist in the South Pacific*

Born in the French port city of Rochefort on the Bay of Biscay, René Lesson was trained as a pharmacist, with a background in medicine and botany. At the age of 20, he was placed in charge of medical and pharmacological research at the botanical garden in his hometown.

In 1822, Lesson sailed on the *Coquille* under the command of LOUIS-ISADORE DUPERREY, part of an official French scientific expedition to the EAST INDIES. Along with his duties as assistant surgeon, he served with Prosper Garnot as one of the expedition's zoologists. In the course of the voyage, which lasted nearly three years, he made an extensive study of the varieties of seals he observed in different parts of the globe.

While exploring Waigeo Island in the Moluccas in September 1823, Lesson first encountered live specimens of the fabled "birds of paradise." He continued his research on these rare birds at Port Dorey in New Guinea the following summer, where he also cataloged several previously unknown species of mound birds, as well as a type of wild boar, a kangaroo, and a scrub wallaby. A species of algae, discovered in the Falkland Islands by the expedition's second in command, JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE, was named *lessonia* in Lesson's honor.

In 1829, four years after he had returned to France with the Duperrey expedition, Lesson published a scientific account of his CIRCUMNAVIGATION OF THE WORLD, and, the following year, he published an illustrated journal of the expedition. He became a professor of botany at the naval academy in Rochefort, a position he held for the remainder of his life. He also served as chief pharmacist for the French navy.

As a zoologist, René Lesson won international fame as the first scientist to report accurately on the "birds of paradise" of the East Indies. In bringing to France live specimens of these creatures, he dispelled as erroneous a legend begun by Dutch navigator JAN HUYGHEN VAN LINSCHOTEN, who had reported in 1596 that these birds were born without feet and consequently were hatched in flight and spent their entire lives airborne.

Lesueur, Charles-Alexandre (1778–1846)*French naturalist, artist in Australia, Tasmania, the East Indies, and North America*

Charles-Alexandre Lesueur was born in the port city of Le Havre, on the northeast coast of France. Joining the French navy, Lesueur was assigned in 1800 as an assistant gunner on the *Géographe*. Under the command of THOMAS-NICOLAS BAUDIN, he sailed from Le Havre on a three-and-a-half-year voyage to Australia, TASMANIA, and the EAST INDIES.

Lesueur's ability as an artist was soon recognized by the expedition's zoologist, FRANÇOIS PÉRON, to whom he became an assistant. In the course of the voyage, Lesueur pro-

duced more than 1,500 drawings and paintings of animal specimens. In addition, he painted landscapes and views of the newly established British settlement of Port Jackson, at present-day Sydney, Australia. Lesueur accompanied Péron on specimen-collecting expeditions throughout the voyage, including one undertaken in Timor, in what is now Indonesia, where they hunted crocodiles in order to take a preserved skin back to France.

After his return from the Baudin expedition in 1804, Lesueur worked with Péron, and, after Péron's death in 1810, with LOUIS-CLAUDE DE SAULCES DE FREYCINET in preparing an account of the expedition, the first volume of which appeared in 1807 as *Voyage aux terres australes sur le Géographe et Naturaliste* (Voyage to the southern lands on the *Géographe* and the *Naturaliste*).

In 1815, Lesueur traveled to the United States. He settled in Philadelphia and continued his work as a naturalist and painter, sending back numerous items of scientific interest to the Museum of Natural History in Paris. In 1816–17, he undertook a voyage on the MISSISSIPPI RIVER for an extensive study of North American fish, and he became acquainted with the American naturalist and artist JOHN JAMES AUDUBON.

Lesueur joined Robert Owen's utopian community at New Harmony, Indiana, in 1826, where he taught art and continued his studies of American fish and other wildlife for the next 10 years. Soon after his return to France in 1836, he became director of the Museum of Natural History in his native city of Le Havre.

With Péron, Charles Lesueur is credited with bringing back from the 1800–1804 Baudin expedition more than 10,000 zoological specimens, including 2,500 that were new to science.

Le Sueur, Pierre-Charles (ca. 1657–ca. 1705)*French trader in present-day northern Wisconsin and southern Minnesota*

Sources vary on the details of Pierre-Charles Le Sueur's origins and early life. Some indicate he was a native of France, while others suggest he was born in French Canada.

In the 1670s, Le Sueur served as a lay assistant to the Jesuit missionaries operating out of Quebec and Montreal. In 1679, he set out as an Indian trader along the CANOE-and-portage route westward into the Great Lakes. Traveling westward across the length of Lake Superior, he reached Chequamegon Bay, on the shore of what is now northern Wisconsin. He soon established friendly relations with both Chippewa (Ojibway) and Sioux (Dakota, Lakota, Nakota) bands, helping to maintain peace between these traditional enemies.

In 1693, Le Sueur founded a trading post on the site of present-day La Pointe on Madeline Island, the largest of

Chequamegon Bay's Apostle Islands. After hearing reports of what he believed were valuable deposits of copper ore south of Lake Superior, he traveled to France in 1697, where the French government granted him permission to mine these resources.

On his return voyage to North America, Le Sueur was taken prisoner by the British. Released soon afterward, he traveled to the French colony at Biloxi, on the Gulf Coast of what is now the state of Mississippi, where he entered the service of PIERRE LE MOYNE, sieur d'Iberville, taking part in a 1699 exploration of the lower MISSISSIPPI RIVER.

In spring 1700, Le Sueur was commissioned by Iberville to lead a 20-man expedition up the Mississippi River on a small vessel to establish a French foothold in Sioux country as well as to explore for the copper deposits he had learned of previously. By September 19, 1700, he had reached St. Anthony's Falls, near present-day St. Paul, and before long he came to the St. Peter's River. He next came upon a stream flowing into the St. Peter's River; he named it Green River (now the Blue Earth River) after the color of its water, which he believed was caused by copper ore deposits farther upstream.

Near what is now Mankato, Minnesota, Le Sueur founded Fort L'Huiller to serve as a headquarters for trade with the Sioux and for his planned mining operations. Over the next year, he supervised the extraction of mineral ore, collecting as much as 15 tons by spring 1701. At great expense, he transported two tons of the material back to France, where assayers soon determined that it was not copper ore, as Le Sueur had hoped, but only worthless blue clay. Soon afterward, Le Sueur died at sea while on the return voyage from France to North America.

Pierre-Charles Le Sueur's fort at La Pointe was one of the earliest permanent non-Indian settlements in the western Lake Superior region of present-day northern Wisconsin. With the establishment of Fort L'Huiller, he was also one of the original non-Indian settlers of what is now southern Minnesota. Although he was unsuccessful in locating mineral wealth, Le Sueur's 1700 expedition up the Mississippi from the Gulf of Mexico revealed much about the little-known geography of the lower and upper Mississippi Valley. In his earlier travels in the Great Lakes region, along with his ascent of the Mississippi in 1700, he explored thousands of miles of the interior of North America. Southern Minnesota's Le Sueur County, the Le Sueur River near Mankato, as well as the town of Le Sueur, Minnesota, are all named after him.

Lewis, Meriwether (1774–1809) *U.S. Army officer, coleader with William Clark of the Corps of Discovery in the Lewis and Clark Expedition to the American West*

Meriwether Lewis was born on his family's plantation near Charlottesville, Virginia. In the early 1790s, he entered the

Virginia militia and took part in the Indian wars in the Ohio Valley as well as the suppression of the Whiskey Rebellion of 1794. By 1801, he was a captain in the regular army. That year, he became private secretary to his long-time friend and Virginia neighbor, newly elected president Thomas Jefferson.

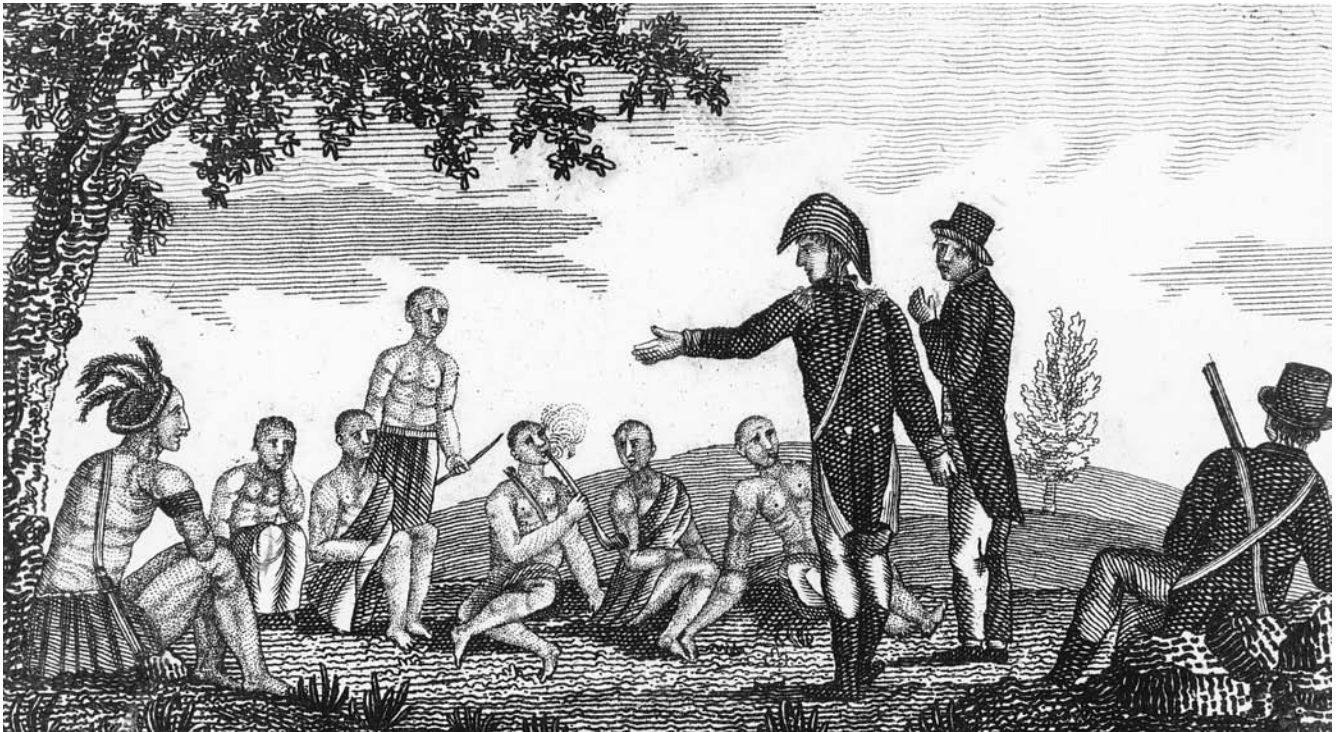
In January 1803, Lewis won an appointment for a proposed government-funded expedition to explore westward from the MISSOURI RIVER and establish an overland route to the Pacific Ocean.

Lewis studied natural sciences at the University of Pennsylvania in preparation for the expedition. In the meantime, the Louisiana Purchase was finalized with France, giving the expedition the added purpose of exploring new holdings and establishing diplomatic contacts with Indian tribes. Lewis requested his former army comrade WILLIAM CLARK as coleader.

In Pittsburgh, Lewis obtained a KEELBOAT and, with some crew members, headed down the Ohio River to



Meriwether Lewis (Library of Congress)



Meriwether Lewis and William Clark holding a council with Native Americans (*Library of Congress*)

Louisville, Kentucky, where he was joined by Clark. Lewis took his party to the mouth of the Ohio and entered the MISSISSIPPI RIVER, following it to Camp Wood River, Illinois, opposite St. Louis. He and Clark assembled a group of MOUNTAIN MEN, soldiers, and VOYAGEURS, including JOHN COLTER, GEORGE DROUILLARD, PIERRE DORION, SR., and PIERRE DORION, JR.

On May 14, 1804, the Corps of Discovery, as it was known, started up the Missouri from St. Louis. At Council Bluffs they met with Sioux (Dakota, Lakota, Nakota) tribal leaders. They continued into the Dakotas and camped for the winter at the Mandan Indian villages near present-day Bismarck, North Dakota. The encampment they constructed was called Fort Mandan. The French-Canadian interpreter TOUSSAINT CHARBONNEAU and his Shoshone wife SACAJAWEA (Sacagawea) joined the expedition at this location. Before departure, Sacajawea gave birth to JEAN-BAPTISTE CHARBONNEAU, who was known as Pomp to the explorers.

In April 1805, the Lewis and Clark Expedition left the Mandan and continued up the Missouri with their men in boats. About 1,200 miles upriver, the Missouri forked north and south, and Lewis left the main group and explored the northern branch, which he called the Marias River, after his cousin Maria. Clark continued with the rest of the expedition along the southern branch. Lewis discovered that the Marias River was unnavigable after 70 miles and rejoined

Clark at the Great Falls of the Missouri. The expedition soon reached the Three Forks of the Missouri, which Lewis named the Gallatin, Jefferson, and Madison Rivers. They followed the westernmost stream, the Jefferson, to its headwaters, then headed into the ROCKY MOUNTAINS on foot.

Lewis led his men across the Continental Divide and reached the Lemhi River. They soon encountered the Lemhi Shoshone band of Sacajawea's brother Cameahwait, who provided them with horses, which they used to continue their journey across the Bitterroot Range of the Rockies into the Clearwater River Valley. By CANOE, they followed the Clearwater westward into the Snake, which took them into the COLUMBIA RIVER.

The Lewis and Clark Expedition reached the Columbia's mouth on the Pacific coast on November 15, 1805. They had planned to return from Oregon by sea, but the season's last trading vessels had already departed. They wintered at Fort Clatsop, the post they constructed near present-day Astoria, Oregon.

In late March 1806, Lewis and Clark began their journey back to St. Louis. They first retraced their outward-bound route, but separated for a time in early June. Lewis went with a small party to explore the Marias River and see whether it led northward to the Saskatchewan River. During this side trip, Lewis and his party were involved in a clash with a band of Indians, probably Blackfeet. This was the only hostile encounter with Native Americans in the course

of the entire expedition, largely due to Sacajawea's presence and linguistic and diplomatic skills.

After a month of exploring, Lewis rejoined Clark at the mouth of the Yellowstone River. They traveled down the Missouri, stopping briefly at the Mandan villages, and proceeded to St. Louis, arriving on September 23, 1806.

Lewis soon headed for Washington, D.C., where he presented the results of his explorations to President Jefferson. In 1807, he was named territorial governor of upper Louisiana Territory, assuming the post the following year. In 1809, at a stopover in Tennessee while en route to Washington, D.C., to answer official criticism relating to his governmental and Indian policies and to arrange for the publication of his journal of the expedition, he was shot to death. The exact circumstances of his death are unknown.

Meriwether Lewis, with William Clark, undertook the earliest exploration of the country between the Missouri River and the northwest coast by Americans. They covered almost 8,000 miles in over three years of exploring. The expedition made contact with more than 50 Indian tribes and brought back a large number of botanical species. They also reaffirmed U.S. claims to the Pacific Northwest and led the way for the fur traders and mountain men, who would follow their route into the northern Rocky Mountains. The map of their expedition, published in 1814, was the first to show clearly a route westward from the northern Rockies to the Pacific. Lewis was the first to refer to the open territory west of St. Louis as the "Great Plains."

Linschoten, Jan Huyghen van (1563–1611)

Dutch geographer in India, explorer in the Arctic Ocean

Jan Huyghen van Linschoten was a native of Enkhuizen, a fishing port in northern Holland. His family were farmers.

In 1583, Linschoten sailed around the CAPE OF GOOD HOPE to Goa, the Portuguese colony on India's west coast. For the next five years, while serving as bookkeeper to the Portuguese archbishop, he learned much about Portuguese trading practices in the Far East and gained knowledge of sea routes to the EAST INDIES, especially the Moluccas, then known as the SPICE ISLANDS. Linschoten returned to Holland in 1588.

In his book *Itineraio*, published the following year, Linschoten presented a firsthand account of the trade carried on between the Far East, India, and Portugal, illustrated with maps detailing sea routes from India to the East Indies, the eastern terminus for the lucrative trade in spices. Much of the information he revealed had been kept secret by the Portuguese for most of the 16th century.

In Holland, Linschoten became known as one of the foremost authorities on trade with the Far East. He soon became involved with Dutch efforts to discover a NORTH-

EAST PASSAGE around the top of Russia and Asia, to China, Japan, and the East Indies.

In 1594, Linschoten commanded a ship in an expedition in search of the Northeast Passage, financed in part by the merchants of Enkhuizen. Another vessel in the small fleet was captained by Dutch navigator WILLEM BARENTS, who served as the expedition's chief pilot and commander. On this voyage, which embarked from Enkhuizen, Barents found the route around the northern end of Novaya Zemlya blocked by ice, while Linschoten managed to navigate his ship eastward for a short distance beyond the southern end of Novaya Zemlya and into the Kara Sea, where he too was turned back by ice.

The following year, Linschoten took part in a second attempt to navigate the Northeast Passage, again with Barents. On this voyage, the two attempted a southern passage around Novaya Zemlya, but were halted by ice near Vaigach Island, between Novaya Zemlya and the Russian mainland.

Jan Huyghen van Linschoten produced an atlas in 1596 with maps depicting all that had been learned by Dutch and English navigators in their explorations for a navigable sea route across the top of Asia. His account of the lucrative SPICE TRADE with the East Indies and his descriptions of key trade routes greatly influenced the voyages of CORNELIUS HOUTMAN and FREDERIK HOUTMAN in 1596 and OLIVER VAN NOORT in 1598 and ultimately gave impetus to the formation of the DUTCH EAST INDIA COMPANY in 1602.

Lisa, Manuel (1772–1820) *American fur trader on the upper Missouri River*

Manuel Lisa was born in New Orleans, where his father was an official with the Spanish colonial government. In about 1790, he settled in St. Louis and soon obtained a trade monopoly with the Osage Indians of the lower MISSOURI RIVER.

In 1803–04, Lisa provided supplies and equipment for the Corps of Discovery under MERIWETHER LEWIS and WILLIAM CLARK. In spring 1807, encouraged by the expedition's success, Lisa launched the first American fur-trading venture to the upper Missouri River and northern plains.

On April 19, 1807, Lisa and 42 trappers left St. Louis and traveled up the Missouri by KEELBOAT. His partner, who remained in St. Louis during this first expedition, was ANTOINE PIERRE MENARD. Among the crew were a number of veterans of the Lewis and Clark Expedition, including John Potts, RENÉ JUSSEAUME, and the interpreter GEORGE DROUILLARD. At the mouth of the Platte River, Lisa recruited JOHN COLTER, who had also traveled west with Lewis and Clark.

Lisa and his party continued up the Missouri into the Dakotas, then entered the Yellowstone River. They traveled along the Yellowstone to its junction with the Bighorn

River, where he established Fort Manuel (also known as Fort Raymond), the first non-Indian settlement in what is now Montana.

During the next several months, Lisa sent out trappers from Fort Raymond, including John Colter, who explored the region of present-day Yellowstone National Park.

Lisa and his party returned to St. Louis in August 1808 after a highly profitable season of trading furs with Plains Indians. In February 1809, he organized the ST. LOUIS MISSOURI FUR COMPANY. His partners included Missouri territorial governor William Clark, Reuben Lewis (brother of Meriwether Lewis), JEAN PIERRE CHOUTEAU, AUGUSTE PIERRE CHOUTEAU, and ANDREW HENRY, among others.

In spring 1809, Lisa, his partners, and 172 fur trappers traveled up the Missouri into the Mandan Indian lands of present-day North Dakota. At the mouth of the Knife River, near what is now Bismarck, they established Fort Mandan. From this post, Lisa mounted several expeditions into the lands of the Blackfeet and Crow Indians.

Lisa soon faced stiff competition from WILSON PRICE HUNT of JOHN JACOB ASTOR'S AMERICAN FUR COMPANY. In spring 1811, in an effort to corner trade with the Arikara Indian villages in the Dakotas, Lisa and his keelboat crew raced Hunt and his party along 1,200 miles of the Missouri River. Naturalist HENRY MARIE BRACKENRIDGE was a paying guest on Lisa's boat. Hunt and the Overland Astorians then continued westward to Oregon, while Lisa continued to develop the FUR TRADE on the northern plains.

In 1812, Lisa established Fort Lisa, near present-day Omaha, Nebraska. During the War of 1812, as a U.S. Indian agent, Lisa succeeded in keeping the central Missouri River tribes from siding with Great Britain. After the war, he expanded his trade into the Arkansas River and Canadian River region of what is now northern Texas and southern Oklahoma. The St. Louis Missouri Fur Company stayed in business into the 1820s.

Manuel Lisa undertook the first American-based fur-trading expedition to the northern plains and eastern Rockies. His 1807 endeavor marked the first commercial application of the explorations of Lewis and Clark and led to St. Louis becoming the focus of the western fur trade for the next 30 years.

Lisiansky, Yury Fyodorovich (Yuri Lisianski, Yuri Lisianskii) (1773–1839) *Russian naval officer in Alaska and the Pacific*

Yury Lisiansky entered the Russian navy following his training with the Royal Naval Cadet Corps. While still in his teens, he took part in naval operations against Swedish forces in 1788; by 1793, he had been promoted to the rank of lieutenant. That year, he was selected by Empress Catherine II to serve with the British navy, along with 15 other

Russian naval officers, including ADAM IVAN RITTER VON KRUSENSTERN.

During the next five years, Lisiansky sailed on British naval vessels over a wide area of the globe, taking part in campaigns in the French Revolutionary Wars of 1793–98, in the Caribbean, North America, and India. Upon his return to Russia in 1798, he was made a captain lieutenant in the Russian navy; three years later, he was given his first command, a frigate.

In 1802, Lisiansky was chosen by Krusenstern to accompany him as second in command on the first Russian CIRCUMNAVIGATION OF THE WORLD. In preparation for the project, Lisiansky traveled to England, where he procured two ships for the expedition, the *Nadezhda* and the *Neva*. In early August 1803, the ships sailed from the Russian Baltic port of Kronstadt, with Krusenstern on the *Nadezhda* and Lisiansky commanding the *Neva*.

By the following summer, Lisiansky and Krusenstern had rounded CAPE HORN and arrived in the HAWAIIAN ISLANDS. The two ships separated, with Krusenstern sailing to the Pacific coast of SIBERIA and Japan, and Lisiansky and the *Neva* heading to the RUSSIAN-AMERICAN COMPANY'S fur-trading settlements on the Gulf of Alaska.

Lisiansky first visited Kodiak, then went on to the Russian settlement of New Archangel on Sitka, where he helped the Russian-American Company's director, ALEKSANDR ANDREYEVICH BARANOV, retake the trading post from the Tlingit Indians, who had captured and destroyed it in 1802. After spending the winter of 1804–05 at Kodiak, Lisiansky and the *Neva* sailed back to the South Pacific Ocean, headed for China with a cargo of furs. On this leg of the voyage, he came upon a previously uncharted outlying island in the Hawaiian chain, known afterward as Lisianski Island in his honor, as well as two reefs that he called Neva Reef and Krusenstern Reef.

After selling the furs in Canton, Lisiansky rejoined Krusenstern and the *Nadezhda* at the Portuguese colony of Macao near Hong Kong. The ships then sailed to Indonesia and into the Indian Ocean, completing their round-the-world voyage by way of the CAPE OF GOOD HOPE and returning to Kronstadt in August 1806, after a voyage of almost exactly three years.

Yury Lisiansky retired from active naval service in 1809 at the rank of full captain. His account of the expedition to the Pacific, *A Voyage Round the World in the Years 1803, 4, 5, & 6*, was first published in English in 1814. In addition to playing a significant role in the first Russian circumnavigation of the world, Lisiansky opened up direct links between Russian fur traders in Alaska and markets in China. Moreover, he pioneered the practice of supplying Russian settlements in Alaska with ships sailing from Russia and around Cape Horn, a more practical alternative to the route then in use, which necessitated a difficult and costly

overland trek through Siberia, followed by transshipment by boat across the Bering Sea.

Litke, Fyodor Petrovich (Count Fedor Petrovich Lütke) (1797–1882) *Russian naval commander in the Arctic and Pacific*

Fyodor Litke was born in St. Petersburg to a Russian aristocratic family. After undergoing training at the Naval Cadet Academy, he entered the Russian navy as a midshipman in 1812.

In 1817–19, Litke made his first trip around the world, serving on the *Kamchatka* under the command of VASILY MIKHAILOVICH GOLOVNIN, visiting ports in Alaska and on the Kamchatka Peninsula of eastern SIBERIA.

Promoted to lieutenant while on the Golovnin voyage, Litke went on to command the *Novaya Zemlya* (or possibly the *Apollo*) on an expedition into the Arctic regions of Murmansk in 1821. During the next three years, he charted the Arctic seas north of Russia, along the shore of the Barents Sea eastward to Novaya Zemlya.

Litke's published account of his exploits in the Russian Arctic, entitled *Four Voyages in the Polar Seas from 1821 to 1824*, appeared soon after his return to St. Petersburg in 1825. That same year, he was appointed aide-de-camp to Czar Nicholas I. On a direct order from the czar, he was promoted to captain lieutenant, and, in 1826, he was placed in command of the *Senyavin*, with a commission for a scientific voyage to the Pacific Ocean and around the world. KARL HEINRICH MERTENS was one of the naturalists.

Sailing from the Russian Baltic port of Kronstadt in September 1826, Litke entered the Pacific by way of CAPE HORN. After a stopover in Valparaiso, Chile, he sailed northward along the Pacific coasts of the Americas to New Archangel, the RUSSIAN-AMERICAN COMPANY's trading settlement at Sitka Bay, off the coast of Alaska's panhandle.

In summer 1827, Litke explored westward into the Bering Sea, visiting Unalaska Island in the Aleutians and reconnoitering St. George and St. Paul Islands in the Pribilof group, as well as St. Matthew Island to the north.

With the onset of winter, Litke sailed the *Senyavin* southward into the tropics. He first cruised the Caroline Islands of Micronesia and made the European discovery of an island group he named the Senyavin Islands after his ship. Reprovisioning in Guam, he sailed northwestward toward Japan and reached the little-known Bonin Islands, off the coast of the Japanese island of Kyushu. On Peel Island in the Bonins, he learned from two shipwrecked sailors from a whaling ship that British navigator FREDERICK WILLIAM BEECHEY had charted the islands the previous year. Although the sailors, for some reason, had previously declined to leave with Beechey, they now accepted passage aboard the *Senyavin* with Litke.

In summer 1828, Litke went northward to Kamchatka. From Petropavlovsk, he continued northward along the Pacific coast, rounded Cape Kronotksi, and sighted the giant volcano Klyuchevskaya Sopka. He then explored around Karaginsky Island, charting the channel separating it from the mainland, known afterward as Litke Strait. Retracing the route of VITUS JONASSEN BERING's final voyage of 1740–41, Litke explored the coast of the Chukchi Peninsula, the northeasternmost region of Siberia, where he located the strait separating Arakamchechen and Itygran islands from the Siberian mainland, naming it the Senyavin Strait. He also undertook a study of the native Chukchi people.

In winter 1828–29, Litke returned to the South Pacific and resumed his explorations in the Carolines, coming upon an additional number of uncharted atolls. Sailing eastward by way of the Philippines and Sumatra, he crossed the Indian Ocean, rounded the CAPE OF GOOD HOPE, and returned to Kronstadt in September 1829, thus completing his second CIRCUMNAVIGATION OF THE WORLD.

The next year, after his arrival back in Russia, Litke again set out on the *Senyavin* for an expedition to Iceland, exploring its coastline.

Litke went on to become one of the founding members of the Russian Geographical Society in 1845. In 1850, he was named maritime governor of the Baltic port of Revel (Tallinn, Estonia), and he later assumed command of the port of Kronstadt, reaching the rank of full admiral in 1855. The Paris Academy of Science appointed him as a corresponding member in 1861.

Fyodor Litke's voyage to the Pacific in 1826–29 was hailed as a great success for the wealth of scientific data brought back by the expedition's naturalists. His account of the expedition, *Voyage Around the World*, was published in 1835. In 1934, the Canadian-built icebreaker, the *Litke*, named in honor of his contributions to the exploration of the Russian Arctic, sailed from Vladivostok to Murmansk the first east-to-west voyage through the NORTHEAST PASSAGE.

Livingstone, David (1813–1873) *Scottish missionary in Africa, husband of Mary Moffat Livingstone*

David Livingstone was born in Blantyre, Scotland, near Glasgow, the son of an itinerant tea salesman. At the age of 10, he went to work in a textile factory, studying Latin and other basic subjects in his spare time and eventually working his way through Glasgow University.

In 1836, Livingstone resolved to become a medical missionary, largely due to the influence of his father, a highly religious man, who distributed religious tracts along with each order of tea he delivered. He studied medicine at Edinburgh University, and, after additional training at hospitals in London, received a medical degree from the Faculty of Physi-

cians and Surgeons in Glasgow in 1840. Soon afterward, he was accepted by the London Missionary Society.

Although Livingstone had originally planned on a career as a medical missionary in China, the outbreak of the Opium War of 1839–42 caused him to change his plans. While training in England, he had met the missionary ROBERT MOFFAT; at Moffat's suggestion, he decided to pursue a career in Africa instead. He arrived at Algoa Bay, on the south coast of Africa near Port Elizabeth, in March 1841, from where he traveled northward to Kuruman, Moffat's mission on the southern edge of the Kalahari Desert in present-day South Africa.

Livingstone remained at the Kuruman outpost for most of the 1840s, marrying Robert and MARY MOFFAT's eldest daughter, Mary (MARY MOFFAT LIVINGSTONE), in 1844. He established a new mission at Mabotsa, deeper into what is now northeastern South Africa. By 1849, however, Boers had started settling in the region, enslaving and abusing the native people to whom Livingstone was ministering. In order to establish a new mission in the unexplored region to the north, he made a crossing of the Kalahari Desert in 1849, accompanied by British sportsman William Oswell. After three months, they reached the Zouga River, and, soon afterward, they came upon Lake Ngami, becoming the first Europeans to see it. Two years later, he made another crossing of the Kalahari, this time with his pregnant wife and three small children, reaching a tributary of the upper ZAMBEZI RIVER, where he was welcomed by a local tribal leader.

While exploring the upper Zambezi, Livingstone had a chance to observe the horrors of the central African SLAVE TRADE, carried on by both black African and Arab traders. He determined that the only way to eradicate the practice was to bring alternative commerce into the African interior.

In 1853, after escorting his wife and children to Cape Town, from where they sailed to England, Livingstone embarked on the first of his great expeditions into the heart of the African continent. He made his way back northward to the Linyote and upper Zambezi region, then set out westward for the Atlantic coast of central Africa, reaching the Portuguese trading port of Luanda in what is now Angola at the end of May 1854. Although he had succeeded in reaching the coast, the route he had followed did not seem suitable for commercial development, and, after a three-month rest at Luanda, he set out eastward to seek a more feasible route to the Indian Ocean. By 1855, he had returned to the upper Zambezi, hoping that river would prove to be a navigable route to the Indian Ocean. Later that year, he became the first known European to see the 420-foot-high waterfalls of the Zambezi, which he named Victoria Falls in honor of the queen of England. On May 20, 1856, he arrived at Quelimane on the Indian Ocean coast of Mozambique, from where he returned to England.

Back in England, Livingstone was hailed as a national hero, the first European known to have made a coast-to-coast crossing of south-central Africa. His account of his experiences, *Missionary Travels*, became an immediate bestseller, and, in honor of his accomplishment, the ROYAL GEOGRAPHICAL SOCIETY awarded him a gold medal.

In 1858, Livingstone left the London Missionary Society to devote himself full time to African exploration. Later that year, having been appointed Great Britain's General Consul to Inner Africa at Quelimane, he returned to central East Africa. During the next five years, he led a series of expeditions exploring up the Zambezi and Ruvuma Rivers, at times using a paddewheel steamship. He also explored the Shire River, and, in 1859, he located Lake Nyasa (Lake Malawi), which had been reached by Portuguese explorers in 1616 but had been forgotten thereafter. The artist THOMAS BAINES traveled with him in 1858–59.

Mary Livingstone died in 1862, while traveling the Zambezi with her husband. Recalled by the British government in 1863, Livingstone sailed his small steamer, the *Lady Nyasa*, from East Africa across the Indian Ocean to Bombay, India, where he sold the vessel, then returned to England.

In 1865, Livingstone published an account of his explorations into the waterways of East Africa, *The Zambezi and Its Tributaries*. The next year, he returned to Africa to investigate the continent's central watershed, hoping to determine the source of the NILE RIVER. From Mikindani on the coast of what is now Tanzania, he set out up the Ruvuma River, and, over the next years, he explored the southern end of Lake Nyasa and the upper CONGO RIVER (Zaire River). He located Lake Mweru and Lake Bangweulu, in present-day Zambia, which had been reached by Portuguese explorer FRANCISCO DE LACERDA in 1798.

Livingstone heard reports of the Lualaba River, which he suspected was a source of the Nile, although it is actually a tributary of the Congo. He set out to investigate it in 1869, reaching the Nyangwe region on the Lualaba two years later.

By that time, the outside world had not heard from Livingstone for over three years. Publisher James Gordon Bennett, Jr., of the *New York Herald* newspaper had instructed the journalist SIR HENRY MORTON STANLEY to find Livingstone. Stanley departed the coast on March 21, 1871, and, on November 10, 1871, Stanley met up with the Scottish explorer, impoverished and in poor health, at Ujiji on the east shore of Lake Tanganyika.

Livingstone recovered his strength sufficiently to explore the northern end of Lake Tanganyika with Stanley, determining that it was not a source of the Nile, but that the Ruzizi River flowed into it.

Although Stanley wanted him to return to England, Livingstone decided to remain in Africa and continue exploring for the Nile's source. He reached Tabora in central

Tanzania, and, after surveying Lake Bangweulu, succumbed to dysentery at a nearby native village on May 1, 1873. The natives who had assisted him in his explorations removed and preserved his heart and other vital organs, embalmed his body in salt, and carried it overland to the Indian Ocean coast, an arduous nine-month journey. Livingstone's remains were then transported by ship to England and interred at London's Westminster Abbey with all the honors of a state funeral on April 18, 1874.

David Livingstone's explorations of central Africa revealed that the interior of the continent was not an arid wasteland as 19th-century geographers had speculated, but a fertile country, inhabited by a large population of highly diverse peoples, skilled in commerce, crafts, and farming. His earlier travels in southern Africa across the Kalahari Desert helped develop what became known as the Missionary Road, a route that later contributed to the settlement of South Africa's Transvaal region and Rhodesia, present-day Zimbabwe. In addition to being recognized as the first European known to have crossed the southern part of the African continent, Livingstone will always be associated with Stanley's heroic efforts to find him.

Livingstone, Mary Moffat (Ma-Robert)

(1821–1862) *Scottish traveler in Africa, daughter of Robert Moffat and Mary Moffat, wife of David Livingstone*

Mary Livingstone, née Moffat, was the eldest daughter of British missionaries ROBERT MOFFAT and MARY MOFFAT. She was born at her parents' missionary settlement in Bechuanaland, the frontier region between Cape Province and the Kalahari Desert.

In 1830, Moffat was sent to school at Grahamstown, on the south coast of Africa, near Port Elizabeth. Nine years later, at the age of 18, she made her first trip outside Africa, sailing to England with her family. In England, she met DAVID LIVINGSTONE.

The Moffat family returned to Bechuanaland in 1843. David Livingstone arrived at the Kuruman mission soon afterward and in 1845, he married Mary. During the next six years, she resided with her husband at a series of missions he established in the country north of Kuruman, and, by 1851, she had had three children and was pregnant with a fourth. That year, she and her children accompanied David Livingstone on his expedition northward across the Kalahari Desert, all nearly dying of thirst before reaching the Linyote River (then known as the Chobe), a tributary of the upper ZAMBEZI RIVER.

Soon afterward, the Livingstones headed southward on a six-month journey to Cape Town, Mary giving birth to her fourth child along the way. From there she sailed to England, where she remained for the next six years while her husband carried on his explorations of south-central Africa.

In 1858, Mary Livingstone and her children rejoined her husband at Quelimane on the coast of what is now Mozambique. She then accompanied her husband on his trips up the Zambezi and Ruvuma Rivers. In 1862, she contracted a tropical fever and died while traveling on the Zambezi. The children soon returned to Cape Town and then to England.

Mary Livingstone was one of the first European women to travel deep into the interior of south-central Africa, taking part in her husband's early explorations north of Bechuanaland and joining him in his later journeys along the waterways inland from the Indian Ocean. As the mother of the Livingstones' eldest son, Robert, she was known among the native people as "Ma-Robert," a name they also applied to the steamboat with which her husband explored the lower Zambezi River.

Llewellyn, Martin (unknown–1634)

English cartographer

There are few details of Martin Llewellyn's origins or early life, although his name suggests he was of Welsh background. In 1598, Llewellyn produced an atlas of 16 maps depicting sea routes to the Far East. His charts, which detailed the CAPE OF GOOD HOPE, the EAST INDIES, the Philippines, Japan, and the Marianas, contained the same place names used by CORNELIUS HOUTMAN and FREDERIK HOUTMAN in their voyages of 1595 and 1598, suggesting that Llewellyn either sailed with the Houtmans or had direct knowledge of their exploits.

From 1599 to 1634, Martin Llewellyn served as the Steward of St. Bartholomew's Hospital. Although forgotten after his death, his cartographic works were rediscovered in Oxford, England, in the 1940s. His atlas is considered one of the earliest major cartographic works to have been produced in England.

Lobo, Jerónimo (1593–1678) *Portuguese missionary in Ethiopia*

A native of Portugal, Jerónimo Lobo entered the Jesuit order at the age of 16. He was ordained a priest in 1621 and, soon afterward, embarked on a career as a missionary.

In 1624, Lobo traveled to the Ethiopian city of Assab at the southern end of the RED SEA. From there, he traveled to Gondar and the region around Lake Tana in the northwestern part of the country. He visited the Tisisat Falls and came upon the source of the Blue Nile, which he observed flowing out of two springs in the ground.

Jerónimo Lobo also carried on his missionary work in India. His account of his explorations around Lake Tana was translated into French as *Voyage historique d'Abissinie*, first published in 1728. His journey to the source of the Blue

Nile followed the 1613 visit of the Spanish Jesuit missionary PEDRO PÁEZ. The next European to explore the region was the Scotsman JAMES BRUCE in 1770.

Long, George Washington de See DE LONG, GEORGE WASHINGTON.

Long, Stephen Harriman (1784–1864)

U.S. Army officer in the American West

Stephen H. Long, a native of Hopkinton, New Hampshire, graduated from Dartmouth College in 1809. Entering the army in 1814, he was commissioned a lieutenant in the U.S. Army Corps of Engineers the next year. He taught mathematics at West Point until 1816, when he was breveted a major in the U.S. Army Corps of Topographical Engineers.

In 1817, the Department of War sent Long on a military and scientific expedition into the upper MISSISSIPPI RIVER region. His mission was to collect topographic and scientific information, and to report on the presence of British traders on the upper Mississippi frontier.

Long explored the portages between the Fox and Wisconsin Rivers and the Mississippi River as far as the Falls of St. Anthony, near present-day Minneapolis, Minnesota. While there he also surveyed the site of Fort St. Anthony (later known as Fort Snelling), established in 1823.

In 1819, HENRY ATKINSON organized the first Yellowstone Expedition, which was intended to establish a military post at the junction of the MISSOURI RIVER and Yellowstone River. He assembled a group of naturalists and artists at Pittsburgh, including zoologist A. E. Jessup, naturalist Titian Ramsey Peale, and artist Samuel Seymour. Long commanded a contingent. Intending to travel up the Missouri to the Yellowstone by steamboat, he supervised the construction of five steam-powered vessels, including the *Western Engineer*, which became the first steamboat on the Missouri River.

Long and the expedition left St. Louis on June 21, 1819. At a site called Engineer Cantonment near present-day Omaha, Nebraska, the expedition wintered. Problems with the steamboats, as well as an outbreak of SCURVY, soon led Long to seek a change in plans. He went to Washington, D.C., over the winter, where he worked out new goals for the expedition with government officials. Instead of heading for the Yellowstone, he was to explore the ROCKY MOUNTAINS and locate the source of the Red River of the South.

On June 6, 1820, Long and a party of 19 men departed Engineer Cantonment (now Fort Atkinson), and headed westward along the Platte River to the South Platte. In central Nebraska, he engaged several French guides. His Indian

interpreter was TOUSSAINT CHARBONNEAU, who had served with MERIWETHER LEWIS and WILLIAM CLARK. On June 30, 1820, they sighted the Rocky Mountains and what later became known as Longs Peak.

Long left the South Platte and headed southward through what is now the Denver, Colorado, area and across the Continental Divide. En route, Dr. Edwin James, a naturalist and geologist with the expedition, made the first successful climb of Pikes Peak, named after ZEBULON MONTGOMERY PIKE.

Long and his expedition reached the Arkansas River near Pueblo, Colorado, where the group divided. Long and some of the men explored southward in search of the Red River, while the rest headed eastward on the Arkansas River.

At Raton Pass, New Mexico, Long found a waterway he thought was the Red River. He followed it through what is now eastern New Mexico, the Texas Panhandle, and Oklahoma, and soon found himself back on the Arkansas River. He realized he had not found the Red River but instead had traveled along the Canadian. He rejoined the rest of the expedition at Fort Smith, Arkansas, on September 13, 1820. Although he failed to find the source of the Red River of the South, the expedition's scientists brought back 200 species of newly discovered plants, animals, and insects.

In 1823, Long made an exploration of the region between the upper Mississippi and Missouri Rivers. With a detachment of army topographers and scientists, he traveled from Philadelphia to Fort St. Anthony. They explored the Minnesota River and the Red River of the North. Long also surveyed the U.S.-Canada boundary north of present-day Pembina, North Dakota. He followed the Red River into Lake Winnipeg, portaged to Lake Superior, then continued by way of the Great Lakes to New York State. His expedition returned to Philadelphia on October 26, 1823.

Long remained in the army until 1863, involved in railroad surveys and civil engineering projects.

Stephen H. Long's report of his 1820 exploration of the Platte and Arkansas River region, assembled by Dr. Edwin James, described the Great Plains as the "Great American Desert," unsuitable for agricultural development. This characterization of the present-day wheat-belt states of Kansas, Oklahoma, and Nebraska appeared on maps of the West for the next 50 years and dissuaded settlement of the region until after the Civil War. Twenty-five years after Long explored the southern plains, JOHN CHARLES FRÉMONT would begin to dispel the myth of the Great American Desert.

López de Cárdenas, García (fl. 1540s)

Spanish conquistador in the American Southwest

García López de Cárdenas was a Spanish conquistador in North America who, in 1540, took part in FRANCISCO

VÁSQUEZ DE CORONADO's exploration into what is now the southwestern United States.

On August 25, 1540, soon after the Spanish had subdued the Zuni Indians in what is now western New Mexico, López de Cárdenas and a small party of soldiers were sent westward to investigate Indian reports of a large river. By mid-September 1540, they had reached the rim of the Grand Canyon in present-day Arizona. Almost a mile below they could see the COLORADO RIVER. They tried to descend the canyon but abandoned the attempt after three days and returned eastward to rejoin Coronado's main force at the Zuni pueblos. At about this time, the seaward portion of Coronado's expedition, under HERNANDO DE ALARCÓN, was exploring the Colorado River from its mouth in the Gulf of California. Following his participation in Coronado's expedition, López de Cárdenas is believed to have returned to Spain.

García López de Cárdenas and his small party of Spanish soldiers were the first non-Indians to see the Grand Canyon. The next European visit to the Grand Canyon occurred more than two centuries later when missionary FRANCISCO TOMÁS HERMENEGILDO GARCÉS journeyed there in 1776.

Lozier, Jean-Baptiste-Charles Bouvet de

See BOUVET DE LOZIER, JEAN-BAPTISTE-CHARLES.

Lyon, George Francis (1795–1832) *British naval officer in North Africa*

George Lyon, a British naval officer, was commissioned by second secretary of the Admiralty SIR JOHN BARROW to travel southward across the SAHARA DESERT from Tripoli in order to ascertain the true course of the NIGER RIVER with British surgeon JOSEPH RITCHIE.

In 1818, Lyon and Ritchie set out from the North African port of Tripoli on the coast of Libya, heading southward into the Fezzan region. At the southern Libyan city of Murzuk, in November 1819, Ritchie died.

Left with only a native guide, a Tuareg from Ghat named Hatita ag-Khuden, Lyon attempted to continue southward across the Sahara, hoping to reach the Niger River. He was able to reach only as far as Tejerri, 200 miles farther to the south.

Before he returned to England, George Lyon obtained information from local natives about Lake Chad to the south. Based on these reports, he wrongly concluded that the Niger River flowed into Lake Chad, and from there into the NILE RIVER. The true course of the Niger remained a mystery for another 12 years until the explorations of RICHARD LEMON LANDER and his brother John, who, in 1830–31, sailed down the river into the Gulf of Guinea.



Mackenzie, Sir Alexander (1764–1820)

Scottish-Canadian fur trader in the Canadian Northwest, cousin of Donald Mackenzie

Alexander Mackenzie was born at Stornoway, Scotland, in the Outer Hebrides. At the age of 10, he was taken to New York by his widowed father. With the onset of the American Revolution, his father, a Loyalist, sent the young Mackenzie to school in Montreal.

In about 1780, Mackenzie joined the Montreal fur-trading firm of Finlay, Gregory & Co. Five years later, he was a partner in the NORTH WEST COMPANY and served at the company's posts at Detroit and at Grand Portage on western Lake Superior. In 1788, he joined PETER POND at Fort Chipewyan, the North West Company's post on Lake Athabasca.

On June 3, 1789, Mackenzie embarked on an expedition north from Fort Chipewyan in search of a water route to the Pacific Ocean. If found, it would enable the North West Company to supply its far western posts from the sea and avoid the long overland trek from Montreal. In addition, an outlet to the Pacific coast would provide access to the lucrative sea otter trade.

With a crew of VOYAGEURS and Indian guides, Mackenzie traveled by CANOE along the Great Slave River north to Great Slave Lake. Pond had previously located a river flowing out of the western end of Great Slave Lake and hypothesized that it led to Cook Inlet on the Alaskan coast. By following this river, Mackenzie planned to reach the Russian trading fort on Unalaska Island, then travel to

Kamchatka on the Siberian coast, and across Russia to England. From Great Slave Lake, Mackenzie and his party followed the river northward along the eastern slopes of the ROCKY MOUNTAINS. By mid-July, he had reached the river's outlet into the Beaufort Sea, an arm of the Arctic Ocean. The river had not taken him to the Pacific coast as hoped, and Mackenzie called it the River of Disappointment. It was later named the Mackenzie River in his honor.

In 1791–92, Mackenzie went to England, where he prepared for his next expedition. He studied astronomy and navigation and became familiar with the charts of the northwest coast of North America brought back from JAMES COOK's final voyage.

By fall 1792, Mackenzie had returned to Lake Athabasca and Fort Chipewyan. From there, he explored the Peace River and made the European discovery of the Smoky River, at the mouth of which he established a new trading post.

On May 9, 1793, Mackenzie set out from the Peace River post, once again in search of a water route to the Pacific. His party of voyageurs and Indian guides traveled in a lightweight canoe carrying over a ton of trade goods and supplies. They reached the Parsnip River. Near its headwaters in the Rocky Mountains, Mackenzie made a short portage and crossed the Continental Divide.

Mackenzie soon found the West Road (Blackwater) River. When he reached the turbulent and impassable upper Fraser River, Mackenzie led his party on foot back to the Blackwater, then across the Coast Range, and on to the Bella Coola River. After obtaining canoes from local Indians, the

party rapidly descended the Bella Coola to the Pacific coast at Dean Channel.

On this site, Mackenzie used vermilion and melted animal fat to write on a large rock the words: "ALEXANDER MACKENZIE, FROM CANADA, BY LAND, THE 22ND OF JULY, 1793." Coincidentally, British naval explorer GEORGE VANCOUVER had explored this part of Queen Charlotte Sound only six weeks earlier. Mackenzie and his party retraced their route. A month later, they reached the Peace River post.

Not long after his successful expedition to the Pacific, Mackenzie returned to eastern Canada. In 1801, he published an account of his exploits in the Canadian Far West, *Voyages from Montreal through the Continent of North America to the Frozen and Pacific Oceans*. His accomplishments won him a knighthood the following year. He remained in the FUR TRADE and served as a legislator in Canada before returning to Scotland in 1808.

Sir Alexander Mackenzie's 1789 expedition to the Arctic coast of Canada showed that the Rocky Mountains extended farther north than was thought, and cast severe doubt on the idea of a NORTHWEST PASSAGE west of HUDSON BAY. Mackenzie also brought back the first reports of the coal deposits north of Great Slave Lake. Mackenzie's expedition of 1792–93, taking into account the preliminary trip from Montreal to Lake Athabasca, constituted the first overland journey across North America north of the Rio Grande. His accomplishment was the first recorded transcontinental journey since ALVAR NÚÑEZ CABEZA DE VACA in 1536. Mackenzie's writings on the voyages came to the attention of Thomas Jefferson and gave impetus to the subsequent overland expedition of MERIWETHER LEWIS and WILLIAM CLARK.

Mackenzie, Donald (Donald McKenzie)

(1783–1851) *Scottish fur trader in the Pacific Northwest, cousin of Sir Alexander Mackenzie*

Donald Mackenzie, a native of the Scottish Highlands, was a cousin of SIR ALEXANDER MACKENZIE, the explorer of northwestern Canada. Although he had planned to enter the ministry, he decided at the age of 17 to follow his brother Roderick to North America and join him in the FUR TRADE.

In 1800, Mackenzie arrived in Montreal and went to work for the NORTH WEST COMPANY as a clerk. Then, in June 1810, he was hired by JOHN JACOB ASTOR to take part in a venture to the Pacific Northwest, organized as the Pacific Fur Company, a subsidiary of the AMERICAN FUR COMPANY.

In 1811, Mackenzie accompanied WILSON PRICE HUNT and his Astorians on a trek from St. Louis up the Missouri River, then across the northern Rocky Mountains. He arrived at Astoria on the Oregon coast in early 1812, hav-

ing explored much of the Snake River region en route. That spring, he embarked on a series of fur-trapping expeditions along the Willamette River, COLUMBIA RIVER, and Snake River.

In March 1813, Mackenzie led a large party of fur trappers into the region between the Okanogan and Spokane Rivers, now part of north-central Washington. Through a trader with the North West Company, he learned of the outbreak of hostilities between the United States and Great Britain, later known as the War of 1812. With Astoria facing imminent capture by a British naval force then on its way to the Pacific coast, Mackenzie and the other managers of the Pacific Fur Company opted to sell the post to the North West Company. The sale was completed in April 1814, after which they headed back to New York to report to Astor.

Mackenzie tried without success to obtain another appointment with Astor, who declined to reengage him, believing Mackenzie and his associates had accepted too low a price for the Astoria post. In 1816, Mackenzie rejoined the North West Company and again traveled to the Oregon Country, operating out of Fort George and Fort William on the Columbia River. Rather than rely on Indians bringing furs to central locations, he began sending out brigades of traders and trappers over extensive territory in the Pacific Northwest. By 1819, he had established Fort Nez Perce at the junction of the Columbia and Walla Walla Rivers, near present-day Walla Walla, Washington, from where he directed extensive fur-trading operations into the interior of what is now Oregon, Washington, and southern Idaho, as well as into the south to western Wyoming and northern Utah.

Mackenzie went on to work for the HUDSON'S BAY COMPANY after it merged with the North West Company in 1821. In 1824, he became director of the company's operations near what is now Winnipeg, Canada, and, soon afterward, he was named governor of the Red River Colony, extending over a vast region of what is now Minnesota, North Dakota, and Canada's Manitoba province. He retired in 1833 and settled on an estate near Mayville in western New York State.

Donald Mackenzie had a leading role in the first great commercial expedition to cross North America in 1811–12 and was later instrumental in reviving the British fur trade in the Oregon Country following the War of 1812. Reportedly a large and imposing figure, weighing over 300 pounds, he was nonetheless a man of great action, nicknamed "Perpetual Motion" by his colleagues. Fur traders under his command explored a wide area of the Pacific Northwest.

Macomb, John N. (1811–1889) *U.S. Army officer in the American Southwest*

In 1855, Captain John N. Macomb of the U.S. Army Corps of Topographical Engineers was placed in command of U.S.

government wagon roadbuilding projects in northern New Mexico. Under his supervision, the route between Taos and Santa Fe, known as the Camino Militar, was developed, as well as the road between Albuquerque and Tecolote.

In summer 1859, Macomb commanded an official U.S. exploring expedition into the San Juan Mountains in search of a route into Utah from the south. He led his men along the Old Spanish Trail from Santa Fe to the Rio Chama, then traced the course of the San Juan River to its headwaters. In the Sierra de La Plata, Macomb and his party located ruins of the ancient Anasazi Indian civilization, near what is now Mesa Verde National Park in southwestern Colorado. At Cañon Pintado, Macomb came upon a complete petrified dinosaur skeleton, which he sent back East for study.

Macomb and a small staff of assistants left the main body of the expedition and explored the Colorado Plateau. They soon reached the junction of the Grand and Green Rivers in eastern Utah, which they determined was the source of the COLORADO RIVER. The Grand River is now considered part of the Colorado itself, and the name has been abandoned. The source of the Colorado is now considered the Grand Lake to the northeast in northern Colorado.

Macomb went on to serve in the Civil War as a commander in a Union army balloon reconnaissance unit.

John N. Macomb surveyed and constructed some of the first major wagon roads in northern New Mexico, which greatly improved communications and accelerated settlement. His 1859 explorations of the Colorado Plateau and Great Basin region of southern Utah and Colorado advanced the knowledge of the river system of the Southwest and determined the source of the Colorado River. The ruins Macomb located at Mesa Verde proved to be one of the foremost sites of Anasazi civilization. His work, *Exploring Expedition from Santa Fe, New Mexico to the Grand and Green Rivers of the Great Colorado of the West in 1859*, was published in 1876.

Magellan, Ferdinand (Fernando Magellanes, Fernão de Magalhães, Fernando de Magallanes)

(ca. 1480–1521) *Portuguese mariner, commander of first expedition to circumnavigate the world, in service to Spain*

Ferdinand Magellan was born in northern Portugal in the vicinity of Oporto and Saborosa. Known in Portugal as Fernão de Magalhães, he was a member of a family of the minor nobility. In 1492, at the age of 12, he became a page at the court of Queen Leonora, consort of Portuguese monarch John II.

Magellan embarked on his first overseas adventure as a member of FRANCISCO DE ALMEIDA'S 1505 expedition to India, along with his friend FRANCISCO SERRANO. He took

part in Portuguese campaigns that secured the port of Diu on the northwest coast of India, and later served under Almeida's successor, AFONSO DE ALBUQUERQUE, in naval actions against Muslim forces at Goa and Calicut on southwestern India's Malabar Coast.

In 1508–09, Magellan and Serrano sailed under DIEGO LÓPEZ DE SEQUIRA in an unsuccessful attempt to take the Malayan port city of Malacca on the southern end of the Malay Peninsula. Two years later, Magellan may have accompanied Serrano on an expedition to the Moluccas, then known as the SPICE ISLANDS, where Serrano established contacts with the Muslim ruler of Ternate.

After returning to Portugal in 1512, Magellan was made a captain in the army and given a noble rank. Later that year, he fought against the Moors in Morocco, where he suffered a wound in the knee that left him lame for the rest of his life. Despite his gallantry in battle, Magellan soon fell out of favor with Portuguese king Manuel I, reportedly over his role in an unauthorized sale of some cattle to the Moroccans. He returned to Lisbon, where he sought royal backing for a proposed expedition to the East Indies, hoping to join his friend Serrano and reap the tremendous profits in the trade in cloves and other spices. When refused a raise in salary by his king, Magellan decided to seek support for his project in Spain; he renounced his Portuguese citizenship and crossed the border into Spain in 1517.

From reports brought back from survivors of JUAN DÍAZ DE SOLÍS'S expedition to the southeast coast of South America, Magellan learned that the continent appeared to curve southwestward. With this information, together with secret Portuguese navigational charts to which he probably had access, he speculated that South America was separated from the conjectured GREAT SOUTHERN CONTINENT by a strait providing a westward passage to the Far East.

Magellan proposed to Charles I of Spain (later Holy Roman Emperor Charles V) that he could reach the Moluccas by sailing westward around South America and continue on a westward course back to Spain, thus avoiding Portuguese territory on the homeward voyage. At that time, it was not known on which side of the demarcation line, established in the 1494 Treaty of Tordesillas between Spain and Portugal, the Moluccas were located. Based on MARTIN BEHAIM'S GLOBE of 1492 and data provided by an associate, astronomer and cosmographer Ruy Faleiro, Magellan suggested that the distance from the west coast of South America to the Moluccas was not great and that the Moluccas actually fell within the part of the world allocated to Spain in the treaty.

Hoping to gain control of the lucrative SPICE TRADE in the Moluccas, the Spanish Crown offered Magellan the support he needed. Additional financing for the expedition came from the German banking firm the House of Fuggers. Five ships were provided for the expedition: the *Trinidad*,



Ferdinand Magellan (*Library of Congress*)

Magellan's flagship, the *San Antonia*, the *Concepción*, the *Victoria*, and the *Santiago*.

Magellan's fleet, with a combined crew of 237 men, sailed from Sanlúcar de Barrameda, south of Seville, on September 20, 1519. After stopovers at Madeira and the CANARY ISLANDS, the expedition followed the coast of West Africa to Sierra Leone, then crossed the Atlantic Ocean to South America. Seeking a passage through the continent, Magellan explored along the coast of Brazil, examining the Bay of Guanabara at present-day Rio de Janeiro. He also explored the estuary of the Rio de la Plata, where he sighted a high mountain and exclaimed "monte video!" ("I see a mountain!"), which became the name of a settlement in the region two centuries later—Montevideo, Uruguay.

With the onset of the Southern Hemisphere's winter season, Magellan and his ships put in at the bay of San Julian along the southeast coast of present-day Argentina. The region came to be known as Patagonia, or "Land of Big Feet," after the Telhuelche Indians, who not only appeared to be of greater than normal stature, but whose footgear made their feet seem enormous. Over the next five months, Magellan attempted to keep his men occupied, but dissension soon developed, with many of the Spanish members resenting their Portuguese commander. A mutiny erupted, which Magellan quelled with the execution of one of the ringleaders. Soon afterward, the *Santiago* was wrecked while surveying the coast of Patagonia.

With his four remaining vessels, Magellan set out before the end of the winter to seek the passage that he believed would lead him to the South Sea. On October 21, 1520, the feast day of St. Ursula of the 11,000 Virgins, a strait was sighted beyond a cape, which he named Cape Vírgenes in honor of the occasion. Over the next 38 days, Magellan's ships made their way through the passage, since named the STRAIT OF MAGELLAN, negotiating channels that varied from two to 15 miles in width. While in the strait, a rebellion erupted aboard the *San Antonia*, and the ship deserted the fleet and returned to Spain. Along the shore to the south, many fires were seen, and for this reason, it was called Tierra del Fuego ("Land of Fire").

On November 28, 1520, Magellan and his ships reached the western end of the strait at a point he named Cape Deseado ("Desired Cape") and entered an ocean, which he called the "Pacific" after its apparent calmness. After exploring northward along the west coast of South America, he set out westward across the Pacific, expecting to encounter before long the Moluccas and the rest of the EAST INDIES. Although his exact route is not known, his course took him north of the numerous islands of the South Pacific. During this period, he sighted land only once, and these were several barren and uninhabited atolls of the Tuamotu Islands, which he dubbed the Islands of Disappointment. With the westward passage across the Pacific taking

much longer than anticipated, supplies of fresh food and water dwindled, and the men began to die of SCURVY. At one point, Magellan's sailors resorted to boiling and eating leather sailing gear, as well as sawdust and rats.

Finally, on March 6, 1521, after nearly 100 days out of sight of land, Magellan came upon an island group and obtained fresh provisions. The natives, although friendly, proved to be larcenous, stealing anything on the ships that they could carry away, and for this reason Magellan called the islands the Ladrones, or "Islands of Thieves," later known as the Marianas.

After a short respite on Guam in the Marianas, Magellan continued his westward search for the Moluccas, not realizing he was well north of those islands. After 10 days of sailing, he reached Samar in the Philippines, making the European discovery of these islands. After a brief exploration of Samar, he continued on to Cebu, where he succeeded in winning the allegiance of the natives and Christianizing their ruler. Soon afterward, he accompanied the native king of Cebu on a military campaign against the nearby island of Mactan. On April 27, 1521, Magellan was fatally wounded by poison-tipped arrows.

Command of Magellan's three remaining ships went first to Duarte Barbosa, Magellan's brother-in-law, and Juan Rodríguez Serrano, probably a brother of Magellan's friend Francisco Serrano. By that time, more than half of the expedition's 250 men had either died of scurvy or been killed in native attacks. Shorthanded, they decided to burn one of the ships, the *Concepción*, and continue with the *Victoria* and the *Trinidad*. Barbosa and Serrano were soon killed in another attack by the natives, and the expedition's pilot, João Lopes de Carvalho, took command. He cruised the East Indies but was unable to locate the Moluccas. Eventually, JUAN SEBASTIÁN DEL CANO assumed leadership and managed to lead the two remaining ships to Tidore in the Moluccas.

At Tidore, it was soon learned that Francisco Serrano had been murdered, and that a Portuguese fleet was on its way. Fearing arrest by the Portuguese, Cano promptly took on a load of spices aboard the *Victoria* and sailed for Spain by way of the CAPE OF GOOD HOPE. Meanwhile, the *Trinidad*, having tried unsuccessfully to sail eastward back across the Pacific, was captured by the Portuguese, and its Spanish crew members were held as prisoners for several years afterward.

The *Victoria* sailed into the harbor at Sanlúcar de Barrameda, Spain, on September 6, 1522, the only one of Magellan's ships to complete the first round-the-world voyage. Aboard were only 18 men, the rest having died on the voyage or been taken into custody by the Portuguese during a stopover in the Cape Verde Islands. Among the survivors was the Italian gentleman adventurer FRANCESCO ANTONIO PIGAFETTA, who later published his journal of the voyage. Although most of the ships had been lost, the

spices taken on in the Moluccas more than paid for the initial investment for the expedition. Moreover, with knowledge of the Strait of Magellan, Portugal's monopoly over trade with the East Indies by way of the Cape of Good Hope had been broken.

Ferdinand Magellan did not live to complete the historic voyage he initiated. Nevertheless, if his westward passage across the Pacific to the Philippines is considered together with his earlier voyages to India and the East Indies, he was among the first explorers known to have circled the world. The Magellan voyage of 1519–22 linked the earlier explorations of VASCO DA GAMA and CHRISTOPHER COLUMBUS, proving beyond any doubt that the Earth was a sphere, and that the world's oceans were connected, including the Indian Ocean, which had been thought to be a landlocked sea since the days of PTOLEMY in the first century A.D. Moreover, Magellan's explorations along both the east and west coasts of South America enabled European geographers to determine more accurately the true dimensions of that continent. Magellan's voyage also revealed the true vastness of the Pacific Ocean and the extent of the distance between Asia and the Americas.

Maire, Jakob le See LE MAIRE, JAKOB.

Malaspina, Alessandro (Alejandro Malaspina)

(ca. 1755–1810) *Italian-born Spanish naval officer in the Americas and the South Pacific*

Alessandro Malaspina was born in Italy's Lombardy region. In about 1770, he traveled to Spain and entered the Royal Naval Academy at Cádiz, eventually becoming a captain in the Spanish navy.

In 1789, Malaspina and fellow naval officer José Bustamante y Guerra won approval from the Spanish government for their proposed scientific CIRCUMNAVIGATION OF THE WORLD. Two ships were built for the enterprise, the *Descubierta* (discovery) and the *Atrevida* (daring). For planning and advice, Malaspina consulted Spanish naval officers who had conducted earlier explorations of South America.

The ships left Cádiz, Spain, on July 30, 1789. Along with a full complement of officers and sailors, the 200-man expedition included scientists, ethnologists, and artists. Its purpose, in addition to scientific research, was to evaluate the status of Spanish possessions in South and North America and reassert Spanish claims to the Pacific islands.

Malaspina's first destination was South America. He reached the coast of Brazil and proceeded to the estuary of the Río de la Plata. While some of the expedition's scientists explored that region, others went overland into Argentina and made a study of the Pampas. A scientific station was established near Montevideo in present-day

Uruguay, where astronomical and gravitational observations were undertaken.

The Malaspina expedition sailed southward along the South American coast and visited the Falkland Islands (Malvinas), Patagonia, and Tierra del Fuego. The ships rounded CAPE HORN and followed the coast of Chile and Peru. Malaspina made stops at San Carlo de Chiloé, Puerto Concepción, and Valparaíso, where the team of scientists undertook expeditions into the ANDES MOUNTAINS and the upper Amazon Basin. Similar inland expeditions were made from Guayaquil, Ecuador.

In spring 1791, Malaspina and his ships arrived in Acapulco, Mexico. There, Malaspina received dispatches from Spain that altered the course of the expedition. The papers of 16th-century Spanish navigator Lorenzo Ferrer Maldonado had recently been uncovered in Catalan, indicating the existence of a passage through North America, with an outlet supposedly in the Gulf of Alaska. Rather than head westward across the Pacific Ocean to the HAWAIIAN ISLANDS as planned, Malaspina was instructed to head northward along the coast of North America and seek the long-sought NORTHWEST PASSAGE, known since the early 1500s also as the STRAIT OF ANIAN.

Malaspina's expedition headed northward from Acapulco on May 2, 1791. By June 1791, his ships had reached Alaskan waters. The Spanish explored westward along the Gulf of Alaska almost as far as the Kenai Peninsula. They then headed eastward to Mulgrave Sound (now Yakutat Bay). A scientific station was established there, in order to study the region's plant and animal life, as well as the culture of the Tlingit Indians.

In small boats, Malaspina explored Yakutat Bay with cartographer Felipé Bauza and crew member Antonio de Tova. They soon found there was no eastern outlet for the Strait of Anian, and Malaspina dubbed the region the "Port of Disappointment." The glacier he discovered on the bay is now called Malaspina Glacier.

In mid-summer 1791, Malaspina's expedition headed southward for Vancouver Island. In 1789, the Nootka Sound controversy had erupted between Spain and England, and the Spanish government wanted Malaspina to assert Spanish sovereignty at its base at Santa Cruz de Nutka (present-day Friendly Cove, British Columbia).

Upon reaching Nootka Sound, off the west coast of Vancouver Island, Malaspina and his party established another scientific station. They studied the region's Nootka Indians and again made a search for an inland passage. But the coastline of Vancouver Island had too many shallow inlets and bays for his large ships to explore adequately, and plans were made for a follow-up expedition.

From Nootka Sound, Malaspina sailed southward along the Pacific coast of North America, exploring Puget Sound. His cartographers made the first charts of the Washington,

Oregon, and California coasts based on triangulation. The expedition's artists, including Manuel José Cardero and Tomás de Suria, produced coastal profiles that detailed how various sections of the Pacific coast looked to approaching ships.

Malaspina's ships arrived at Monterey, California, on September 11, 1791. Another scientific station was established, and his naturalists and scientists explored the interior of central California. Among them was Bohemian botanist Tadeo Haenke, who made the first scientific description of California's giant redwood trees.

In late September 1791, the expedition left Monterey and followed the coastline back to Acapulco. In summer 1792, Malaspina sent two sloops from Acapulco, the *Mexicana* and the *Sutil*, which succeeded in making the first circumnavigation of Vancouver Island.

Malaspina himself set sail westward across the Pacific. The expedition reached Guam and visited the Philippines, Macao, NEW ZEALAND, and Australia. Malaspina then headed eastward across the Pacific, stopping at the Fiji Islands, then retraced the expedition's outward-bound route around the west and east coasts of South America.

Malaspina arrived back in Cádiz, Spain, on September 21, 1794, after a voyage of over five years. Not long after his return, he became embroiled in a political intrigue and was found guilty of plotting a coup against the Spanish government. He served eight years in prison, then was exiled to his native Italy, where he spent the remainder of his life. Most of the seven-volume report of his expedition was suppressed by the Spanish government for nearly a century.

Alessandro Malaspina did not circumnavigate the world as planned. Nevertheless, his five-year voyage, undertaken in the spirit of scientific inquiry, complemented the late-18th-century Pacific explorations of British captain JAMES COOK and French navigator JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse. In addition to scientific studies of the flora, fauna, and native culture of the Americas, Malaspina brought back the first scientifically based navigational charts of the west coast of North and South America. Previous charts of much of these shores had not been revised since the voyages of 17th-century Spanish explorers.

Malinche (Malintzin, “the tongue,” Doña Marina, Marina) (ca. 1508–ca. 1528) *Aztec interpreter in the Spanish conquest of Mexico*

Malinche was a young Aztec woman living in Mexico at the time of the Spanish conquest. She was born in Painalla, a village in the province of Coatzacoalco, a region adjacent to Aztec territory.

Malinche's father, a rich and powerful native chief, died when she was still an infant; her mother remarried and bore

a son by her second husband. In an attempt to take away Malinche's rightful inheritance on behalf of her newborn son, Malinche's mother falsely reported that Malinche had died. The corpse of a dead slave child was used to verify the death, while Malinche herself was secretly sold into slavery to an itinerant trader from Xicallanco. Eventually, Malinche was sold to Maya Indians living near the mouth of the Tabasco River on Mexico's Gulf Coast, west of the Yucatán Peninsula.

By 1519, Malinche had grown into a beautiful young woman. That year, HERNÁN CORTÉS and his army of conquistadores arrived on the Mexican mainland. When the Spaniards reached the island of San Juan de Ulúa, off the coast of the Tabasco region, the local chiefs presented Cortés with a group of young Indian women, among whom was Malinche. Possessing intelligence as well as great beauty, she soon came to the attention of Cortés.

Malinche knew both Nahuatl, the language of the Aztec, as well as Mayan dialects. Prior to his landing on the Yucatán mainland, Cortés had stopped at offshore Cozumel Island, where he had picked up the missionary priest Jerónimo de Aguilar, who, in the course of his eight years among the Indians, had learned Mayan. With Aguilar's knowledge of Spanish and Mayan, together with Malinche's ability in Nahuatl and Mayan, Cortés could learn about the Aztec Empire. Malinche informed Cortés of the Aztec belief in the return of the white god Quetzalcoatl and told him that many of the Aztec already believed Cortés and his Spanish forces to be the living embodiment of this divinity and his entourage.

Malinche, who was baptized a Christian as Doña Marina, rapidly learned Spanish and eventually acted as Cortés's interpreter in his dealings with the Aztec ruler Montezuma (Moctezuma). During the conquest of 1519–21, she exposed spies of hostile Aztec forces within his camp and revealed a plot by the Aztec rulers to exterminate Cortés and his men in a secret attack.

By 1525, Malinche and Cortés had had a son, Don Martín Cortés, who grew to be a military leader among the Spanish forces in Mexico. That year, Malinche was reunited with her mother, whom she forgave for abandoning her to slave traders, bestowing upon her gifts of jewels. Also in 1525, Cortés took Malinche with him on his conquest of present-day Honduras, and, in the course of that campaign, he presented her as a gift to one of his military colleagues, Don Juan Xamarillo, a knight from Castile.

Malinche settled on lands she was granted in her native Coatzacoalcos province, where she spent the rest of her short life (although some sources suggest she went to live in Spain with Xamarillo), dying at the age of 20. The details of her life and the role she played for the Spanish were recorded by BERNAL DÍAZ DEL CASTILLO in his account of the conquest.

Malinche greatly aided the Spanish in their swift victory over the Aztec by providing her skills as an interpreter and by informing Cortés that the Aztec perceived the Spaniards as divine beings.

Mallet, Pierre-Antoine (Pierre-Antoine Maillet, Pierre-Antoine Mailhet, Pierre-Antoine Malet) (1700–ca. 1751) *French Canadian fur trader on the northern and southern plains*

French-Canadian Pierre-Antoine Mallet moved to Detroit with his parents, Pierre Mallet and Madeleine Thuney, as a young child. His brother, Paul, was baptized there in 1711.

In the early 1730s, the two brothers relocated to the Illinois country, becoming fur traders on the central MISSISSIPPI RIVER. In 1734, they left a French trading post in the Illinois country and ascended the MISSOURI RIVER into the Dakotas, where they established trade contacts with the Mandan Indians. They also established a trade route between the French merchants of St. Louis and New Orleans and Native Americans of south-central Canada.

In 1739, the Mallet brothers and a small trade caravan set out from the Illinois country, intending to reach the Spanish settlements in New Mexico by way of the Missouri River. They erroneously believed the Missouri would lead them directly to Santa Fe.

The Mallets followed the Missouri to its junction with the Niobrara River in northern Nebraska. They explored the Niobrara and, guided by Pawnee Indians, crossed present-day Nebraska southwestward to a river they named “La Rivière Plate”—the “Flat River”—and known afterward as the Platte River. They continued southward beyond the Platte, exploring into present-day Kansas. From the Republican and Smoky Hill Rivers, they crossed into the valley of the Arkansas River. The Mallets followed the Arkansas River and reached the Apache Indian settlement at El Cuartelejo in western Kansas. From there, they were guided by an Indian into the southeastern Colorado ROCKY MOUNTAINS and the Raton Mountains of northern New Mexico. They crossed the Raton Mountains, possibly through Raton Pass, stopped at Taos, then entered Santa Fe on July 22, 1739.

Even though visits by foreign traders were forbidden by the Spanish government, the Mallets were welcomed in Santa Fe, having brought with them a shipment of sought-after French manufactured goods, available at considerably lower prices than similar items imported from Mexico.

The Mallet brothers and their six companions were guests of prominent Santa Fe merchants for the next nine months. The colonial governor of New Mexico petitioned Spanish authorities in Mexico City for the Mallets to trade openly out of New Orleans with the Spanish. Permission

was denied, however, and the Mallets and the rest of their party were ordered out of New Mexico.

In May 1740, the Mallets headed eastward into the upper Pecos Valley. They explored the Texas Panhandle and, on June 14, came upon a river that was later named the Canadian in their honor. The Canadian River took them back to the Arkansas, which they followed to the Mississippi and New Orleans.

In New Orleans, French colonial governor JEAN-BAPTISTE LE MOYNE, sieur de Bienville, engaged the Mallets to lead André Fabry de la Bruyère’s trade expedition to New Mexico.

Starting out in August 1741, the Mallets led the expedition up the Mississippi to the Arkansas, then attempted to cross the southern plains. But the water level on the southwestern rivers was too low for their boats. The brothers separated from the main party and sought an overland route, but failed to reach Santa Fe.

The Mallets settled near a trading post on the Arkansas River, using it as their base of trading operations at least until 1750. Pierre Mallet headed another expedition out of New Orleans that year, organized by Louis-Xavier Martin de Lino de Chalmette, head of the Arkansas post, and Pierre de Rigaud de Vaudreuil, the new governor of New Orleans. Pierre Mallet and three companions were arrested by Spanish officials at Pecos in November 1750, then taken to Santa Fe, then El Paso, and, in February 1751, to Mexico City. It is thought that he died a prisoner in Spain. His brother Paul died at the Arkansas post in 1753.

Pierre and Paul Mallet’s expeditions into the Dakotas opened the Indian trade of the northern plains to the French on the lower Mississippi. Their 1739–40 exploration of what is now Kansas, Nebraska, Colorado, and New Mexico laid the basis for the development of the Santa Fe Trail, which remained a major trade and transportation conduit into the Southwest for more than a century.

Mallory, George Herbert Leigh (George Leigh-Mallory) (1886–1924) *British mountain climber on Mount Everest in the Himalayas*

British-born George Mallory, the son of a clergyman, became a teacher as a young man. In World War I, he served as a gunner for British forces. He became an accomplished rock climber and ice climber in his spare time and established his reputation in MOUNTAIN CLIMBING with ascents in the Alps.

In 1921–22, Mallory participated in two British pioneering expeditions on the north side of MOUNT EVEREST, the tallest mountain in the world at 29,035 feet above sea level in the HIMALAYAS. Plagued by strong winds and avalanches and without oxygen bottles to assist in breathing the thin air, the teams were unable to reach

the summit, falling only 2,000 feet short on the second climb.

In 1924, Mallory participated in a third expedition. His climbing partner was 22-year-old Andrew “Sandy” Irvine, who, although he had little high-altitude climbing experience, was an expert in the supplemental oxygen rigs that Mallory now considered essential for the expedition. The first part of their ascent up the north side was successful, but they ran into problems near the top. The last person to see them alive was Noel Odell, who reported that they were possibly within a few hours of the summit—maybe as close as 80 feet—at about 1:00 P.M. on June 8.

In 1999, Mallory’s body was found by an expedition filming a television special for *NOVA*, a program of the Public Broadcasting Service (PBS). The location of the body, at the point where he was last seen, began a debate as to whether he and Irvine had died after rather than before reaching the summit. Mallory’s body was left on the mountain, as were those of many others who died in ensuing years, because of the difficulty of recovering bodies from that particular location.

George Mallory, legendary because of his pioneering attempts on Mount Everest as well as the mystery surrounding his disappearance, was once asked why he wanted to climb Mount Everest. He replied with the now-famous quote, “Because it is there.” SIR EDMUND PERCIVAL HILLARY and TENZING NORGAY finally reached Mount Everest’s summit in 1953, via the south side.

Manning, Thomas (1772–1840) *British traveler in Tibet*

In 1811, Thomas Manning, an employee of the BRITISH EAST INDIA COMPANY in Calcutta, endeavored to undertake a journey northward across the western HIMALAYAS into Tibet, which had been closed to British travelers since 1791.

At first Manning sought support for his expedition from his employers, proposing to travel to Tibet as the official representative of the British East India Company. When this plan was rejected, he set out on his own in late summer 1811, accompanied only by a Chinese servant. He made his way northward across the Himalayas in Bhutan, disguised in Oriental clothing, and he reached the Tibetan capital of LHASA in December 1811.

Manning remained in Lhasa for more than three months, during which he conferred with the seven-year-old Ninth Dalai Lama, the spiritual leader of Tibetan Buddhism, and toured the Buddhist palace, the Potala. In April 1812, compelled by occupying Chinese forces to leave Lhasa, he returned southward to India.

Thomas Manning later prepared a detailed account of his impressions of Lhasa and the Tibetans, especially of the young Dalai Lama. He was the first Englishman to enter

Lhasa, as well as the first European to visit the Tibetan capital, since the visit of Italian Jesuit missionary IPPOLITO DESIDERI in 1716. Nearly a century elapsed before the next Englishman, SIR FRANCIS EDWARD YOUNGHUSBAND, ventured into the forbidden city of Lhasa in 1904.

Marchand, Jean-Baptiste (1863–1934)

French army officer in Africa

Jean-Baptiste Marchand was born in Thoisey, near Lyon in eastern France. At the age of 20, he enlisted in the French army, and, four years later, he was commissioned a sub-lieutenant.

In 1889, Marchand undertook his first tour of duty in France’s colonial possessions of West Africa. In addition to military actions in what is now Senegal, he undertook exploring expeditions to the source of the NIGER RIVER and into the region inland from the Ivory Coast.

Marchand returned to France in 1895, where he was promoted to the rank of major. He returned to Africa in command of a military expedition aimed at reinforcing French forces in the territory between the Ubangi and Bahr El Ghazal Rivers, now parts of the Central African Republic and southern Sudan.

From the mouth of the CONGO RIVER (Zaire River) on the west coast of central Africa, Marchand led his command northeastward across the continent. Via the Ubangi and Uele Rivers, he traveled eastward across what is now northern Democratic Republic of the Congo. By late summer 1898, he had crossed the watershed region between the upper Congo and upper Nile Rivers and reached Fashoda (now Kodok) on the White Nile, in southern Sudan. Britain’s general Horatio Herbert Kitchener, commander of Anglo-Egyptian forces in Sudan, protested the presence of the French troops at Fashoda and ordered Marchand to withdraw. Marchand’s refusal to leave the upper White Nile region resulted in a major international crisis, known afterward as the Fashoda Incident, which brought England and France to the brink of war.

After intense diplomatic negotiations, the French government ordered Marchand’s withdrawal. In November 1898, he led his expedition southeastward along the Sobat River, reaching Djibouti on the Gulf of Aden by May 1899.

Soon afterward, Marchand returned to France, where he was hailed as a hero for his great journey across Africa. In 1900, he took part in the suppression of the Boxer Rebellion in China. Promoted to the rank of general by the outbreak of World War I in 1914, he went on to command French forces in the Battle of the Somme and in the Battle of Verdun. He retired from military service in 1919.

Jean-Baptiste Marchand’s explorations in the last decades of the 19th century took him across both West and East Africa. In the course of his transcontinental march, he

led the first major expedition to the upper NILE RIVER region from the coast of West Africa.

Marco Polo See POLO, MARCO.

Marcos de Niza See NIZA, MARCOS DE.

Marcy, Randolph Barnes (1812–1887) *U.S. Army officer in the American Southwest*

Randolph B. Marcy was born in Greenwich, Massachusetts. He graduated from West Point in 1832 as a second lieutenant in the infantry and was assigned to Fort Howard, a frontier post on the west shore of Lake Michigan, near present-day Green Bay, Wisconsin. He served in the last phase of the Black Hawk War of 1832, then went on to a long military career on the frontier.

In 1849, Marcy, as a captain in the U.S. Fifth Infantry, commanded a military escort for an emigrant wagon train bound for the California goldfields from Fort Smith, Arkansas. He was to accompany the wagon train as far as Santa Fe, New Mexico, and en route blaze a trail across the Indian Territory (present-day Oklahoma) and northern Texas, along the south bank of the Canadian River. Attached to his expedition was army topographer Lieutenant JAMES HERVEY SIMPSON. Marcy left Fort Smith on April 4, 1849. Leading his command in advance of the wagon train, he traversed the Cross Timbers region of northern Texas. He then explored the Llano Estacado (staked plains) region of western Texas and eastern New Mexico, which he later characterized as the “Great Sahara of North America.” Marcy and his party reached Santa Fe on June 28, 1849, after crossing 800 miles of the southern plains.

On his return to the Indian Territory, Marcy followed a more southern route through Texas. He crossed the Organ, Sacramento, and Guadalupe Mountains of central Texas, followed the Pecos River to the Brazos, then headed northward to the Red River and Fort Washita. In his official report of the expedition, Marcy declared that the southern route from western Arkansas to New Mexico was highly suitable for emigrant wagon traffic, and before long, Fort Smith became a major gateway for overland travel into the southern plains.

On an 1852 military reconnaissance, Marcy located the source of the Red River near present-day Amarillo, Texas. He then explored what is now Arizona and New Mexico, making contact with previously isolated Indian bands. Based on his explorations, Marcy made recommendations to the army that led to the establishment of a chain of forts stretching from Oklahoma to western Texas.

Captain Marcy served in western Wyoming and northeastern Utah during the Mormon War of 1857–58.

In November 1857, with Fort Bridger in southwestern Wyoming cut off by Mormon insurgents, Colonel Albert Sidney Johnston ordered Marcy to lead a detachment of 60 mounted soldiers and a contingent of MOUNTAIN MEN southward to obtain supplies and fresh horses at Fort Massachusetts in southwestern Colorado’s San Luis Valley.

Marcy and his command made their way southward through the winter snows of the southern Rocky Mountains, at times forcing their way through snowdrifts as high as 10 feet. Through some stretches the route was passable only after some of the soldiers broke a path through the high snows by crawling on their hands and knees. They became lost in the Sangre de Cristo Mountains while searching for Cochetopa Pass, but were saved by a Mexican mule driver named Manuel Aleno, who managed to guide them to it.

By the time Marcy and his men had entered the San Luis Valley, they were short of food and in an exhausted state. Facing death from starvation and exposure, they nevertheless pushed on, and after another 10 days, reached Fort Massachusetts. Their harrowing north-south trek had traversed most of the present state of Colorado in severe winter weather, a distance of more than 600 miles across snow-covered mountains. On the last part of the journey, they had succeeded in making a winter crossing of the San Juan Mountains, the same range in which JOHN CHARLES FRÉMONT and his expedition had met disaster in the winter of 1848–49.

Although Marcy’s heroic march through the southern Rockies ultimately succeeded in securing aid for beleaguered Fort Bridger to the north, the extreme difficulty of the journey also underscored the need for better north-south travel routes across the Colorado Plateau and Great Basin. As a result, Marcy’s relief expedition prompted the first formal reconnaissance of the San Juan Mountains, which was undertaken by Captain JOHN N. MACOMB of the U.S. Army Corps of Topographical Engineers in 1859.

In the Civil War, Marcy was breveted a brigadier general of volunteers and served as chief of staff for his son-in-law, General George B. McClellan. After the war, Marcy became inspector general of the army, retiring from active duty in 1881.

Randolph B. Marcy’s 1849 wagon route across Texas to Santa Fe provided an eastern connection for the established route from the Rio Grande to the Pacific coast. He traced the Red River to its source in 1852, which the earlier explorations of both ZEBULON MONTGOMERY PIKE and STEPHEN HARRIMAN LONG had been unable to do. Marcy’s military career on the American frontier spanned the period from the Mexican Cession of 1848 to the settlement of the southern plains after the Civil War. He wrote a number of official reports and personal accounts of his explorations, including *Exploration of the Red River in 1852* (1853), *The Prairie Traveller, a Handbook for Overland Emigrants* (1859), *Thirty*

Years of Army Life on the Border (1866), and *Border Reminiscences* (1871).

Marignolli, Giovanni de (John of Marignolli)

(ca. 1290–unknown) *Italian envoy, missionary in China*
Giovanni de Marignolli became a Franciscan friar in Florence, Italy, at a young age. He later taught theology at the University of Bologna.

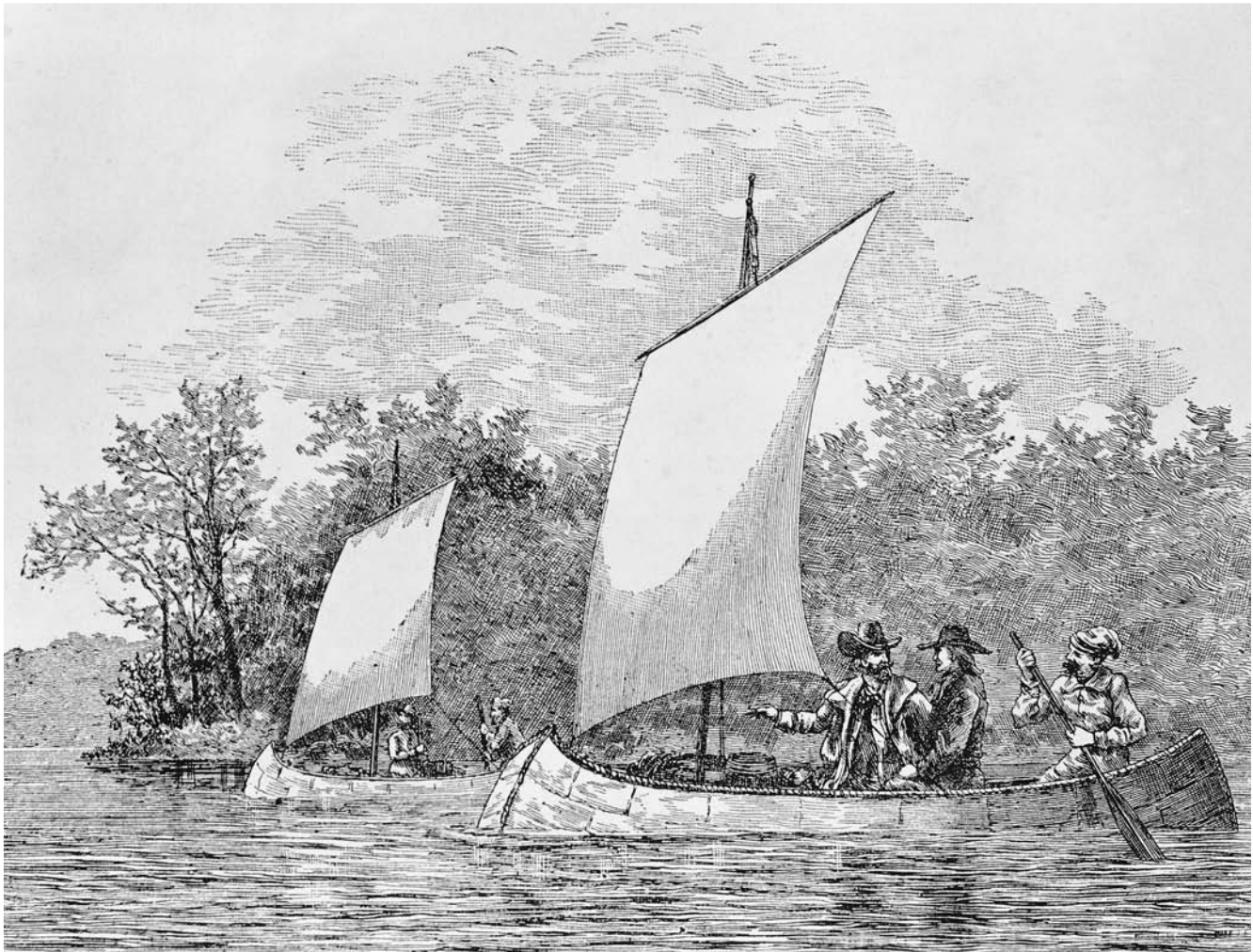
In December 1338, Marignolli set out from Avignon in southeast France as part of a papal mission to the emperor of China, arriving in Constantinople (present-day Istanbul) in early 1339, then continuing on to the Crimea on the north shore of the Black Sea and to Sarai near present-day Volgograd. At Sarai, he met with Usbek, khan of Kiptchak, who provided an escort as far as Armalec, which he reached in the winter of 1340–41. He remained there about a year and crossed the GOBI DESERT to Peking (Beijing), arriving in 1342. He stayed there three years, continuing the missionary work begun by JOHN OF MONTECORVINO.

Marignolli next traveled in southern China, India, CEYLON (Sri Lanka), as well as Java and Sumatra in present-day Indonesia. He departed India from the Malabar Coast and sailed to the Persian Gulf. After travels in the Middle East and Egypt, he returned to Italy in 1353.

Marignolli became the bishop of Bisignano in 1354 and papal legate in Avignon two years later. The next year, he became a chaplain to Charles IV, Holy Roman Emperor and king of Bohemia. He also served as court historian. The date of his death is unknown.

Giovanni de Marignolli's *Bohemian Chronicle*, in which he relates his travels, educated Europeans on lands to the east.

Marquette, Jacques (1637–1675) *French missionary, interpreter in the Great Lakes and Mississippi Valley regions*
Jacques Marquette was born in Laon, France. In 1654, he entered the Jesuit order. In 1666, he was ordained a missionary priest and went to French Canada to work among



Jacques Marquette and Louis Jolliet entering the upper Mississippi River (Library of Congress)

Native Americans. He studied Indian languages for two years at the Jesuit center in Trois Rivières on the St. Lawrence.

In 1668, Marquette went west to Sault Sainte Marie, where he established a mission to the Ottawa Indians. The next year, he traveled to the western end of Lake Superior and established La Pointe mission on Chequamegon Bay. It was here he first met fur trader LOUIS JOLLIET. From the Indians of the western Great Lakes, Marquette and Jolliet heard reports of a great south-flowing river.

Sioux (Dakota, Lakota, Nakota) Indian attacks caused Marquette to relocate to Mackinac Island in 1670, where he established the St. Ignace mission. In late 1672, Jolliet joined Marquette at Mackinac. The French colonial government had commissioned Jolliet to search for the great south-flowing river and determine its outlet. Marquette, with his expertise in Indian languages, was chosen as the expedition's interpreter.

In May 1673, Marquette and Jolliet left Mackinac with a part of VOYAGEURS and Miami Indian guides and traveled by CANOE south to Green Bay. They then traveled by way of the Fox and Wisconsin Rivers to the MISSISSIPPI RIVER, which they descended as far as the mouth of the Arkansas River. At that point, warnings from local Indians—probably the Quapaw—of hostile natives farther downstream led Marquette and Jolliet to turn back; they eventually reached Lake Michigan by way of the Illinois River.

In fall 1673, Marquette returned to Mackinac and resumed his missionary work. In 1674, he embarked on an expedition to the Illinois Indian bands he had contacted on the Mississippi expedition. He explored the region of what is now northeastern Illinois, visiting the site of present-day Chicago. His health began to fail, however, and during his return journey to Mackinac and St. Ignace, he died on the east shore of Lake Michigan, near present-day Ludington, Michigan.

Jacques Marquette played a key role in the first European descent of the Mississippi River from the Great Lakes. He obtained important geographic information from the Indians, which helped the expedition locate the portage route between the Fox and Wisconsin Rivers. With Louis Jolliet, he helped determine that the Mississippi most likely flowed into the Gulf of Mexico, which was proven conclusively by RENÉ-ROBERT CAVELIER DE LA SALLE in the years to come.

Marsden, Samuel (1764–1838) *British clergyman in Australia and New Zealand*

Born in Horsforth, near Leeds, England, Samuel Marsden was the son of a retail merchant. Following his early education at Hull Grammar School, he worked briefly for his father, then was granted a scholarship to study at Cambridge University's Magdalene College, which he entered in 1790.

While at Cambridge, Marsden was ordained a minister in the Anglican Church, and, in January 1793, he received a royal commission as assistant chaplain to the newly established penal colony at New South Wales, Australia.

In March 1794, Marsden arrived at New South Wales, settling at Parramatta near present-day Sydney. In addition to overseeing the religious life of the convict population, he was instrumental in creating the first separate penitentiaries for women prisoners and in establishing schools for the colony's orphans.

Marsden returned to England in 1807, where he met with King George III and informed the British monarch on the progress of the New South Wales settlement. The king presented him with five Spanish or Merino sheep from the royal flock. Upon his return to Australia in 1809, Marsden used these animals to breed his own flock of wool-bearing sheep, which formed the basis for the Australian sheep-raising and wool industry.

In 1814, Marsden outfitted the ship the *Active*, which sailed from New South Wales to NEW ZEALAND's North Island. The two missionaries aboard were the first ever to visit New Zealand. Marsden himself arrived soon afterward, accompanied by six Maori chiefs, who had been residing in Parramatta. Later that year, he gained permission from the Maori to establish the first Christian mission at the Bay of Islands on the North Island.

Over the next 23 years, Marsden made seven voyages from Australia to the North Island of New Zealand. Although his main purpose was to win converts among the Maori, he also undertook extensive explorations along the northern part of the North Island. He investigated the region between the Bay of Plenty and the Firth of Thames and located the narrow strip of land joining the northern peninsula with the rest of the island. The city of Auckland, New Zealand's first capital, was founded on this strip in 1840.

Called the "Apostle of New Zealand," the Reverend Samuel Marsden was also known as the "Flogging Parson" for his propensity for meting out severe punishments to rebellious convicts in New South Wales, especially Irish Catholics. He became one of the largest landowners in New South Wales during its initial period of colonization and, with his wife Ellen, founded one of the colony's leading families. On his final visit to New Zealand in 1837, he entered into a peace treaty with the Maori, which soon led to the founding of the first European settlements on the North Island.

Marsili, Luigi Ferdinando (Count Marsili, Luigi Ferdinando Marsigli) (1658–1730) *Italian naturalist, oceanographer*

Luigi Ferdinando Marsili, born into an Italian noble family, served as a surveyor in Emperor Leopold's Austrian army in

campaigns against Turkey. During his military career, he wrote a history and geography of lands along the Danube River.

After leaving the military, Count Marsili devoted himself to scientific pursuits. In 1706–08, living in Montpellier in southern France, he began a survey and study of the MEDITERRANEAN SEA's coastline, floor, and features, including waves, tides, and currents. Accompanying fishing boats that harvested corals with scoops and nets, he collected specimens and later examined them under a microscope. He defined them as marine plants, which was later disproved (corals are a coelenterate, or invertebrate animal, of the class Anthozoa). In 1712, Count Marsili founded the Academy of Science in Bologna, Italy, and in 1722, was elected a member of the ROYAL SOCIETY.

Luigi Ferdinando Marsili carried out the first scientific underwater exploration. His book *Histoire physique de la mer* (Physical history of the sea), published in 1725, was the first scientific text devoted entirely to oceanography.

Martínez de Irala, Domingo (Domingo Martínez de Iraola, Captain Vergara)

(ca. 1509–1557) *Spanish conquistador, colonial governor in Paraguay*

Domingo Martínez de Irala was born in the town of Vergara, in the Basque region of northeastern Spain. In 1535, Martínez de Irala sailed to South America in an expedition commanded by PEDRO DE MENDOZA, and, in February 1536, he took part in the founding of the original settlement of Buenos Aires in present-day Argentina, at the mouth of the Río de la Plata.

In 1536, Martínez de Irala served as second in command under JUAN DE AYOLAS in an exploration farther up the Río de la Plata, to the Paraná and Paraguay Rivers. He took over command of the newly established colony of Asunción, and, in 1538, he was elected by the colonists as the settlement's governor.

In 1540, Martínez de Irala was replaced as governor by ÁLVAR NÚÑEZ CABEZA DE VACA. Appointed as Cabeza de Vaca's deputy, he was sent on a voyage of exploration in 1542 to the upper Paraguay River, reaching a point 250 miles above Asunción, at a place he called Puerto de los Reyes. Soon after his return in 1543, the colonists at Asunción rose up against Cabeza de Vaca and imprisoned him; the next year, they reinstated Martínez de Irala as governor.

Martínez de Irala set out on another exploration of the Paraguay River in 1546, hoping to find an overland route to Peru. Reaching his previous outpost at Puerto de los Reyes, he left his boats and, with a company of 300 Spaniards and 3,500 Indians, pushed into the interior as far as the eastern slopes of the ANDES MOUNTAINS. There,

he made contact with Indians allied with Spanish forces engaged in the war against rebel leader GONZALO PIZARRO. His soldiers refused to continue northwestward, and he was compelled to return to the Paraguay River and Asunción in a trek made even more arduous because the boats left behind at Puerto de los Reyes had been stolen.

An expedition Martínez de Irala sent out from Asunción in 1548 managed to reach the high plains of what is now Bolivia, and several of its members arrived in Lima, completing one of the earliest east-to-west crossings of the South American continent.

Martínez de Irala led his last foray into the upper Paraguay region in 1550. This journey was so fraught with hardships that it was later dubbed the "Mala Entrada," or "unfortunate invasion." Throughout his governorship in the 1550s, Martínez de Irala continued to consolidate Spanish rule over peoples of the upper Paraguay and Paraná Rivers, and in 1557, he sent out an expedition that founded the town of Ontiveros.

Domingo Martínez de Irala, also known as Captain Vergara after his birthplace, has the distinction of being the first freely elected colonial governor in the Americas. His colonizing efforts in what is now Paraguay made Asunción a center for trade and one of the most important cities of the Río de la Plata region prior to the development of Buenos Aires.

Martius, Carl Friedrich Phillip von (Charles Frederic Philip de Martius; Karl Martius)

(1794–1869) *German botanist in South America*

Carl Friedrich von Martius was born in Erlangen, a German city in northern Bavaria. He attended the University of Munich, graduating in 1816 as a surgeon, with a background in botanical studies.

In 1817, Martius was appointed as physician and botanist for a scientific expedition to eastern Brazil, jointly sponsored by the governments of Austria and Bavaria. Sailing later that year from Trieste, which was then an Austrian port, Martius and the expedition accompanied Archduchess Leopoldina of Austria, who was then en route to South America to join her fiance, the crown prince of Brazil.

Martius, along with another German, Johann Baptist von Spix, the expedition's zoologist, traveled first to the southeastern Brazilian city of São Paulo, and from there headed northward across eastern Brazil. While Spix studied fauna, Martius undertook a thorough examination of the region's natural history, concentrating on flora as well as the life and customs of the native people.

Martius and Spix eventually reached the AMAZON RIVER, which they ascended to its junction with the Japura

River, west of Manaus, near the border with Peru and Colombia. At that point, they separated, with Spix continuing up the Amazon, and Martius up the Japura River into the eastern slopes of the ANDES MOUNTAINS.

After nearly three years in the Amazon Basin, Martius and Spix returned to Europe, where Martius set to work on a three-volume account of his explorations, *Journey to Brazil*, published in Munich from 1824 to 1832. In 1826, he was appointed professor of botany at the University of Munich, a position he held until 1860. He also served for many years as the director of Munich's botanical gardens. Over the next 30 years, Martius wrote many scientific and general studies of Brazil, including a 10-volume work published by the Bavarian government from 1840 to 1857, entitled *Flora Brasiliensis* (Brazilian flora).

Carl Friedrich von Martius, along with Johann Baptist von Spix, conducted one of the most extensive scientific surveys of South America since the 1799–1803 explorations of ALEXANDER VON HUMBOLDT. Their 1817–20 expedition into eastern Brazil and the upper Amazon River yielded 6,500 different plants, as well as 3,300 animal specimens. They brought back the earliest reports of the Amazon rain forest's giant trees, one of which they measured as having a circumference of 82 feet.

Masudi, Abu al-Hasan Ali al- (Abul Hasan Ali ibn Husain Ibn Ali al-Masudi, Abul Hasan Ali Ibn al-Husain al-Masudi, Abul Hasan Ali al-Masudi, Abu al-Hasan Ali al-Husayn al-Masudi, Masoudi, al-Masuid, Masudi) (d. 956 or 957) *Arab traveler, writer in central Asia, the Far East, Africa, and Europe*

The Arab historian, geographer, and world traveler Abu al-Hasan Ali al-Masudi was born at Baghdad in present-day Iraq. According to his own account, one of his ancestors was Masud, an associate of the prophet Mohammed, the founder of Islam.

In about 914, al-Masudi embarked on a career of travel, and, over the next 20 years, he visited every country in the Islamic world. From Baghdad, he traveled across Persia (present-day Iran) to the south shore of the Caspian Sea. He then sailed across the Caspian to Armenia, and also visited the Turkistan region of central Asia. On another journey, he sailed westward across the MEDITERRANEAN SEA to Muslim cities in Spain and North Africa.

One of Masudi's longest trips was a sea voyage he made from the South China Sea westward across the Indian Ocean. After stopping at CEYLON (present-day Sri Lanka), India, and the islands of Madagascar and Zanzibar off central Africa, he returned to the Middle East. He also visited Syria and what is now Israel.

After settling in Egypt in about 943, al-Masudi wrote his 30-volume *Akkbar al-Zaman* (History of time) and a

shorter work, *Kitab al-Tanbih wa al-Isharf* (Book of warning and supervision). In his history of the universe from the creation until the period in which he lived, he included a description of the world as revealed to him in his travels, as well as from the accounts of scholars he had met in distant lands.

Maternus, Julius (fl. A.D. 50s) *Roman army officer in North Africa*

Julius Maternus was a Roman military leader in North Africa during the first century A.D. From the Roman city of Jerma, in what is now either northern Libya or Tunisia, Maternus led a military expedition southward across the SAHARA DESERT in about A.D. 50.

Maternus and his command advanced deep into the Sahara and, after four months, arrived in a country known as Agisymba, a region he later characterized as a central breeding ground for the rhinoceros.

The exact route that Julius Maternus followed into the Sahara is not known. Nevertheless, based on the amount of time he spent traveling southward and his description of the animals he saw, historians have speculated that he may have made the first known north-to-south crossing of the Sahara, reaching as far south as what is now Lake Chad. If he did indeed see Lake Chad, he would have predated by almost 1,800 years its discovery in 1823 by British naval officer HUGH CLAPPERTON.

Matonabee (ca. 1736–1782) *Chipewyan guide to British explorations of northern Canada*

Matonabee was born near the HUDSON'S BAY COMPANY post, Fort Prince of Wales, on the southwest shore of HUDSON BAY near the mouth of the Churchill River. His father was a Chipewyan Indian; his mother a captured Indian from a southern tribe.

Left fatherless soon after his birth, Matonabee was adopted by the governor of Fort Prince of Wales, Richard Norton. Although he was raised by non-Indians during his early years, he returned to live with the Chipewyan of Canada's Barren Grounds when Norton returned to England.

Matonabee returned to Fort Prince of Wales by about 1752, working as a hunter for the Hudson's Bay Company. With his Chipewyan band, he roamed the Barren Grounds in search of game, possibly as far west as the Continental Divide, and as far north as the Arctic coast. He also traveled aboard Hudson's Bay Company ships on expeditions along the west coast of Hudson Bay.

In the late 1760s, Matonabee became acquainted with Hudson's Bay Company trader SAMUEL HEARNE at Fort Prince of Wales. In late September 1770, Matonabee met

up with Hearne at the Englishman's encampment south of Aberdeen Lake. Hearne was on his way back to Fort Prince of Wales after a second attempt at locating the fabled Northwest Passage, or the STRAIT OF ANIAN. When Matonabbee arrived, Hearne's party was dangerously short of food and proper clothing for the trip back to the Churchill River post. With Matonabbee's influence, Hearne obtained the necessary supplies from the Chipewyan. Matonabbee then guided Hearne safely back to Fort Prince of Wales. He also agreed to help Hearne undertake another expedition to find the Coppermine River.

Hearne and Matonabbee left Fort Prince of Wales on the Third Coppermine Expedition in December 1770. Matonabbee led a number of Chipewyan families, with women as bearers and workers for the trip. While Hearne kept track of the route they followed, Matonabbee was responsible for the daily progress across the Barren Grounds, as well as the party's survival.

After traveling northward from Fort Prince of Wales, Matonabbee, Hearne, and the Indians headed northwestward from the Egg and Seal Rivers across the Barren Grounds, exploring Nueltin Lake, then Kasba Lake and Snowbird Lake. Chipewyan men hunted in separate parties in order to locate enough food for the expedition. In June 1771, Matonabbee brought Hearne to Contwoyto Lake, near the Arctic Circle, where they were joined by a band of Copper Indians.

In early July 1771, Matonabbee and Hearne reached the Coppermine River at Sandstone Rapids. On July 15, at a place later called Bloody Falls by Hearne, Matonabbee and band members launched a surprise attack on a band of Inuit (Eskimo), their traditional enemies, killing all of them. The expedition continued the remaining length of the Coppermine River to the Arctic coast at Coronation Gulf.

Hearne found that the shallow Coppermine River was unsuitable for shipping. He also concluded that he had journeyed far enough north to prove that an east-west passage did not traverse the North American continent. After Matonabbee showed Hearne the copper deposits east of the Coppermine River, the expedition set off on the return journey to Fort Prince of Wales.

Matonabbee led Hearne on a circuitous trip back, heading southwestward onto the northern Canadian prairies before going eastward to Hudson Bay. Along the way, they stopped at Great Slave Lake, where Hearne named Matonabbee Point after the Chipewyan.

Matonabbee and Hearne eventually reached the Egg and Seal Rivers, then followed the west coast of Hudson Bay south to Fort Prince of Wales, arriving there on June 30, 1772. The last part of the journey was fraught with hardship, and a number of Indians died of starvation.

In the years that followed, Matonabbee continued to hunt and trade at Fort Prince of Wales, and Hearne became

the post's governor. In 1782, he surrendered the fort to an overwhelming French naval force under JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, and was taken back to France as a prisoner. Soon afterward, a smallpox epidemic took a heavy toll among the Churchill River Chipewyan. Faced with these disasters, Matonabbee took his own life by hanging himself.

Matonabbee's participation in the Third Coppermine Expedition contributed to its success and enabled Samuel Hearne to reach the Arctic coast, as well as make the European discovery of Great Slave Lake, the 10th largest lake in the world.

Maury, Matthew Fontaine (1806–1873)

American naval officer, meteorologist, oceanographer

Matthew Fontaine Maury was born near Fredericksburg, Virginia, and grew up in Tennessee. Following in the footsteps of an older brother, a naval officer, he joined the navy and reached the rank of lieutenant. From 1825 to 1834, he traveled extensively on active duty, circumnavigating the world on one of his trips. He kept notes on his travels and later wrote about the history and science of navigation.

In 1839, Maury was injured in a stagecoach accident, which forced him from active service. In 1842, he was appointed superintendent of the Depot of Charts and Instruments (the predecessor of the U.S. Naval Observatory and the U.S. Naval Oceanographic Office), based in Washington, D.C. Requesting data from current captains of both naval and merchant marine ships, and using old ship logs as well, Maury compiled charts on wind and currents. He also sought information on deep soundings. In 1855, Maury's work was published under the title *The Physical Geography of the Sea*.

During the Civil War, which interrupted his scientific work, Maury served as a captain in the Confederate States navy. He traveled to England as a spokesperson for the Confederate cause and was successful in acquiring warships. He also engaged in research in torpedoes and electrical mines. After the war, he became a professor of meteorology at the Virginia Military Institute in Lexington.

Matthew Fontaine Maury's *Physical Geography*, although containing many inaccuracies, is considered the first textbook of modern oceanography. His work also helped bring about the first international conference on oceanography, held in Brussels in 1853.

Mawson, Sir Douglas (1882–1958) *Australian scientist in the Antarctic*

Douglas Mawson was born in Bradford, England. When still young, he immigrated to Australia with his family.

Trained in science, Mawson had a background in both physics and geology. In 1903, he took part in his first scientific expedition, serving as a geologist with an Australian team in the New Hebrides, the island group east of Australia.

In 1907, while serving as a professor of physics at the University of Adelaide, Mawson was recruited by SIR ERNEST HENRY SHACKLETON for a voyage to Antarctica. The expedition sailed from NEW ZEALAND later that year, arriving on the Ross Sea coast of Antarctica in summer 1908. With two other members of Shackleton's expedition, T. W. Edgeworth David and Dr. A. F. Mackay, Mawson made the first ascent of 12,280-foot Mount Erebus, the volcanic peak on the Ross Sea that had been sighted by SIR JAMES CLARK ROSS in 1841.

In October 1908, Mawson set out again with David and Mackay to explore Victoria Land in search of the SOUTH MAGNETIC POLE. They originally planned to use an automobile equipped with skis. The vehicle broke down, however, and the men resorted to pulling their 2,200 pounds of equipment across the ice. Their trek took them from Terra Nova Bay and across the Larsen Glacier. On Jan-



Matthew Fontaine Maury (Library of Congress)

uary 16, 1909, they reached a point 190 miles inland from the west shore of the Ross Sea, where they determined by their compass readings that they were at the South Magnetic Pole. They then headed back to the coast, where the expedition's ship, the *Nimrod*, picked them up in early March 1909, then took them to England.

In 1911, Mawson was placed in command of an official Australian government-sponsored exploration of Antarctica, known as the Australasian Antarctic Expedition. Aboard the *Aurora*, Mawson and his team sailed to Antarctica's Adelie Coast in late 1911. By January 1912, they had established a base camp at Cape Denison. On this expedition, Mawson had brought the first aircraft to be used in Antarctica. Although the airplane was wingless, having been damaged in an accident at Adelaide, the explorers planned to use it as a propeller-driven tractor to haul equipment. Mechanical problems led Mawson to abandon the attempt and resort to the old standby of sledges pulled by dog teams.

In January 1913, accompanied by Swiss mountaineer and champion skier Dr. Xavier Mertz and Lieutenant B. E. S. Ninnis of the British army, Mawson set out to explore the inland region east of Commonwealth Bay. They soon came upon a previously uncharted part of the Antarctic coast, which they called George V Land (afterward George V Coast). On their way back to Commonwealth Bay, Ninnis fell into a deep crevasse with his sledge and dog-team and was lost; soon afterward, Mertz died of exhaustion. Left alone, Mawson overcame great hardships caused by frostbite and shortages of food and managed to return to the Cape Denison camp. He spent another winter there, then returned to Australia on the *Aurora*. According to Mawson, the Cape Denison site was the windiest place on Earth, with frequent storms. He referred to it as "Home of the Blizzard," which became the title of his account of the expedition, published in 1915.

In 1915, soon after his return from Antarctica, Mawson was awarded a gold medal by the ROYAL GEOGRAPHICAL SOCIETY. He was appointed professor of geology at the University of Adelaide in 1920, a position he held for 32 years.

In 1929, Mawson returned to Antarctica in command of a joint British, Australian, and New Zealand expedition. During the next two years, he undertook a series of aerial reconnaissance flights over Antarctica, in the course of which he made the European discovery of the MacRobertson Coast. At one point, he met up with a Norwegian expedition at Enderby Land, a region that had not been explored since it was sighted in the first half of the 19th century. Mawson reached an agreement with the Norwegians that set the 45th meridian of longitude as the boundary between Australian and Norwegian exploration and territorial claims.

Sir Douglas Mawson's aerial explorations of Antarctica, along with the aerial surveys of LINCOLN ELLSWORTH and Admiral RICHARD EVELYN BYRD, provided a complete picture of the continent's coastline. On his 1911–14 expedition, Mawson was the first to use a radio in Antarctic exploration. Ninnis Glacier Tongue and Mertz Glacier Tongue on the George V Coast were named in honor of the two companions he lost while exploring that part of Antarctica. Mawson Coast on the Indian Ocean is named after him. One of Mawson's most significant findings was made early in his Antarctic career in 1909, when he reached the South Magnetic Pole and determined that it was not a fixed point but periodically shifted its location.

Maximilian, Alexander Philipp (Prince Maximilian, Maximilian, prinz zu Wied-Neuwied) (1782–1887) *German naturalist, ethnologist in the Americas*

Prince Alexander Philipp Maximilian was a German nobleman from the Prussian principality of Wied, near Coblenz. He served in the Napoleonic Wars with the Prussian army and was captured after the Battle of Jena in 1806.

Maximilian became an avid student of the natural sciences—geology, zoology, and botany. He was also interested in studying the cultures of aboriginal peoples. Among his friends in German scientific circles was naturalist and explorer ALEXANDER VON HUMBOLDT.

In 1815, Maximilian took part in an expedition to South America with two other German scientists. During the next two years, he explored the coastal forest of Brazil and studied the culture of the inhabitants. He also made sketches of Native Americans that served as the basis for illustrations in his later published account of the expedition.

In 1832, Maximilian engaged Swiss artist KARL BODMER to accompany him on a trip to North America and produce drawings and watercolors of wilderness themes. Later that year, they traveled to Boston, then to New York, where they were the guests of German-American financier JOHN JACOB ASTOR, who arranged a tour for them of his upper MISSOURI RIVER fur-trading posts.

Maximilian, Bodmer, and Maximilian's retainer, David Dreidoppel, left St. Louis in April 1833 aboard the AMERICAN FUR COMPANY steamboat *Yellowstone*. They traveled up the Missouri into the Dakotas. Over the next 13 months, they visited trading posts on the upper Missouri, including Fort Clark near present-day Pierre, South Dakota, Fort Union at the mouth of the Yellowstone River, and Fort McKenzie at the mouth of present-day Montana's Marias River.

Maximilian's trip up the Missouri was undertaken with the help and cooperation of Indian Superintendent WILLIAM

CLARK, as well as American Fur Company officers PIERRE CHOUTEAU, JR., and KENNETH MCKENZIE. TOUSSAINT CHARBONNEAU, who had traveled with Clark and MERIWETHER LEWIS in the Lewis and Clark Expedition 30 years earlier, served as interpreter to the Indians.

Throughout his tour of the upper Missouri region, Maximilian made ethnological studies of Indian peoples, especially the Mandan. Bodmer recorded their culture in drawings and paintings.

In spring 1834, Maximilian and Bodmer returned eastward from St. Louis by way of the MISSISSIPPI RIVER, the Ohio River, and the Erie Canal. They sailed from New York for Europe, returning to Germany with hundreds of sketches of Indians, as well as botanical specimens, including several bears captured during the expedition. Their 13-month odyssey had covered more than 5,000 miles of the Missouri frontier.

During the next several years, Maximilian worked with Bodmer on producing an illustrated account of the upper Missouri expedition. It was first published in 1839 as *Travels in the Interior of North America*.

Maximilian's North American expedition was his last. He settled at his family's estate in Wied along the Rhine River, where he spent the rest of his life in ethnological and naturalist studies.

Among his scientific observations, Prince Alexander Philipp Maximilian remarked on the fertility of the northern plains, noting that only a rich soil could provide the extensive grasslands that supported the region's huge buffalo herds and other abundant wildlife. He was among the first to predict the region's great agricultural potential at a time when the area was widely considered a wasteland. Maximilian and Bodmer traveled as scientists and artists in the upper Missouri frontier only a generation after the area was first explored by non-Indians. Maximilian's written account, coupled with Bodmer's illustrations, provides an image of the trans-Mississippi region as it was in the last decades before the influx of settlers and the advent of railroads changed it forever.

Mazuchelli, Elizabeth Sarah (Nina Mazuchelli) (1832–1914) *British traveler, writer in Nepal and northern India*

Elizabeth Sarah "Nina" Mazuchelli was the wife of Anglican clergyman Francis Mazuchelli. In 1858, she went to India with her husband, who had been sent there to serve as a chaplain to the British army.

Mazuchelli spent the next 10 years with her husband at garrisons on the plains of central India. In 1869, she and Francis moved to Darjeeling in the foothills of the HIMALAYAS, where he had been transferred.

In 1872, the Mazuchellis undertook a 600-mile, two-month expedition from Darjeeling into the Himalayas of

northern Sikkim and eastern Nepal. Along the way, Mazuchelli made sketches of MOUNT EVEREST and Mount Kanchenjunga. They traveled through the unmapped regions of the Singalila Mountains, which Mazuchelli dubbed the "Indian Alps." At some locations, they suffered from the ill effects of the high altitude's rarefied atmosphere, as well as snow blindness.

The Mazuchelli party traveled into northern Sikkim as far as the base of 25,311-foot Mount Junnoo. They returned to Darjeeling on ponies, following the Great Rangit River southward.

In 1875, the Mazuchellis returned to England and eventually settled in Wales. The next year, Mazuchelli's account of the Himalayan journey was published, entitled *The Indian Alps and How We Crossed Them*. She subsequently toured the Carpathian Mountains of central Europe and wrote about the experience in her 1881 book *Magyar Land*.

Nina Mazuchelli's journey through the eastern Himalayas took her across some uncharted regions without roads or paths. She was the first known European woman to travel the entire length of the Singalila Mountains of eastern Nepal and northern Sikkim.

McClintock, Sir Francis Leopold (1819–1907)

Irish-born British naval officer in the Canadian Arctic

Francis Leopold McClintock was born in Dundalk on the northeast coast of Ireland. In 1831, in his 13th year, he enlisted in the British navy as a midshipman. Over the course of his early naval career, McClintock served on British naval vessels in the coastal waters of both North and South America.

In 1845, soon after his completing of a two-year cruise in the Pacific Ocean, McClintock was promoted to the rank of lieutenant. His first Arctic assignment came in 1848, when he was attached to SIR JAMES CLARK ROSS's voyage in search of SIR JOHN FRANKLIN, missing since 1845. With Ross, McClintock conducted several reconnaissance expeditions from Somerset Island, at the western outlet of Lancaster Sound, traveling by sled southward into Peel Sound and westward to Prince of Wales and Melville Islands. The expedition returned to England in fall 1849.

Although no trace of Franklin was found, the experience taught McClintock much about Inuit (Eskimo) sledging techniques, as well as the deployment of food depots and relays, essential for exploration on the Arctic ice.

McClintock made his second voyage to the Canadian Arctic in 1850, serving under Captain Horatio Austin. From the expedition's winter quarters at Barrow Strait, at the western end of Lancaster Sound, he undertook a sledge journey westward and southward to Prince of Wales Island, Bathurst Island, Byam Martin Island, and Melville Island, covering more than 770 miles in 80 days.

In 1852, McClintock took part in SIR EDWARD BELCHER's effort to find Franklin. They also searched for SIR ROBERT MCCLURE and RICHARD COLLINSON, who had been missing since their own search for Franklin. In spring and summer 1853, McClintock undertook several explorations by sledge from the expedition's base on Melville Island and covered more than 1,400 miles. West of the base, he made the European discovery of Eglington Island and Prince Patrick Island on the eastern edge of the Beaufort Sea.

McClintock returned to England in 1854, where he was promoted to the rank of captain. That year, the British Admiralty ended its official search efforts for Franklin. Nevertheless, JANE FRANKLIN was not satisfied with reports brought back by JOHN RAE of the HUDSON'S BAY COMPANY, which indicated her husband's expedition had perished near King William Island, and she commissioned McClintock to lead another effort.

In command of Lady Franklin's steam yacht the *Fox*, in 1857, McClintock sailed to the west coast of GREENLAND, where he put in at Upernavik and acquired sled-dogs and Inuit guides. He attempted to negotiate into Lancaster Sound, hoping to retrace Franklin's conjectured route, but advancing PACK ICE drove the *Fox* back into Baffin Bay. Finally, after eight months, he managed a passage through Lancaster Sound. He stopped at Beechey Island and erected a monument commemorating Franklin's Arctic exploits, then headed southward into Peel Sound. He located a passage through Bellot Strait, which took him into an open stretch of water north of King William Island, named McClintock Channel in his honor.

By 1859, McClintock and his men had reached the north coast of King William Island, which he circumnavigated, proving that it was truly an island, separated from the Canadian mainland by Simpson Strait. While on King William Island, McClintock found a sledge and several skeletons of crew members of Franklin's expedition, some still clad in the tattered remains of British navy uniforms. Another party under his command, led by Lieutenant W. R. Hobson, crossed Simpson Strait and, at the mouth of the Back River, found letters written by Franklin's men. The letters indicated that Franklin himself had died in spring 1847 and that the remaining men had attempted to reach a Hudson's Bay Company outpost on the lower Back River in 1848. Accounts by Inuit and the discovery of more skeletal remains revealed that all had perished in the attempt.

McClintock returned to England later in 1859. That same year, he published his account of the expedition, *The Voyage of the Fox*, in which he described his own explorations in the Canadian Arctic, reconstructed what had happened to Franklin and his expedition, and suggested that Franklin had located the eastern entrance to the NORTHWEST PASSAGE, dying before he could explore it.

Both Lady Franklin and McClintock were awarded gold medals by the ROYAL GEOGRAPHICAL SOCIETY in 1859; the following year, McClintock was knighted by Queen Victoria.

McClintock went on to a long and distinguished naval career, remaining on active duty until age 75. He was made an admiral in 1884, retiring from the navy soon afterward.

Sir Francis Leopold McClintock served as an adviser to subsequent Arctic explorers, including SIR GEORGE STRONG NARES and FRIDTJOF NANSEN. ROALD ENGELBREGT GRAVNING AMUNDSEN used *The Voyage of the Fox* as a guide in his successful voyage through the Northwest Passage in 1903–06. In his 1915 Arctic expedition, VILHJALMUR STEFANSSON recovered a canister with letters left by McClintock in 1853 on Prince Patrick Island, at a site since known as Cape McClintock. In addition to shedding light on the true fate of Sir John Franklin and his expedition, McClintock is credited with introducing sledging techniques adapted from the Inuit, which proved invaluable in later Arctic and Antarctic explorations.

McClure, Sir Robert John Le Mesurier

(1807–1873) *Irish-born British naval officer in the Canadian Arctic*

Born in Wexford, on the southeast coast of Ireland, Robert McClure was educated in England at Eton before going on to the Royal Military Academy at Sandhurst. He entered the British navy at the age of 17 and served in many regions of the world.

McClure had his introduction to Arctic exploration in 1836–37, while serving as mate under Captain GEORGE BACK on the *Terror* in a voyage to HUDSON BAY. On his return to England, he was promoted to lieutenant. Attached to the Coast Guard, he then took part in patrols in the Great Lakes region of Canada, as well as in the Caribbean Sea.

In 1848, McClure was assigned to the British navy's first search efforts for SIR JOHN FRANKLIN and his expedition, which had been missing in the Canadian Arctic since 1845. Under the command of SIR JAMES CLARK ROSS, he sailed with SIR FRANCIS LEOPOLD MCCLINTOCK in an attempt to locate Franklin and his ships by retracing the route they were thought to have taken westward through Lancaster Sound. The British ships were beset by ice at Somerset Island at the western end of Lancaster Sound and blocked for the winter; they returned to England after the spring thaw.

Late in 1849, McClure was placed in command of the *Investigator* in a second attempt to find Franklin. Sailing from England on January 31, 1850, he was accompanied by the *Enterprise* under SIR RICHARD COLLINSON, the commanding officer for that part of the search. Acting on the assumption that Franklin may have actually navigated westward through the NORTHWEST PASSAGE, Mc-

Clure and Collinson planned to approach the Canadian Arctic from the north coast of Alaska and locate its western entrance.

McClure and Collinson sailed around South America by way of CAPE HORN, then headed northward along the coasts of South and North America. En route to the Arctic, the ships became separated. Instead of waiting for Collinson at BERING STRAIT as planned, McClure made his way through the Strait and around Point Barrow before winter ice conditions blocked the way. Collinson, who arrived at Bering Strait just 10 days later, could not continue because of the ice and wintered there.

Meanwhile, McClure had managed to proceed well east of the north coast of Alaska, reaching the south shore of Banks Island, east of the Yukon mainland. He made the European discovery of a channel, Prince of Wales Strait, between Banks Island and Victoria Island to the east, although by early September 1850, as he approached Melville Island to the north, his ship became trapped in the ice.

Taking to sledges, McClure and his men explored northward around Banks Island and reached the shore of Viscount Melville Sound on October 26, 1850. On sighting Melville Island and the westernmost point reached by SIR WILLIAM EDWARD PARRY in his 1819 expedition, McClure declared that he had found the long-sought Northwest Passage. At the site on the north coast of Banks Island, in a cannister beneath a small monument, he left a letter announcing his accomplishment, which was found by VILHJALMUR STEFANSSON in his Arctic expedition of 1917.

With the route to the north and east blocked by ice, McClure made a counterclockwise circumnavigation of Banks Island, making the European discovery of a wide ice-free stretch of water on its north coast, known afterward as McClure Strait. Seeking shelter at an inlet he called Mercy Bay, the *Investigator* was again trapped by advancing ice, this time inextricably.

In spring 1853, McClure decided to abandon the ship and lead his expedition over frozen Viscount Melville Sound to Melville Island, in the hope of joining other British vessels penetrating the Canadian Arctic from the east at Lancaster Sound. Soon after McClure and his men had set out on their sledges, they encountered another sledge-borne party sent westward by McClintock. They then all returned to SIR EDWARD BELCHER's fleet at Beechey Island, at the western end of Lancaster Sound, from where they sailed back to Baffin Bay and eventually to England.

McClure and his men were hailed for their crossing of the Canadian Arctic and their finding the Northwest Passage. He had not made a continuous sea passage. But McClure's eastward journey, taken together with the earlier voyages of Parry and the explorations undertaken by Collinson in 1851–52, demonstrated that a navigable northwest passage existed between the Atlantic and Pacific Oceans.

Soon after his triumphant return to England in 1854, McClure was knighted and promoted to the rank of captain. He then served in the Pacific, reaching the rank of rear admiral in 1857. In 1873, the year of his death, he was elevated to vice admiral.

Sir Robert McClure's journal of his historic Arctic expedition was edited by Sherard Osborn and published in 1856 as *The Discovery of the Northwest Passage by H.M.S. "Investigator," Capt. R. M'Clure, 1850, 1851, 1852, 1853, 1854*. Whether he actually was the first to find the Northwest Passage has become a matter of dispute. McClintock, based on the findings of his 1857–59 expedition, later maintained that Franklin had found open channels that he could have followed from Prince William Island westward to the Beaufort Sea and Bering Strait, had he and his men not perished. Nonetheless, McClure commanded the first known circumnavigation of both South and North America, and, in his 1853 sledge journey, he and his men made the first known crossing of North America north of the ARCTIC CIRCLE.

McKenzie, Kenneth (Kenneth Mackenzie)

(ca. 1800–1861) *Scottish-Canadian fur trader in the American West*

Kenneth McKenzie was born at Rosshire in Inverness, Scotland. He moved to Canada while still in his teens and went to work for the NORTH WEST COMPANY, the trading firm based in Montreal.

In 1821, McKenzie left the North West Company on its merger with the HUDSON'S BAY COMPANY and joined the American-owned Columbia Fur Company. By 1825, he was president of the Columbia Fur Company, and he made it a leading competitor in the FUR TRADE of the Great Lakes and the upper Mississippi and upper Missouri rivers.

McKenzie's success led to a merger, in 1827, between the Columbia Fur Company and JOHN JACOB ASTOR'S AMERICAN FUR COMPANY. McKenzie then took charge of the American Fur Company's Upper Missouri branch.

In fall 1829, McKenzie established Fort Union near the junction of the Yellowstone River and MISSOURI RIVER, 1,800 miles upstream from St. Louis. This post soon dominated the upper Missouri fur trade, and McKenzie sent out traders and trappers southwestward into the ROCKY MOUNTAINS. JAMES PIERSON BECKWORTH and CALEB GREENWOOD worked for McKenzie.

During the next several years, McKenzie established more trading centers in present-day Montana, including Fort Cass on the Bighorn River and Fort McKenzie at the mouth of the Marias River. The latter, established in 1832, became the principal post for the American Fur Company's penetration of the Rocky Mountains. Traders, among them

ÉTIENNE PROVOST and WILLIAM HENRY VANDERBURGH, ranged into present-day Wyoming and Utah.

Meanwhile, Fort Pierre and Fort Clark, McKenzie's posts on the Missouri in the Dakotas, dominated much of the trade above Old Council Bluffs.

In 1832–33, McKenzie had a whiskey still constructed at Fort Union, in response to a law enacted by the U.S. government forbidding the importation of liquor into Indian territory. Rival traders reported the still to American authorities in St. Louis, and McKenzie was forced to resign his post with the American Fur Company.

Sometime after 1834, McKenzie traveled to Germany, where he visited ALEXANDER PHILIPP MAXIMILIAN. The prince and Swiss artist KARL BODMER had been McKenzie's guests at Fort Union and Fort McKenzie during their 1833–34 tour of the upper Missouri. Upon his return to the United States, McKenzie settled in St. Louis, where he became a wholesale liquor importer.

Kenneth McKenzie expanded the influence of the American Fur Company to the headwaters of the Missouri River, as well as into the northern plains and northern Rockies. His traders brought back reports of the geography of the Rockies and the Great Basin. He also initiated the trade in buffalo hides, which provided further impetus for exploration of the northern plains. At the height of his career in the fur trade, he was known as the "King of the Missouri."

McLeod, William C. (unknown–1880) *British army officer in Southeast Asia*

In December 1836, William C. McLeod, a British army captain who had served in India, set out from Moulmein, the principal city of British-controlled Burma (present-day Myanmar), in search of a feasible travel route northward into China's southeastern Yunnan province. Ten years before, Burma had ceded much of its southern region to Great Britain as a consequence of the First Anglo-Burma War of 1824–26, leaving only the still semi-autonomous Shan States of northern Burma between British territory and a direct trade link with southern China.

McLeod first followed the Salween River northward from its mouth near Moulmein to a point upstream where it becomes unnavigable. Traveling overland, he then headed eastward into what is now northwestern Thailand, arriving at the city of Chiang Mai in January 1837. From there, he embarked northward across the Shan States, making his way on the back of an elephant into the mountainous, little-known region of northern Burma.

By March 1837, McLeod had reached the northern Burmese city of Keng Tung, not far from the Chinese border. Although he was close to reaching his goal, Chinese officials denied him permission to enter the country.

Although political problems prevented Captain William C. McLeod from making one of the earliest crossings into Yunnan, China, from the south, he was nonetheless the first European to explore the territory between northern Burma and southeastern China since the 13th-century travels of MARCO POLO. For another 100 years after McLeod's expedition, there was still no regular travel route through this country. Then, in 1937–38, with the outbreak of the Sino-Japanese War, in which China's Pacific ports fell into Japanese hands, the Chinese constructed the Burma Road, finally establishing a link between Yunnan and lower Burma.

McLoughlin, John (1784–1857) *Canadian-born fur trader, physician in the Pacific Northwest*

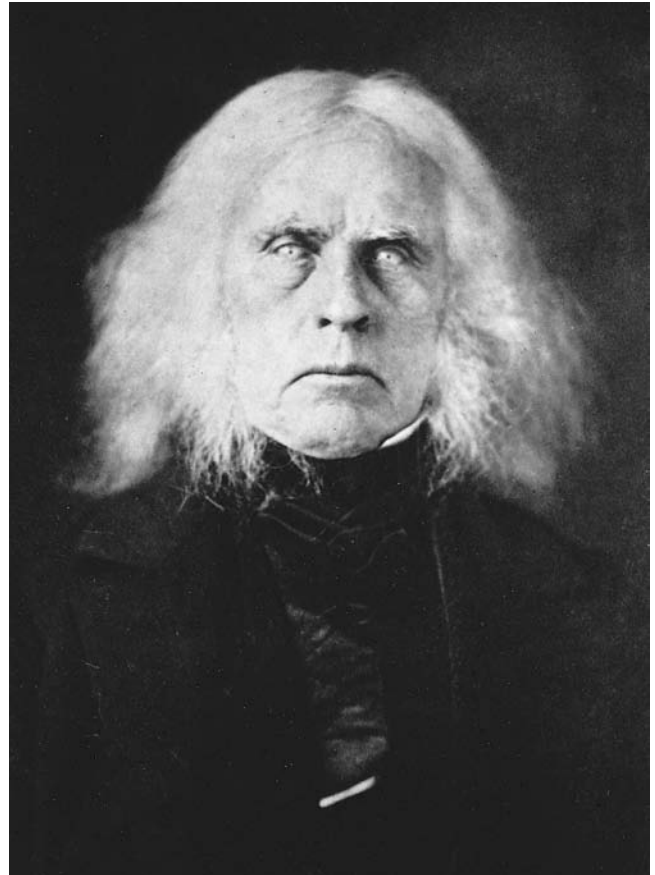
Born in Rivière-du-Loup, Quebec, John McLoughlin came from a family with extensive ties to Canada's FUR TRADE. He studied medicine under his uncle, Alexander Fraser, a celebrated Canadian doctor, and was licensed as a physician in 1803.

In 1814, McLoughlin's family connections led to his appointment as a physician at the NORTH WEST COMPANY's trading post, Fort William, on the northwest shore of Lake Superior in present-day Ontario, Canada. While there, he engaged in fur trading with the Indians of the Kaministikwia River region, gaining valuable experience that soon led to his partnership in the company.

After the North West Company merged with the HUDSON'S BAY COMPANY in 1821, McLoughlin was named director of operations at Lac la Pluie, and, in 1824, he was put in charge of the Hudson's Bay Company fur-trading enterprise in the Pacific Northwest. The following year, he established Fort Vancouver on the COLUMBIA RIVER, opposite present-day Portland, Oregon, where his associate was PETER SKENE OGDEN.

From his base on the Columbia River, McLoughlin directed trading expeditions into the Snake River country of what is now eastern Washington and southern Idaho, and, until the late 1830s, into the Sacramento Valley region of northern California. He also played host and rendered help to the earliest American trappers to explore the Oregon Country, including JEDEDIAH STRONG SMITH and his party of mountain men, who arrived at Fort Vancouver in 1828.

McLoughlin provided help and lent his support to settlers from the East who began arriving in the mid-1830s, attracted by the great farming potential of the Cascade region. Among those he assisted at Fort Vancouver were Methodist missionaries MARCUS WHITMAN and HENRY HARMON SPALDING. Concerned that increased non-Indian settlement of the Oregon Country would lead to a decline in fur trade with the Indians, McLoughlin di-



John McLoughlin (*Library of Congress*)

rected many of the settlers south of the Columbia, to the Willamette River region around present-day Salem, Oregon.

In 1841, McLoughlin became director of the Hudson's Bay Company's new trading center on Vancouver Island in present-day British Columbia, where the headquarters of its Pacific Northwest operations had been moved when it seemed likely that the lower Columbia River region would become U.S. territory. McLoughlin served there until 1845, when he retired from the fur trade and settled in the Willamette Valley. He became an American citizen and helped establish the community that became Oregon City, Oregon.

John McLoughlin was an important figure in the early settlement of the Pacific Northwest. As director of fur-trading operations on the Columbia, he provided organization and support for the explorations of Peter Skene Ogden into the Great Basin Region, as well as invaluable assistance to the first mountain men and settlers to venture into the interior of the Oregon Country. The site of his original Columbia River post, at Fort Vancouver in southwestern Washington, was declared a National Historic Site in 1948 by the U.S. National Park Service.

Mee, Margaret Ursula (Margaret Ursula Brown) (1909–1988) *British botanical painter in Brazil*
Margaret Mee, née Brown, was born near Chesham, in Buckinghamshire, England. As a young girl, she was inspired to draw by an aunt who had illustrated children's books, and she later studied art at St. Martin's School of Art in London, where she met her second husband, Greville Mee, then at the Camberwell School of Art, also in London. In the 1940s, while on a visit to Brazil to see her sister, she was hired to teach art at St. Paul's, a British school in São Paulo. Her husband eventually joined her there and built a successful career as a commercial artist.

In 1956, when she was in her late 40s, Mee first traveled into the Amazon rain forest to paint plants, especially flowers. She undertook a total of 15 such expeditions by dugout CANOE, each trip lasting months. Her travels took her along the AMAZON RIVER and its tributaries, among them the Arinos, Içana (Isana), Maués, and Tefé. She worked in the medium of gouache, a method of painting using opaque watercolors, in the field or from sketches in the studio. She also collected live specimens to take home and would wait for them to blossom before painting them and kept a diary with notes about plant she painted.

Mee corresponded with botanists from around the world. Her paintings appeared in *Flowers of the Brazilian Forest, Collected and Painted by Margaret Mee* (1968) and in *Flores do Amazonas/Flowers of the Amazon* (1980). *Margaret Mee: In Search of Flowers of the Amazon Forests* (1988) includes excerpts from her diaries. She died in an automobile accident during a visit to England in 1988.

In addition to her contributions to the field of botany, Margaret Mee became an early advocate of preservation of the rain forest, having witnessed over the course of three decades the impact of growing settlement and development. Many of her paintings are kept at Kew Gardens in London.

Meek, Joseph L. (Joe Meek) (1810–1875)
American fur trader, trapper in the American West, Oregon pioneer

Joseph Meek spent his early years in the mountains of southwestern Virginia's Washington County. At the age of 18, he moved to St. Louis, Missouri, where he joined his brothers, Hiram and Stephen.

In 1829, Meek traveled into the northern and central ROCKY MOUNTAINS as a trapper with WILLIAM LEWIS SUBLETTE. That year, he took part in the annual fur trappers' rendezvous at Pierre's Hole, on the western slopes of the Teton Mountains. He also attended the 1832 Pierre's Hole rendezvous with such famous MOUNTAIN MEN as THOMAS FITZPATRICK and JAMES BRIDGER, as well as two nephews of legendary frontiersman DANIEL BOONE. In 1833–34,

Meek was a member of JOSEPH REDDEFORD WALKER's expedition that crossed the Sierra Nevada into California's Yosemite region.

During most of the 1830s, Meek was active as a fur trader and mountain man throughout a wide area of the west. With his brother, Stephen, he ranged from the Snake River of Idaho south into the Great Basin region of central Utah. During this period, he joined CHRISTOPHER HOUSTON CARSON (Kit Carson) in hunting expeditions on the northern plains and hunted and trapped around Yellowstone Lake.

With the decline in the FUR TRADE after 1838, Meek settled at Fort Hall in what is now southeastern Idaho, where he lived for a short time with his Indian wife. In 1840, Meek, with his wife and children, left Fort Hall for the Oregon Country, accompanying one of the earliest wagon trains to cross the mountains on the Oregon Trail.

Meek and his family settled in Oregon's Willamette Valley. In 1847, in the wake of the killing of MARCUS WHITMAN and others by Cayuse Indians under Chief Tiloukaikt, Meek was dispatched to Washington, D.C., by a group of concerned Oregon settlers seeking federal military support from President James Polk (whose wife was Meek's cousin). Meek made the transcontinental journey in the middle of an exceptionally severe winter, arriving in Washington in spring 1848. Partly through his efforts, Oregon was given territorial status. Meek, appointed a U.S. marshal, escorted Oregon's newly appointed territorial governor, Joseph Lane of Indiana, back to Oregon. They reached St. Louis, from where they headed westward by way of the Santa Fe Trail and the Gila River across the Mojave Desert to Los Angeles. From there, they reached Oregon by ship. Meek went on to become prominent in Oregon territorial and state politics.

As a mountain man in the 1830s, Joseph Meek played an active role in the exploration of the trans-Mississippi West. His later exploits as a pioneer in the Pacific Northwest contributed directly to the settlement of Oregon.

Megasthenes (fl. 290s B.C.) *Greek diplomat in India*
Megasthenes was a Greek from Ionia, now the Mediterranean coast of present-day Turkey. He became a diplomat in the service of Seleucus I, the king of ancient Syria and one of the inheritors of the empire of ALEXANDER THE GREAT. In about 302 B.C., he was sent as an ambassador to the court of King Chandragupta, the ruler of the Mauryan Empire of northeastern India.

Megasthenes spent several years at Chandragupta's capital city of Palibothra (on the site of present-day Patna, India) and traveled widely in northern India, recording his observations on the region's geography, politics, and social institutions, including the Hindu caste system. He also wrote about

the natural history of the region between the INDUS RIVER and GANGES RIVER.

On his journey from the eastern edge of Seleucus's domain, Megasthenes traveled eastward to Patna along India's Grand Road, a well-maintained trade route stretching from Patna in the east, northwestward across India into the Punjab, as far as the Kabul region in present-day Afghanistan.

Only fragments of Megasthenes's account, called *Indica*, survived. The work provided the ancient Mediterranean world with the earliest account of India, including such details as the correct shape of the Indian subcontinent. It also contained the earliest reports on the existence of Tibet and the island of CEYLON (present-day Sri Lanka), the latter referred to by Megasthenes as Taprobrane.

Megasthenes was probably the first Greek, as well as the first Westerner, to see the Ganges River, fulfilling the aspirations of Alexander the Great from a generation earlier. In his speculations on the source of the Ganges, Megasthenes correctly surmised that the river originated in the HIMALAYAS, a mountain range he called the "Indian Caucasus." With the decline of the Hellenistic empires of the eastern Mediterranean and the Middle East two centuries after Megasthenes's journey to Patna, connections between India and the West withered, and they were not revived until the emergence of the Roman Empire in the first century A.D.

Menard, Antoine Pierre (1766–1844)

Canadian fur trader on the upper Missouri

Pierre Menard was born in St. Antoine, Quebec. After spending his early years in Montreal, he moved west to Vincennes on the Indiana frontier, where he found work under Indian trader Francis Vigo.

In 1789, Menard moved to the Illinois country and settled at Kaskaskia, a settlement on the MISSISSIPPI RIVER just below St. Louis. Along with Toussaint DuBois, he established a mercantile business, dealing with both Indians and non-Indian settlers. During the 1790s, Menard became prominent in the territorial militia and served as a magistrate in the territorial government.

In 1806, Menard married a sister-in-law of JEAN PIERRE CHOUTEAU, head of a leading St. Louis merchant family. That same year, he joined fellow Kaskaskia businessman William Morrison in a partnership with St. Louis entrepreneur MANUEL LISA. Menard was one of the backers and key suppliers of Lisa's spring 1807 expedition up the MISSOURI RIVER to the Dakotas and the Bighorn River region of present-day Montana. Menard did not personally take part in the expedition; GEORGE DROUILLARD, a veteran of the Corps of Discovery under MERIWETHER LEWIS and WILLIAM CLARK, went along as Menard and Morrison's agent.

In 1809, Menard was one of the founding partners of the ST. LOUIS MISSOURI FUR COMPANY. Manuel Lisa and William Clark also participated.

On June 15, 1809, Menard left St. Louis with the company's 200-man expedition to the Dakotas and northern ROCKY MOUNTAINS. By early September, the expedition had reached the mouth of the Knife River in present-day central North Dakota, where the fur traders constructed Fort Mandan.

In late November 1809, Menard departed Fort Mandan and traveled overland into Montana, accompanied by Andrew Henry, George Drouillard, and a party of trappers. Menard and his party wintered at Fort Raymond, the post Lisa had established at the confluence of the Bighorn and Yellowstone Rivers during his first expedition in 1807.

In March 1810, guided by JOHN COLTER and EDWARD ROSE, Menard's party headed westward through the Bozeman Pass to the Three Forks of the Missouri. They constructed a stockade, the first such post at that location, and began trapping beaver and trading with the Indians. Attacks by Blackfeet Indians plagued the enterprise from the start. Shortly after Drouillard and some other trappers were killed near the fort in May, Menard headed back to St. Louis, arriving in July 1810.

Menard returned to Kaskaskia, Illinois, and subsequently became a leading political figure. He was president of the Illinois territorial legislative council from 1812 to 1818. When Illinois was admitted to the Union in 1818, Menard became the state's first lieutenant governor.

Pierre Menard provided the financial support for the first commercial expedition into the upper Missouri and northern Rockies. With the 1809–10 expedition into central Montana, he took part in one of the earliest organized ventures into the Three Forks of the Missouri area.

Ménard, René (1604–1661) *French missionary in the Great Lakes region*

Born in Paris, René Ménard studied to be a Jesuit priest. After serving in France, he traveled to Quebec in 1640. His first assignments were among the Nipissing and Huron (Wyandot) Indians of present-day Ontario and among the Cayuga of present-day New York. He also ministered to Indians at Trois-Rivières, Quebec.

In 1659, at the age of 55, Ménard joined up with a party of Ottawa Indians who had visited the St. Lawrence settlements for the purpose of trade, and along with five French traders, set out westward on the traders' return CANOE journey to their homeland by the Ottawa River, Lake Huron, and Lake Superior. On the south shore of Lake Superior in present-day Michigan, Ménard founded a mission at a place he called Chassahamigan, thought to be Keewenaw Bay, located about 190 miles west of Sault Sainte

Marie. In July 1661, Ménard embarked on a journey farther to the west in the hope of preaching to Sioux (Dakota, Lakota, Nakota) Indians. He traveled with one other Frenchman, thought to be a blacksmith. That August, however, the two became separated in the woods. Ménard, never heard from again, was most likely killed by Indians in present-day Wisconsin.

René Ménard, along with MÉDARD CHOUART DES GROSEILLIERS and PIERRE-ESPRIT RADISSON, was one of the first known Europeans to visit the lands and Indians of the western Great Lakes. The work he started was continued by fellow Jesuit CLAUDE-JEAN ALLOUEZ, who founded a mission farther to the west at Chequamegon Bay.

Mendaña, Álvaro de (Álvaro Mendaña de Neira, Álvaro Mendaña de Neyra, Álvaro Mendeña de Nehra) (ca. 1541–1595) *Spanish mariner in the South Pacific*

The navigator Álvaro de Mendaña, born in Saragossa, Spain, was an associate of PEDRO SARMIENTO DE GAMBOA, a cosmographer who had commanded an expedition to Peru in 1557 and had become a recognized authority on Inca Indian history.

Both Mendaña and Sarmiento held the view that Terra Australis, the GREAT SOUTHERN CONTINENT, existed in the high southern latitudes as a counterbalance to the landmasses of the Northern Hemisphere. Moreover, in his study of Inca legends, Sarmiento had come upon an account of an Inca king who had undertaken a westward voyage across the Pacific Ocean, reached the “Western Lands,” and returned from there with a treasure in silver and gold. Sarmiento concluded that the “Western Lands” of Inca tradition were actually the biblical lands of OPHIR and Tarshish, the site of King Solomon’s mines. He further speculated that these islands lay off the coast of Terra Australis, somewhere west of Tierra del Fuego.

Mendaña and Sarmiento organized an expedition to reach these fabled islands, discover Terra Australis, and Christianize its inhabitants. Outfitted with two ships under Mendaña’s general command, they sailed from the port of Callao, near Lima, Peru, in November 1567.

After sailing almost due westward across the Pacific for 80 days, Mendaña and his ships made their first sighting of land, Nui Island in the Ellice group. About a month later, in February 1568, after coming upon Ontong Java and Roncador Reef, he made a landing on a larger island nearby, which he named Santa Isabel in honor of his wife’s patron saint. At first, Mendaña believed he had reached the mainland of Terra Australis, but upon further exploration in a small boat, he learned that the landmass was an island. Yet Mendaña was certain that he was at least near the mainland of a southern continent and named the island group the

Solomons, believing they were the fabled lands mentioned in the Bible’s Book of Solomon.

Mendaña conducted further explorations in the Solomons, making the European discovery of islands he named Guadalcanal and San Cristobal. In August 1568, he headed northward and reached the Marshall Islands, as well as an island he called San Francisco, between Guam and the HAWAIIAN ISLANDS. He continued eastward, across 4,000 miles of the Pacific, and reached the Santa Barbara Islands, off the coast of present-day Los Angeles, California. He then followed the coastline to Acapulco and beyond, returning to Peru in early 1569.

It was not until 1595, three years after Sarmiento’s death, that Mendaña was able to mount a follow-up voyage to the Solomons. The Spanish government had lost interest in the findings of his first expedition when he failed to return with gold in 1569. By 1595, however, SIR FRANCIS DRAKE and other English PRIVATEERS were causing serious problems for Spanish shipping off the Pacific coast of South America, leading the Spanish to seek additional lands in the western Pacific as colonies and naval bases.

Mendaña was given command of a four-ship fleet, with the Portuguese-born navigator PEDRO FERNÁNDEZ DE QUIRÓS as chief pilot. In June 1595, the expedition sailed from Callao, Peru, as on his earlier voyage. The 378 people aboard included soldiers and colonists. Among them was his wife, Doña Isabela Bareto de Mendaña, nicknamed “the Governess,” who was accompanied by her three brothers.

On July 26, 1595, after about a month at sea, Mendaña came upon an island group he dubbed Las Marquesas de Mendoza, in honor of the viceroy of Peru, who had sponsored the expedition. The islands were afterward known as the Marquesas. At one of these islands, which he had called Magdalena Island, the Spanish massacred about 200 native islanders.

On his earlier voyage, Mendaña had incorrectly plotted the Solomon Islands, largely because an accurate technique for establishing longitude had not yet been perfected. Over the next several weeks, he tried in vain to locate them, until finally, short on supplies, he was compelled to stop in another South Pacific island group, the Santa Cruz chain. One of his ships, the *Almirante*, was lost while exploring these islands. The chain was claimed for Spain and an attempt was made to establish a colony on Ndeni. The Spanish discovered breadfruit growing there, becoming the first Europeans known to eat it.

After a few months, dissension among the members of Mendaña’s colony erupted into a mutiny, resulting in some deaths. Soon afterward, Mendaña was taken ill and died. Command of the ships then went to Quirós. With food running short, the colonists opted to leave the Santa Cruz Islands and head for the Philippines. Under the command of

Quirós, they sailed for Manila on November 15, 1595. Many succumbed to SCURVY on this part of the voyage, although the Governess and her brothers survived on hoarded stores of food.

Alvaro de Mendaña was one of the earliest European navigators to search for Terra Australis and attempt to colonize the South Pacific. Nevertheless, many of the lands he explored were lost to subsequent European seafarers until the late 1760s. British naval officer PHILIP CARTERET, as well as French navigator LOUIS-ANTOINE DE BOUGAINVILLE, came upon the Solomon Islands during their separate Pacific explorations, and each thought he had located an unknown archipelago. In 1792, French explorer ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux, finally determined that these islands were actually the Solomon Islands group, mistakenly charted by Mendaña two centuries earlier. The Marquesas were located again by JAMES COOK in 1774. San Francisco Island was not precisely charted until 1841, when it was found by Lieutenant CHARLES WILKES of the U.S. Navy, who named it Wake Island.

Mendoza, Antonio de (ca. 1490–1552)

Spanish colonial official in Mexico, organizer of expeditions to the American Southwest

Born in Spain, Antonio de Mendoza was a member of a noble family. In 1535, after holding high posts in the Spanish government, he was sent to Mexico as the first viceroy of New Spain, superceding the administration of HERNÁN CORTÉS, who had been ruling Mexico as governor since the conquest of 1519–21.

Soon after his arrival, Mendoza directed the construction of what became Mexico City on the site of the old Aztec capital. In 1539, he sent out the friar MARCOS DE NIZA and the slave ESTEVANICO to investigate the accounts of a wealthy Indian civilization north of Mexico reported by ÁLVAR NÚÑEZ CABEZA DE VACA. Soon afterward, Mendoza organized the first large-scale expedition to explore what is now the southwestern United States, commanded by FRANCISCO VÁSQUEZ DE CORONADO. He also dispatched HERNANDO DE ALARCÓN to explore the northern end of the Gulf of California, and he sponsored a seaward expedition along the coast of California under the command of JUAN RODRÍGUEZ CABRILLO.

After 15 years in Mexico, Mendoza was named as viceroy of Peru. He died after having served there for only one year.

Known as the “Good Viceroy,” for his attempts to limit the exploitation of the conquered Indians, Antonio de Mendoza also supervised Spanish forces in putting down a revolt of the Indians in the Mixtón War of 1541 in the Nueva Galicia region of western Mexico. His administration provided a foundation for Spanish colonial rule in Mexico that

endured for almost 300 years and fostered Spanish explorations northward into present-day California, Arizona, New Mexico, Texas, Oklahoma, and Kansas.

Mendoza, Pedro de (ca. 1487–1537)

Spanish conquistador in South America

Pedro de Mendoza was born at Gaudix in southern Spain. Born into a noble and wealthy family, he embarked on a military career as an officer in the army of Charles I of Spain (later Holy Roman Emperor Charles V) in campaigns on the Italian Peninsula.

In 1534, Mendoza was appointed as the first military and civil governor of the country between the Río de la Plata and the STRAIT OF MAGELLAN, a territory comprising most of what is now Argentina. Commissioned by Charles to colonize and explore the region, he outfitted at his own expense a large expedition of 14 ships and recruited more than 2,000 colonists, among them many Germans and Flemings.

On August 24, 1535, Mendoza and his expedition sailed from the port of Sanlúcar de Barrameda, near Seville, and by early January 1536 they had reached the estuary of the Río de la Plata. On February 22, 1536, he founded a city at the mouth of the Riachuelo River he called Santa María del Buen Aire (Our Lady of the Fair Wind), known afterward as Buenos Aires.

In addition to colonizing this vast region of South America, Mendoza had been instructed to explore inland to seek an overland route through the continent to Peru and to investigate stories of a source of gold and silver in the interior reported by English explorer SEBASTIAN CABOT. To this end, he sent out his lieutenants JUAN DE AYOLAS and DOMINGO MARTÍNEZ DE IRALA to travel up the Paraná River.

Pedro de Mendoza died at sea on a return voyage to Spain in 1537. Although his original settlement at Buenos Aires was abandoned two years later because of repeated attacks by Querandí Indians, it was reestablished in 1580 and endured to become one of the largest and most important cities of South America.

Menéndez de Avilés, Pedro (1519–1574)

Spanish naval officer, colonizer in Florida

Pedro Menéndez de Avilés was a native of Avilés, a port on the Bay of Biscay in Asturias, Spain. At the age of 13, he left his affluent family and embarked on a maritime career.

Menéndez rose to prominence in the Spanish navy. In 1549, Spanish king Charles I (Holy Roman Emperor Charles V) commissioned him to drive out the French pirates and PRIVATEERS then preying on ships in Spanish waters.



Pedro Menéndez de Avilés (Library of Congress)

In 1554, Menéndez was appointed captain general of the Indies Fleet. From 1555 to 1563, he made three trips to the Americas and commanded the convoys of treasure-laden galleons returning to Spain.

Menéndez was imprisoned for political reasons in 1563 but was released in 1565. On March 20, 1565, Spanish monarch Philip II named him *adelantado* (governor) and captain general of Florida.

Specifically, Menéndez's mission was to drive out the recently established French colony on the east coast of Florida. The Spanish considered the French presence there a direct threat to their ships returning with gold and silver from South America and Mexico. By spring 1565, pirates based at the French settlement of Fort Caroline, Florida, had already raided Spanish shipping in the Caribbean Sea.

On June 29, 1565, Menéndez, in command of 2,000 men on 11 ships, including soldiers, priests, slaves, and colonists, set out from Spain. Part of his fleet reached Puerto Rico in late July. After a daring crossing of the Caribbean Sea by way of a shortcut through the Bahamas, his five ships sighted the Florida coast on August 28, 1565, the feast day of St. Augustine. Menéndez soon located a suitable harbor, which he

called St. Augustine. He quickly set some of his party ashore and sailed northward along the coast. With him was a force of 700 soldiers.

On September 4, 1565, Menéndez made an unsuccessful assault on Fort Caroline, at the mouth of the St. Johns River, 40 miles up the coast from St. Augustine. The French ships, under JEAN RIBAUT, escaped.

Menéndez and his men returned to St. Augustine and completed construction of the settlement. Meanwhile, Ribault and his fleet attempted a seaward counterattack against St. Augustine. The French ships were wrecked in a hurricane, leaving Fort Caroline undefended. Taking advantage of this turn of events, Menéndez led his forces overland in an assault on the French colony. The unprotected settlement quickly fell to the Spanish, who massacred most of the Huguenot inhabitants. Colonial leader RENÉ GOULAIN DE LAUDONNIÈRE and artist JACQUES LE MOYNE DE MORGUES escaped, however.

Menéndez turned his attention to the survivors of Ribault's fleet. They had come ashore near present-day Cape Canaveral and were marching against St. Augustine to the north. Although his forces were outnumbered, Menéndez tricked the French into surrendering. He put most of his 500 prisoners to death, sparing only the Catholics among them. Ribault himself was executed. The site of this massacre became known as Matanzas, which means "slaughters" in Spanish.

Soon after destroying the French colony, Menéndez occupied Fort Caroline and renamed it San Mateo. During the next two years, he explored the Atlantic and Gulf coasts of Florida and established Spanish garrisons at Tampa Bay and Charlotte Harbor and on the Miami River and St. Lucie River. He also founded settlements on the coastal islands of present-day Georgia and the Carolinas, as well as on Chesapeake Bay to the north.

In 1566, Menéndez sent Captain Juan Pardo from Santa Elena Island (St. Helena Island) on the Carolina coast up the Broad River to explore for gold in the APPALACHIAN MOUNTAINS. Pardo and his party also explored the upper reaches of the Chattahoochee River in present-day Georgia.

In 1567, Menéndez was recalled to serve in the naval war against England. He made two brief visits to Florida in 1568 and 1571. He died in 1574, still serving in the Spanish navy.

The brutal campaign of Pedro Menéndez de Avilés against the French resulted in Spanish sovereignty in Florida. Unlike his predecessors, JUAN PONCE DE LEÓN and PÁNFILO DE NARVÁEZ, Menéndez succeeded in establishing a Spanish presence in Florida that provided a base from which the treasure route back to Spain could be protected. Although most of Menéndez's Florida posts were soon abandoned, St. Augustine endured, the first permanent non-Indian settlement in what is now the United States.

Mercator, Gerardus (Gerhardus Mercator, Gerard Mercator, Gerhard Kremer) (1512–1594)

Flemish cartographer

Born as Gerhard Kremer in the Flemish town of Rupelmonde, Gerardus Mercator adopted the Latin form of his name (after the fashion of 16th-century humanists) in 1530, during his university studies at Louvain, in what is now central Belgium. Among his studies at Louvain were mathematics and philosophy. Mercator also worked with engraver Gaspar a Myrica, under whom he learned basic graphic arts skills. In 1534, he embarked on a career as a cartographer, establishing his first workshop in the university town.

After producing a map of the Holy Land in 1537, Mercator was commissioned by King Charles I of Spain (Holy Roman Emperor Charles V) to create a map of the Earth and the heavens. In 1538, he published his first world map, in the style of the second century A.D. cartographer PTOLEMY.

Mercator constructed a world GLOBE in 1541, the details of which may have run contrary to Catholic Church doctrine, for in 1544, he was accused of heresy and imprisoned for seven months. In 1551, he produced a celestial globe. The following year, he moved to the German city of Duisberg, accepting a professorship in cosmography at that town's university.

Establishing a new cartography workshop at Duisberg, Mercator produced a six-part map of Europe in 1554, further establishing his reputation. In 1564, he was appointed as the official cartographer to the court of Wilhelm, the duke of Cleve.

Mercator's most famous work, a projection map of the world, was published in 1569. At that time, European cartographers were faced with the difficult task of depicting the explorations then being made by Spanish, French, English, and Portuguese mariners on two-dimensional maps. Mercator (and perhaps others of his age) approached the problem by projecting a globe of the world onto a cylinder wrapped around it. Although the extreme northern and southern regions of the world were distorted, the temperate, subtropical, and equatorial regions, where most travel and commerce took place, were accurately depicted. Moreover, the lines of LATITUDE AND LONGITUDE from the globe were projected onto Mercator's two-dimensional map as lines that intersected at right angles, enabling navigators to plot courses between two geographic points. Although the course set was not exactly a straight line between the points, a COMPASS would give a steady reading when sailing from one point to the other. As a result, Mercator's projection map of the world became extremely popular among both navigators and geographers.

Mercator was a proponent of the idea that the great landmasses of the Northern Hemisphere had to be coun-

terbalanced by equally large continents in the Southern Hemisphere. He included on his map a region known as Terra Australis, the GREAT SOUTHERN CONTINENT, which he showed as taking up much of the as yet unexplored South Pacific Ocean. One curious feature of Mercator's 1569 projection map was that it showed the known coast of northern Australia as separate from the large island of New Guinea, although the Torres Strait that divides these two bodies of land had not yet been charted by Europeans.

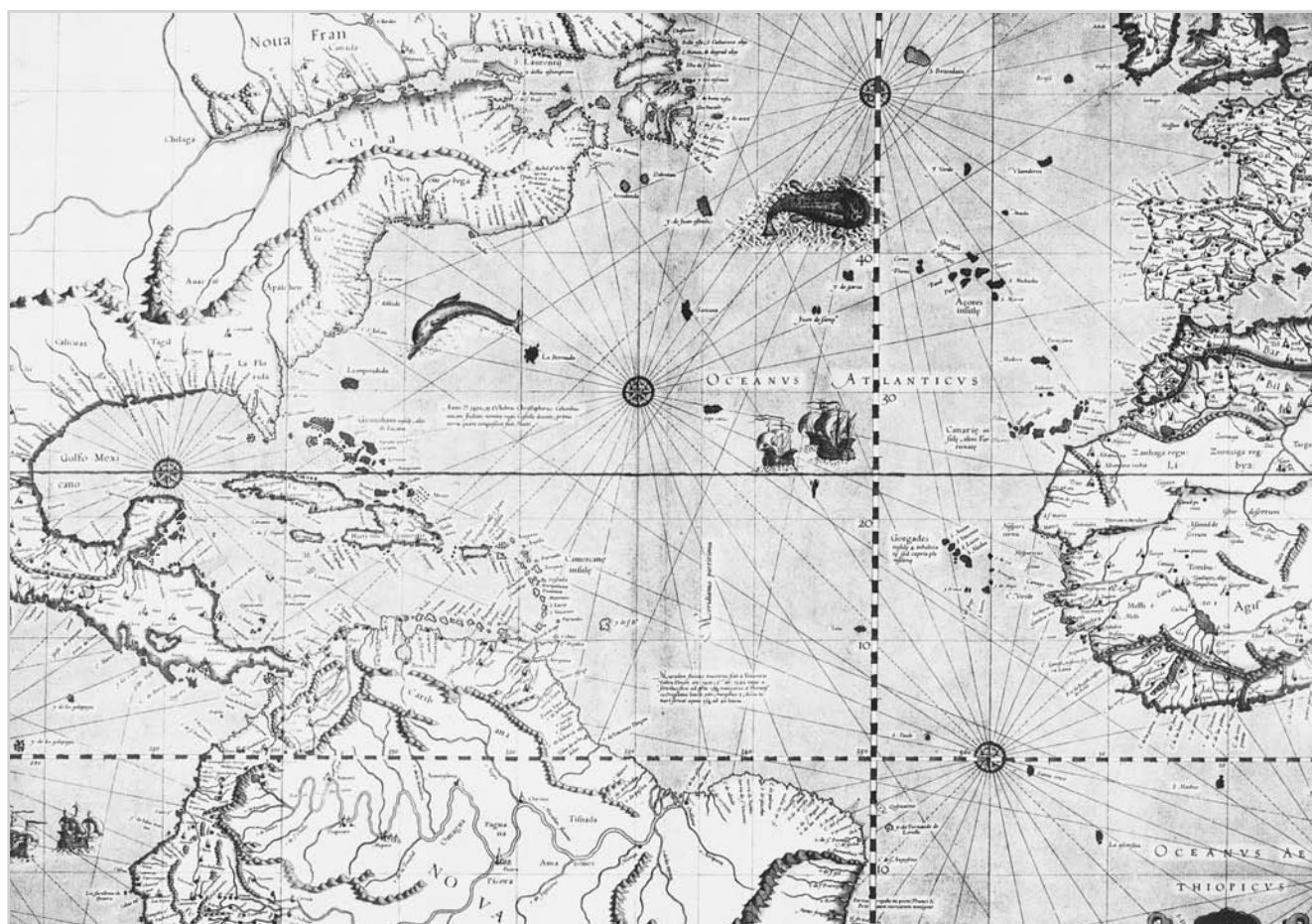
Mercator became known as one of the foremost cartographers of his day. In 1580, a group of London merchants and navigators, including STEPHEN BOROUGH, consulted him on the feasibility of seeking a NORTHEAST PASSAGE from Europe to the Far East, around the top of Russia, an idea that he strongly supported.

Mercator's final project, a comprehensive world atlas, was begun in 1585 and completed in 1595, a year after his death, by his son Rumold.

The cartographic technique developed (if not entirely invented) by Gerardus Mercator, the MERCATOR PROJECTION, revolutionized mapmaking. His innovations in cartography resulted from the need to portray accurately the



Gerardus Mercator (Library of Congress)



Detail of map of the world by Gerardus Mercator (1569) (Library of Congress)

new image of the world stemming from the great discoveries then being made. His maps, as practical aids to navigation, enabled explorers to expand geographic knowledge. Decades after MARTIN WALDSEEMÜLLER had applied the name “America” to the newly explored continent in the Southern Hemisphere, Mercator was the first to apply this name to the adjoining continent to the north, known afterward as North America. He was also the first to use the word *atlas* in reference to a group of maps.

Mertens, Karl Heinrich (1796–1830)

German physician, naturalist in South America, Alaska, and the South Pacific, in service to Russia

Karl Heinrich Mertens was born in the German city of Bremen, the son of noted botanist Francis Karl Mertens. The younger Mertens’s own keen interest in natural history took him to Paris, where he studied at the Museum of Natural History. He soon established contacts with the leading naturalists of the day, including ALEXANDER VON HUMBOLDT, SIR JOSEPH BANKS, ROBERT BROWN, and JOHANN REIN-

HOLD FORSTER, each of whom had made great contributions in his respective field after conducting research in distant lands.

Mertens also studied medicine, graduating with a medical degree in 1820. Soon afterward, he moved to St. Petersburg, where he worked as a doctor. There he came to the attention of Russian navigator ADAM IVAN RITTER VON KRUSENSTERN of the St. Petersburg Academy of Sciences. With Krusenstern’s assistance, Mertens won an appointment as surgeon and naturalist with FYODOR PETROVICH LITKE’s scientific expedition to the Pacific Ocean.

Sailing from the Russian Baltic port of Kronstadt on the *Senyavin* in September 1826, Mertens spent the next three years on a voyage that took him to the coasts of Chile, Alaska, and the Kamchatka Peninsula of eastern SIBERIA. In the summer seasons, he conducted extensive botanical and other naturalist studies throughout the Caroline Islands of the western South Pacific.

Mertens returned to St. Petersburg in September 1829, having circumnavigated the world, as well as having collected more than 4,000 plant specimens. He also had con-

ducted a study of crustaceans, discovering 150 new species, and identified 700 different types of insects. Moreover, he had produced more than 300 drawings relating to the natural history of the places he visited.

Soon after his return from the Pacific expedition, Mertens again joined Litke as surgeon and naturalist in a second voyage on the *Senyavin*, this time to the coast of Iceland. On this expedition, Mertens's medical skills were called upon to tend sick crew members when an epidemic of fever erupted on board. He himself became ill and died in September 1830, less than two weeks after returning to St. Petersburg.

One of Dr. Karl Heinrich Mertens's most significant contributions to science was his study of algae throughout the Pacific, from Chile to the Caroline Islands. By the time he had returned to St. Petersburg in 1829, he had accumulated the largest collection of algae specimens until that time.

Messerschmidt, Daniel Gottlieb (1685–1735)

German physician, naturalist in central Siberia, in service to Russia

Originally from the Prussian city of Danzig (present-day Gdańsk, Poland), Daniel Messerschmidt attended the University of Halle, where he studied medicine as well as geography, archaeology, and natural history.

Messerschmidt's diversified scientific background came to the attention of Czar Peter I (the Great) of Russia, who invited him to St. Petersburg in 1716. The Prussian doctor was then commissioned by the czar to undertake an extensive exploration into central SIBERIA. He was to study the geography of this vast unknown region, its plant and animal life, as well as the ethnography of the Siberian people. As a medical man, he was to note the diseases prevalent among the Siberians as well as the medicinal plants they used.

In 1719, Messerschmidt set out from St. Petersburg. After first traveling to Moscow, he made his way across the Ural Mountains to the western Siberian city of Tobolsk, from where he entered the lower Ob River region. He was soon assigned an assistant, a Swedish war prisoner named Tabbert (also known as Strahlenberg). During the next eight years, Messerschmidt covered a wide area of Siberia, from the Arctic regions of the lower Lena and Yenisey Rivers in the north to Lake Baikal and the upper Amur River in the south. While exploring the Tom River region, he located a complete mammoth skeleton, which he had transported back to St. Petersburg. His scientific work took him into the Lake Dalai Nor region of inner Mongolia. In the course of his explorations around Lake Baikal, he discovered significant deposits of mineral resources. Throughout his travels in Siberia, he made astronomical observations on the

height of the NORTH STAR, and his findings were later applied by geographers to fix definite points in the great landmass.

In 1727, Messerschmidt returned to St. Petersburg with a collection of animal and plant specimens, plus drawings depicting the natural history and ethnography of central Siberia. He also obtained several ancient Tatar and Kalmyk manuscripts, which enabled him to deduce the connections between the various languages of the nomadic people of the Siberian steppes.

Messerschmidt wrote a 10-volume account of his Siberian explorations. He wrote in Latin, however, and the work was never translated or published; he thus found little support for further scientific work in Russia. He spent his remaining years in St. Petersburg in relative poverty and obscurity.

Although much of Daniel Messerschmidt's scientific work was overlooked in his lifetime, he is recognized as having initiated the Russian government's program of planned Siberian exploration. In addition, he provided the earliest accurate description of permafrost, an Arctic phenomenon in which the soil and subsoil remain permanently frozen to depths of several hundred feet.

Meyer, Hans (1858–1929) *German mountain climber, geographer in East Africa and South America*

Born in the central German city of Hildburghausen, Hans Meyer was the grandson of 19th-century publishing magnate and industrialist Joseph Meyer. In 1884, the younger Meyer entered his family's reference book publishing firm, Bibliographisches Institut, becoming its director the following year.

Meyer was a world traveler and mountaineer, who spent time in the late 1880s exploring German East Africa, the region comprising what is now Tanzania. In 1887 and 1888, he made two unsuccessful attempts at climbing MOUNT KILIMANJARO, Africa's highest mountain at 19,341 feet above sea level. On a third try in 1889, he made it to the top with the Austrian Ludwig Purtscheller.

Nine years later, Meyer returned to East Africa, where he undertook an extensive exploration of the region around Mount Kilimanjaro. In 1901, he was named as a member of the German Colonial Council, which then oversaw the administration of this part of Africa. In 1903, Meyer turned his attention to the ANDES MOUNTAINS of Ecuador, where he undertook geological studies of volcanoes and glaciation.

Meyer revisited German East Africa in 1911. In 1915, he accepted an appointment as professor of colonial geography at the University of Leipzig.

In his 1889 climb of Mount Kilimanjaro's highest point, the peak known as Kibo, Hans Meyer discovered a

crater at the top, from which he determined that the highest mountain in Africa was an extinct volcano.

Middleton, Christopher (ca. 1700–1770)

British mariner in Hudson Bay

In his early maritime career, Christopher Middleton sailed with PRIVATEERS. Then, in the 1730s, he entered the service of the HUDSON'S BAY COMPANY, as second mate on the supply ship *Hannah*; soon afterward, he was given command of the vessel.

Middleton believed that HUDSON BAY was actually a strait whose western outlet provided access to a NORTHWEST PASSAGE to the Pacific Ocean. His ability as a mariner and his sailing experience in Hudson Bay brought him to the attention of the former surveyor general of Ireland, Arthur Dobbs, an outspoken critic of the Hudson's Bay Company's monopoly. Dobbs shared the view that a Northwest Passage could be found on the western side of Hudson Bay. Throughout the 1730s, Dobbs had challenged the Hudson's Bay Company to live up to the terms of its original charter and search for the Northwest Passage. By 1741, through contacts in the British Board of Trade and Plantations and in the Admiralty, Dobbs had succeeded in promoting an official naval expedition for that purpose.

Middleton offered to command the expedition, and, through Dobbs's influence, and with the approval of King George II, received the appointment. Outfitted with two naval vessels, the *Furnace* and the *Discovery*, Middleton sailed from England in June 1741. He and his men spent the following winter on the southwest shore of Hudson Bay near Prince of Wales Fort at the mouth of the Churchill River.

In June 1742, Middleton set out to explore northward. He soon came upon a large opening to the west, which, upon further exploration, proved to be a closed inlet, which he named Wager Bay after then first lord of the Admiralty, Sir Charles Wager. He continued northward into Roes Welcome Sound, which separates Southampton Island from the northwest coast of Hudson Bay. At the closed northern end of Roes Welcome Sound, Middleton came upon another opening, which also proved to be closed at its western end, and named it Repulse Bay.

Middleton reached Frozen Strait at the northern tip of Southampton Island before turning southward to reexamine the bay's west coast. Finding no evidence of a Northwest Passage in either the southern or northern sections of western Hudson Bay, he sailed back to England.

Later in 1742, in recognition of his explorations in Hudson Bay, Middleton was awarded the Copely Medal by the ROYAL SOCIETY, which had elected him as a member. In addition, his study of the magnetic variations of the

compass he had observed in Hudson Bay appeared in the Royal Society's publication, *Philosophical Transactions*. Nevertheless, he received only scorn from his former sponsor, Dobbs, who accused him of having taken a bribe from the Hudson's Bay Company to fail in the search for the Northwest Passage.

Middleton retired from the Hudson's Bay Company in 1750. An expedition sent out by Dobbs under WILLIAM MOOR in 1746, along with other expeditions, revealed that Middleton had correctly surmised that Hudson Bay's west coast offered no outlet.

Captain Christopher Middleton commanded the first expedition in search of the Northwest Passage to be mounted by the British navy. He proceeded farther north along the west coast of Hudson Bay than had any European before him.

Miletus, Hecataeus of See HECATAEUS OF MILETUS.

Miller, Alfred Jacob (1810–1874) *American artist on the Great Plains and in the northern Rocky Mountains*

Alfred Jacob Miller was born in Baltimore, Maryland, where his father was a grocer. He exhibited a talent for art and studied under Thomas Sully in Philadelphia. In 1833, Miller went to Europe to complete his formal art training, studying at the École des Beaux Arts in Paris, and also in Florence and Rome.

Back in Baltimore in 1834, Miller attempted to establish himself as a professional artist, specializing in portraits. He moved to New Orleans in 1837. Soon afterward, he met adventurer and hunter Sir William Drummond Stewart, a Scottish nobleman and former captain in the British army. Stewart engaged Miller to accompany him on an expedition to the Great Plains and ROCKY MOUNTAINS, during which he was to make sketches for later paintings of western scenes.

From New Orleans, Miller traveled with Stewart to St. Louis, where they joined up with an AMERICAN FUR COMPANY trade caravan and headed westward across the Great Plains, along the Oregon Trail, to Fort Laramie. Miller made a sketch of Fort Laramie as it appeared that summer. Miller and Stewart then crossed the Continental Divide via the SOUTH PASS and spent a month at the fur trappers' rendezvous in the Green River Valley in what is now western Wyoming. Miller made sketches of Native Americans and Rocky Mountain landscapes. More than 3,000 Snake Indians attended the Green River rendezvous that year, as well as mountain men such as CHRISTOPHER HOUSTON CARSON (Kit Carson) and JAMES BRIDGER, both of whom Miller had the opportunity to meet.

In fall 1837, Miller returned to New Orleans by way of St. Louis, and soon set to work producing oil paintings based on his western travels. The next year, he showed his paintings in Baltimore and New York. In 1840, he sailed to Scotland, where he stayed at Stewart's family home, Murthly Castle, and completed additional western pictures. In 1842, Miller moved back to Baltimore permanently and continued his artwork.

Alfred Jacob Miller's painting reflected a crucial turning point in the development of the American West. The Plains Indians, whose images he preserved in his art, were in the final decades of relatively peaceful coexistence and profitable trade with non-Indians. Over the next 30 years, the influx of settlers, along with the development of cattle ranching and railroads, greatly altered the Plains Indian way of life.

Milton, William-Wentworth Fitzwilliam
(Viscount Milton, Lord Milton) (1839–1877)

British traveler in the Canadian West

William-Wentworth Fitzwilliam, an English nobleman and descendant of the old and prominent Fitzwilliam family, was born in London and studied at Eton College and Cambridge University. He first visited the Canadian West in 1860, when he took part in a buffalo hunt in the region of the Red River in southern Manitoba.

In summer 1862, Viscount Milton accompanied the physician WALTER BUTLER CHEADLE on a journey across Canada in an attempt to find a direct east-west route to the Cariboo goldfields in eastern British Columbia. They crossed the ROCKY MOUNTAINS by way of Yellowhead Pass.

Back in England, Viscount Milton wrote and lectured about his experiences in the Canadian West and, with Cheadle, coauthored an account of their trans-Canada journey. It was first published in 1865. Starting that year, until 1872, he sat in the British House of Commons.

Viscount Milton, along with Walter Cheadle, helped establish a more direct route through the Canadian Rockies.

Mitchell, Sir Thomas Livingstone (1792–1855)

British army officer, government official in Australia

Thomas Mitchell was born in Craigend, a town in the former Stirlingshire county of central Scotland. As a teenager, he went to work for his uncle's coal-mining business, and when about 18, he enlisted in the British army. In 1810–13, Mitchell served in Portugal and Spain as a surveyor and draftsman in the Peninsular War under the command of Arthur Wellesley, duke of Wellington.

Mitchell left the army at the rank of major and, in 1827, he was appointed deputy surveyor general for New South Wales, Australia. In May 1828, the surveyor

general of New South Wales, JOHN JOSEPH WILLIAM MOLESWORTH OXLEY, died, and Mitchell was appointed his successor.

In his first years as surveyor general, Mitchell supervised bridge- and road-building projects throughout New South Wales. Then, in 1831, spurred on by the explorations of CHARLES STURT into the interior, Mitchell organized a series of expeditions of his own, hoping to locate a great navigable northwestward-flowing river, which could be used as a trade link between New South Wales, the north coast of Australia, and the riches of India and Southeast Asia.

Mitchell heard from the Aborigines reports of just such a river, which they called Kindur. On his first two expeditions into the region of the upper Darling River in 1831–35, he made the European discovery of the Peel, Namoi, and Gwydir Rivers. In 1835, he made a concerted effort to determine the true course of the Darling River, believing that it flowed northwestward into the Gulf of Carpentaria more than 1,000 miles distant. Mitchell established a post on the Darling, Fort Bourke, from where he descended the river for about 300 miles, eventually becoming resigned to the fact that it did not turn northward. Losing two of his men in a native attack, he returned to Sydney.

On a third expedition in 1836, Mitchell searched for a connection between the Murray and Darling Rivers. After finding a junction between them, he pushed far to the south and came upon a large fertile region in the interior of what is now western Victoria, which he named "Australia Felix." On this expedition, he reached the south coast of Australia at Portland Bay and also climbed Mount Macedon.

In 1845, Mitchell mounted his largest expedition in an attempt to make the first crossing of the Australian continent, from Sydney to Port Essington, on the north coast near present-day Darwin. Soon after his departure, he received word that German explorer FRIEDRICH WILHELM LUDWIG LEICHHARDT had already succeeded in making the northwestern traverse from Darling Downs to the north coast. Instead of turning back, Mitchell went on to explore the central region of what is now Queensland and came upon large areas of previously uncharted lands suitable for agriculture and sheep raising.

On the return journey, Mitchell made the European discovery of a river, which he named Victoria in honor of the queen. The stream seemed to flow northwestward, leading Mitchell to speculate that he had at last found the northern river that would connect Joseph Bonaparte Gulf on the north coast with settled regions of southeast Australia. A follow-up expedition carried out in 1847 under his assistant EDMUND KENNEDY revealed that Mitchell's Victoria River was actually the Barcoo, which eventually flowed into the desert region around Lake Eyre to the southwest.

Mitchell returned to England in 1848, where he published his journals, received a knighthood, and was rewarded by the British government for locating new areas for agricultural settlement. He was back in Sydney in 1855, when his survey department came under investigation by a royal commission. He died of pneumonia later that year.

Sir Thomas Mitchell managed the official exploration of New South Wales, Victoria, and Queensland for 27 years. In that time, he personally undertook extensive explorations into the interior, which revealed much about the river system of eastern Australia. While he did not fulfill his goal of finding the great water route through the continent that would link Sydney with Asia, his investigations into the continent resulted in the European discovery of vast areas of fertile lands for future settlement.

Moffat, Mary (1795–1871) *British missionary in South Africa, wife of Robert Moffat, mother of Mary Moffat Livingstone*

Mary Moffat was born Mary Smith in Salford, near Manchester, England. Her family was deeply involved with Methodism, and two of her brothers became missionaries. Mary herself developed strong religious convictions in her education at the Moravian school in Fairfield.

In 1815, Mary first met ROBERT MOFFAT, who had come to work for her father's garden nursery in Dukinfield, near Manchester, where her family had settled. Although the two became engaged, Mary's parents objected to the match. The following year, Robert Moffat sailed to South Africa to begin his work as a missionary.

By 1819, Mary had won her parents' consent to marry Robert Moffat, and she sailed to Cape Town. Soon after her arrival, she and Moffat were wed, and almost immediately the couple set out northward into the interior regions of Bechuanaland (present-day Botswana) as missionaries to the tribes of southern Africa. In 1825, the Moffats established the first Christian mission at Kuruman, on the edge of the Kalahari Desert.

In 1870, after a half century in Africa, Mrs. Moffat returned to England with her husband. They settled at Brixton, then a suburb of London, where she died the following year.

Mary Moffat accompanied her husband on his travels and explorations in Africa and, according to contemporary accounts, was a motivating force both for the missionaries who worked with her husband and for the natives to whom they ministered. While in Africa, she and her husband raised a family of two girls and one boy. In 1844, her eldest daughter, also named Mary (MARY MOFFAT LIVINGSTONE), married the Scottish missionary-doctor and African explorer DAVID LIVINGSTONE.

Moffat, Robert (1795–1883) *Scottish missionary in South Africa, husband of Mary Moffat, father of Mary Moffat Livingstone*

Robert Moffat was born at Ormiston in southern Scotland. As a child, he moved with his family to Falkirk, north of Glasgow, where his father, a customs officer, had been assigned. At the age of 14, after schooling in Falkirk, Moffat began an apprenticeship as a gardener, and, in 1812, he went to work on the estate of Scottish nobleman Lord Moray in Fifeshire.

Moffat moved south to England in 1813, and two years later, he obtained a position as gardener for James Smith at his nursery near Manchester. While there, he became engaged to Smith's daughter, Mary.

Moffat, who had come from a religious family, found himself drawn to Methodism in his first years in the Manchester area. He resolved to become a missionary, and in September 1816, he was accepted by the London Missionary Society. After his admission to the Methodist ministry, he was commissioned to undertake a mission to the tribes of South Africa; he sailed for Cape Town on the *Alacrity* in October 1816, arriving three months later.

Although he had intended to head northward beyond the settled district around the CAPE OF GOOD HOPE, Moffat was at first denied permission by Cape Town authorities to cross the frontier. During the next nine months, while waiting for authorization to proceed into Namaqualand, he studied the Afrikaans language.

In September 1817, Moffat was allowed to travel northward. He traveled first to Namaqualand on the Atlantic coast, from where he set out eastward into the Kalahari Desert, reaching as far as Griquatown and Lattakoo, near present-day Kimberly, South Africa. Moffat undertook several explorations north of Lattakoo before returning to Cape Town in 1819. He was joined there by Mary Smith, who had arrived from England, having won her parents' permission to marry him. The two were soon wed, and Moffat was appointed as superintendent of missions for Lattakoo, where the Moffats returned in March 1820.

By 1821, Moffat had established a mission settlement at Lattakoo. During this period, he studied native languages and undertook explorations into the Kuruman River region. An outbreak of tribal strife drove Moffat and his wife from Lattakoo in 1825, and they relocated their mission to the largely unsettled country along the Kuruman River.

Moffat pursued his missionary work at Kuruman for the next several years, undertaking a translation of the Old Testament into the Sechwana language. In 1830–31, he traveled to Cape Town, where he arranged to have the work printed, and returned to Kuruman with one of the first printing presses to be taken into the interior of Africa.

In 1835, Moffat accompanied a British scientific team in an expedition into the land of the Matabele people. Two

years later, an influx of Boer settlers caused problems for Moffat and his native following, and he was compelled to leave the area. He traveled with his family to Cape Town, from where they sailed for England, arriving in June 1839.

Moffat published another edition of the New Testament, which he had translated into native African languages, as well as an account of his experiences as a missionary in Africa, *Labours and Scenes in South Africa* (1842). He also went on a lecture tour, in the course of which he met DAVID LIVINGSTONE, whom he inspired to embark on a career as a missionary in Africa.

Moffat and his wife returned to Africa in 1843, and, with Livingstone, reestablished the Kuruman mission. The following year, Moffat's eldest daughter, Mary, and Livingstone were married.

During the next decade, Moffat continued his missionary work and produced more translations into Sechwana of religious writings, including *The Pilgrim's Progress*. He also continued to explore the outlying regions around Kuruman, visiting the Highveld, the Drakensberg Escarpment, and the Transvaal, and traveling northeastward to the Zimbabwe River. In 1854, he joined British sportsmen James Chapman and Samuel Edwards in an expedition along the edge of the Kalahari Desert.

In 1870, Moffat and his wife returned to England, after nearly 50 years engaged in missionary work in Africa. In England, Moffat continued to lecture and promote missionary work. When David Livingstone's remains arrived at Southampton in 1874, it was Moffat who identified them. He later attended Livingstone's state funeral at Westminster Abbey, and, in 1876, he officiated at the unveiling of a statue of Livingstone in Edinburgh. In 1882, Moffat met with Zulu leader Ketchwayo during his visit to England.

In his missionary work, Robert Moffat was one of the first Europeans to venture into what is now Botswana. He made several long overland trips northward from Cape Town and was one of the earliest European explorers of the region around the Kalahari Desert. He is also known for the influence he had on David Livingstone.

Montecorvino, John of See JOHN OF MONTECORVINO.

Montejo, Francisco de (1508–1565)

Spanish conquistador in Mexico's Yucatán Peninsula, son of Francisco de Montejo y León

Francisco de Montejo the Younger was born in Salamanca, Spain, son of FRANCISCO DE MONTEJO Y LEÓN, veteran of the Spanish conquests of Panama and the Aztec Empire in Mexico.

In 1537, Montejo's father directed him to carry on the conquest of the Yucatán. The campaign, begun by the elder Montejo in 1528, had come to a halt two years earlier in the face of fierce resistance by the Maya Indians, who by 1535, had succeeded in driving all the Spaniards out of the region.

Montejo established a stronghold at the former Maya settlement of Champotan on the west coast of the Yucatán Peninsula. He then advanced northeastward, and by 1540, he had captured the ancient Maya stronghold of Kimpech, where he then founded a city known today as Campeche. From there, he penetrated into the interior of the peninsula and, in 1542, after taking control of most of western Yucatán, founded the city of Mérida on the ruins of another Maya city. By 1546, after suppressing a final uprising by a coalition of Maya tribes, he had the rest of the Yucatán Peninsula's eastern region firmly under Spanish control.

Montejo was appointed assistant governor of Yucatán and nearby Cozumel Island by his father in 1545. He settled in Mérida, which later became the principal city of the region and, after 1821, was capital of Mexico's Yucatán State.

Francisco de Montejo, part of the first wave of CONQUISTADORES in Mexico, participated in the subjugation of Indian peoples of the Yucatán, which opened the region to Spanish settlement.

Montejo y León, Francisco de

(ca. 1479–ca. 1549) *Spanish conquistador in Mexico and Central America, father of Francisco de Montejo*

Born in Salamanca, Spain, Francisco de Montejo was a member of a noble family. There are few details of his early years until 1514, when he sailed to the coast of Panama as a member of PEDRO ARIAS DE ÁVILA's expedition.

After a brief stay at Ávila's settlement at Nombre de Dios in Panama, Montejo went on to Cuba, where he entered the service of the island's colonial governor, DIEGO DE VELÁSQUEZ. In May 1518, he was given command of the soldiers who were sent under JUAN DE GRIJALVA to explore reports of a rich Indian civilization to the west. With Grijalva, Montejo explored the coast of Yucatán; he was among the first Europeans to learn of the Aztec Indian civilization of Mexico.

In 1519, Montejo served as an officer under HERNÁN CORTÉS in his expedition to the mainland of Mexico. Among the original landing party on the Yucatán Peninsula, he was later sent northward along the coast to discover a suitable landing site. He soon located a natural harbor where Cortés's ships were able to anchor. Cortés organized a permanent settlement, which he named Veracruz (true cross), and appointed Montejo as one of its administrators.

In July 1519, Montejo was sent back to Spain by Cortés to report personally to the Spanish monarch, Charles I (Holy Roman Emperor Charles V) on his contacts with the Aztec and to present him with gifts of gold, silver, and jewels acquired from the Indians. Charles appointed Montejo as governor of Veracruz.

Returning to Mexico in 1522, Montejo went on to assist Cortés in his conquest of the Aztec, leading the Spanish advance into Coatzacoalcos province, as far as the Gulf of Honduras and present-day Belize.

Montejo again returned to Spain in 1526, where he was commissioned to undertake the conquest of the Yucatán, which was then thought to be an island. In May 1528, he sailed from the port of Sanlúcar de Barrameda, near Seville, in command of a fleet of three ships and a force of 500 soldiers. His first attempt to subdue the Maya Indians from the east failed, and, in 1530, the CONQUISTADORES were forced to withdraw to Mexico.

In the meantime, Montejo succeeded in conquering the Tabasco region of southern Mexico, and, in 1531, he launched a second offensive against the Maya. This too met with little success in the face of stiff resistance. His men, disappointed at not finding wealth among the Maya comparable to the riches of the Aztec, deserted him in 1535, and he again returned to Mexico.

In 1540, Montejo's son, also named FRANCISCO DE MONTEJO, mounted a successful campaign that resulted in the total subjugation of the Maya and other native peoples of Yucatán.

The elder Montejo received the surrender of the Yucatán's most powerful native chief, Tutulxin, on January 23, 1541. The following year, he was appointed governor of Honduras, where he established the cities of Caballos and Comayagua. In 1547, he took charge of the Chiapas region of southern Mexico and became governor of Guatemala, where he founded the cities of New Sevilla and Olancho.

Montejo's colonial administration was investigated by a royal commission in 1546. To clear his name, he sailed to Spain in 1548, where he died the following year.

Francisco de Montejo served as one of Cortés's leading officers in the conquest of Mexico. He is credited with helping found Veracruz, one of the earliest permanent Spanish settlements on the North American mainland, and with initiating the conquest of the Yucatán, the last part of Mexico to fall under Spanish domination.

Moor, William (unknown–1765) *British mariner in Hudson Bay*

William Moor, who had served as a mate on HUDSON'S BAY COMPANY supply ships, was selected in 1746 to lead an expedition in search of an entrance to the NORTHWEST PASSAGE on the west coast of HUDSON BAY.

Moor was given command of the *Dobbs*, named after the enterprise's chief promoter, Arthur Dobbs, a politically well connected former Irish parliamentarian and surveyor general, who had won the support of the British Admiralty for this and a previous venture commanded by CHRISTOPHER MIDDLETON in 1741–42. A year before Moor sailed in 1746, the British Parliament had offered a prize of £20,000 to anyone who found the Northwest Passage. The expedition included another vessel, the *California*, commanded by Francis Smith, also a seafarer from the Hudson's Bay Company's supply fleet.

After wintering on the southwest shore of Hudson Bay at York Factory, Moor cruised northward along the bay's west coast and explored what first seemed to be a passage westward. Upon further exploration, the passage proved to be a closed-end bay, later known as Chesterfield Inlet. To the north, he made a thorough investigation of Wager Bay, located by Middleton in 1742. Using longboats, Moor and his men went more than 150 miles up Wager Bay, reaching Brown Lake at its western end, where they found the mouth of an unnavigable stream. Finding no other major openings to the west, Moor and his ships returned to England.

William Moor's expedition of 1746–47 served to convince many English navigators and geographers that Hudson Bay was not the gateway to the Northwest Passage. In the decades that followed, maritime explorers seeking the elusive waterway through North America concentrated their efforts on the coast of the Pacific Northwest.

Moorcroft, William (1765–1825) *British veterinarian in central Asia*

William Moorcroft, of Lancashire, England, studied medicine at the Liverpool Infirmary and, while still a student, was called upon to help determine the cause of a livestock epidemic known as the Derbyshire Cattle Plague of 1783. The experience led him to pursue a career in veterinary medicine, for which he went to France for additional training.

Moorcroft settled in London and developed a highly successful practice as an animal doctor. Then, in the late 1790s, he began to suffer financial losses as a result of problems arising from a patent he had obtained for a mechanical horse-shoeing process. In 1808, he accepted a position as a veterinary surgeon with the British-controlled Bengal government in northeastern India, caring for Bengal army horses; he also was engaged as the superintendent of the BRITISH EAST INDIA COMPANY's horse-breeding operations near the city of Kanpur.

It was in connection with his duties as an army veterinarian and horse breeder for the British East India Company that Moorcroft first became involved in the exploration of central Asia. In an effort to improve the quality of the na-

tive cavalry horses, he sought to travel overland into Turkistan to acquire breeding stock from the central Asian steppes. In 1812, he accompanied British army officer HYDER JUNG HEARSEY on an expedition, undertaken as part of the British government's Great Trigonometrical Survey of India, in which they searched for the source of the GANGES RIVER and crossed the HIMALAYAS into Tibet.

In 1819, Moorcroft embarked on a trade mission northwestward from Calcutta, seeking to open the independent states of northern India to trade with the British East India Company. Accompanied by a young English geologist, George Trebeck, he traveled to the city of Leh in the Ladakh region (now part of Kashmir), where he remained for more than two years, establishing diplomatic and commercial ties. In 1822, the company showed its displeasure at his overly long stay in Leh by suspending him from its payroll.

Undaunted, Moorcroft set out to implement his plan to obtain larger and stronger horses in Turkistan for the Bengal Army. He had first intended to travel by way of western China but he was denied permission to cross the border. Instead, he set out from Leh for Kashmir, where he arrived in early November 1822. While there, he arranged to send back several live "shawlwool goats," whose offspring eventually reached England.

From Kashmir, Moorcroft and Trebeck traversed the Punjab region of what is now northern Pakistan on a route not traveled by Europeans in modern times, and reached Peshawar. After crossing the Hindu Kush range and the KHYBER PASS, then following the Kabul River, they reached Kabul, Afghanistan. Moorcroft then traveled to the Turkistani kingdom of Bukhara, again through country not visited by Europeans since the days of ALEXANDER THE GREAT. In Bukhara, he met with the region's king and sold a shipment of trade goods.

In August 1825, Moorcroft set out from Bukhara for the city of Meymaneh on the northern Afghani border, hoping to find the finest horses in the world. While en route, he was captured by bandits. He died soon afterward, either from the effects of poison or from fever. His body was transported to the city of Balkh, where he was buried. Trebeck died of fever not long afterward at the Afghani city of Mazar.

In his 1812 expedition with Hearsey, William Moorcroft became one of the first Englishmen to cross the Himalayas. His account of this journey was published in England in the journal *Asiatic Researches* in 1816. At the time of his death in Afghanistan in 1825, he was still under suspension by the British East India Company, a fact that later led to a dispute over who actually had a claim to the journals of his last expedition. They remained unpublished for more than 20 years, and later British travelers from India, covering much of the same territory through which

Moorcroft had already explored, mistakenly believed they were the first Europeans to visit northern Afghanistan and the Turkistan region. Finally, in 1841, the ROYAL GEOGRAPHICAL SOCIETY published Moorcroft's account of the six years he spent in northern Pakistan and Turkistan, entitled *Travels in the Himalayan Provinces of Hindustan and the Punjab, from 1819 to 1825*. Even though he did not obtain the Asian horses for the Bengal army as planned, the "shawlwool" goats he sent back had a great impact on the British woolen industry and led to the introduction into western markets of what is known today as cashmere (Kashmir) wool.

Moreno, Francisco (1827–ca. 1905)

Argentine naturalist in the Andes Mountains and Patagonia

Born in Buenos Aires, Francisco Moreno attended Argentina's University of Córdoba, then went on to the University of Buenos Aires, graduating in 1854 as a doctor of natural science.

Moreno became a professor in the department of natural history at the University of Buenos Aires, where he concentrated in anthropology. In 1872, he undertook the first of a series of explorations, which would take him through much of the little-known regions south and west of Buenos Aires.

In 1876–77, Moreno traveled into the southern Andes Mountains and Patagonia to study the life and culture of the region's native peoples. After exploring Lake Nahuel Huapi, he continued southward, and on February 14, 1877, he became the first non-Indian to see Lake San Martín; two weeks later, he explored Cerro Chaltel (Mount Fitzroy).

On his second Patagonian expedition in 1880, Moreno was taken captive by the Tehuelche Indians (the "fabled Patagonian giants" reported by FERDINAND MAGELLAN and other earlier explorers of South America). He managed to escape just before his captors planned to kill him.

In 1882–83, Moreno undertook his most extensive exploration of the ANDES MOUNTAINS, traveling southward along the length of the mountain range, from Bolivia into the frontier region between Chile and Argentina. In 1884–85, he explored southwestward into the region south of Argentina's Río Negro, and into the Andean country around Lake Buenos Aires.

Francisco Moreno wrote many books based on his explorations into southern Argentina and the Andes Mountains. He was named chief of the Argentine government commission on the exploration of the country's southern territories and became director of Buenos Aires's anthropological museum. His work carried on the tradition of scientific study of the natural history of Patagonia begun by CHARLES ROBERT DARWIN and GEORGE CHAWORTH MUSTERS.

Morgues, Jacques Le Moyne de See LE MOYNE DE MORGUES, JACQUES.

Morozko, Luka (Luka Moroskoi)

(unknown–ca. 1699) *Russian Cossack in eastern Siberia*

In the late 1690s, the Russian Cossack Luka Morozko participated in the exploration and conquest of northeastern SIBERIA. Morozko served under VLADIMIR VASILYEVICH ATLASOV at Anadyr, which at that time was Russia's main settlement on the Pacific coast of Siberia, located at the mouth of the Chukchi Peninsula's Anadyr River. In 1696, under the direction of Atlasov, Morozko led a detachment of 16 Cossacks to investigate reports of a land to the south rich in fur and minerals. Morozko and his men penetrated the Kamchatka Peninsula, the only part of Siberia still unknown to Europeans, exploring along its west coast as far as the Tigil River.

Back at Anadyr later that year, Morozko reported to Atlasov on his findings, including accounts he had heard of the Kuril Islands, a chain of islands that stretch off the southern tip of Kamchatka, all the way to northern Japan. Starting in 1697, Morozko took part in Atlasov's campaign to bring the newly explored Kamchata Peninsula under Russian control. He was killed in about 1699 in a battle with the Kamchadal natives of eastern Kamchatka.

With Luka Morozko's penetration of the Kamchatka Peninsula in 1696, the full extent of Russia's vast Siberian domain was revealed.

Moscoso, Luis de (Luis de Moscoso de Álvara, Luis de Moscoso de Alvarado, Luys Moscoso)

(fl. 1530s–1540s) *Spanish conquistador in the American Southeast and Southwest*

Luis de Moscoso was born at Zafra in southwestern Spain, the son of a local government official. From 1530 to 1535, Moscoso, having become a professional soldier, served as an officer under PEDRO DE ALVARADO in campaigns of conquest in present-day Guatemala and in the northern Inca province of Quito, part of present-day Ecuador.

In April 1538, Moscoso left Spain with HERNANDO DE SOTO's expedition to explore Florida and adjacent lands for new sources of wealth. He sailed with de Soto's fleet, in command of the GALLEON *Concepción*, and after a long stopover in Cuba, landed with the expedition in the Tampa Bay area in May 1539. As de Soto's *maestro de campo*, or second in command, Moscoso undertook reconnaissance missions ahead of the main body of Spanish forces as they traveled through what is now northwestern Florida and into the southern APPALACHIAN MOUNTAINS of present-day Georgia, the Carolinas, and Tennessee. He was frequently sent

ahead to confer with local native leaders and to announce de Soto's arrival.

In fall 1540, Moscoso warned de Soto that the Creek Indians were planning to attack the Spaniards while they were encamped near present-day Mobile, Alabama. His warning went unheeded, and although de Soto and his forces were able to repel the Indians, they suffered losses in both men and equipment. De Soto replaced Moscoso as chief lieutenant with Baltasar Gallegos following a defeat at the hands of the Chickasaw Indians near present-day Pontotoc, Mississippi, in March 1541. Nevertheless, as de Soto was dying of fever in May 1542, he appointed Moscoso as his successor.

Moscoso tried, without much success, to convince local Indian leaders that de Soto had not really died but had ascended into heaven and would soon return. For this reason, he had his men weight de Soto's body with rocks and dispose of it secretly in the MISSISSIPPI RIVER.

After conferring with his officers, Moscoso determined that the expedition, with severe losses in men, livestock, food, and equipment, was in no condition to continue the quest for riches among the Indians, and he decided to lead survivors to safety in New Spain (Mexico). In late spring 1542, from a site near what is now Texarkana, Arkansas, he led them westward into eastern Texas. From Indians in Texas, Moscoso heard legend-like accounts of ÁLVAR NÚÑEZ CABEZA DE VACA and his companions, who had wandered through much of Texas and the American Southwest in the early 1530s.

By fall 1542, after reaching as far westward as the Trinity and Brazos Rivers, near the present-day Dallas–Fort Worth area, Moscoso abandoned his attempt to reach Mexico overland across the seemingly endless southern plains. He led his men back eastward along the Arkansas River and returned to the Mississippi River, where the expedition wintered in 1542–43, near present-day Natchez, Mississippi. While there, seven crude barges were built under the direction of a Genoese shipwright and, on July 2, 1543, Moscoso and his men sailed down the Mississippi River into the Gulf of Mexico, then followed the Gulf Coast southward. After a voyage of 52 days, they reached the mouth of the Pánuco River, near the newly established Spanish settlement of Tampico, Mexico, on September 10, 1543. Reequipped with food and clothing, they walked from there to Mexico City, where Moscoso was received by the Spanish viceroy, ANTONIO DE MENDOZA, to whom he presented an official narrative of the expedition, written by Luis Hernández de Biedma and sent back to King Charles I in Spain. Of the more than 600 men who had started out with de Soto, only 311 returned to Mexico with Moscoso.

As de Soto's second in command and as his successor, Moscoso had covered more than 4,000 miles of territory

through what is now the southeastern United States and eastern Texas and had commanded the first vessels to be sailed by Europeans down the Mississippi River into the Gulf of Mexico.

Luis de Moscoso's explorations, taken together with those of de Soto and Coronado, provided Spain with much information on the interior of the vast country north and east of Mexico. Yet Moscoso's return to Mexico marked the end of European exploration into the lower Mississippi River Valley and the southeastern United States for 140 years. The next major European penetration into the region did not occur until the 1682 expedition of RENÉ-ROBERT CAVELIER DE LA SALLE.

Mothe, Antoine Laumet de la See LA MOTHE, ANTOINE LUMET DE.

Mouhot, Henri (Alexandre-Henri Mouhot)

(1826–1861) *French naturalist in Southeast Asia*

Henri Mouhot was born at Montbeliard in eastern France, the son of an official in the French government. With his father's support, Mouhot embarked on a career of full-time scholarship. In the early 1850s, after studies in natural history at various European universities, as well as philology studies in Russia, he became involved in an early form of photography. He traveled throughout Europe with his brother, producing daguerreotype pictures of well-known natural scenes and works of art.

In 1856, Mouhot settled on Jersey in the Channel Isles, with his English wife, a descendant of the Scottish explorer of Africa, MUNGO PARK. Mouhot continued his work as a naturalist, concentrating on ornithology and on conchology, the study of shells. Not long afterward, inspired by reading about the kingdom of Siam (present-day Thailand), Mouhot resolved to attempt a scientific expedition into the upper Mekong River region of Southeast Asia, an area little known to Europeans.

With the support of Great Britain's ROYAL GEOGRAPHICAL SOCIETY and Royal Zoological Society, Mouhot sailed to Singapore in April 1858, from where he traveled to Bangkok and met with the king of Siam. Mouhot was one of the first Europeans to report that the native people of Siam called themselves and their land "Thai," meaning "free" in the Thai language.

Mouhot made his first scientific foray into the jungles of Southeast Asia in October 1858 on a voyage up the Mae Nam River, during which he collected specimens of fish, reptiles, and mammals. After several weeks, he returned to Bangkok. That December, he set out for Phnom Penh, capital of the neighboring kingdom of Cambodia. He was also received by this country's ruler.

Soon afterward, Mouhot embarked on his first expedition up the Mekong River. West of the river, in early 1860, he came upon the ruins of the ancient temples at Angkor. Extending over 100 square miles, they comprise the largest complex of religious buildings ever constructed. Erected from about A.D. 880 to 1434 by the Khmers, they had since been abandoned and overgrown with dense jungle. Mouhot sent back to England and France a written description and sketches of the site.

In October 1861, Mouhot traveled into northern Laos and made a study of the region's animal life. He visited additional sites of ancient ruins, accompanied at times by French missionary priests. He also explored the upper Mekong River and some of its tributaries. While traveling through the Plain of Jars region of northern Laos, he was stricken with tropical fever, dying near Louangphrabang on November 10, 1861.

Henri Mouhot's account of his explorations in Southeast Asia, *Journey to the Kingdoms of Siam, Cambodia, Laos and Parts of Indochina*, was first published in France in 1863. The Angkor ruins were hailed in Europe as one of the greatest archaeological finds of all time. Moreover, Mouhot's explorations in Laos immediately prompted the French government to sponsor efforts to find the source of the Mekong River. The most important of these efforts was the Mekong River Expedition of 1866, undertaken by ERNEST-MARC-LOUIS DE GONZAGUE DOUDART DE LAGRÉE and FRANÇOIS GARNIER.

Muir, John (1838–1914) *American naturalist, preservationist, writer*

John Muir was born in Dunbar, Scotland. When he was 11 years old, his family immigrated to the United States and settled on a farm in Portage, Wisconsin. He attended the University of Wisconsin in 1860–63, leaving before obtaining a degree. He pursued an interest in natural science on walking trips through the countryside, studying geography, geology, and wildlife. In 1867, he hiked from Indianapolis, Indiana, to the Gulf of Mexico.

In 1868–74, Muir spent time in the West, exploring and studying Yosemite Valley and the peaks of the Sierra Nevada in California and Glacier Bay in Alaska. In 1880, he settled on a fruit ranch in Martinez, California, and became successful in horticulture. In the 1890s, he traveled to and studied the forests of Australia, Africa, Europe, and South America.

Muir became active politically as a preservationist of wilderness areas and wildlife. His efforts led to the founding of Yosemite and Sequoia National Parks in 1890. He also was one of the founders of the Sierra Club in 1892, an environmental organization still active at present. His books include *The Mountains of California* (1894), *Our National*



John Muir (Library of Congress)

Parks (1901), *My First Summer in the Sierra* (1911), and *The Yosemite* (1912). His journals, *Travels in Alaska* (1915) and *A Thousand Mile Walk to the Gulf* (1916), were published posthumously.

John Muir's work was central to the shaping of the environmental movement in the United States and around the world and influenced President Theodore Roosevelt to set aside national forest reserves, national parks, and national monuments. Muir Glacier, which Muir located in Glacier Bay, Alaska, was named after him. In 1964, Muir's California home, some of his fruit orchards, and his gravesite were designated the John Muir National Historic Site.

Munk, Jens Eriksen (Eriksen Munk, Eriksen Munke, Jens Muncke) (1579–1628) *Danish mariner in Hudson Bay*

Jens Munk was born in Barbo on the south coast of Norway, at that time under the sovereignty of Denmark. He went to sea when very young, serving as a merchant sailor in Portugal and Brazil, as well as with the Dutch merchant fleet. By

the age of 25, he had become an experienced mariner and shipowner.

In 1609, Munk attempted a voyage to Novaya Zemlya, but, in the Barents Sea, he lost his ship to the ice. On Kolguyev Island, he and his men constructed a boat from the wreckage and used it to reach Archangel 580 miles away. From there, they returned to Copenhagen.

Munk was commissioned as a captain in the Danish navy in the Kalmar War of 1611–13 with Sweden. Afterward, he remained in service to Danish king Christian IV, carrying out a campaign against PIRATES along the North Sea coast of Norway. Munk was one of the first Danes to recognize the profits to be gained from Arctic whaling, and, in about 1618, he established the first Danish whaling facility on Spitsbergen (present-day Svalbard).

In 1619, Munk was directed by Christian IV to explore HUDSON BAY's west shore for a NORTHWEST PASSAGE to India. King Christian, known as the Danish Sailor King for his efforts to make Denmark a maritime power, decided upon this expedition after learning of the explorations of the Greek seafarer known as JUAN DE FUCA, who reportedly had

located the STRAIT OF ANIAN, a fabled opening on the west coast of North America providing a passage between the Pacific and Atlantic Oceans.

Outfitted with two naval vessels, the frigate *Unicorn* and a sloop the *Lamprey*, Munk and a combined crew of 63 men sailed from Denmark in May 1619. Following a course north of the Shetlands, they passed the Faeroe Islands and sighted Cape Farewell, GREENLAND's southern tip, in late June 1619. Sailing northwestward across Davis Strait, Munk and his ships entered closed-end Frobisher Bay, which they mistook for Hudson Strait.

Although Munk soon realized his error and managed to locate the entrance to Hudson Strait, he then sailed too far to the south, into Ungava Bay on the north coast of present-day Quebec, mistaking it for HUDSON BAY. He went ashore on land he called "Rinsund," where he met with a band of Inuit (Eskimo) and hunted reindeer. He took possession of the region in the name of King Christian.

By August 1619, Munk had managed to correct his navigational errors and negotiate the length of Hudson Strait, rounding Cape Wolstenholme and Digges Island. He then made a southwestward crossing of the bay, reaching the estuary of the Churchill River, near present-day Churchill, Manitoba, in early September 1619. The ships were beached to protect them from storms, and Munk and his men settled in for the winter.

During his stay, Munk undertook the first scientific studies to be made in Hudson Bay, noting bird migrations, making astronomical observations, and recording his own speculations on the origins of the icebergs he had encountered while negotiating Davis and Hudson Straits. By noting the exact time of an eclipse on December 20, 1619, and later correlating it with the time the same eclipse was observed in Paris, he was able to determine accurately the exact meridian of longitude of his winter base at Churchill.

By mid-January 1620, SCURVY had begun to take its toll among the crew; by the end of June 1620, only Munk and two others remained alive. Some sources suggest that the crew may have actually succumbed to an outbreak of trichinosis resulting from eating undercooked polar bear meat. Munk had commented in his journal that he preferred his meat cooked well-done, a factor that may have saved his life.

Munk and the other two survivors recovered by eating grass and other plants on shore. They refloated the *Lamprey* and sailed back to Norway, which they reached in September 1620. From there, Munk returned to Denmark.

Despite the disastrous outcome of his Hudson Bay voyage, Munk planned a second expedition to the Churchill River region, where he intended to establish a fur-trading colony. Called back to naval service in 1623, he never did return to Hudson Bay. He served on the Weser River in the Thirty Years' War of 1618–48, reaching the rank of admiral in 1625. He died three years later at the age of 49.

Jens Munk's 1619–20 expedition to Hudson Bay was the only known Danish attempt to find the Northwest Passage. He and his men were the first to winter in the Churchill River estuary in 1625, a region that had been visited but not thoroughly explored by SIR THOMAS BUTTON in 1612–13. Munk's account of his voyage and the harrowing winter he spent on Hudson Bay was published in 1624. His map was the first to depict Hudson Bay in its entirety and identify it as a single inland sea, which he had named the Novum Mare Christian (new Christian sea). European exploration of Hudson Bay resumed 10 years after Munk's expedition, with the 1631 voyages of THOMAS JAMES and LUKE FOXE.

Musters, George Chaworth (1841–1879)

British naval officer in South America

Born in Naples, Italy, George Musters was the son of a former British army officer, whose family was among the landed gentry of Nottinghamshire, England. Orphaned by the time he was four, he was raised by his uncles, one of whom, Robert Hammond, had sailed the Pacific Ocean and the coasts of South America on the *Beagle* with Admiral ROBERT FITZROY.

Musters underwent schooling on the Isle of Wight, then at a naval academy near Portsmouth; he entered the British navy as a cadet in 1854. His first assignment took him to the Black Sea, where he participated in naval actions in the Crimean War of 1853–56. By the war's end, at the age of 15, he had been awarded medals for valor by both the British and Turkish governments.

In 1861, Musters was promoted to lieutenant while serving on Queen Victoria's yacht; soon afterward, he was assigned to the *Stromboli*, on which he took part in a five-year cruise in South American waters. While ashore at Rio de Janeiro in 1862, he and a midshipman from the *Stromboli* scaled Sugarloaf Mountain and, as a prank, planted a British flag at the mountain's peak. The flag remained there for several years, despite efforts by Brazilian authorities to remove it.

Musters purchased lands around Montevideo, Uruguay, where he established a sheep ranch while still with the British navy. Leaving active naval service at the rank of commander by 1869, he settled briefly in the Falkland Islands in the Atlantic Ocean. He became interested in the natives of Patagonia, the Tehuelche, whom FERDINAND MAGELLAN and other explorers had described as giants.

In 1869, Musters embarked on an expedition to explore the little-known interior regions of Patagonia and to study the life and culture of the Patagonian natives. From the Falklands, he first sailed to Punta Arenas on the STRAIT OF MAGELLAN. He then traveled northward to Santa Cruz on the southeast coast of Argentina. Accompanied by a band of

Tehuelche (who came to regard him as their king), he traced the course of the Río Chico westward almost to its source, then followed the eastern slopes of the southern ANDES MOUNTAINS northward. After crossing Argentina's Pampas, he followed the Río Negro to its mouth on the South Atlantic, which he reached in 1870, having covered more than 1,400 miles through the interior of southernmost South America.

Musters returned to England, where he wrote an account of his journey, entitled *At Home With the Patagonians, a Year's Wanderings on Untrodden Ground from the Straits of Magellan to the Río Negro*. It was published in London in 1871. The work provided his contemporaries with a full description of the customs of the Tehuelche, distinguishing them from the Araucanian tribes to the north and the Tierra del Fuego people to the south. In addition, it added much to the geographic knowledge of the interior of southern Argentina, which until that time had remained largely unknown to Europeans. Musters's achievements in exploring South America were officially recognized by the ROYAL GEOGRAPHICAL SOCIETY, which awarded him a gold watch in 1872.

Musters made a visit to Vancouver Island, British Columbia, where he lived among the Indians and studied their life and culture. Afterward, he returned to South America, planning to make a west-to-east crossing of the continent from Chile to Patagonia. Circumstances led him to abandon this venture, however. He soon married the daughter of a British family living in Bolivia and settled there, traveling throughout that country and adjoining regions.

In 1876, Musters returned to his family's home, Wiverton Hall, in Nottinghamshire. Two years later, he was appointed Great Britain's diplomatic representative in Mozambique, but he died in early 1879 before he could travel there.

Nicknamed the "King of Patagonia" for his exploits among the Tehuelche, George Musters provided one of the first modern descriptions of the aboriginal people of southern Argentina. Lake Musters, near the headwaters of the Chico River, was named in honor of his explorations along the southeastern slopes of the Andes and the upper Chico River region.

Mylius-Erichsen, Ludwig (Ludvig Erichsen)

(1872–1907) *Danish explorer in Greenland*

Born in Denmark, Ludwig Mylius-Erichsen commanded the Danish Greenland Expedition of 1902–04. His team of anthropologists, scholars, and scientists traveled to GREENLAND's northwest coast, at the upper end of Melville Bay, where they made a study of the language and customs of the Inuit. They also explored the uncharted shores of the Hayes Peninsula, near what is now Thule Air Force Base, Greenland, reaching as far north as Cape York.

In an expedition aboard the Arctic exploring vessel *Danmark*, Mylius-Erichsen led another Danish scientific expedition to Greenland's northeast coast in 1906. He reached a point farther north than the one achieved by KARL CHRISTIAN KOLDEWEY in a 1869–70 expedition to eastern Greenland. In 1907, Mylius-Erichsen reached the Northeast Foreland, a peninsula jutting out of Greenland's northeastern corner. While exploring Northeast Foreland, he and two members of his expedition perished of cold, hunger, and exhaustion.

The peninsula Ludwig Mylius-Erichsen located at 82° north latitude, Greenland's northeasternmost point, was renamed Mylius-Erichsen Land in his honor. One of the survivors of the expedition was the German meteorologist and geophysicist ALFRED LOTHAR WEGENER, who undertook subsequent explorations in Greenland.



Nachtigal, Gustav (1834–1885) *German physician, diplomat in North and West Africa*

Gustav Nachtigal was born in the Bavarian town of Eichstatt, the son of a Lutheran pastor. He studied medicine at several German universities and eventually became an army surgeon.

With the onset of tuberculosis, Nachtigal traveled to Algeria in 1862 to recover his health in the dry desert climate. While there, he made his first explorations into the SAHARA DESERT. Two years later, he was appointed court physician to the bey of Tunis. Learning enough Arabic to travel among the Arabs as one of them, he took part in a year-long military expedition with the Tunisian army against marauding desert nomads.

In 1868, the German explorer GERHARD ROHLFS of North Africa contacted Nachtigal in Tunis, arranging a commission from Wilhelm I of Prussia for a diplomatic mission to the Sultanate of Bornu in what is now northeastern Nigeria. Nachtigal set out from Tripoli and, traveling southward into the Fezzan, reached the desert city of Murzuk in southwestern Libya, where he was joined for a short time by the Dutch woman explorer of North Africa, ALEXANDRINE PETRONELLA FRANCINA TINNÉ. From Murzuk, Nachtigal headed southeastward across nearly 500 miles of desert into the 11,000-foot-high Tibesti range of what is now northwestern Chad, becoming the first European to visit the region.

Nachtigal eventually reached Kukawa, the capital of Bornu, where he presented the sultan with gifts from the

Prussian monarch, among which was a type of portable organ known as a harmonium. He then proceeded to Lake Chad, disguised as a Muslim pilgrim, and after exploring the Chari River, he journeyed to TIMBUKTU and into central Africa before traveling into the eastern Saharan states of Wadai, Darfur, and Kordofan. He then made a southeastward crossing of the Sahara Desert. By summer 1874, he had reached Khartoum on the White Nile River, from where he traveled to Cairo, then back to Europe. In Germany, Nachtigal wrote a three-volume account of his explorations in North Africa, *Sahara and Sudan*, published from 1879 to 1889.

Nachtigal became German general consul of Tunisia in 1884, soon after it had become a French protectorate. After a subsequent appointment as German imperial commissioner to West Africa, he headed a diplomatic expedition to Togoland and Cameroon, which by then were among the last regions of West Africa not yet under European colonial rule. In July 1884, Nachtigal successfully negotiated a treaty with the native ruler of Togoland, making the region a German colony. In the same month, he entered into an agreement with the tribal leaders of Cameroon under which that land became a German protectorate. While returning to Germany, he died at sea off the Ivory Coast and was buried ashore at Grand-Bassam.

Gustav Nachtigal was the first European to make a southeastward crossing of the Sahara and travel through the region between Lake Chad and the White Nile. He revealed much about the relationship between the dominant

geographic features of the eastern and western regions of North Africa.

Naddod (Naddod the Viking, Naddoc)

(fl. 860s–870s) *Norse mariner in Iceland*

Naddod the Viking appears in several traditional Norse historical accounts as a seafarer. In about A.D. 860 (according to events reconstructed from one version of the Norse *Book of the Settlements*), Naddod sailed from Norway on a voyage to the Faeroe Islands. After being driven by a storm about 250 miles northwest of the northernmost of the Faeroes, he came upon the east coast of ICELAND.

Naddod and his crew landed at a point that may have been near Reyðharfjordhur and briefly explored the surrounding countryside. They scaled a mountain, hoping to find some sign of human habitation. Failing to do so, they set sail for the Faeroes. As they left, snow began to fall, whereupon Naddod and his men named the land Snaeland, meaning “snow land” in Old Norse.

In another version of the *Book of the Settlements*, the Swedish Viking GARDAR SVARSSON is credited with landing in Iceland at about the same time as Naddod. Although one of them may have been the first Norseman to reach Iceland, traditional Irish sources suggest that Irish monks may have made voyages there earlier.

Nain Singh See SINGH, NAIN.

Nansen, Fridtjof (1861–1930) *Norwegian zoologist, oceanographer, statesman in Greenland and the Arctic Ocean*

Fridtjof Nansen was born in Store Froen, Norway, near Christiania (present-day Oslo). In 1880, he entered the University of Oslo, where he concentrated in zoological studies.

In 1882, while still a student, Nansen undertook his first venture to the Arctic, sailing on the Norwegian sealing vessel the *Viking* to Spitsbergen (present-day Svalbard), where he collected zoological specimens. On the return voyage, he sailed by way of the east coast of GREENLAND, where the vessel was trapped in the PACK ICE for three weeks. Soon after his return to Norway, Nansen was appointed as curator of the Museum of Natural History in Bergen.

In 1888, a year after he had received his doctorate in zoology, Nansen, inspired by the accounts of NILS ADOLF ERIK NORDENSKJÖLD, organized an expedition to explore the southern part of Greenland. He designed special equipment for the venture, including an ultralight sledge and a portable stove that used a minimum of fuel, which came to be known as the “Nansen Cooker.”

Among the five men Nansen had recruited to accompany him were two Laplanders (Sami) and three Norwe-

gians, including OTTO NEUMANN SVERDRUP. Aboard the sealing ship the *Jason*, they sailed from Oslo in May 1888. Upon reaching the uninhabited southeast coast of Greenland, they approached the shore in two small boats, making a landing at Kjøge. Using snowshoes and what are known today as cross-country skis, Nansen and his companions then traveled westward, and, by mid-August 1888, they had ascended Greenland’s ice cap to an altitude of 9,000 feet. On September 27, they reached Greenland’s west coast at Ameralikfjord, then made their way to the Danish settlement at Godthaab (present-day Nuuk). While wintering there in 1888–89, Nansen made a study of the Inuit (Eskimo) and their Arctic survival techniques.

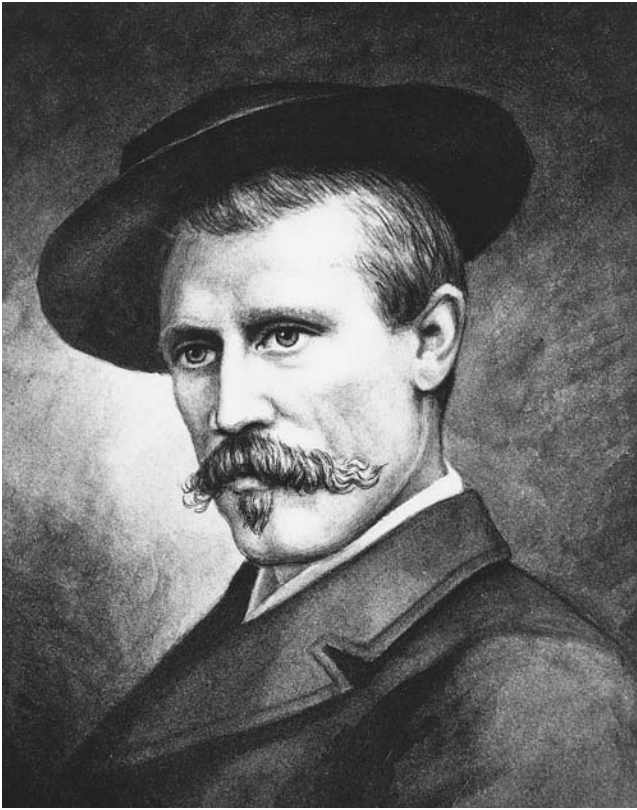
Nansen returned to Norway in 1889, having proven that Greenland’s ice cap extended all the way into the interior. Soon afterward, he married Eva Sars, the daughter of a university professor. His account of the expedition, *The First Crossing of Greenland*, was published in 1890.

In 1884, Nansen had learned that wreckage from the *Jeannette*, American Arctic explorer GEORGE WASHINGTON DE LONG’s ship, which had been crushed and sunk by the ice in the polar seas off the New Siberian Islands in 1881, had been found on the southwest coast of Greenland. Based on this information, he speculated that a specially designed vessel could be deliberately set in the ice near where the *Jeannette* had been stranded and drift enough northward through the frozen Arctic Ocean to serve as a base for a successful expedition by sledge across the ice to the NORTH POLE.

Although Nansen’s plan was at first met with some skepticism, by 1893 he had gained enough financial support from the Norwegian government, King Oscar of Norway, and Great Britain’s ROYAL GEOGRAPHICAL SOCIETY to mount an attempt. A ship, the *Fram*, built under the direction of Scottish naval architect Colin Archer, was equipped with a saucer-shaped hull designed to withstand the pressure of advancing ice and force the vessel on top of the surface of the frozen Arctic Ocean.

In June 1893, Nansen and the *Fram* sailed from Oslo with a crew of 12, including a member of the earlier Greenland expedition, Otto Sverdrup, as second in command. On rounding North Cape, they made their way into the NORTHEAST PASSAGE along the Arctic coast of Russia and SIBERIA. Before entering the Kara Sea, they stopped at Khabarova, near Vaigach Island, where Russian Arctic explorer EDUARD VON TOLL provided them with dogs for the planned sledge journey to the North Pole.

Sailing eastward beyond Cape Chelyuskin, Asia’s northernmost point, they entered the Sea of Laptev, and, on September 26, 1893, they achieved their goal of being ice-bound near the New Siberian Islands, at 77° north latitude. After a year, the ship had drifted only 5° northward and had begun to trend more to the west. In March 1895, with the *Fram* still heading too much to the west, Nansen de-



Fridtjof Nansen (Library of Congress)

cided to leave the ship and make an attempt on the North Pole, then 400 miles to the north. Leaving Sverdrup in charge, on March 14, 1895, he and Frederik Hjalmar Johansen embarked across the ice equipped with two kayaks, three sledges, and 24 dogs.

On April 8, 1895, at a point 240 miles from the North Pole, Nansen decided to turn back when ice conditions made progress northward by either sledge or kayak impossible. He had reached 86°14' north latitude, a record at that time.

Realizing that they would be unable to locate the still drifting *Fram*, Nansen and Johansen traveled southward toward the Siberian mainland. On July 24, 1895, they reached the northernmost islands of Franz Josef Land, where they built a hut of stone and moss, with a roof of walrus skins. They wintered there, hunting polar bear and walruses. On June 17, 1896, Nansen met up with British Arctic explorer FREDERICK GEORGE JACKSON, then in Franz Josef Land with the Jackson-Harmsworth Expedition. Anticipating such a meeting, Jackson had brought along letters from both the Norwegian government and Nansen's wife, Eva, which he presented to Nansen at his base at Cape Flora. Soon afterward, Nansen and Johansen were picked up by Jackson's relief ship, the *Windward*, on which they sailed to the northern Norwegian port of

Vardo. There, they learned of the arrival of the *Fram* at Tromsø a few days later. The *Fram* had drifted to Spitsbergen, where Sverdrup had managed to free it from the ice.

Hailed as a national hero in Norway, Nansen returned to academic life as a professor of zoology. He was honored with degrees from both Oxford and Cambridge Universities in England, where an English edition of his account of his attempt on the North Pole, *Farthest North*, was published in 1897. Having achieved national prominence, he went on to play an important political role in the dissolution of Norway's union with Sweden in 1905, and, that year, he was appointed modern Norway's first ambassador to Great Britain.

In 1908, Nansen became professor of oceanography at the University of Oslo. Ten years later, he became involved in relief efforts to aid displaced persons and war prisoners in the aftermath of World War I, for which he was awarded the Nobel Peace Prize in 1922. He had planned another Arctic exploit, a flight over the North Pole in an AIRSHIP, the *Graf Zeppelin*, before he died in May 1930, at his home outside of Oslo.

Fridtjof Nansen made the first known crossing of Greenland in 1888. Although he did not reach the North Pole in his Arctic expedition of 1893–96, the oceanographic studies he conducted revealed the Arctic Ocean to be much deeper than was thought, containing neither large landmasses nor a large number of islands, as some geographers and scientists had speculated. Among his numerous published works on oceanography and Arctic exploration, he wrote *Northern Mists* (1911), which recounts the history of Arctic exploration, dating from the ancient voyages of PUTHIAS and the medieval voyages of the VIKINGS. Nansen's ship, the *Fram*, was used by ROALD ENGELBREGT GRAVNING AMUNDSEN on his successful 1910–12 expedition to Antarctica and the SOUTH POLE.

Nares, Sir George Strong (1831–1915)

British naval officer in the Canadian Arctic

George Nares was born in Aberdeen, Scotland, the son of a British naval officer. At the age of 15, he entered the British navy as a midshipman.

In 1852, Nares was appointed as second in command aboard the *Resolute*, one of the fleet of ships under SIR EDWARD BELCHER searching for SIR JOHN FRANKLIN, who had been missing in the Canadian Arctic since 1845. He undertook several long sledge journeys over the next two years, surveying more than 1,100 miles to the north and west of Devon Island.

Nares next took part in naval actions in the Black Sea in the Crimean War of 1853–56. During the late 1860s, he undertook coastal surveys for the British Admiralty in Australia as well as in the Gulf of Suez.

In 1872, at the rank of captain, Nares was given command of the steamer *Challenger* and sailed around the world on one of the first oceanographic research voyages in history. In charge of the expedition's scientific team was SIR CHARLES WYVILLE THOMSON. After three crossings of the Atlantic Ocean, Nares directed the expedition to the Pacific Ocean by way of the CAPE OF GOOD HOPE. The team made oceanographic observations in the waters off Australia, NEW ZEALAND, and Japan, as well as in Polynesia. The expedition then headed southward, and, in February 1874, the *Challenger* became the first steamship to cross the ANTARCTIC CIRCLE. From the findings of his subsequent coastal survey, geographers were able to determine that Antarctica was a continent.

Later in 1874, Nares was called back to England and placed in command of the British Arctic Expedition, the major aim of which was to plant the British flag at the NORTH POLE. With two ships, the *Alert* and the *Discovery*, he was to explore the region north of Smith Sound and the channel between northern Ellesmere Island and northwestern GREENLAND, from where he could make an attempt on the North Pole. On May 29, 1875, he sailed with his ships from Portsmouth, England. After a stopover for sledge dogs at Proven, Greenland, he headed into Baffin Bay and then to Smith Sound, which he reached in July 1875. He then crossed westward to Ellesmere Island and northward to Cape Frazier.

Leaving the *Discovery* at the southern end of Kennedy Channel to serve as a relief ship, Nares, on the *Alert*, continued northward into Robeson Channel. He reached a point on the north coast of Ellesmere Island, adjacent to the edge of the frozen Arctic Ocean, where he and his men wintered.

Under Nares's command, sledging parties explored westward along the north coast of Ellesmere Island. The sledging expedition on the polar attempt was led by Commander Albert Markham, who managed to reach 83°20'26" north latitude, the northernmost record until that time. At that point, on encountering impassable stretches of ice, the team was forced to return.

Nares and his ships returned to England on October 27, 1876. He again commanded the *Alert* in an 1878 survey of the STRAIT OF MAGELLAN. Knighted for his achievements in Arctic exploration, he was made a vice admiral in 1892.

Based on his 1875–76 expedition, Sir George Nares reported that he had proved the nonexistence of an ice-free polar sea, and he concluded erroneously that the impassable permanent ice fields north of Ellesmere Island and Greenland made any attempt on the North Pole futile. He confirmed and corrected the locations of earlier geographic discoveries made by the Americans ISAAC ISRAEL HAYES and CHARLES FRANCIS HALL, and established that Greenland was an island. In addition, his study of the ice north of

Ellesmere Island revealed it to be nearly identical to the type of ice encountered around Banks Island, farther to the west, demonstrating that the Arctic Ocean was a single, unified, frozen expanse. On the site of the north coast of Ellesmere Island where Nares and his expedition spent the winter of 1875–76, a radio and meteorological base was later established by the U.S. and Canadian governments. Named Alert in honor of Nares's ship, the base is the most northerly permanent settlement in the world. The body of water that separates northwestern Greenland from Ellesmere Island is named Nares Strait.

Narváez, Pánfilo de (ca. 1478–ca. 1528)

Spanish soldier, colonial official in the Caribbean, Mexico, and Florida

Pánfilo de Narváez was born in Valladolid, Spain. A soldier by profession, he traveled to the Americas in about 1500, where he took part in the Spanish conquests of Jamaica and Hispaniola (present-day Haiti and the Dominican Republic). In 1511–14, he was DIEGO VELÁSQUEZ's chief lieutenant in the conquest of Cuba.

In 1520, Narváez was sent from Cuba by Velásquez to arrest conquistador HERNÁN CORTÉS, who had disobeyed official orders in his advance on the Aztec. That May, Narváez landed near Veracruz, Mexico, with a 900-man military force. Cortés launched a surprise counterattack against Narváez at Veracruz. Narváez lost an eye in battle and was taken prisoner, whereupon most of his men deserted to join Cortés in the conquest of Mexico. In 1521, after his release, Narváez returned to Spain.

In 1526, Narváez was appointed *adelantado* (governor) of Florida by Spanish king Charles I (Holy Roman Emperor Charles V) and was empowered to explore and conquer the lands between the Río de las Palmas in northeastern Mexico and the Cape of Florida. With a fleet of five ships, carrying 600 soldiers and colonists, Narváez left the Spanish port of Sanlúcar de Barrameda in June 1527. He stopped first at the Spanish settlements in Cuba and Santo Domingo, where one-third of the colonists deserted. In April 1528, his expedition, now reduced to 400 men, attempted to reach the Mexican coast at Tampico, but the ships were blown off course by storms. He instead made a landing at Tampa Bay on Florida's Gulf Coast.

Narváez stayed ashore with 300 men, sending his ships with the rest of his forces northward. He planned to rejoin the ships after a short exploratory march and sail to a Spanish settlement at the mouth of the Pánuco River on the east coast of Mexico.

Narváez led his reduced expedition inland into the Florida Panhandle. From the Indians, he heard tales of gold and other riches at the town of Apalachen to the north. This site, near present-day Tallahassee, Florida,

proved to have only an abundance of food. The Spanish pillaged Apalachen, thus earning the hostility of the Indians. After engaging the Indians in several battles and losing some of his men to Indian arrows as well as to tropical fever, Narváez headed for the Gulf Coast, where he believed his ships were waiting.

Narváez reached Apalachicola Bay, but the ships had since departed for Mexico. When food ran out, his men were forced to eat the last remaining horses at Apalachicola Bay, referred to as the “Bay of Horses.” With no gold to be found and supplies critically low, Narváez decided to abandon the enterprise and try to reach Mexico by sea, still believing it to be only a few days’ journey away. His men undertook the construction of five crude barges.

On September 22, 1528, Narváez and his 242 remaining men set sail into the Gulf of Mexico, intending to follow the shoreline to the Pánuco River. At a point below the outlet of the MISSISSIPPI RIVER, the barges were driven farther offshore by the river’s currents. Narváez, in command of one barge, was caught in a storm and never seen again. Only a handful of the expedition later reached the Texas mainland and Mexico, including the expedition’s treasurer, ÁLVAR NÚÑEZ CABEZA DE VACA, and a former slave, ESTEVANICO.

Pánfilo de Narváez’ 1528 attempt to conquer and colonize Florida ended in disaster. Nevertheless, his explorations resulted in the first significant land penetration by Europeans into the present-day United States. The expedition’s few survivors brought back the first reports by Europeans of a great river—the Mississippi—flowing into the Gulf of Mexico.

Nearchus (Nearchos) (ca. 360–312 B.C.)

Greek mariner under Alexander the Great in the Arabian Sea, Gulf of Oman, and Persian Gulf

Nearchus was a native of the island of Crete in the Mediterranean Sea. He settled at Amphipolis in the northern Greek kingdom of Macedon, where he was befriended by ALEXANDER THE GREAT. Starting in 334 B.C., he joined Alexander in his campaign against the Persian Empire, and, following the victory over Darius III at Granicus that same year, he was appointed governor of Lycia, a town on the Mediterranean coast of present-day Turkey.

In 329, Nearchus traveled east into Bactria (present-day Afghanistan), bringing reinforcements for Alexander’s campaign to India. By 325, Alexander had reached western India’s Hydaspes (the Jhelum River), where his army refused to continue. A fleet of 150 ships was constructed for a voyage of exploration, and a force of 5,000 men, including Macedonian officers, plus Greek, Cypriot, and Egyptian soldiers, was placed under Nearchus’s command.

By September 325, Nearchus had reached the mouth of the INDUS RIVER near modern-day Karachi, Pakistan. The

expedition was delayed in the Indus Delta by unfavorable monsoon winds for about three weeks. Nearchus then headed westward along the coast of what is now Pakistan. The fleet made daily stops for food and water, putting in at Gwadar Bay near the present-day Pakistan-Iran border.

Nearchus sailed into the Gulf of Oman, then passed through the Strait of Hormuz and entered the Persian Gulf. During one of his frequent stops along the west shore of the Persian Gulf, he met up with Alexander’s lieutenant Leonnatus, with whom he made a five-day march inland to present-day Kerman, Iran. With fresh supplies from Alexander’s army, Nearchus returned to his fleet on the Persian Gulf.

Sailing along the Makran Coast—the Persian Gulf coast of what is now Iran—Nearchus came into contact with several different primitive peoples, whom he described in his subsequent report to Alexander. He reported seeing “hairy men,” who used their long fingernails as tools, as well as a people he called the Ichthyophagi (literally, “fish eaters”), who subsisted entirely on fish and built houses from whale bones. At one point, the fleet had an encounter with a group of large whales, creatures unknown to his Mediterranean sailors. Nearchus made a visit to the island of Astola, which, according to legend, was inhabited by mermaids.

Nearchus journeyed inland to meet with Alexander at Gulashkird, then returned to the Persian Gulf and his ships. He sailed to the head of the Persian Gulf and the mouth of the Euphrates River, which he ascended to the Tigris, rejoining Alexander at Susa.

Nearchus had intended to undertake additional voyages of exploration, including a proposed voyage around the Arabian Peninsula and a circumnavigation of Africa, but Alexander’s death in 323 put an end to these plans. Nearchus resumed his governorship of Lycia.

Alexander had hoped Nearchus’s coastal voyage from western India to the head of the Persian Gulf would establish a sea route connecting the Asian and Mediterranean portions of his empire. Following the breakup of Alexander’s empire after 323, a better route to India was established that made use of the monsoon winds of the Indian Ocean. Nonetheless, an account of Nearchus’s expedition, written in the second century A.D. by the Greek historian Arrian in his work *Indica*, survives as one of the earliest records of nonmilitary exploration.

Necho II (Neco, Nechoh) (unknown–593 B.C.)

king of ancient Egypt, organizer of expedition along coastal Africa

Pharaoh Necho II, who ruled Egypt from 609 to 593 B.C., was the son of Psamtik, founder of the XXVI dynasty.

Soon after his ascent to the throne, Necho launched a campaign of expansion eastward into what is now Israel and

Syria, decisively defeating King Josiah of Judah and his army at Megiddo in 608. Three years later, Necho himself was defeated at Carchemish on the Euphrates River by the Babylonians under Nebuchadnezzar, and withdrew to Egypt.

From his capital in the ancient Nile Delta city of Saïs, Necho turned his attention to establishing a trade link between the MEDITERRANEAN SEA and the RED SEA. He first attempted to re-excavate an old canal that had run from the city of Bubastis, on the NILE RIVER north of Cairo, eastward to the Red Sea. He abandoned the project after an oracle warned him of its dire consequences.

In about 600, Necho commissioned a group of Phoenician seafarers to undertake a voyage from the Gulf of Aqaba southward into the Red Sea and Indian Ocean, in an attempt to find an alternate sea route from Egypt to the Mediterranean. The Phoenicians reportedly followed the coastline of Africa, and, on rounding the continent's southern end from east-to-west, sailed northward to the STRAIT OF GIBRALTAR, from where they crossed the Mediterranean eastward to Egypt's Nile Delta.

According to an account of the expedition by HERODOTUS, written more than 100 years later, the voyage Necho had commissioned took almost three years to complete, during which the Phoenicians stopped each fall to plant a crop of grain, remaining until the following spring to harvest it. The sailors' descriptions of the relative position of the sun as they rounded southern Africa from east to west strongly suggests that they were the first people from the Mediterranean world to travel south of the EQUATOR and circumnavigate Africa.

Although the expedition Necho II had sent out located no practical alternate sea route between Egypt and the Mediterranean, the geographic information it brought back led Herodotus to conclude correctly that Africa, except where it is connected to Asia, is surrounded by a continuous sea. Almost 2,000 years afterward, surviving fragments of Herodotus's account inspired Portugal's HENRY THE NAVIGATOR, prince of Portugal, to launch a program of exploration, which culminated in the voyage around Africa under VASCO DA GAMA in 1497–99.

Needham, James (unknown–1673) *English colonist in North Carolina and Tennessee*

In April 1673, Carolina colonist James Needham accompanied GABRIEL ARTHUR on a voyage of exploration of the Occaneechi Path, an Indian trail that followed the Blue Ridge southwest from Fort Henry, present-day Petersburg, Virginia. Their expedition was organized by prominent Virginia colonist Major General ABRAHAM WOOD.

At the headwaters of the Roanoke River, Needham and Arthur were turned back by Occaneechi Indians, who resented the intrusion of Englishmen into their lucrative trade with the inland Cherokee. Needham and Arthur again set

out from Fort Henry in May 1673 and traveled southwestward across present-day North Carolina into Cherokee territory at the headwaters of the Tennessee River. Needham left Arthur with the "Tomahitan" Indians (probably Cherokee) to learn their language, and headed back to Fort Henry.

In September 1673, Needham departed Fort Henry to rejoin Arthur. His Occaneechi guide, John Hasecoll, fearing that his tribe's trade with the Cherokee would be jeopardized by English interlopers, murdered Needham at a point southwest of present-day Winston-Salem, North Carolina. Arthur, after being held captive, wandered for several months through a wide area of the western APPALACHIAN MOUNTAINS.

James Needham participated in one of the earliest explorations of the Blue Ridge southwest of the early English Virginia settlements. He was among the first Englishmen to enter what is now Tennessee and make contact with trans-Appalachian tribes.

Nevelskoy, Gennady Ivanovich (Genadii Nevelskoi) (1814–1876) *Russian naval officer in southeastern Siberia and the Russian Far East*

Gennady Nevelskoy was a captain-lieutenant in the Russian navy in 1848, when he commanded the *Baykal* on a voyage from the Baltic port of Kronstadt, by way of CAPE HORN, to Kamchatka on the Pacific coast of SIBERIA.

In 1849, Nevelskoy undertook explorations southward from Kamchatka to the region around the mouth of the Amur River and the northern end of Tatar Strait. He then cruised around the northern end of Sakhalin, proving it to be an island.

Nevelskoy traveled westward across Siberia and European Russia and returned to St. Petersburg in 1850, thus completing a journey around the world. He reported that the lower Amur River was navigable, and that a strait separated Sakhalin from the mainland, indicating the existence of a short sea route from the mouth of the Amur River into the Sea of Okhotsk and the North Pacific Ocean.

In 1851, Nevelskoy, as commander of the Amur Expedition, again traveled to the region southwest of the Sea of Okhotsk and claimed for Russia the territory around the lower Amur River, as well as all of Sakhalin. He established Nikolayevsk, an outpost near the mouth of the Amur, and, during the next four years, directed further explorations of Sakhalin and the regions inland from Tatar Strait. These expeditions located new harbors, including one that came to be known as Nevelskoy Bay. The results of the land explorations were later used to establish a portion of the Russian-Chinese border in the early 1860s.

Nevelskoy returned to European Russia in 1856. Soon afterward, he left active naval service, taking up residence in Paris.

Gennady Nevelskoy's explorations revealed Sakhalin to be an island, not a peninsula, as had been previously reported by JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, and ADAM IVAN RITTER VON KRUSENSTERN. His finding that the lower Amur River was navigable soon led to the development of Nikolayevsk as an important Pacific port for Russia.

Newberry, John (unknown–ca. 1585)

English merchant, traveler in Persia and India

In 1580, John Newberry, an English merchant, was sent by the London-based LEVANT COMPANY to revive direct overland trade links between India, the Persian Gulf ports, and the MEDITERRANEAN SEA. His sponsors hoped to establish an alternative to the sea route around Africa, which was then dominated by Portugal and Spain.

Newberry descended the Euphrates River to Baghdad, and then Basra, reaching the Persian Gulf. He sailed down the gulf to Portuguese-controlled Hormuz, from where he traveled northward into western Persia (present-day Iran), visiting the cities of Shiraz, Esfahan, Qazvin, and Tabriz. On his return trip to England, he made a westward crossing of what is now Turkey to Constantinople (present-day Istanbul), and sailed for England, reaching it in 1581.

In 1583, Newberry acted as guide for an English diplomatic and trade expedition to the court of Akbar, the Mogul emperor of India. The group, which included merchant and diplomat RALPH FITCH, sailed to Syria, then reached the Persian Gulf by way of the Euphrates River.

At Hormuz, Newberry and his party were arrested by the Portuguese and taken across the Arabian Sea to Goa, the Portuguese colony on India's southwest coast. Yet they soon managed to gain their release.

Newberry then accompanied Fitch and another Englishman to the court of Akbar at Fatehpur Sikri, near Agra, India, and presented the Mogul ruler with letters from Queen Elizabeth I.

In 1585, Newberry began the return trip to England on his own, having left his companions at the Mogul capital. Soon after his departure for Lahore to the northwest, he disappeared without a trace.

John Newberry was the first Englishman to descend the Euphrates and to travel across Persia. Along with Ralph Fitch, he initiated trade contacts leading to the organization of the BRITISH EAST INDIA COMPANY in 1600.

Newberry, John Strong (1822–1892)

American physician, geologist in the American West

John Strong Newberry was born in Windsor, Connecticut. He attended Western Reserve College (now Case Western Reserve University) in Cleveland, graduating in 1846. He continued his studies at Cleveland Medical College, receiving a degree as a doctor in 1848. After two years of travel

and additional studies in Europe, he returned to Cleveland, where he set up a medical practice.

In May 1855, Newberry served as assistant surgeon and geologist for an official U.S. government expedition exploring the country between San Francisco and the mouth of the COLUMBIA RIVER, as part of a survey for a proposed transcontinental railroad route. Under the command of Lieutenant Robert S. Williamson of the U.S. Army Corps of Topographical Engineers, he made a detailed study of the geology, plant life, and animal life of northern California and the Pacific Northwest, which was incorporated into the official account of the expedition, published in 1857, *Reports of Explorations and Surveys to ascertain the most Practical and Economical Route for a Railroad from the Mississippi River to the Pacific ocean, made in 1853–6*.

Newberry took part in a subsequent topographical expedition in 1857–58, accompanying Lieutenant JOSEPH CHRISTMAS IVES in a journey by steamboat 500 miles up the COLORADO RIVER. He then spent nearly a year studying the natural history of the Grand Canyon and the surrounding territory; he contributed much to the expedition's official report, *Report Upon the Colorado River of the West, explored in 1857–58*, which was published in 1861.

In summer 1859, Newberry served under Captain JOHN N. MACOMB in a Topographical Corps expedition to the San Juan and upper Colorado River regions of what is now southwestern Colorado, southern Utah, and northern New Mexico and Arizona. While traveling across hundreds of square miles of unknown territory, he collected thousands of fossil specimens and made several discoveries of mineral deposits. His findings were included in *Report of the Exploring Expedition from Santa Fe to the junction of the Grand and Green Rivers*, published in 1876.

During the Civil War, Newberry directed the supply and administration of the Union army's hospitals. At the war's end, he became a professor of geology and paleontology at New York's Columbia College (now Columbia University). In 1869, he was appointed state geologist of Ohio, and he later worked as a consultant to mining operations throughout the United States. In 1884, he joined the U.S. Geological Survey as a paleontologist.

In the course of his scientific work in the American West, John Strong Newberry amassed more than 100,000 fossil and geological specimens, which later became part of the natural history collection at Columbia University.

Newell, Robert (1807–1869) *American fur trader, trapper, pioneer in Oregon*

Robert Newell was originally from Ohio. While in his early 20s, he became a trapper, and, in 1829, he traveled from St. Louis up the MISSOURI RIVER with one of JEDEDIAH STRONG SMITH's fur-trading expeditions to the northern ROCKY MOUNTAINS.

After about 10 years in the fur trade, Newell decided to head into the Oregon Country. In 1839, he set out with his family from Fort Boise and took his wagons along the difficult last leg of the Oregon Trail northwestward to Walla Walla. The following year, he continued his trek westward, arriving in the Willamette Valley, south of present-day Portland, Oregon, in early 1841.

Newell was one of the founders of Oregon's first provisional government in 1843, several years before the region was organized as a U.S. territory. His memoirs of his career as a mountain man in the Rockies, and of his later life as a pioneer in Oregon, were edited by D. O. Johansen and published in 1959 as *Memoranda*.

In his journey from Fort Boise into what is now southeastern Washington in 1839–41, Robert Newell became the first settler to lead wagons along the entire length of the Oregon Trail, having blazed a wagon road through northeastern Oregon's Blue Mountains, a barrier over which previous Oregon Trail travelers had passed only on horses and mules, or by foot.

Newport, Christopher (ca. 1565–1617)

English mariner in Virginia and the East Indies

Christopher Newport, an English sea captain and privateer, took part in SIR FRANCIS DRAKE's raid of PRIVATEERS on the Spanish port of Cádiz in 1587.

In 1590–91, Newport commanded one of the ships in the fleet sent by JOHN WHITE to bring relief to the Roanoke Colony off the coast of what is now North Carolina. The ships sailed first to the WEST INDIES, where Newport and his ship, the *Little John*, remained behind to attack Spanish settlements on Hispaniola (present-day Haiti and the Dominican Republic) and along the coast of Honduras. The next year, while in the AZORES, Newport aided in the capture of the Spanish galleon the *Madre de Dios*, which proved to be the richest prize ever taken by Queen Elizabeth I's privateers.

During the next 10 years, Newport commanded several more voyages to the Caribbean in which he continued to prey on Spanish shipping. In September 1605, he was back in England, where he presented King James I with two live young crocodiles and a wild boar captured in the West Indies.

A year later, Newport was engaged by the London Company as commander of its colonizing expedition to Virginia. BARTHOLOMEW GOSNOLD was his vice admiral. In December 1606, he sailed from England with a fleet of three vessels, the *Discovery*, the *Godspeed*, and the *Susan Constant*, carrying 120 colonists. After the Atlantic crossing to the West Indies, Newport sailed north to Chesapeake Bay, which he entered in April 1607. The colonists disembarked near the mouth of the James River, where,

on May 14, 1607, they founded the settlement of Jamestown.

Newport had been instructed by the VIRGINIA COMPANY to explore inland from the settlement for a waterway to the Far East, the much-sought-after NORTHWEST PASSAGE. In May 1607, he sailed about 100 miles up the James River to its head of navigation, near what later became Richmond, Virginia. At the same time, the settlement's military leader, Captain JOHN SMITH, explored along the shores of Chesapeake Bay.

In late July 1607, Newport returned to England with mineral samples from Virginia that he believed to be gold. Upon analysis, they proved to be worthless.

In January 1608, Newport arrived back in Jamestown in command of the "First Supply," the Virginia Company's first follow-up expedition, carrying an additional 100 colonists. More than half of the original Jamestown settlers had since died; the colony's director, E. M. Wingfield, had been jailed, and John Smith was about to be hanged. Newport soon freed Wingfield and Smith and restored order to the colony. Less than a week later, another crisis developed when a fire swept through the settlement. With their food supplies destroyed, Newport and Smith were compelled to seek aid from the Indian leader Powhatan. They journeyed to his village, Werowocomoco, on the York River in late February 1608, where they were able to obtain a supply of corn. Having seen the Jamestown colony survive through its first difficult year, Newport sailed back to England.

On his third trip to Virginia, in 1608–09, Newport presented Powhatan with gifts, including a crown, which he used in a coronation ceremony for the Indian leader. Newport later undertook an overland exploration along the upper James River, probing beyond the point he had sailed to in 1607, possibly reaching as far inland as the mouth of the Rivanna River near present-day Columbia, Virginia.

In 1609, at the rank of vice admiral, Newport sailed from England for Virginia in command of a nine-ship fleet. Along with him were Sir Thomas Gates, the deputy governor of the Virginia colony; Sir George Somers, a founder of the Virginia Company; and SILVESTER JOURDAIN, British mariner. On September 28, 1609, Newport's ship was wrecked off Bermuda, and he, Gates, Somers, and some of the colonists were stranded on the island for 10 months. Somers took the opportunity to claim Bermuda and the neighboring islands for Great Britain. By the following spring, they had constructed several small sailboats, with which they managed to reach Virginia in May 1610.

Newport commanded a fourth colonizing expedition to Virginia in 1611, then left the Virginia Company for the BRITISH EAST INDIA COMPANY. He made his first voyage to the EAST INDIES in 1613–14, in which he took the shah's ambassador, the Englishman Sir Robert Sherley, brother of SIR ANTHONY SHERLEY, back to Persia (present-day Iran)

from a diplomatic mission in Europe. Traveling with Newport on his second voyage for the British East India Company in 1615–16 was SIR THOMAS ROE, on his way to India as England's ambassador to the court of the Mogul emperor. In August 1617, while on his third voyage to the Far East, Newport died at Bantam, in the East Indies.

Christopher Newport played a part in establishing what was to become the first permanent English settlement in North America. He also carried out the earliest European explorations deep into the interior of Virginia, and he was among the first to realize that the rivers that emptied into Chesapeake Bay led inland only as far as the barrier of the Blue Ridge. Accounts of the shipwreck and time in Bermuda in 1609–10 by Silvester Jourdain and fellow crew member William Strachey reportedly served as inspiration for William Shakespeare's 1611 play *The Tempest*.

Nicolet, Jean (Jean Nicollet de Bellesborne)

(ca. 1598–1642) *French fur trader, interpreter in Lake Michigan and Green Bay areas*

Jean Nicolet was born in Cherbourg, France. In 1618, he arrived in French Canada, as a protégé of SAMUEL DE CHAMPLAIN and as an agent in the FUR TRADE for merchants in Rouen and St.-Malo, France.

From 1618 to 1620, Nicolet lived among the Algonquin Indians on Allumette Island in the Ottawa River. He then spent nine years with the Nipissing Indians, a subgroup of the Chippewa (Ojibway), in the Georgian Bay region of Lake Huron.

By 1634, Nicolet had learned a variety of Indian languages and had become an important intermediary between French traders and the region's tribes. That year, Champlain sent him to investigate reports of a great "bad-smelling" sea that lay to the west of Lake Huron. After escorting a group of Jesuit missionaries to the Huron (Wyandot) Indian settlements on Georgian Bay, Nicolet set out by CANOE with seven Huron and retraced ÉTIENNE BRULÉ's route to Sault Sainte Marie. He explored the entrance to Lake Superior, located the Straits of Mackinac, and entered Lake Michigan.

Nicolet had been instructed to make contact with the Winnebago (Ho-Chunk) Indians. He followed the north shore of Lake Michigan, entered Green Bay, and came upon a Winnebago band living at the mouth of the Fox River. Under the impression that he was not far from the East China Sea and China, Nicolet believed the Indians were subjects of the Great Khan. He reportedly dressed in a Chinese damask robe in preparation for a meeting with Chinese officials.

From Green Bay, Nicolet explored the Fox River and the watershed above the Wisconsin River. From the Indians, he heard of a great river to the south, which he speculated flowed into the Pacific Ocean.

Nicolet returned to Trois Rivières on the St. Lawrence River, where he became prominent in the fur trade. In 1642, while he was traveling on the St. Lawrence, his small boat capsized and he was drowned.

Jean Nicolet was the first non-Indian to report the existence of Lake Michigan. He also brought back Indian accounts of what turned out to be the MISSISSIPPI RIVER. Twenty years after Nicolet's visit to Green Bay, French fur traders MÉDARD CHOUART DES GROSEILLIERS and PIERRE ESPRIT RADISSON followed his route and developed a lucrative fur-trading business with the Indians. Green Bay, in the 1670s, would become a key staging area for French explorations of the Mississippi Valley undertaken by LOUIS JOLLIET, JACQUES MARQUETTE, and RENÉ-ROBERT CAVELIER, DE LA SALLE.

Nicollet, Joseph Nicolas (Jean N. Nicollet)

(1786–1843) *French mathematician, astronomer in North America*

Joseph Nicollet was born at Cluses in southeastern France. As a child, he exhibited talent for mathematics and astronomy, and he went on to become a professor at the Collège Louis-le-Grand. His academic career in France came to an end in 1832 with his immigration to the United States, resulting from a series of financial setbacks. He settled in New Orleans, where he was received by the French community as an internationally known scientist.

Seeking to carry on the tradition of French exploration in North America, Nicollet, in 1836–37, organized and led an expedition in search of the source of the MISSISSIPPI RIVER (although HENRY ROWE SCHOOLCRAFT had correctly determined the river's source four years earlier).

In 1838, Nicollet traveled to Washington, D.C., where he accepted an appointment with the U.S. Army Corps of Topographical Engineers, and, in 1838–39, he headed two government surveying expeditions into the prairies between the upper Mississippi River and MISSOURI RIVER, assisted by the young lieutenant JOHN CHARLES FRÉMONT. Nicollet and Frémont explored up the Minnesota River from Fort Snelling to the Red Pipestone Quarry in what is now southwestern Minnesota, a site sacred to a number of tribes.

Nicollet's later work was devoted to astronomy and mathematics, including the calculation of actuarial charts for life insurance companies. During a visit to St. Louis, Nicollet became interested in exploration of the American West, and in 1842, he was chosen to command a Topographical Corps expedition into the ROCKY MOUNTAINS. Because of serious illness, however, he was replaced by Frémont. Nicollet died the following year.

Joseph Nicollet's report of his explorations in the upper Mississippi River region was published in 1843. The maps

he produced of the territory between the upper Mississippi and the Missouri Rivers were the first to be based on mathematical calculations and astronomical observations. While serving with Nicolle in 1838–39, John C. Frémont learned the skills necessary for his subsequent explorations into the Rocky Mountains and California.

Nicuesa, Diego de (unknown–1511)

Spanish conquistador in Central America

Diego de Nicuesa was born at Baeza in the Andalusia region of southern Spain into a noble family. He was well connected to the Spanish ruling family, serving in the household of an uncle of King Ferdinand II, and was known in Spain as an accomplished lute player. His involvement in the early Spanish settlement of Hispaniola (present-day Haiti and the Dominican Republic) brought him considerable wealth.

In 1508, King Ferdinand granted Nicuesa a license to establish a colony on the mainland of CENTRAL AMERICA in what is now Panama, west of the Gulf of Urabá. At the same time, the coastal region to the east in the vicinity of present-day Cartagena, on the Caribbean coast of present-day Colombia, had been granted to ALONSO DE OJEDA.

Both Nicuesa and Ojeda launched their colonizing expeditions from Hispaniola in 1509. The first to sail was Ojeda, whose men were attacked by Indians soon after landing at Cartagena. Nicuesa arrived there not long afterward and aided Ojeda in a counterstrike against the native peoples. He then sailed westward across the Gulf of Darien for the coast of Panama.

Nicuesa's fleet of four ships, carrying more than 700 men, became separated in a storm, leaving him with only one ship and fewer than 100 men. He tried to reach the site of his proposed colony at the mouth of the Darién River, but his ship ran aground and was wrecked. Nicuesa and his men then set out westward along the coast, although the site of the proposed colony lay in the opposite direction. With supplies of food running short, and having suffered repeated attacks by Indians, the Spaniards were relieved to come upon a natural harbor. Nicuesa decided to found his settlement on the site and reportedly exclaimed, "Here let us stop, in the name of God." His men called the site Nombre de Dios (name of God) after Nicuesa's remark. Soon afterward, contact was made with the other members of the expedition, who had reached the mouth of the Darién River to the west.

Nicuesa promptly sailed there to claim governorship over the newly established colony, Santa María la Antigua del Darién, but he found members of Ojeda's expedition in control. The colonists, under the leadership of VASCO NÚÑEZ DE BALBOA, refused to accept Nicuesa as their ruler. They sent him and 17 of his followers out to sea in an unseaworthy vessel. They were never seen or heard from again.

Diego de Nicuesa's settlement at Nombre de Dios later became the eastern terminus of the main route across the Isthmus of Panama from the Pacific coast, serving as the transshipment point for Spanish gold and other treasure from Peru and the Philippines.

Niebuhr, Carsten (Karsten Niebuhr)

(1733–1815) *German traveler in Arabia, Yemen, and the Persian Gulf, in service to Denmark*

Carsten Niebuhr was born into a German family at Holstein, which then was under the dominion of Denmark, and later became part of northern Germany. Following his early education, he went on to advanced studies in astronomy and mathematics, and, by the age of 27, he had applied his skills to become an accomplished surveyor, topographer, and cartographer.

At the invitation of Frederick V, King of Denmark, Niebuhr joined a Danish government-sponsored scientific expedition to explore the once-fertile southwestern corner of the Arabian Peninsula, a region known to Europeans since classical times as Arabia Felix, and comprising the Arab kingdom of Yemen. Although the expedition was loosely organized, without an appointed leader, Niebuhr held the position of "Engineer-Lieutenant." Along with the scientific aim of the project, a thorough study of the topography and animal and plant life of the region, the expedition was also charged with determining if Denmark could enter into trade contacts with Yemen, a region where foreign commerce was then dominated by the English and the Dutch.

In fall 1761, Niebuhr left Copenhagen with the five other members of the expedition: Peter Forsskal, a Swedish naturalist; Christian Kramer, a Danish physician and zoologist; George Baurenfeind, a German artist; Friedrich von Haven, a Danish linguist; and a former Swedish military man named Berggren. They first traveled to Egypt, where they remained until October 1762. Then, disguised as Muslims, they sailed on a ship carrying pilgrims to the Arabian port of Jidda on the RED SEA.

From Jidda, Niebuhr and his companions continued their journey to southern Arabia in a type of open boat known as a *tarrad*. During nightly stops, Niebuhr went ashore and made astronomical observations and calculations, upon which he based his later map of Yemen. The naturalists Forsskal and Kramer collected specimens of the region's fauna and flora, sending them back to Europe.

On December 29, 1762, Niebuhr and the Danish expedition arrived at Luhaiya, a port on the Red Sea coast of northern Yemen in what is now the Yemen Arab Republic. They proceeded inland, heading southward on donkeys along the coastal plain of the Tihama region. Niebuhr continued to make stellar and solar observations

en route. In February 1763, the expedition reached the coastal city of Bait al-Faqih, where Niebuhr and von Haven both contracted malaria. At the port city of Mocha on the southwestern corner of the Arabian Peninsula, von Haven died.

In late June 1763, Niebuhr and the four remaining expedition members headed inland from Mocha across the desert toward the Yemeni capital Sanaa, where they hoped to meet with the ruler of Yemen, known as the imam. During this leg of the journey, the naturalist Forrskal died of malaria, and Niebuhr, himself weakened by the disease, was unable to record their route on his map. Despite his illness, he managed to reach Sanaa and also explored the region to the east, on the edge of the Rub' al-Khali Desert, the great waterless region of southern Arabia known as the EMPTY QUARTER.

After meeting with the imam in late July 1763, Niebuhr, Baurenfeind, Kramer, and Berggren made their way back to Mocha on camels just in time to catch the yearly ship to Bombay, India, as planned. Both Baurenfeind and Berggren died on the voyage to India. In Bombay, in February 1764, Kramer also died, leaving Niebuhr as the expedition's sole survivor.

Niebuhr remained in India until late 1764, sailing to the Persian Gulf aboard a British naval vessel in December of that year. He made his way overland through southwestern Persia (present-day Iran), then traveled up the Tigris River through present-day Iraq into Syria and what is now Israel, returning to Copenhagen by way of Constantinople (present-day Istanbul, Turkey) in 1767.

Carsten Niebuhr's account of his journey in Arabia and the Persian Gulf was first published in German in 1772–74, with an English edition, *Travels through Arabia*, published in Edinburgh in 1792. His work provided Europeans with the first comprehensive descriptions of the region from an 18th-century rationalist viewpoint. Niebuhr was also the first European to report on the spread of the Wahhabi revolution, an Islamic fundamentalist movement that had begun to sweep through Yemen and subsequently had a tremendous impact on the history of Arabia and adjoining lands. His map of Yemen was the first to detail scientifically that portion of the Arabian Peninsula.

Niebuhr, Sigismund (1631–1699)

German navigator along the south coast of South America, in service to Holland

Sigismund Niebuhr was born near the southwestern German town of Breisach on the Rhine. He became a skilled mariner and navigator, and, in about 1670, he entered the service of the Dutch government, the States-General.

In 1675, commissioned by the States-General, Niebuhr left Holland to explore the southernmost coast of South

America. He first sailed to Rio de Janeiro, then made his way southward to Le Maire Strait off the south coast of Tierra del Fuego (explored in 1616 by JAKOB LE MAIRE and WILLEM CORNELIS SCHOUTEN). He undertook depth soundings and plotted the exact locations of dangerous rocks and other hazards to navigation. Niebuhr made a landing on Tierra del Fuego, where he befriended the natives and convinced two of them to accompany him back to Holland. Although Niebuhr's ship was wrecked in a storm off Los Reyes Island, he and his crew managed to construct another vessel, on which they returned to Holland in October 1677.

The next year, Sigismund Niebuhr published an account of his explorations around CAPE HORN and Tierra del Fuego. He also produced a navigational chart of Le Maire Strait, which greatly aided subsequent mariners in using that passage as a more practical alternate route around the tip of South America than the maze of channels that make up the STRAIT OF MAGELLAN.

Niño, Andrés (1475–ca. 1530) *Spanish mariner in Central America*

Born at Moguer in southwestern Spain, Andrés Niño went to sea when young. His first maritime exploits were on Portuguese ships along the coast of Africa and in the EAST INDIES. In 1515, he went to the newly established Spanish colony in Panama, where he became known as a skilled pilot.

When Spanish conquistador Gil González de Ávila set out to explore and conquer the Pacific coast of CENTRAL AMERICA in 1521–22, Niño was named as chief pilot for the seaward part of the expedition. In January 1522, at Tararegui, the expedition embarked on four ships that had been constructed on the Bay of San Miguel along the eastern end of Panama's Pacific coast.

After González de Ávila and his forces had gone ashore at the Bay of San Vicente to explore the interior, Niño and the small fleet continued northward along the coast, hoping to locate a strait that, according to reports by Indians, linked the Pacific Ocean and the Atlantic Ocean. He reached as far as 17°50' north latitude, off the Pacific coast of southern Mexico, and, finding no inland passage to the Atlantic, returned southward.

Niño found González de Ávila and his men under attack by a large force of Indians, reportedly numbering 4,000. He helped fight them off, then joined González de Ávila in exploring the coastal region around Cape Blanco and the Gulf of Papagayo, on the Pacific coast of what is now northwestern Costa Rica. They became the first known Europeans to reach the Possession River, and on the coast of what is now Honduras, they came upon a large bay, which they named the Gulf of Fonseca in honor of Bishop Juan Rodríguez de Fonseca, the head of the Council of the

Indies (which then supervised all Spanish explorations in the Americas).

Niño and González de Ávila's expedition next explored southward into the lands of an Indian chieftain known as Nicarao. They came upon a large body of freshwater, which they named Mar Dulce (sweet sea), later known as Lake Nicaragua after Nicarao. North of the lake, the Spaniards sighted the volcano called Masaya, near the present-day Nicaraguan city of the same name.

After exploring the interior of what is now western Nicaragua, Niño and González de Ávila returned to the Panama colony by sea, arriving on December 29, 1522. The gold, precious stones, and other valuables they obtained from the natives led them to compare the lands they had explored to the "paradise of Mohammed."

In 1523, Andrés Niño and González de Ávila returned to Spain with their treasure. Soon afterward, the region of Central America that they had explored was colonized by FRANCISCO FERNÁNDEZ DE CÓRDOBA. Lake Nicaragua, which Niño reached with González de Ávila in 1522, is the largest lake in Central America.

Niza, Marcos de (Fray Marcos, Fray Marcos of Nizza, Marco de Nica, Sayota) (ca. 1495–1558)

Italian missionary in Peru and the American Southwest

Marcos de Niza, born in Nice, then part of the Italian principality of Savoy, grew up to become a Franciscan missionary priest. In 1531–35, he served with FRANCISCO PIZARRO in the conquest of the Inca Indians of Peru in South America.

After time in Guatemala, Niza was assigned to Culiacán, Mexico, in 1537. Two years later, he was commissioned by ANTONIO DE MENDOZA, viceroy of New Spain, to undertake a reconnaissance of Sonora and investigate the reports, brought back by ÁLVAR NÚÑEZ CABEZA DE VACA and ESTEVANICO, of fabulously rich Indian cities to the north.

Niza was chosen by Mendoza because of the priest's earlier experience among the Inca of Peru. It was thought that a priest would be better received by the Indians. Additionally, sending Niza was much less expensive than mounting a military expedition led by a knight.

In March 1539, Niza, accompanied by Estevanico and another priest named Honorato, journeyed north from Culiacán on the west coast of Mexico, along the Sonora and San Pedro Rivers, into present-day Arizona. Among Indians he encountered, Niza became known as Sayota, or "Man from Heaven."

Niza sent Estevanico ahead, with instructions to send back crosses of varying sizes indicating the relative importance and wealth of any cities he came upon. Estevanico, at times two weeks ahead of Niza, sent back a cross the size

of a man, signifying that he had found cities that contained greater riches than those of the Aztec Indians. Soon afterward, Niza received news of Estevanico's death at the hands of Zuni Indians at Hawikuh Pueblo near present-day Zuni, New Mexico. The priest proceeded northward and espied from a distance what he thought must be cities of gold—the legendary Seven Cities of CIBOLA. They were actually adobe pueblos whose turquoise decorations glistened in the sun. Niza then went to Mexico City, where he presented his exaggerated report to Mendoza.

In spring 1540, Niza guided FRANCISCO VÁSQUEZ DE CORONADO and an advance party of about 100 soldiers and Indians from Culiacán, back across the Colorado Plateau, into present-day western New Mexico. After a battle, the Spaniards subjugated Hawikuh and learned it was not the hoped-for Cibola. Coronado, concerned that his disappointed soldiers would vent their anger against Niza, whose misinformation had led them there, sent the priest back to Sonora, Mexico, with one of his lieutenants.

Niza remained in Mexico for the rest of his life, serving as father provincial of Franciscan missionaries in New Spain. He later wrote of his explorations in what is now northern Mexico, the Gila River region of Arizona, and western New Mexico, in his published account, *Descubrimiento* (Discovery). In addition to erroneous descriptions of the Indians, he also reported seeing elephants, camels, unicorns, and other fabulous creatures.

Marcos de Niza was one of the earliest Europeans to explore north of Mexico. His report that the region's Indian pueblos were the fabled Seven Cities of Cibola, inspired Coronado's subsequent extensive explorations of the American Southwest and Great Plains.

Nobile, Umberto (1885–1980) *Italian air force officer, aviator, aeronautical engineer in the Arctic*

Umberto Nobile was born in the southern Italian city of Avellino near Naples. Trained as an aeronautical engineer, he became a high-ranking officer in the Italian Military Aeronautic Corps during World War I, supervising Italian aircraft production.

After the war, Nobile became an accomplished pilot and designer of AIRSHIPS, in particular the semi-rigid variety with a longitudinal keel providing support for the bags holding hydrogen gas. In 1925, Norwegian polar explorer ROALD ENGELBREGT GRAVNING AMUNDSEN and his partner, American millionaire LINCOLN ELLSWORTH, purchased from the Italian government the airship *N-1*, which Nobile had designed. Planning to use the airship for a flight over the NORTH POLE, they engaged Nobile as pilot for the expedition.

Nobile flew the airship, which had been rechristened the *Norge* by Amundsen, from Italy northward across

Europe. At the port of Vadso, on Norway's Arctic coast, he left the mainland and crossed over the Arctic Ocean to King's Bay, Spitsbergen (in Svalbard), arriving in early May 1926. He was met by Amundsen and Ellsworth, who had been on the Arctic island since the previous October, supervising the construction of a huge hangar for the airship.

While Nobile, Amundsen, and Ellsworth were making final preparations before take-off, RICHARD EVELYN BYRD and Floyd Bennett arrived at King's Bay, and they soon reportedly made a successful flight to the North Pole and back in an airplane on May 9, 1926. On May 11, 1926, the *Norge* lifted off from King's Bay, and, the next day, flew over the North Pole and continued over the ice cap to Teller, Alaska, completing the first Europe-to-America flight by way of the North Pole (and perhaps the first flight over the Pole since there is some question as to whether Byrd and Bennett passed directly over it). While over the Pole, the explorers dropped the flags of the United States, Norway, and Italy onto the ice. The flight had taken them across more than 3,400 miles in two and a half days. Inuit who had viewed the *Norge* from the ground later described it as a great "flying whale."

In the following weeks, Nobile grew to resent that the international press had overlooked his important contributions to the mission as both the pilot and designer of

the *Norge*. Instead, public attention concentrated on Amundsen, now acclaimed as the first man to have reached both South and North Poles. Nobile's cause was taken up by the Italian press, who supported his contention that he had not been sufficiently credited for his role. A falling-out developed between Nobile and Amundsen after the latter openly criticized Nobile's ability as an aviator, claiming he had made several serious navigational errors during the flight. He characterized Nobile as a "boasting dreamer" and an "epauletted Italian." Nobile was affronted even more when Amundsen expressed the view that dirigibles were unreliable and impractical, and that future polar exploration from the air should be with airplanes with at least four engines.

Nobile reacted by organizing an Italian-sponsored dirigible flight over the North Pole under his command. Money for the venture was raised by public subscription in Milan; additional support came from Great Britain's ROYAL GEOGRAPHICAL SOCIETY. Nobile designed the airship *Italia*, specially equipped for the polar regions. He also received the backing of the Italian government under Mussolini, who provided the expedition with the naval vessel *Citta' di Milano* as an escort ship. Nobile recruited a mostly Italian crew of expert mountaineers from the Alps, and, intending to make scientific studies while at the North Pole, took along three internationally known scientists: Czechoslovakian radium specialist Franz Behounek, Italian physicist Aldo Pontremoli, and Swedish meteorologist Finn Malmgren. Spiritual support for the enterprise came from Pope Pius XI, who blessed the *Italia* and gave Nobile a large cross to drop at the North Pole.

In May 1928, almost exactly two years after his flight with Amundsen, Nobile arrived in Spitsbergen with the *Italia*. A planned preliminary flight over the Siberian archipelago of Nicholas II Land was called off because of bad weather. On May 23, Nobile and the *Italia* took off from Spitsbergen and headed for the North Pole, which he reached at one o'clock the next morning. As he flew over the Pole, the flag of Italy and the pope's cross were thrown out of the airship, and a message was radioed to Mussolini announcing that "the standard of Fascist Italy is floating in the breeze over the ice of the Pole." The *Italia* circled the North Pole for two hours, but it did not land to make oceanographic observations as planned. Because the airship's aerial had become ice-encrusted, and radio contact had been lost, Nobile decided instead to return to Spitsbergen.

With intense cold and winds, the airship was iced over on the return flight. The added weight of the ice and conditions of dense fog forced a crash landing onto the frozen sea, 180 miles northwest of Spitsbergen. On hitting the ice, the *Italia's* control gondola, carrying Nobile and eight others, broke free, while the lighter-than-air portion of the airship, carrying seven other crewmen, became airborne once again



Umberto Nobile (Library of Congress)

and drifted out of control. No trace of it or the men aboard was ever found.

Nobile suffered a broken leg and broken arm in the crash, and one of the crewmen in the gondola was killed on impact. The others suffered a variety of injuries. Although the *Italia* had landed only 180 miles northwest of Spitsbergen, the PACK ICE was too rugged for most of the survivors to cross on foot, and Nobile decided to remain in that location and radio for help. After two weeks, three of the survivors, two Italians, Zappi and Mariano, and the Swedish meteorologist Malmgren, set out over the ice to obtain help, while Nobile and the others continued to transmit a distress call on the gondola's emergency radio set.

On June 6, 1928, an amateur radio operator near Arkhangelsk, Russia, picked up the signal from Nobile's party. The Soviet icebreaker *Krassin* was dispatched, and its reconnaissance plane sighted Zappi, Mariano, and, reportedly, Malmgren. Yet, when the ship reached them several weeks later, only Zappi and Mariano were found. Zappi reported that there were only two of them left, contrary to what the Soviet pilot had seen, and claimed that Malmgren had died a month earlier. The contradictory accounts led to charges that Malmgren may have met with foul play, and that Zappi may have committed cannibalism.

Sixteen ships, 21 airplanes, and more than 1,500 men from Italy, Norway, Sweden, and the Union of Soviet Socialist Republics (USSR or Soviet Union) took part in the search and rescue efforts for Nobile and his crew. Amundsen, despite his previous differences with Nobile, agreed to the Norwegian government's request that he join the search; he perished when his plane disappeared en route to Spitsbergen.

On June 24, 1928, Nobile's red tent was sighted from the air by Swedish aviator Einar Lundborg, who then made a landing on the ice. With room in his plane for only one passenger, Lundborg took Nobile back first, reportedly so that the commander of the expedition could more effectively supervise the rest of the rescue effort. The others were later rescued by ship. Nonetheless, with charges of cannibalism already leveled against one member of the expedition, Mussolini took a dim view of the fact that Nobile had been the first to be saved, and he ordered the aviator to be put under arrest for allegedly deserting his men.

Back in Italy in 1929, Nobile faced a board of inquiry that ultimately found him at fault for the disastrous outcome of the expedition. His reputation became further clouded amid reports that the real reason why he was the first to be rescued was because his life had been heavily insured and that underwriters at Lloyds of London had offered Lundborg a substantial cash reward for his rescue.

With his conduct officially condemned, Nobile was compelled to resign his commission as general in the Italian air force. He also lost his post as professor at Italy's Aero-

autical Institute, and, in 1931, he went into voluntary exile in the Soviet Union. He lived there for the next five years, teaching aeronautics and advising the Soviet government on airship construction. In 1936, Nobile moved to the United States, where he became head of the aeronautical engineering department at Lewis College of Science and Technology (now Lewis University) near Chicago, Illinois.

At the end of World War II, Nobile returned to Italy, where the newly installed democratic government, having reconsidered his role in the 1928 Arctic disaster, cleared him of any wrongdoing and reinstated him in the air force. In 1946, he was elected as a deputy in the Italian parliament.

Several firsthand accounts were written about the *Italia* expedition, including Nobile's own *With the Italia to the North Pole* (1930), Einar Lundborg's *The Arctic Rescue* (1929), and *The Truth About the Red Tent* (1929), written by one of the survivors, Czech scientist Franz Behounek.

Umberto Nobile's Arctic exploit marked the last time aircraft were used to explore large stretches of uncharted territory in the Arctic. In the years that followed, such flights were made mainly to establish new air travel routes between specific points.

Noort, Oliver van (Olivier van Noort)

(1568–ca. 1622) *Dutch mariner on the coasts of South America and in the South Pacific*

A native of Utrecht in the Netherlands, Oliver van Noort became well known in Holland as an accomplished seafarer and navigator. In 1598, a group of Dutch merchants commissioned van Noort to command two commercial fleets on a voyage to the Far East by way of the STRAIT OF MAGELLAN. He sailed from Rotterdam on September 13, 1598, and reached the South American coast at Rio de Janeiro. When his ships were driven back by storms, he sought shelter along the coast of Brazil, where he lost some of his men in Indian attacks.

Van Noort came upon uninhabited Santa Clara Island, on which he and his men spent the winter of 1598–99. Resuming the voyage on June 2, 1599, he continued southward to the coast of Patagonia, and, three weeks later, he came upon an uncharted island, where his ships put in for repairs.

Van Noort's expedition entered the eastern approach to the Strait of Magellan on November 23, 1599. During the next two months, he made landings along the strait's north shores, during which he suffered additional losses in repeated Indian attacks. In the Penguin Islands, he located three uncharted bays, which he named Mauritius, Henry, and Oliver.

Van Noort and his ships left the Strait of Magellan and entered the Pacific Ocean on February 6, 1600. He then followed the coast of Chile northward, attacking Spanish

ports and ships as far as the coast of Peru. Although the Spanish viceroy of Peru, Luis de Velasco, sent a naval force after the Dutch, they eluded capture and made their way westward across the Pacific to Guam in the Mariana Islands. From there, they resumed their attacks on the Spanish in the Philippines, then visited the Indonesian islands of Java and Borneo. The expeditor continued westward across the Indian Ocean, and, after rounding the CAPE OF GOOD HOPE, arrived back in Rotterdam on August 26, 1601.

Oliver van Noort commanded the first Dutch ships in a CIRCUMNAVIGATION OF THE WORLD and was among the first northern European navigators to probe the Pacific Ocean, a part of the world that had been explored mainly by the Spanish and Portuguese. A Dutch narrative of his voyage was published in Amsterdam in 1612, with translations in French and German appearing in 1613.

Nordenskjöld, Nils Adolf Erik (Baron Nordenskjöld, Adolf Nordenskiöld)

(1832–1901) *Swedish-Finnish geologist in the Arctic regions of Spitsbergen, Greenland, and Siberia, explorer of Northeast Passage, uncle of Nils Otto Gustaf Nordenskjöld*

Adolf Nordenskjöld was born in Helsinki, Finland, the son of prominent Swedish parents. He attended Helsinki University, specializing in chemistry, mineralogy, and geology.

In 1858, Nordenskjöld left Finland, which was then under Russian rule, and moved to Stockholm, Sweden, where he accepted both an appointment as head of the mineralogy department of the National Museum of Natural History and a professorship at the University of Stockholm. That year, he began his career in Arctic exploration with a Swedish scientific expedition, led by Otto Martin Torell, to Spitsbergen (in Svalbard), midway between the north coast of Norway and the NORTH POLE. In 1861, he accompanied Torell on a second expedition to Spitsbergen, exploring the northern islands of the group by dogsled and producing one of the first scientifically based maps of the region.

Nordenskjöld led his own expedition to Spitsbergen in 1864, then again in 1868, in command of the First Swedish North Polar Expedition. On the steamer *Sofia*, accompanied by naval officer F. W. von Otter (who went on to become a prime minister of Sweden), Nordenskjöld reached 81°42' north latitude, the northernmost point a ship had reached in the Eastern Hemisphere until that time. For his achievement, Great Britain's ROYAL GEOGRAPHICAL SOCIETY awarded him a gold medal the following year.

In 1870, Nordenskjöld turned his attention to western GREENLAND, where he made an attempt at an inland penetration by dogsled. Although he traveled only 30 miles inland from Disko Island, he reached an elevation of 2,200

feet and undertook the first scientific investigation of the Greenland ice cap.

Nordenskjöld returned to Spitsbergen in command of the Second Swedish North Polar Expedition in 1872. He had planned to use reindeer to pull his sledges over the frozen expanse of the Arctic Ocean to the North Pole, but the PACK ICE proved to be too rugged, and his ship was later frozen in for the winter. Unable to make an attempt on the Pole, he instead explored Nordaustlandet, the northernmost of Spitsbergen's islands.

Back in Sweden in 1873, Nordenskjöld became interested in finding a navigable sea route from Europe, along the Arctic coast of Russia and SIBERIA, to the Bering Sea and the Pacific Ocean—the long-sought NORTHEAST PASSAGE. After familiarizing himself with the history of earlier unsuccessful attempts, he sailed on the walrus-hunting ship *Proeven* in 1875, across the Barents Sea to the islands of Novaya Zemlya. The next year, with the financial support of Swedish merchant Baron Oscar Dickson, he sailed on the steamer *Ymer*, halfway across the Kara Sea, to the mouth of the Yenisey River. Nordenskjöld came upon a natural harbor, which he named Port Dickson after his sponsor, reporting that it could become an important seaport if an ice-free Northeast Passage route were established.

With his reports that the Kara Sea's coastal waters were generally ice-free, Nordenskjöld gained additional support for a Northeast Passage expedition from King Oscar II of Norway and Sweden, as well as from Aleksandr Sibiryakov, a Russian mining and shipping tycoon. The expedition was outfitted with a 300-ton converted whaler, the *Vega*, which was driven by sails as well as a steam engine. Nordenskjöld sailed aboard the *Vega*, equipped with coal and provisions for two years, from Tromsø on Norway's Arctic coast on July 21, 1878, accompanied by three Russian merchant vessels. The expedition headed eastward around North Cape, then proceeded across the Barents Sea to the Kara Sea. At Port Dickson, two of the Russian ships left the group to ascend the Yenisey River, planning to return to Sweden with a cargo of Siberian wheat. Nordenskjöld and the *Vega*, along with the remaining merchant vessel, the *Lena*, continued to follow the coast eastward, and, on August 19, 1878, they rounded Cape Chelyuskin, making Nordenskjöld and his expedition the first men known to have sailed past the Asian mainland's northernmost point.

By August 28, 1878, Nordenskjöld had reached the Arctic delta of eastern Siberia's Lena River, where the *Vega* and the remaining merchant ship parted. While the *Lena* proceeded to ports on the upper Lena River, Nordenskjöld, aboard the *Vega*, made an attempt to reconnoiter the New Siberian Islands to the north. Pushed back to the Siberian mainland by the advancing pack ice, he resumed the voyage eastward.

On September 27, 1878, Nordenskjöld was off North Cape (now Cape Shmidta), the westernmost point JAMES COOK had reached from the Pacific Ocean in his search for the Northeast Passage in 1778. The next day, the last remaining ice-free channel also became choked, and, at a point only 120 miles from BERING STRAIT, the *Vega* became icebound. During the next 10 months, friendly contacts were made with the region's natives, the Chukchi people of northeastern Siberia, whose customs were studied by the expedition's scientific team. Extensive scientific work was also undertaken in the areas of zoology, botany, oceanography, and geophysics.

The *Vega* was able to break free of the ice on July 18, 1879, and, on July 20, Nordenskjöld sailed southward into Bering Strait, thus completing the first voyage from the Atlantic Ocean to the Pacific by way of the Northeast Passage. After stops in Japan and CEYLON (present-day Sri Lanka), the *Vega* returned to Europe by way of the recently opened Suez Canal, arriving in Stockholm on August 24, 1880.

Nordenskjöld was made a baron for his achievement and soon published an account of the voyage, *The Voyage of the Vega Round Asia and Europe, With a Historical Review of Previous Journeys Along the North Coast of the Old World* (1881). The book became a best-seller and was followed by a five-volume report on the expedition's scientific work, *Scientific Observations of the Vega Expedition*. Published from 1882 to 1887, it served as a model for subsequent polar studies.

Nordenskjöld resumed his explorations of the Greenland ice cap in 1882–83, hoping to locate an ice-free region, which he theorized lay within the interior. He again scaled the glacier on the mainland at Disko Bay, reaching about 75 miles inland.

In addition to his Arctic exploits, Nordenskjöld also undertook studies on the history of geographic exploration. His *Facsimile-Atlas to the Early History of Cartography* (1889) and his *Periplus: An Essay on the Early History of Charts and Sailing Directions* (1897), published simultaneously in English and Swedish editions, were important early works on the history of mapmaking and exploration.

Baron Adolf Nordenskjöld led the first successful navigation through the Northeast Passage, a feat that had challenged mariners since the voyages of SIR HUGH WILLOUGHBY, WILLIAM BOROUGH, and STEPHEN BOROUGH in the 1550s, and WILLEM BARENTS in the 1590s. On his return voyage to Sweden, Nordenskjöld completed the first circumnavigation of Europe and Asia. In the years following the Russian Revolution of 1917, the Soviet government developed the Northeast Passage into a viable commercial waterway, which became known as the Northern Sea Route. As Nordenskjöld had predicted, the once uninhabited Port Dickson (known today as Dikson), strategically located

midway between the Atlantic and Pacific entrances of the Northeast Passage, became a vital stopover point and Arctic gateway to central Siberia. The Laptev Sea, the arm of the Arctic Ocean east of the Kara Sea, was known for a time as the Nordenskjöld Sea in his honor, and April 24 is still celebrated in Sweden as Vega Day, in recognition of his triumphant return from his 1878–79 Northeast Passage voyage. His nephew NILS OTTO GUSTAF NORDENSKJÖLD became a renowned geologist.

Nordenskjöld, Nils Otto Gustaf (Otto Nordenskiöld) (1869–1928) *Swedish geologist in Antarctica, South America, Greenland, and Alaska, nephew of Nils Adolf Erik Nordenskjöld*

Otto Nordenskjöld, born in Sweden, like his famous uncle, the NORTHEAST PASSAGE pioneer NILS ADOLF ERIK NORDENSKJÖLD, was a distinguished geologist who embarked on a career of scientific exploration.

In 1895–97, Nordenskjöld led a scientific team to southernmost South America, where he undertook geological studies in Patagonia and Tierra del Fuego.

In 1898, Nordenskjöld conducted geological research in Alaska and the adjoining Klondike region of the Yukon Territory, and, in 1900, he visited GREENLAND. That same year, the International Geographical Congress was held in Berlin, where the world's leading scientists declared 1901–03 to be the Antarctic Year, with scientific expeditions to Antarctica planned by Germany, France, Scotland, and Sweden.

Appointed to lead the Swedish expedition, Nordenskjöld sailed from Gothenburg, Sweden, in October 1901 on the *Antarctic*, captained by C. A. Larsen. After stopovers in the New Hebrides and in Argentina, the *Antarctic* went to the South Shetland Islands off the Antarctic Peninsula. In exploring the southwestern South Shetlands, the expedition corrected some errors made by SIR JAMES CLARK ROSS and JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE when they charted the Antarctic archipelago more than 60 years earlier.

After surveying the Antarctic coast of Louis Philippe Land, Nordenskjöld and his expedition landed on the Weddell Sea coast of Grahamsland, where he planned to undertake geological studies to determine if northeastern Antarctica had ever been joined to the southern end of South America. While a base was established at Snow Hill Island, Larsen sailed the *Antarctic* back toward South America, planning to return the following Antarctic summer. Although the ship failed to arrive after a year, Nordenskjöld and his men, equipped for only one winter in the Antarctic, nevertheless managed to comfortably survive through a second winter, living on birds and animals they hunted and whatever edible vegetation they could forage.

In October 1903, Nordenskjöld explored nearby Mount Haddington, which he found to be an island surrounded by ice. He encountered three members of the expedition who had sailed with the *Antarctic* and learned from them that the ship had been unable to breach the PACK ICE the previous year. A month later, Captain Irizar of the Argentine navy arrived on the ship *Uruguay*, having been dispatched to rescue the Swedish expedition when the *Antarctic* failed to arrive in Argentina. As it turned out, the *Antarctic* had sunk in February 1903, crushed in the ice on its second attempt to reach Snow Hill Island. Larsen and the rest of the *Antarctic* crew arrived at Nordenskjöld's encampment soon afterward, and all expedition members were safely taken back to South America by the *Uruguay*.

Nordenskjöld continued his geological studies of South America with scientific expeditions to the Andes in 1904–05 and again in 1920–21. He made another visit to Greenland in 1909.

In 1905, Otto Nordenskjöld was appointed as professor of geography at the University of Gothenburg. His geological investigation in Antarctica in 1901–03 revealed an abundance of fossil evidence suggesting that Graham Land had been covered with lush forests during the Jurassic period and was probably once connected to Tierra del Fuego or TASMANIA.

Norgay, Tenzing See TENZING NORGAY.

Noué, Charles-Edouard de la (1624–1691)

French priest in South America

Charles-Edouard de la Noué was born in the Anjou region of western France. Although he had entered the priesthood, he involved himself more in the study of scientific matters than in the practice of religion.

In 1665, the French government sent Noué to explore Tierra del Fuego and the Pacific coast of southern Patagonia in what is now southern Chile. The region, nominally part of Spanish territory, had not yet been settled by Europeans, and France hoped to claim it.

Noué traveled in Patagonia and Tierra del Fuego for a number of years. Taken captive by the Indians, he learned their language and customs and adopted their mode of dress. The natives came to accept him as an equal and eventually allowed him to depart on a passing European ship.

Back in France, Charles-Edouard de la Noué recorded his experiences in South America in his two-volume *Mémoire*, published in 1675. Its stark portrayal of the region's rugged terrain, inhospitable climate, and primitive native population served to discourage any further attempts by the French to settle that part of South America.

Núñez de Balboa, Vasco (1475–1519)

Spanish conquistador, colonizer in Panama, brother-in-law of Hernando de Soto

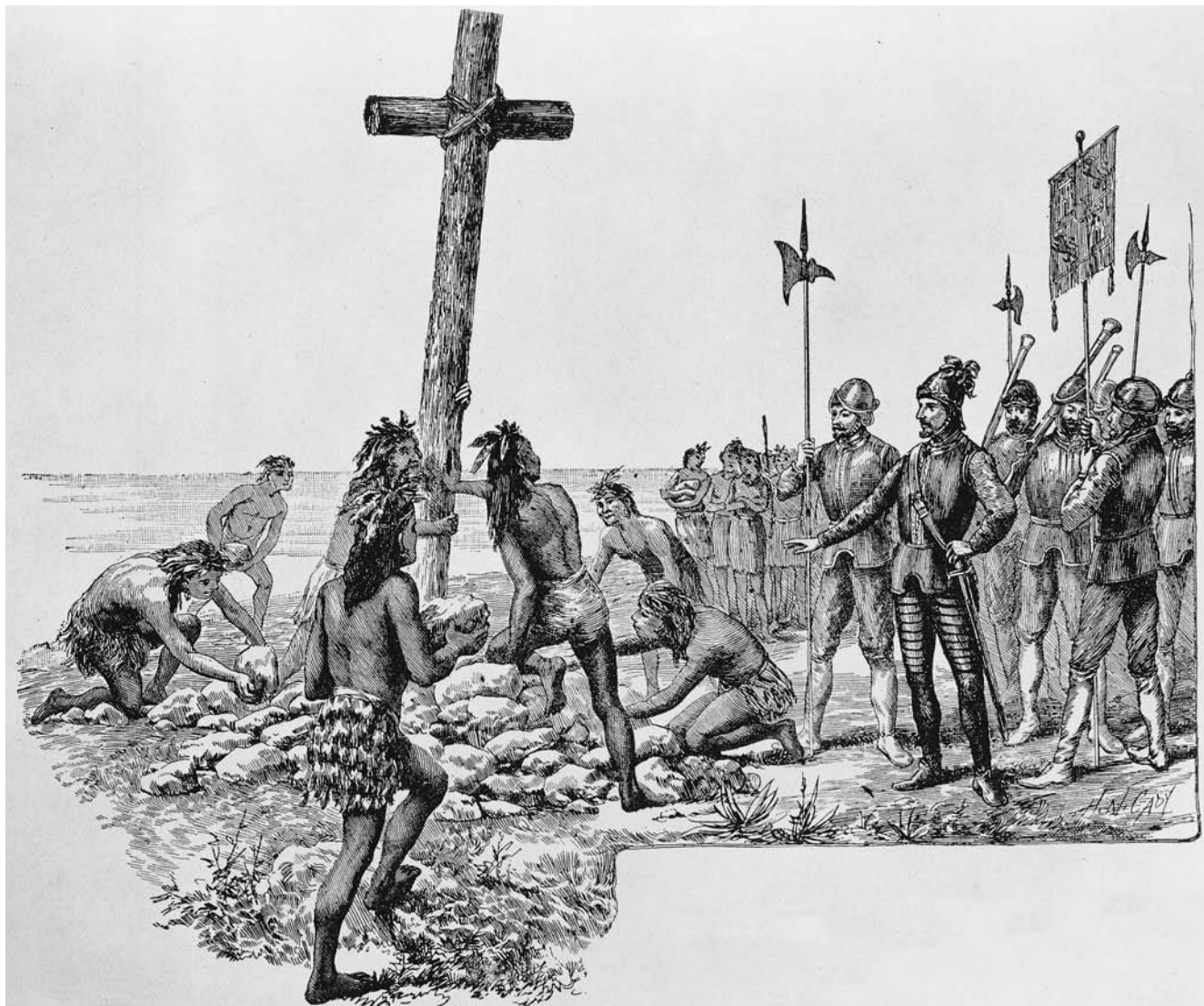
Vasco Núñez de Balboa was born in the Estremadura region of west-central Spain. Although of a humble family, he became well-connected among the Spanish nobility, serving in his early years as a page in the court of Don Puertocarrero, the lord of Moguer.

In 1501, Núñez de Balboa embarked on a career as a conquistador in the Americas. He left Spain as part of RODRIGO DE BASTIDAS's expedition to the north coast of South America in search of pearls. With Bastidas, he explored the harbor around what is now Cartagena, Colombia, and also visited the Gulf of Urabá, at the lower end of the Isthmus of Panama. Problems with the ships forced the expedition to head for the Spanish settlements on the island of Hispaniola (present-day Haiti and the Dominican Republic). Núñez de Balboa settled there and attempted to establish a plantation.

By 1510, Núñez de Balboa found himself seriously in debt. To escape his creditors, he stowed away on a ship headed for San Sebastián, on the eastern end of the Gulf of



Vasco Núñez de Balboa (Library of Congress)



Vasco Núñez de Balboa at the Pacific Ocean (*Library of Congress*)

Urabá, to commence an expedition. With him, he had few possessions other than his sword and his dog, Leoncico. The leader of the expedition, Martín Fernández de Encisco, agreed reluctantly to allow Núñez de Balboa to remain with it. Upon reaching San Sebastián, they discovered the colony had been abandoned. Drawing upon his earlier experience on the Panama coast with Bastidas, Núñez de Balboa directed the expedition and the remaining colonists to the western side of the Gulf of Urabá and established the settlement of Santa María de la Antigua del Darién.

By 1511, Núñez de Balboa had consolidated his control over the new colony, deposing the former Spanish rulers, DIEGO DE NICUESA and ALONSO DE OJEDA. The Spanish king commissioned him as interim governor and captain general of Darién, as Panama was then known. Núñez de

Balboa penetrated the interior of the isthmus, battling Indians and expanding the colony. His chief lieutenant at this time was FRANCISCO PIZARRO.

Núñez de Balboa was skillful in his diplomatic relations with native peoples. He made alliances with Indian leaders Careta and Comogre, from whom he first heard reports of tribes to the south and west who possessed gold and pearls. He was told that if he could defeat the powerful chief Tubanamá, these riches could be his. He also learned from the Indians of a great sea on the other side of the Sierra de Quareca Mountains.

In early September 1513, Núñez de Balboa set out from Darién with a force of almost 200 Spaniards and 1,000 Indians and slaves. Crossing the lower part of the isthmus, his men struggled through some of the densest jungles and most rugged mountains in CENTRAL AMERICA. On September

25, 1513, they came to a hill that appeared to afford an unobstructed view to the south and west. Núñez de Balboa ascended it, accompanied only by his dog, and viewed the PACIFIC OCEAN.

Núñez de Balboa and his men pushed onward through the jungle and reached the shores of the Pacific on September 29. He called it the Great South Sea and, in a solemn ceremony, claimed it and all the lands it touched for the king of Spain. He named the bay there the Gulf of San Miguel. On this expedition, he and Pizarro heard the earliest reports of the Inca civilization to the south in present-day Peru. Núñez de Balboa obtained gold and pearls on the Pacific coast of Panama, then returned to the Atlantic side of the isthmus and, following a different route, conquered more Indian towns and obtained more riches.

Núñez de Balboa arrived back at the Darién settlement in January 1514. Meanwhile, court intrigues in Spain led to his being superceded in command in Panama by PEDRO ARIAS DE ÁVILA, who arrived at the colony later that year.

In 1516, Núñez de Balboa directed another expedition across Panama to the Pacific. On this occasion, the parts of disassembled ships were carried across the isthmus from Acla, a town Núñez de Balboa had established as his base on the Atlantic coast of Panama, near Puerto Careta. Transporting the ships through the mountains and jungles was accomplished with great difficulty and succeeded only because of Núñez de Balboa's great organizational skills. Núñez de Balboa himself had to make 20 crossings of the isthmus in the course of this project. Nearly 500 Indian laborers lost their lives. Two brigantines were eventually launched into the Gulf of San Miguel, and Núñez de Balboa sailed to the Perlas Islands, where he obtained pearls and undertook a few short explorations southward along Panama's Pacific coast.

Meanwhile, back on the Atlantic coast, intrigues against Núñez de Balboa continued. He was lured to Acla by Arias de Ávila and was arrested by his former lieutenant, Pizarro. In late January 1519, Núñez de Balboa was tried and found guilty of treason, stemming from trumped-up charges that he planned to establish his own colony on the Pacific side of the isthmus. Along with four of his chief supporters, he was publicly beheaded.

Vasco Núñez de Balboa was the first European to see the Pacific Ocean from the west coast of the Americas. His exploit had a profound influence on subsequent explorers, encouraging hopes that the newfound continent was narrow enough to provide an all-water route to the Pacific. His explorations also revealed that the riches of the Far East lay much farther west of the American landmass than previously believed. Núñez de Balboa established the first overland trail across the Americas, which subsequently provided the Spanish with a direct route to the west coast of South America and the gold and silver of Peru.

Nuttall, Thomas (1786–1859) *British naturalist in North America*

Born in the town of Settle in Yorkshire, England, Thomas Nuttall grew up in a family of modest means. After serving as an apprentice in the printing trade, he went to work at his uncle's printing shop in Liverpool.

In 1808, at the age of 22, Nuttall traveled to the United States, settling in Philadelphia. He became acquainted with the physician and naturalist Benjamin S. Barton, who encouraged him to pursue his interest in natural history. Nuttall soon began making field trips southward into the Delaware River Valley, as well as northward to the New Jersey Pine Barrens. His specimen-collecting expeditions eventually took him into the Delaware-Maryland Peninsula, coastal Virginia, the lowlands of North Carolina, and as far south as Mississippi and Florida.

In 1811, Nuttall, along with Scottish naturalist JOHN BRADBURY, accompanied WILSON PRICE HUNT and his fur-trading expedition from St. Louis up the MISSOURI RIVER by keelboat, reaching a point on the river above the Mandan Indian villages in what is now North Dakota.

Nuttall was back in Philadelphia in 1811, where he prepared a detailed study of his botanical specimens from the West. In 1813, he was elected a fellow of London's prestigious Linnaean Society, and, in 1817, he was made a member of the Philadelphia-based American Philosophical Society and correspondent of Philadelphia's Academy of Natural Sciences.

In 1818–20, Nuttall returned to scientific exploration in the American West, traveling along the Arkansas and Red Rivers into the remote parts of what is now Arkansas, Louisiana, and eastern Oklahoma. His *Journal of Travels into the Arkansas Territory, during the Year 1819*, published in 1821, includes information on the history of the region's Indian tribes as well as meteorological observations.

Nuttall's major botanical work, *The Genera of North American Plants, and a Catalogue of the Species, in the Year 1817*, first published in 1818, brought him fame in American scientific circles. In 1822, he was appointed a professor of natural history at Harvard, where he also served as curator of the botanical gardens.

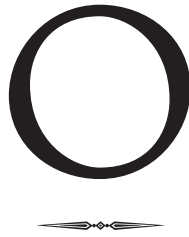
Nuttall left his post at Harvard in 1834 to travel with NATHANIEL JARVIS WYETH's fur-trading expedition to the mouth of the COLUMBIA RIVER. He was accompanied by another naturalist, ornithologist John Townsend, as well as by Jason Lee and his small band of missionaries on their way to the Oregon Country. After the overland crossing to the Pacific coast, Nuttall returned to the East the following year by ship, sailing via the HAWAIIAN ISLANDS and CAPE HORN.

Nuttall returned to England in 1842 to live on an estate near Liverpool called Nutgrove, left to him by his uncle, where he cultivated exotic plants. He returned to Philadelphia

for a visit in 1847–48, during which he studied a natural history collection that had recently arrived at the Academy of Sciences from the Far West. He spent his remaining years in England.

With the publication in 1832 of his *Manual of the Ornithology of the United States and Canada*, Thomas Nuttall, like his contemporary JOHN JAMES AUDUBON, was acclaimed as one of the foremost authorities on the birds of North America. The first ornithological association in the United States was subsequently named in Nuttall's honor. In

addition to his work in botany and bird studies, Nuttall was a pioneer paleontologist, and he was among the first to cite the similarities in the geological makeup of such widely separated regions as Iowa and Derbyshire, England. He was one of the best-traveled naturalists to study the flora and fauna of North America in the first half of the 19th century. His explorations in search of plant and bird specimens took him into almost every state in the Union as well as into uncharted territory of the American West.



Odanais, Isabela Godin des See GODIN DES ODANAIS, ISABELA.

Odoric of Pordenone (Friar Odoric, Friar Oderic) (ca. 1265–1331) *Italian missionary in India, China, and Tibet*

Odoric of Pordenone was probably born in the northeastern Italian city of that name, north of Padua. He took holy orders as a Franciscan friar, becoming a missionary priest committed to winning converts to Christianity in Asia.

In about 1318, Odoric left Italy on a missionary expedition to the Far East. From Constantinople (present-day Istanbul, Turkey), he traveled overland across Asia Minor and Persia (present-day Iran) to the mouth of the Persian Gulf and the port of Hormuz, from where he continued his eastward journey by ship. He sailed first to Thana on India's northwest coast, north of Bombay, where he collected the bones of some recently martyred Christian missionaries. On southwestern India's Malabar Coast, he visited the port of Quilon and witnessed the trade carried on in the city's pepper and ginger markets.

Odoric then sailed to the island of CEYLON (present-day Sri Lanka); he later reported seeing a two-headed bird, probably a variety of hornbill whose long, curved bill confused him. After stopping at the Nicobar Islands of the eastern Indian Ocean, he reached Sumatra and the Strait of Malacca, from where he sailed to Borneo and Java, then

landed on the East Asian mainland of Cochin China (present-day Vietnam).

In about 1322, Odoric arrived at the Chinese port of Hangchow, then proceeded inland along the Grand Canal to Peking (Beijing). He stayed with JOHN OF MONTECORVINO, who had founded a Franciscan mission and church in the Chinese capital.

The bones of the martyred missionaries Odoric had carried from India were interred in Peking. Odoric remained in northern China until about 1328, then set out overland for his return journey to Europe. From Peking, he traveled northward, beyond the Great Wall of China into Inner Mongolia, then made his way southwestward across central China and entered Tibet. He reportedly reached the Tibetan capital of LHASA, the first Christian to do so. He later described the Tibetan people in critical terms, stating that they practiced cannibalism and that they drank out of the skulls of their ancestors.

Odoric's homeward journey took him along the northern slopes of the HIMALAYAS and through the Hindu Kush. He passed through Persia again, traveling along the south shore of the Caspian Sea, and, in about 1330, he arrived back in Padua. His route to the Far East and back followed in reverse that taken by MARCO POLO some 40 years earlier.

Soon after returning to Italy, Odoric wrote, with the help of another Franciscan friar, an account of his 12-year odyssey to the Far East. In the course of his travels, he reportedly had made as many as 10,000 converts to Christianity.

Odoric of Pordenone died in 1331, one year after his return from China. At the time of his death, he was planning a second proselytizing mission to Asia. The narrative of his travels, along with that of Marco Polo, fueled European interest in Asia, with its descriptions of the great size and marvels of such Chinese cities as Hangchow (Hangzhou) and Zaiton (Quanzhou), and the SPICE TRADE in India and Sumatra. It also provided Europeans with new geographic information about the Orient, much of which was incorporated by cartographer ABRAHAM CRESQUES in his *Catalan Atlas* of 1375. Odoric's account seems to have been a source for the 14th-century travel book *The Travels of Sir John Mandeville* by Sir John Mandeville, thought to be a pseudonym. After Odoric, 300 years elapsed before the next European visited Tibet; Jesuit missionary ANTONIO DE ANDRADE entered the region from India in 1624.

Ogden, Peter Skene (M'sieu Pete) (1794–1854)
Canadian fur trader in the American West

Peter Skene Ogden was born in Quebec City, Canada, to a Loyalist family who had settled there during the American Revolution. He was raised and educated in Montreal, where his father was a magistrate.

Although trained as a lawyer, Ogden decided against a legal career in favor of a life of travel and adventure in the FUR TRADE. In 1811, he joined the Canadian-owned NORTH WEST COMPANY and took part in fur-trading and trapping operations in the Great Lakes region.

Ogden journeyed to the Pacific Northwest in 1818. In 1824, three years after the North West Company's merger with the HUDSON'S BAY COMPANY, he became chief lieutenant to the Hudson's Bay Company's factor, JOHN MCLOUGHLIN, in the COLUMBIA RIVER region.

In late 1824, Ogden, with a party of 75 trappers and about 400 pack animals, embarked on an expedition to the south and east of the Hudson's Bay Company's Flathead Post in present-day northern Idaho. He was directed to deplete the area's beaver resources in an effort to discourage American trappers who were then penetrating the region from the upper MISSOURI RIVER. Driven out of the Three Forks of the Missouri area by Indian attacks, Ogden and his men explored the upper Jefferson River, then headed southward to the Salmon River, crossing the Continental Divide en route.

By May 1825, Ogden reached the northern Wasatch Mountains, near the site of present-day Ogden, Utah. From there, he explored the Weber River and the Bear River to its outlet into the Great Salt Lake. He returned to the Three Forks of the Missouri, and, after exploring and trapping along the Marias River, he reached Fort Vancouver, the Hudson's Bay Company's main post on the Columbia, in late 1825.

Ogden soon embarked on a second wide-ranging fur expedition. Starting from Fort Vancouver in winter 1825–26, he led a group of traders and trappers southward from the Columbia along Oregon's Deschutes River, then explored the region of the Blue Mountains to the east, as far as the Snake River.

In 1826–27, Ogden again headed southward from Fort Vancouver to Klamath Lake and northern California. While trapping and exploring there in 1827, Ogden and his party became the first non-Indians to sight Mount Shasta, which he named.

Ogden undertook an expedition into Utah's Great Basin in 1828–29. He and his men explored the north and west shores of the Great Salt Lake, then traced a previously unknown stream to its sink in what is now western Nevada, which Ogden named the Marys River. Fifteen years later, it was located by JOHN CHARLES FRÉMONT, who renamed its lower course the Humboldt River.

The next season, 1829–30, Ogden led his men from the Columbia southward across the Great Basin to the COLORADO RIVER, which he followed to its outlet into the Gulf of California. He and his party crossed the Sierra Nevada into California via Walker Pass, then returned northward to the Columbia through the San Joaquin and Sacramento Valleys. Along the way, Ogden was joined at times by EWING YOUNG and his men.

Throughout the 1830s, Ogden continued to expand the Hudson's Bay Company's operations in the Pacific Northwest. For a time, he supervised the fur trade in the Stikene River region of southeastern Alaska, and he was subsequently appointed as chief factor at Fort Vancouver. In 1847, he helped negotiate the release of non-Indian captives held by Cayuse Indians following the attack on missionary MARCUS WHITMAN and his followers.

After retiring from the fur trade, Ogden settled in Oregon City, Oregon, with his Indian wife. His explorations of the American West had brought him into contact with a wide variety of Native Americans, and he wrote about these experiences in his book *Traits of American Indian Life and Character. By a Fur Trader*, published posthumously in 1855.

Peter Skene Ogden's trading expeditions took him over a vast area of the American West. He was among the first non-Indians to report the existence of the Great Salt Lake. His 1828–29 exploration along the Humboldt River to the Humboldt sink in Nevada confirmed that it was not the fabled Bonaventura River and ended speculation that the Great Salt Lake was an arm of the Pacific Ocean. His 1829–30 expedition took him from the Columbia River as far south as the Gulf of California and constituted the first north-south crossing by non-Indians of the North American continent west of the Continental Divide. Utah's Ogden City, Ogden River, Ogden Valley, and Ogden Canyon were named in honor of his extensive explorations of the Great Basin.

Ojeda, Alonso de (Alonso de Hojeda)

(ca. 1465–ca. 1515) *Spanish conquistador in the West Indies, South America, and Panama*

Alonso de Ojeda was born in Cuenca, Spain, the son of aristocratic parents. In his early years, he was a member of the household of the Duke of Medina Celi and took part in Spain's final campaigns of reconquest against the Moors.

In 1493, Ojeda commanded one of the ships in CHRISTOPHER COLUMBUS's second voyage of exploration, sailing to the island of Hispaniola (present-day Haiti and the Dominican Republic), where he helped establish the settlement of Isabela. He then explored the interior of the island, discovering gold mines near Cibao. In April 1494, Ojeda led a military expedition against Indians in the La Vega Real region of Hispaniola, defeating the leader Caonabo at the Battle of La Vega the following March.

In 1497, Ojeda returned to Spain and sought royal authority for an expedition of his own to the Americas. In 1499, he received permission to explore along the coast of South America, reached by Columbus on his third voyage in 1498. On May 16, 1499, Ojeda sailed with several ships from the Spanish port of Santa María, near Cádiz. Accompanying him were Columbus's former pilot, JUAN DE LA COSA, and AMERIGO VESPUCCI, a representative of the Italian banking interests that had partly financed the voyage.

Ojeda's small fleet reached South America at about 5° north latitude, off the coast of what later became French Guiana. While Vespucci explored to the south and east, Ojeda coasted to the north and west, making stops at Margarita Island and Trinidad. On the mainland, along a coastal inlet, he came upon an Indian settlement of houses supported by piers in the water. The scene reminded Ojeda of Venice with its canals and he named the place Venezuela, "Little Venice" in Spanish. He also came upon a similar village at what is now Maracaibo, which he called San Bartolomé.

After exploring the northeast coast of South America as far as Cape Vela, Ojeda sailed to Hispaniola for ship repairs. He soon ran afoul of Columbus's lieutenants, who ordered him to leave Hispaniola, accusing him of trespassing on territory already claimed by Columbus. In response, Ojeda attempted, without success, to mount an uprising against Columbus's rule on Hispaniola. He then sailed to Jamaica, and, on a stopover in the Bahamas, he captured a number of Indians whom he sold as slaves upon his return to Cádiz in June 1500. He also took back a cargo of brazilwood, used for dyeing cloth, as well as a quantity of pearls from the Gulf of Paria.

In January 1502, Ojeda led another expedition to the northeast coast of South America, intending to establish a colony on the coast of Venezuela. The settlement, which he called Santa Cruz, was constantly besieged by the Indians. After about nine months, when supplies became low, his

men mutinied. They arrested Ojeda and sent him in chains to Spanish authorities in Hispaniola, charging him with being despotic and brutal in his treatment of both his own men and the region's Indians. Bishop Fonseca, president of the Council of the Indies, which directed all Spanish exploration and settlement in the Americas, interceded on Ojeda's behalf and won his release. In 1505, Ojeda again unsuccessfully attempted to establish a colony on the Venezuelan mainland.

In 1508, Ojeda sent Cosa to Spain to seek another royal commission for a colony in South America. As a result, Ojeda was named governor of New Andalusia, a colonial province extending from Cape Vela to the Gulf of Darien, comprising most of the Atlantic coast of what is now Colombia and eastern Panama.

Among the men Ojeda recruited on Hispaniola for this enterprise was FRANCISCO PIZARRO, the future conqueror of Peru. HERNÁN CORTÉS, who later commanded the conquest of Mexico, also planned to accompany Ojeda, but he was forced to stay behind due to an injury. In November 1509, Ojeda sailed from Hispaniola's port of Santo Domingo with four ships, carrying 300 men and supplies. He landed at what is now Cartagena, Colombia, where his men suffered a devastating defeat in an Indian attack; Cosa, who had partly financed the expedition, was killed. Soon afterward, DIEGO DE NICUESA, in command of a rival expedition, arrived at Cartagena, rescued Ojeda, then helped him launch a counterattack against the Indians.

Unable to subdue the native peoples around Cartagena, Ojeda moved his colony westward along the coast, establishing San Sebastian on the east shore of Colombia's Gulf of Urabá. The relief ship supposedly sent by the principal backer, Spanish lawyer Martín Enciso, failed to arrive, and Ojeda decided to return to Hispaniola. Leaving Pizarro in command, he sailed with Bernardino de Talavera (or Calavera), one of the Spanish PRIVATEERS active in the region. The ship was wrecked off the coast of Cuba. A message sent by CANOE to Jamaica was received there by PÁNFILO DE NARVÁEZ, who sent a ship to pick up Ojeda and take him back to Hispaniola. Meanwhile, Enciso had already sailed for the mainland, and VASCO NÚÑEZ DE BALBOA, in Ojeda's absence, usurped his authority and reorganized the Panama colony under his own leadership.

Left without financial backing to reestablish his claim on New Andalusia, Ojeda spent his last years on Hispaniola in poverty. His death was reportedly due to the effects of a poison-tipped arrow with which he had been wounded on his final expedition to the mainland of South America and the Isthmus of Panama.

Alonso de Ojeda was among the first generation of Spanish adventurers to colonize the lands explored by Columbus between the mouths of the ORINOCO RIVER and Panama's Gulf of Urabá. Based on his 1499 voyage with

Ojeda, Cosa produced the first map to depict the mainland of northern South America. Although Ojeda's own colonizing efforts were unsuccessful, they soon led to permanent European settlements on the coast of what is now Venezuela, Colombia, and Panama. His son, also named Alonso, played a leading role in the Spanish conquest of Mexico under Cortés in 1519–21.

Oñate, Juan de (ca. 1550–ca. 1630)

Spanish colonizer of New Mexico

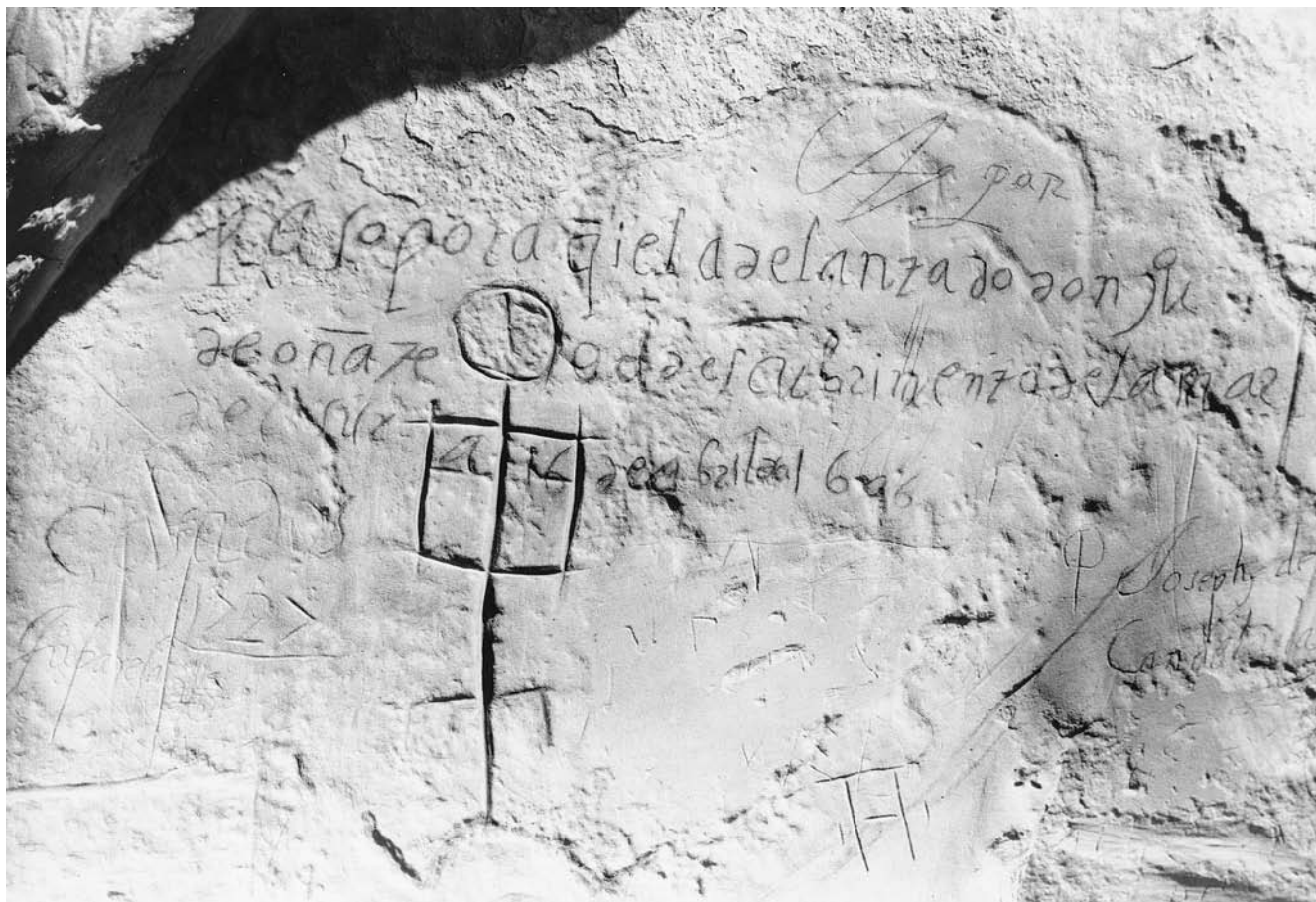
Juan de Oñate was probably born in western Mexico, in the old colonial province of Nueva Galicia. His father, Cristóbal de Oñate, was one of the original European discoverers of the silver mines of Zacatecas. The younger Oñate married a direct descendant of HERNÁN CORTÉS, the leader of the Spanish conquest of Mexico.

In 1595, Juan de Oñate was commissioned by the Spanish government to undertake a colonizing expedition north of the Rio Grande into what is now New Mexico. Three years later, in late 1598, he led several soldiers, settlers, and Franciscan missionaries north from Nueva Gal-

icia into what is now western Texas. Oñate and his expedition reached the Rio Grande near present-day El Paso, Texas, and followed it to its confluence with the Chama, where they established the settlement of San Juan de los Caballeros, near present-day Santa Fe. He claimed New Mexico for Spain and became the province's first Spanish governor. Soon afterward, he established a permanent settlement nearby at San Gabriel de Yungue-Ouinge, at what became known as the San Gabriel Pueblo, the first colonial capital of the province of New Mexico.

Beginning in 1601, Oñate undertook a series of explorations in the lands surrounding his New Mexico settlements, in search of mineral wealth and the fabled Seven Cities of CIBOLA and QUIVIRA. He explored the Texas Panhandle and the Canadian and Arkansas Rivers, crossing what is now Oklahoma, and penetrated the southern plains as far as present-day Wichita, Kansas.

In 1604–05, Oñate explored westward from the San Gabriel settlement into the Gila River region of present-day Arizona, in search of a direct route to the "South Sea." He reached the COLORADO RIVER and followed it to the northern end of the Gulf of California.



Juan de Oñate's inscription at El Morro in New Mexico (Library of Congress)

Oñate served as Spain's first colonial governor of New Mexico until 1609. After he resigned, he was charged with mismanagement and excessive cruelty in suppressing Indian uprisings, especially at Acoma Pueblo in 1598–99. In 1609, he founded a settlement at Santa Fe. In 1614, he was exiled from New Mexico. He later traveled to Spain, where he won a reversal of his sentence.

Juan de Oñate explored much of the same territory covered by FRANCISCO VÁSQUEZ DE CORONADO in 1541. He founded the first permanent European settlements west of the MISSISSIPPI RIVER in what is now the United States. Oñate's 1604–05 expedition across what is now western New Mexico took him to the famous inscription rock, El Morro, where he was the first European to record his name at the base of the 200-foot-high natural sandstone monument.

Orbigny, Alcide-Charles-Victor Dessalines d'

(1802–1857) *French naturalist in South America*

Alcide d'Orbigny was born in Coueron, France. In 1825, when he was just 23 years old, his studies of foraminifera (a class of shelled, near-microscopic, protozoa-type creatures) so impressed the directors of the Paris Museum of Natural History that they commissioned him to lead a scientific expedition to South America.

In 1826–27, Orbigny traveled across Brazil and Uruguay, collecting zoological and botanical specimens. In 1827–28, he undertook an exploration of the Paraná River and its tributaries in southeastern Brazil, Paraguay, and Argentina.

In 1828, Orbigny was commissioned by the government of Argentina to explore the Pampas and prepare a report on its potential for agricultural development. That year, he went south to Patagonia to conduct natural history studies. While there, he was adopted by a native band and fought on their side in an intertribal war. He then spent several years exploring Bolivia and traveling in Peru, during which he carried out additional scientific studies and collected plant and animal specimens.

Orbigny returned to France in 1834. The extensive natural history collection he had amassed in his travels in South America brought him the Grand Prize from the Geographical Society of Paris, and the French government published his nine-volume report of the expedition, *Voyage dans l'Amérique Méridionale* (1834–47). In the course of his explorations in South America, Orbigny had also collected and studied microscopic fossils, work that became the foundation for the science of stratigraphical paleontology.

Alcide d'Orbigny's explorations through nearly every part of South America yielded much new geographic information, and, in 1842, he produced the first comprehensive map of the continent.

Ordaz, Diego de (Diego de Ordás) (1480–1535)

Spanish conquistador in the Americas

Diego de Ordaz was born at Zamora in northwestern Spain. While in his early 20s, he sailed to the WEST INDIES. In 1509, he embarked from Hispaniola (present-day Haiti and the Dominican Republic) with ALONSO DE OJEDA's abortive colonizing expedition to the coast of what is now Colombia and Panama.

Ordaz took part in the conquest of Cuba under DIEGO DE VELÁSQUEZ in 1511 and he later served in Velásquez's household after the latter was appointed as the island's first colonial governor.

Ordaz served as an officer under HERNÁN CORTÉS in his conquest of Mexico in 1519–21. In the early stages of that campaign, he commanded a reconnaissance of the Yucatán coast. Later, as Cortés and his army approached the Aztec capital, Ordaz led a number of men part way up 17,930-foot Popocatepetl, an active volcano on the outskirts of what is now Mexico City. He thus became one of the first Europeans to catch a glimpse of Tenochtitlán, the Aztec capital. Soon afterward, Ordaz accompanied Cortés in his first meeting with the Aztec emperor Montezuma (Moctezuma).

In 1521, Ordaz returned to Spain and reported on the conquest of Mexico to King Charles I (Holy Roman Emperor Charles V). In honor of Ordaz's having made the climb of Popocatepetl, the Spanish monarch permitted his family to display a burning mountain in its coat of arms.

Ordaz became the commander of his own expedition in 1530. He was commissioned by the king to explore, conquer, and colonize a large portion of the northeast coast of South America, stretching from the mouth of the AMAZON RIVER to Cape de la Vela, a region comprising part of what is now eastern Colombia, Venezuela, the Guianas, and northeastern Brazil.

Ordaz sailed from Spain with three ships carrying 500 men. Although he located the mouth of the Amazon, he was unable to make a landing, and instead he sailed westward along South America's northeast coast to the Gulf of Paria. He learned from the natives of another great river, which the natives called the Huyapari. By June 1531, Ordaz had succeeded in finding the delta of this river, now known as the ORINOCO RIVER. He explored upriver for about 800 miles, reaching its junction with the Meta River, which he briefly investigated.

From the region's Indians, Ordaz learned of a mysterious people called the "Guiana," who supposedly possessed vast amounts of gold and other riches and were said to be white, like Europeans. Ordaz searched in vain for this fabled land of wealth before returning to the coast. On nearby Cubagua Island he ran afoul of Spanish settlers, who charged him with trespassing in lands that had already been claimed in that part of what is Venezuela.

Placed under arrest, Ordaz was transported to Santo Domingo on Hispaniola, where he was soon released. In 1532, he sailed for Spain to assert his claim on the lands he had explored, but he died on the homeward voyage.

Diego de Ordaz, who played a significant role in the early stages of the Spanish conquest of Mexico, became the first European to explore the Orinoco River, one of the longest in South America, ascending it to a point about 600 miles inland from the Caribbean coast of present-day Venezuela. The reports he related of a rich Native American civilization rumored to exist in the region encouraged subsequent explorations of the Orinoco, in search of the fabled land of EL DORADO.

Orellana, Francisco de (ca. 1490–ca. 1546)

Spanish conquistador in Peru, Ecuador, and the Amazon Basin

Born at Trujillo in the Extremadura region of western Spain, Francisco de Orellana was a relative and boyhood friend of FRANCISCO PIZARRO. In 1527, he left Spain to seek his fortune in the WEST INDIES. In the years that followed, he took part in campaigns of conquest on the mainland.

Orellana joined his kinsman Pizarro in the conquest of Peru in 1533–35, during which he fought in battles against the Inca at Lima, Trujillo, and Cuzco, suffering the loss of an eye in one engagement. In 1538, he led Spanish forces in the conquest of the Inca province of La Culata, and soon afterward he helped reestablish the city of Guayaquil near the Pacific coast of what is now Ecuador. Orellana also aided Pizarro and his forces in defeating DIEGO DE ALMAGRO in the civil war that same year.

Orellana settled for a time at Puerto Viejo (present-day Portoviejo, Ecuador) near Guayaquil, where he had been appointed governor by Pizarro. In early 1541, he organized at his own expense a small force of about 20 Spaniards and a number of Indians and set out eastward from Quito, across the northern ANDES MOUNTAINS, hoping to join up with a larger expedition under the command of GONZALO PIZARRO, Francisco Pizarro's younger brother. The younger Pizarro was at that time in search of La Canela (the land of cinnamon), reportedly an abundant source of that highly prized spice, and of the fabled kingdom of EL DORADO, a land that, according to Indian stories, was rich with gold.

In March 1541, Orellana met up with Gonzalo Pizarro and his men on the upper Coca River in what is now northern Ecuador; he was immediately named second in command. Pizarro had located some cinnamon trees in the region, but not enough to be of any commercial value. The search for El Dorado persisted, and, by late 1541, the combined expedition was facing a critical shortage of food and supplies. A brigantine-type boat, the *San Pedro*, was constructed with improvised materials, and on Christmas Day

1541, Orellana, accompanied by 56 men and a number of natives traveling by CANOE, headed down the Coca, hoping to find an Indian village with food.

Although he had been instructed by Pizarro to return within 12 days, Orellana and his men were soon swept into the upper Napo River. At the confluence of the Napo and the Aguarico Rivers, they came upon an Indian village called Aparia, where they found ample food, and it was there that Orellana decided not to attempt a return journey upstream to rejoin Gonzalo Pizarro. Instead, he resolved to construct a larger vessel and continue downstream into the AMAZON RIVER, then known as the Marañon (maze), intending to explore it to its mouth on the Atlantic Ocean. After two months, the second boat, the *Victoria*, was completed, and, on April 24, 1542, Orellana resumed his downriver journey.

In mid-May 1542, Orellana and his men successfully fought off a series of Indian attacks as they made their way downstream. In early June, after locating the mouth of the Río Negro (so named after the darker appearance of its water as it combined with the main stream of the Amazon), the Spaniards were reportedly besieged by a group of women warriors, likened by the expedition's chronicler, Dominican friar Gaspar de Carvajal, to the Amazon women of Greek legend.

On July 28, 1542, Orellana and his men reached the tidal basin of the Amazon. After rigging sails made from blankets, they continued into the mouth of the Amazon, entering the Atlantic on August 26, 1542. While following the northeast coast of South America, along the shores of what is now the Guianas and Venezuela, the ships were separated. They were not reunited until September 11, when they met up at Nueva Cádiz on Cubagua Island off the central Caribbean coast of what is now Venezuela.

Meanwhile, Gonzalo Pizarro, having managed to return to Quito with the remnants of his expedition, charged Orellana with deserting him. Amidst the political turmoil that soon erupted in Peru, and which resulted in the end of the Pizarro family's domination of the region, the accusations were overlooked.

In 1543, Orellana returned to Spain to seek royal sponsorship for another voyage of exploration. King Charles I (Holy Roman Emperor Charles V) appointed him governor of the region around the river he had descended and commissioned him to lead a colonizing expedition to New Andalusia, as it was named. In May 1545, Orellana sailed from the Spanish port of Sanlúcar de Barrameda with four ships and about 350 men. By the time he had returned to the mouth of the Amazon in December 1545, he had only two ships remaining. He explored the great river's estuary, searching for the river's main channel, until December 1546, when he reportedly died of tropical disease.

Although it was not his intention, Francisco de Orellana led the first known journey down the Amazon River, traveling along it for 2,000 miles, from a point near its source in the Andes to its outlet on the Atlantic. Taken together with his preliminary trek over the Andes from Guayaquil in 1541–42, he and his men had also made the first complete crossing of the South American continent. Friar Carvajal's eyewitness account of the expedition, entitled *Account by Friar Gaspar de Carvajal of the Voyage down the River that Captain Francisco de Orellana Discovered*, appeared in Spain soon afterward. Carvajal referred to the river as the "Orellana," although VICENTE YAÑEZ PINZÓN had actually reached the mouth of the river in 1500 and had named it La Mar Dulce (the freshwater sea). By the early 1600s, because of Carvajal's report on the women warriors, whom he had likened to the Amazons of Greek legend, the river had come to be known as the Amazon. Carvajal also described the so-called Amazons as being fair-skinned and reported other white inhabitants in the rain forest. Similar sightings of white-skinned native people in the Amazon Basin persisted well into the 20th century. Orellana's voyage of 1542 initiated exploration of the Amazon and revealed for the first time the full extent of the river. The geographic knowledge resulting from his expedition was incorporated into the first comprehensive map of the South American continent, produced by DIEGO GUTIÉRREZ in 1562.

Ortelius, Abraham (Abraham Oertel, Abraham Ortell, Abraham Ortel) (1527–1598)

Flemish cartographer, geographer

Abraham Ortelius was born at Antwerp in present-day Belgium, which was then under Spanish rule. His original family name, Oertel or Oertell, was later Latinized in the humanist tradition. He became involved with cartography early in his life, becoming a skilled illuminator of maps by the time he was 20 years old.

The death of Ortelius's father left him as the sole support for his widowed mother and two sisters, and, to augment their income, he became an itinerant dealer in maps. The maps he acquired were mounted on linen by his mother and sisters and sold on his commercial trips to Germany, France, Italy, and England. Ortelius also collected locally produced maps in the course of his travels, which he brought back to Antwerp, illuminated, and resold.

In about 1549, Ortelius was commissioned by Dutch merchant Aegidius Hoofman to put together a comprehensive collection of European maps in book form. Hoofman and other businessmen of that time needed such a portable reference work to aid in determining the best routes with which to carry on trade during the nearly constant political and religious warfare then raging between the nations of Europe. Demand for more such works soon followed, and over

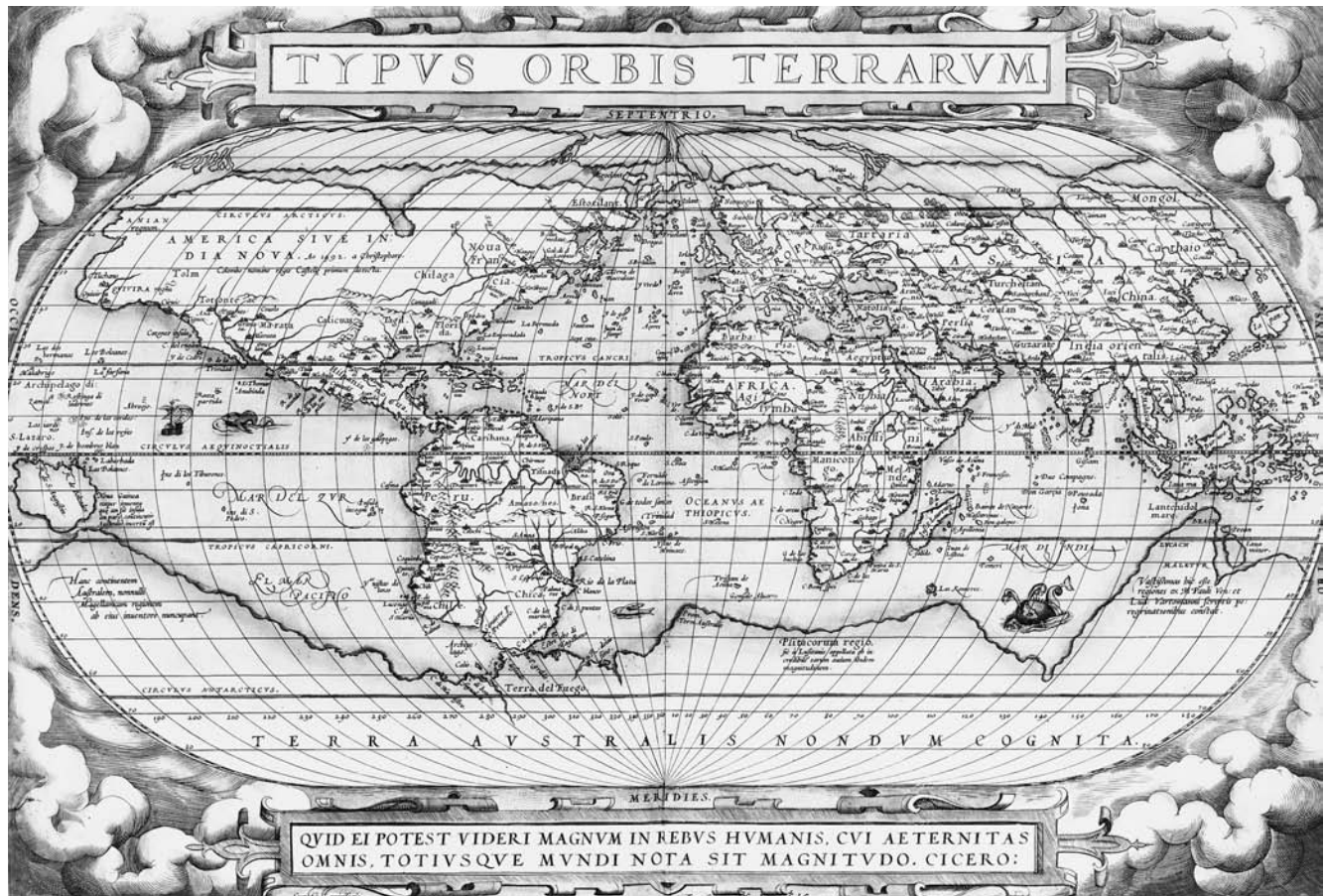
the next 10 years, Ortelius published maps he had collected in bound, uniform-sized sheets. He became a friend and associate of Flemish cartographer GERARDUS MERCATOR, who assisted him in acquiring maps and with whom he corresponded about the latest geographic information.

On May 20, 1570, Ortelius published what amounted to the first modern geographic world atlas. Entitled *Theatrum Orbis Terrarum* (Picture of the world), it contained 53 maps printed from newly etched copperplates. It was an immediate commercial success. During the next 28 years, Ortelius regularly produced annual editions; by 1598, the year of his death, the work included more than 100 maps with an accompanying text.

Ortelius's reputation as one of the leading cartographers of his day spread across Europe. Editions of his books of maps were soon published in Dutch, German, French, Italian, and English translations from the original Latin, and in 1575, he was appointed as royal geographer to King Philip II of Spain. In addition to his cartographic work, Ortelius produced a geography, *Thesaurus Geographicus*, first published in 1587.



Abraham Ortelius (Library of Congress)



Map of the world by Abraham Ortelius (1570) (Library of Congress)

The maps included in Abraham Ortelius's published works were based more on actual explorations and reports of mariners and less on the traditional geographic dogma handed down since the days of PTOLEMY. Although his charts did continue to depict such traditional inaccuracies as Terra del Fuego being an extension of Terra Australis (the hypothetical GREAT SOUTHERN CONTINENT), some features were inexplicably accurate. His map of North America, published in 1570, details what appears to be HUDSON BAY, yet that feature was not reported until after HENRY HUDSON's last voyage 41 years later in 1611. In addition, Ortelius's atlases were among the first to list the Americas among the continents of the world and to reflect the rapid gains in geographic knowledge that were made in his lifetime. With his annually updated atlases, Ortelius made the latest findings of such explorers as CHRISTOPHER COLUMBUS, VASCO NÚÑEZ DE BALBOA, FERDINAND MAGELLAN, and SIR FRANCIS DRAKE available to the European public. Prior to his work, such information had been included only on charts used by mariners or in lavishly produced works privately commissioned by wealthy, usually royal, patrons.

Orville, Albert d' (1621–1662) *Flemish missionary in China, Tibet, and India*

Albert d'Orville was a native of Flanders, territory now part of Belgium. After entering the Jesuit order, he dedicated himself to a career as a missionary priest in the Far East.

Orville was in Peking (Beijing) in 1658, when fellow Jesuit missionary JOHANN GRUEBER arrived there from Europe. In 1661, the two set out on a journey westward across China, which took them across the Ordos desert country to Lake Koko Nor, then southward into Tibet.

After a brief visit to LHASA, the Tibetan capital, Orville and Grueber crossed the HIMALAYAS into Nepal and India. While on a stopover at Agra in north-central India, Orville died, and soon afterward, Grueber resumed his journey, traveling back to Europe by way of the Middle East and the MEDITERRANEAN SEA.

Albert d'Orville, together with Johann Grueber, made one of the first extensive journeys across China and into Tibet since the travels of MARCO POLO in the late 1200s and ODORIC OF PORDENONE in the early 1300s. Grueber survived to take back to Europe much updated information about the geography and people of central Asia.

Oudney, Walter (1790–1824) *Scottish physician, naturalist in North and West Africa*

Walter Oudney was born into a family of modest means in Edinburgh, Scotland. As a youth, he acquired some knowledge of medicine, and in 1810, he entered the British navy as a surgeon's mate. In 1814, after serving in the EAST INDIES, he was made a naval surgeon. Soon after the conclusion of the Napoleonic Wars in 1815, Oudney left the navy and began a course of medical studies at Edinburgh University. He also undertook studies in chemistry and natural history and pursued an interest in botany. Soon after receiving his medical degree in 1817, he opened a private practice in Edinburgh and also carried on independent studies in chemistry and natural history, hoping to someday secure a university professorship in botany.

In 1820, Oudney accepted the British government's proposal to determine the course of West Africa's NIGER RIVER. Accompanying him on this venture was British naval officer HUGH CLAPPERTON, with whom he sailed to Tripoli in present-day Libya, arriving there in October 1821. They were soon joined by British army officer DIXON DENHAM, as well as by an English shipbuilder named William Hillman.

Oudney, having been instructed to trace the course of the Niger River through the kingdom of Bornu in what is now northern Nigeria, almost at the opposite end of Africa's great western bulge from Tripoli, led his expedition southward across the SAHARA DESERT. By April 1822, they had reached Murzuk in the Fezzan region of present-day southwestern Libya. They remained there for the next seven months, exploring the surrounding territory while waiting to arrange for an armed escort from the bey, the region's local ruler. In December 1822, Oudney and his companions managed to get the support they needed from a wealthy native merchant, Abu Bakr bu Khullum, and they soon crossed the border into the kingdom of Bornu.

On February 4, 1823, Oudney, Clapperton, Denham, and Hillman became the first confirmed Europeans to see Lake Chad. On a reconnaissance around the lake with Clapperton, Oudney went on to locate the Chari River, Lake Chad's principal tributary.

Oudney and the expedition next visited the Bornu capital at Kuka (now the Nigerian city of Kukawa), where they remained until the following fall. He began his quest for the Niger on December 14, 1823, when he left Kuka and headed into western Bornu, believing that the river flowed from somewhere in a region called Nupe to the southwest. Clapperton alone accompanied him, while Denham and Hillman remained at the Bornu capital.

Exposed to extreme cold, Oudney contracted pneumonia and died at Katagum on January 12, 1824, barely a month after setting out from Kuka. Clapperton continued on alone but returned to Kuka after native rulers warned

him that to proceed to Nupe would be too hazardous. With Denham and Hillman, he then returned to Tripoli, from where they sailed to England, arriving in June 1825.

Some of the mineralogical studies made by Walter Oudney on his crossing of the Sahara in 1821–22 were later incorporated into Dixon Denham's published account of the expedition, as was Oudney's account of the journey from Murzuk to Bornu. Further exploration to determine the true course of the Niger River resumed with Clapperton's expedition of 1825 and ended in 1830 when RICHARD LEMON LANDER and his brother John followed the river to its outlet into the Gulf of Guinea.

Overweg, Adolf (1822–1852) *German geologist, astronomer in North and central Africa*

A native of Germany, Adolf Overweg had, by his late 20s, achieved a reputation as an accomplished geologist and astronomer. In 1849, he joined German geographer HEINRICH BARTH in an expedition into central and West Africa, sponsored by the British government and led by antislavery activist and explorer JAMES RICHARDSON.

Overweg and Barth arrived in Tripoli along the North African coast on January 18, 1850. They were soon joined by Richardson, and the three set out southward across the SAHARA DESERT to the oasis city of Murzuq in the Fezzan region of what is now southwestern Libya. In October 1850, they arrived at Agades in what is now central Niger, from where they continued into the sub-Saharan region, traveling with a salt caravan. They then separated, each taking a different route southward to Lake Chad, with Overweg approaching the lake from the northwest.

In April 1851, Overweg rejoined Barth in Kuka, the capital of the black Muslim kingdom of Bornu in what is now northern Nigeria. They learned there that Richardson, who had been sent to Bornu on a semidiplomatic mission, had died en route to Lake Chad.

Overweg returned to his explorations around Lake Chad, while Barth independently explored the Chari River, as well as the Benue River. In summer 1851, Overweg completed his survey of the west and north shores of Lake Chad. From his continuous exposure to the swampy regions around the lake, he developed a fever, dying on September 27, 1852. The inhabitants of the lakeside village, with whom he had become friends, buried him on the shore of the lake he had explored, according to his final wishes.

In the course of his explorations, Adolf Overweg mapped the entire perimeter of Lake Chad from a small boat and was the first known European to sail completely around the lake. Barth, who continued to explore in West and North Africa until 1855, sent Overweg's maps back to Europe.

Oxley, John Joseph William Molesworth

(ca. 1783–1828) *British explorer, government official in Australia*

Born at Westow in Yorkshire, England, John Oxley entered the British navy as a teenager. After 12 years of service, he left the navy at the rank of lieutenant. He sailed to Australia in 1812, where he had been appointed surveyor general of New South Wales.

Oxley undertook his first major exploration into the interior of southeastern Australia in 1817, when he was sent by New South Wales governor Lachlan Macquarie to explore the Lachlan River, southwest of Bathurst. Macquarie hoped to determine if the Lachlan led to an internal network of rivers, similar to the MISSISSIPPI RIVER and its tributaries in North America. If so, he speculated that such a river system could provide a water route through the continent from Sydney to either the Indian Ocean to the west or to Spencer Gulf on the south coast.

Oxley and his expedition left Bathurst on April 28, 1817. Second in command was George W. Evans, who had made the European discovery of the Lachlan River five years earlier. Along with Oxley and Evans were 11 other men, including botanist ALLAN CUNNINGHAM. Equipped with packhorses and boats, it was the largest expedition to penetrate the Australian interior until that time. Evans led Oxley to the point he had reached on the Lachlan in his earlier exploration. From there, the expedition attempted to trace the river's westward-flowing course. After several hundred miles, the river opened up into a vast and impassable morass of reedy marshlands they called Field's Plains. Oxley led the expedition overland to the southwest, hoping to find a navigable stretch of the Lachlan downstream, but he once again found it blocked by swamps. Without realizing it, Oxley had reached a point only 25 miles from the mouth of the Murrumbidgee River, a major tributary of the Murray and one of southeastern Australia's longest rivers.

Deciding that further exploration through the Lachlan's swampy lower reaches would be impossible, Oxley proceeded overland to the Macquarie River, which he followed back to Bathurst, arriving on August 29, 1817.

In April 1818, Oxley, again accompanied by Evans, led a larger expedition in an exploration of the upper Macquarie River, northwest of Bathurst. In June, 220 miles downriver,

they were again halted by a great expanse of marshes. In an attempt to skirt southward around the region, Oxley came upon a chain of mountains he called the Arbuthnot Range, as well as an expanse of fertile grazing land he called the Liverpool Plains. After crossing the GREAT DIVIDING RANGE, the expedition headed southward down the Hastings River and reached the Pacific coast, then returned to Sydney.

In 1819, Oxley, with HAMILTON HUME, undertook an exploration by boat along the shores of Jervis Bay and the Illawarra District, south of Sydney. Four years later, in 1823, New South Wales governor Thomas Brisbane sent Oxley northward from Sydney to explore Moreton Bay, hoping to find a suitable site for a new penal colony. Although Moreton Bay had been charted 50 years earlier by JAMES COOK, Oxley conducted the first thorough reconnaissance of the bay, locating the mouth of the Brisbane River. He came upon two shipwrecked sailors who, having been adopted by Aborigines, had survived on the abundant supply of fish and birds in the region. On his return to Sydney, Oxley reported that the region contained rich soil and adequate freshwater. Although he recommended that the Moreton Bay area be colonized by free settlers, a penal colony was nonetheless established the following year.

John Oxley was active in the early political life of the New South Wales colony, and was one of the pioneer settlers of the coastal Bowral District, south of Sydney. From his explorations of both the Lachlan and Macquarie Rivers in 1817–18, he speculated that the interior of the Australian continent was not crisscrossed by a network of interconnecting rivers but contained a large, landlocked inland sea. This view, which had been expressed previously by MATTHEW FLINDERS and others, was based on Oxley's having found great marshes in his explorations of both the Lachlan and Macquarie, which he concluded defined the inland sea's shoreline. His theories inspired the subsequent expeditions of CHARLES STURT and THOMAS LIVINGSTONE MITCHELL, who also searched for the hypothetical sea. The Oxley Highway, which crosses New South Wales along the route of his 1818 expedition, was named in honor of Oxley's contributions to the exploration of southeastern Australia, as was the town of Oxley on the Lachlan River, near its junction with the Murrumbidgee.

P



Pacheco, Duarte (Duarte Pacheco Pereira)

(unknown–ca. 1530) *Portuguese mariner, soldier in Africa and India*

Duarte Pacheco was born at Santarem, near Lisbon, into a family of nobles with close ties to the Portuguese ruling family. He was well educated and, in his early career, served as a personal assistant to King John II of Portugal.

Pacheco took part in Portuguese voyages of exploration along the southwest coast of Africa during the 1480s. In 1488, he was shipwrecked with his crew on the island of Principe in the gulf of Guinea. He and his men were rescued later that year by BARTOLOMEU DIAS, who was returning to Portugal from the CAPE OF GOOD HOPE.

According to some sources, Pacheco first sailed to India with PEDRO ÁLVAREZ CABRAL's fleet in 1500, which also landed along the coast of Brazil. In 1503, he accompanied AFONSO DE ALBUQUERQUE on his expedition to the ports of southwestern India's Malabar Coast, where he played a major role in naval victories against Calicut. In 1504–05, he successfully defended the port of Cochin against a year-long siege.

Proclaimed a hero, Pacheco returned to Lisbon in 1505, where he was personally greeted by King Manuel I. Four years later, he added to his naval triumphs with a decisive victory over the pirate Mondragon, who had long been preying on Portuguese treasure ships along the African coast.

In 1520, Pacheco was appointed military governor at the fortress of São Jorge da Mina, the Portuguese trading settlement on the Gulf of Guinea coast (present-day Elmina,

Ghana). After two years, he was sent back to Lisbon in chains, accused of embezzlement. Although he managed to prove his innocence and regain his freedom, the scandal ruined his reputation. Poverty-stricken, he lived out the rest of his days in obscurity.

Pacheco wrote an account of Portuguese explorations, entitled *Principio do Esmeraldo de Situ Orbis*. The work, which contained valuable geographic information, as well as sailing and navigational directions for voyages to India, was long suppressed by the Portuguese government under its policy of keeping all such information secret.

In the 1570s, nearly 50 years after his death, Duarte Pacheco's fame as a hero was revived in the works of the Portuguese epic poet Luíz Vaz de Camões, who bestowed on Pacheco the sobriquet Aquiles Lusitano—the “Portuguese Achilles.”

Padilla, Juan de (ca. 1500–1542) *Spanish missionary in Mexico and the American Southwest and Midwest*

Spanish Franciscan missionary Friar Juan de Padilla arrived in Mexico in 1528. He accompanied HERNÁN CORTÉS on an expedition into southern Mexico in 1533, and, in 1540, he was attached to FRANCISCO VÁSQUEZ DE CORONADO's expedition northward from western Mexico into what is now Arizona and New Mexico. He hoped to prove the truth of the legendary, fabulously rich Seven Cities of Antillia, which now were thought to be the Seven Cities of CIBOLA.

In July 1540, after finding no great wealth among the Zuni Indians, Padilla, along with one of Coronado's officers, PEDRO DE TOVAR, explored into what is now eastern Arizona. They came upon seven Hopi Indian villages and returned to Coronado with reports of a great river to the west. A follow-up expedition, led by GARCÍA LÓPEZ DE CÁRDENAS, further investigated the region and made the European discovery of the COLORADO RIVER, as well as the Grand Canyon.

Padilla was among the friars who traveled with Coronado and his army of CONQUISTADORES in search of QUIVIRA, an Indian land that, according to the account of the captured Indian TURK, contained an abundance of gold and silver and that Padilla believed might be Antillia. In April 1541, the expedition departed Tiguex in the upper Rio Grande Valley of what is now north-central New Mexico and marched across the Texas Panhandle into present-day western Oklahoma.

Padilla may have remained with Coronado until his expedition reached what was thought to be Quivira, near present-day Lindsborg in central Kansas. Finding no riches, Coronado led his men back to Tiguex on the Rio Grande, from where he planned to return to Mexico. With the prospect of winning new Christian converts, Padilla decided not to return to Mexico with Coronado but instead to proselytize among the Plains Indians. He may have been joined by two other missionaries, Juan de la Cruz and Luis de Escalona. Soon after traveling back onto the plains, he was murdered by the native people.

Friar Juan de Padilla's explorations with Pedro de Tovar led to the Spanish discovery of the upper Colorado River. Padilla was the last known European to visit the plains of central Kansas until JUAN DE OÑATE sent his reconnaissance expeditions into the region more than a half century later.

Páez, Pedro (Pedro Páez Xaramillo) (1564–1622)

Spanish missionary in Ethiopia, in service to Portugal

Pedro Páez was a native of Spain. In about 1586, after entering the Jesuit order, he sailed to Goa, the Portuguese colony on the west coast of India, where he worked as a missionary.

In 1589, Páez set out from Goa for Ethiopia, drawn there by reports of a Christian kingdom, possibly that of the fabled PRESTER JOHN. While sailing across the Arabian Sea, Páez's ship was attacked by Turkish pirates, and he was taken captive and sold into slavery. He then spent seven years as a slave in Yemen before his release, returning to Goa in 1596.

In 1603, Páez again left Goa for Ethiopia, and he soon reached the northern Ethiopian port of Massawa on the RED SEA. During the next 10 years, he made numerous journeys inland, including one in 1613 in which he traveled from

Gondar to Lake Tana and the nearby Springs of Geesh, which he determined were the principal source of the Blue Nile, which feeds the NILE RIVER. By the time of his death in 1622, Páez had succeeded in converting the emperor of Ethiopia, Negus Susenyos, and his family to Catholicism.

Although Pedro Páez was the first European known to have reached Lake Tana and to have determined that the Blue Nile flowed from it, his finding was long suppressed by the Portuguese, who, with their traditional policy of keeping new geographic information secret, then dominated European contacts with East Africa. A century and a half later, Scottish explorer JAMES BRUCE, in his travels in Ethiopia during the early 1770s, finally confirmed Páez's earlier finding that Lake Tana was the true source of the Blue Nile.

Palgrave, William Gifford (1826–1888)

British missionary, diplomat, writer in Arabia, in service to France

William Palgrave was born in London, England, the son of prominent upper-class parents. His father was the historian Sir Francis Palgrave, and his grandfather, Meyer Cohen, was a member of the London Stock Exchange. Palgrave's early education at Charterhouse School was followed by several years at Oxford University, where he studied modern and classical languages, graduating in 1846. Having developed an interest in Eastern studies, he traveled to India and entered the Eighth Bombay Infantry Regiment as a lieutenant. After only a few years, he left the military and converted to Catholicism. In 1848, he began studies at a Jesuit college near Madras. He eventually undertook missionary work in southern India.

In 1853, Palgrave sailed back to Europe, where he continued his religious studies in Italy at the Colegio Romano in Rome. He was assigned to Beirut, Lebanon, where he served as a priest and teacher in the Maronite Christian community. He became proficient in Arabic, and, in 1857, he was ordained a priest.

Palgrave remained in Lebanon until 1860, when he was forced to flee to France amid a widespread outbreak of persecution and violence against the Christian minority. In 1861, he conceived a plan to undertake a missionary expedition into the heart of the Arabian Peninsula. His idea came to the notice of French emperor Napoléon III, who, anticipating the construction of the Suez Canal, sought to extend French hegemony over the region and was willing to provide financial backing. French businessmen were also interested in exploring the possibility of trade in Arabia, as well as in the prospect of increased imports of the region's cotton, for cotton was in short supply in Europe because shipments from the United States had been interrupted with the outbreak of the Civil War. European horse breeders also

gave their support to Palgrave, hoping his expedition would facilitate the importation of pure-blood Arabian breeding stock.

Palgrave left Europe for the Middle East on June 24, 1861. After a stopover in Egypt, he continued to the city of Ma'an in what is now southern Jordan; in July 1862, he left there and headed into the Arabian Peninsula. Disguised as a Syrian doctor and accompanied by a Syrian-Greek Christian priest and teacher named Barakat Jurayjuray, Palgrave traveled southeastward across the Nafud Desert into the land of the Shammar people. After a visit to the Shammar capital at Hai'l, where he was welcomed by the emir, he continued to Riyadh, finally reaching the Persian Gulf coast at Qatif, north of Qatar.

Back in England, Palgrave lectured on his Arab exploits before the ROYAL GEOGRAPHICAL SOCIETY, and, in recognition of his accomplishment, Napoléon III and the French government awarded him a grant of 10,000 francs. In 1865, he published an account of his 13-month, 1,500-mile trek from Jordan to the Persian Gulf, entitled *Narratives of a Year's Journey Through Central and Eastern Arabia*. The book was immediately translated into French and became a best-seller throughout Europe.

In 1865, Palgrave left the priesthood and began a diplomatic career with the British Foreign Office. That year, he was dispatched to Ethiopia, where he obtained the release of the British consul and his staff, who had been taken hostage by the Abyssinian ruler, King Theodore. Soon afterward, he assumed consular duties at Trabzon, on the Black Sea coast of the Ottoman Empire, and while stationed there, he undertook explorations into various regions of Asia Minor. During the next 20 years, he served in diplomatic posts in the Philippines, Japan, Bulgaria, Thailand, and the WEST INDIES. His last assignment was in Montevideo, Uruguay, where he died of bronchitis in September 1888.

William Palgrave was the second European known to have crossed the Arabian Peninsula, the first being British officer GEORGE FOSTER SADLIER in 1819. While Sadlier had made the first east-to-west crossing of Arabia, Palgrave was the first to traverse the region from west to east.

Palliser, John (1807–1887) *Irish sportsman, traveler in the Canadian West*

Born into a family of wealthy landowners in Waterford County, Ireland, John Palliser attended schools in Europe before going on to Trinity College in Dublin. While serving as a captain with the Waterford Artillery Militia in the mid-1840s, he was probably exposed to modern topographic mapping techniques, knowledge of which was vital in his subsequent explorations into the Canadian West.

Palliser was a sportsman as well as a hunter, and in 1847–48, he undertook a hunting expedition up the MIS-

SOURI RIVER into the Great Plains, where he hunted buffalo while living with Indians. Upon his return to Great Britain, he wrote an account of the experience, published in 1853 as *Adventures of a Hunter in the Prairies*. The book became a bestseller, and, in 1856, Palliser was elected as a fellow of the ROYAL GEOGRAPHICAL SOCIETY.

Later in 1856, Palliser received the support of the Royal Geographical Society for a planned expedition into the Canadian West. At that time, much of the vast prairie country extending across what was to become southern Saskatchewan and Alberta was largely unknown to non-Indians, and there was great interest in learning whether the region had potential for agricultural development.

The British government provided financial backing for the proposed expedition through the influence of Palliser's friend John Ball, then undersecretary of state for the colonies. The government wanted Palliser to undertake a topographic survey along the 49th parallel, westward from Lake Superior to the Pacific Ocean, and thereby determine the international border between western Canada and the United States. He was also instructed to explore and evaluate the lands of the Canadian West and investigate the old CANOE route of the NORTH WEST COMPANY between Lake Superior and the Red River Settlement (present-day Winnipeg, Manitoba), in order to determine whether it could be revived as a transportation and communications link. The British government also provided Palliser with a scientific team: John William Sullivan, an astronomer; James Hector, a geologist; Eugène Bourgeau, botanist; and Thomas Wright Blakiston, an ornithologist. A simultaneous expedition under HENRY YOULE HIND also was to explore the region.

In May 1857, the expedition arrived in New York and from there headed westward to Sault Sainte Marie and the Lake Superior shore of Michigan's Upper Peninsula. At Isle Royale, they met up with VOYAGEURS with canoes provided with the help of HUDSON'S BAY COMPANY governor SIR GEORGE SIMPSON. After examining eastern Lake Superior's White Fish Bay and the White Fish River, the party headed north and west along the Rainy River and Lake of the Woods canoe and portage route to what is now Winnipeg, Manitoba. From there, the expedition traveled southward to the 49th parallel at present-day Pembina, North Dakota, which they surveyed westward as far as the Turtle Mountains along the present-day border between western Manitoba and north-central North Dakota.

While the rest of the expedition spent the winter of 1857–58 at Fort Carlton in what is now north-central Saskatchewan, Palliser traveled to New York, where he conferred with British government officials in an attempt to get more funding for the project. In spring 1858, he rejoined the expedition, which proceeded westward into the ROCKY MOUNTAINS.

Accompanied by the expedition's astronomer, John W. Sullivan, Palliser crossed the Buffalo Prairie of southern Alberta and made his way through the Rockies by way of the North Kananaskis and North Kootenay Passes. He then returned to Edmonton, Alberta, where he was reunited with the other members of the expedition, who had explored South Kootenay and Kicking Horse Passes. After wintering at Edmonton, Palliser and his companions headed eastward to explore the region around the confluence of the Red Deer and South Saskatchewan Rivers on the present-day border of Saskatchewan and Alberta. He thus completed a wide circuit around an expanse of the Canadian prairies, which, except for fur traders, was largely unknown to non-Indians.

From the Red Deer River, Palliser and his expedition returned westward, crossed western Canada's Blackfoot country, and traversed the Rockies by way of North Kootenay Pass. West of the COLUMBIA RIVER, they traveled overland to New Westminster, where the 49th parallel meets the Pacific coast. Palliser had surveyed nearly 2,000 miles of the border, as well as having undertaken an exploration of the prairies and the key passes through the Rockies.

In 1859, Palliser was awarded a gold medal by the Royal Geographical Society for his wide-ranging explorations. He returned to England in 1860, then traveled to North America again in 1862–63, visiting the American South, which at the time was embroiled in the Civil War. In 1869, he sailed to the Russian and Siberian Arctic, where he hunted and explored along the Kara Sea and the islands of Novaya Zemlya.

John Palliser completed the first scientific survey of western Canada, topographically determining the present-day U.S.-Canada boundary from the western end of Lake Superior to the Pacific coast. Based on his recommendations, Canada's first transcontinental railroad used Kicking Horse Pass as its principal route through the Rocky Mountains. The semiarid prairies of southern Saskatchewan and Alberta that he surveyed came to be known as Palliser's Triangle. The maps resulting from Palliser's topographic survey were of great help to subsequent geological expeditions, as well as to the region's first civil authority, the North West Mounted Police.

Palmer, Nathaniel Brown (Captain Nat)

(1799–1877) *American mariner, sealer in Antarctica*

Nathaniel Palmer was born in Stonington, Connecticut, a small seaport at the eastern end of Long Island Sound. He was a descendant of one of the town's original 17th-century settlers and the son of a shipbuilder and lawyer.

At the age of 14, Palmer went to sea, and, during the next four years, he served on vessels plying the coastal waters between Maine and New York. In 1819, he sailed with Stonington's sealing fleet to the South Shetland Islands south of

CAPE HORN in the South Atlantic Ocean, serving as second mate aboard the *Hersilia* under Captain James P. Sheffield. The voyage proved highly profitable, and, the next year, Palmer again sailed to the South Shetlands with the Stonington fleet, this time as captain of the sloop *Hero*.

In November 1820, after a sighting of what appeared to be mountains, the fleet's commodore, Captain Benjamin Pendleton, sent Palmer and the *Hero* to explore southward from Deception Island in the South Shetlands. Palmer soon sighted an archipelago of barren, snow-covered islands, about 700 miles southwest of CAPE HORN, just north of the ANTARCTIC CIRCLE. Since there were no seals to be found there, he continued south and west. After a month, he encountered what appeared to be a contiguous mainland, which later proved to be a peninsula extending from the Antarctic continent.

In February 1821, on his way back to the fleet in the South Shetlands, Palmer met up with the Russian navigator FABIAN GOTTLIEB BENJAMIN VON BELLINGSHAUSEN and his vessels, which were then engaged in exploring the waters around Antarctica. When Palmer informed the baron of his recent findings, Bellingshausen insisted on naming the new islands the Palmer Archipelago and the new coastline Palmer Land in honor of the young American seafarer, and he indicated them as such on the charts he published in Europe. Before rejoining the Stonington vessels, Palmer came upon another group of uncharted islands near the Falklands, now known as the South Orkneys.

Palmer commanded the *James Monroe* on another sealing voyage to the Antarctic in 1821. After again reaching the coast of Palmer Land, he proceeded eastward and located a strait that he named Washington Strait. Upon further examination, he found that the strait led into a bay, which he named Monroe Bay. A good natural anchorage he found there became known as Palmer's Harbor. He made a landing on an offshore island teeming with leopard seals and king penguins. Although he found no vegetation, Palmer was certain he had come upon a continuation of the large landmass he had located the previous year, having sighted rocky peaks projecting from the ice and snow along the coast.

Palmer then undertook voyages to the Caribbean Sea and the northeast coast of South America, during which he reportedly carried troops and supplies for Simón Bolívar in his struggle for independence. Palmer returned to the Antarctic in 1829, on a voyage that included a scientific team, and attempted, without success, to locate uncharted lands west of Palmer Land.

In 1833, Palmer received his first appointment as captain of a packet, plying the sea route between New York and New Orleans. Over the next several years, he became one of the most accomplished sea captains in New England, commanding clipper ships between New York and Liverpool, England, and eventually to China. In 1845, Palmer became

one of the founding members of the New York Yacht Club. After commanding the steamship *United States* on a voyage to Bremen, Palmer retired from the sea in 1850. Thereafter, he became director of a major New England-based steamship line. He remained active in yacht racing, becoming well known as a ship designer. "Captain Nat," as he was known through much of his career, died in San Francisco while returning from a voyage to China in 1877.

Nathaniel Palmer was only 21 years old when he was credited with sighting the Antarctic mainland. Although the land he reached in 1820 was called Palmer Land on American, Russian, and other charts in the years that followed, Great Britain claimed that the peninsula had actually been first sighted by British naval officer EDWARD BRANSFIELD in January 1820. Accordingly, Palmer Land was for years depicted on British charts as Graham Land, in honor of then lord of the Admiralty, James R. G. Graham. The dispute over just which seafarer the land should be named after was finally resolved in 1964 when Great Britain and the United States agreed to call that part of the continent the Antarctic Peninsula.

Park, Mungo (1771–1806) *Scottish physician, explorer in West Africa*

Mungo Park was born at Foulshiels, near Selkirk, in southern Scotland, the son of a tenant farmer and the seventh in a family of 13 children. He attended Edinburgh University, studying medicine and botany.

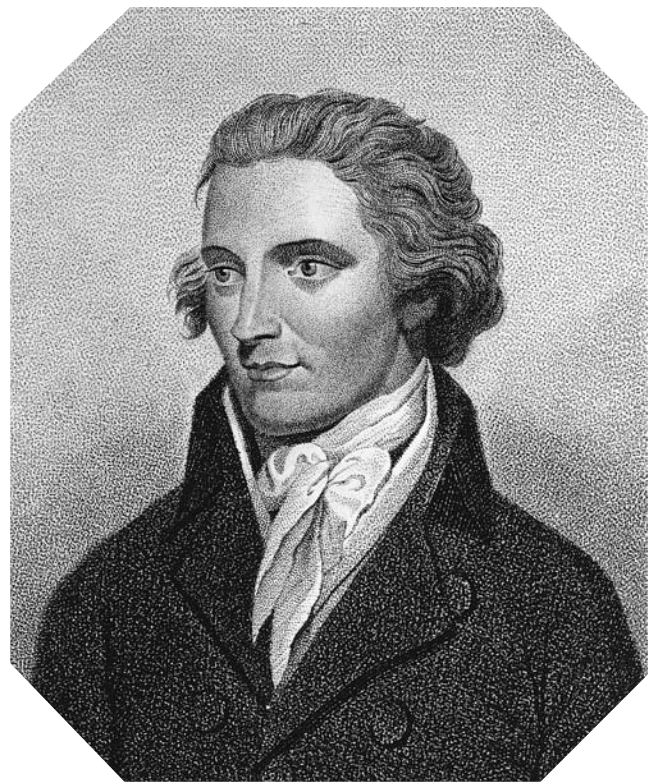
In 1792, Park's brother-in-law, botanist James Dickson, arranged for him to sail to the EAST INDIES as assistant ship's surgeon aboard the BRITISH EAST INDIA COMPANY vessel the *Worcester*. Park's study of Sumatra's plant and animal life, published upon his return to England the following year, came to the attention of the naturalist SIR JOSEPH BANKS, president of the ROYAL SOCIETY and principal founder of the AFRICAN ASSOCIATION.

Prompted by Banks's recommendations, the African Association commissioned Park to undertake an exploration into the interior of West Africa. His main objectives were to find the NIGER RIVER and determine its course, then follow it to the legendary city of TIMBUKTU and return to the African coast by way of the Gambia River or by some other route that he might locate. At that time, Europeans knew of the Niger only from the reports of the medieval Arab travelers ABU ABD ALLAH MUHAMMAD IBN BATTUTAH and LEO AFRICANUS and from descriptions attributed to ancient Greek historian and geographer HERODOTUS. As late as the last decade of the 18th century, European geographers were not certain if the Niger flowed east or west, or whether it was a western tributary of the NILE RIVER.

Park sailed from England aboard the MERCHANT SHIP *Endeavor*, arriving at the mouth of the Gambia River along

the coast of West Africa in June 1795. He made contact with an English trader, Dr. John Laidley, at his Gambia River trading post at Pisania (present-day Karantaba, Gambia), and there was soon stricken with tropical fever. While recovering, Park studied the native Mandingo language and engaged an interpreter, a former slave named Johnson, who had lived for a time in Jamaica.

On December 2, 1795, Park set out from Pisania, accompanied by the interpreter Johnson, a slave boy named Demba, and several servants. His party first headed up the Gambia with a group of native slave traders. Park then crossed from the swampy Gambia River Valley into the semiarid Kaarta region of what is now eastern Senegal. At Nioro, he was shown the place where another explorer sent by the African Association, Major DANIEL HOUGHTON, had died four years previously. Park then entered the kingdom of Bondou, where he was treated well by the native ruler. Nevertheless, as he continued north and east toward the Niger and Timbuktu, the natives proved to be far less hospitable and increasingly larcenous, and, by the time he had entered the lands of hostile Muslim tribesmen, he had been robbed of most of his possessions. Deserted by most of his servants, including his interpreter Johnson, Park was left with only the slave boy Demba. In spring 1796, the two were taken captive at Benowm by the Moorish chief Ali, king of Ludamar.



Mungo Park (Library of Congress)

Park was held prisoner by Ali and his people for three months, traveling with the nomadic tribe through the arid regions of western Mali. On July 1, 1796, at Quiera, after suffering much ill treatment at the hands of his Moorish captors and learning that he was about to be put to death as a Christian spy, he managed to escape. Instead of fleeing for the safety of European settlements on the coast, he continued inland, traveling alone and totally impoverished, in search of the Niger River and Timbuktu. At a native village, Park received help in the way of food and cowrie shells with which to trade. Traveling by horseback, he finally sighted the Niger River at Segou on July 21, 1796.

Park determined that the Niger indeed flowed eastward, as had been reported by Ibn Battutah in the 14th century. He then headed downstream toward Timbuktu, hoping to determine if the river led to the Nile River, the Atlantic Ocean, or, as he himself had theorized, to the CONGO RIVER (Zaire River). After about 300 miles, at a village called Silla, he was informed by friendly natives that Muslims controlled the region downriver, including Timbuktu. Rather than face more hostile tribesmen, and with his resources running low, Park headed back upriver to Bamako, and from there crossed overland to the Gambia River. His westward journey was halted for seven months at Kamalia, where he was again stricken with fever. By the time he had reached Pisanía, near the Gambia River's mouth, in spring 1797, no one had heard from him for 18 months and he had been given up for dead.

In June 1797, Park left the coast of West Africa aboard an American slave ship, the *Charleston*, and, by way of the WEST INDIES and the South Carolina coast, he arrived back in England in December. In 1799, his account of his African explorations, *Travels in the Interior Districts of Africa*, was published and became an immediate bestseller.

Park returned to Scotland, married, and settled down to a medical practice in the town of Peebles, near Selkirk. Although he wanted to return to Africa and further explore the Niger, the African Association was not forthcoming with additional support. In 1801, Park was offered a post with the British navy on a scientific voyage to Australia, under the command of MATTHEW FLINDERS, a position he declined and which was later filled by naturalist ROBERT BROWN.

In 1803, the British Colonial Office proposed to Park that he lead a second exploration of the Niger. By then, the British government, concerned about French expansion into Africa south of the Sudan, wanted to establish a colonial presence of its own in West Africa. After a series of delays, Park sailed from England in January 1805. As commander of the expedition, he had been commissioned a captain, and, at the British garrison on Goree Island, off the coast of Dakar and Cape Verde, he recruited 35 soldiers to accompany him into the African interior. Joining him as well were

two ship's carpenters, who were to supervise the construction of a boat for the voyage down the Niger. Second in command was fellow surgeon Alexander Anderson, who was also Park's brother-in-law.

In April 1805, Park led his expedition eastward up the Gambia from the river port of Kaiaf, then crossed the mountains to the Senegal River. Continuing eastward across southwestern Mali, Park and his expedition reached the Niger at Bamako. By that time, tropical fever and dysentery had taken their toll on Park's men. More than 30 had died, including Anderson. The survivors continued downriver to Sansanding, at which point their interpreter, a Mandingo priest named Isaaco, was sent back to the coast with journals of the expedition's progress to date. A boat was constructed from two native canoes fitted together, which Park named the *Joliba* after the Mandingo name for the Niger River. On November 19, 1805, Park, three surviving soldiers, several slaves, and a native guide and interpreter named Amadi Fatouma set out on the Niger, planning to discover where it ultimately led.

No word was heard of Park or any of his expedition until nearly three years later, when, in 1808, British colonial authorities sent Park's former interpreter Isaaco to investigate what had happened. Isaaco located Fatouma, Park's last interpreter. According to his account, in April 1806, the boat had been attacked as it descended the rapids at Bussa in what is now northern Nigeria. When the *Joliba* ran aground on a rock, Park and the three remaining Europeans attempted to escape from the native people by jumping into the raging waters but were drowned. Since this was at a point about 500 miles upstream from the Niger's outlet into the Gulf of Guinea, if he indeed had reached this far, he had gone by Timbuktu, although there is no record of his having stopped there.

One of the objects of the Bornu Mission, the British expedition into West Africa undertaken in 1821 by HUGH CLAPPERTON, WALTER OUDNEY, and DIXON DENHAM, was to find out what had happened to Park. In 1827, Park's son Thomas, who had become a naval officer, attempted to find some trace of his father, but he died of fever en route to Bussa.

Mungo Park was the first European known to have reached the Niger River in modern times. On his return from his first expedition in 1797, he was acclaimed "the Great African Traveler." Park's explorations led to a series of journeys into West and central Africa sponsored by European governments. His published account of his travels into the interior of West Africa revealed to Europeans for the first time the varied cultures of the region. Park added to the geographic knowledge of Africa by identifying the southern limit of the SAHARA DESERT and demonstrated that there was a feasible route into the southern Sudan from the coast of West Africa, a finding that had great impact on the fu-

ture of European trade and colonial expansion south of the Sahara.

Parke, John Grubb (1827–1900) *U.S. Army officer, American topographer in the American Southwest*

John G. Parke was born in Coatesville, Pennsylvania, and raised in Philadelphia. He attended the University of Pennsylvania, then went on to West Point, graduating in 1849 as a second lieutenant in the U.S. Army Corps of Topographical Engineers.

In 1851, after taking part in a survey of the Minnesota-Iowa boundary, Parke went to the Southwest, where he assisted Captain LORENZO SITGREAVES in an expedition that explored westward from Santa Fe to Fort Yuma on the COLORADO RIVER, and across the Mojave Desert and Sierra Nevada to San Diego. Just prior to this expedition, Parke, with RICHARD HOVENDON KERN, prepared an updated map of the Southwest based on the explorations by JOHN CHARLES FRÉMONT, as well as information provided by mountain men WILLIAM SHERLEY WILLIAMS and Antoine Leroux.

Parke undertook several important explorations for the Pacific Railroad Surveys of 1852–55. He explored along the coastal ranges of California and Oregon with Lieutenant HENRY LARCOM ABBOTT, seeking connections between Pacific ports north and south of any proposed western terminus for the planned transcontinental railroad.

In January 1854, Parke commanded an expedition that examined the possibility of a railroad route along the 32nd parallel, from San Diego, California, to El Paso, Texas. Parke and his party traveled along the Gila River from the Pima (Akimel O'odham) Indian villages of south-central Arizona, through Tucson, and into the Chiricahua Mountains. Along the way, he ascertained the correct location of an emigrant trail known as Nugents Wagon Road. He then followed part of Cooke's Wagon Road to the Rio Grande, undertaking a side expedition that revealed a more direct route to El Paso. In spring 1855, on a second exploration of the Gila River country, Parke found a pass through the Chiricahua Mountains near Mount Graham, which shortened the 32nd parallel route.

From 1857 to 1861, Parke was chief astronomer and surveyor in the Canada-U.S. boundary survey. He worked directly with the British Royal Engineers and helped establish the last segment of the international border, from the ROCKY MOUNTAINS to the Pacific coast of Washington.

In the Civil War, Parke commanded Union troops in campaigns throughout the South and was breveted a major general. He returned to the Topographical Corps after the war and went on to become superintendent of West Point. After his retirement from the army in 1889, he was involved in railroad development and banking.

Parke's official account of his explorations along the 32nd parallel in 1854–55 were included in the U.S. government's *Pacific Railroad Reports* (1855–59). He described the territory from southern Arizona to the Rio Grande as generally level and practical for a railroad, the only drawbacks being lack of a water supply and a scarcity of timber.

Parry, Sir William Edward (1790–1855)

British naval officer in the Canadian Arctic

Born in Bath, England, Edward Parry entered the British navy in 1803, at the age of 13. After serving for five years on the English Channel, he took part in naval operations in the Baltic Sea. In 1810, as a lieutenant, he made his first voyage to the Arctic aboard a naval escort for British whalers in the Spitsbergen (present-day Svalbard) region, north of Norway.

In 1818, Parry was named second in command to SIR JOHN ROSS in a British naval expedition in search of the NORTHWEST PASSAGE. In command of the *Alexander*, he accompanied Ross on the *Isabella* to GREENLAND's west coast, then headed northward into Baffin Bay, in an attempt to verify the early-17th-century findings of ROBERT BYLOT and WILLIAM BAFFIN. Sailing westward to the northern end of Baffin Island, the expedition examined the entrance to Lancaster Sound; soon afterward, Ross ordered the ships to turn back, having sighted what he believed was a mountain range blocking further progress westward. Parry and some other officers later reported to the British Admiralty that they had seen a clear channel ahead, which they would have explored had they not been ordered back by Ross.

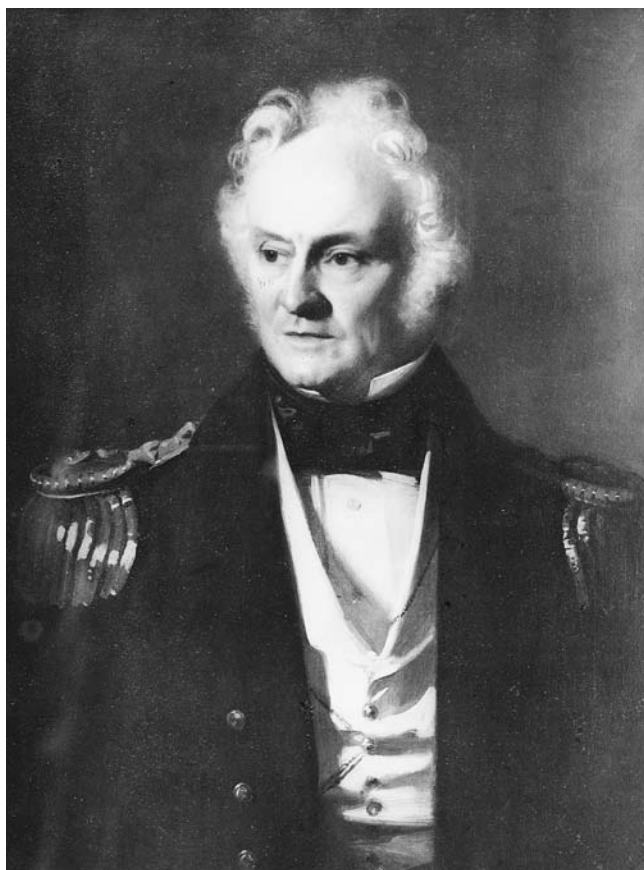
By 1819, Parry had been elected to the ROYAL SOCIETY for his studies on nautical astronomy. That year, SIR JOHN BARROW, second secretary of the Admiralty, and Lord Melville, the first lord of the Admiralty, put Parry in command of a Northwest Passage expedition of his own, instructing him to navigate through Lancaster Sound, and thereby resolve the controversy that had arisen from Ross's voyage of the previous year.

In command of two ships, the *Hecla* and the *Griper*, he sailed from Yarmouth on May 11, 1819, heading westward back to Baffin Bay and Lancaster Sound.

By August 1, 1819, Parry had managed to sail through Lancaster Sound, establishing that it was actually a strait. He then made the European discovery of Barrow Strait, which he named after Sir John Barrow. Continuing westward, he reached the south coast of a large island he named Melville Island after Lord Melville. Parry and his men had sailed west of the 110th meridian of longitude, half the distance of the Northwest Passage, and thereby won a prize of £5,000, which Parliament had offered as an incentive for its discovery.

Frozen in at Melville Island, Parry and his expedition were well equipped for the first deliberate wintering by a naval expedition above the ARCTIC CIRCLE. At an anchorage they called Winter Harbor, the decks of the ship were covered with an insulated roof. Heat was supplied by coal-fueled stoves, and dietary precautions were taken against SCURVY. Recreation among the men was encouraged, and the officers published a newspaper. A theatrical troupe was organized, with Parry himself writing a musical play entitled *The Northwest Passage*, a light-operatic satire of the expedition that was staged by the crew and directed by one of Parry's officers, FREDERICK WILLIAM BEECHEY.

In spring 1820, Parry undertook a two-week land exploration of Melville Island. He observed such Arctic animals as musk oxen, reindeer, wolves, and foxes, and found patches of grass and moss, as well as traces of abandoned Inuit (Eskimo) encampments. Having trekked as far westward as Cape Dundas, at 113°48' west longitude, he was just 250 miles from the Beaufort Sea, which subsequently proved to be the western outlet of the Northwest Passage. With the southeastward drift of the PACK ICE making further progress westward impossible, Parry sailed back to England, arriving in fall 1820.



Sir William Edward Parry (Library of Congress)

Parry's encouraging reports of ice-free channels leading far to the west of Lancaster Sound soon led to his appointment as commander of yet another Northwest Passage expedition. On this voyage, which sailed from England in May 1821, he had under his command the *Hecla*, as well as an identical vessel, the *Fury*. Instead of returning to Lancaster Sound, he directed the expedition into HUDSON BAY by way of Hudson Strait and toward its north shore at Foxe Channel and Foxe Basin, hoping to find an ice-free passage into Prince Regent Inlet from the south.

The expedition explored around Southampton Island in the northwestern corner of Hudson Bay, then wintered at Winter Island off the south coast of the Melville Peninsula. Overland exploring parties probed inland along the coast, with one group discovering the complete skeleton of a whale, inexplicably perched atop a rocky cliff, 100 feet above sea level. In July 1822, Parry resumed his explorations for a western outlet from Hudson Bay, reaching a strait that he named Fury and Hecla Strait after his ships. Although unobstructed by land, it proved to be ice-choked the year round and unnavigable for sailing ships even in summer. After only a month of open-sailing conditions, the ships were again iced in for the winter in August 1822. They anchored near the Inuit settlement Igloodik at the northern end of the Melville Peninsula along the eastern end of Fury and Hecla Strait.

Over the winter, Parry and his men established good relations with the Inuit, who constructed an igloo village on the ice alongside the ship. Parry made a study of Inuit customs, observing how efficiently their survival skills enabled them to thrive even in wintertime. He also entertained the Inuit, delighting them with an organ recital aboard one of his ships. Over the winter of 1822–23, Parry purchased a dog team from the Inuit, which he used in the first British naval explorations of the Arctic by dogsled.

In July 1823, Parry sailed back to England. Although he had established Fury and Hecla Strait as the long-sought western outlet from Hudson Bay, its icebound condition made it unusable for the Northwest Passage.

Parry led another expedition with the *Fury* and *Hecla* to the Canadian Arctic in 1824, in search of an ice-free route west of Lancaster Sound that would ultimately lead to the Bering Sea and the Pacific Ocean. After sailing through Lancaster Sound in 1824, he headed southward into Prince Regent Inlet, hoping again to locate the Northwest Passage by skirting Canada's Arctic mainland. After exploring the Gulf of Boothia, south of Lancaster Sound and Somerset Island, the *Fury* became entrapped in the ice and was wrecked. Left with only one vessel for his combined crews, and short on supplies, Parry was compelled to cut short his search for the Northwest Passage in spring 1825 and return to England.

After 1825, Parry's exploits won him national renown as the British navy's foremost Arctic explorer and navigator. In

1827, he won the support of both the Admiralty and the Royal Society for an attempt on the NORTH POLE. In April 1827, he sailed from England with the *Hecla*, and at Spitsbergen he set out across the frozen Arctic Ocean with flat-bottomed, amphibious sledges and boats hauled by a party of 24 sailors and marines. Among the officers accompanying him were SIR JAMES CLARK ROSS, who had been with Parry on all of his previous Arctic expeditions, and FRANCIS RAWDON MOIRA CROZIER, a veteran of Parry's second and third voyages.

Although Parry and his men traversed more than 700 miles, the actual distance they advanced from Spitsbergen northward to the pole was less than 200 miles, due to the southward drift of the pack ice. At 82°45' north latitude, the latitude of Greenland's northernmost point, and less than eight degrees from the North Pole, Parry turned back, having concluded he was being pushed southward faster than he was progressing northward. Nonetheless, he had set a farthest-north record that stood for years, until CHARLES FRANCIS HALL's expedition of 1871.

Parry, who had married a daughter of Lord Stanley, was knighted in April 1829. Soon afterward, he left the navy to supervise a private agricultural enterprise in New South Wales, Australia. He returned to England in 1837, where he was appointed to a government post in Norfolk, and he subsequently returned to the navy and directed the development of steam machinery for ships. He went on to serve as governor of Greenwich Hospital. In 1852, he was made a rear admiral.

Parry's *Journal of a Voyage for the Discovery of a North-West Passage from the Atlantic to the Pacific; performed in the years 1819–20 in his Majesty's Ships Hecla and Griper, under the orders of William Edward Parry, R.N., F.R.S., and commander of the Expedition* was published in London in 1821. His *Narrative of an Attempt to Reach the North Pole in Boats Fitted for the Purpose, and Attached to his Majesty's Ship Hecla, in the year MCCCXXVII* was first published in 1828.

Sir William Edward Parry's feat of reaching as far west as Melville Island in one season was not equaled until 1969 by the steel-hulled tanker *Manhattan*. As a result of Parry's 1819–20 voyage, the islands and channels of the Canadian Arctic archipelago north of the North American mainland were revealed to Europeans for the first time. The westernmost islands of this group are known today as the Parry Islands in his honor. The techniques Parry developed for wintering in the Arctic were adopted by later British naval expeditions, including Franklin's in 1845, as well as those sent to search for Franklin in the 1850s. Parry's explorations in the Canadian Arctic firmly established that Lancaster Sound was the only practical eastern entrance to the Northwest Passage. As the leading Arctic explorer of his time, Parry had traveled farther westward through the

Northwest Passage and reached a point closer to the North Pole than anyone before him. His 1827 North Pole attempt was the first Arctic expedition the main objective of which was not the discovery of a Polar Sea route between the Atlantic and Pacific Oceans, but the attainment of the pole itself.

Pascoe, William (Pasko, abu-Bakr)

(unknown–1833) *African guide and interpreter in West Africa*

William Pascoe was born in the Gobir region of what is now northern Nigeria. The Hausa, his tribe, are a Muslim people, and his name among them was abu-Bakr. As a young man, he was kidnapped and sold into slavery to the Portuguese but was liberated in a British naval attack on the slaver ship. He served with the Royal Navy for a time, but, in 1823, at Cape Coast, in present-day Ghana, he left to work as a guide and interpreter for an Italian by the name of Giovanni Belzoni on an expedition to locate the NIGER RIVER. Belzoni died soon afterward, however.

Pascoe was eventually hired by the Englishman HUGH CLAPPERTON for an expedition undertaken with RICHARD LEMON LANDER to locate the true source of the Niger. In 1825, with Pascoe serving as a cook as well as a guide and interpreter, they set out from the Gulf of Guinea, which Clapperton believed to be the outlet of the Niger—not the NILE RIVER, a prevalent theory. They reached the Niger in early 1826. Pascoe deserted more than once because of disputes with Clapperton and was dismissed by the Englishman once. But when Clapperton succumbed to dysentery in Sokoto in spring 1827 before an attempt to reach TIMBUKTU, Lander—the only surviving European member of the expedition—hired Pascoe to help him return to the coast, which they accomplished despite great hardship. Lander hired Pascoe for a subsequent expedition in 1830, during which it was determined that the Niger did indeed flow into the Gulf of Guinea, as Clapperton had theorized. Lander and Pascoe also located the Niger's main tributary, the Benue.

In 1832, on a third expedition, this one organized by a group of Liverpool merchants to develop commercial interests along the Niger, Pascoe again accompanied Lander into the interior. The next year, because of disputes over trading, he was reportedly poisoned by a local ruler because he recommended trading with another people farther upriver.

William Pascoe, like fellow African guide SIDI BOMBAY, proved indispensable to the efforts of the Europeans for whom he worked and helped solved the mystery of the source of the Niger River.

Pasha, Mehmed Emin See EMIN PASHA, MEHMED.

Pattie, James Ohio (ca. 1804–ca. 1851)*American fur trapper, trader in the American West*

James Ohio Pattie, son of frontiersman Sylvester Pattie, was born in Bracken County, Kentucky. He moved to the Missouri frontier with his father in 1812. In 1824, the Patties became traders on the MISSOURI RIVER. In July of that year, the two joined up with Silvestre Pratte's trade caravan near what is now Omaha, Nebraska, and traveled across the southern plains to Santa Fe, arriving there in November 1824.

While his father operated a copper mine at Santa Rita in southwestern New Mexico, James Ohio Pattie embarked on a career in the FUR TRADE in the southern ROCKY MOUNTAINS. In 1826, Pattie trapped the Gila River region with EWING YOUNG and his party. He explored the COLORADO RIVER into the Grand Canyon and established an overland route from New Mexico to the eastern edge of California, south of the Old Spanish Trail. Pattie also reportedly traveled northward along the Rockies as far as the Bighorn and Yellowstone Rivers of present-day Montana and Wyoming. He returned to Santa Fe via the Arkansas River and the Rio Grande in September 1827.

In winter 1827–28, Pattie, accompanied by his father, again trapped the Gila River into northern Mexico, then followed the Colorado River to its outlet on the Gulf of California. They crossed the northern end of the Baja California peninsula to the Pacific coast at Santa Catalina mission, arriving in March 1828. They were taken into custody by Mexican officials for unauthorized trapping in California. The elder Pattie died after a month of imprisonment in San Diego. The younger Pattie won his release from the Mexicans in 1829, after helping stem an epidemic of smallpox with vaccine he and his father had brought from New Mexico.

Pattie returned to U.S. territory in 1830, settling for a time near his Kentucky birthplace. He collaborated with Cincinnati journalist Timothy Flint in writing an account of his adventures and explorations in the American West, entitled *The personal narrative of James O. Pattie of Kentucky, During an Expedition from St. Louis, through the Vast Regions Between That Place and the Pacific Ocean*. First published in 1831, it was an immediate success.

Pattie returned to California during the gold rush of 1849. In winter 1850–51, he left a mining camp in the Sierra Nevada, and he was never seen or heard from again.

James Ohio Pattie was one of the first Americans to travel widely through the entire Rocky Mountain frontier. The route he blazed from New Mexico to California became a well-traveled path for traders and trappers in the 1830s, and for California-bound emigrants following the U.S.-Mexican War of 1846–48.

Paulinus, Suetonius (Caius Suetonius Paulinus)*(unknown–ca. A.D. 70) Roman general in North Africa*

Suetonius Paulinus, a Roman general under Emperor Claudius I, served in Rome's Mauretanian provinces in North Africa, now comprising the coastal regions of north-eastern Morocco and western Algeria. In A.D. 42, soon after the Romans had subdued a native rebellion and organized the region into provinces, Paulinus led a company of soldiers inland from the MEDITERRANEAN SEA to investigate the country to the south. He crossed the Atlas Mountains somewhere between Tangier and Algiers and came upon the northern edge of the SAHARA DESERT. Determining that the Roman provinces of North Africa were bounded by a vast arid expanse, he returned to the Mediterranean Sea and Rome, where he was hailed for having explored beyond the southern frontiers of the empire.

Paulinus's later career took him to Britain, where from 59 to 61, as military governor, he commanded Roman forces in suppressing a revolt by the Druids, as well as by Queen Boudicca of the Iceni. GNAEUS JULIUS AGRICOLA served under him. He later played a leading role in the military revolt against Emperor Nero in A.D. 69.

Suetonius Paulinus was one of the first Europeans known to have traveled beyond the barrier of the Atlas Mountains; his reports indicated the vast extent of the African continent, stretching southward from the Mediterranean. His expedition marked one of the few recorded instances of official Roman exploration.

Pavie, Auguste-Jean-Marie (1847–1925)*French diplomat in Southeast Asia*

Originally from France, Auguste Pavie arrived in Southeast Asia as a member of a French marine regiment in the early 1860s, when the French government first began to bring the region around the lower Mekong River within its colonial sphere.

In 1868, Pavie went to work for the French colonial government of Cochin China (present-day Vietnam), serving at Kampot on the Cambodian coast of the Gulf of Thailand. While there, he made sojourns into the countryside, traveling through territory little known to Westerners, and undertook a study of the Cambodian language and culture.

Pavie's interest in further exploring the interior of Indochina (present-day Cambodia, Thailand, Laos, and Vietnam) came to the attention of the French colonial authorities in Cochin China. In 1880, they commissioned him to direct the construction of the first telegraph line between Phnom Penh and Bangkok.

Starting in 1881, Pavie directed a series of surveys into the interior of what is now Cambodia and Laos, as well as the upper Mekong River. Over the next 14 years, he and his associates traversed 18,000 miles of Southeast Asian territory, much of which was unknown to Europeans.

In 1886, Pavie was appointed as French vice consul at Louangphrabang, capital of the northern Laotian principality. During the next five years, he oversaw the demarcation of the Laotian kingdom's border with Siam (present-day Thailand) in the upper Mekong Valley, and was instrumental in the establishment of a French protectorate over the region in 1893, as part of French Indochina. He also served as French consul general at Bangkok from 1891 to 1893.

Auguste Pavie's extensive program of exploration from 1881 to 1895 became known as the Pavie Mission. As a result of his efforts, few areas of Southeast Asia, outside of some remote mountain and highland regions, remained unknown to Europeans by the beginning of the 20th century. Pavie was the editor of the expedition's official record, *Mission Pavie* (1898–1919), an 11-volume study of Southeast Asia that included scientific information as well as linguistic and cultural profiles of the region's native peoples.

Pavy, Octave (1844–1884) *American physician and naturalist in the Arctic*

Born in New Orleans, Octave Pavy was the son of Creole parents and a descendant of Louisiana's original French settlers. He was educated in France, attending the University of Paris, where he studied science, art, and medicine; he regularly took time out from his studies for travel in Europe.

In 1869, Pavy was named second in command of a French government-sponsored Arctic expedition that was to have been led by Gustave Lambert. The following year, before the expedition could leave France, it was called off due to the outbreak of the Franco-Prussian War. In that conflict, Pavy, along with a nephew of Confederate general Pierre G. T. Beauregard and a number of other Americans of French descent, served in the French army with the Zouave Corps, a volunteer unit that he had helped to organize.

At the war's end in 1871, Pavy returned to the United States, where he was soon named a member of a privately backed Arctic expedition that planned to reach the NORTH POLE by way of the BERING STRAIT. This endeavor was also abandoned before it could get under way when its chief financial sponsor suddenly died.

Nearly 10 years elapsed before Pavy was to reach the Arctic. In the meantime, he completed his medical studies at the Missouri Medical College, and, in 1878, he married Lilla May Stone, a woman from Lebanon, Illinois. They resided in St. Louis, where he served as a physician at an iron works and lectured about the Arctic.

Finally, in June 1880, Pavy sailed for GREENLAND on the *Gulnare*, as surgeon and naturalist in H. W. Howgate's Arctic expedition. It seemed like another false start for Pavy when, soon after the *Gulnare* had arrived off the west coast

of Greenland, the vessel was found to be unsuitable for navigation northward into the ice-choked channels above Baffin Bay and was forced to return to the United States. Pavy, however, opted to stay behind in Greenland. Over the next year, he explored the west-central coast, learned Inuit survival and travel techniques and undertook a study of the region's animal and plant life. In July 1881, at Godhavn, Pavy joined ADOLPHUS WASHINGTON GREELY and his U.S. government expedition to northwestern Ellesmere Island's Lady Franklin Bay. In April 1882, after a winter at the expedition's base at Lady Franklin Bay, Pavy undertook a sledge exploration northward in which he reached the north coast of Ellesmere Island and rounded Cape Joseph Henry. Although he had neared the northernmost point reached by members of SIR GEORGE STRONG NARES's 1876 expedition, he was unable to proceed farther northward or westward when the PACK ICE on which he had been traveling began to break up and drift away from the coast.

When a relief ship failed for a second time to reach the expedition in 1883, Pavy and the rest of the expedition withdrew southward to Smith Sound. At Cape Sabine, they awaited a third rescue attempt. With their food supply all but exhausted, the men began to succumb to starvation and exposure. Pavy died on June 6, 1884, just 16 days before a relief ship finally reached Cape Sabine to pick up Greely and the other survivors.

In his sledge journey in spring 1882, Dr. Octave Pavy reached the north coast of the Ellesmere Island, one of the northernmost points of land on Earth. He later reported that the frozen sea ice stretching northward to the pole was subject to drift and broke up regularly, demonstrating that it was not a solid and immovable mass as had been previously thought. In Greely's official account of the expedition, he reported that Pavy had been insubordinate in questioning some of his commander's decisions, and, at one point, Greely had placed the doctor under arrest. Yet Pavy's medical skill helped maintain the health of the expedition's surviving members during their last two difficult years.

Payer, Julius von (1842–1915) *Austrian army officer in the Arctic*

Julius von Payer was born in Schoenau, Bohemia, in what is now the Czech Republic. After his education at the military academy in Vienna, he entered the Austrian army as a lieutenant in 1859. In 1866, after serving briefly as a history professor at the military academy, he conducted a survey for the army's general staff in which he determined the altitude of most of the peaks in the Austrian Alps.

Payer first visited the Arctic in 1869–70, when he took part in a German expedition to GREENLAND, led by KARL CHRISTIAN KOLDEWEY, during which he discovered a

mountain range in the interior with summits as high as 11,000 feet above sea level.

Soon after his return from Greenland, Payer was commissioned by the Austrian government to explore the Arctic coast of Russia on the Austro-Hungarian Arctic Expedition. The goal was to locate an open “polar sea,” extending eastward from Spitsbergen to North America—the long-sought NORTHEAST PASSAGE. In spring 1871, Payer, along with German Arctic explorer KARL WEYPRECHT, undertook a preliminary voyage on the ship *Isbjorn* to Novaya Zemlya, the islands extending northward from the Arctic coast of eastern Russia. They speculated that if the ice-free polar sea opened to the north of these islands, it might provide access not only to the Northeast Passage, but also to the NORTH POLE itself.

Payer and Weyprecht left for Novaya Zemlya once again in June 1872, sailing from Bremen aboard the *Tegethoff*, a ship equipped with both sails and steam power. There were 23 others in the expedition, which had been outfitted with provisions for three years. Off the northwest coast of Novaya Zemlya, the *Tegethoff* became entrapped in the ice of the eastern Barents Sea. Payer and the Austrian expedition drifted northward with the ice until August 1873, when they came upon an uncharted chain of islands, which they christened Franz Josef Land in honor of the Austrian emperor.

In spring 1874, after wintering off Franz Josef Land, Payer explored the archipelago, reaching as far north as 82°5' north latitude. Soon afterward, convinced that the *Tegethoff* was likely to remain trapped in the ice for another winter, Payer and Weyprecht decided to abandon the vessel and return across the frozen sea to the continental mainland. After leading the expedition on a 300-mile sledge journey southward, they reached the southern limit of the PACK ICE, then continued across the open water in small boats they had hauled over the ice. The Austrian explorers soon encountered the Russian whaling ship *Nicholas*, which took them safely to the coast of northern Lapland.

Payer was back in Vienna by July 1874. He retired from the military the following year. In 1876, he published an account of his attempt on the Northeast Passage and the North Pole from Novaya Zemlya. He later settled near Frankfurt, Germany, where he undertook scientific research and painted pictures depicting his experiences in the Arctic.

In their 1872–74 voyage, Julius von Payer and Karl Weyprecht demonstrated that the seas north of Novaya Zemlya were frozen year round, a finding that helped disprove the idea that an open polar sea surrounded the North Pole. Along with Weyprecht, Payer was one of the European discoverers of Franz Josef Land, the northern islands of which constitute the northernmost points of land in the Eastern Hemisphere.

Peary, Robert Edwin (1856–1920) *U.S. naval officer in the Arctic*

Born in Cresson, Pennsylvania, Robert E. Peary grew up in Maine, where he attended Bowdoin College, graduating in 1877 with a background in engineering. After working as a draftsman for the United States Coast and Geodetic Survey in Washington, D.C., he entered the U.S. Navy as a commissioned officer and civil engineer in 1881.

In 1884–85, Peary was in Nicaragua, where he took part in a survey for a proposed canal route across Central America. In 1886, inspired by the accounts of Norwegian polar explorer NILS ADOLF ERIK NORDENSKJÖLD, Peary made his first trip to the Arctic, in which he attempted a west-to-east crossing of GREENLAND from Disko Bay. Although he managed to ascend the ice cap to a height of 7,500 feet, he was able to reach only 125 miles inland before bad weather forced him back. Nevertheless, he had penetrated the interior of Greenland farther than any expedition before him.

Back in Washington, D.C., in 1887, Peary hired as his butler MATTHEW ALEXANDER HENSON, who, for the next 22 years, accompanied and assisted Peary in all his Arctic expeditions. After a surveying assignment in Nicaragua later in 1887, Peary returned to the United States and sought support for other Arctic explorations. He married Josephine Diebitsch in 1888. In 1891, the Philadelphia Academy of Natural Sciences appointed him to lead an expedition to the northwest coast of Greenland. That year, with his wife and Henson, Peary sailed aboard the *Kite* to Inglefield Gulf on Greenland’s west coast north of Baffin Bay. En route, he suffered a broken leg in an accident aboard the ship and was treated by the expedition’s medical officer, FREDERICK ALBERT COOK. At Inglefield Gulf, a portable house was set up, and, during the next 13 months, Peary and his expedition lived among the region’s Inuit (Eskimo) and made a study of their Arctic survival techniques.

In spring 1892, Peary set out to explore eastward by sledge. After traveling 500 miles across the north of Greenland, he came upon an inlet along the east coast on July 4, 1892, which he named Independence Bay. Peary made another trek across Greenland to the same region in 1893. In the fall of that year, his wife gave birth to a daughter, Marie Ahnighito Peary, while at the Inglefield Gulf base.

By 1895, Peary had reached Greenland’s northernmost extension, a peninsula that came to be known as Peary Land in his honor. On expeditions to Independence Bay and northern Greenland from 1895 to 1897, he found several large meteorites, which had previously been reported as an “iron mountain.” Peary shipped them to the United States.

The Peary Arctic Club, organized in 1898 by a group of wealthy New Yorkers, provided funding for Peary’s later Arc-

tic expeditions. The AMERICAN GEOGRAPHICAL SOCIETY also offered support. In 1898–99, Peary explored Grant Land on Ellesmere Island. At Fort Conger (ADOLPHUS WASHINGTON GREELY's former base near Lady Franklin Bay), he lost eight of his toes to frostbite.

In 1900, Peary demonstrated conclusively that Greenland was an island on reaching its northernmost point, which he named Cape Morris Jesup in honor of the president of the American Museum of Natural History and one of his chief patrons. By that time, he had resolved to make an attempt on the NORTH POLE and had determined that the only feasible starting point was the north coast of Ellesmere Island.

Peary set out for the Pole from Cape Hecla on northern Ellesmere Island in 1902, and, although he was forced back by DRIFT ICE 340 miles short of his goal, he nonetheless set a farthest-north record for the Western Hemisphere by reaching 84°17'27" north latitude.

In 1905, Peary sailed from New York on the *Theodore Roosevelt*, a steam-powered vessel specially designed for Arctic navigation. Planning to penetrate Robeson Channel, the northern part of the passage between Ellesmere Island and Greenland, he hoped to reach the Lincoln Sea and the North Pole beyond. Peary set yet another farthest-north record on this voyage, reaching 87°6' north latitude, within 200 miles of the North Pole. Nevertheless, the ship had become badly damaged in its forced passage through the ice, and, with the onset of rough weather, the expedition was forced to turn back.

Two years passed while the *Theodore Roosevelt* underwent repairs, and Peary raised the additional support he needed for another polar attempt. He sailed on the *Theodore Roosevelt* from New York on July 6, 1908, and, by early September of that year, he had set up his base camp at Cape Sheridan on Ellesmere Island. En route, he had stopped at Etah, Greenland, where he had taken on a number of Inuit families and several hundred sled dogs. Over the next several months, supply depots were set up along a trail to the north coast of Ellesmere Island, terminating at Cape Columbia. From there, on March 1, 1909, Peary, Henson, and four Inuit set out northward with sledges and dogs. After a month-long trek across the frozen sea, they reached the North Pole on April 6, 1909.

Peary and his companions unfurled five flags at the Pole: the U.S. flag, the U.S. Navy flag, the official banner of his Delta Kappa Epsilon fraternity chapter at Bowdoin College, a Red Cross flag, and the "World Ensign of Liberty and Peace." Soundings were made of the ocean depths beneath the ice, revealing that they were atop 10,000 feet of water, thus proving that no continental shelf lay beneath the North Pole. Peary, Henson, and their Inuit companions then made a safe dash back to Cape Columbia, from where they returned with the rest of the expedition to the *Theodore Roosevelt* at Cape Sheridan.

The news that Peary had reached the North Pole could not be communicated to the outside world until July 17, 1909, when the *Theodore Roosevelt* put in at Indian Harbor, Labrador. There, Peary learned that Dr. Frederick Cook, the medical officer on his 1891–92 expedition, had announced five days earlier that he had reached the North Pole in April 1908, a full year ahead of Peary. Upon Peary's return to New York, a bitter controversy ensued over who had actually reached the Pole first, with many doubting that Cook had reached it at all. Scientists and Arctic explorers continued to take sides in the dispute, although, in 1911, Peary received official recognition from the U.S. Congress for his achievement (although Peary may have missed the Pole by a couple of miles). He retired from the navy that year with the rank of rear admiral and spent his latter years promoting the advancement of U.S. air power.

Peary published accounts of his Arctic explorations, including *Northward over the "Great Ice"* (1898), about his experiences in Greenland; *Nearest the Pole* (1907), an account of his 1905–06 North Pole attempt; *The North Pole* (1910), about his final success in 1909; and *Secrets of Polar Travel* (1917). Josephine Peary recounted her own experience in northern Greenland in *My Arctic Journal* (1894) and *The Snow Baby* (1901).

Admiral Robert E. Peary, along with Henson and their four Inuit companions, were the first men known to have stood at the North Pole. Peary is also credited with having clearly established that Greenland is an island and not part of a continental landmass extending northward to the Pole. Peary's consistent success in his Arctic expeditions was due largely to what he called the "Peary System," which freely adapted the Arctic survival techniques of the Inuit to his own method of establishing food depots and shelters in advance of the main exploring party.

Peck, Annie Smith (1850–1935) *American mountain climber in the Alps and Andes Mountains*

Annie Peck was born in Providence, Rhode Island. In 1870–72, she attended the Rhode Island State Normal School (now Rhode Island College) and, in 1874–78, the University of Michigan, graduating with honors. She earned a master's degree from Michigan in 1881. She went on to teach Latin at Purdue University, then continued her studies in Germany. In 1885, she became the first woman to attend the American School of Classical Studies in Athens, Greece. In 1886–87, she taught at Smith College in Massachusetts as a professor of classics.

During a visit to the Alps, Peck, who had participated in sports with her older brothers, decided to pursue MOUNTAIN CLIMBING as a hobby. Her first climb, in 1888, at the age of 38, was Mount Shasta in the Cascade Range in northern California. In 1895, she climbed the Matterhorn in the Swiss Alps, first summited by EDWARD WHYMPER 30 years



Annie Peck (Library of Congress)

before, and by only two women before Peck. With her reputation as a woman mountaineer growing, she ascended two volcanoes in Mexico in 1897, Popocatepetl and Citlaltépetl (Pico de Orizaba), the latter the highest peak (18,700 feet) in the Western Hemisphere ascended by a woman to that time.

Peck lectured and wrote magazine articles to raise money for her climbs. She completed other climbs in Europe and founded the American Alpine Club in 1902. In the years to follow, she turned her attention to South American peaks. In 1904, she ascended Illampu, a peak on Mount Sorata in Bolivia's Cordillera Real. In 1906, after failing to reach the top of Huascarán in Peru's ANDES MOUNTAINS, she pursued the source of the AMAZON RIVER, traveling up the Marañón and Ucayali tributaries. In 1908, on her sixth attempt, she finally reached the summit of Huascarán. In 1911, she climbed the north peak of the Coropuna volcano, also in the Peruvian Andes. At the age of 82, Peck made her last climb, ascending Mount Madison in New Hampshire's White Mountains.

Peck also had an interest in the development of South America and researched the possibilities of commercial aviation there, flying 20,000 miles at the age of 80. Peck's books include *A Search for the Apex of South America* (1911), *The South American Tour* (1913), *Industrial and Commercial South America* (1922), and *Flying over South America—20,000 Miles by Air* (1932).

Annie Peck's fame as a mountain climber in Victorian times helped further the cause of women's rights. Already controversial for wearing pants when mountain climbing, Peck raised a "Votes for Women" banner at the summit of Mount Coropuna. In 1927, the Lima Geographical Society named the north peak of Huascarán in her honor—Cumbre Ana Peck.

Pedrarias Dávila See ÁVILA, PEDRO ARIAS DE.

Penha, Joseph de la (fl. 1680s–1690s)

Dutch explorer in eastern Canada

In about 1685, Joseph de la Penha, a Dutch Jew from Rotterdam, reportedly explored and settled parts of northeastern Canada, including Labrador, as well as regions he identified as Corte Real Land and Estotis Land.

In 1697, King William III of England, who also ruled the Netherlands, granted Penha and his descendants ownership of Labrador, in recognition for his having claimed the region in the name of the House of Orange.

Joseph de la Penha's heirs never attempted to gain title to the region, although their claim to it was officially recognized by Prince William of Orange, the Dutch monarch, in 1768.

Pérez Hernández, Juan Josef (Juan Pérez)

(ca. 1725–1775) *Spanish naval officer in California and the Pacific Northwest*

Juan Pérez was born in Majorca, Spain. A trained pilot, he served aboard Spanish naval vessels in the Pacific Ocean, along the Manila Galleon route between the Philippines and the west coast of Mexico and South America.

In 1767, Pérez was assigned to San Blas, then the main Spanish naval base on Mexico's Pacific coast and the administrative center for all settlements to the north. At about that same time, Spanish colonial authorities in Mexico, alarmed by reports of Russian encroachment southward from the Aleutian Islands and Alaska into Spanish territory, initiated a full-scale program to colonize California. In 1769, Pérez took part in the earliest of these efforts, commanding the packet boat *Príncipe*, which carried some of the first colonists to the newly established settlements at San Diego and Monterey.

Although not a high-ranking naval officer in 1774, Pérez was nonetheless the most senior officer at San Blas and, as such, was commissioned to lead a voyage of exploration north of the known sections of the California coast. Spanish viceroy Antonio María Bucareli y Ursúa instructed him to sail as far northward as the 60th parallel and thereby determine the geography of the coastline north of California, as well as evaluate the extent of Russian settlement southward from the Gulf of Alaska. On his return southward, he was to land at various points along the coast and make formal acts of possession of the mainland in the name of Spain. In addition, he was to study the coastal Indians and try to establish friendly relations with them.

Pérez departed San Blas on January 25, 1774, in command of the frigate *Santiago*. After stops at San Diego and Monterey, he headed northwestward in June 1774. He sailed out of sight of land for several weeks, then changed his course to due north. On July 15, 1774, the North American mainland came in sight again at 55°30' north latitude, near Dixon Entrance and the southernmost point of the Alaskan Panhandle. Pérez and a landing party went ashore on one of the northernmost of the Queen Charlotte Islands, where he and his men encountered the Haida Indians. The Spaniards, the first Europeans to come in contact with the Haida, established friendly contacts with these coastal Indians and traded copper, cloth, and beads for furs.

Faced with unfavorable winds, Pérez decided not to sail any farther to the north. On his return along the coast, the mainland was shrouded in fog, and a thorough reconnaissance near the coastline was not possible due to currents and hazardous rocks. Pérez did manage to examine the west coast of Vancouver Island, although he was unaware that it was separated from the mainland. There, on August 8, 1774, he made the European discovery of an inlet he named Surgidero de San Lorenzo, later known as Nootka Sound. A landing was made; Pérez and his crew became the first Europeans to

meet the Nootka Indians, with whom they also traded for furs. At that point in the voyage, the crew was weakened by SCURVY, so Pérez decided against additional landings and set sail for Mexico. Soon after leaving Nootka Sound, his second in command, Esteban José Martínez, reportedly sighted what he believed was the much-sought-after entrance to the Strait of Juan de Fuca, but Pérez declined to investigate, having determined that the offshore breakers and coastal fog posed too great a risk. Within a short time, they sighted a snow-capped peak rising eastward beyond the coastline of what is now Washington State. Named Sierra Nevada de Santa Rosalía by Pérez, it is known today as Mount Olympus. The expedition then continued back to San Blas.

In spring and summer 1775, Pérez took part in a second voyage of exploration north of California, serving with JUAN FRANCISCO DE LA BODEGA Y QUADRA under BRUNO DE HECETA. On the return trip to San Blas, in November 1775, Pérez died of scurvy off the California coast and was buried at sea with full naval honors.

Juan Pérez commanded the first known European expedition along the Pacific coast of what is now British Columbia. His exploration of Nootka Sound in 1774 provided the basis for Spain's claim in the Nootka Sound Crisis of 1789. In 1778, a landing party from JAMES COOK's expedition visited Nootka Sound, where they found the natives to be in possession of several silver spoons that had been stolen from one of Pérez's officers four years earlier. This was cited by Cook's own officers as proof that the Spanish had been there earlier, even though later accounts incorrectly credited Cook with having made the European discovery of Nootka Sound. In addition to geographic data, Pérez's written accounts of the Haida and Nootka tribes provide an image of the pre-contact life and culture of these coastal Indians.

Péron, François (1775–1810) *French naturalist in Australia and Tasmania*

François Péron was born and raised at Cerilly in central France near Vichy. With the onset of the French Revolutionary Wars in 1792, the 17-year-old Péron abruptly ended his theological studies to enlist in a local militia unit. In the ensuing conflict, he lost his right eye and was discharged from the army. Soon afterward, a woman he had planned to marry broke off their engagement. He then undertook medical studies in Paris, pursuing also an interest in natural history.

Péron's abilities as a naturalist came to the attention of French botanist Antoine-Laurent de Jussieu, who recommended him for the scientific team on a proposed French government-sponsored voyage of exploration to Australia and the South Pacific Ocean. Appointed as one of the expedition's zoologists, Péron sailed on the *Géographe* from Le

Havre in October 1800, under the command of THOMAS-NICOLAS BAUDIN. The *Géographe*, accompanied by the *Naturaliste*, reached the west coast of Australia in July 1801, after a voyage around the CAPE OF GOOD HOPE and across the Indian Ocean.

Péron went ashore on Bernier Island at the mouth of Western Australia's Shark Bay, where he made a study of a species of red-headed marine snakes that lived on the rocky shoreline. At a stopover at Kupang on the island of Timor, Péron became friends with the headman of local natives.

In January 1802, Péron went ashore on Van Diemen's Land (TASMANIA), becoming one of the first Europeans to encounter the island's natives. Soon afterward, he took part in a specimen-gathering expedition on King Island, off southeastern Australia, in which he collected 180 different types of mollusks and zoophytes and undertook a study of elephant seals. He also made contact with King Island's natives.

Baudin's expedition next visited the British colony at Sydney, which Péron, in his later published account of the voyage, described in glowing terms, citing the penal settlement's great success in transforming its population of transported convicts and prostitutes into productive citizens. On a second visit to Timor in 1803, Péron joined the expedition's naturalist artist, CHARLES-ALEXANDRE LESUEUR, in a crocodile hunt.

By the time the *Géographe* arrived back in France in March 1804, Péron was the last remaining zoologist among the scientists, the others having died or left the expedition due to illness. Péron took on the task of classifying and cataloging the more than 100,000 zoological specimens, which had been collected in the four years of the Baudin voyage. His finished work, presented to the French Academy of Sciences in June 1806, included as many as 2,500 species new to science.

Acclaimed for his efforts, Péron was elected in 1806 to the Institute of France, the prestigious governmental body that, under the direction of Napoléon, had organized the Baudin expedition. He was then commissioned to write an official account of the expedition, the first volume of which appeared in 1807 as *Voyage aux terres australes sur le "Géographe" et le "Naturaliste"* (Voyage to southern lands on the *Géographe* and *Naturaliste*).

François Péron was unable to finish his account. He developed tuberculosis and died at his home at Cerilly in 1810. His work was later completed by his friend LOUIS-CLAUDE DE SAULCES DE FREYCINET, who had served as a naval officer on the Baudin expedition, and was published from 1811 to 1816. Although it was soon revealed that many of the geographic discoveries attributed to Baudin had actually been made a year earlier by British naval officer MATTHEW FLINDERS, Péron's zoological studies based on the 1800–1804 voyage remained a standard source on Australia's animal life for years afterward.

Perrin du Lac, François-Marie (1766–1824)*French government official, traveler on the Missouri River*

François Perrin du Lac was born at La Chaux de Fonds, Neuchâtel (now part of Switzerland), into a noble French family. In 1789, he was appointed to an administrative post with the French colonial administration in Haiti, attached to the colony's treasury department. Soon after his arrival, civil strife erupted between the slaves, the mixed-bloods, and the French colonists.

In 1791, Perrin du Lac was part of an official French delegation to Washington, D.C., requesting military help from the U.S. Congress in suppressing the slave rebellion. With the situation still unsettled in Haiti, and the outbreak of war between France and England in 1792 preventing his return to Europe, Perrin du Lac decided to remain in the United States. During the next years, he traveled widely throughout the valleys of the lower MISSISSIPPI RIVER and Ohio River, exploring Pennsylvania and Spanish-held Louisiana.

On May 18, 1802, Perrin du Lac, accompanied by a former fur trader, set out from St. Louis up the MISSOURI RIVER. He reached as far as the river's junction with the White River in what is now south-central South Dakota before returning to St. Louis.

Perrin du Lac returned to France in 1803, where he accepted a position with Napoléon's government in Hamburg, a post he held only briefly. He retired from government service until the restoration of the monarchy in 1814, when he was granted an appointment with the navy; in 1819, he accepted a government administrative post near Paris.

François Perrin du Lac included an account of his 1802 Missouri River trip in his book on his travels in North America: *Voyage dans les deux Louisianes, et chez les nations sauvages du Missouri . . .* (Journey in the two Louisianas and among the Indian nations of the Missouri River . . .). Published in Paris in 1805, it was the first written report describing the upper Missouri River. It was in print a full year before the first official American expedition into the region, under MERIWETHER LEWIS and WILLIAM CLARK, returned to St. Louis.

Perrot, Nicolas (ca. 1644–1717) *French fur trader, interpreter in the western Great Lakes and upper Mississippi Valley regions*

Nicolas Perrot was born in the Burgundy region of France, the son of a government law enforcement officer. Arriving in French Canada in 1660, he served for a few years as an assistant to the Jesuit missions, during which he learned several Indian languages.

In about 1667, Perrot embarked on a career in the FUR TRADE. He undertook an expedition west from Quebec to the Great Lakes, where he visited the Potawatomi and Fox

(Mesquaki) Indians around Green Bay in present-day Wisconsin. He introduced the first European trade goods to the Indians of the western Great Lakes and may have been the first Frenchman to trade directly with the Sioux (Dakota, Lakota, Nakota). Perrot not only succeeded in convincing the Green Bay tribes to trade directly with the French, but also won their allegiance in the French wars against the Iroquois (Haudenosaunee) Indians.

From Green Bay, Perrot explored the Fox and Wisconsin Rivers, then became one of the earliest Europeans to see the upper MISSISSIPPI RIVER. In 1669–70, he served as an interpreter for the French colonial government in an expedition to the Indians of the Great Lakes. He traveled to northern Lake Huron by way of the Ottawa River and Lake Nipissing, and, after wintering on Manitoulin Island, went to Green Bay.

At Green Bay, Perrot induced the Potawatomi and other Wisconsin tribes to attend a ceremony at Sault Sainte Marie in which French colonial official Simon Francis Daumont, sieur de St. Lusson, formally took possession of the Great Lakes and upper Mississippi Valley in the name of King Louis XIV. This event, which occurred in June 1671, was attended by major tribal leaders of the Old Northwest, as well as Perrot, LOUIS JOLLIET, and missionary CLAUDE-JEAN ALLOUEZ.

Later in 1671, Perrot returned to Quebec, where he married and continued to develop his fur trading. In the 1680s, he used his influence among the western Great Lakes tribes to win their military support in the French conflicts with the Iroquois and English. In 1685, he was named commander of the French fur-trading and military settlement at Green Bay. He then made peace between warring Chippewa (Ojibway) and Fox bands by winning the release by the Fox of a Chippewa Indian girl, who otherwise would have been burned at the stake.

While in Green Bay in 1685, Perrot explored the Fox River to the lands of the Miami and Illinois Indians, then descended the Wisconsin River to the Mississippi.

In 1687, Perrot led a large force of Great Lakes Indians eastward in a raid against the Seneca Indians. While he was away, his stock of furs, stored at a Jesuit mission, was destroyed in a fire. Financially ruined, he returned to Montreal, where he served as an interpreter to delegations of Sac, Miami, and Potawatomi Indian leaders.

Two years later, in 1689, Perrot again ventured west of Lake Michigan. He explored the Fox, Wisconsin, and Mascouten Rivers and established trading forts at Lake Pepin and at the mouth of the Wisconsin River, near present-day Prairie du Chien, Wisconsin. The next year, he explored parts of present-day northern Iowa and discovered lead deposits.

With the revocation of independent trading licenses in 1696, Perrot was forced to leave the fur trade. He settled in

Montreal and continued to serve as an important intermediary with the Indians.

Nicolas Perrot's efforts helped open up the western Great Lakes and the upper Mississippi Valley to French trade interests. He made a significant impact on the life and culture of the Indians of the region by introducing tools and implements made of iron.

Petermann, August Heinrich (1822–1878)

German geographer

August Petermann was born in the central German town of Bleicherode near Weimar. After studying geography in Potsdam, he continued his studies in Edinburgh, Scotland, where he also was trained as a cartographer.

Petermann opened a small London map-publishing business in 1847. After seven years he returned to Germany, where he had been appointed director of the Perthes Geographical Institution in Gotha. The following year, 1855, he launched his journal, *Petermann's Geographische Mitteilungen*, which, in the latter part of the 19th century, became an important record for new geographic knowledge.

Petermann became an internationally recognized authority on the geography of central Africa and the Arctic. In 1852, he speculated that SIR JOHN FRANKLIN and his expedition, missing in the Canadian Arctic Archipelago since 1845, may have actually navigated the ice-choked channels northward into what he theorized was an "open polar sea." If this were the case, he theorized, Franklin and his men could be found somewhere between the NORTH POLE and the Bering Sea.

Petermann persisted in advancing his idea of an open polar sea for the next 20 years. In the late 1860s, he cited the unexplored Arctic region north of European Russia, between Spitsbergen (in Svalbard) and Novaya Zemlya, as a likely place where an ice-free entrance to such a body of water could be found. Prompted by Petermann's ideas, KARL CHRISTIAN KOLDEWEY led explorations into the region between Spitsbergen and GREENLAND from 1868 to 1870. Also influenced by Petermann were Austrian Arctic explorers JULIUS VON PAYER and KARL WEYPRECHT, who probed the frozen Arctic seas north of Novaya Zemlya. Although they found no ice-free passage to the Arctic Basin, they nonetheless made the European discovery of Franz Josef Land.

By the mid-1870s, Petermann had formulated a new concept of the geography of the Arctic, suggesting that Greenland, the northern limits of which were yet to be determined, extended northward across the North Pole, to the East Siberian Sea, where it was known as Wrangel Island.

August Petermann died in 1878, a suicide. A year later, American naval officer GEORGE WASHINGTON DE LONG, prompted by Petermann's last Arctic theory, undertook an

attempt on the North Pole by way of BERING STRAIT and Wrangel Island. This expedition, which ended disastrously in 1881, nevertheless showed that Petermann's theory of a polar landmass extending from Arctic SIBERIA to Greenland was as erroneous as his earlier ideas about the open polar sea. Although he was ultimately wrong in his views on Arctic geography, Petermann nonetheless gave impetus to American and European expeditions to the Arctic and helped promote modern geographic investigations in central Africa. Significant among his works were his atlas of physical geography and his maps of Africa, which provided details on the continent's interior based on the most recent European explorations.

Pethahia of Regensburg (Petahiah of Regensburg) (fl. 1180s–1190s) *German traveler, writer in eastern Europe and Middle East*

Pethahia was a German Jew from the Bavarian city of Regensburg. In about 1180, he left Prague and journeyed eastward through Europe, the Crimea, and Armenia, into the Middle East, visiting Jewish communities in the lands of present-day Syria, Iraq, Jordan, Israel, Turkey, and Iran.

Soon after Jerusalem fell to MUSLIMS in 1187, Pethahia returned through Greece to Prague, where an account of his travels was recorded in Hebrew in a work entitled *Sibbuw* (Circuit).

Although mainly concerned with the Jewish legends and traditions that Pethahia had collected in the course of his journey, his report also included geographic and cultural information on the Middle Eastern lands he had visited, including contemporary descriptions of the Holy Land's sacred sites. His work became an important source of information for Western Europeans when contacts with the region accelerated with the initiation of the third of the CRUSADES in 1189.

Pfeiffer, Ida Reyer (1797–1858) *Austrian world traveler, writer*

Ida Pfeiffer, née Reyer, was born in Vienna, the daughter of a wealthy merchant. She had a liberal upbringing and was educated at home by tutors. At the age of 22, she married a Swiss-born lawyer named Pfeiffer who was many years her senior; they had two sons together.

Starting in 1842, at the age of 45, after her children had grown and her husband had gone to live with a son from a former marriage, Pfeiffer embarked on a career of world travel. She first went to the Middle East, where she visited Jerusalem and Egypt, crossing the desert region between Cairo and Suez. After nine months in the region, she returned to Vienna where her journal of the trip was published in 1843. (The first English edition of this work was pub-

lished in London in 1852 as *Visit to the Holy Land, Egypt and Italy*.)

With the money from this work, Pfeiffer was able to finance a trip to ICELAND in 1844. During a stay of six months, she collected geological and plant specimens that she later sold to museums. With this money, along with what she earned from the publication of her account of the trip (published in an English edition in 1852 as *Visit to Iceland*), she was able to undertake a trip around the world.

Leaving in spring 1847, Pfeiffer sailed to Brazil; from Rio de Janeiro, she traveled inland to the town of Petropolis. In the surrounding forest area she visited with the Puri Indians, with whom she took part in a monkey hunt. She next sailed to Tahiti, where she remained for several weeks before continuing across the Pacific Ocean to Hong Kong, then sailed by a Chinese JUNK to Canton (Guangzhou), China, where she toured the city and the surrounding countryside.

Pfeiffer's next destination was India, where she visited nutmeg groves and a sugar cane processing plant. She also took part in a tiger hunt. In her travels in India, she collected plants and insect specimens for sale to European museums. She then went on to the Persian Gulf region, where she ascended the Tigris River to Baghdad. After traveling by camel caravan 300 miles to Mosul in what is now northern Iraq, she continued to the Persian city of Tabriz in present-day northern Iran. Pfeiffer proceeded northward into the Kurdistan region of eastern Turkey and crossed into Russia, where Cossack authorities detained her briefly due to some misunderstanding concerning her passport. She then returned home by way of Greece and Italy, reaching Vienna in November 1848. In all, she had traversed some 2,800 miles by land, and 35,000 miles by sea.

Pfeiffer's account of her trip was published soon afterward, the first English edition of which appeared in 1852 as *A Woman's Journey Round the World*. The book earned her wide acclaim, and shipping companies offered her free passage on trans-oceanic vessels in recognition of her accomplishments as a world traveler.

Pfeiffer began her second round-the-world journey in May 1851. From London, she sailed to Cape Town, and, following a month-long stay, she continued across the Indian Ocean to the Dutch East Indies (present-day Indonesia). At Sarawak on the island of Borneo, she was hosted by the territory's British-born rajah, Sir James Brooke.

During her six months on Borneo, Pfeiffer undertook several forays into the interior, making contact with the Dyak, a tribe of headhunters. She also went to Sumatra where she visited with another tribe, the Batak. On Ceram, she spent time among the Alfora.

Pfeiffer next sailed across the Pacific Ocean to San Francisco, California, from where she left for additional travels in South America. Before returning home, she undertook a tour of the United States. In June 1855, she arrived back in

London, having circled the world for the second time. She chronicled her four-year odyssey in another travel book, published in an English edition in 1856 as *A Woman's Second Journey Round the World, from London to the Cape of Good Hope, Borneo, Java, Sumatra, Celebes, Ceram, the Moluccas etc., California, Panama, Peru, Ecuador, and the United States*.

Pfeiffer's last journey was to Madagascar, where she joined several other Europeans in an abortive plot to overthrow the island's tyrannical ruler, Queen Ranavalona. After the plot failed, she and the other Europeans were expelled. She had become ill with fever and was still ailing when she reached Vienna, where she died in October 1858.

Although without great financial resources, Ida Reyer Pfeiffer managed to travel on her own around the world two times, both west to east as well as east to west. The exotic places she visited and described in her highly popular travel accounts had rarely been seen by European women.

Philby, Harry St. John Bridger (1885–1960)

British diplomat, traveler in Arabia

Harry St. John Philby was born on the island of CEYLON (present-day Sri Lanka) into a British colonial family who operated a tea plantation. After attending Westminster School in London, he went on to Cambridge University's Trinity College, where he studied classical and modern languages, including Persian and Arabic, as well as Urdu and Hindi, two of the major languages of India.

In 1908, Philby entered the British diplomatic service in India. Soon after the outbreak of World War I in 1914, he was sent to the Middle East, attached to the British army as a political officer in Baghdad.

Philby made his first long journey into the Arabian Peninsula in 1917, when he was sent to Riyadh to meet with Ibn Saud, a local Arab leader, in an attempt to gain his support for the Arab rebellion against Turkish rule that had erupted the year before. From Baghdad, Philby traveled to the Persian Gulf coast of Arabia, then headed inland at Qatar, and, from Hofuf, proceeded to Riyadh. After conferring with Ibn Saud, Philby made his way westward across the interior of Arabia, visiting ancient ruins at Dariyan. He then went through the Sagta Pass and followed the Muslim pilgrim route toward Mecca, arriving on the coast of the RED SEA at Jidda. He thus completed an east-to-west crossing of the Arabian Peninsula, the first European to do so since GEORGE FOSTER SADLIER, who had made a similar journey a century earlier in 1819.

From Jidda, Philby sailed to Bombay, India, then returned to Basra (present-day Iraq), at the head of the Persian Gulf. In 1918, he again traveled southward into Arabia and explored the southern provinces of the Nejd region, as far as the northern edge of southeastern Arabia's vast Rub' al-Khali

—known as the EMPTY QUARTER—one of the largest sand deserts in the world.

In 1920, the ROYAL GEOGRAPHICAL SOCIETY awarded Philby a gold medal for his explorations into the little-known regions of Arabia. He remained in the diplomatic service in the Middle East for the next few years. In 1920–22, he explored the Syrian Desert, covering the territory between Amman, Jordan, and the upper Euphrates River.

In 1924, Philby left the British diplomatic corps to pursue private business ventures in Arabia. He returned to the Riyadh region, and, over the next five years, as an agent for Western oil and mining interests, he sought the cooperation and support of Ibn Saud, who was then emerging as the dominant leader on the Arabian Peninsula.

By 1930, Philby had become disenchanted with British foreign policy in regard to Arabia; after converting to Islam, he became a trusted political adviser to Ibn Saud. Soon afterward, Ibn Saud succeeded in consolidating his rule into the present-day Kingdom of Saudi Arabia.

In 1931, Philby received permission from the Saudi king to undertake an exploration into the Rub' al-Khali in search of the ruins of the legendary city of Wabar, which, according to Muslim tradition reminiscent of the biblical account of Sodom and Gomorrah, had been destroyed by God for its wickedness. On January 7, 1932, Philby set out from the wells at Dulaiqiya, west of Qatar near Hofuf, and traveled southward into the Empty Quarter. In the middle of this great desert, he located several large craters near a site known as Al Hadida. There, he discovered quantities of iron, which he later determined were fragments of a giant meteor, and which some Muslim authorities judged to be remnants of the fabled Wabar. From this site, Philby headed westward across the desert wastes, and, on March 11, 1932, he arrived at the mouth of the Wadi Dawasir, near the Arabian oasis settlement at Sulaiyil.

In 1936, Philby undertook additional explorations in southwestern Arabia, traveling from Mecca southward into the Hadhramaut region of what is now the People's Democratic Republic of Yemen.

Philby remained as an adviser to the Saudi royal family in the years after the discovery of great oil reserves in Arabia in 1936, guiding the kingdom through the massive changes that resulted from the sudden influx of western capital and technology.

Harry St. John Philby, whose epitaph hails him as the "Greatest of Arabian Explorers," was one of the last Europeans to explore vast areas of Arabia before oil companies began to probe the remote regions of the interior with motorized vehicles and aircraft. Although Englishman BERTRAM THOMAS had been the first European to cross the Empty Quarter in 1931, Philby's journey a year later, in which he traversed far more difficult terrain, is considered

to have been a more thorough exploration. In his travels in Arabia, Philby amassed hundreds of plant, animal, and fossil specimens that later became part of the natural history collections of major museums in Great Britain and the United States. Among Philby's works on the region are *Heart of Arabia* (1923), *The Empty Quarter* (1933), *Sa'ud Arabia* (1955), and *Forty Years in the Wilderness* (1957). His son, Kim Philby, was exposed in 1963 as having been a long-time Soviet spy within the British intelligence establishment.

Phillip, Arthur (1738–1814) *British naval officer in Australia*

Arthur Phillip, a British naval officer, received command of the *Sirius*, the flagship of First Fleet, consisting of 11 ships on what was to be first colonizing expedition to Australia. The excursion was planned as a follow-up to JAMES COOK's landing in Botany Bay in 1770.

Commissioned by Thomas Townsend, Viscount Sydney, the First Fleet departed Portsmouth, England, on May 13, 1787, with 450 crew members; 564 male and 192 female convicts, plus 58 wives and children; and two years' worth of supplies. Sailing via Rio de Janeiro in Brazil around Africa's CAPE OF GOOD HOPE and past Van Diemen's Land (TASMANIA), the First Fleet arrived in Botany Bay on the east coast of Australia and then continued northward to Port Jackson (present-day Sydney) and founded a colony on January 26, 1788. Despite great hardship, the colony survived with Phillip serving as governor until 1792, when he returned to England because of failing health.

Arthur Phillip's expedition led to the first permanent European settlement in Australia and the New South Wales colony. January 26 is celebrated as Australia Day.

Phipps, Constantine John (1744–1792)
British naval officer in the Arctic

Constantine Phipps, an experienced British naval officer, received command of an early expedition to the NORTH POLE, proposed by John Montagu, earl of Sandwich, and sponsored by the ROYAL SOCIETY, with the support of the Lords of the Admiralty and King George III. The hulls of two warships, the *Racehorse* and the *Carcass*, were reinforced for DRIFT ICE. It was believed at the time that the North Pole could be reached by a water route.

Captain Phipps and his expedition departed England in June 1773, sailing due north. Between GREENLAND and the Spitsbergen island group (part of present-day Svalbard), Phipps found passage blocked by ice. While skirting the ice barrier, Phipps attempted to carry out planned experiments, using a thermometer for measuring

water temperature and an apparatus for distilling fresh-water from the sea. The expedition reached 80°48' North latitude.

Phipps wrote about the expedition in *A Voyage Towards the North Pole Undertaken by His Majesty's Command 1773*, published in 1774. His observations on Arctic navigation as well as on natural science, including a discussion of polar bears, proved helpful to subsequent Arctic explorers sent out by the British Admiralty, including DAVID BUCHAN and SIR JOHN ROSS in 1818.

Piccard, Auguste (1884–1962) *Swiss physicist, aviator, oceanographer, father of Jacques Ernest-Jean Piccard*
Auguste Piccard was born in Basel, Switzerland. In 1922, he became a professor of physics at the Polytechnic Institute of the University of Brussels in Belgium.

Piccard, interested in lighter-than-air flight, pioneered the use of the pressurized cabin to enable a high-altitude ascent in a BALLOON. In 1931, he and Paul Kipler, in a sealed spherical gondola lifted by a hydrogen-filled balloon, set a new world altitude record of 51,793 feet, becoming the first humans to penetrate the stratosphere. In 1932, Piccard reached 55,577 feet. In these ascensions, he studied temperature and cosmic rays in the stratosphere. His twin brother, Jean-Félix Piccard, ascended with his wife to an altitude of 57,564 feet in 1934.

Auguste Piccard next turned his attention to undersea exploration and the SUBMERSIBLE. In 1947, applying the principles of an AIRSHIP, he built his first BATHYSCAPH (an improvement on the BATHYSPHERE), an envelope filled with heptane (an aviation petrol), bearing a steel watertight cabin. In 1954, after a series of dives, he accomplished a descent to a depth of 13,125 feet.

In 1957, the U.S. Navy financed a series of dives in Piccard's bathyscaph, refurbished and renamed the *Trieste II*, off the island of Capri, Italy. Piccard's son JACQUES ERNEST-JEAN PICCARD was hired to join the team. In 1959, the bathyscaph was brought to the island of Guam in the Pacific Ocean. After a series of engineering trials, on January 23, 1960, Jacques, as pilot, along with Donald Walsh, a navy lieutenant, dove in the *Trieste II* about 35,810 feet to the bottom of the Challenger Deep of the MARIANAS TRENCH, the deepest point on Earth, and set the world record in depth.

Auguste and Jacques Piccard also designed a mesoscaph for diving to 6,000 feet. The mesoscaph used helicopter-like propellers to maintain its depth.

Auguste Piccard was a pioneer in both aviation and oceanography. He also collaborated with Albert Einstein on the development of instruments for measuring radioactivity. His grandson Bertrand Piccard participated in the first non-stop balloon flight around the world in 1999.

Piccard, Jacques Ernest-Jean (1922–)

Swiss oceanographer, engineer, son of Auguste Piccard

Born in Brussels, Belgium, the son of the Swiss physicist AUGUSTE PICCARD, Jacques Piccard originally pursued a career in economics, graduating from the University of Geneva in Switzerland in 1946 and then becoming an assistant professor there.

Moving to Italy and working as an economist in Trieste, Piccard was invited to join the team building the BATHYSCAPH, a type of BATHYSPHERE, designed by his father. In 1957, the U.S. Navy purchased Auguste Piccard's second bathyscaph, the *Trieste*, completed five years earlier, and hired Jacques as a scientific consultant. Starting in 1959, off Guam in the Pacific Ocean, more engineering trials were carried out. On January 23, 1960, Jacques, as pilot, and Donald Walsh, a navy lieutenant, dove in the renamed *Trieste II* some 35,810 feet (seven miles), nearly to the bottom of the Challenger Deep of the MARIANAS TRENCH, the deepest point on Earth, setting the world record in depth.

Piccard, working in Lausanne, Switzerland, designed an exploratory SUBMARINE, the *Auguste Piccard*. In 1964, some 33,000 visitors of the Swiss National Exhibition, were taken on sight-seeing dives in Lake Geneva to a depth of 330 feet. Piccard designed another submarine, the *Ben Franklin* (PX-15), for the purpose of studying OCEAN CURRENTS. In 1969, he and a team of five observers drifted in the GULF STREAM along North America's Atlantic coast from Palm Beach, Florida, to Cape Hatteras, North Carolina.

For their record-setting dive in the *Trieste*, Piccard and Walsh were awarded the Distinguished Public Service award by the U.S. government. Piccard's writings include *Seven Miles Down* (1961, with American oceanographer Robert Dietz) and *The Sun Beneath the Sea* (1971).

Jacques Piccard's dive in the Pacific Ocean's Marianas Trench—more than 6,000 feet deeper than the highest point on Earth from sea level, MOUNT EVEREST—still stands as a world record. His son, Bertrand Piccard, participated in the first nonstop BALLOON flight around the world in 1999.

Pigafetta, Francesco Antonio

(ca. 1491–ca. 1535) *Italian author, traveler in South America and the South Pacific, in service to Spain*

Antonio Pigafetta was born at Vicenza in northern Italy's Lombardy region, the son of noble parents. He received a good education, and, with his talent for languages, planned a career as a diplomat.

In 1518, Pigafetta toured the major European capitals with a Vatican diplomatic mission. He had become interested in the explorations then being undertaken by Portuguese and Spanish navigators, and, while in Spain with the papal delegation, he learned of FERDINAND MAGELLAN'S

planned expedition to the EAST INDIES. He offered his services to Spain's king Charles I (Holy Roman Emperor Charles V), the expedition's chief sponsor, and received a royal commission as a "gentleman volunteer" to be Magellan's private secretary.

Pigafetta arrived in May 1519 in Seville, where he spent the next few months studying navigational techniques in preparation for the voyage. On September 20, 1519, he sailed from the nearby port of Sanlúcar de Barrameda on Magellan's flagship, the *Trinidad*, one of a fleet of five vessels.

During the next three years, Pigafetta kept a daily record of this historic voyage in which the STRAIT OF MAGELLAN was located and the world was first circumnavigated. He was one of the 18 survivors of the expedition to return to Spain on the *Victoria* in September 1522. As it turned out, Pigafetta's journal was the only surviving eyewitness written record of the historic voyage, the Portuguese having confiscated Magellan's own log when they seized the *Trinidad* in the East Indies in 1521.

Soon after his return to Spain, Pigafetta presented his journal to King Charles I. He then went to Rome, where he was received by Pope Clement VII. Through the pope's influence, in 1524, Pigafetta became a member of the Knights of Rhodes (later the Knights of Malta), a military-religious order. At the request of Pope Clement and King Charles, Antonio Pigafetta wrote an account of the Magellan voyage, *Primo viaggio intorno al mondo* (First journey around the terrestrial globe), which was first published in an abridged form in Paris in 1540.

The work describes the mutiny on the South American coast and Magellan's death in the Philippines. Although JUAN SEBASTIÁN DEL CANO was initially hailed as having completed the first CIRCUMNAVIGATION OF THE WORLD, since he commanded the *Victoria* on its return voyage to Spain after Magellan's death in 1521, the accomplishment, according to Pigafetta, was largely due to Magellan's skill as a navigator and leader. With his background in navigation, Antonio Pigafetta was able to provide details on the locations of the various islands he visited. The work relates that Magellan first learned of the passage at the southern end of South America (afterward known as the Strait of Magellan) from a secret GLOBE or chart he had seen in Lisbon, produced by MARTIN BEHAIM in 1492.

In addition to revealing to European geographers the vast extent of the Pacific Ocean, Antonio Pigafetta was among the first to comment on the phenomenon of having lost a day in the westward journey around the world. Although he had kept an accurate record of all the days that had transpired on the three-year voyage, Pigafetta nonetheless failed to take into account that the expedition had sailed westward across the 180th meridian of longitude in its passage across the Pacific Ocean and, in so doing, had traversed what has since been designated as the INTERNATIONAL

DATE LINE. Pigafetta also provided European leaders with valuable information on trading practices in the East Indies and described the native peoples he had encountered.

Pike, Zebulon Montgomery (1779–1813)

U.S. Army officer, American explorer of the upper Mississippi, eastern Colorado Rockies, and Arkansas River

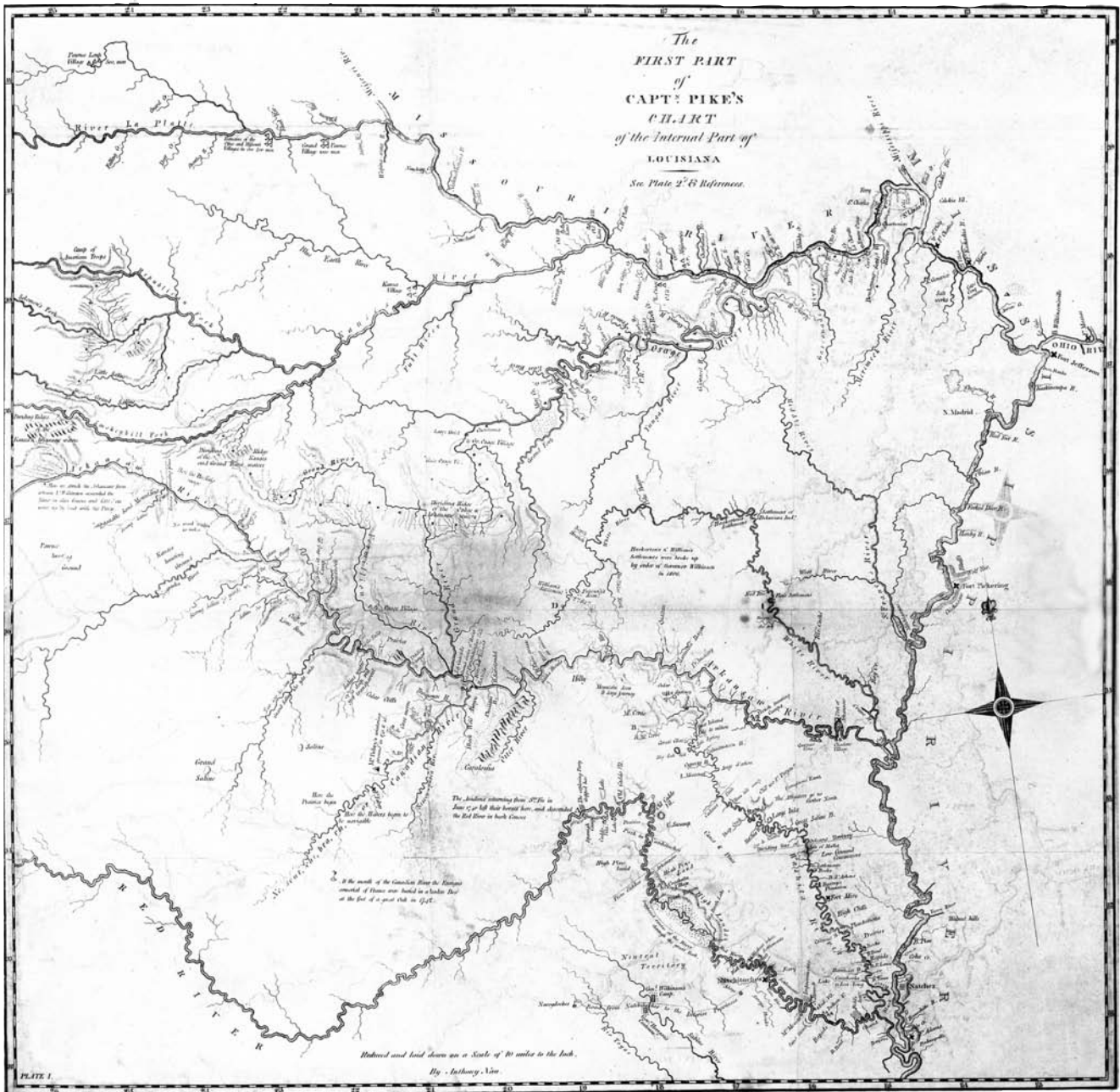
Zebulon Pike was born in Lambertton, near Trenton, New Jersey. His father, who had the same name, was an American army officer in the Revolutionary War. The younger Pike joined the army in about 1793, serving alongside his father under General "Mad" Anthony Wayne in campaigns against the Ohio Valley tribes in the Miami War, or Little Turtle War, of 1790–94. Pike remained in the army and was subsequently stationed at garrisons throughout the Old Northwest. By 1799, he had been commissioned a second lieutenant.

In 1805, General James Wilkinson sent Pike on an expedition to explore the headwaters of the MISSISSIPPI RIVER. In addition to locating the Mississippi's source, Pike was ordered to assert U.S. sovereignty over the upper Mississippi and Great Lakes region and to enforce the terms of Jay's Treaty of 1794, under which British traders and military personnel were to leave U.S. territory. Pike was also instructed to establish peaceful contacts with Indians in the region and survey fur and mineral resources.

Pike's expedition of 20 soldiers departed St. Louis on August 9, 1805, and traveled up the Mississippi aboard a 70-foot KEELBOAT. After meeting with leaders of the Sac tribe at



Zebulon Pike (Library of Congress)



Map of the Louisiana Territory by Zebulon Pike (1807) (Library of Congress)

present-day Keokuk, Iowa, and surveying the lead deposits at Dubuque, Pike continued upriver to Prairie du Chien. At this point, he left his keelboat, proceeding with his expedition on two smaller and faster boats. He negotiated a purchase of 100,000 acres of land in Minnesota from the Sioux (Dakota, Lakota, Nakota) Indians, which later became the site of Minneapolis.

About 230 miles above the Falls of St. Anthony, Pike established winter quarters for most of his party. In December 1805, accompanied by some of his men, he pushed onward into northern Minnesota, seeking the source of the

Mississippi. The river was frozen in some places, and his expedition traveled alternately by CANOE and sled. In February 1806, Pike and his men reached Red Cedar Lake (Cass Lake) and Leech Lake, which he wrongly concluded were the sources of the Mississippi River. The actual source of the Mississippi, Lake Itasca, was determined by HENRY ROWE SCHOOLCRAFT in 1832.

Pike returned to his expedition's winter encampment at present-day Little Falls, Minnesota, and from there descended the Mississippi, arriving back in St. Louis on April 30, 1806.

Two months later, Wilkinson again dispatched Pike. This time, he was to search for the sources of the Arkansas and Red Rivers and survey the southern boundary of the newly acquired Louisiana Territory. On July 15, 1806, with 23 soldiers and 51 recently freed Osage Indians, whom he was to escort back to their homeland, plus Wilkinson's son James Biddle, also a U.S. army lieutenant, and a naturalist, Dr. John Robinson, Pike left Fort Belle Fontaine, near St. Louis, and headed up the MISSOURI RIVER on two riverboats. By way of the Osage River, Pike and his men reached the Osage lands, then traveled on horseback overland to the Republican River in what is now western Nebraska. On learning that a Spanish military force had been sent to intercept him, Pike led his men southward to the Great Bend of the Arkansas River. While the younger Wilkinson and a small party explored the Arkansas to its junction with the Mississippi, Pike and the rest of his command ascended the Arkansas into Colorado.

In November 1806, Pike and his men first sighted the Front Range of the ROCKY MOUNTAINS, near what is now Pueblo, Colorado. From a distance, they espied the 14,110-foot mountain that would later be known as Pikes Peak. Pike and a small party attempted to climb the mountain, but early winter snows prevented an ascent. The expedition headed southward and returned to the Arkansas, tracing it to its source in the Royal Gorge.

Pike then attempted to reach the Red River. He crossed the Sangre de Cristo Mountains into the San Luis Valley. On the Conejos River, a tributary of the Rio Grande, he established a stockade, where he and his men spent the winter.

In spring 1807, Spanish military authorities arrested Pike's party for illegally crossing into Spanish territory. They suspected that the expedition had been sent to spy on Spanish defenses in the Southwest. The prisoners were taken to Santa Fe, then to Chihuahua, Mexico. Pike maintained that he had mistaken the Rio Grande for the Red River and had entered Spanish territory accidentally. Historians have speculated that Pike knew his true location and was indeed engaged in a spying operation against the Spanish. After being held in custody for several months, Pike and his men were taken across Texas and returned to the United States at Natchitoches, Louisiana, on June 30, 1807.

Pike was subsequently implicated along with Wilkinson in Aaron Burr's plot to establish a separate empire in the American Southwest, but he was soon acquitted of any wrongdoing. He went on to serve as a brigadier general in the War of 1812. In April 1813, while leading an attack against Toronto, he was killed in an explosion of a British powder magazine.

The charts and journals that Pike made on his Colorado expedition were confiscated by the Spanish. Nevertheless, he was able to reproduce most of his observations from memory and from private papers he had smuggled back to St. Louis.

Zebulon Pike's report of his expeditions up the Mississippi and into the Rockies was published in 1810 as *An Ac-*

count of the Expeditions to the Sources of the Mississippi and through the Western Parts of Louisiana. It was translated into French, German, and Dutch. In it, Pike described the southern plains as too arid for agricultural settlement. His findings were confirmed by STEPHEN HARRIMAN LONG in his 1819 expedition and helped lay the foundation for the myth of the "Great American Desert." Yet Pike's descriptions of the Spanish settlements in New Mexico encouraged St. Louis traders to develop commerce by way of the Santa Fe Trail. Pike's explorations of the southern plains began at the same time that the expedition of MERIWETHER LEWIS and WILLIAM CLARK was returning from the Pacific Northwest. His account, along with that of Lewis and Clark, provided the first complete picture of the American trans-Mississippi West.

Pilcher, Joshua (1790–1843) *American fur trader on the upper Missouri and in the Rocky Mountains*

Born in Culpeper County, Virginia, Joshua Pilcher moved with his family to western Tennessee while young. He studied medicine for a short time, but gave it up to become a frontier merchant.

In 1815, Pilcher arrived in St. Louis, Missouri, where he soon became prominent in business as a director of the Bank of St. Louis. He entered the FUR TRADE, and, by 1819, he had become a partner with MANUEL LISA in the ST. LOUIS MISSOURI FUR COMPANY.

Following Lisa's death in 1820, Pilcher became president of the company and directed its trading operation on the upper MISSOURI RIVER. In spring 1823, one of his fur brigades was attacked and annihilated by Arikara Indians in the Dakota country. That summer, Pilcher led a battalion of fur traders and allied Sioux (Dakota, Lakota, Nakota) Indians as part of Colonel HENRY LEAVENWORTH's punitive military expedition against the Arikara at their villages on the Missouri near the present border between North and South Dakota. During this operation, Pilcher's men, without authorization from Leavenworth, destroyed the Arikara villages. That same year, another of his trading parties was wiped out by marauding Blackfoot Indians in western Montana.

With the upper Missouri effectively closed by Indian resistance, the St. Louis Missouri Fur Company continued to suffer losses and went out of business by 1825. He subsequently organized a new trading outfit in 1827. That year, he led 45 traders and trappers into the ROCKY MOUNTAINS by way of the Platte River. Pilcher's explorations across the northern plains and into the northern Rockies continued for the next three years. He and his men eventually reached the Columbia River Basin and the HUDSON'S BAY COMPANY post, Fort Vancouver.

Pilcher returned to St. Louis in 1830, and, the following year, he took charge of the AMERICAN FUR COMPANY's trading fort on the Missouri at Council Bluffs.

In 1833, he accompanied ALEXANDER PHILIPP MAXIMILIAN and artist KARL BODMER on their tour of the upper Missouri.

Through his fur-trading operations, Pilcher developed extensive contacts with the upper Missouri Indian tribes, and in 1837, he was appointed Indian subagent to the Sioux, Ponca, and Cheyenne. In 1839, he succeeded WILLIAM CLARK as superintendent of Indian affairs at St. Louis, serving until 1841. He remained prominent in St. Louis political and business affairs and was a friend and associate of Missouri senator Thomas Hart Benton.

Joshua Pilcher's report on his explorations was later published by the U.S. Congress. In it, he commented on the Oregon Country's potential for agricultural settlement, pointing out that emigrants could easily reach it by way of the Platte River route and the SOUTH PASS. His account gave impetus to the development of the Oregon Trail as a major migration route across the Great Plains and northern Rockies to the Pacific Northwest.

Pinto, Fernão Mendes (Fernando Pinto)

(1509–1583) *Portuguese traveler in India and the Far East*
Born at Montemor-o-Velho in southern Portugal, Fernão Pinto came from a family of modest means. As a teenager, he served as a page in the households of nobles.

In about 1537, Pinto traveled to India with Cristoval da Gama, a son of VASCO DA GAMA, and was taken captive by Turks, who sold him into slavery. He eventually regained his freedom in Malaya, from where he went to China with a European trading expedition.

In about 1541, Pinto arrived in Peking (Beijing), where he entered the diplomatic service of the Chinese government. He accompanied an official Chinese delegation to Cochin China (present-day Vietnam), visiting the lower Mekong River region and Hainan Island in the South China Sea. From there, he sailed to Japan, arriving in 1542. While in Japan, he became associated with FRANCIS XAVIER, with whom he traveled for a time.

After 20 years as a trader and adventurer in Southeast Asia, China, Indonesia, and India, Pinto returned to Europe, arriving in Portugal in 1558. He settled near Lisbon and wrote an account of his travels, entitled *Peregrinação* (Peregrinations, or Wanderings). It was published in 1614, 30 years after his death.

Although many of his described adventures were too fantastic to be believed and earned him the sobriquet "Prince of Lies," Fernão Pinto is nonetheless credited as being the first known European to visit Japan.

Pinzón, Arias Martín (1465–1510) *Spanish mariner in the West Indies and South America, nephew of Francisco*

Martín Pinzón, Martín Alonso Pinzón, and Vicente Yáñez Pinzón

Arias Pinzón was born at Palos de Moguer in the Andalusia region of southwestern Spain. A member of a family of well-established seafarers and shipowners, he was the son of an older brother of FRANCISCO MARTÍN PINZÓN, MARTÍN ALONSO PINZÓN, and VICENTE YÁÑEZ PINZÓN.

By 1492, Pinzón had become an accomplished mariner and pilot. He sailed on CHRISTOPHER COLUMBUS's first voyage to the WEST INDIES as a crewman on the *Niña*, commanded by his uncle Vicente. Also along on this expedition were his uncle Martín, who commanded the *Pinta*, as well as his uncle Francisco, who was the first mate on the *Pinta*.

The next year, 1493, Pinzón joined Columbus on a second exploration of the West Indies, taking him to Hispaniola (present-day Haiti and the Dominican Republic), Puerto Rico, the south coast of Cuba, and the north coast of Jamaica. Five years later, in 1498, he sailed again with Columbus to the northeast coast of South America and the island of Trinidad.

In 1499, together with his uncles Vicente and Francisco, Pinzón commanded several ships exploring the South American coast north and south of the mouth of the AMAZON RIVER. On the westward voyage across the Atlantic Ocean from the Cape Verde Islands, Pinzón's ships and those of Vicente became separated in rough weather. They met up again in late January 1500, off Cape São Augustinho, just south of South America's great eastern bulge, near what is now Recife, Brazil. They then headed northward along the coast to the mouth of the Amazon. While Vicente continued to probe northward along the coast of the Guianas, Pinzón returned southward and may have cruised along the Brazilian shore as far as what is now Rio de Janeiro. He later rejoined his uncle in the Gulf of Paria, on the coast of present-day Venezuela, from where they returned to Spain by way of Hispaniola.

Over the next several years, Pinzón became wealthy as one of the first traders to develop commercial ties between his home at Palos de Moguer in Spain, and Spanish colonies in the West Indies. In 1506–07, together with his uncle Vicente and JUAN DÍAZ DE SOLÍS, he explored along the coast of the Yucatán Peninsula, and, in 1509–10, he returned to the South American coast in search of an interoceanic strait through the continent.

Arias Pinzón, while not the best known of the Pinzóns, was nevertheless instrumental in the early exploration of the West Indies and the mainland of South America.

Pinzón, Francisco Martín (1462–1500)

Spanish mariner in the West Indies and South America, brother of Martín Alonso Pinzón and Vicente Yáñez Pinzón, uncle of Arias Martín Pinzón

Born at Palos de Moguer in southwestern Spain, Francisco Pinzón was the youngest of the three Pinzón brothers whose

shipbuilding firm provided the *Niña* and the *Pinta* for CHRISTOPHER COLUMBUS's first voyage to the Americas.

On that 1492 voyage, in which Columbus reached the Bahamas, Hispaniola (present-day Haiti and the Dominican Republic), and other islands in the WEST INDIES, Pinzón sailed as first mate and pilot on the *Pinta*, under the command of his brother MARTÍN ALONSO PINZÓN. He supported his brother's attempt to desert the expedition with the *Pinta* off the coast of Cuba, despite the fact that another brother, VICENTE YÁÑEZ PINZÓN, commander of the *Niña*, remained loyal to Columbus.

With Martín's death in 1493, Pinzón became managing partner of the family shipbuilding business. In 1499–1500, he joined his brother Vicente and their nephew ARIAS MARTÍN PINZÓN in an exploration of the northeast coast of South America, during which they made the European discovery of the AMAZON RIVER. On the homeward voyage, he was lost with all his crew when the ship he commanded went down in a hurricane off Hispaniola.

Francisco Pinzón, together with his brothers and nephew, provided the ships and navigational expertise essential for the success of Columbus's 1492 voyage. In his final voyage with Vicente and Arias, he took part in the first European exploration of the South American mainland south and east of Trinidad.

Pinzón, Martín Alonso (Martín Alonzo Pinzón)

(ca. 1441–1493) *Spanish mariner in the West Indies, brother of Francisco Martín Pinzón and Vicente Yáñez Pinzón, uncle of Arias Martín Pinzón*

Martín Pinzón was a native of Palos de Moguer, near the former seaport of Palos de Frontera, on the Andalusian coast of southwestern Spain. A descendant of a long line of seafarers, he became an accomplished mariner and ship's pilot, taking part in trading voyages throughout the MEDITERRANEAN SEA and along the coast of West Africa.

According to some accounts, Pinzón sailed with a French navigator named Cousin in a 1488 voyage to the coast of West Africa; after a storm had driven their vessel far to the southwest, they reportedly came within sight of uncharted land and reached the mouth of large river.

Another source relates that, by the late 1480s, Pinzón had retired from the sea and joined his brothers FRANCISCO MARTÍN PINZÓN and VICENTE YÁÑEZ PINZÓN in the family's shipbuilding business in Palos de Frontera, as the senior partner. The Pinzón brothers befriended CHRISTOPHER COLUMBUS and supported his idea that Japan and China could be reached by sailing westward across the Atlantic Ocean. On a visit to Rome about 1490, Pinzón reportedly came across records that papal taxes, or tithes, had been collected from a land called VINLAND until about 1400, and found references to this place on old Norman charts, indicating that it was located westward across the Atlantic.

Pinzón was well respected in the Spanish royal court as an authority on maritime matters, and on his return to Spain, he presented these findings to the advisers of King Ferdinand II and Queen Isabella I. His report may have influenced the Spanish monarchs' ultimate decision to sponsor Columbus in 1492.

Pinzón provided one-eighth the cost of mounting the expedition, helped recruit the crews from his native Palos de Moguer and Palos de Frontera, and was instrumental in obtaining two of the ships for the voyage, the *Niña* and the *Pinta*. He sailed with Columbus in early August 1492, as captain of the *Pinta*, assisted by his brother Francisco. His brother Vicente commanded the *Niña*, while Columbus commanded the expedition's flagship, the *Santa María*.

In early October 1492, Pinzón convinced Columbus to follow flocks of birds migrating southward, a sign that land was probably in that direction. He had determined that they had traveled westward beyond the point where Japan was thought to be; the decision to head toward a possible landfall calmed the fears of the men on all the ships, who had become alarmed at not having come upon land since leaving the CANARY ISLANDS three weeks earlier.

On the morning of October 12, 1492, one of Pinzón's crewmen on the *Pinta*, Roderigo de Triano, sighted land, one of the Bahama Islands. Columbus named it San Salvador (also known as Watling Island).

Pinzón and the *Pinta* abruptly left Columbus and the other two ships off the east coast of Cuba on November 21, 1492. The natives on Cuba had reported that gold could be found in abundance on a nearby island, and it was there that Pinzón had gone. He later reported that he had landed on Great Inagua Island, off Cuba's eastern tip, but found no gold there. He then explored the Cibao region along the north coast of the island of Hispaniola (present-day Haiti and the Dominican Republic), where he found some gold and learned from the natives that the *Santa María* had been wrecked. On January 6, 1492, off northern Hispaniola's Monte Cristi Peninsula, Pinzón rejoined Columbus and his one remaining ship, the *Niña*.

Pinzón sailed back toward Europe with Columbus as far as the AZORES, where their ships were again separated, this time by a storm. The *Pinta*, driven northward, reached the northwest coast of Spain near Vigo. King Ferdinand and Queen Isabella refused Pinzón's request for an audience to report on his findings. Instead, they ordered Pinzón not to leave his ship until he had returned to Palos de Frontera, where he was to wait for Columbus, who had stopped in Portugal. Pinzón and the *Pinta* reached Palos de Frontera on March 15, 1493, just hours after Columbus had arrived. Reportedly, the snub by the Spanish court, coupled with Columbus's accusations of disloyalty, further undermined his health, already weakened by the voyage, and Pinzón died in Palos de Moguer several weeks later. Some sources suggest that Pinzón may actually have succumbed to a particularly

virulent strain of syphilis, contracted in his contacts with the natives in the WEST INDIES, which would make him one of the first Europeans to die of that disease.

The fact that Martín Pinzón apparently deserted Columbus on the Cuban coast has cast a shadow on his reputation as one of the European discoverers of the Americas. Nonetheless, Pinzón's support was essential for the success of Columbus's first voyage. He had helped Columbus gain the backing of the Spanish court and had contributed his own money to the venture. As second in command, he served as an intermediary between Columbus and his men, most of whom, like Pinzón, were from the Palos area and regarded the Italian-born Columbus as a foreigner. In his independent explorations in the West Indies, Pinzón may have actually preceded Columbus in reaching the island of Hispaniola.

Pinzón, Vicente Yáñez (Vicente Anes Pinzón)

(1463–ca. 1523) *Spanish mariner in the West Indies, South America, and Central America, brother of Francisco Martín Pinzón and Martín Alonso Pinzón, uncle of Arias Martín Pinzón*

Vicente Pinzón was born at Palos de Moguer on the Andalusian coast of southwestern Spain, a member of a prominent family of seafarers and shipbuilders that included his brothers FRANCISCO MARTÍN PINZÓN and MARTÍN ALONSO PINZÓN.

Along with his brothers, Pinzón was a friend of CHRISTOPHER COLUMBUS and a backer of his plan to reach Japan and China by sailing westward across the Atlantic Ocean. All three brothers took part in Columbus's first voyage, which sailed, in August 1492, from the seaport of Palos de Frontera, near their home. On the historic voyage, Pinzón commanded the *Niña*, on which he was assisted by his nephew ARIAS MARTÍN PINZÓN.

Pinzón remained loyal to Columbus after his brother Martín, captain of the *Pinta*, deserted the expedition off the coast of Cuba in November 1492. A month later, when the *Santa María* was wrecked off the north coast of Hispaniola (present-day Haiti and the Dominican Republic), Pinzón rescued Columbus and his crew, and it was his ship, the *Niña*, on which Columbus triumphantly returned to Spain in March 1493. Pinzón may have sailed again with Columbus on his second voyage of 1493 and on his third voyage of 1498, but there is no accurate record of his having done so.

Although the Spanish government had granted him permission to undertake an additional voyage of exploration on his own in 1495, Pinzón apparently did not sail until November 13, 1499. His fleet of four ships embarked from Palos de Frontera, on a voyage in which he was joined by his brother Francisco and his nephew Arias. After first sailing to the Cape Verde Islands, where the ships were resupplied, Pinzón headed southwestward. According to his astronomical observations, he lost sight of the NORTH STAR,

indicating that he had gone south of the EQUATOR. On January 20, 1500, he sighted a cape on the mainland of South America, which he named Santa María de la Consolación, later known by the Portuguese as São Augustinho, near present-day Recife, Brazil.

Proceeding northwestward, Pinzón made the European discovery of the mouth of the AMAZON RIVER, which he named La Mar Dulce (the freshwater sea), having noted that the river's water flowed well out to sea, where it was still fit to drink. He explored up the Amazon for about 50 miles, then continued along the Caribbean coast of the Guianas and what is now Venezuela. He explored the Gulf of Paria, where he made the European discovery of the island of Tobago, which he called Isla de Mayo.

Pinzón then examined the coast of CENTRAL AMERICA, sailing as far northward as what is now Honduras and Costa Rica. Some accounts suggest that on this voyage, Pinzón made one of the first known circumnavigations of Cuba, thus establishing that it was an island, contrary to Columbus's previous assertion that it was part of the mainland of Asia.

Pinzón's ships were struck by a hurricane off Hispaniola in July 1500. Two of his four vessels were lost with all hands, including the one commanded by his brother Francisco. He returned to Spain on September 30, 1500, with a cargo of tropical wood and 20 Indian slaves. He also brought back an opossum from South America, the first marsupial ever to be seen by Europeans.

Pinzón returned to the northeast coast of South America in 1502. Over the next two years, he traded with the Indians along the Gulf of Paria, from whom he obtained gold, woven cotton fabrics, and parrots, which had become popular pets in Europe soon after the European discovery of the Americas.

In 1504, Pinzón visited the Spanish settlement on Hispaniola, where he met with Columbus. The next year, he was named governor of Puerto Rico, an appointment that lapsed when he made no attempt to colonize that island.

In 1506, Pinzón joined JUAN DÍAZ DE SOLÍS in an exploration of the coast of Central America. Together they retraced the route of Columbus's last voyage of 1502, landing on Guanaja Island, off the coast of what is now Honduras. From there, they sailed into the Gulf of Mexico and were among the first Europeans to explore the coast of the Yucatán Peninsula and Bay of Campeche.

Pinzón returned to Spain in 1507, where he conferred with AMERIGO VESPUCCI on the findings of his recent voyage. In 1508, he sailed again with Díaz de Solís, leaving Spain with two ships, the *Isabeleta* and the *Magdalena*. Pinzón and Díaz de Solís had been commissioned by the Spanish government to follow the coast of South America southward in hopes of locating a strait leading to the Indian Ocean and the SPICE ISLANDS, the present-day Moluccas of Indonesia. (The fact that the Pacific Ocean lay on the other side of South

America was then unknown to Europeans.) From Cape São Augustinho on the Brazilian coast, Pinzón and Díaz de Solís explored southward as far as 40° south latitude, where they reached the mouth of the Río Negro, on the central coast of what is now Argentina.

Pinzón returned to Spain in 1509, having had a falling-out with Díaz de Solís during the voyage, and he undertook no further voyages of exploration. In 1518, King Charles I of Spain (Holy Roman Emperor Charles V) granted Pinzón and his heirs a hereditary title of nobility.

In addition to his vital role in the Columbus voyage of 1492, Vicente Pinzón became well known as an explorer in his own right. Although generally credited with the European discovery of the Amazon River, his reported sighting of the Brazil coast to the south in 1500 has been disputed by Portuguese and Brazilian historians. They maintain that Pinzón never went south of the equator, and that the European discoverer of Brazil was Portuguese navigator PEDRO ÁLVARS CABRAL, who reached the southern Brazilian coast in April 1500, several months after Pinzón's reported landing.

Pires, Tomé (ca. 1468–ca. 1540) *Portuguese apothecary, diplomat in the East Indies and China*

Portuguese-born Tomé Pires was the son of the apothecary to King João II. In 1490, he himself became an apothecary in the Portuguese royal household.

Pires traveled to India in 1511, with what is assumed to be a royal commission to study medicinal spices of the Orient. After a year amassing a fortune in the SPICE TRADE, he participated in expeditions under the Portuguese viceroy of the region, AFONSO DE ALBUQUERQUE, visiting Java in 1513, and Sumatra and Malacca on the Malay Peninsula in the South China Sea two years later.

In 1516, the new viceroy, Lopo Soares de Albergaria, chose Pires as an envoy to the Chinese. The fleet failed to reach China, after being driven off course south of present-day Vietnam in September of that year. A second attempt succeeded in August 1517, and it is thought that Pires stayed at the Chinese court in Peking (Beijing) for some 20 years.

In the *Suma Oriental*, written in India and Malacca in 1512–15, Tomé Pires gives an account of the Far East from his travels and those of others. Although his writings on China have not survived, his visit there is important in that it represents the first opening of diplomatic relations between Portugal and China.

Pizarro, Francisco (ca. 1475–1541)
Spanish conquistador in South America, half brother of Gonzalo Pizarro and Hernando Pizarro

Francisco Pizarro was born at Trujillo in the Estremadura region of west-central Spain. He was born out of wedlock; his father was a nobleman and officer in the Spanish army,

and his mother was a local peasant girl. Raised outside his father's aristocratic household, he remained uneducated in his early years, during which he worked as a swineherd tending his father's pigs. Some sources suggest he gained his earliest military experience while serving with his father in campaigns in Italy.

In about 1500, Pizarro ran away to Seville, then a major staging area for colonizing expeditions to the newly explored WEST INDIES. He soon entered the service of Nicolas de Ovando, who had just been appointed governor of Hispaniola (present-day Haiti and the Dominican Republic), succeeding CHRISTOPHER COLUMBUS, and sailed with Ovando's fleet to the West Indies in 1502. In 1509, he made his first landing on the South American mainland as part of ALONSO DE OJEDA's expedition to the Caribbean coast of what is now Colombia. Left in charge at San Sebastián, he later moved the colony to Panama's Gulf of Urabá, where he helped to found the settlement of Santa María de la Antigua.

Pizarro accompanied VASCO NÚÑEZ DE BALBOA in his explorations of the Isthmus of Panama, including the 1513 expedition in which Europeans first sighted the Pacific Ocean. From Native Americans encountered on these expeditions, Pizarro heard of a fabulously rich native kingdom to the south, called by the natives Biru and known afterward as Peru.

It was Pizarro who later arrested Núñez de Balboa on behalf of Panama's colonial governor PEDRO ARIAS DE ÁVILA. In the years following Núñez de Balboa's execution in 1519, Pizarro rose to prominence in Panama, becoming mayor of Panama City and receiving grants of land. He also explored the Pearl Islands off Panama's Pacific Coast. In 1522, he learned more about an advanced Indian civilization south of Panama from the accounts of Spanish navigator PASCUAL DE ANDAGOYA. The next year, he entered into a partnership with DIEGO DE ALMAGRO to undertake the exploration and conquest of the fabled land of Biru. Another partner was a priest named Hernando de Luque, who provided financing for the venture.

In 1524, Pizarro sailed from Panama southward along the Pacific coast of what is now Colombia to Cabo Corrientes and the San Juan River. His explorations along Colombia's Buenaventura Bay were soon curtailed when he lost two-thirds of his 80-man expedition to disease and Indian attacks.

Pizarro's losses were so great that Spanish authorities forbade his undertaking any additional explorations. Undaunted, he and Almagro continued their probings southward, and in 1526, they reached as far as the Gulf of Guayaquil on the coast of what is now southern Ecuador. A landing was soon made at the Inca town of Tumbes, where Pizarro's men saw evidence of an advanced civilization rich with gold and jewels. A further seaward reconnaissance along the coast by Pizarro's chief mariner, Bartolomeo Ruiz,

confirmed that there were greater Inca Indian cities south-east of Tumbes.

In 1528, Pizarro returned to Spain to seek royal backing for a large-scale expedition of exploration and conquest. In Toledo, he met with King Charles I (Holy Roman Emperor Charles V), to whom he presented gold and jewels from Peru; several captured Indians; several llamas, an animal that had been unknown in Europe; and samples of a silk-like cloth produced from the wool of the vicuña, a species of wild camel found in the ANDES MOUNTAINS. Coincidentally, HERNÁN CORTÉS, a distant relative of Pizarro, was visiting the Spanish royal court, reporting on his recent conquest of the Aztec Indians of Mexico. Encouraged by Cortés's success, the king agreed to sponsor Pizarro's planned expedition, naming him captain general and governor of New Castile, as the yet-to-be explored region of what is now Peru had been designated. Pizarro's partner, Almagro, who had remained behind in Panama, was given a subordinate position as commandant of Tumbes.

Along with his half brothers GONZALO PIZARRO, HERNANDO PIZARRO, Juan Pizarro, and Martín Pizarro, Pizarro returned to Panama in 1530. In January 1531, he set out by boat with a force of 180 men and 27 horses. They landed at San Mateo Bay on the coast of present-day Ecuador, and, soon afterward, they occupied the Inca Indian town of Tumbes without resistance. The Inca emperor, Atahualpa, had recently consolidated his rule by defeating his half brother Huascar in a civil war. On learning of the arrival of Pizarro and his forces, Atahualpa decided to allow the Spaniards to penetrate the interior of his realm, where they could then be easily contained. The Inca may also have mistaken the Spaniards for legendary white gods, who, according to traditional beliefs, were expected to arrive soon after the death of Atahualpa's father, which had occurred at about that time.

Pizarro was joined by additional forces at Tumbes, led by HERNANDO DE SOTO and SEBASTIÁN DE BENALCÁZAR. After establishing a base he called San Miguel, south of Tumbes, near the mouth of Peru's Piura River, he led his men along the Royal Inca Road, eastward into the Andes and the Piura Valley. Unopposed by the Inca, he crossed the Sechura Desert and proceeded through the high passes of the Western Cordillera to the central plateau region of the Andes.

On November 15, 1532, Pizarro entered the city of Cajamarca, which he found to be deserted. Nearby, the Inca ruler, Atahualpa, had encamped with 50,000 of his men. Pizarro's half brother Hernando, the only one of them of legitimate and noble birth, was sent as an emissary to Atahualpa. He presented the Inca leader with a Bible and asked him to embrace Christianity and pledge his allegiance to Charles V. On hearing that the Bible would teach him about Christ, the Inca leader reportedly held it to his ear, expecting it to speak to him; when it did not, he cast it to the

ground. This gesture was taken by the Spaniards as an insult to their faith and provided them with an excuse to launch a surprise assault on the Inca, charging them with horses and firing upon them with cannon. Thousands of the Inca were killed in the attack, and Atahualpa was taken captive. The Spaniards, numbering fewer than 200 men, suffered minimal casualties.

Atahualpa, knowing how interested Pizarro and his men were in acquiring gold, offered to ransom himself for an amount of the metal that would fill the room of the building in which he was being held (a space measuring 22 by 17 feet) to a height equal to his own. Pizarro ostensibly agreed to these terms, and during the next several months, gold was brought from all parts of the Inca Empire. Many of the objects were artistic and religious works, which were nevertheless melted down into gold bars by the Spaniards. The total amount of gold brought to rescue Atahualpa in Cajamarca amounted to 1,325 pounds.

Pizarro betrayed his word and kept Atahualpa prisoner. Atahualpa had meanwhile ordered the murder of his half brother Huascar to prevent him from forming an alliance with the Spaniards. Pizarro used this act as a pretext to try Atahualpa and condemn him to death for conspiring against the Spanish. Both de Soto and Pizarro's half brother Hernando protested against the killing of the Inca ruler, but to no avail. Although Atahualpa had been sentenced to be burned, Pizarro had him garroted after the Inca ruler agreed to embrace some measure of the Christian faith. Just prior to his death in July 1533, he reportedly uttered a curse on Pizarro and all his descendants.

On November 15, 1533, Pizarro's forces captured the Inca capital at Cuzco, seizing all its gold and enslaving many of its inhabitants. Pizarro then founded a new capital for his domain nearer to the coast, which he called Ciudad de Los Reyes (city of kings), at the mouth of the Rimac River. Established on January 18, 1535, it later came to be known as Lima (after a corruption of the name of the nearby Rimac River) and is one of the oldest capital cities in South America.

Pizarro's partner, Almagro, suppressed an Inca revolt at Cuzco in 1538, and, soon afterward, he attempted to seize control of Peru for himself. He was captured and executed by forces loyal to Pizarro.

Pizarro was made a marquis in his last years. He sent his brother Gonzalo on an expedition across the Andes to the headwaters of the AMAZON RIVER, in an expedition under FRANCISCO DE ORELLANA. In June 1541, followers of the late Almagro's half-Indian son and heir, Don Diego Almagro, assassinated Pizarro at his residence at Lima.

The high level of culture that the Inca had reached at the time of European contact facilitated Pizarro in his conquest. Specifically, their highly centralized system of roads, spanning more than 2,000 miles and connecting every part of their empire, enabled the Spaniards to subjugate rapidly

a large portion of western South America, equal in size to the eastern seaboard of the United States (with the spread of European diseases among the native population being a major factor in the conquest). The Spanish had by then realized that the Indians of the Americas were not subjects of the great powers of the Orient, as had previously been thought, and therefore could be conquered without instigating the wrath of the rulers of China and central Asia. In the subsequent years of colonial rule, the Spanish suppressed all active traces of the Inca civilization. Nevertheless, contact with the Inca had a long-ranging impact on Europe, where the sudden influx of vast quantities of gold led to severe inflation, with dire economic consequences, especially in Spain.

The tremendous wealth that Francisco Pizarro and his followers reaped in their conquest of Peru inspired the subsequent explorations of de Soto into the American Southeast and those of FRANCISCO VÁSQUEZ DE CORONADO into the American Southwest. Another of his officers, Benalcázar, went on to undertake an exploration into what is now central Colombia.

Pizarro, Gonzalo (ca. 1506–1548)

Spanish conquistador in South America, half brother of Francisco Pizarro and Hernando Pizarro

Born at Trujillo in Extremadura, Spain, Gonzalo Pizarro was the youngest of FRANCISCO PIZARRO's four half brothers. As a youth, he served with his father, a nobleman and army officer, in military campaigns in Italy during the 1520s. In 1530, he arrived in Panama with Francisco, along with HERNANDO PIZARRO, Juan Pizarro, and Martín Pizarro. Over the next four years, he served with them in the Spanish conquest of Peru.

After taking part in the suppression of the Inca uprising in 1536–37 and in the defeat of DIEGO DE ALMAGRO in 1538, Gonzalo was appointed by Francisco as governor of the northern Inca province of Quito, comprising most of present-day Ecuador.

From the Indians in the Quito region, Pizarro learned of La Canela (the land of cinnamon), located east of the ANDES MOUNTAINS, which was said to contain extensive forests of cinnamon, a spice highly prized in Europe. The Indians also reported the existence of the kingdom of EL DORADO, the fabled land of the Gilded One, where there was supposedly a lake with a bottom lined in gold and jewels. In 1540, Pizarro was authorized by Francisco to undertake an expedition eastward into the Andes to locate and conquer both these places.

Pizarro recruited about 300 Spanish adventurers, and, along with nearly 4,000 enslaved Indians, left Quito in February 1541, heading eastward into the Andes. The Spaniards took along a large herd of pigs as a mobile source of fresh food, plus a number of llamas as pack animals. They also had a pack of hunting dogs, used to terrorize the natives.

Many of the Indians died of the cold in the high altitudes of the Andes, and Pizarro's men soon ran short of supplies when most of the pigs and llamas died or ran away into the jungles beyond the eastern slopes of the mountains. At the Valley of Zumaco, Pizarro was joined by the lieutenant governor of Guayaquil, FRANCISCO DE ORELLANA, and a small contingent of Spaniards. After seven months, they reached the upper Coca River, where Pizarro located some cinnamon trees, but not in sufficient quantity to be of any commercial value. With his men facing starvation, he decided to send Orellana, whom he had named as his second in command, downriver to search for an Indian village where food could be obtained. The Spaniards constructed a brigantine-type riverboat with which to proceed farther downstream, the jungle having by that time become flooded and made impassable by the seasonal rains. On December 26, 1541, Orellana and his men left Pizarro and continued down the Coca, eventually reaching the Napo River and the AMAZON RIVER, which they followed all the way to its outlet on the Atlantic Ocean.

Meanwhile, Pizarro and his men suffered great privations in the jungle. Believing he had been deserted by Orellana, Pizarro decided to head back westward across the Andes to Quito, which they reached in June 1542. Only 80 of his 300 men had survived, and nearly all of the Indians with the expedition had perished.

On his arrival in Quito, Pizarro learned of his half brother Francisco's murder in Lima the year before. Although he had been designated by the elder Pizarro as his successor, the administration of Peru had been given to a royal viceroy, Blasco Núñez Vela, appointed by the king of Spain. During the next six years, Pizarro and his followers attempted to seize control of Peru, but they were ultimately defeated in 1548. Soon afterward, Pizarro was taken prisoner by the royal viceroy's forces and executed in Cuzco.

Gonzalo Pizarro was the first of many European explorers to seek the fabled land of El Dorado. His expedition took him across the Andes from Quito, to the western edge of the Amazon Basin, and ultimately led to the first known descent of the Amazon River and the first known crossing of the South American continent, accomplished by Orellana in 1542.

Pizarro, Hernando (ca. 1478–1578)

Spanish conquistador in South America, half brother of Francisco Pizarro and Gonzalo Pizarro

Hernando Pizarro was born at Trujillo in the Extremadura region of Spain. A half brother of FRANCISCO PIZARRO, GONZALO PIZARRO, Juan Pizarro, and Martín Pizarro, he was the only one of the five to be of legitimate birth and the only one to receive any sort of formal education. With his father, a nobleman and colonel in the Spanish army, he was part of military campaigns in Italy in 1502–03 and in the Navarre region of Spain in 1512.

In 1530, Pizarro accompanied Francisco and his other three half brothers to Panama, and soon afterward, he took part in the conquest of the Inca Empire in Peru. He returned to Spain in 1533 to present the king of Spain, Charles I (Holy Roman Emperor Charles V), with his share of the treasure obtained as ransom for the Inca ruler Atahualpa. After being received at court and knighted, Pizarro organized an expedition of his own and returned to Peru in 1535. Named governor of Cuzco, he defended that city when it was besieged by its former Inca inhabitants the following year.

In the civil war that erupted between the Pizarros and DIEGO DE ALMAGRO in 1537, Pizarro was taken prisoner. Released soon afterward, he promptly breached the terms of his parole and led his troops against Almagro, whom he captured and executed in 1538.

In 1539, Pizarro returned to Spain to answer charges against himself and his half brothers in connection with the execution of Almagro and their administration of Peru. He appeared before Charles I, to whom he presented an additional large quantity of Inca gold as a gift. Although not actually sentenced for any wrongdoing, Pizarro was nonetheless held as a prisoner until 1568. During his incarceration at the fortress of Medina del Campo in León, he was allowed a fair amount of liberty and was able to marry a niece in 1551. Upon his release, he returned to his native Trujillo, where he reportedly lived until the age of 100.

Hernando Pizarro, as the sole legitimate half brother among the Pizarros, was the only one deemed suitable to act as the official emissary to the Inca emperor Atahualpa at Cajamarca in 1532. The next year, he was one of the few Spanish officers to protest the execution of the Inca ruler when Francisco betrayed his promise to release Atahualpa and had him put to death, despite the payment of an enormous ransom in gold.

Pliny the Elder (Pliny, Gaius Plinius Secundus)

(ca. A.D. 23–79) *official, geographer in ancient Rome*

Born near Lake Como in what is now northern Italy, Pliny went to Rome as a young man and embarked on a military career in which he served as a cavalry officer in Africa and Germany. He was a friend of the Roman emperor Vespasian and of Titus, who also went on to become emperor.

Known as Pliny the Elder to distinguish him from his adopted nephew, the Roman orator and statesman Pliny the Younger, he served as a Roman government official in what is now Spain, France, and northern Italy. He was an industrious scholar as well, producing many literary works detailing information about the known world. Pliny the Elder died of asphyxiation near Mount Vesuvius during a visit to observe the volcano's eruption in A.D. 79.

The only one of Pliny's works to survive was his *Historia Naturalis*, a comprehensive study of the physical world as



Pliny the Elder (Library of Congress)

it was known in his day. Completed in 77, it includes much geographic information about the Mediterranean world, western and northern Europe, Asia, and Africa. He is known as the first writer to have referred to what is now Norway and Sweden as Scandinavia, although he depicted that region as an island, not a peninsula. Relying on secondhand sources for his accounts of Asia, he makes references to the Tigris and Euphrates Rivers, northern India, and the island of CEYLON (present-day Sri Lanka), as well as the SILK ROAD between the Black Sea and central Asia. In his descriptions of West Africa, Pliny the Elder made the earliest known reference to a great river south of the SAHARA DESERT, which he called the "Nigris," which came to be referred to as the NIGER RIVER. Pliny the Elder's geographic works, along with MARCO POLO's account of his travels to the Far East, influenced CHRISTOPHER COLUMBUS. In addition, his accounts of the interior of North and West Africa, largely unknown to Europeans until the early 19th century, inspired German explorer HEINRICH BARTH in his archaeological investigations in the Sahara during the 1850s.

Polo, Maffeo (Matteo Polo) (fl. 1260s–1290s)

Italian merchant, traveler in central Asia and the Far East, brother of Niccolò Polo, uncle of Marco Polo

Maffeo Polo was a minor Venetian nobleman and merchant. With his brothers Marco and NICCOLÒ POLO, he operated

a lucrative trade in jewels and precious stones in Constantinople (present-day Istanbul, Turkey).

In 1260, Maffeo and Niccolò sailed across the Black Sea to Soldaia in the Crimea, where the family operated a trading establishment. Unable to obtain an adequate price for the jewels they had brought from Constantinople, they headed eastward across the Crimea to the north shore of the Caspian Sea and the court of Barka Khan at Serai, near the mouth of the Volga River.

Barka Khan welcomed the Polo brothers and bought their entire stock of jewels for a price that netted them a 100 percent profit. While they were at Serai, a war broke out between Barka Khan and the khan of Persia, to the south. The conflict made a trip back across the Crimea to the Black Sea too hazardous to consider. Cut off from any homeward route, the Polo brothers headed eastward again in 1263. After a 17-day trek across the Kara-Kum desert, they arrived at the city of Bukhara in what is now Uzbekistan.

The Polo brothers remained in Bukhara, at that time a major center of the caravan trade, from 1263 to 1266. Their planned return to Italy by way of Persia (present-day Iran) and the MEDITERRANEAN SEA was still impossible because of warfare and uncertainty to the west. They then met up with a group of Tartar envoys who were on their way to visit the court of Kublai Khan—the Great Khan, ruler of the vast Mongol Empire—at his capital at Cambaluc (present-day Beijing, China). The envoys invited the Polos to travel with them eastward across China to Cambaluc, and, encouraged by the prospect of great profits to be made there, Maffeo and Niccolò agreed.

In their eastward journey across central Asia and China, the Polo brothers followed the well-established SILK ROAD. They stopped at Samarkand, crossed Turkistan, and, after skirting the northern rim of the Tarim Basin and the desert regions north of Tibet, traversed the Mongolian steppes, arriving at Cambaluc in 1266.

In Cambaluc, the Polos met with Kublai Khan, who had never seen Europeans before and was very interested in the culture of the West, especially Christianity. Since the Mongols had no strong religious institution of their own, and were continually threatened by the Islamic armies to the South, he wanted to bring Christianity to his empire, hoping it would have a unifying and civilizing effect on the Mongols, as well as the other diverse peoples he now ruled. After a year in the Chinese capital, the Polo brothers were given leave by Kublai Khan to return home. He gave them a passport, made of a large slab of gold, which ensured safe passage and hospitality as they traveled westward through his vast empire stretching from the Pacific coast of China to the Black Sea. Moreover, he made them his envoys to Pope Clement IV. He entrusted them with a letter to the pontiff requesting that 100 missionary priests be sent to China to teach his people the ways of Christianity. He also wanted some holy oil from the Church of the Holy Sepulcher in Jerusalem.

It took the Polo brothers three years to reach Europe, traveling westward to Bukhara, then southwestward across Persia and Syria to the northeastern corner of the Mediterranean. From there, they headed southward to Palestine, reaching Acre, north of Jerusalem, in April 1269. From the papal legate Teobaldo Visconti, they learned that Pope Clement IV had died the year before, and that conflicts between factions in the Church would delay the election of his successor for some time. They returned to Venice, where they remained for the next two years.

In 1271, the Polo brothers left Venice for China, accompanied by Niccolò's 17-year-old son, MARCO POLO. Even though a new pope had not yet been elected, they were eager to reestablish their contacts with the Mongol emperor. This time, the Polos remained in China until 1292, acquiring great wealth, which they carried with them in the form of jewels and precious stones sewn into their Mongol-style garments.

In his famous account of his travels, Marco Polo relates little about his father and uncle's experiences in China, because he traveled apart from them much of the time. He did mention, however, that at one point they helped design siege engines for an assault on the city of Siang Yang Fou near present-day Yangzhou. He does not describe how the Polo brothers acquired the great riches they carried back to Europe by 1295.

Maffeo and Niccolò Polo were the first Europeans to visit what is now Beijing, China. Their 1260–69 journey to the Far East marked the beginning of a century of open contacts between East and West resulting from the stabilization of the Mongol Empire.

Polo, Marco (1254–1324) *Italian traveler in central Asia and the Far East, son of Niccolò Polo, nephew of Maffeo Polo*

A native of Venice, Marco Polo was the son of NICCOLÒ POLO, a minor nobleman and merchant in jewels. Just prior to Marco's birth, his father and his uncle MAFFEO POLO had left for Constantinople (present-day Istanbul, Turkey), from where they subsequently embarked on a journey across Asia to Cathay and the court of Kublai Khan, the Great Khan, ruler of the Mongols, at Cambaluc (present-day Beijing, China). Marco's mother had died in childbirth, and he was 15 before his father returned to Venice in 1269.

In 1271, 17-year-old Polo accompanied his father and uncle on their second journey to the East. From Venice, they sailed to the east shore of the MEDITERRANEAN SEA, and at Acre, north of Jerusalem, they met with papal legate Teobaldo Visconti. He gave them a letter for Kublai Khan explaining that the delay in the election of a new pope had precluded the sending of 100 missionary priests, which the Mongol emperor had requested on the elder Polos' earlier trip to China. Soon afterward, Visconti himself was elected



Marco Polo (*Library of Congress*)

to the papacy as Pope Gregory X, and the Polos, recalled to Acre upon hearing the news, were joined there by just two Dominican friars, William of Tripoli and Nicolas of Vicenza, who planned to carry Christian learning to Kublai

Khan's domain. Not long after they had left Acre, the two priests decided not to risk the hazards of a long journey to the East, and they turned back to the Mediterranean coast. The Polos nevertheless continued eastward across

Mesopotamia to Baghdad and into Persia (present-day Iran), then went southward to Hormuz, at the mouth of the Persian Gulf, carrying with them a flask of holy oil from the Holy Sepulcher in Jerusalem for Kublai Khan.

Although the Polos had planned to continue their journey by sea, they were unable to find a boat at Hormuz on which they were willing to embark. Instead, they decided to undertake an overland journey, and, in 1272, they traversed the desert of Persia's southern Kerman region, traveling north-eastward into the mountains of Khorasan. From there, they entered northern Afghanistan, visiting the cities of Herat and Balkh, the easternmost point reached by ALEXANDER THE GREAT in his conquests 1,500 years earlier. En route to the caravan trade center at Kashgar on the Chinese frontier, the young Polo fell ill, and his father and uncle took him to the mountains of Badakhsan in northeastern Afghanistan, where they remained a year while he recovered his health.

From the mountains of northern Afghanistan, the Polos continued their journey to Cathay by following the Oxus River (the Amu Darya) northward toward Samarkand and around the northern Hindu Kush mountain range to the 15,600-foot-high Pamir Plateau, where Marco noted the effects of the high altitude and also observed a peculiar type of large wild sheep. They then traveled along the edge of the Taklimakan desert to the remote western Chinese city of Lop Nor on the edge of the GOBI DESERT.

Polo and his father and uncle crossed the desert region of northwestern China with a camel caravan. In the middle of inner Mongolia, a 40-day journey from the court of Kublai Khan, they were met by representatives of the Mongol emperor, who escorted them to the royal palace, Shangdu, northwest of Cambaluc, which they reached in 1275, after a three-and-a-half-year journey from Europe.

The Mongol emperor, much impressed by Polo, who by then was a young man of 21, appointed him to a diplomatic post. Over the next 17 years, the emperor sent Polo on missions throughout his vast empire. Adept at languages, Polo quickly mastered several Mongol dialects. His official travels took him all over China and Southeast Asia. He visited Tibet and the provinces along the YANGTZE RIVER (Chang), YELLOW RIVER (Huang He), and upper Mekong River, and he was the first known European to visit the interior of Burma and what is now Thailand and Vietnam. At one point, he undertook a seaward expedition on behalf of Kublai Khan in which he sailed to the islands of Indonesia. In the north, he visited the former Mongol capital at Karakorum in what is now modern Mongolia, and he may have journeyed into eastern SIBERIA. For three years of his stay in China, 1282 to 1285, Polo served as governor of the city of Yangchow (Yangzhou).

While Marco had been in service to the emperor, his father and uncle had become wealthy from their trading activities. By 1292, however, all three were concerned about their future in China after the death of the emperor, who

by that time was well advanced in years, and they were anxious to return to Italy. That year, they accepted an opportunity to return to the West as escorts for the Mongolian princess Cocachin, who had been betrothed to the khan of Persia, Arghun. Since warfare still raged along the overland route to Persia, it was decided to travel by sea. The Polos, provided with a 14-ship fleet, carrying combined crews of 600, sailed from the Chinese port of Zaiton (Quanzhou) and, after a long passage around Sumatra, entered the Indian Ocean by way of the Strait of Malacca. The voyage across the Indian Ocean included stops at the Nicobar and Andaman Islands, as well as a visit to CEYLON (present-day Sri Lanka).

In 1294, Polo, his father, his uncle, and the princess arrived safely in Hormuz after a two-year voyage. All but 18 of the 600 members of the expedition had perished, either in shipwrecks or from SCURVY. Since Arghun, the khan of Persia to whom Cocachin had been promised, had died a year before they arrived, she became the bride of his son and successor, Ghazan.

The Polos remained at the Persian court at Tabriz for some months, then continued their homeward trek to Trabzon on the Black Sea, from where they sailed to Constantinople (present-day Istanbul, Turkey). They then headed for Venice, arriving in late 1295, after an absence of 24 years.

In 1298, Marco took part in a naval war between Genoa and his native Venice, serving as a commander of a Venetian galley. On September 6, 1298, he was captured along with 7,000 other Venetians following a naval engagement at Curzola on the Dalmatian coast of what is now Croatia. In the Genoese prison where he was confined, Polo met a writer of romances, Rustichello (or Rusticano) of Pisa, also a prisoner of war. Polo related his experiences in the Far East to him, and Rustichello recorded them in a work that came to be known as *The Book of Ser Marco Polo, the Venetian, Concerning the Kingdoms and Marvels of the East* (also known in various editions and languages as *The Travels of Marco Polo*, *The Book of Marco Polo*, *The Book of Marvels*, *The Description of the World*, and *Il Milione*, the last referring to Marco Polo himself, "the man with a million stories").

Released after a year, Polo returned to Venice, where he married and lived the life of a wealthy merchant, dying in 1324 at the age of 70.

During the next two centuries, Marco Polo's book became the principal source of information about the Far East for medieval Europeans. Many of the places and customs he described were unknown in Europe, where contact with the Orient had been severed by the Muslim conquests five centuries earlier. His depictions of the great cities of China, with populations far exceeding any in Europe, as well as his account of the huge palaces of the Mongols and other wonders of the East, were met with skepticism. For his repeated use of the term *millions* in his expansive descriptions of the Orient, he later became known as "Marco Millions." He was

the first European to mention the use of paper, the Chinese method of printing from blocks of carved type, how coal was used as a fuel, and the Chinese practice of using paper money, all of which were unknown in Europe until that time. Many of his observations were rejected by his contemporaries as outlandish exaggerations, although his geographic descriptions of Asia were more readily accepted and were incorporated by ABRAHAM CRESQUES in his *Catalan Atlas* of 1375. In the late 1400s, CHRISTOPHER COLUMBUS, influenced by Polo's writings, grossly underestimated the distance between the west coast of Europe and the easternmost point of Asia, and, based on this determination, undertook his historic voyage in 1492. When he arrived in the WEST INDIES that year, he believed he had reached CIPANGU, as described by Marco Polo (probably referring to Japan or some other outlying islands of Asia). Parts of Burma, Southeast Asia, and western China that Marco Polo visited during his long sojourn in the Far East were not seen again by Europeans until the 19th century. The type of long-horned sheep he described in the Pamir region was later named *Ovis polii*, in his honor, by British zoologist Edward Blyth in 1840.

Polo, Niccolò (Nicolò Polo) (fl. 1260s–1290s)

Italian merchant, traveler in central Asia and the Far East, brother of Maffeo Polo, father of Marco Polo

Niccolò Polo, a Venetian merchant and minor nobleman, made two journeys to China. In his first, he and his brother MAFFEO POLO were the first Europeans to reach what is now Beijing, China (then known as Cambaluc), in 1266, after an overland journey eastward across Asia from Constantinople (present-day Istanbul, Turkey).

On a second visit to China in 1275, in which he was again joined by his brother Maffeo, as well as by his son, MARCO POLO, he remained for 17 years, and returned to Venice in 1295, after a two-year sea voyage through the islands of Indonesia and across the Indian Ocean to Persia (present-day Iran).

Although his son became known as the greatest medieval traveler to the Orient, Niccolò Polo, along with his brother, may have actually traveled over a much wider territory of central Asia. They followed a northern route around the Caspian Sea on their first voyage in 1260–66 and took a more southern route through the Hindu Kush mountain range on their second journey to the East with Marco in 1271–75. In any event, with Maffeo, Niccolò Polo was the first European known to have made a complete west-to-east crossing of Asia and an east-to-west trek back to Europe.

Ponce de León, Juan (ca. 1460–1521) *Spanish colonial official in Puerto Rico, conquistador in Florida*

Juan Ponce de León was born in Tierra de Campos in the León province of Spain (although some sources say he was born at Santervas del Campo in the province of Valladolid). As the son of a noble family, he served as a page at the Spanish royal court at Aragon. He went on to a military career, taking part in the reconquest of Spain from the Moors. In 1490, he participated in the recapture of the city of Granada.

In 1493, Ponce de León sailed with CHRISTOPHER COLUMBUS on his second voyage to the WEST INDIES. He eventually settled in the Spanish colony on Hispaniola (present-day Haiti and the Dominican Republic). In 1502, he served as a deputy to Spanish colonial governor Nicolás de Ovando, and, during the next two years, he fought the Arawak (Taino) Indians in the conquest of the eastern part of the island.

In 1508, on orders from Ovando, Ponce de León undertook an expedition to Puerto Rico, which he had visited with Columbus in 1493. Columbus had named the island San Juan de Boriquen, but, after Ponce de León reportedly discovered gold there, it became known as Puerto Rico, Spanish for “rich port.”

By 1509, the island of Puerto Rico had been subjugated by Ponce de León. That year, King Ferdinand of Spain appointed him governor of Puerto Rico, and Ponce de León established Caparra, the first Spanish settlement on Puerto Rico, near the site of what later became the city of San Juan on an offshore island.

Over the next several years, Ponce de León prospered on Puerto Rico, making his fortune in gold, slaves, and land. He heard tales from the Indians about an island to the north, called Bimini, which he was told possessed great riches. He supposedly also heard that on Bimini was a fabled FOUNTAIN OF YOUTH, the waters of which had great restorative powers, providing anyone who drank from it with the gift of perpetual youth.

In 1512, Ponce de León lost his position as governor of Puerto Rico when Diego Columbus, son of Christopher, asserted his exclusive right to make official appointments in the newly explored West Indies. To compensate for his loss, King Ferdinand commissioned Ponce de León to search for Bimini and conquer and colonize it.

Ponce de León's expedition left the port of San Germán, Puerto Rico, on March 3, 1513. His three ships, the *Santa María de la Consolación*, the *Santiago*, and the *San Cristóbal*, sailed northwestward through the Turks and Caicos Islands and into the Bahamas. On March 13, 1513, the expedition made a brief stop at the island then known as San Salvador, where Columbus possibly had made his first landing in the Americas in 1492. From there, they approached the coast of what is now Florida.

Ponce de León and some of his men landed on the Florida mainland on April 2, 1513, below the mouth of the St. Johns River, where the city of St. Augustine would be



Juan Ponce de León (Library of Congress)

founded 52 years later. (Some sources indicate Ponce de León's landing place was at what is now known as Ponce Inlet near Daytona Beach, Florida.) The next day, Easter Sunday, he officially claimed it for Spain, naming it Florida after the Spanish name for Easter—Pascua Florida.

According to some sources, Ponce de León and his ships explored the Atlantic coast as far north as the Okefenokee Swamp. In any event, soon after his initial landing on the Florida mainland, he sailed southward and made additional stops at Jupiter Inlet, where his men obtained fresh water from the Santa Cruz River. He also made a landing at what is now Cape Canaveral. After exploring Biscayne Bay, he headed into the Florida keys, then reached a group of islands he called the Dry Tortugas because of the quantity of sea turtles his men captured there. On this part of the expedition, Ponce de León made an early observation of the GULF STREAM, a current that seemed to drive his ships more forcefully than the wind.

At the time of his voyage, Ponce de León believed Florida to be an island. To confirm this, he sailed up the Gulf Coast of the Florida peninsula and made a landing at Pine Island, off the shores of Charlotte Harbor, between what is now Sarasota and Fort Myers, Florida. A Calusa Indian attack soon cut short his inland explorations.

Ponce de León continued along the west coast of Florida, possibly sailing as far north as Pensacola Bay. He

turned to the southwest and reached what he thought was the unexplored coast of Cuba (although some historians believe it was the Yucatán). From there, he returned to the southern end of Florida, explored Miami Bay and, after stopping at Cuba, returned to Puerto Rico on September 21, 1513.

The next year, Ponce de León was involved in the suppression of a revolt on Puerto Rico. In September 1514, he was named captain general of Puerto Rico. Soon afterward, he returned to Spain, where he presented an account of his explorations in Florida to King Ferdinand. The king then appointed Ponce de León *adelantado* (governor) of Florida, commissioning him to return there and establish a colony.

Ponce de León returned to the West Indies in 1517. Before undertaking a second expedition to Florida, he was involved in a military expedition against the Carib Indians of Guadeloupe and also participated in the conquest of Trinidad. In the meantime, expeditions by Spanish explorers LUCAS VÁSQUEZ DE AYLÓN and ALONSO ÁLVAREZ DE PINEDA had explored the Florida coast in 1519 and 1520, determining it was an extension of a much larger mainland.

Ponce de León's royal appointment as *adelantado* had granted him control over Florida and all lands contiguous to it. Fearing encroachment by other CONQUISTADORES, he set about organizing a new colonizing expedition. In spring 1521, with two ships carrying 200 soldiers and settlers, as well as a number of farm animals and agricultural tools and supplies, he sailed from Puerto Rico to the west coast of Florida. Ponce de León and his expedition landed on Sanibel Island in the mouth of the Caloosahatchee River, where they were soon attacked by Indians, possibly Calusa.

After Ponce de León was wounded by an Indian arrow, the attempt to colonize Florida was abandoned, and the expedition withdrew to Cuba. There, in July 1521, he died of his wounds. His remains were subsequently moved to San Juan, Puerto Rico. The city of Ponce, the second largest in Puerto Rico, was named in his honor.

Juan Ponce de León was one of the first generation of Spanish conquistadores to travel to the New World after Columbus's earlier voyages. In the course of his expedition to Florida, he unwittingly made the first recorded European exploration of what is now the mainland United States. Moreover, he founded the first settlement on Puerto Rico. His attempt to colonize Florida in 1521 was soon followed by the expeditions of PÁNFILO DE NARVÁEZ and HERNANDO DE SOTO. Almost as significant as his expedition to Florida was Ponce de León's report of the Gulf Stream, which soon was used by treasure-laden Spanish ships in their northeastward journey across the Atlantic to Europe. Two small islands of the Bahamas east of Florida were named the Bimini Islands after the mythical land.

Pond, Peter (1740–1807) *American fur trader in the Canadian Northwest*

Peter Pond was born in Milford, Connecticut, the son of a shoemaker. In 1756, he enlisted in the colonial militia and took part in the final years of the French and Indian War. In the campaign against Montreal of 1760, he was commissioned an officer.

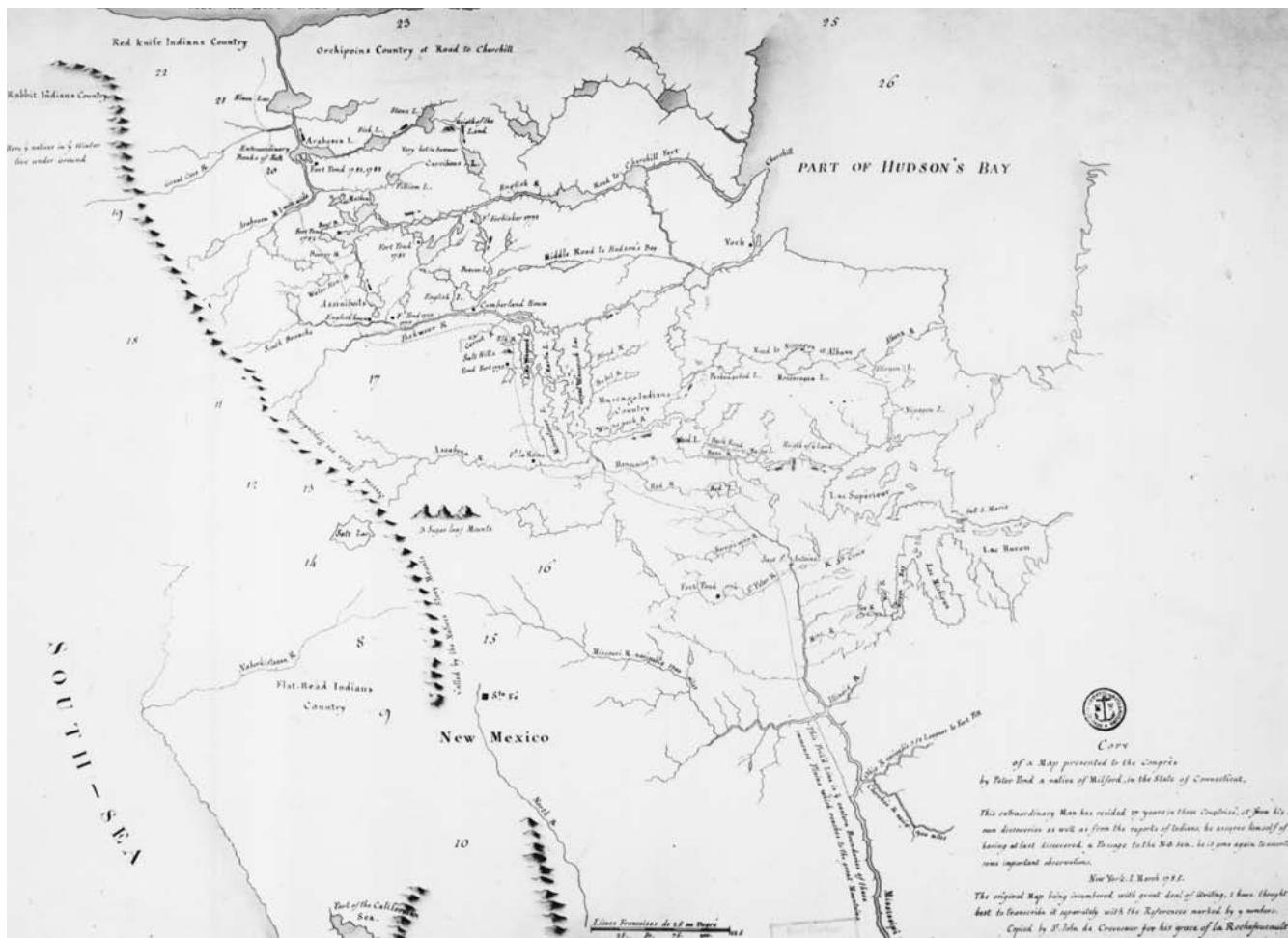
Pond left the military after the war and entered the fur trade in the Great Lakes region. From 1765 to 1771, he operated out of Detroit in present-day Michigan. During this period, he killed a man in a duel, the first in a series of violent episodes that would mark his career.

In 1772, Pond went to Mackinac, from where he undertook fur-trading expeditions into the upper MISSISSIPPI RIVER region of what is now Wisconsin and Minnesota.

Pond first traveled to western Canada in 1775. Accompanied by fellow trader ALEXANDER HENRY (the elder), he traveled to the Saskatchewan River region by way of Lake Superior, Grand Portage, and Lake Winnipeg. From there, he went on by himself to Dauphin Lake, south of Lake Winnipegosis.

In 1777, Pond entered into a partnership with Simon McTavish, the Frobisher brothers, and the McGill brothers, which eventually developed into the NORTH WEST COMPANY. That year, Pond established a trading fort on the Saskatchewan River that brought the FUR TRADE to the Indians of western Canada and cut into the monopoly of the HUDSON'S BAY COMPANY outposts to the east.

In spring 1778, Pond led a trading expedition northwest of Cumberland House on the lower Saskatchewan River. His party of 16 VOYAGEURS, traveling by CANOE, carried several tons of supplies and trade goods. In summer 1778, they reached the Methye Portage, which they crossed, becoming the first non-Indians to traverse the watershed between the rivers draining into HUDSON BAY and those emptying into the Mackenzie River Basin and the Arctic Ocean. The Methye Portage took them to the Clearwater River, which they followed into the Athabasca River. Thirty miles below the entrance to Lake Athabasca, Pond and his men established winter quarters. He traded with the Chipewyan Indians and was able to obtain twice as many fur pelts as



Map of western North America by Peter Pond (1775) (Library of Congress)

expected. He returned to the lower Saskatchewan post at Cumberland House in summer 1779.

Pond made his next trip to the Lake Athabasca region in 1780. The next year, he was caught in early winter weather and remained at Lac La Ronge. While there, he was involved in another killing, this time of a competing trader. He returned to Montreal in 1782, where he was tried and acquitted of murder. Soon afterward, he left Canada and returned to the United States.

While in the Lake Athabasca region, Pond had heard from the Indians of a river flowing eastward from the ROCKY MOUNTAINS, now known as the Peace River. He incorrectly surmised that from Lake Athabasca the distance to the Pacific Ocean was less than 400 miles. His error was based on his incorrect determination of the longitude of Lake Athabasca, which Pond placed 700 miles farther west than it really was. In 1784, the first published reports of JAMES COOK's 1778 exploration of the coast of the Pacific Northwest appeared. Based on the maps included in Cook's account, coupled with tales from the Chipewyan Indians, Pond speculated that there was a water route that linked the rivers north of Lake Athabasca with the Pacific coast of Alaska, near present-day Anchorage.

In 1785, Pond went to New York City, then the U.S. capital, where he tried to present a map of the Canadian Northwest to the U.S. Congress, in the hope of winning support for an expedition to the lucrative sea otter resources on the Alaskan coast. Failing to gain governmental support, he returned to Lake Athabasca.

From 1785 to 1788, Pond explored the Lake Athabasca region, reaching Great Slave Lake. He observed there the Mackenzie River, which seemed to flow southwestward toward the Pacific Ocean. He mistakenly concluded that this stream would link up with the Cook River, thus providing a canoe route to the sea otter trade in the Gulf of Alaska and beyond to the Kamchatka Peninsula of eastern SIBERIA.

Pond left northwestern Canada in about 1788, after another violent confrontation in which a rival trader was shot and killed. He reportedly returned to Milford, Connecticut, where he remained for the rest of his life, although other sources indicate that he returned to the upper Mississippi.

Peter Pond's 1785 map provided the first comprehensive picture of the Canadian Northwest. During his last year at Lake Athabasca, he conferred with North West Company trader and explorer ALEXANDER MACKENZIE, who, in 1789, explored Great Slave Lake and followed the river previously reached by Pond. This was the Mackenzie River, which led to the Arctic Ocean, not the Pacific. Nevertheless, several years later, Mackenzie, based on Pond's reports of the Peace River, was able to trace a canoe-and-portage route from Lake Athabasca to the Pacific coast.

Pope, John B. (1822–1892) *U.S. Army officer, American topographer in the American Southwest*

Born in Louisville, Kentucky, John B. Pope graduated from West Point in 1842. During the next four years, as a second lieutenant in the U.S. Army Corps of Topographical Engineers, he conducted government surveys of Florida as well as the northeastern part of the U.S.-Canada boundary.

During the U.S.-Mexican War of 1846–48, Pope served under General Zachary Taylor in the Texas and Mexico campaigns. After the war, Pope returned to the Topographical Corps. In 1849, he undertook a survey of the Red River of the North in the Minnesota Territory.

In 1851, Pope became chief topographical engineer for the Department of New Mexico. That year, he surveyed a route between Santa Fe, New Mexico, and Fort Leavenworth, Kansas, that was to serve as an alternative to the established Santa Fe Trail.

In February 1854, as part of the Pacific Railroad surveys, Pope led an expedition eastward from Dona Ana on the Rio Grande, across central Texas, to Fort Washita on the Red River. The expedition explored the eastern segment of the proposed 32nd parallel transcontinental railroad route, while another expedition, under the command of Lieutenant JOHN GRUBB PARKE, explored the western segment from the Rio Grande to the Pacific Ocean.

Heading eastward from the Rio Grande, Pope located a pass over western Texas's Guadalupe Mountain. He sent two small parties northward to explore the arid Llano Estacado (Staked Plain) region. The expedition reached Fort Washita by following a route that closely paralleled a well-established emigrant wagon road.

In 1855, Pope returned to western Texas, where he supervised the drilling of experimental artesian wells in the Staked Plain region to determine if the 32nd parallel route was viable for a railroad.

Pope rose to prominence as a Union commander in the early battles of the Civil War. Yet, after suffering a severe reversal at the second battle of Bull Run in 1862, he was sent to western Minnesota to help suppress the Santee Sioux (Dakota) Indian uprising. After the war, during the late 1860s, he commanded the army's vast Department of the Missouri. He retired from the army in 1886 as a major general.

John B. Pope's contribution to North American exploration is somewhat tainted by the fact that his 1849 map of Minnesota was revealed by Lieutenant HENRY LARCOM ABBOTT to be a plagiarism of JOSEPH NICOLAS NICOLLET's map of the same region, published in 1843. Nonetheless, his subsequent official account of his explorations from the Rio Grande to the Red River, included as part of the results of the Pacific Railroad surveys, widened geographic knowledge of the southern plains.

Popham, George (ca. 1550–1608) *English mariner, colonizer in the Americas*

Born at Huntsworth in Somerset, England, near Bristol, George Popham was a nephew of Sir John Popham, England's lord chief justice. In 1594–95, Popham commanded a ship of British PRIVATEERS to the WEST INDIES and the mainland of northeastern South America, where he took part in raids on Spanish ships and ports. From a captured Spanish vessel, he recovered documents detailing the interior of the region known as Guiana, which he later gave to SIR WALTER RALEIGH.

In 1606, Popham was one of the original organizers of the VIRGINIA COMPANY of Plymouth, which, with the VIRGINIA COMPANY of London, had received from King James I grants of land in what is now New England and Virginia. That year, with the help of his uncle Sir John Popham and Sir Ferdinando Gorges, he organized a colonizing expedition to North America.

On May 31, 1607, Popham sailed from Plymouth in command of the *Gift of God*, accompanied by the *Mary and John* captained by Raleigh Gilbert, a son of SIR HUMPHREY GILBERT and a nephew of Sir Walter Raleigh. The ships, carrying about 100 colonists, reached Maine in late July. After exploring along the coast, they made an initial landing on Monhegan Island on August 9, 1607. One week later, they established a colony at the mouth of the Kennebec River (then known as the Sagadahoc), near what is now Phippsburg, Maine. The settlement consisted of 15 huts and a church. Popham was elected governor of the colony, which was called Fort St. George.

Popham, Gilbert, and about 45 colonists remained in the Maine colony when the ships sailed back to England on December 5, 1607. Before long, however, a fire destroyed most of their provisions, and, on February 8, 1608, Popham died. Gilbert soon sailed for England, and, the following summer, the remaining colonists abandoned the settlement and also returned to England.

Short-lived as it was, George Popham's settlement on the Maine coast was the first English colony in New England. At the same time, a more successful settlement had been established by the London Company at Jamestown on the Virginia coast. Popham Beach, Maine, near the site of the abandoned colony, was named in his honor.

Popov, Fyodot Alekseyev (Feodot Alekseyev Popov) (fl. 1640s) *Russian trader in Siberia*

Fyodot Alekseyev Popov was a merchant from the Northern Dvina River port of Veliki Ustyug, north of Moscow and then an important trade and transportation center on the road from European Russia to SIBERIA. Popov became a pioneer Russian trader along the Arctic coast of eastern Siberia. In 1647, he organized an expedition planning to travel by sea from Nizhnekolymsk, a settlement near the

mouth of the Kolyma River, around the Chukchi Peninsula, to Anadyr Island off the Siberian coast of the Bering Sea, which had been reported as a rich source of walrus ivory.

Turned back by ice at the mouth of the Kolyma River in his first attempt, Popov set out again in 1648, accompanied by SEMYON IVANOVICH DEZHNEV, a Cossack in service to the czar. With six small boats, carrying about 90 men, he left Nizhnekolymsk and managed to travel eastward around what later came to be known as Cape Dezhnev, to the mouth of the Anadyr River and Anadyr Island. Afterward, he reportedly went south into the northern Kamchatka Peninsula.

In their 1648 voyage, Fyodot Alekseyev Popov and Dezhnev unwittingly located the northeasternmost extent of the Asian continent, a finding that eventually led Russian geographers to conclude that Asia and North America were separated by open sea.

Pordenone, Odoric of See ODORIC OF PORDENONE.

Porte, François de la (comte de Castelnau, Francis de la Porte, count of Castelnau)

(1812–1880) *French naturalist in the Americas*

François de la Porte, comte de Castelnau, was born in London, England, to French nobility. His interest in geography and the natural sciences led him to an appointment as head of an 1837 French scientific expedition to North America. During the next four years, Castelnau and his team of scientists undertook a study of the lakes of Mexico, the United States, and Canada.

In 1843, Castelnau led a French scientific team in an expedition to South America. From Rio de Janeiro, he traveled to the Río de la Plata, which he ascended in his exploration of the interior of Brazil. He then surveyed the watershed between the AMAZON RIVER and the Río de la Plata, and explored the Paraguay River, locating its source in the Mato Grosso region of western Brazil. Proceeding westward from Brazil, he became one of the few 19th-century European explorers to traverse the difficult and uninhabited Gran Chaco region. While in Brazil, he also explored the Araguaia and Tocantins Rivers. Entering Bolivia from the east, Castelnau continued on to Potosí, eventually reaching Lake Titicaca, near the Pacific coast.

Starting in 1846, Castelnau began his second great exploration of South America. From Urubamba, north of Cuzco, Peru, he traveled along the eastern slopes of the ANDES MOUNTAINS to the Urubamba and Ucayali Rivers into the Amazon. Eventually reaching the Pará River, he followed it to the Atlantic Ocean, arriving in 1847.

Comte de Castelnau's two explorations of the South American continent revealed much about the geography of the little-known area lying between the Amazon and Río de la Plata. In his second expedition of 1846–47, he made the first west-to-east crossing of South America by way of Peru and Brazil.

Porto, Antonio Silva See SILVA PORTO, ANTONIO.

Portolá, Gaspar de (ca. 1722–ca. 1784)

Spanish army officer, colonial governor in California

Gaspar de Portolá was born at Balaguer in the Catalonia region of Spain, into a noble family. While in his early teens, he entered the Spanish army as a commissioned officer, and during the next 30 years, he served in assignments in Portugal and Italy, attaining the rank of captain in 1764.

In 1767, Portolá was named governor of the Spanish-held province of California, which then comprised Mexico's Baja California as well as what is now the state of California. Two years later, on May 15, 1769, he left Velicate, the Spanish settlement in Baja California, in command of a colonizing expedition northward into present-day southern California. Accompanied by Franciscan missionary Father JUNÍPERO SERRA, Portolá led a group of 126 soldiers, colonists, and Franciscan friars, along with pack animals and a large herd of cattle, northward across several hundred miles of unexplored desert.

On July 1, 1769, after an overland trek of six weeks, Portolá and his party arrived at San Diego. They met up with another contingent of colonists there, who had arrived by ship several weeks earlier. Two weeks later, Portolá set out with a party of 40 soldiers, heading northward along California's coastal valleys and mountains, seeking the great bay that SEBASTIÁN VISCAÍNO had reported finding in 1602. Serra stayed in San Diego for the time being.

On October 1, 1769, Portolá and his party arrived at the mouth of the Salinas River on the shores of Monterey Bay, although at the time the Spaniards did not recognize it as the one Viscaíno had described. Instead, they continued to search northward. After several more weeks, a reconnaissance team reached Drakes Bay, a site already known to Spanish navigators. Soon afterward, on November 1, 1769, Portolá's scouts came upon a huge natural harbor, which one member of the expedition later described as big enough to hold the ships of all the navies of Europe. Portolá took possession of the harbor and the surrounding territory for the Spanish Crown, naming it San Francisco Bay. He then led his men southward, back to San Diego, which they reached on January 24, 1770.

After a rest at San Diego, and the arrival of a ship carrying much-needed supplies, Portolá set out again in search of

Monterey Bay. On May 24, 1770, he reached Monterey Bay a second time, and, from the height of a mountain overlooking the coast, he was able to discern that it was indeed the shape of the bay that Viscaíno had described. One week later, Portolá established the mission and presidio of San Carlos Borromeo on the shores of the bay. The next year, it was moved to the north near present-day Carmel, California.

With a permanent Spanish presence firmly established in California, Portolá returned to Mexico. In 1776, he was appointed governor of the city of Puebla, a post he held until 1784. He may have then returned to Spain, although some sources suggest he spent his last years in Mexico.

Gaspar de Portolá, along with Serra, played an important role in establishing the first European settlements in California. His overland explorations in 1769–70 resulted in the first European penetration into California's interior, and his northward route from San Diego to San Francisco later developed into the California Mission Trail. It was Portolá's landbased expedition that made the European discovery of San Francisco Bay in 1769, a find that had eluded European navigators through more than 200 years of exploration along that part of the California coast by sea, beginning with JUAN RODRÍGUEZ CABRILLO's voyage of 1542.

Pottinger, Sir Henry (1789–1856) *Irish-born*

British army officer in southwestern Asia

A native of Ireland, Henry Pottinger's military and diplomatic career began in the early 1800s with the British army in India. In 1810, Pottinger and a military surveyor, Captain CHARLES CHRISTIE, were sent from Bombay to the Baluchistan coast of what is now southern Pakistan to explore northward as far as the Afghan frontier, territory then little known to Europeans. The expedition had been spurred on by British concern that the French, under Napoléon, might get military support from Russia and Persia (present-day Iran) for an assault on India. Essential to meeting this possible challenge to British influence in southwestern Asia was updated and accurate geographic information about the territory between the Persian Gulf and western India.

Pottinger and Christie sailed from Bombay, and after landing at Karachi, they explored inland disguised as horse traders. They traversed the interior of Pakistan northward to Nushki on the Afghan border, where they separated. While Christie crossed Afghanistan to Herat, Pottinger made his way westward through the Kerman region of Persia, present-day southeastern Iran. He reached Bushehr, midway up the Persian Gulf, from where he went northward to Esfahan and rejoined Christie.

From there, Pottinger and Christie traveled northward to the city of Qazvin, where they again parted. Christie surveyed the region around Baku, west of the Caspian Sea, and

Pottinger went southward to Baghdad, then proceeded down the Euphrates River to Basra and the Persian Gulf.

In his later career, Pottinger took part in military campaigns in west-central India, and, following the consolidation of British rule there, held diplomatic positions in southern Pakistan's Sindh region. He went on to command British forces in the Far East in the Opium War of 1839–42, and, in 1843, he became the first British governor of Hong Kong. In 1846, he served as British colonial governor at the CAPE OF GOOD HOPE, returning to India the following year to become governor of Madras. Pottinger described his early travels in Persia and Pakistan in his book *Travels in Beloochistan and Sinde*, first published in 1816.

Sir Henry Pottinger and Charles Christie were among the first modern European explorers of southwestern Asia, a part of the world that had remained largely unknown to Europeans since medieval times.

Powell, John Wesley (1834–1902)

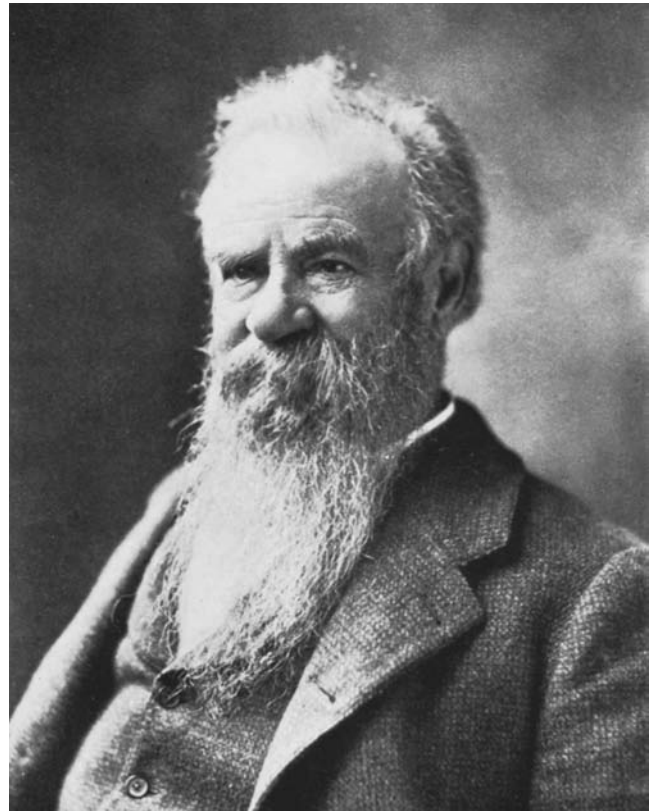
American geologist, ethnologist, explorer of the Grand Canyon
John Wesley Powell was born at Mount Morris in western New York State's Genesee Valley region. His father, who had come from England in 1830, was an exhorter for the Methodist Episcopal Church. While still young, Powell moved with his family to Jackson, Ohio, where he first studied the natural sciences as a student of naturalist George Crookham. The family subsequently moved west to Wisconsin, finally settling in Wheaton, Illinois.

Starting in 1852, Powell attended what later became Wheaton College, while supporting himself as a schoolteacher. He went on to Illinois College at Jacksonville and also studied at Oberlin College in Ohio. Powell planned to follow his father in a career as a Methodist minister, but instead embarked on a study of natural science, concentrating on geology.

From 1855 to 1858, while studying at Oberlin and Wheaton, Powell undertook solo expeditions in a small boat along the MISSISSIPPI RIVER and Ohio River.

With the onset of the Civil War in 1861, Powell enlisted in the army and received a commission as a lieutenant. He organized an artillery unit in 1862, and that year, at the battle of Shiloh, suffered a wound in which he lost the lower part of his right arm. In 1865, Powell left the army at the rank of major and became a professor of geology at Illinois Wesleyan College in Bloomington, Illinois.

In summer 1867, Powell took a group of his geology students and a party of scientists on a field trip to the Colorado ROCKY MOUNTAINS. On a second field trip the following summer, he visited the gorge of the Green River in present-day Wyoming and the Grand Canyon in present-day Arizona, which inspired him to obtain federal funding for an exploration of the COLORADO RIVER.



John Wesley Powell (Library of Congress)

On May 24, 1869, Powell's expedition of 11 men entered the Flaming Gorge of the Green River at the Union Pacific Railroad's crossing near the town of Green River, Wyoming. In four specially constructed boats, Powell and his men traveled southward through what is now eastern Utah to the Green River's confluence with the Colorado, which they descended into what is now northern Arizona. At the entrance to the Grand Canyon, three of his party decided not to continue. Powell and the remaining eight men then proceeded in boats down the rapids and through the mile-high walls.

In 1871, Powell led a government scientific expedition that explored and charted the Colorado Plateau in Utah and Arizona. Over the next four years, he undertook topographic and geological surveys of the Uinta Mountains. In 1875, he became a director of the U.S. Geological and Geographical Survey of the Territories, then went on to succeed CLARENCE KING as director of the U.S. Geological Survey in 1881.

Powell's interest in the American West also included the study of the culture of Pueblo Indians. In 1894, he became the director of the Smithsonian Institution's Bureau of American Ethnology and supervised anthropologists in studies of Indian tribes. Powell's account of his 1869 exploration of the Grand Canyon is included in his *Explorations*

of the *Colorado River of the West and Its Tributaries*, first published in 1875.

John Wesley Powell led the first successful navigation down the Colorado River through the Grand Canyon. His subsequent efforts helped promote and consolidate U.S. government-sponsored scientific explorations in the American West. His studies of topography and geology in Arizona and Utah led to his theories on the origins of the Uinta Mountains and other ranges in the West, and laid the foundation for the science of geomorphology, the branch of geology that studies the origins of the Earth's land forms.

Poyarkov, Vasily Danilovich (Vasili Poyarkov)

(fl. 1640s) *Russian Cossack in eastern Siberia*

Vasily Poyarkov was a Russian Cossack leader in service to the czarist government in eastern SIBERIA. In 1643, he was commissioned to lead a military expedition from Yakutsk in search of the Shilka (black dragon), a river thought to lead southward into China. He was also to investigate the region's mineral resources and collect taxes from the area's fur traders.

From Yakutsk, Poyarkov and his command traveled along the Lena River to its junction with the Aldan, which they followed eastward and southward to the edge of the Aldan Plateau. At the Gonam River, he established a small garrison, leaving a contingent of men, then continued southward across the mountains. He came upon the Zeya River, an uncharted tributary of the Amur.

Poyarkov and his men wintered on the Zeya, and, in spring 1644, the rest of his command arrived from the Gonam River post with fresh supplies. Soon afterward, Poyarkov led his expedition down the Zeya and reached the Amur River, near what is now the Russian city of Blagoveshchensk on the Chinese border. The Cossack leader's brutal treatment of the region's native Daurian people aroused hostility, instigating attacks in which Poyarkov lost half his force.

Poyarkov and the survivors descended the Amur in small boats; after three months, they reached its mouth on the Sea of Okhotsk. In summer 1645, following delays because of ice at the mouth of the Amur, they sailed into Sakhalin Gulf and sighted the north coast of Sakhalin Island. They followed the shore of the Sea of Okhotsk northward, eventually reaching the mouth of the Ulya River, where they encamped for the winter.

Poyarkov and his men began the last leg of their journey homeward in spring 1646, with a trip up the frozen Ulya River on skis. They eventually reached the Aldan River, which led them back to the Lena and Yakutsk by June 1646.

Vasily Poyarkov is the first European known to have descended the length of the Amur River to the Sea of Okhotsk and the Pacific. The information he brought back about the Amur River and the surrounding territory was

used by the Russian government in planning its conquest of the region in the 18th and early 19th centuries. His combined river and overland explorations took him across a vast area of southeastern Siberia.

Pribylov, Gavriilo Loginovich (Gavril Pribylov, Gerasim Pribilof) (fl. 1780s) *Russian mariner in the Bering Sea*

During the 1780s, sea captain Gavriilo Pribylov sailed the Bering Sea for a Russian fur-trading company in search of new sources of seal and sea otter fur. In 1786, two years after the establishment of the first Russian fur-trading colony in Alaska on Kodiak Island, Pribylov reached a group of four volcanic islands, approximately 230 miles north of Unalaska. Although previously sighted by earlier mariners, they had not been visited by Europeans. These islands proved to be the main breeding grounds of the Alaska fur seal, a type of eared seal, related to the California sea lion and highly prized as a source of fur.

Gavriilo Pribylov named the uninhabited islands after himself (later spelled Pribilof). Russian fur traders soon took some Aleut there to hunt the fur seals for their valuable pelts as well as for their sex glands, which were then in great demand in China, where they were believed to have rejuvenative powers. Seal hunting in the Pribilofs became so extensive in the next two decades that by 1810 the seal population there had been reduced by 90 percent. In 1868, the year after the United States took possession of the islands as part of its purchase of Alaska, the Pribilofs became a seal preserve. Nevertheless, open-sea hunting of seals migrating to the Pribilof Islands in the spring continued on a wide scale so that, by 1911, the herd was threatened with extinction. The situation changed that year, when the United States, Japan, and Russia entered into the North Pacific Sealing Convention under which the three nations agreed to prohibit open-sea seal hunting; as a result, the seal herd was gradually built up again.

Pring, Martin (fl. 1603–1606) *English mariner on the New England coast*

Martin Pring was originally from Devonshire, England. By the early 1600s, he had developed a reputation as an able navigator and sea captain. In 1603, a group of Bristol merchants commissioned a followup of BARTHOLOMEW GOSNOLD's 1602 voyage to the New England coast. The expedition was organized by English geographer RICHARD HAKLUYT and was to be headed by Pring.

In April 1603, Pring departed England in command of the ship the *Speedwell*. A smaller ship, the *Discoverer*, commanded by William Brown, was also part of the expedition. Pring followed Gosnold's route to North America, reaching the coast of Maine in June 1603. From there, he

sailed southward around Cape Cod and made a landing at what is now Edgartown on Martha's Vineyard. He proceeded along the Massachusetts coast to New Bedford, then explored the New England coast of Long Island Sound.

Pring traded with the Indians, obtaining furs and sassafras, which he sent back to England aboard the *Discoverer*. On locating a good harbor, he sent a party ashore to investigate the fertility of the soil. His men planted wheat, barley, oats, peas, and other garden vegetables. After seven weeks, the crops started to sprout, confirming earlier reports that the New England coastal region was highly suitable for an agricultural colony.

In August 1603, Martin Pring and the rest of his party sailed for England, reaching Bristol about nine weeks later. He made another voyage to the Maine coast in 1606. The success of Pring's agricultural experiment, the first such undertaking in New England, inspired the establishment of an English colony under GEORGE POPHAM on Maine's Kennebec River in 1607.

Provost, Étienne (1782–1850) *French-Canadian fur trader in the American West*

Born in Montreal, Canada, Étienne Provost arrived in St. Louis in 1815, where he entered the FUR TRADE as a trapper with AUGUSTE PIERRE CHOUTEAU. He took part in Chouteau's 1815–17 expedition up the Arkansas River into present-day Colorado. When his party wandered into Spanish-held New Mexico, he was arrested along with them and briefly jailed in Santa Fe.

Provost remained in New Mexico after Mexican independence had been won in 1821, and he undertook fur-trapping expeditions into the ROCKY MOUNTAINS north of Taos, New Mexico. He may have been with an 1823 fur-trapping expedition under JEDEDIAH STRONG SMITH that rediscovered the SOUTH PASS in what is now southern Wyoming. In 1824, Provost and a party of trappers explored the Wasatch Mountains, into the area around present-day Provo, Utah, and may have continued northward as far as the Great Salt Lake.

Indians later attacked the trappers in the Wasatch Mountains, killing several. Provost and the other survivors fled to their encampment on the Green River in northeastern Utah. In 1825, Provost joined with WILLIAM HENRY ASHLEY on the way to the first trappers' rendezvous on the Green River at Henrys Fork.

In 1837, Provost traveled with THOMAS FITZPATRICK and frontier artist ALFRED JACOB MILLER along the Oregon Trail to Fort Laramie on the Laramie River in present-day Wyoming. Two years later, in 1839, he guided JOHN CHARLES FRÉMONT and JOSEPH NICOLAS NICOLLET in their exploration of the territory between the upper MISSISSIPPI RIVER and upper MISSOURI RIVER. Then, in 1843, he

served as a guide for JOHN JAMES AUDUBON's expedition to the upper Missouri.

The city of Provo, Utah, although spelled differently, was named in honor of Étienne Provost, as were a Utah river and mountain peak. His career as a mountain man and fur trader took him across a wide area of the Rocky Mountains and brought him in contact with some of the best-known explorers of the American West.

Przhevalsky, Nikolay Mikhailovich (Nikolai Mikailovich Prejevalski, Nicholas Michailovitch Prjevalsky, Nicholas Przevalskii, Nikolai Przewalski) (1839–1888) *Russian army officer, naturalist in central Asia*

Born in the Russian town of Otradnoe, near Smolensk, west of Moscow, Nikolay Przhevalsky was of Cossack descent, born into a family of landed gentry. He attended secondary school in Smolensk; in 1855, at the age of 16, he entered the Russian army as a career military officer. He served with a Moscow-based regiment, then became a teacher of geography at the army's military academy in Warsaw.

In 1867, on volunteering for an assignment in eastern SIBERIA, Przhevalsky was sent to the frontier region along the Ussuri River on the Russia-China border, 200 miles inland from the Pacific coast. He conducted a census of the native inhabitants and took part in military actions against the gangs of marauding Chinese bandits infiltrating Russian territory from Manchuria. Przhevalsky also studied the region's natural history, and, in his subsequent report, he detailed the plant and animal life around the Ussuri River region, as well as the life and culture of its native people.

Highly impressed with Przhevalsky's account, the Russian Imperial Geographical Society agreed to sponsor his plan to conduct a series of extensive explorations into the interior of Mongolia and China. A leave of absence from the army was arranged, and in 1870 he set out on his first expedition from the southeastern Siberian city of Irkutsk, accompanied by two Russian companions. The group traveled southward around Lake Baikal to Kyakhta along Mongolia's north-central frontier, continuing on to Ulan Bator, where they obtained camels for the journey across the GOBI DESERT to Peking (Beijing) in China. Przhevalsky and his party followed the traditional caravan route across northeastern China, crossing the Great Wall at Kalgan. They completed the last leg of the trip to Peking on horseback, arriving in early 1872. From there, he assembled another camel caravan for an expedition into northern and western China.

Following the east-west caravan route, Przhevalsky reached Koko Nor, a large salt lake, and the Tsaidam Swamp (depression) in western China. By that time, he had run out of funds to continue his explorations southwestward into the Tibetan Plateau and to LHASA. He made an arduous

return journey across the Ordos desert to the Russia-Mongolia frontier at Kyakhta. On this expedition, he had traversed Mongolia from north to south, and had traveled along a wide arc through eastern, western, and southern China.

Przhevalsky's next expedition penetrated China from the west. In 1876, he set out from Kuldja (present-day Yinling, China), then a Russian-held city on China's northwestern frontier with Russia. He crossed the Tian Shan range and the Taklimakan Desert; after exploring the Tarim River Basin, he came upon Lop Nor, the dried-up bed of an immense salt lake whose location had mysteriously shifted over the last six centuries. Afterward, in an attempt to reach Tibet, he entered the previously uncharted Astin Tagh mountains. With the onset of winter in the difficult mountain terrain, he was again forced to abandon his planned trip to Lhasa, and he returned to Kuldja.

In 1879, Przhevalsky undertook another exploration of the Chinese interior from the west, starting out from Zaysan in what is now Kazakhstan. On this exploration, he explored the upper Yellow River (Huang He) region and approached the Tsaidam Swamp and Koko Nor from the west. He then traveled southward across southwestern China's Dzungaria region into Tibet. He reached within 150 miles of Lhasa, when Tibetan authorities, suspicious of all Westerners, ordered him out of the country. The next year, he returned to Russian territory.

In 1883–85, in his fourth and final expedition, Przhevalsky again crossed the Gobi Desert from northern Mongolia and traversed China westward to Koko Nor. He proceeded westward through the Kunlun and Tian Shan Mountains to Karakul, on Issyk Kul, a lake in what is now Kyrgyzstan. He had planned a fifth expedition to Tibet in 1888, but he died that year, shortly after setting out from Karakul.

Nikolay Przhevalsky is credited with making the first scientific exploration of central Asia. His expeditions were undertaken amid Russian apprehensions over possible British encroachment into central Asia from India and Afghanistan, making his reports on the region's geography politically significant as well. In his nine years of explorations, he traveled more than 20,500 miles in Mongolia, China, and Tibet, covering a vast area ranging from the edge of the Pamirs in the west, eastward to Peking, and from Mongolia southward to Tibet. Among the species new to science that he encountered were a type of wild camel, a type of wild sheep, a long-eared pheasant, and a type of wild horse, known today as Przhevalsky's horse, which in its pure-bred state is believed to be a "living ancestor" of the domestic horse. A city in the Kirghiz region where Przhevalsky died has since been named Przhevalsk in his honor. Przhevalsky's visit to Lop Nor in 1876 marked the first time a European ventured to that region since the travels of

MARCO POLO, 600 years earlier. Although he did not achieve his goal of reaching the city of Lhasa, which was then forbidden to most foreigners, he is nonetheless considered the greatest Russian explorer of central Asia. His published accounts of his travels include *From Kulja, Across the Tian Shan to Lop-Nor* (1879) and the two-volume *Mongolia, the Tangut Country and the Solitudes of Northern Tibet* (1876).

Ptolemy (Ptolemy of Alexandria; Claudius Ptolemaeus) (ca. A.D. 90–ca. A.D. 150)

Hellenized Egyptian geographer, astronomer, mathematician in ancient Alexandria, Egypt

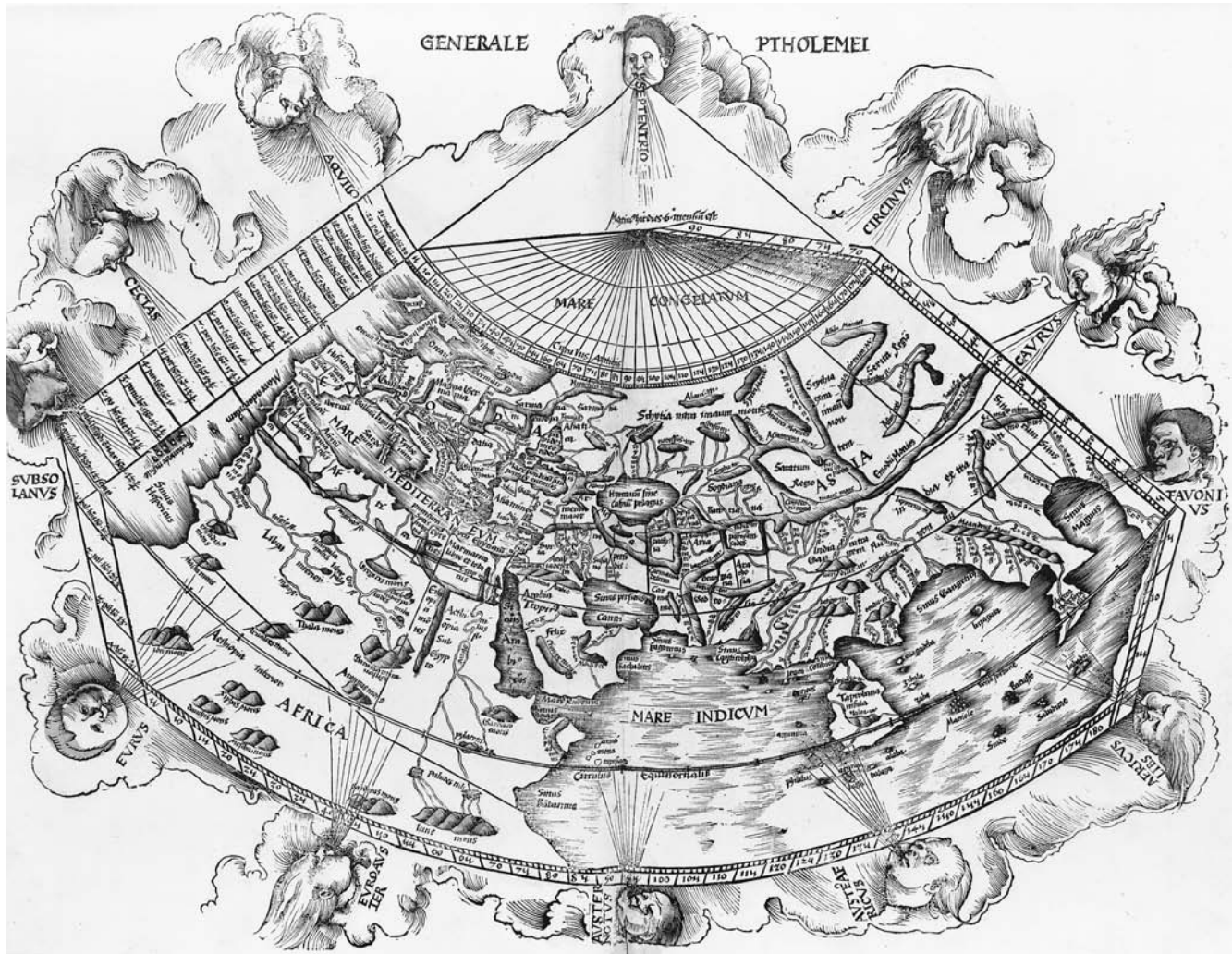
A Hellenized Egyptian, Ptolemy was a native of Alexandria, Egypt, and a leading scholar and scientist among that city's Greek intellectual community in the second century A.D. His exact heritage is not known. He may have had Egyptian, Greek, or Roman ancestry, or a combination. He conducted studies in and wrote works on mathematics, astronomy, and geography.

From A.D. 127 to 147, Ptolemy produced an eight-volume work summarizing the geography of the known world. Known as *Geographia*, or *Introduction to the Description of the Earth*, it includes a compilation of 8,000 places, along with their coordinates of LATITUDE and LONGITUDE, with relative distances obtained from travel reports and some astronomical observations.

Like other learned Greeks of his day, Ptolemy conceived the world as spherical, although he rejected the notion that all the lands on Earth were surrounded by a great "Ocean Stream," and instead suggested that uncharted lands could be located across the unexplored seas.

Ptolemy's *Geographia* was fairly accurate about the Mediterranean region and correctly located Ireland as lying west of Britain. His northernmost point, known as ULTIMA THULE, has since been hypothesized as one of Scotland's Shetland Islands. He also mentions eastern Europe's Volga River and makes the first known reference to the Carpathian Mountains. He was also aware of the lands of western China, citing that region as the ultimate source of silk that was transported along the SILK ROAD. Much of his work was drawn from earlier Greek geographers, including Marinus of Tyre and STRABO.

Ptolemy's larger view of world geography, based more on traditional beliefs than on actual travel accounts, was far less precise. In later world maps based directly on his work, Africa is shown to be joined to eastern Asia, thus depicting the Indian Ocean as an entirely enclosed inland sea. He also believed that a great unknown landmass had to exist in the Southern Hemisphere to counterbalance the known continents of the Northern Hemisphere, an idea that later prompted European exploration of the Pacific Ocean in



Map by Ptolemy (Library of Congress)

search of the GREAT SOUTHERN CONTINENT, or Terra Australis, including the first two voyages of JAMES COOK in the early 1770s. Yet Ptolemy accurately portrayed the NILE RIVER as flowing from two large lakes in the interior, fed by snow melting off the fabled MOUNTAINS OF THE MOON. This idea, rejected by later geographers, was later proven to be true with the African expeditions of SIR HENRY MORTON STANLEY and his exploration of the Ruwenzori Mountains in the 1870s. (It is not certain, however, if Ptolemy was actually describing the Ruwenzori Range, or other peaks, such as MOUNT KILIMANJARO and Mount Kenya.) Ptolemy's work included an account of the journey across the Atlas Mountains into the northern SAHARA DESERT undertaken by the Roman officer JULIUS MATERNUS in the first century A.D.

After the decline of Roman rule in Egypt, Ptolemy's *Geographia* was preserved by Arab scholars. Translated into Arabic, it greatly influenced geographic thought in the

Muslim world throughout the medieval period. In about 1400, a copy in Greek translation was taken from Constantinople (present-day Istanbul, Turkey) to Florence, along with 27 maps, reported to be copies of originals produced under Ptolemy's direction. The *Geographia*, translated into Latin by 1410, widely circulated in Europe and greatly influenced mapmakers GERARDUS MERCATOR and ABRAHAM ORTELIUS and Italian navigator CHRISTOPHER COLUMBUS. The work detailed the principles of mapmaking, with directions for projecting a spherical image of the world onto a plane, and such now commonly followed practices as orienting a map with north at the top and east to the right, with parallels of latitude and meridians of longitude. In 1477, the first printed atlas of the world, based on Ptolemy's work, was published in Bologna. His writings, and the maps that resulted from them, helped popularize the idea among educated Europeans that the world was round. About the same time that Ptolemy's

geographic ideas were being revived in Europe, direct overland contact with Asia was severed by the conquests of the Turks; influenced by his work, geographers and navigators began to turn their attention westward in their search for a new route to the Orient. In addition to his work in geography, Ptolemy's studies in astronomy and his concept of an Earth-centered solar system dominated European thought until the findings of Copernicus in the 16th century.

Pytheas (Pytheas of Marseilles, Pytheas of Massilia, Pytheas of Masilia) (fl. 320s B.C.)

Greek scholar, mariner in the British Isles and the North Sea

Pytheas was born in the Greek colony of Massilia (present-day Marseilles, France) in the early fourth century B.C. Trained in mathematics and astronomy by Plato's student Eudoxus of Cnidus, he went on to become an accomplished navigator, and he is known to have used astronomical observations to determine the latitude of Massilia.

In about 325 B.C., Pytheas set out from Massilia on a voyage to explore westward beyond the STRAIT OF GIBRALTAR and along the west coast of Europe. At that time, Greek mariners had been prevented from venturing from the MEDITERRANEAN SEA into the Atlantic Ocean by the Carthaginians, who dominated the western Mediterranean and maintained a naval blockade of the Strait of Gibraltar. The Greeks had been further discouraged by a belief in sea monsters and other terrible hazards as reported by the Carthaginians HANNO and HIMILCO in their separate Atlantic voyages a century earlier.

Pytheas may have received backing for his expedition from the merchants of Massilia, who were keenly interested in establishing a direct sea route to tin and amber sources in northern Europe. Carthage, then engaged in a war with Rome, had temporarily left the Strait of Gibraltar unguarded, allowing Pytheas to sail along the south coast of Spain to Gades (present-day Cádiz) and into the Atlantic.

Pytheas sailed northward along the coast of Spain to Cape Ortegal, then turned northeast into the Bay of Biscay and reached the coast of Brittany, which he later accurately described as a peninsula, extending westward. From there, he crossed the English Channel and landed on the coast of Cornwall, near Land's End. He established friendly contacts with the natives, who, as tin miners, had frequent contacts with foreign traders, which, Pytheas later noted, had made them civilized and less warlike. In several inland excursions, he noted other aspects of life in southern Britain, including how alcoholic beverages were made: beer from fermented grain and mead from honey.

Pytheas next sailed northward along Britain's west coast, sighted Ireland, and rounded the north coast of Scotland. He heard reports there of an island called Thule, a six-day

sail to the north, which he believed to be the northernmost point on Earth. He made an attempt to reach Thule but was forced back by icebergs or dense, chilled fog. Pytheas later reported on the great difference between the length of day and night, indicating he may have approached the high latitudes near the ARCTIC CIRCLE, or, at the very least, reached as far north as the Shetland Islands, or the south coast of Norway near Bergen.

Pytheas completed his exploration of Britain by sailing down its east shore, reportedly completing one of the first circumnavigations of the island. He then sailed across the North Sea in search of principal sources of amber, a commodity highly prized by the Greeks for making jewelry. He entered the Baltic and sailed along its south coast as far as the mouth of the Vistula. After exploring islands in the Baltic as well as Heligoland Island at the mouth of the Elbe River, he followed the Atlantic coast of Europe back to the Mediterranean and Massilia.

Pytheas wrote an account of his voyages called *On the Ocean* (ca. 310 B.C.). Although the work did not survive long after his death, his observations were cited in the works of subsequent ancient geographers, including Polybius, STRABO, and Pliny the Elder. Strabo rejected as outright fabrications much of what Pytheas described on his northern voyage. After Pytheas's expedition, the Carthaginians again closed off the sea route to the Atlantic, and additional seaward exploration of northwestern Europe was not resumed until the Roman expedition to Britain under GAIUS JULIUS CAESAR 200 years later. In terms of trade, Pytheas revealed to the Massilian merchants that the sea route to the tin mines of Cornwall and the amber sources along the Baltic was impractical compared to the much shorter overland route across present-day France and Germany. Yet he demonstrated that the supposed terrors of the Atlantic were imaginary, probably having been invented by the Carthaginians to discourage Greek maritime expansion westward from the Mediterranean.

In addition to being known as the first Arctic explorer, Pytheas is sometimes thought of as the discoverer of Britain, making the first known reference to that island and correctly determining its shape to be triangular. His 8,000-mile voyage, considered to be the longest sea journey undertaken in ancient times, took several years. One result of his expedition was his finding that the NORTH STAR did not lie above true north. Another was his observations on the great effect the moon had on the tides along the North Atlantic coast of Europe, a phenomenon that was much less evident in the Mediterranean basin. Pytheas's report of Thule led to the image of ULTIMA THULE, a literary allusion to the most remote place on Earth. The name was given to the northwestern GREENLAND settlement founded by KNUD JOHAN VICTOR RASMUSSEN in 1910, which after World War II became the site of a major U.S. Air Force base.



Quadra, Juan Francisco de la Bodega y

See BODEGA Y QUADRA, JUAN FRANCISCO DE LA.

Quesada, Gonzolo Jiménez de See JIMÉNEZ DE QUESADA, GONZOLO.

Quirós, Pedro Fernández de (Pedro Fernandes de Quirós, Pedro Queiróz, Pero Fernandes de Queiros) (ca. 1565–1615) *Portuguese mariner in South Pacific, in service to Spain*

Born in the Alentejo region of southeastern Portugal (where he was known as Pero Fernandes de Queiros), Pedro Fernández de Quirós settled in Spain as a teenager, becoming a naturalized Spanish citizen and entering the maritime service of the Spanish government as a pilot and navigator.

In 1595, Quirós sailed from Peru with ÁLVARO DE MENDANA as second in command and chief pilot on an expedition in search of the Solomon Islands in the South Pacific Ocean, which Mendaña had found on a voyage in 1568. After Mendaña's death, it was Quirós, left in command, who conducted the survivors of the abandoned colony to Manila on the *San Jerónimo* in February 1596. On this voyage, many of the crew died from shortages of food and water, and conditions were compounded by the difficult Doña Isabela, Mendaña's widow, who hoarded supplies for herself and her three brothers. Quirós left the Philippines in

August 1597, sailing eastward across the Pacific to Acapulco, Mexico, where he arrived in late 1597. He returned to Spain soon afterward.

In about 1600, Quirós secured a position as tutor of geography to the son of the duke of Sessa, then Spain's ambassador to the Vatican. By that time, Quirós had become convinced that Terra Australis, or the GREAT SOUTHERN CONTINENT—the hypothetical landmass thought to occupy most of the Southern Hemisphere, as depicted on most world maps of the period—lay just south of the islands he had explored with the 1595–96 Mendaña expedition. While serving with Sessa's household in Rome, he was granted an audience with Pope Clement VIII, from whom he sought support for an expedition in search of the continent, where he intended to make Christian converts among its supposedly large population. With a letter of recommendation from the pope, he then approached King Philip III of Spain, who, in 1602, agreed to sponsor a voyage of exploration.

After numerous delays, including a shipwreck in the West Indies in 1604, Quirós arrived in Callao, Peru, from where he planned to set out on his exploration of the South Pacific Ocean. The Spanish government had provided him with provisions and three ships: the *Capitana*, which he commanded; the *Almirante*; and an unnamed launch.

Quirós and his fleet left the Peruvian port on December 21, 1605, carrying 300 men, including Spanish, Portuguese, and Flemish sailors and soldiers, as well as a number of Franciscan missionaries. He followed a more southerly course

than had Mendaña, expecting it would lead him to the mainland of Terra Australis. After a month at sea, Quirós had reached as far as 26° south latitude, where rough weather and unfavorable winds forced him to turn to the northwest. He soon came upon the Tuamotu Archipelago, and, on February 10, 1606, he landed on Anaa Island, 200 miles east of Tahiti. From there, he continued westward, and, after landing on numerous small islands in the southwestern Pacific, sighted what appeared to be the mainland of a large continent on May 1, 1606.

A landing was made two days later, in which Quirós proclaimed possession in the name of the king of Spain of all land extending southward from that point to the SOUTH POLE. Believing he had finally located the Great Southern Continent, he named it Australia del Espíritu Santo. Actually he had reached Manicolo, the largest island of the New Hebrides group. Quirós and his expedition held a religious festival on the island but made no attempt to convert the natives. A church was erected, but, after less than six weeks, he was compelled to take leave for reasons that are still not clear. Rough weather may have threatened his ships lying at anchor offshore, or his crew may have threatened mutiny. In any event, he sailed on June 8, 1606, and, although he may have planned to return to Espíritu Santo, contrary winds soon made that impossible.

Meanwhile, the other main ship in Quirós's fleet, the *Almirante*, captained by LUIS VÁEZ DE TORRES, had waited for Quirós off Espíritu Santo. When the *Capitana* failed to return after two weeks, Torres set out on his own to the west and explored the coast of New Guinea.

Quirós and the rest of the expedition headed back eastward across the Pacific along the latitude of Guam, reaching the coast of North America at Acapulco in Mexico in late November 1606. He sailed from Mexico to Madrid the following year, where he published, at his own expense, an account of his voyage. After submitting numerous proposals to the king, he was finally granted support for a new expedition to the South Pacific, but, en route to Peru, he died in Panama in 1614.

Unlike his predecessors, Mendaña and FERDINAND MAGELLAN, Pedro Fernández de Quirós encountered numerous clusters of islands in his explorations of the Pacific, including the islands in what are now known as the Cook Islands and the New Hebrides. These landfalls encouraged subsequent geographers and navigators in their belief that Terra Australis, the Great Southern Continent, still remained to be located, and influenced explorations into the Pacific well into the 18th century, including the voyages of

the Frenchman LOUIS-ANTOINE DE BOUGAINVILLE and the Englishman JAMES COOK.

Quoy, Jean-René-Constant (1790–1869)

French naturalist in Australia and the South Pacific

Jean-René-Constant Quoy was born in St. Jean de Liverasy, France, near the port city of Rochefort on the Bay of Biscay. Trained as a surgeon at Rochefort, he also studied natural history with Gaspard Vives, a veteran scientist who had sailed the South Pacific Ocean with LOUIS-ANTOINE DE BOUGAINVILLE in 1766–69.

In 1808, Quoy entered the medical service of the French navy, taking part that year in a government expedition to the WEST INDIES, as well as to the island of Reunion in the Indian Ocean. In early 1817, he was selected to serve on the *Uranie* as surgeon and zoologist in LOUIS-CLAUDE DE SAULCES DE FREYCINET's scientific voyage to Australia and the southwestern Pacific.

Quoy was assisted on this voyage by JOSEPH-PAUL GAIMARD. The *Uranie*'s scientific team also included botanist CHARLES GAUDICHAUD-BEAUPRÉ and artist JACQUES ARAGO. In the 1817–20 voyage, in which he circumnavigated the world, Quoy collected zoological specimens, which he sent back to the Paris Museum of Natural History, including a type of striped kangaroo from the islands off of Western Australia's Shark Bay and some species of sand lizards that he found near Sydney.

In 1826–29, Quoy served on another French scientific voyage to the South Pacific, sailing as a naturalist aboard the *Astrolabe*, under the command of JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE, along with Gaimard. On this expedition, he undertook extensive zoological field research in NEW ZEALAND, where he found species of quail, plover, and dolphin unique to those islands. He also visited New Guinea, where he captured a scrub wallaby, a small kangaroo about the size of a rabbit. In the Fiji Islands, he undertook ethnological studies detailing the life and culture of the native inhabitants.

Jean-René Quoy's reports on the zoology of the South Pacific regions he had visited were first published in 1830–33. He later served as a professor of medicine at the naval school at Rochefort. Upon his return to France from his 1826–29 voyage on the *Astrolabe*, the French Academy of Sciences and the Paris Museum of Natural History credited him with bringing back a larger collection of zoological specimens than had any previous French scientific expedition.

R



Radisson, Pierre-Esprit (ca. 1630—1710)

French fur trader in the Great Lakes, upper Mississippi River region, and Hudson Bay, brother-in-law of Médard Chouart des Groseilliers

A native of France, Pierre-Esprit Radisson arrived in 1651 in French Canada, where he joined his half-sister at Trois-Rivières, Quebec, on the St. Lawrence River. A year later, he was captured and adopted by Mohawk Indians. He learned various Indian dialects while living among them for the next year and a half.

In 1653, Radisson escaped from his captors and made his way to the Dutch settlement of Fort Orange (present-day Albany, New York), where he worked as an interpreter for Dutch fur traders. In 1657, he joined a Jesuit missionary expedition to Onondaga Indian territory near present-day Syracuse, New York.

Radisson's half sister, Marguerite Hayet, was married to fur trader MÉDARD CHOUART DES GROSEILLIERS, who had explored the western Great Lakes in 1654–56. In 1659, Radisson accompanied his brother-in-law on a fur-trading expedition out of Montreal. Traveling by way of a canoe-and-portage route along the Ottawa River and Lake Nipissing to Georgian Bay on Lake Huron, they crossed to Lake Superior and followed the south shore to its western end at Chequamegon Bay, where they established Fort Radisson.

The next year, Radisson took part in further explorations of Lake Superior, reaching as far north as Lake Nipigon. He traveled the entire length of Lake Michigan and

explored what is now southern Michigan and northern Illinois. With Groseilliers, he made forays into what is now Wisconsin, as far as Sawyer County, and explored the Fox and Wisconsin Rivers. From the Native Americans, Radisson learned of a possible water route northeast of Lake Superior leading into HUDSON BAY. (He later claimed he had also made an overland journey from Lake Superior to James Bay, but it is thought he made the claim to win over British support for a fur enterprise.)

Radisson and Groseilliers eventually headed back eastward with a valuable cargo of furs. When they reached Montreal, French colonial officials confiscated their goods for unauthorized trading as COUREURS DE BOIS. Radisson and his brother-in-law headed for Boston, where they found employment with New England merchants from 1663 to 1665.

In 1665, Radisson and Groseilliers traveled to England, where, after four years, they succeeded in organizing a syndicate of merchants into the HUDSON'S BAY COMPANY. In 1668–69, Groseilliers made a trip by sea from England to Hudson Bay. Radisson, meanwhile, ran into trouble in Ireland and was forced to turn back. In 1670, Radisson again sailed to Hudson Bay from England and established a post at the mouth of the Nelson River, the first permanent settlement on the west shore of Hudson Bay in what is now northeastern Manitoba, Canada.

During the early 1670s, Radisson served as an interpreter and adviser on Indian affairs for Hudson's Bay



Pierre-Esprit Radisson and the sieur des Groseilliers with some American Indians in the North American wilderness, painting by Frederic Remington (*Library of Congress*)

Company forts. He again worked for French interests for a time, even participating in French naval attacks against the settlement at Fort Nelson as well as English posts on James Bay. By 1684, however, Radisson had returned to the Hudson's Bay Company, and he subsequently retired to England on a company pension.

Radisson's account of his explorations and exploits in North America, *Voyages of Pierre-Esprit Radisson*, was published in 1885. In it he states that he accompanied Groseilliers on a 1654 expedition to the Great Lakes, but this claim has since been discredited.

Pierre-Esprit Radisson took part in the first recorded explorations of Minnesota and Wisconsin and brought back the earliest reports from Indians of the extent of the MISSISSIPPI RIVER and MISSOURI RIVER. His descriptions of the upper Mississippi Valley were the first to cite its great potential as a region for European settlement. His efforts to bring the FUR TRADE to both the western Great Lakes tribes

and those west of Hudson Bay led to increased profits for French and English traders by enabling them to circumvent the Ottawa and Huron Indians who, as middlemen, had dominated the trade on the western St. Lawrence. He was a major force behind the creation of the Hudson's Bay Company, which would play a key role in the exploration of western Canada.

Rae, John (1813–1893) *Scottish physician and explorer in the Canadian Arctic*

John Rae was born near Stromness in northern Scotland's Orkney Islands, the son of an estate manager. At the age of 16, he entered medical school in Edinburgh, graduating four years later. Soon afterward, he obtained an appointment as ship's surgeon aboard the *Prince of Wales*, a HUDSON'S BAY COMPANY supply vessel, and he sailed to Moose Factory on lower James Bay in 1834–35.

Rae stayed on at Moose Factory as a doctor for the Hudson's Bay Company for the next eight years. He accompanied local Cree Indians into the interior on hunting expeditions, during which he became adept at wilderness travel and survival skills. His ability in this regard came to the attention of SIR GEORGE SIMPSON, the Hudson's Bay Company governor, who, in 1843, appointed Rae to survey and chart the region north of Fury and Hecla Strait, above the northernmost end of HUDSON BAY, a part of the eastern Canadian Arctic mainland not yet explored by fur traders.

In July 1846, after studying surveying and map-making in Toronto, Rae led 12 others from Churchill on the southwest shore of Hudson Bay northward aboard two small boats, the *Magnet* and the *North Pole*. At Repulse Bay, just north of Southampton Island, the expedition set up a winter base called Fort Hope, where they survived the winter by hunting and by living in Inuit-style shelters built from snow, thus becoming the first Europeans known to have used igloos.

In spring 1847, Rae undertook a series of explorations northward from Repulse Bay to the Arctic coast, during which he mapped over 600 miles of uncharted shoreline and determined the northern extent of the Boothia Peninsula. He firmly established that it was a peninsula, extending beyond 68° north latitude.

Later in 1847, Rae took part in a British government effort to locate SIR JOHN FRANKLIN and his expedition, which had been missing in the Canadian Arctic since 1845. Along with SIR JOHN RICHARDSON, Rae set out from Great Bear Lake to the Mackenzie River's delta, then followed Canada's Arctic coastline eastward. At Dolphin and Union Strait, ice conditions made it impossible to continue into Coronation Gulf, and Rae and Richardson turned back to Great Bear Lake for the winter. In spring 1849, Rae set out to search again on his own, reaching as far as Cape Krusenstern at the western end of Coronation Gulf. The next year, he crossed over to the Wollaston Peninsula and Prince Albert Sound on Victoria Island, mapping and surveying while continuing his search for Franklin. Rae surveyed Victoria Strait, separating southeastern Victoria Island from King William Island, not realizing at the time that he was less than 100 miles from Franklin's ice-bound expedition.

In 1852, the ROYAL GEOGRAPHICAL SOCIETY awarded Rae its Founder's Medal for having undertaken extensive explorations on Victoria Island. In 1853, he returned to Repulse Bay in northeastern Hudson Bay, from where he resumed his exploration of the Arctic coastline. On this 1853–54 expedition, he located the strait off the southwest coast of the Boothia Peninsula that now bears his name, and, in so doing, he established that King William Island was not connected to the mainland.

In April 1854, at Pelly Bay on Boothia's east shore, Rae learned from an Inuit man named In-Nook-Poo-Zhee-Jook that whites had been seen several years earlier, marching southward from King William Island toward the estuary of the Back River, and that all of them had eventually died of starvation and exposure. From other Inuit in the region, Rae recovered such relics as silverware inscribed with Franklin's personal crest, as well as Franklin's Order of Merit medal. Rae immediately returned to York Factory, then went on to England with his findings.

In England, Rae was awarded the £10,000 prize that had been offered for conclusive proof of the fate of Franklin and his expedition. Based on Rae's findings, the British Admiralty officially declared that Franklin and his men had perished and ended its search efforts. Yet when Rae's report on the fate of the Franklin expedition revealed that the men had resorted to cannibalism in their final days, the startling news resulted in a storm of controversy directed against Rae, who was publicly criticized for having rushed back to England to claim his monetary reward rather than carry on additional search efforts in the Back River region. Not satisfied with the results, Franklin's widow, Lady JANE FRANKLIN, decided to continue the search at her own expense, culminating in an expedition under SIR FRANCIS LEOPOLD MCCLINTOCK in 1857–59.

Rae retired from the Hudson's Bay Company in 1856; soon afterward, he went on a hunting trip to GREENLAND. He married the daughter of a British army officer in 1860. After taking part in a telegraph line survey between Winnipeg and the Pacific coast in 1864, he lived out his life in London and in his hometown on the Orkney Islands.

Underlying Dr. John Rae's great achievements in Arctic exploration was his use of the wilderness skills he had adopted from the native peoples. In his career with the Hudson's Bay Company, he is credited with having walked across 23,000 miles of Canadian wilderness territory and charting 1,500 miles of Arctic coastline. His explorations demonstrated that any NORTHWEST PASSAGE across the top of North America had to pass north of the Boothia Peninsula. From his explorations north of Repulse Bay, he proved the insularity of King William Island, and the strait separating it from the Boothia Peninsula was named Rae Strait in his honor. This channel later proved vital in the first seaward voyage through the Northwest Passage, successfully completed in 1903–06 by Norwegian explorer ROALD ENGELBREGT GRAVNING AMUNDSEN. The Rae River, which empties into western Coronation Gulf, and the Rae Isthmus, north of Repulse Bay, also bear his name. Rae's only book on his Arctic exploits, an account of his first expedition to Repulse Bay, *Narrative of an Expedition to the Shores of the Arctic Sea in 1846 and 1847*, was published in London in 1850.

Raleigh, Sir Walter (Walter Raleigh)

(ca. 1554–1618) *English colonizer in North America, explorer on the Orinoco River in South America, half brother of Sir Humphrey Gilbert*

Walter Raleigh was born at Hayes Barton in Devon, England, into an affluent and landed family. In 1569, he took part in military campaigns in France on behalf of the Huguenots. During the early 1570s, he attended Oxford University, but he did not receive a degree.

In 1578, Raleigh joined his half brother SIR HUMPHREY GILBERT in a voyage to the Americas, during which he took part in raids on Spanish shipping. Two years later, Raleigh won the favor of Queen Elizabeth I after leading English forces in suppressing a rebellion in Ireland. He was rewarded with commercial licenses and trade monopolies, and, in 1584, he was knighted. That same year, he received a royal patent to explore and colonize the region of the eastern seaboard of North America, north of the Spanish settlements in Florida.

In April 1584, Raleigh sent out two ships from Plymouth, England, commanded by Philip Amadas and Arthur Barlowe. They reached the coast of present-day North Carolina and explored the region around Pamlico Sound, naming it “Virginia” in honor of the Virgin Queen, Elizabeth I.

In 1585, Raleigh commissioned SIR RICHARD GRENVILLE to found a colony on the North Carolina coast. A fleet of seven ships carried 600 men, among them the scientist THOMAS HARRIOT and cartographer and painter JOHN WHITE. Yet, the next year, because of trouble with Roanoke Indians, the colonists returned to England with SIR FRANCIS DRAKE after a stopover by him.

In May 1587, Raleigh sent JOHN WHITE to reestablish the Roanoke Colony, this time with 150 men, women, and children. White returned to England for supplies that August, but he was delayed in his return to the settlement by the outbreak of hostilities with Spain in 1588. White finally arrived in 1590 but found no trace of the colony or the settlers. Raleigh’s men found the inscription “CROATOAN” on a tree, indicating that the colonists may have moved to a nearby island of that name, but a search turned up no trace.

In 1595, Raleigh won royal authorization for an expedition to search for the fabled kingdom of EL DORADO and its golden city of Manoa, then believed to be somewhere in northern South America. Reports by Spanish explorers DIEGO DE ORDAZ and others led Raleigh to believe that El Dorado would rival the Inca and Aztec civilizations in riches. Raleigh’s five ships sailed from Plymouth, England, for South America in February 1595. A stormy Atlantic Ocean crossing scattered the fleet, however. Raleigh arrived in Trinidad, where he soon led an attack on Spanish settlements. From the captured Spanish official ANTONIO DE BERRÍO, he obtained additional reports of El Dorado. While

in Trinidad, he visited Pitch Lake, a natural asphalt seepage, which he described in his later published account.

Raleigh’s ships regrouped at Port of Spain, Trinidad, from where they embarked on an exploration of the ORINOCO RIVER in the Guiana region. Using small boats, Raleigh led a party of 100 men up the branches of the Orinoco to its confluence with the Caroni. Along the way, they explored Lake Parime and other affluents of the Orinoco in what is now Venezuela. Tropical fever and shortages of supplies soon led Raleigh to abandon the search for El Dorado, and he headed back to the Caribbean coast by way of the Cano Macareo River. His ships then embarked for England, making stops on the Venezuelan coast and in Cuba.

In 1596, Raleigh published an account of his first South American expedition, *The Discoverie of the Beautiful Empire of Guiana, with a Relation of the Great and Golden City of Manoa . . . in the year 1595*.

By the late 1590s, Raleigh had fallen out of favor with Queen Elizabeth. Shortly after King James I came to the English throne in 1603, Raleigh was implicated in a plot against the new monarch and was imprisoned in the Tower of London under sentence of death.

Raleigh remained a prisoner until 1616, when he succeeded in convincing King James to allow him to undertake another expedition to South America in search of El Dorado. In 1617, his ships sailed to Trinidad, where Raleigh



Sir Walter Raleigh (New York State Library, Albany)

was stricken with fever. His son Walter and English courtier Lawrence Kemys went ahead to the Orinoco, in search of a gold mine. They entered Spanish-held territory and attempted to take the settlement of São Tomé, but were defeated. Raleigh's son was killed in the conflict, and Kemys committed suicide soon afterward.

Raleigh then returned to England. He had defied the king's orders not to undertake any attacks against the Spanish and had failed to find the fabled El Dorado. For these reasons, the death sentence was reinstated, and, in 1618, Raleigh was beheaded.

Sir Walter Raleigh never visited his short-lived settlement on the coast of what is now North Carolina. The fate of Roanoke, later known as the LOST COLONY, became one of the great mysteries of early colonial American history. Although he failed in his own efforts to found an English colony in North America, Raleigh did indirectly influence the success of the subsequent colony at Jamestown in Virginia, established in 1607. In the 1580s and 1590s, Raleigh was a prominent figure at the court of Queen Elizabeth I, and, as a trend-setter of his day, he popularized tobacco smoking in England. As a result, demand for tobacco soared in England, and after 1612, tobacco became Jamestown's principal export product and the basis for the colony's prosperity and survival as the first permanent English colony in what is now the United States. Raleigh's 1617 Orinoco expedition was the last organized attempt by a European power to find the legendary El Dorado.

Rasmussen, Knud Johan Victor (1879–1933)

Danish-Inuit anthropologist in Greenland and the Canadian Arctic

Knud Rasmussen was born in Jakobshavn, a Danish settlement on the west coast of GREENLAND. The son of a Danish father and an Inuit mother, he was educated in the European tradition, as well as in the ways of the Greenland Inuit.

Rasmussen's interest in the Arctic was focused on the study of the life and culture of the Inuit (Eskimo). In 1902–04, he took part in the Danish Literary Expedition under the leadership of Arctic explorer LUDWIG MYLIUS-ERICHSEN, exploring northwestern Greenland and conducting an ethnological study of the region's Inuit. It was on this expedition that Rasmussen made the first known sledge crossing of Melville Bay on Greenland's northwest coast.

From 1906 to 1908, Rasmussen continued his ethnological studies among the Inuit of northwestern Greenland, reaching native settlements as far north as Smith Sound. In 1910, he founded a permanent settlement on Greenland's northwest coast at North Star Bay, naming it Thule, after the legendary northernmost point on Earth reported by the ancient Greek navigator PYTHEAS (see ULTIMA THULE). In ad-

dition to serving as a base for future expeditions, the settlement asserted Danish sovereignty over the region, thereby ending the exploitation of the Inuit by visiting whalers.

In 1912, Rasmussen began the first of a series of explorations across the northern part of Greenland. He set out from Thule to a point north of 82° north latitude in a west-to-east crossing of Greenland. As a result of this exploration, he determined that Peary Land, the barren stretch of territory north of the Greenland ice cap, was a northern extension of the mainland, and not an island off the north coast as some geographers believed, thus disproving the existence of what was thought to be "Peary Channel."

Rasmussen's greatest Arctic expedition began in 1921. His main goal was to make a comprehensive study of the various Inuit bands living in the Arctic region between Baffin Bay and the BERING STRAIT, and to prove his hypothesis that the Inuit of Greenland and the Canadian Arctic were descended from Asian stock.

Accompanied by an Inuit couple, Knud Rasmussen embarked from Upernavik on September 7, 1921, aboard the ship *King of the Sea*. He first sailed to Denmark Island on the northwest coast of HUDSON BAY, where he established a winter base. During the next two years, he conducted ethnological studies on the life and culture of the nomadic Caribou Inuit.

In spring 1923, Rasmussen and his companions set out on their journey across the entire width of the Canadian Arctic to the Bering Sea, 1,800 miles to the west. After being held captive briefly by the Seal Inuit of the Boothia Peninsula, Rasmussen and his party continued westward to King William Island, where they came upon some skeletal remains of the ill-fated SIR JOHN FRANKLIN expedition of 1845–47. After another Arctic winter, they crossed frozen Viscount Melville Sound to Victoria Island, making the first traverse of the NORTHWEST PASSAGE's 110th meridian by dogsled. In spring 1924, they reached Point Barrow, Alaska, and soon afterward, they passed southward through the Bering Strait, arriving in Nome.

Rasmussen undertook his last Arctic expedition in 1932, traveling from Thule to southeastern Greenland and continuing his study of native peoples.

In addition to exploring much of northernmost North America and Greenland, Knud Rasmussen gathered a great wealth of ethnological data on the Inuit. His books include *The People of the Polar North* (1908), *Myths and Legends from Greenland* (1921–25), *In the Home of the Polar Eskimo* (1923), and *Greenland by the Polar Sea* (1921).

Raynolds, William Franklin (1820–1894)

U.S. Army officer on the northern plains

William F. Raynolds was a native of Canton, Ohio. He graduated from West Point in 1843 as a second lieutenant in

the Fifth Infantry. After serving in the U.S.-Mexican War of 1846–48, he was attached to the U.S. Army Corps of Topographical Engineers.

In 1859, Reynolds, now a captain, was given command of a scientific and military expedition to the upper MISSOURI RIVER and Yellowstone River. In addition to 30 soldiers, his command included geologist FERDINAND VANDEVEER HAYDEN, artist Antoine Schoenborn, and an astronomer and meteorologist. Mountain man JAMES BRIDGER was Reynolds's chief guide.

Reynolds was ordered to locate routes for wagon roads between Fort Laramie and Fort Union. He was also to seek a suitable route from Fort Laramie northwestward along the Bighorn Mountains to Fort Benton, in order to provide connections between army posts in the Dakotas and the Platte River. From Fort Benton, he was to find a link by way of the Mullan road and Fort Walla Walla and the Columbia River Basin beyond. In addition, Reynolds was instructed to explore the region between the Yellowstone country and the South Pass.

On June 28, 1859, Reynolds led his expedition westward from Fort Pierre in present-day South Dakota, along the Cheyenne River, and around the northern edge of the Black Hills. He reached the Powder River in what is now north-central Wyoming, then followed its northeastward course into present-day southern Montana. At the Yellowstone River near the mouth of the Bighorn, he divided his group. Part of the expedition explored O'Fallon Fork; Reynolds led the rest of his men southward along the Bighorn River to a trading fort on the Platte, where they rejoined the others and spent the winter.

In May 1860, Reynolds resumed his exploration, heading westward to the Wind River. He attempted to cross into the Yellowstone Park region but was forced back by spring snows and rugged terrain. After exploring the Grand Tetons near Pierre's Hole, he reached the Three Forks of the Missouri and crossed the Continental Divide. On this segment of the trek, Reynolds located and named Union Pass, the same route through the Wind River Mountains used by WILSON PRICE HUNT and the Astorians in 1811.

From the Three Forks of the Missouri, Reynolds and his party headed northward to Fort Benton in what is now north-central Montana. The expedition then traveled by riverboat to Fort Union near the mouth of the Yellowstone, from where they continued overland back to Fort Pierre, arriving on September 7, 1860.

Reynolds went on to serve in the Civil War as chief topographical engineer in the Virginia campaign. After the war, he supervised lighthouse construction and harbor improvements on the Great Lakes.

William F. Reynolds's 14-month expedition through the northern plains and upper Missouri was the final U.S. Army Topographical Survey in the West. Although he

failed to find wagon routes connecting the lower Missouri River and the Columbia River Basin, his expedition collected extensive scientific data on the last region of the American West to be explored. Most significantly, Hayden's findings in the Dakotas and Montana completed a total geological profile of the West. Reynolds's official account, *Report on the Exploration of the Yellowstone and the Country Drained by That River*, published in 1868, included extensive information on the disposition of the region's Indian tribes, and the accompanying map was used throughout the Indian wars.

Real, Gaspar Côrte See CÔRTE-REAL, GASPAR.

Real, Miguel Côrte See CÔRTE-REAL, MIGUEL.

Rebmann, Johann (Johannes Rebmann)

(1820–1876) *German missionary in East Africa*

Johann Rebmann was born in Württemberg, Germany, into a peasant family. Educated in Switzerland at the Basel Missionary Institute, he became a missionary in East Africa with the Church Missionary Society, an Anglican organization.

In 1848, Rebmann served as an assistant to JOHANN LUDWIG KRAPF at his Neu-Rabai mission near Mombasa on the Indian Ocean coast of present-day Kenya. Based on reports from native travelers, the German missionaries learned of huge mountains topped with an unknown white substance, as well as a large inland sea, in the interior of East Africa. Krapf, who was then too ill with malaria to venture inland and investigate these accounts himself, sent Rebmann to explore in his place.

Rebmann left Mombasa in April 1848, and, traveling westward in the company of Swahili and Nyika tribesmen, eventually sighted the snow-covered twin peaks of MOUNT KILIMANJARO, which at 19,340 feet is the highest mountain in Africa. Several months later, Krapf himself sighted the snow-covered mountain and also sighted Mount Kenya.

Johann Rebmann and Johann Ludwig Krapf pioneered exploration into the interior of East Africa from the Indian Ocean coast. In 1855, the London Missionary Society published a map of East Africa produced by the missionaries, based on their own explorations and the accounts they had gathered from native travelers. Their depiction of snow-topped mountains lying along the EQUATOR, plus an inland sea as large as the Caspian Sea in the interior of East Africa, was met with skepticism by British geographers and scientists. To SIR RICHARD FRANCIS BURTON and JOHN HANNING SPEKE, however, Rebmann and Krapf's description of East Africa's interior strongly suggested the existence of the fabled MOUNTAINS OF THE MOON, the ultimate

source of the NILE RIVER as recounted by ancient Greek geographer PTOLEMY. Encouraged by the missionaries' reports, Burton and Speke embarked on their 1856–59 expedition, which resulted in the European discovery of Lake Tanganyika and Lake Victoria.

Regensburg, Pethahia of See PETHAHIA OF REGENSBURG.

Ribault, Jean (Jean Ribaut) (ca. 1520–1565)

French naval officer, colonizer in Florida and South Carolina
Jean Ribault, a native of Dieppe, France, was an early Huguenot convert. He went to sea and became a prominent captain in the French navy under Admiral Gaspar de Coligny, a fellow Huguenot.

In 1562, with Coligny's support, Ribault led a colonizing expedition to the southeast coast of North America, which had previously been claimed for France by GIOVANNI DA VERRAZANO. On May 1, 1562, Ribault and his fleet of three ships, carrying 150 colonists, including the Huguenot RENÉ GOULAIN DE LAUDONNIÈRE and artist JACQUES LE MOYNE DE MORGUES, arrived off the coast of northern Florida, near the mouth of the St. Johns River. On landing, Ribault erected a stone monument and claimed the region for France.

From the St. Johns River, Ribault sailed northward into the Sea Islands off the coast of what is now Georgia and South Carolina. He explored and named Port Royal Sound, and, at a point 18 miles up the sound near present-day Paris Island, he established his Huguenot colony, naming it Charlesfort in honor of French king Charles IX. Soon afterward, Ribault returned to France for supplies.

The outbreak of religious war in France prevented Ribault's immediate return. He was forced to flee France to England in October 1562. Queen Elizabeth I proposed that he join Thomas Stukely in an English colonizing venture to Florida. When Ribault declined the offer, he was imprisoned. In the meantime, because Ribault's relief expedition had failed to arrive, the colonists had abandoned Charlesfort. In 1564, Huguenots under Laudonnière made a second attempt to establish a North American colony, founding Fort Caroline on the St. Johns River in Florida, previously explored by Ribault.

In spring 1565, Ribault and a French fleet arrived offshore from the new site. The following August a Spanish naval force under PEDRO MENÉNDEZ DE AVILÉS landed at what is now St. Augustine, Florida, 40 miles to the south. The Spanish attempted a surprise attack on the French, but Ribault and his ships were able to escape. Menéndez then led an attack on the defenseless Fort Caroline, in which he massacred most of the inhabitants. A subsequent French

counterattack was foiled by a storm at sea, which all but destroyed Ribault's fleet.

Ribault and his men came ashore near what is now Cape Canaveral, Florida. He attempted to lead his forces northward back to Fort Caroline but was intercepted by the Spanish. Menéndez then tricked Ribault and many of his men into surrendering. Taken captive, most of the French non-Catholics, including Ribault, were put to death on Menéndez's orders.

Jean Ribault's colonizing efforts in 1562 were the first attempt to establish a French settlement on the North American mainland since the expeditions of JACQUES CARTIER. In 1563, while in England, Ribault published an account of his explorations in Florida and South Carolina, entitled *The Whole and True Discovery of Terra Florida*, providing some of the earliest descriptions of the Indian tribes of the region.

Ricci, Matteo (Li Ma-tou, Li Madou) (1552–1610)
Italian missionary in India and China

A native of Italy, Matteo Ricci went to Rome at the age of 17 with plans to study law. Despite his family's protests, he decided instead on a religious career. He attended the Jesuit college, studying astronomy and mathematics under German scholar Christoph Clavius. In 1577, a chance meeting with a Jesuit priest returning from India inspired Ricci to become a missionary in the Far East.

Later that year, Ricci sailed from Genoa to Portugal, then traveled with the annual trading fleet around the CAPE OF GOOD HOPE to India and the Portuguese colony at Goa, arriving in September 1578. For the next four years, he engaged in theological studies in Goa. During that period, he visited Cochin on southwestern India's Malabar Coast.

In 1582, Ricci sailed to the Portuguese island of Macao near Canton (Guangzhou), China. After a short course of study in Chinese, he crossed over to Canton, where he was soon granted permission to establish a Christian mission in Chao-ch'ing (Zhao-Qing).

Along with a fellow Jesuit, Father Michele Ruggieri, Ricci stayed at his Chao-ch'ing mission for the next seven years, continuing his study of the Chinese language and culture and introducing the Chinese to European scientific and geographic knowledge. In 1584, he produced a translation of ABRAHAM ORTELIUS's 1570 map of the world, which demonstrated to the Chinese the position of their country in relation to continents and oceans of the West. Ricci also introduced the concept of a spherical Earth to Chinese thought.

Driven from Chao-ch'ing by townspeople suspicious of the missionaries' motives, Ricci and Ruggieri headed northward in 1591 toward the capital at Peking (Beijing), hoping to meet with the Chinese emperor Wan-Li (Wanli). Refused

time and again, they took up residence in Nanking. In 1601, they were finally invited to meet with the Chinese monarch. Ricci eventually became the official mathematician and astronomer to the court and was allowed to open a mission in Peking. He was also allowed to travel freely and was able to conduct explorations of China's interior. In 1602, Ricci produced a world map, drawing on the work of Chinese scholars, such as CHU SSU-PEN.

In 1607, Ricci sent word to Portuguese missionary BENTO DE GÔES, who was then in western China. Gôes had been sent overland from northern India to determine if the Cathay reported by MARCO POLO was the China that the Portuguese were then regularly visiting by sea. Ricci confirmed this fact, which the Portuguese traveler received just days before he died. Ricci lived in China for a total of 28 years, dying in 1610.

Known in China as Li Ma-tou, Father Matteo Ricci traveled widely in the country, sending back to Europe his reports on China. He also wrote several classic religious works in Chinese, which helped introduce Christian theological thought to China. Ricci gave the Chinese a modern geographic perspective, introducing them to the world beyond their borders. In revealing the enormous distance separating China from Europe, he helped allay the concerns the Chinese had about possible encroachment, making the country more open to foreign contacts.

Rice, Alexander Hamilton (Ham Rice)

(1875–1956) *American physician, surveyor in South America*

Born in Boston, Hamilton “Ham” Rice was a Harvard graduate and medical doctor. His interest in tropical diseases led him to embark on a career of exploration in northern South America.

In 1907, Rice traveled over the ANDES MOUNTAINS from Quito, Ecuador, to the Napo River, which he descended to its junction with the AMAZON RIVER in northeastern Peru. From there, he traveled northward across the Amazon Basin to the Uaupes River, which he explored to its confluence with the Rio Negro in northwestern Brazil.

In 1912–13, Rice undertook a survey of the northwestern Amazon Basin. From Cartagena on the Caribbean, he crossed Colombia southward to Bogota, then traversed the Andes to Villavicencio and the Ariari River region. After exploring the Içana and Inírida Rivers, he set out northward in search of the source of the ORINOCO RIVER, but he was forced to withdraw from the area because of hostile Indians.

Rice completed a topographical study of the Rio Negro to its junction with the Amazon at Manaus in 1917. Two years later, he began to explore the Casiquiare River, the natural canal that joins the eastern Rio Negro to the Orinoco and the Amazon. By 1920, he had surveyed the upper

reaches of the Rio Negro, from the Uaupes River of southwestern Colombia to the Casiquiare and the Orinoco of southern Venezuela.

Rice's most extensive survey of the northern Amazon Basin was carried out over nine months in 1924–25. He explored the Branco and Uraricoera Rivers, both northern tributaries of the Rio Negro and Amazon system in north-central Brazil. He traced the Uraricoera into the Sierra Parimá, the mountains that skirt the border between southeastern Venezuela and northwestern Brazil, then made his way overland to the upper Orinoco.

Dr. Hamilton Rice initiated 20th-century exploration in South America with his systematic survey of all the rivers draining into the northwestern Amazon Basin. In his 1924–25 expedition, he was the first to employ aircraft and wireless communication to explore large areas of South America. Using a seaplane, members of his expedition flew over 12,000 miles of unexplored territory, taking photographs from the air and communicating by radio their findings to Rice.

Richardson, James (1806–1851) *British minister, antislavery activist in North and West Africa*

James Richardson was born at Lincolnshire in eastern England. Trained as a minister, he became an evangelical preacher and was committed to the spread of Christianity to the peoples of Africa, as well as to the abolition of the African SLAVE TRADE.

Richardson became a leading member of the English Anti-Slavery Society, which sent him to Malta to prepare for his planned journey into Africa. While there, he learned Arabic and studied the geography of the interior of North and West Africa, which at that time was known by Europeans only as far as Lake Chad.

After visiting the Moroccan coast for several months, Richardson undertook his first journey into the interior of North Africa in spring 1845. He landed in Algiers, then traveled to Tripoli, from where he set out into the SAHARA DESERT. Heading southward, he made a stopover at Ghadames, and, in late October 1845, he arrived at the oasis town and former caravan center of Ghat, in present-day southwestern Libya, 600 miles south of the MEDITERRANEAN SEA. During the next several weeks, Richardson recorded his observations of the native people at Ghat and established contacts with Arab sheiks who controlled the desert lands between there and Lake Chad. Soon afterward, he traveled northward through the Fezzan region, arriving in Tripoli on April 8, 1847.

Back in England, Richardson received British foreign minister Lord Palmerston's support for another, more extensive exploration into North and West Africa. Appointed to lead a government-sponsored expedition to investigate the

little-known region around Lake Chad, Richardson also planned to establish diplomatic contacts with the Bornu kingdom in what is now northern Nigeria, as a preliminary step in stemming the slave trade in West Africa. The expedition, organized as an international effort, included German scholar and archaeologist HEINRICH BARTH and German geologist ADOLF OVERWEG, both of whom had been recruited through Prussia's ambassador to Great Britain.

Richardson was married just prior to embarking on his second Sahara expedition, and in 1850, he took his new wife to Tripoli, where she would await his return. On March 23, 1850, Richardson, accompanied by Barth and Overweg, set out from Tripoli and undertook a 14-day trek across the waterless Hamada el Homra desert to Murzuk, 500 miles to the south. Along the way, they came upon the ruins of an ancient Roman settlement.

Richardson and his companions made their way southwestward through what is now northern Niger and across the Air Mountains, reaching the southern edge of the Sahara in January 1851. Near Agades, the party decided to separate, with Richardson continuing on his own directly toward Lake Chad, while Overweg went to Maradi and Barth headed for the city of Kano. They planned to join up again at Kuka, the capital of Bornu.

Two months later, Richardson, whose health had begun to suffer as a result of the climate, was stricken with fever at Ungouratona in what is now northern Nigeria, less than two weeks' travel from Lake Chad. He died on March 4, 1851. The native villagers buried him with honors; his journals were later recovered by Barth, who sent them, along with news of his death, back to Tripoli. The year after Richardson's death, Overweg also died, and, over the next three years, Barth carried out extensive explorations of West Africa on his own.

James Richardson's *Travels in Morocco* was edited by his widow Mrs. J. E. Richardson and first published in 1860. His journey to Ghat and Ghadames was recounted in his *Travels in the Desert of Sahara, 1845–6* (1848); and his report on his last expedition, *Mission to Central Africa, 1850–1*, was published posthumously in 1853. He also wrote extensively on the language and culture of the Sahara's Tuareg people. Richardson's explorations encompassed a wide area of the western Sahara and Sudan, and his published accounts described for the first time large areas unknown to Europeans.

Richardson, Sir John (1787–1865) *Scottish physician, naturalist in the Canadian Arctic*

John Richardson was born at Dumfries in southern Scotland, the son of a local magistrate. Scottish poet Robert Burns was a friend of his family, and Richardson attended the local grammar school with Burns's eldest son.

While still in his early teens, Richardson began his medical training with an apprenticeship to his uncle, a surgeon in Dumfries. He continued his education at Edinburgh University in 1801. In 1807, after working several years at a local hospital in Dumfries, Richardson entered the British navy as an assistant surgeon. In the Napoleonic Wars of 1803–15, he saw action in the attack on Copenhagen in 1807, in the Baltic Sea in 1813, and off the southeast coast of the United States in 1815.

Richardson resumed his medical studies at Edinburgh in 1815, where he also undertook the study of botany and mineralogy, receiving his M.D. the following year. After pursuing a private practice, he returned to active naval service in 1819, appointed as surgeon and naturalist for an overland exploration of the Canadian Arctic, under the command of SIR JOHN FRANKLIN, then a naval lieutenant. As part of the British navy's newly revived efforts to find the NORTHWEST PASSAGE, the expedition planned to conduct a survey of the largely unknown Arctic coastline of North America, between HUDSON BAY and the Bering Sea.

Richardson and Franklin, along with midshipmen GEORGE BACK and ROBERT HOOD, sailed from England to York Factory on the southwest shore of Hudson Bay. From there, they traveled northwestward by way of the Nelson and Saskatchewan Rivers, and, after wintering at the fur-trading post Cumberland House in present-day northern Saskatchewan, they reached the north shore of Great Slave Lake and established a base camp. On July 14, 1821, accompanied by VOYAGEURS working for the HUDSON'S BAY COMPANY, Franklin, Richardson, Hood, and Back set out for the Coppermine River, which they descended to the Arctic coast. They then explored eastward along Coronation Gulf as far as Turnagain Point on the Kent Peninsula. On the return trip across the Barren Grounds toward Great Slave Lake, the expedition suffered from a critical shortage of food, and Richardson shot to death a voyageur named Michel who had murdered Hood and resorted to cannibalism.

After a second winter on Great Slave Lake, Richardson returned to England with Franklin and Back in October 1822. They had covered more than 5,500 miles of Canadian territory. Richardson's natural history observations were subsequently incorporated into Franklin's official narrative of the 1819–22 expedition, including studies on the aurora borealis and the fish of the Canadian Arctic.

Richardson was appointed surgeon to a British marine unit in 1824, and the following year, he was named second in command in Franklin's second expedition to the Canadian Arctic. He traveled to Great Bear Lake with Franklin, again accompanied by George Back. After wintering there in 1825–26, they set out in small boats down the Mackenzie River on June 22, 1826, reaching its delta on July 4. They separated there, with Franklin exploring the Arctic coastline

westward toward Point Barrow, Alaska, while Richardson and his party made their way eastward in two small boats. Richardson covered 2,000 miles in 10 weeks, reaching as far as the channel between Victoria Island and the mainland, west of Coronation Gulf, which he named Dolphin and Union Strait, after his contingent's two small boats.

Richardson returned to Franklin's base camp at Great Bear Lake on September 1, 1826. He then undertook a geological survey of the lake by CANOE. After another winter in the Canadian Arctic, he returned to England, by way of Cumberland House and New York, in September 1827.

Back in Edinburgh, Richardson wrote an account of his studies of the animal life he had observed in the Canadian Arctic, *Fauna Boreali-Americana*, published from 1829 to 1837. In 1847, after serving as an inspector of hospitals for the British navy, Richardson was appointed to lead the first search efforts for Franklin and his Northwest Passage expedition, which then had been missing in the Canadian Arctic for 18 months. Accompanied by JOHN RAE of the Hudson's Bay Company, he made another descent of the Mackenzie River, then searched for Franklin and his ships along Canada's Arctic coastline eastward, almost as far as the mouth of the Coppermine River. Their efforts were finally halted by impassable ice conditions in Dolphin and Union Strait. After wintering at Great Bear Lake, Richardson returned to England in 1849, while Rae continued the search.

Richardson retired from the British navy in 1855, after 48 years of service. He wrote an account of his 1847–48 expedition, *Arctic Searching Expedition, A Journal of a Boat Voyage Through Rupert's Land* (1851), which included his observations on the region's geology and native inhabitants. He also published *The Polar Regions* (1861). He was elected a member of the ROYAL SOCIETY in 1825 and knighted in 1846.

During his explorations, from the Mackenzie River's delta to the eastern end of Coronation Gulf, Sir John Richardson surveyed a wider area of North America's Arctic coastline than any explorer before him.

Riche, Claude-Antoine-Gaspard (1762–1797)

French physician, naturalist in Australia and the South Pacific

Claude Riche was born in the Beaujolais region of eastern France. While studying medicine, he also pursued an interest in botany and zoology.

In 1791, stricken with tuberculosis, Riche left his medical practice in Montpellier to join a French naval and scientific expedition to the South Pacific Ocean, hoping the long sea voyage might restore his health. He sailed from Brest on September 29, 1791, as a member of the scientific team aboard the *Espérance*, one of the two vessels in

ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux's expedition in search of JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse.

In April 1792, Riche, along with the other scientists on the expedition, including JACQUES-JULIEN HOUTOU DE LA BILLARDIÈRE, collected specimens of plant and animal life in the islands that d'Entrecasteaux explored off the southeast coast of TASMANIA. In December 1792, Riche and La Billardière undertook an investigation inland from what came to be known as Esperance Bay on the south coast of present-day Western Australia. It was there that Riche became separated from his companions and was lost for two days before making his way back to La Billardière and the rest of the landing party. He reported that while lost, he had encountered three giant kangaroos. Riche also participated in explorations of the New Hebrides, Friendly, Admiralty, and Santa Cruz island groups.

In February 1794, Riche and the rest of the d'Entrecasteaux expedition were detained as enemies by Dutch authorities in Batavia (present-day Jakarta). The French Revolutionary Wars had erupted the previous year, and the Netherlands had sided with the royalist cause against France. Soon afterward, Riche was permitted to embark for Île de France, where he remained for some time before returning to France, which he finally reached in 1797. His health had deteriorated and, upon his return, he went to the Monts Doré region of central France seeking a cure. He died there in September 1797.

Claude Riche's poor health and early death precluded his preparing a report of his work in the South Pacific. Nonetheless, as a member of the scientific team with the d'Entrecasteaux expedition, he took part in one of the earliest zoological and botanical investigations inland into southwestern Australia and explored a portion of Tasmania that until then had not been visited by Europeans.

Richtofen, Ferdinand Paul Wilhelm von **(baron von Richtofen)** (1833–1905)

German geologist in China

Born in the southwestern German city of Karlsruhe, Ferdinand von Richtofen became a geologist. His early scientific investigations took him into the Dolomite Alps of northern Italy and the Transylvanian Alps of central Romania.

Richtofen first traveled in the Far East as a member of a Prussian diplomatic and trade mission in 1860–62. He later lived in California for a number of years, working as a geologist.

In 1868, Richtofen arrived in Shanghai, which became his base for a series of expeditions into a wide area of eastern, central, and southern China. That year, he traveled up the YANGTZE RIVER (Chang) to Hankow (part of present-day Wuhan), about 500 miles upstream from Shanghai, then

returned downriver as far as Chengchou (Zhengzhou). From there, he headed northward into the Shan-tung (Shandong) Peninsula and continued on into Manchuria. After a visit to Peking (Beijing), he sailed down the Chinese coast back to Shanghai.

In 1869, Richthofen sailed from Shanghai to Canton (Guangzhou) on China's south coast, then set out on a south-to-north crossing of eastern China, as far north as Peking, a distance of more than 1,200 miles.

Back in Shanghai in 1870, Richthofen explored the region south of the Yangtze's mouth, then sailed northward into the Yellow Sea to Tientsin (Tianjin), from where he traveled overland to Peking. He also traveled through southern China's Szechwan (Sichuan) region and visited Shensi (Shaanxi) and Shansi (Shanxi) provinces in east-central China, while tracing the course of the Yangtze River.

Richthofen returned to Germany in 1872, where he wrote his great multivolume work on China. Known by the abbreviated title *China* and published, along with an accompanying *Atlas*, from 1875 to 1883, it included the first comprehensive, modern geographic, geological, and cultural profile of China, including a description of the region's mineral resources.

Baron Ferdinand von Richthofen went on to an academic career, which included professorships at universities in Bonn, Leipzig, and Berlin. In 1911, three more volumes of his work on China were published posthumously. Richthofen's explorations of eastern and southern China, taken together with MARIE-JOSEPH-FRANÇOIS GARNIER's earlier Mekong River explorations, helped give Europeans detailed knowledge of eastern Asia, from the Southeast Asian regions of Thailand and Vietnam as far northward as Manchuria. Richthofen's grandson was the famous World War I air ace, Baron Manfred von Richthofen, the "Red Baron."

Ride, Sally Kristen (1951–) *American astronaut, first American woman in space*

Sally Ride was born in Encino, California. She attended Westlake School for Girls in Los Angeles on a tennis scholarship. She enrolled in Swarthmore College in 1968 but dropped out to play professional tennis. She later attended Stanford University, earning a B.S. in physics and a B.A. in English in 1973 and a Ph.D. in physics in 1978. At the age of 27, she was accepted by the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) into the training program for ASTRONAUTS aboard the SPACE SHUTTLE. Her training included radio communications, navigation, working in zero gravity, parachute jumping, and water survival.

Ride served as mission control communications officer for the second and third flights of the space shuttle *Columbia* in November 1981 and in March 1982. On June

18, 1983, she became the first American woman in space on the shuttle *Challenger*, orbiting the Earth for six days. (The cosmonaut VALENTINA VLADIMIROVNA TERESHKOVA had become the first woman in space 20 years before in the VOSTOK PROGRAM of the Union of Soviet Socialist Republics.) Ride next served as a mission specialist, participating in SATELLITE launching and retrieval. She again traveled on *Challenger* on an eight-day mission in October 1984.

Ride later formed part of the presidential commission investigating the *Challenger* disaster of 1986 and also became involved in long-range planning of SPACE EXPLORATION. She left NASA in 1987 and has since been affiliated with Stanford University and the University of California at San Diego. She has dedicated herself to promoting science education, especially for girls because of a lack of women scientists and engineers. Some of her activities have been Internet-based. She has written a number of children's books about space.

As the first American woman to walk in space, Sally Ride has a special place in the history of space exploration.

Ritchie, Joseph (ca. 1788–1819) *British physician, writer in North Africa*

Joseph Ritchie was born at Otley in Yorkshire, England. The son of a local doctor, he entered the medical field himself, and, when in his early 20s, he began practicing as a hospital surgeon in York. Then, starting in 1813, he practiced at London's Lock Hospital.

While in London, Ritchie developed contacts among the literary and scientific community, which led to his meeting with the German naturalist and explorer ALEXANDER VON HUMBOLDT in Paris in 1817. Impressed by Ritchie's ability as an observer of natural phenomenon and his talent as a writer, Humboldt recommended him to the British government for its planned expedition to explore the upper NIGER RIVER region of West Africa.

Ritchie was instructed to penetrate the interior of West Africa from the north, with a crossing of the SAHARA DESERT from the Mediterranean coast at Tripoli, Libya. In September 1818, he arrived in Malta, where he was joined by British naval officer GEORGE FRANCIS LYON. They then traveled to Tripoli, where they remained for several months, during which they explored the mountains around nearby Gharyan.

On March 22, 1819, Ritchie and Lyon, disguised as Muslims, began their intended trans-Sahara trek, setting out from Tripoli for Murzuk south of the Fezzan region of southwestern Libya. Short on supplies and funds, their trip from Tripoli was fraught with difficulties, and, by the time they had reached Murzuk, Ritchie had become seriously ill. He died there on November 20, 1819, and, soon afterward,

Lyon was compelled to abandon the expedition and return to Tripoli.

While preparing for the expedition in London in 1817–18, Joseph Ritchie encountered the English Romantic poet John Keats, then 23 years old. Greatly impressed by Keats's recently published poem "Endymion," with its images alluding to the fabled MOUNTAINS OF THE MOON, Ritchie resolved to carry a copy of the work on the expedition and cast it symbolically into the sands of the Sahara. Ritchie was a poet in his own right, and just before he departed for Africa, he wrote a poem in Spenserian stanzas entitled "A Farewell to England." It was published posthumously in 1829. Ironically, Joseph Ritchie had been chosen to lead the expedition partly because of his abilities as a writer, yet he recorded no observations while en route, planning to rely on his memory afterward. Consequently, the history of the journey to Murzuk was written by Lyon, and when published in 1821, it proved to be one of the most popular narratives of African travel of that period.

Rivera y Villalón, Pedro de (ca. 1664–1744)

Spanish soldier, official in Mexico, New Mexico, and Texas

Pedro de Rivera was born in Antequera, Spain. Pursuing a career in the military, he served in the Netherlands in the late 1670s.

It is thought that Rivera had traveled to New Spain (Mexico) in the Americas by the 1690s, where he served as an engineer. He eventually reached the rank of colonel. In 1710, he was appointed governor of Tlaxcala but returned to Spain in 1714–15 to battle the French at Barcelona. Back in New Spain, he campaigned against pirates along the Yucatán Peninsula coast.

In 1724, Rivera was sent to inspect the northern defenses of New Spain. He traveled from the Gulf of California, then northward to Santa Fe in New Mexico and back southward, then east to the Gulf of Mexico in Texas, covering more than 8,000 miles until 1728. Rivera produced a written report of his inspection, and his assistant, Francisco Álvarez Barreiro (or Barreyto), drafted maps.

Rivera became governor of Veracruz in 1731 and then of Guatemala the next year. He retired in 1742 and moved to Mexico City.

Pedro de Rivera's expedition led to the most accurate maps of northern New Spain at that time. His report led to consolidation of the economy and increased defenses against Apache Indians.

Robertson, James (1742–1814) *American*

frontiersman, colonizer in North Carolina and Tennessee

Born in Brunswick County, Virginia, James Robertson had, by 1768, moved with his family into North Carolina's Yad-

kin Valley. Two years later, in fall 1770, he traveled with a hunting expedition to the Holston and Watauga Rivers in northwestern North Carolina and present-day eastern Tennessee.

Robertson took his family from Wake County, North Carolina, to the Watauga region in spring 1771. Other settlers soon followed.

Robertson played a key role in securing the lease on the Watauga region from the Cherokee Indians. Moreover, at the outbreak of Lord Dunmore's War in 1774, his diplomatic efforts ensured Cherokee neutrality.

In February 1779, Robertson left Virginia in command of a small advance party sent by the Transylvania Company to explore and settle the Cumberland River Valley of what is now Tennessee. Soon after this group had planted a crop and laid out a town, the main party of 300 settlers began to arrive, traveling through the APPALACHIAN MOUNTAINS overland through the CUMBERLAND GAP, or by riverboat along the Tennessee River and Cumberland River route. In 1780, Robertson officially organized the settlement as Nashborough, which later became Nashville, the capital of Tennessee. In March of that year, with the colony facing starvation, Robertson undertook an overland trek through the wilderness to obtain supplies at DANIEL BOONE's settlement of Boonesborough, Kentucky.

In 1784, Robertson, with the North Carolinian William Blount, organized a settlement in western Tennessee on the Chickasaw Bluffs of the MISSISSIPPI RIVER, near what is now Memphis.

Throughout the 1780s and 1790s, Robertson was active in the North Carolina legislature. He was one of the organizers of the short-lived state of Franklin, after which he helped establish the state of Tennessee. He was briefly connected with a Spanish plan to annex Tennessee, but he ultimately remained loyal to the United States.

James Robertson's explorations west of the Appalachian Mountains accelerated the rate of non-Indian settlement beyond the mid-Atlantic seaboard in the years immediately before and after the American Revolution. He is known as the "Father of Tennessee."

Roberval, Jean-François de La Roque de (sieur de Roberval) (ca. 1500–1561)

French nobleman, colonizer in North America

Jean-François de La Roque de Roberval was a member of an aristocratic family of northern France's Picardy region, the son of a diplomat and a noblewoman. During the 1520s, he served as an officer with French forces in Italy, and later he was an official in the court of King Francis I of France.

In January 1541, Roberval received a commission from the king to command a colonizing expedition to Canada's St. Lawrence River region. His appointment superseded that

of JACQUES CARTIER, who had explored the Gulf of St. Lawrence and the St. Lawrence River in his voyages of 1534 and 1535–36. Cartier remained as Roberval's second in command.

Roberval provided the financing for what was to be Cartier's third voyage to Canada, which sailed from France in spring 1541. Meanwhile, he remained in France for the next 11 months, raising additional funds through privateering raids on Portuguese and English ships in the English Channel. On April 16, 1542, Roberval sailed from La Rochelle to join Cartier, who had by then established a small settlement near what is now the city of Quebec.

On June 7, 1542, Roberval's three ships, the *Marye*, the *Sainte-Anne*, and the *Valletyne*, carrying more than 150 men and women colonists as well as a number of soldiers, arrived at St. John's Harbor on the southeast coast of Newfoundland, a place already known to European fishermen. Less than a week later, Roberval was joined by Cartier and his contingent of colonists, who, after suffering through a severe winter at the St. Lawrence River settlement, had decided to return to France. Cartier was also eager to reach France to learn if the mineral deposits he had discovered in Canada were diamonds and gold.

Despite Roberval's insistence that Cartier accompany him back to the St. Lawrence, Cartier, under cover of darkness, departed the Newfoundland anchorage and sailed for France. Roberval remained at St. John's Harbor for several more weeks, and then, resolving to carry on the colonizing effort on his own, sailed his fleet into the Gulf of St. Lawrence by way of the Strait of Belle Isle. He then ascended the St. Lawrence River to the site of Cartier's colony of Charlesbourg-Royal at the mouth of what is now the Jacques Cartier River. A better-fortified settlement was constructed on the site, which Roberval renamed France-Roy.

In September 1542, two of Roberval's ships returned to France to obtain additional provisions, as well as to find out if Cartier had indeed discovered mineral wealth, which he had not, the minerals brought back to Europe proving to be worthless mica and iron pyrites, the latter known as FOOL'S GOLD. During the next winter, 50 of the colonists died from SCURVY at France-Roy. In spring 1543, Roberval explored southwestward up the St. Lawrence in small boats, in search of a possible westward passage to the Pacific Ocean, as well as the fabled native kingdom SAGUENAY, which, according to what Cartier had learned from the Indians, was rich in gold and precious stones.

Roberval reached the Lachine Rapids near present-day Montreal, where he decided to turn back after losing a boat and eight crewmen. His chief pilot, Jean Alfonse, undertook a similar reconnaissance of the Saguenay River to the northeast, reaching almost as far as its junction with the Chicoutimi River.

By mid-summer 1543, Roberval decided to abandon his settlement, faced with the prospect of another harsh winter on the St. Lawrence and unable to locate either Saguenay or a passage to the Far East. He sailed with the surviving colonists on the one remaining vessel, arriving in France on September 11, 1543. (According to some accounts, Cartier returned to North America that year and picked up the colonists.)

Roberval continued his career as a courtier under Francis's successor, King Henry II, and engaged in several unsuccessful mining ventures. In 1561, he was killed in an outbreak of religious violence in Paris.

After Sieur de Roberval's 1542–43 expedition, France's efforts to explore and settle Canada were suspended for the next 60 years by the outbreak of religious and civil wars. The efforts were not resumed until the voyages of SAMUEL DE CHAMPLAIN in the early 1600s.

Robidoux, Antoine (Antoine Robidou)

(1794–1860) *American fur trader, interpreter in the southern Rocky Mountains*

Antoine Robidoux was born in St. Louis, Missouri, to a family of French-Canadian descent. In 1822, he was one of the first St. Louis traders to embark on the newly opened Santa Fe Trail. In 1824–25, he took part in a fur-trading expedition from Fort Atkinson, near present-day Omaha, to the Green River in what is now northern Utah.

Robidoux then took the FUR TRADE to New Mexico. In 1828, he married into a prominent New Mexico family and settled in Taos, where he became known as the "first fur trader out of Taos." Also in 1828, he established Fort Uncompahgre on the Gunnison River in what is now southwestern Colorado. In 1837, he opened Fort Uinta in northeastern Utah, a post that came to be known as the Robidoux Rendezvous.

Competition from Bent's Fort on the Arkansas River and Fort Laramie to the north, plus Ute Indian uprisings, drove Robidoux out of business by 1844. That year, JOHN CHARLES FRÉMONT and his expedition stopped at Fort Uinta.

After a short stay at St. Joseph, Missouri, which his brother Joseph Robidoux had founded in 1831, Antoine again ventured west in 1846, as an interpreter for General STEPHEN WATTS KEARNY's expedition across the Great Plains and ROCKY MOUNTAINS to New Mexico for engagement in the U.S.-Mexican War. After Kearny's conquest of Santa Fe, Robidoux continued westward into California with the American forces. He was severely wounded at the Battle of San Pascual in December 1846, and he soon retired to St. Joseph, Missouri. Eight years before his death in 1860, he was stricken with blindness.

Antoine Robidoux's five brothers (Joseph, François, Louis, Michel, and Isidore) joined him in trading ventures in the southern Rockies and southern plains. From 1832 to 1844, the Robidoux brothers dominated the trade between northern Utah and what is now southern Arizona, providing north-south supply routes for traders along both the eastern and western slopes of the Rocky Mountains.

Rodríguez, Cermeño See CERMENHO, SEBASTIÁN MELÉNDEZ RODRÍGUEZ.

Roe, Sir Thomas (Sir Thomas Rowe)

(ca. 1581–1644) *English mariner in South America, traveler, diplomat in India*

Thomas Roe was born at Low Leyton in Essex, England, into a prominent London family, his grandfather having served as that city's lord mayor. After attending Oxford's Magdalen College, Roe studied law in London, and, in about 1601, he became an official in the court of Queen Elizabeth I. After her death in 1603, he gained prominence in service to her successor, King James I, from whom he received a knighthood in 1605.

Roe's closest friend at court was the king's son, Henry, Prince of Wales, through whose influence he gained support for a voyage of exploration to the northeast coast of South America in search of gold. With financial backing from SIR WALTER RALEIGH and the earl of Southampton, Roe sailed from Plymouth in command of two vessels on February 24, 1610.

After reaching the coast of the Guianas, Roe located the mouth of the AMAZON RIVER and sailed his ships 200 miles upriver. He then explored 100 miles farther upstream in small boats, investigating the surrounding Brazilian jungle for signs of gold before returning to the river's mouth. The next year, Roe examined the coastline northward as far as the ORINOCO RIVER delta. Traveling by CANOE, he explored inland along the region's numerous rivers that emptied into the sea, including the Oyapock on the present border between French Guiana and northeastern Brazil.

In July 1611, Roe returned to England without the hoped-for riches. He reportedly made two more voyages to the lower Amazon region the following year, and he may have established a small settlement there.

Soon after Prince Henry's death in 1612, Roe left the royal court to serve as a member of the House of Commons. In 1614, he returned to the king's service, as the royal ambassador to the court of the Mogul Empire in northern India.

Roe's appointment had been instigated by the BRITISH EAST INDIA COMPANY's desire to win from Mogul emperor Jahangir the trade concessions that were vital in an effort to compete effectively with the Portuguese, the chief commer-

cial rivals of the English in India. Roe departed England with the British East India Company's fleet in February 1615, sailing aboard the *Lion*. After a voyage around the CAPE OF GOOD HOPE, with stops at the Comoro Islands in the INDIAN OCEAN and Socotra Island, south of the Arabian Peninsula, he arrived at Surat on India's western coast in September 1615. From there, he journeyed inland with a small diplomatic delegation, through Burghampur and Mandu, and, on Christmas Eve 1615, he reached the Mogul capital, Ajmer.

Roe remained at Jahangir's court for a year. He presented the emperor with such gifts as an English-style coach and two virginals (early-17th-century piano-type instruments), and he traveled with the Mogul ruler on a tour of his domain in northeastern India. Prior British attempts to enter into a commercial treaty with Jahangir had been frustrated by the emperor's general disdain for businessmen and traders, but by demonstrating that the English king was of equal stature to the Mogul emperor, Roe eventually succeeded in obtaining for British merchants the same privileges enjoyed in India by other foreign merchants.

Roe's return route was by way of Persia (present-day Iran), where he discussed matters relating to the silk trade with government officials. He arrived back in England in September 1619. After another year in Parliament, he became British ambassador to the Ottoman Empire, a post he held until 1628. He was made a member of the Order of the Garter in 1636. In the course of his later diplomatic career, he represented England at peace conferences in Europe in connection with the Thirty Years' War.

Sir Thomas Roe was the first Englishman known to have explored the Amazon. In his better-known diplomatic mission to the Mogul emperor, he laid the foundation for Great Britain's subsequent commercial foothold in the Bombay region, which eventually led to British domination of all of India. His journal of his experiences in India was published in 1625 by Samuel Purchas as part of *Hakluytus Posthumus, or Purchas His Pilgrims*. The work introduced Englishmen to the great wealth of India's Moguls, relating how he had witnessed Jahangir receive his weight in gold and jewels as tribute from his subjects. Roe remained an ardent supporter of British voyages of exploration and used his influence to help LUKE FOXE mount his 1631 expedition in search of the NORTHWEST PASSAGE. When Foxe located the stretch of water separating Southampton Island from the northwest shore of HUDSON BAY, he named it Roe's Welcome Sound.

Roerich, Nikolay Konstantinovich (Nicholas Konstantin Roerich) (1874–1947)

Russian painter, writer in central Asia

Nikolay Roerich was born in St. Petersburg; his father, Konstantin Roerich, was a prominent attorney. Showing an early

interest in art yet wanting to please his father with a career in law, he simultaneously attended the Academy of Art and St. Petersburg University. After finishing his university thesis, he traveled in Europe for a year, during which he visited museums in Berlin and Paris and began his career as a painter. On his return, he married Helena Blavatsky, a writer interested especially in spiritual themes.

Roerich and Blavatsky lived for a time in New York where they pursued their mutual interests and promoted a cross-fertilization of the arts and world religions. Roerich became secretary of a school associated with the Society for the Encouragement of Art and would later become its director, one of many such positions in the course of his life as a teacher and sponsor of the arts. In addition to working in painting and writing, he designed sets and costumes for theatrical productions. In 1923, the Nicholas Roerich Museum was founded in New York City in his honor.

Also in the 1920s, after the period of unrest during World War I and the Russian Revolution, Roerich and Blavatsky undertook a journey to India and central Asia, along with their son George Roerich, who spoke Chinese, Mongolian, Tibetan, and several Indian languages. They landed in Bombay at the end of 1923 and after meeting prominent scholars and artists, continued to the HIMALAYAS. They traveled in central Asia until 1928, visiting Chinese Turkestan, Altai, Mongolia, and Tibet. Afterward, the family made a home in the Kulu Valley of India's Himalayan foothills and founded the Urusvati Himalayan Research Institute for studies of natural science, archaeology, linguistics, and religion. Roerich wrote about the central Asian expedition in his book *Heart of Asia* and recorded scenes from it in about 500 paintings. Roerich lived in the Himalayas until his death.

Nikolay Roerich, among his many other accomplishments, furthered knowledge among Europeans of Asian culture and history. A central thesis of his work was the common cultural bond of the peoples with whom he came into contact, such as the Tibetans and nomadic people of the Russian steppes. Among Helena Roerich's works is *The Foundations of Buddhism*.

Rogers, Robert (1731–1795) *Colonial American army officer in New York and Great Lakes, seeker of the Northwest Passage*

Robert Rogers was born in Methuen, Massachusetts. As a young child, he moved with his family to the frontier region of New Hampshire, where he learned wilderness skills. While still in his teens, he served as a scout for British troops in King George's War of 1744–48.

Rogers went on to serve in the French and Indian War of 1754–63, reportedly as an alternative to imprisonment on counterfeiting charges. He led a unit of frontiersmen,

known as Rogers' Rangers, in raids against the French-allied Indians of Lake Champlain and the eastern St. Lawrence valley.

In November 1760, following the fall of Quebec and Montreal, Rogers, who had been promoted to major, was sent west to receive the surrender of the French trading posts at Detroit and Mackinac. In 1763, he took part in campaigns against the tribes of the Old Northwest in Pontiac's Rebellion, an uprising led by the Ottawa Indian of that name.

Rogers left Mackinac in 1765, amid charges of illegal trading activities. He went to London to clear his name, and while there wrote and published the book *A Concise Account of North America*. He also had a play produced, *Ponteach*, a sympathetic dramatic portrait of Pontiac.

By 1766, Rogers was back in Mackinac, after winning reappointment as a British administrator of the region's Indian trade. Based on reports by Indians and on old maps, he had long believed a water route, the much sought-after NORTHWEST PASSAGE, led to the Pacific coast from the western Great Lakes. That year, he dispatched JONATHAN CARVER and James Tute from Mackinac on explorations to Lake Superior and northern Minnesota, with instructions to expand the Mackinac trade to outlying Indian tribes and to investigate streams west and north of Lake Superior in hopes of locating the Northwest Passage. Yet, in 1768, Carver and Tute abandoned their search at Grand Portage on the north shore of Lake Superior, because Rogers failed to send the promised supplies.

Rogers was implicated in a Spanish plot to take over the British Great Lakes posts but was acquitted of any wrongdoing. He returned to England in 1769, where he was imprisoned for debt. At the outbreak of the American Revolution in 1775, he returned to America. He served briefly under George Washington but was soon arrested as a Loyalist spy. After escaping to the British, Rogers organized a unit known as the "Loyalist Rangers," but they played no significant role in the war.

Rogers left the United States for England in 1780, where he lived out his remaining years in obscurity.

The heroic exploits of Major Robert Rogers in the French and Indian War are legendary. Nevertheless, his nonmilitary career was checkered with accusations of dishonesty and malfeasance. In terms of exploration, Rogers kept alive the idea of the Northwest Passage in the years between the French and Indian War and the American Revolution. Ironically, the expedition he sponsored, undertaken by Carver and Tute in 1767–68, did reach Grand Portage, where 20 years later NORTH WEST COMPANY fur traders PETER POND and SIR ALEXANDER MACKENZIE would launch their explorations into the Canadian West and ultimately locate a river system that drained into the Pacific Ocean.

Roggeveen, Jakob (Jacob Roggeveen)*(1659–1729) Dutch mariner in the South Pacific*

Born at Middelburg in the southwestern Netherlands, Jakob Roggeveen was the son of a wine merchant. Trained in theology and law, he also acquired a fair knowledge of navigation, cartography, and the natural sciences.

In 1706, after working as a lawyer in Middelburg for a number of years, Roggeveen sailed to the EAST INDIES (present-day Indonesia), where he had been appointed to a post with the Dutch colonial administration. After nine years, he returned to the Netherlands.

In 1721, the DUTCH WEST INDIA COMPANY appointed Roggeveen commander of an expedition to the South Pacific Ocean in search of Terra Australis, the theoretical GREAT SOUTHERN CONTINENT, which European geographers believed spanned a wide area of the Southern Hemisphere.

From Amsterdam, Roggeveen, in command of a fleet of three ships, sailed to the southern tip of South America and, after passing through Le Maire Strait, continued southward beyond CAPE HORN as far as 60° south latitude. He correctly surmised that the icebergs encountered in those waters indicated a large landmass to the south.

The onset of cold weather conditions compelled Roggeveen to turn back northward before he could investigate further. Sailing west of Cape Horn, he entered the Pacific Ocean along the coast of present-day Chile. After a brief exploration of the Juan Fernandez Islands, Roggeveen and his crew made the first European visit to an island on April 5, 1722, Easter Sunday. In honor of the occasion, he named it Easter Island.

In need of fresh provisions, Roggeveen then headed westward across the Pacific toward the Dutch colonies in the EAST INDIES. Along the way, he made the European discovery of the islands of Samoa and stopped at New Britain.

After sailing along the north coast of New Guinea, Roggeveen arrived at the Dutch port of Batavia (present-day Jakarta, Indonesia). There, his ships were confiscated by officials of the DUTCH EAST INDIA COMPANY, because as an employee of the Dutch West India Company, he was considered to be trespassing in the other company's commercial domain. He was arrested but soon released and sent back to the Netherlands by way of the Cape of Good Hope, thus completing a CIRCUMNAVIGATION OF THE WORLD. He spent his remaining years in his hometown of Middelburg.

Jakob Roggeveen was the first European to report on the giant stone monuments and inscriptions on Easter Island, the origins of which still pose one of the best-known archaeological riddles. His voyage in search of Terra Australis, one of the last major explorations of the South Pacific undertaken by the Dutch, revealed that the missing Southern Continent, if it existed, had to lie even farther south than the cartographers and geographers of his day supposed.

Roggeveen is also credited with the European discovery of Samoa.

Rohlfs, Friedrich Gerhard (1831–1896)*German-born French Foreign Legionnaire in North Africa*

Gerhard Rohlfs was born in the German town of Vegesack, near Bremen. He studied medicine at Heidelberg, Würzburg, and Göttingen universities, then briefly served with the Austrian army.

Rohlfs's career as an explorer of West and North Africa began in 1855, when he enlisted in the French Foreign Legion as an assistant pharmacist and took part in French efforts to subdue the Berber tribes of the Great Kabylia region in what is now central Algeria. Over the next several years, while with the Legion in Algeria and Morocco, he became fluent in Arabic and familiar with the teachings of Islam and the culture of the native peoples of the northern SAHARA DESERT.

Rohlfs remained in North Africa after his discharge from the Foreign Legion in 1861. He was appointed physician general for the army of the sultan of Morocco and chief of sanitation for the sultan's harem.

In July 1862, Rohlfs, disguised as a Muslim doctor, set out from Tangier in an attempt to travel southward across the Sahara to TIMBUKTU. From Meknes, he made his way through central Morocco's Atlas Mountains to the Tafilet Oasis, the first European to reach it since RENÉ-AUGUSTE CAILLIÉ, nearly 40 years earlier. Wounded in an attack by bedouin tribesmen, Rohlfs was compelled to turn back, eventually reaching Rabat on the Moroccan coast.

About a year later, Rohlfs undertook a second journey into the Sahara, starting out from Agadir, Morocco. He made his way across the mountains and desert to central Algeria's Touat Oasis, becoming the first European to reach it. From there, he continued eastward to the caravan trade center in In-Salah, then turned northeastward into present-day Libya, stopping at Ghadames before arriving at Tripoli.

In his next expedition, Rohlfs departed Tripoli in 1865, and, after traveling to Murzuk in southern Libya, he crossed the Sahara Desert to Lake Chad and the Bornu Kingdom of what is now northern Nigeria. He examined Lake Chad for a possible connection with the NIGER RIVER, then traveled down the Benue River to its junction with the Niger, which he descended to its outlet in the Gulf of Guinea.

In 1867–68, Rohlfs explored the Abyssinian Highlands of Ethiopia. In 1874, he returned to Tripoli to begin a series of expeditions, at times accompanied by GEORG AUGUST SCHWEINFURTH. He explored eastward toward Alexandria, Egypt, visiting the Siwa Oasis in northwestern Egypt as well as the little-known Kufra Oasis in southeastern Libya, which he reached in 1878. Later that year, Rohlfs led a German

government-sponsored expedition into the Wadai region of what is now southeastern Chad.

Rohlfs was back in Ethiopia in 1880–81, where he explored from Massawa on the RED SEA coast inland to the upper reaches of the Blue Nile River. In 1885, he began a brief term as German consul at Zanzibar on the Indian Ocean coast of central Africa. He later retired to Godesberg, Germany.

Gerhard Rohlfs was the first European to complete a north-to-south crossing of the entire bulge of West Africa, from the Mediterranean coast to the Gulf of Guinea. Great Britain's ROYAL GEOGRAPHICAL SOCIETY, in recognition of this accomplishment, awarded him its Patron's Medal in 1868. In the course of his 30 years in Africa, Rohlfs spent more than 16 years engaged in exploration. He covered a vast area of the continent, ranging from Tangier and Tripoli southward to Lagos on the Gulf of Guinea, and from the Niger River eastward to the upper reaches of the Blue Nile in Ethiopia.

Rose, Edward (Nez Coupé, Cut Nose, Five Scalps) (ca. 1775–ca. 1832) *American interpreter, guide in the northern Rocky Mountains*

Details of Edward Rose's life before 1807 are sketchy. He was the son of a non-Indian trader to the Cherokee Indians, and his mother was part African American and part Cherokee. He may have spent some years as a river pirate with Jean Lafitte on the MISSISSIPPI RIVER between southern Illinois and New Orleans.

In 1807, Rose was an interpreter for MANUEL LISA's fur-trading expedition to the Bighorn River region of present-day Montana. While there, he settled among the Crow Indians and became a chief. By that time, Rose was known by the Indians as Nez Coupé or Cut Nose, because a piece of his nose had been bitten off in a brawl. Later in his career, he would be known as Five Scalps, after a reported fight in which he killed five Blackfoot warriors. Two years later, in 1809, Rose was an interpreter for Lisa and his partner ANDREW HENRY in their dealings with the Arikara Indians at their Knife River post in what is now North Dakota.

In 1810, Rose traveled to the Three Forks of the Missouri with Andrew Henry, ANTOINE PIERRE MENARD, JOHN COLTER, and GEORGE DROUILLARD, then explored the Madison River in southeastern Montana and Henrys Fork of the Snake River in eastern Idaho. In 1811, Rose served as an interpreter and guide for WILSON PRICE HUNT and his party of Astorians, heading for Oregon. He was discharged in Crow territory on suspicion of leading the group into an ambush. During the War of 1812, Rose is believed to have assisted Manuel Lisa in keeping the upper Missouri tribes from siding with the British.

In 1823, Rose was an interpreter and negotiator for WILLIAM HENRY ASHLEY's fur-trading expedition to the Arikara and worked with other MOUNTAIN MEN. After warfare erupted between non-Indians and the Arikara, Rose acted as a negotiator on behalf of Colonel HENRY LEAVENWORTH in his punitive military expedition. Rose then joined JEDEDIAH STRONG SMITH in an expedition from Fort Kiowa in present-day South Dakota, overland through the Badlands and Black Hills to the northern ROCKY MOUNTAINS.

In 1825, Rose joined General HENRY ATKINSON's Yellowstone Expedition at Council Bluffs on the Missouri and served as a guide and Indian diplomat to the Crow. Rose is believed to have been killed in an attack by Arikara while hunting with HUGH GLASS on the Yellowstone River, below the mouth of the Bighorn River, during the winter of 1832–33.

Edward Rose's career in the northern plains and Rockies spans the entire period of the early upper Missouri FUR TRADE. His exploits have been confused with those of another part-African mountain man, JAMES PIERSON BECKWORTH. It is probable that Beckwirth claimed Rose's adventures as his own in a written account of his life.

Ross, Alexander (1783–1856) *Scottish-Canadian fur trader in Pacific Northwest and Montana*

Alexander Ross was a native of Nairnshire, Scotland. When he was about 20 years old, he immigrated to present-day Ontario, Canada, where he worked as a schoolteacher until 1810. That year, he met with WILSON PRICE HUNT in Montreal and soon joined JOHN JACOB ASTOR's fur-trading venture to the Pacific Northwest.

In September 1810, Ross embarked on the *Tonquin* from New York, and sailed around CAPE HORN, to the Oregon Coast. He was one of the founders of the Astoria outpost for Astor's Pacific Fur Company, a subsidiary of the AMERICAN FUR COMPANY, and the first permanent non-Indian settlement in Oregon.

Ross remained at the Astoria post after 1813, when it was purchased by the NORTH WEST COMPANY and renamed Fort George. In 1818, he undertook a trade expedition from the mouth of the COLUMBIA RIVER as far as its confluence with the Snake River. Nearby, he founded Fort Nez Percés, later known as Fort Walla Walla.

In 1823, following the takeover of the North West Company by the HUDSON'S BAY COMPANY, Ross assumed command of the latter company's post at Flathead Lake in what is now western Montana. In February 1824, he led an expedition from the Flathead Lake post into the Snake River country of western Idaho, exploring southward as far as the mouth of the Boise River. Along the way, a group of his Iroquois (Haudenosaunee) trappers were rescued from

local Indians by American mountain man and fur trader JEDEDIAH STRONG SMITH. Ross then allowed Smith and his companions to explore the exclusive Hudson's Bay Company trapping grounds in the Oregon Country, a decision that alarmed the company's directors and led to Ross being replaced at Flathead Lake by PETER SKENE OGDEN.

From Flathead Lake, Montana, Ross headed eastward with his Okanagan Indian wife in 1825. He settled at the Red River Colony, near present-day Winnipeg, Manitoba, where, during the next three decades, he played a significant role in the settlement's administration.

Alexander Ross, in the course of his career in the FUR TRADE, explored uncharted territory eastward from the Pacific coast into what is now Idaho, Washington, and Montana. His books, *Adventures of the First Settlers on the Oregon or Columbia River* (1849) and *The Fur Hunters of the Far West* (1853), provide some of the earliest accounts of the first decade and a half of non-Indian settlement in the Pacific Northwest.

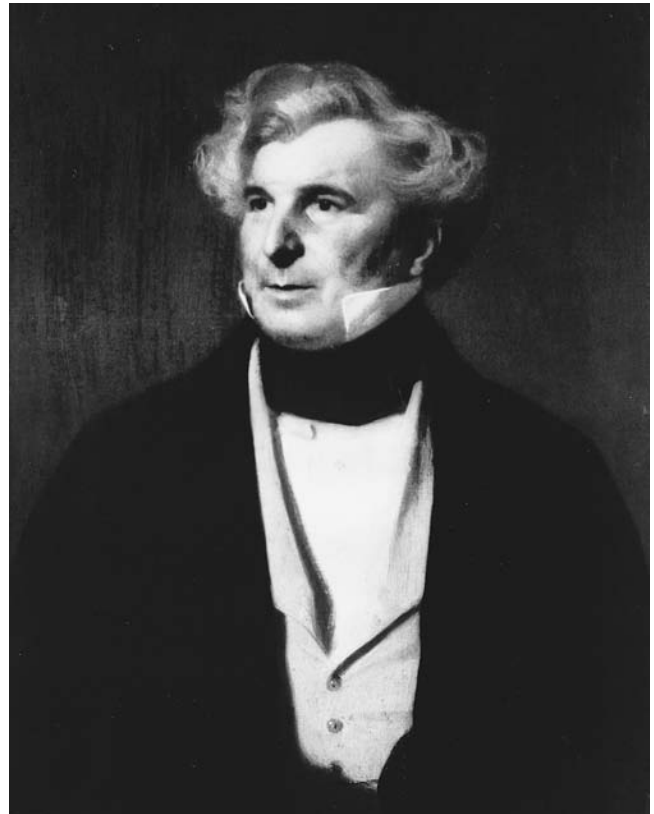
Ross, Sir James Clark (1800–1862) *British naval officer in the Canadian Arctic and Antarctic, nephew of Sir John Ross*

Born in London, James Clark Ross was of Scottish descent. At the age of 12, he entered the navy, serving on ships commanded by his uncle SIR JOHN ROSS for the next six years.

In 1818, Ross sailed as a midshipman on the *Isabella* in the elder Ross's expedition to Baffin Bay and Lancaster Sound, undertaken as part of the British navy's newly revived effort to find the NORTHWEST PASSAGE. The next year, he took part in SIR WILLIAM EDWARD PARRY's voyage through Lancaster Sound to Melville Island, and, while wintering there with the expedition, learned survival skills essential to polar exploration.

Ross again accompanied Parry on an 1821–23 exploration of northwestern HUDSON BAY, and, in 1824–25, he took part in Parry's voyage to Lancaster Sound and Prince Regent Inlet, during which he was promoted to lieutenant. In 1827, Ross joined Parry in his unsuccessful attempt to reach the NORTH POLE from Spitsbergen (present-day Svalbard).

Promoted to commander on his return, Ross took a leave from the navy in 1829 to serve as second in command in his uncle John's privately funded Northwest Passage expedition to the Canadian Arctic. While their vessel, the *Victory*, was icebound on the east shore of the Boothia Peninsula, he undertook a series of overland explorations. In spring 1830, he crossed to the west coast of the Boothia Peninsula and reached what he thought was a northward extension of the mainland. He named it King William Land, not realizing that it was actually an island separated from the Boothia Peninsula by a frozen strait. On May 31, 1831, in



Sir James Clark Ross (Library of Congress)

the course of another overland expedition, Ross located the NORTH MAGNETIC POLE, then situated at 70°5'17" north latitude and 96°46' west longitude on the west coast of the Boothia Peninsula.

Soon after his return to England in 1833, Ross was promoted to the rank of captain, and, in 1835–38, he conducted an extensive study of terrestrial magnetism throughout the British Isles.

Ross was next given command of a British navy expedition to seek the SOUTH MAGNETIC POLE and explore the seas around Antarctica. In command of the *Erebus*, and accompanied by the *Terror* under FRANCIS RAWDON MOIRA CROZIER, Ross sailed from England in September 1839. The next year, he established a series of magnetic observatories in the Southern Hemisphere on St. Helena Island in the South Atlantic Ocean; at Cape Town, South Africa; in the Kerguelen Islands of the southern Indian Ocean; and in Hobart, Tasmania.

After several months in Hobart, where he was hosted by SIR JOHN FRANKLIN, then Tasmania's governor, and his wife Lady JANE FRANKLIN, Ross and his expedition set out for Antarctica. He sailed due south along the INTERNATIONAL DATE LINE, planning to explore east of those portions of the Antarctic coast already sighted the previous year in the American expedition of CHARLES WILKES and the

French expedition of JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE.

On January 1, 1841, Ross and his ships crossed the ANTARCTIC CIRCLE. After forcing a passage through the PACK ICE, they sailed another 500 miles across ice-free seas to the Antarctic mainland at Cape Adare. He then entered what later became known as the Ross Sea, and, on January 11, 1841, he sighted a mountain range on a section of uncharted coastline. He called this Victoria Land in honor of Queen Victoria, and named the mountains the Prince Albert Range after her consort. A landing party sent ashore took possession of the region for Great Britain. An active volcano was soon sighted on the coast, which Ross named Mount Erebus after his ship. He named a nearby, dormant volcanic peak Mount Terror after the expedition's other vessel. A large bay explored in the vicinity was named after Archibald McMurdo, an officer on the *Terror*, and was known afterward as McMurdo Sound.

Ross soon found his efforts to continue southward toward the SOUTH POLE blocked by an immense floating mass of ice, several hundred feet high, extending along the shoreline for more than a thousand miles. Known afterward as the Ross Ice Shelf, it was later determined to cover an area roughly the size of France. Although his southward progress was blocked, Ross nonetheless reached 78°4' south latitude, breaking the record set by navigator JAMES WEDDELL in 1822–23.

After making oceanographic studies in the Ross Sea for the ROYAL SOCIETY, as well as a study of offshore plant, animal, and marine life, Ross and his expedition sailed for Tasmania and Port Jackson (Sydney), Australia, to spend the Antarctic winter.

Ross made his second probe into the Antarctic seas in December 1841. On returning to the Ross Sea, he succeeded in bettering his previous farthest-south record by an additional 11 seconds of latitude. Soon afterward, in early February 1842, his ships were damaged in a collision in the Ross Sea while trying to avoid icebergs. Ross then made for the Falkland Islands for repairs.

In December 1842, after brief explorations of Tierra del Fuego and Hermite Island just west of CAPE HORN, Ross again sailed southward to the Antarctic mainland. This time, he explored along the Antarctic Peninsula (Graham Land), surveying its uncharted Weddell Sea coast, along which he located the island group that now bears his name.

Ross arrived back in England in September 1843 and was knighted soon afterward. Although offered the command of yet another attempt on the Northwest Passage, he resolved to undertake no more long voyages. Sir John Franklin, who had been given command of the expedition in his place, subsequently disappeared in the Canadian Arctic in 1845 with the *Erebus* and the *Terror*; the latter still

commanded by Crozier, along with the expedition's entire complement of 127 officers and men.

In 1848–49, Ross commanded the *Enterprise* and the *Investigator* in the British navy's first seaward search effort for Franklin. Ross managed to navigate through Lancaster Sound as far as Barrow Strait to Somerset Island, wintering on its north shore. Overland expeditions were undertaken to find some trace of Franklin, including one in which Ross, accompanied by SIR FRANCIS LEOPOLD McCLINTOCK, traveled down Peel Sound and reached within 70 miles of where Franklin's ships had become icebound on King William Island. Short of supplies, Ross and McClintock were compelled to return to the ships at the Somerset Island anchorage, without realizing how close they had come to solving the mystery of Franklin's disappearance. Ironically, it may have been Ross's error 18 years earlier, when he had incorrectly charted King William Island as joined to the mainland, that led Franklin to head away from the only navigable strait along that segment of the Northwest Passage, thus dooming his expedition.

After his return to England in 1849, Ross ended his career at sea. Made a rear admiral in 1856, he retired to his home at Aylesbury, near London.

Sir James Clark Ross commanded the first British scientific expedition to Antarctica since the voyages of JAMES COOK in the late 1770s. His two-volume account of the expedition, *A Voyage of Discovery and Research in the Southern and Antarctic Regions During the Years 1839 to 1843*, was published in 1847. In addition to charting the Ross Sea and the Ross Ice Shelf, he also determined that the South Magnetic Pole lay inland from the Antarctic coast. His explorations along the Antarctic mainland ultimately revealed that the geographic South Pole was surrounded by a large landmass. During the first decades of the 20th century, the Ross Sea and the adjoining Ross Ice Shelf, which extend deeper into the continent than any other part of the Antarctic coast, provided an entry way into the continent for the South Polar attempts of ROBERT FALCON SCOTT, ERNEST HENRY SHACKLETON, and ROALD ENGELBREGT GRAVNING AMUNDSEN.

Ross, Sir John (1777–1856) *Scottish-born British naval officer in the Canadian Arctic, uncle of Sir James Clark Ross*

Born near Wigtown, on the southwest coast of Scotland, John Ross entered the British navy when he was only nine years old. He served on British warships in the MEDITERRANEAN SEA and on merchant vessels in the WEST INDIES and the Baltic Sea. In 1799, after several years with the BRITISH EAST INDIA COMPANY, he returned to the navy to serve in the Napoleonic Wars of 1803–15, reaching the rank of commander by 1812.

In 1818, Ross was given command of the navy's effort to explore west of GREENLAND in search of the NORTHWEST PASSAGE. He sailed on the *Isabella*, along with his nephew SIR JAMES CLARK ROSS, then a midshipman. Second in command of the expedition was SIR WILLIAM EDWARD PARRY aboard the *Alexander*.

Ross and his ships rounded the southern tip of Greenland and sailed up Davis Strait into Baffin Bay. In his initial explorations along the west coast of Greenland, he made the European discovery of Melville Bay, where he encountered a theretofore unknown band of Inuit, whom he dubbed the "Arctic Highlanders." He also reported finding meteorites at Cape York. From there, he surveyed the entrances to Smith Sound and Jones Sound, determining that neither one provided a western entrance to a Northwest Passage.

Ross next explored Lancaster Sound, and, after navigating through it for about 50 miles, sighted what he took to be a chain of mountains blocking progress westward, which he named the Croker Mountains. Although a number of his officers, most notably Parry, reported seeing nothing ahead but open water, Ross nonetheless turned back to England, where he informed British naval authorities that all three of the channels he had explored, including Lancaster Sound, were closed-end bays, affording no western outlet from Baffin Bay. A year later, Parry sailed back to Lancaster Sound and navigated westward as far as Melville Island, exploring the islands and channels of the Canadian Arctic and reaching a point that was at least half-way through the Northwest Passage.

Ross's professional reputation suffered after news of Parry's success reached England. As a result, despite his proposal to lead another Arctic expedition, he was offered no new commands. In 1828, however, Felix Booth, a gin distiller who also held the position of sheriff of the City of London, provided Ross with the financial backing to undertake a second Arctic expedition.

In spring 1829, Ross left England for the Canadian Arctic aboard the *Victory*, a paddle-wheel steamer that had formerly served as an English Channel ferry, now rigged with sails and equipped for Arctic navigation. Second in command was his nephew James Clark Ross, who had been promoted to commander after taking part in a series of Arctic explorations with Parry during the 1820s. The elder Ross planned to investigate Prince Regent Inlet, the channel leading southward from Lancaster Sound, which Parry had explored in 1824–25.

After passing through Lancaster Sound, Ross entered Prince Regent Inlet and managed to reach a point 200 miles beyond where Parry's ship, the *Fury*, had been wrecked five years earlier. By October 1829, the *Victory* had become ice-bound, and the expedition spent the winter aboard the ship at an anchorage Ross called Felix Harbor in honor of his backer. Overland expeditions were undertaken under the command of the younger Ross.

From the reports of the exploring parties and from local Inuit, John Ross determined that they were on the mainland of North America, a region he named the Boothia Peninsula, also in honor of the London gin maker. On an overland expedition in spring 1831, James Clark Ross located the NORTH MAGNETIC POLE.

In 1832, John Ross, concluding that the *Victory* was inextricably entrapped in the ice at Felix Harbor, resolved to abandon the ship and travel northward with his men in sledges and boats to Lancaster Sound, in the hope that they would be picked up there by a passing whaling ship. Unable to progress beyond what remained of the *Fury*, Ross and his men spent the winter of 1832–33 in a shelter made from the wreckage, which Ross called Somerset House. They survived fairly well through the winter, eating the canned and preserved food that had been left on Parry's ship.

In the spring, Ross and his men reached Lancaster Sound, where, on August 26, 1833, they were rescued. The ship that picked them up turned out to be the *Isabella*, the same vessel on which Ross had made his first voyage to Lancaster Sound 15 years before.

Back in England, Ross, who was thought to have perished with his expedition, quickly redeemed himself as one of Great Britain's leading Arctic explorers. He was honored with a knighthood in 1834 for having survived four consecutive Arctic winters and for having brought his men through the ordeal with few losses. In addition, he had made the first European sighting of the Boothia Peninsula, which he determined to be the northernmost point of the North American mainland. The British Parliament awarded Ross and his men £5,000 for having made significant gains in revealing the geography of the Canadian Arctic and the eastern segment of the Northwest Passage. Moreover, the government reimbursed Felix Booth for the costs of mounting his private Arctic expedition.

Ross became a diplomat afterward, serving from 1839 to 1846 as British consul at Stockholm. In 1847, although then entering his seventies, Ross sought to lead a British navy search effort for SIR JOHN FRANKLIN and his expedition, which had been missing in the Canadian Arctic for two years. Although he was turned down by the navy, Ross again won the support of Sir Felix Booth (who had also been knighted for his contribution to British Arctic exploration). Booth provided Ross with the schooner *Felix*, on which Ross wintered at Barrow Strait in 1850–51. Finding no trace of Franklin's expedition, Ross returned to England. He retired to his home, North West Castle, on southern Scotland's Loch Ryan.

Sir John Ross, with his controversial 1818 voyage to Baffin Bay and Lancaster Sound, initiated modern exploration of the Canadian Arctic. In addition, he reaffirmed the findings made by WILLIAM BAFFIN and ROBERT BYLOT in their 1616 voyage, which, after two centuries, had remained largely forgotten. Ross's 1829–33 expedition was the first to

employ steam power in polar exploration, even though the *Victory's* engine proved unreliable and was abandoned in Prince Regent Inlet before the end of the first winter. His landing on the Boothia Peninsula in 1829 marked the first time the North American mainland had been approached from the north. Ross's 1829–33 expedition also indirectly led to the European discovery of one of northern Canada's longest rivers—the Back River—by British naval officer SIR GEORGE BACK, after he had participated in an overland search for Ross in 1833–34.

Rossel, Elisabeth-Paul-Edouard de (chevalier de Rossel) (1765–1829) *French naval officer in the South Pacific*

Elisabeth-Paul-Edouard de Rossel was born in the north-central French town of Sens. He joined the French navy's Marine Guard in 1780 and, after serving in the Caribbean Sea, took part in French efforts in the American Revolution, including the Battle of Yorktown in October 1781.

In 1785, Rossel served with ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux, in the Indian Ocean, becoming his protégé. Promoted to lieutenant in 1789, he went on to sail aboard the *Récherche* as third in command under d'Entrecasteaux in the 1791–94 search for JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, whose expedition had vanished in the southwestern Pacific Ocean several years earlier.

On the 1791–94 voyage, Rossel made astronomical observations and conducted studies of terrestrial magnetism. In August 1793, while the expedition was off the eastern end of New Guinea, he briefly assumed leadership of the expedition when ALEXANDRE HESMIVY D'AURIBEAU, d'Entrecasteaux's successor, became too ill with SCURVY to carry on his command.

In 1795, Rossel sailed from Surabaya, Java, for France aboard a Dutch vessel. By that time, the expedition had been abandoned, and as a result of the outbreak of the French Revolutionary Wars two years earlier, the ships had been confiscated by pro-royalist Dutch authorities in the EAST INDIES. On the homeward voyage, Rossel's ship was captured by British naval forces, and he was held prisoner in England until 1802, when the Peace of Amiens temporarily ended hostilities. Rossel's account of d'Entrecasteaux's explorations in search of La Pérouse, *Voyage d'Entrecasteaux envoyé à la recherche de La Pérouse* (Journey of d'Entrecasteaux, sent to search for La Pérouse), was published in 1808.

Rossel went on to a distinguished scientific and naval career. After serving as director general of the French navy's department of maps and charts, he reached the rank of rear admiral in 1828. He took part in the planning of JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE's expedition of 1826–29, in the course of which the wreck of one of La Pérouse's ships was finally located. Rossel had been named

to the French Academy of Sciences in 1812, and in 1821, he was founding member of the Geographical Society of Paris.

Rossel Island, one of the islands of the Louisiade Archipelago, which d'Entrecasteaux discovered off the eastern end of New Guinea, was named in honor of the chevalier de Rossel. Captured along with Rossel in 1795 were maps he was carrying of the Australian coastline, which had been prepared by d'Entrecasteaux's hydrographer, CHARLES-FRANÇOIS BEAUTEMPS-BEAUPRÉ. Copies of these French charts were later provided to Captain MATTHEW FLINDERS for his explorations around Australia on the *Investigator* in 1801–03.

Rubrouck, William of See WILLIAM OF RUBROUCK.

Rumi, Shihab al-Din Abu Abd Allah Yaqut al- See YAQUT AL-RUMI, SHIHAB AL-DIN ABU ABD ALLAH.

Russell, Osborne (ca. 1814–1892) *American fur trapper in the northern Rocky Mountains and Oregon*

Osborne Russell was born in southern Maine. Little is known of his family background or early life. At the age of 16, he briefly went to sea, then embarked on a career in the FUR TRADE in the frontier regions of present-day Wisconsin and Minnesota.

In 1834, Russell accompanied NATHANIEL JARVIS WYETH and his fur-trading expedition to the Snake River region of what is now southern Idaho, where he took part in the establishment of Fort Hall. Over the next year, he trapped and hunted in the Cache Valley, the Teton Mountains, and the Jackson Hole region of present-day western Wyoming. Soon afterward, Russell joined up with CHRISTOPHER HOUSTON CARSON (Kit Carson), JAMES BRIDGER, and JOSEPH MEEK in trapping forays into the northern ROCKY MOUNTAINS, during which he survived attacks by Blackfeet and Crow Indian war parties.

In 1842, Russell traveled to the Oregon Country with an emigrant wagon train, settling in the upper Willamette Valley. He taught himself law while recovering from an eye injury, and, in 1843, he was appointed to a judgeship by Oregon's provisional government. In 1848, soon after his election to the territorial legislature, he left Oregon for the California goldfields.

After trying his hand at prospecting, Russell operated a general store in Placerville, California, where he also served as a frontier judge. His later business enterprises included a shipping line between Sacramento, California, and Portland, Oregon.

Russell's fortunes sharply declined after a business partner suddenly took off with most of his firm's assets, leaving him seriously in debt for his remaining years in Placerville.

Osborne Russell was one of the few MOUNTAIN MEN known to have kept a written account of his experiences in the Rocky Mountain fur trade. Although he had submitted his journal to a New York City publisher in 1846, it was not printed until 68 years later. His *Journal of a Trapper: or, Nine Years in the Rocky Mountains, 1834–1843*, published in 1914, provides an eyewitness account of the northern Rockies frontier in the decade between the initial exploration of the region and the advent of non-Indian settlement.

Rusta, Abu Ali Ahmad ibn See IBN RUSTA, ABU ALI AHMAD.

Rut, John (fl. 1520s) *English mariner in Newfoundland*
John Rut, an English mariner, was given command of an expedition to the Americas in search of a NORTHWEST PASSAGE to the Orient, sailing for King Henry VIII.

In 1527, Rut departed England with two ships, the *Mary Guildford* and the *Samson*, and crossed the Atlantic Ocean to a point off the Labrador coast near the Strait of Belle Isle, which separates Newfoundland from the mainland. He proceeded to the Avalon Peninsula on Newfoundland's east coast and anchored in the harbor opposite present-day St. John's. From there, he sailed southward to Santo Domingo on Hispaniola (the island made up of present-day Haiti and the Dominican Republic) in the WEST INDIES.

John Rut's visit, 30 years after that of JOHN CABOT to the Newfoundland region, held historical importance in that he wrote a letter to King Henry, describing the fishing activity around the island. He reported seeing 14 fishing ships—11 Norman, one Breton, and two Portuguese—in the "Haven of St. John" in the month of August. St. John's, frequented by fishermen from many nations in the 16th century, became a thriving settlement and is represented as "St. Jehan" and "San Joham" on maps of the 1540s.

S



Saavedra Cerón, Álvaro de (unknown–1529)

Spanish mariner in the South Pacific

Born in Spain, Álvaro de Saavedra was a cousin of HERNÁN CORTÉS, serving under him in the conquest of Mexico in 1519–21 and afterward as lieutenant governor of Veracruz.

In 1526, Cortés commissioned Saavedra to undertake a voyage from Mexico, westward across the Pacific Ocean, to rescue the survivors of a previous Spanish expedition stranded in the SPICE ISLANDS (the Moluccas of present-day Indonesia). Three ships were constructed for the expedition—*Santiago*, *Espíritu Santo*, and *Florida*—and, on October 31, 1527, Saavedra and his fleet sailed from Zihuatanejo on Mexico's Pacific coast, just north of Acapulco.

After a month at sea, two of the vessels were lost in a storm, leaving Saavedra with only his flagship, the *Florida*. On December 29, Guam was sighted. By the end of January, after a stopover on the north coast of New Guinea, he reached the Philippines. He landed on Mindanao on February 2, 1528, where he ransomed some of the crew of the previous Spanish expedition held by natives. He then headed southward for Halmahera and Tidore in the Moluccas.

After picking up more survivors on Tidore and obtaining a valuable cargo of cloves, Saavedra set sail back to Mexico. Although he went northward as far as 14° north latitude, he was forced to return to Tidore on failing to find the westerly winds necessary for an eastward passage across the Pacific. In a second attempt, he sailed even farther to the north, reaching as far as 31° north latitude, making the European

discovery of Ponape Island in the Carolines as well as Eniwetok in the Marshalls.

Soon afterward, Saavedra died at sea. The *Florida* returned to the Moluccas in early December 1529, once again unable to locate winds favorable for the homeward voyage. The surviving crew members were taken into custody by Portuguese authorities on Halmahera and held until 1533.

Álvaro de Saavedra was among the first Europeans to sail westward across the Pacific Ocean since the 1519–21 voyage of FERDINAND MAGELLAN. It was not until 1565 that Spanish navigator ANDRÉS DE URDANETA finally succeed in making the first known eastward voyage across the Pacific, sailing from the Philippines to the west coast of Mexico.

Saavedra, Hernandarias See ARIAS DE SAAVEDRA, HERNANDO.

Sable, Jean Baptist Point (Jean-Baptiste Point du Sable, Jean-Baptiste Pointe du Sable)

(ca. 1745–1818) *Haitian-French fur trader, trapper in the American Midwest, founder of Chicago*

Jean Baptist Point Sable is thought to have been born in Saint Marc in the French colony of Saint Domingue (present-day Haiti), his father a French sailor and his mother a slave of African ancestry. He was raised Catholic.

Many stories of Sable's early life are not confirmed. He may have studied in Paris. He was reportedly shipwrecked off the coast of Louisiana with a friend, Jacques Clemorgan, and after the two were rescued by a passing ship, they were taken to New Orleans, where Sable stayed and worked for French priests. After saving enough money to buy a CANOE and supplies, he possibly traveled up the MISSISSIPPI RIVER to the western Great Lakes. Other accounts indicate Sable reached the Great Lakes by way of French Canada.

Sable came into contact with the Potawatomi Indians, at that time living along the west coast of Lake Michigan. He gained the tribe's permission to hunt and trap on the Eschikagou Plain surrounding present-day Chicago and built his first home in the region, south of Chicago on the Illinois River.

In 1779, during the American Revolution, Sable appears in an official record, a British officer in the Great Lakes region reporting that he was active in the FUR TRADE with sympathies for the French. He was arrested in present-day Indiana and his goods confiscated. He was taken to Fort Michilimackinac in present-day Michigan. The British eventually released him, and he became their liaison to Indians along the Saint Clair River north of present-day Detroit.

In 1784, Sable returned to the Eschikagou Plain, where he built a homestead and trading post at the mouth of the Eschikagou River (now known as the Chicago River) on the site of present-day Chicago. He also built docks on Lake Michigan. At some point, he married a Potawatomi woman, Kittihawa, known to non-Indians as Catherine. On failing to win the tribe's chieftaincy in 1800, he and Kittihawa left the region and lived for a time in Peoria in present-day Illinois and eventually settled at Saint Charles in present-day Missouri.

As the first non-Indian to settle on the site of Chicago, Jean Baptist Point Sable is credited with founding the city; his successor at the trading post, John Kinzie, is also considered a father of Chicago. Sable's house and his role in the city's history are commemorated by a plaque at the corner of Pine and Kinzie Streets.

Sacajawea (Sacagawea, "Bird Woman," Boinaiv, "Grass Maiden," Janey) (ca. 1784–1812 or 1884)

Shoshone Indian interpreter, guide for Lewis and Clark Expedition in the American West, wife of Toussaint Charbonneau, mother of Jean-Baptiste Charbonneau
Sacajawea was born in the Lemhi Mountains region of what is now western Montana, the daughter of a Shoshone Indian chief. When she was about 10 years old, she was taken captive by a band of Hidatsa Indians.

By 1804, Sacajawea had become the wife of French-Canadian fur trapper TOUSSAINT CHARBONNEAU, who re-



Statue of Sacajawea in Portland, Oregon (*Library of Congress*)

portedly had won her and another Indian young woman in a gambling game with the Hidatsa. In the winter of 1804–05, the Corps of Discovery under the command of MERIWETHER LEWIS and WILLIAM CLARK encamped at the Mandan Indian villages at the confluence of the Knife River and MISSOURI RIVER, near present-day Bismarck, North Dakota. There, Toussaint Charbonneau was hired on as the expedition's interpreter, with the understanding that Sacajawea would accompany him on the trek to the Oregon coast.

In February 1805, Sacajawea gave birth to a son, JEAN-BAPTISTE CHARBONNEAU. Two months later, with her newborn infant strapped to her back, she and her husband departed the Mandan Indian villages with Lewis and Clark. Sacajawea served as a guide, as well as interpreter to Indian

tribes. The Corps of Discovery reached the Three Forks of the Missouri in August 1805; she guided them along the southwesternmost branch, the Jefferson, then through the Lemhi Pass to her Shoshone homeland. There, she was reunited with her brother Cameahwait, who had by that time become a chief.

Sacajawea convinced her brother to provide the expedition with horses, vital for their continued progress overland to the Clearwater, Snake, and Columbia watershed. She continued westward with Lewis and Clark and their men to the Oregon coast, arriving there in November 1805. On the return journey east in March 1806, she accompanied William Clark and his contingent as they explored the Yellowstone River to its junction with the Missouri. She and her husband left the expedition when it returned to the Mandan villages at the mouth of North Dakota's Knife River in summer 1806.

Details of Sacajawea's life after 1806 are contradictory. According to one account, she accompanied Toussaint Charbonneau to St. Louis in 1809, when he took their young son to William Clark, who had arranged to adopt the boy. She then reportedly returned to the upper Missouri with one of MANUEL LISA's fur-trading expeditions, where she died of fever in 1812.

An alternate, less likely version relates that Sacajawea went on to live with the Comanche Indians, then returned to her homeland and finally settled on the Wind River Indian Reservation in Wyoming, living there until her death at about age 100 in 1884.

Sacajawea was one of the few women to play an active role in the early exploration of North America. Through her skill as an interpreter and diplomat, the Lewis and Clark Expedition had mostly peaceful encounters with the more than 50 Indian tribes they met en route.

Sadlier, George Foster (fl. 1819) *British army officer in Arabia*

In 1819, George Sadlier, a captain with the British army in India, was sent to Arabia on a diplomatic mission to Ibrahim Pasha, the Egyptian military leader who had just defeated the Wahhabis, an Islamic reform movement.

Sadlier landed at Qatif, north of Bahrain on the Persian Gulf coast of Arabia, in June 1819. Accompanied by a small detachment of Egyptian soldiers, he set out westward across the desert of central Arabia, hoping to catch up with Ibrahim Pasha, who was then withdrawing with his army back to Egypt. En route, Sadlier visited Dar'iyah, a city that had never before been seen by Europeans, although by the time of his arrival, it was deserted and mostly destroyed by Ibrahim Pasha's forces.

Halfway across the Arabian Peninsula, near Anaiza, Sadlier learned that Ibrahim Pasha had continued westward

to the holy city of Medina. Sadlier continued across the desert and, on reaching the outskirts of Medina, presented Ibrahim Pasha with a ceremonial sword from the British government, as well as an offer of British military aid in support of the continuing campaign against the Wahhabis. Sadlier then headed for the RED SEA port of Yenbo, north of Jidda, arriving on September 20, 1819.

With his trek from the Persian Gulf to the Red Sea, which had taken a little longer than three months, Captain George Sadlier became the first European to cross the Arabian Peninsula, an accomplishment not duplicated until the 1917 journey of HARRY ST. JOHN BRIDGER PHILBY.

St. Denis, Louis Juchereau de (Louis Juchereau de St. Denys) (1676–1744) *French colonizer, trader in Louisiana and Texas*

A native of French Canada, Louis de St. Denis was born in Beauport, near Quebec City, the son of a local seigneur, or titled landowner. In 1698–99, he sailed to Mobile Bay with the brothers PIERRE LE MOYNE, sieur d'Iberville and JEAN-BAPTISTE LE MOYNE, sieur de Bienville, taking part in their colonizing expedition to the lower MISSISSIPPI RIVER.

In 1700, soon after the establishment of the French settlement on Biloxi Bay, St. Denis accompanied Bienville in an exploration up the Red River, ascending it into northwestern Louisiana and eastern Texas, which then was the northeastern frontier of New Spain. Two years later, he took command of a French outpost on the Mississippi Delta, Fort de la Boulaye. During the next three years, he undertook additional explorations westward into the interior.

St. Denis returned to the Red River in 1710, traveling upstream to the land of the Natchitoches Indians, a subgroup of the Caddo, among whom he established trade contacts; he did the same in nearby eastern Texas. In 1713, the French governor of Louisiana, ANTOINE LAUMET DE LA MOTHE, sieur de Cadillac, received word from a Spanish missionary in Mexico, Francisco Hidalgo, informing him that the Spanish had failed to provide enough missionaries to area tribes, and that the presence of French priests might be welcomed. Interpreting this news more as an open invitation for the French to extend their Indian trade into Texas, Cadillac sent St. Denis back up the Red River in 1713, with instructions to cross Texas to the Rio Grande and open up trade contacts with Indians.

St. Denis first traveled back to the Natchitoches village on the Red River, where he established a trading post, then set out across Texas. On July 14, 1714, he arrived at San Juan Bautista, the northernmost Spanish settlement on the Rio Grande, opposite present-day Eagle Pass, Texas, where he was promptly arrested for illegally entering Spanish territory.

St. Denis won the favor of the post commander's granddaughter, Manuela Sánchez Ramón, but he was later sent to Mexico City and imprisoned. On convincing the viceroy of Mexico that he was sincerely interested in extending Spanish settlement into Texas, he was released. He was so persuasive that the viceroy sent him back to San Juan Bautista, where he married Sánchez Ramón. Several months later, he set out on an expedition with her grandfather, Captain Domingo Ramón, planning to establish additional Spanish settlements to counter the threat of French expansion westward from Louisiana.

Proceeding northeastward from San Juan Bautista, St. Denis and Ramón, jointly in command of a party of 25 soldiers and nine missionaries, crossed from the Rio Grande to the Neches River of eastern Texas, which they reached in July 1716. There, they established the mission of Nuestro Padre San Francisco de los Tejas, as well as Mission San Miguel, not far from the Red River, and Mission Ais, west of the Neches.

St. Denis returned to Mobile soon afterward, where he again entered the service of Cadillac. In 1717, he returned to the Natchitoches trading post on the Red River, from where he recrossed Texas to the Rio Grande. Back at San Juan Bautista, the Spanish confiscated his trading goods. St. Denis traveled to Mexico City to protest this action, but he was again imprisoned. He managed to escape in September 1718, then made his way back to Mobile and on to Natchitoches, where he was soon joined by his wife, Manuela.

St. Denis remained in command of the French Red River post at Fort St. Jean Baptiste de Natchitoches for the next 24 years. In 1731, he succeeded in repelling a siege by Natchez Indians, and the next year, he led a party of soldiers and allied Indians in a counterattack at nearby Sang Pour Sang Hill.

Louis de St. Denis's settlement at Natchitoches became a starting point for a number of French explorations into the Canadian River and Arkansas River regions of Oklahoma and northern Texas; after 1719, it was the first center for the western FUR TRADE. Most significantly, St. Denis's activity on New Spain's northern border with French Louisiana caused the Spanish great concern over the threat of further French incursions and instigated stepped-up Spanish efforts to settle Texas.

St. Vrain, Céran de Hault de Lassus de

(1802–1870) *American fur trader, businessman in the American Southwest*

Céran de St. Vrain was born in Spanish Lake, near St. Louis, Missouri, the son of a former French naval officer. As a youth in the early 1820s, St. Vrain worked as a clerk for one of the fur-trading firms operating out of St. Louis. In fall 1824, he mounted his own fur-trading expedition across the

southern plains and into the southern ROCKY MOUNTAINS, arriving in Taos, New Mexico, on March 21, 1825. The next year, St. Vrain, together with mountain man and itinerant preacher WILLIAM SHERLEY WILLIAMS, received permission to trade and trap in the Gila River region of what is now southern Arizona.

St. Vrain entered into partnership with the brothers CHARLES BENT and WILLIAM BENT in 1830, establishing the firm of Bent, St. Vrain & Company, which outfitted fur-trapping and trading expeditions from Taos and Santa Fe. Three years later, the company founded its post on the Arkansas River, near the mouth of the Purgatoire, not far from present-day La Junta in southeastern Colorado. At the same time, St. Vrain and the Bents developed the trail southward from their Arkansas River post to Raton Pass and Taos, widening it to accommodate wagon caravans. Known as the Raton Pass Route, it provided traders from Missouri headed for New Mexico with a safer alternative than the hazardous Cimarron Cutoff, part of the Santa Fe Trail.

In 1847, St. Vrain, who had settled in Taos, led a volunteer force of mountain men in support of U.S. forces in the U.S.-Mexican War of 1846–48. After 1849, he left the FUR TRADE to engage in banking, real estate, and railroad ventures in the newly organized New Mexico Territory, where he also became a leading figure in territorial politics, although he was never elected to public office.

The site of the trading post that Céran de St. Vrain and the Bent brothers established on the Arkansas River was designated as a National Historic Site by the U.S. government in 1960. Known as Bent's Old Fort, it was the focal point of the fur trade in the southern and central Rockies, and, during the 1840s, was the staging area for the exploratory expeditions of CHRISTOPHER HOUSTON CARSON (Kit Carson) and JOHN CHARLES FRÉMONT.

Salle, René-Robert Cavalier de la See LA SALLE, RENÉ-ROBERT CAVELIER, SIEUR DE.

Sargon (Sargon of Akkad, Sargon the Great, Sargon I, Sharrukin, "the Righteous King")

(fl. 2340s–2300s B.C.) *Mesopotamian ruler in the Persian Gulf and eastern Mediterranean*

Sargon was a ruler of the ancient Mesopotamian kingdom of Akkad, situated at the northern end of the Persian Gulf, comprising much of what is now Iraq. Sargon's reign (from about 2340 to 2305 B.C.) was highlighted by a great campaign of conquest in which he expanded his domain northward, beyond the central Euphrates River Valley, into what is now Syria and southern Turkey, founding the first empire in Mesopotamia. Moreover, he established trade contacts to the east with the peoples of the Indus Valley, to the south

with the peoples of the southeast coast of the Arabian Peninsula, and to the west with the peoples of the eastern MEDITERRANEAN SEA.

According to an ancient account, Sargon mounted several naval campaigns in which he sailed across a great sea west of his kingdom, possibly the Mediterranean, to locate and conquer lands some historians have identified as Crete and Spain. Other scholars have speculated that his maritime exploits were probably limited to the islands and coasts of the Persian Gulf.

Sargon, along with the Egyptian HANNU, is one of the earliest known explorers. The dynasty he founded lasted until about 2180 B.C.

Saris, John (unknown–1646) *English trader, mariner in Japan*

An English seafarer and merchant, John Saris first visited the Far East in 1604, when he accompanied Sir Henry Middleton of the BRITISH EAST INDIA COMPANY on a voyage to Bantam in the Dutch East Indies.

Saris remained in Bantam as an agent of the British East India Company for the next four years, returning to England in 1609. On April 18, 1612, he sailed from England on the *Clove*, in command of a company fleet bound for Japan. The voyage took him around the CAPE OF GOOD HOPE and along the coast of East Africa to the Ethiopian port of Assab near the mouth of the RED SEA.

After a stopover at Bantam and the SPICE ISLANDS (the Moluccas of present-day Indonesia), Saris landed on Japan's southernmost island of Kyushu in June 1613. There, he was met by his countryman, WILLIAM ADAMS, who had been living in Japan since 1600 as a naval adviser to the emperor. With Adams as his guide and interpreter, Saris made his way northward to the main Japanese island of Honshu. After visiting Osaka, he was received by the emperor at his court in nearby Suruga in early September 1613. Saris presented the emperor with a letter and gifts from King James I of England and, with Adams's help, obtained liberal trading privileges in Japan for the British East India Company.

After founding an English trading establishment on Kyushu and leaving Adams in charge of the company's interests in Japan, Saris sailed for England in November 1613, a journey that took almost a year. It was soon revealed that Saris had carried back a shipment of erotic books and pictures from the Far East, precipitating a minor scandal for the British East India Company that was resolved only when the offending material was destroyed.

John Saris settled near London, remaining as a consultant to the court of King James on matters relating to Far Eastern trade. His published narrative of his experiences was the earliest English account of Japanese life and culture. Although he had commanded the first English ships to land

in Japan, his success in opening the country to British trade was short-lived. By the mid-1600s, Japan's rulers had closed the country to all European trade, except for the Dutch, and contact between Japan and the West was not reestablished until 1853, with the arrival of American admiral Matthew Perry and his fleet.

Sarmiento de Gamboa, Pedro

(ca. 1530–ca. 1592) *Spanish mariner, scientist, historian in South America and the Pacific Ocean*

Pedro Sarmiento de Gamboa was born in Galicia, Spain. By 1555, he had reached the Americas, first Mexico, then Peru. An accomplished scientist as well as mariner, in 1564, during the Spanish Inquisition, he had to defend himself against charges of conjuration by the Catholic Church in Lima, but was cleared of wrongdoing, although he would continue to be harassed by religious authorities over the years.

In 1567–69, Sarmiento de Gamboa planned and accompanied an expedition under ÁLVARO DE MENDAÑA that headed westward from Peru in search of the fabled GREAT SOUTHERN CONTINENT, also known as Terra Australis. The excursion made instead the European discovery of the Solomon Islands and the Marshall Islands. Sarmiento de Gamboa also helped suppress Inca Indian resistance to Spanish rule. He wrote a history of the Inca people that was widely read in Europe.

In 1579, following English attacks under SIR FRANCIS DRAKE against Spanish settlements and ships along the coasts of Peru and Mexico, Sarmiento de Gamboa received the naval assignment of intercepting Drake in the STRAIT OF MAGELLAN at the southern tip of South America. Drake, however, returned to the Atlantic Ocean westward by way of the Indian Ocean and the CAPE OF GOOD HOPE. Over the next 16 months, Sarmiento de Gamboa conducted a survey of the strait, returning to Spain in 1580 and reporting his findings to King Philip II. A colonizing expedition of 350 was planned under Sarmiento de Gamboa and Diego Flores de Valdés. Many of the 24 vessels were lost in a storm, and Flores de Valdés led a number of ships back to Spain. Sarmiento de Gamboa continued on to the strait with four ships and 64 colonists, and, in 1584, founded the settlements of Rey Don Felipe and Nombre de Jesús.

On his return voyage to Spain for supplies, Sarmiento de Gamboa was captured by the English. In London, he was interviewed by Queen Elizabeth I in 1588. He borrowed funds to be ransomed but was captured in France and held there until 1590 when he was ransomed by the Spanish Crown. By that time, the colony he had founded had been abandoned, many of the colonists dying of starvation. In 1591, he was assigned the task of organizing another colonizing expedition but died before departure.

Pedro Sarmiento de Gamboa played a part in the Spanish discovery of the Solomon and Marshall Islands and contributed to knowledge of South America through his historical and scientific writings. In addition to his survey of the Strait of Magellan, he is also known for the most accurate calculation of the longitude of Peru up to that time.

Sarychev, Gavriil Andreyevich (1763–1831)

Russian naval officer in Alaska and eastern Siberia

Gavriil Sarychev was a Russian naval officer trained in the art of producing coastal maps from navigational surveys. Starting in 1785, he took part in the Russian government's Northeastern Secret Geographical and Astronomical Expedition, an official exploration of northeasternmost SIBERIA and the Gulf of Alaska, under the leadership of British seafarer JOSEPH BILLINGS.

In 1790–91, as second in command on the ship *Slava Rossy*, Sarychev accompanied Billings in an exploration of the Aleutian Islands and the Gulf of Alaska, during which he charted Alaska's southern coastline eastward as far as Prince William Sound and Cape St. Elias. The next year, he and Billings undertook an examination inland into northeastern Siberia's Chukchi Peninsula.

In 1802, Sarychev continued his hydrographic work with a survey of the west coast of Russia, along the shores of the Gulf of Finland and the Baltic Sea.

In 1806, Gavriil Sarychev's report on his explorations with Billings was published in an English edition as *Account of a Voyage of Discovery to the North-East of Siberia, the Frozen Ocean, and the North-East Sea*. Named as the Russian navy's chief hydrographer in 1808, and made an admiral in 1830, Sarychev was responsible for producing the first accurate charts of the Aleutian Islands, the Gulf of Alaska, and the coast of eastern Siberia's Chukchi Peninsula.

Sauma, Rabban bar See BAR SAUMA, RABBAN.

Schlagintweit, Adolf von (1829–1857)

German traveler in India and central Asia, brother of Hermann von Schlagintweit and Robert von Schlagintweit

Born in Munich, Adolf von Schlagintweit was the brother of HERMANN VON SCHLAGINTWEIT and ROBERT VON SCHLAGINTWEIT. Starting in 1854, Schlagintweit accompanied his two brothers in their scientific exploration of India, Tibet, and western China. In 1857, he stayed behind in western China after Hermann and Robert had returned to Europe; he was intent on continuing northward into the Pamir region of southern central Asia. Later that year, Schlagintweit followed the Northern Way segment of the ancient SILK ROAD as far as the caravan center of Kashgar, where he was killed by bandits.

Adolf von Schlagintweit's brief career as an explorer in central Asia ended before he was 28 years old. Along with his brothers, he was among the first Europeans to travel from Tibet, northward across the Kun Lun mountain range, into the desert regions of western China's Sinkiang (Xinjiang) province.

Schlagintweit, Hermann von (1822–1882)

German mountain climber in India and central Asia, brother of Adolf von Schlagintweit and Robert von Schlagintweit

Hermann von Schlagintweit was born in Munich, the older brother of ADOLF and ROBERT VON SCHLAGINTWEIT. Schlagintweit, who had become an accomplished mountaineer in his early climbing expedition in the Alps, joined his brothers on an 1854–57 scientific expedition to India, Tibet, and western China.

By the time he had returned to Europe in 1857, Hermann von Schlagintweit had explored the Karakoram mountain range of north-central India, as well as the Kunlun mountain range between northern Tibet and the western Chinese province of Sinkiang (Xinjiang).

Schlagintweit, Robert von (1833–1885)

German mountain climber, geologist in India and central Asia, brother of Adolf von Schlagintweit and Hermann von Schlagintweit

Robert von Schlagintweit was born in Munich, the son of an ophthalmologist. Educated as a geologist, he was also an accomplished mountaineer.

In 1854, on the recommendation of German naturalist ALEXANDER VON HUMBOLDT, Schlagintweit and his older brothers ADOLF VON SCHLAGINTWEIT and HERMANN VON SCHLAGINTWEIT were commissioned by the BRITISH EAST INDIA COMPANY to conduct an extensive scientific survey of India. During the next two years, they traveled throughout the Deccan Plateau of south-central India, as well as the Kashmir and Himalayan regions of northern India, carrying out studies in geology and terrestrial magnetism.

In 1856–57, Schlagintweit and his brothers extended their explorations beyond India's northern border into the Karakoram mountain range, crossed into Tibet, and continued northward across the Kunlun range, entering the desert region of western China's Sinkiang (Xinjiang) province.

Upon his return to Europe in 1857, Schlagintweit accepted a professorship at the University of Giessen and wrote an account of the expedition, *Results of a Scientific Mission to India and High-Asia*, a four-volume work published in 1860–66. In 1867–70, he went on a lecture tour of universities in the United States, during which he undertook additional scientific field work on the Pacific coast.

While in the HIMALAYAS, Robert and Adolf von Schlagintweit set a new MOUNTAIN CLIMBING record by ascending Mount Kamet to a height of 21,000 feet.

Schmidt, Otto Y. (1891–1956) *Soviet scientist in the Russian and Siberian Arctic*

Otto Schmidt, a Russian scientist, became involved with the exploration of the Russian and Siberian Arctic seas in conjunction with his work in geophysics and astronomy.

In 1928, in command of the icebreaker *Sedov*, Schmidt led a scientific expedition to Franz Josef Land, the Arctic archipelago north of Novaya Zemlya, which the Union of Soviet Socialist Republics (USSR, or Soviet Union) had claimed as part of its national territory two years earlier. After establishing a scientific station there, he returned to Leningrad (present-day St. Petersburg), and, two years later, in 1930, he undertook a second voyage to Franz Josef Land.

In 1932, Schmidt, a professor at the Arctic Institute of the USSR in Leningrad, was named as head of the Central Administration of the Northern Sea Route, an agency that had been created to direct the development of the NORTHEAST PASSAGE across northern Europe and Asia as a practical shipping and communications channel, linking European Russia with northern SIBERIA and the Pacific Ocean. That year, he commanded a Soviet expedition aboard the icebreaker *Sibiriyakov*, which navigated the entire length of the Northeast Passage on a course through the Severnaya Zemlya Islands and north of Cape Chelyuskin, Asia's northernmost point. Schmidt made the voyage from Murmansk to Vladivostok in two months and four days, demonstrating that the Northeast Passage could be navigated within one season.

Schmidt soon commanded another voyage through the Northeast Passage on the icebreaker *Chelyuskin*, with plans to return westward within the same year. Sailing from Leningrad on July 12, 1933, he was accompanied by a crew of more than 100, including women and children.

In early November 1933, Schmidt and his expedition became icebound in the Chukchi Sea, north of BERING STRAIT. After drifting northward with the PACK ICE, the *Chelyuskin* reached the north coast of Alaska, where it sank on February 13, 1934, crushed by the ice. The expedition was able to abandon the ship with few losses and set up a temporary encampment on the ice, surviving sub-zero temperatures. A makeshift landing strip was soon constructed as well, and in early March, Schmidt and his party were evacuated by a fleet of rescue aircraft.

Schmidt next became involved in scientific research in the Arctic supported by aircraft. On May 21, 1937, he took off from the airfield on Rudolf Island, one of the Franz Josef Land islands, and, with a party of four others, flew to within 13 miles of the NORTH POLE, where he landed. Other air-

craft soon followed with additional supplies, and within a few days the first manned scientific station near the North Pole had been set up. Soon afterward, Schmidt flew back to Franz Josef Land. By February 1938, the base had drifted southward with the pack ice to the east coast of GREENLAND, a distance of more than 1,500 miles. Maintaining radio contact with the men at the base, Schmidt determined their position and mounted a rescue mission. In command of two Soviet icebreakers, Schmidt reached the scientific team on February 19, 1938, rescuing them just as the ice floe on which they were drifting was about to break up.

In the course of his explorations in the polar seas of Russia and Siberia, Professor Otto Schmidt undertook extensive studies of Arctic Ocean currents, as well as observations of solar radiation in high latitudes. His 1932 expedition, in which he navigated across northern Europe and Asia within one season, demonstrated that the Northeast Passage could be developed into a practical route for shipping and communication, vital for the development of the Soviet Union's Arctic region. The rescue of his 1933–34 expedition, stranded on the ice of the frozen Chukchi Sea, was the first polar airlift in history. In his 1937 expedition, Schmidt and his party became the first men to reach the vicinity of the North Pole since the 1909 voyage of Admiral ROBERT EDWIN PEARY and MATTHEW ALEXANDER HENSON. In addition, the base Schmidt established near the North Pole that year served as a radio station for a series of Soviet transpolar flights from Moscow to Washington State and California. Schmidt's later scientific work concentrated on developing a theory on the origin of the Earth. In honor of Schmidt's contribution to Soviet exploration in the Arctic, an island he located in Franz Josef Land was named after him.

Schomburgk, Sir Robert Hermann

(1804–1865) *German-born naturalist in South America, in service to Great Britain*

Robert Hermann Schomburgk was born in the eastern German city of Freiburg, the son of a minister. In 1826, after an education in Germany that included training in geology and the natural sciences, he moved to the United States, settling in Richmond, Virginia.

In 1830, after his brief career as a Virginia tobacco merchant ended when a fire destroyed his business, Schomburgk traveled to the WEST INDIES, where he undertook a natural history survey of the coast of Anegada in the British Virgin Islands. His work there came to the attention of Great Britain's ROYAL GEOGRAPHICAL SOCIETY, which, in 1831, commissioned him to explore the interior of British Guiana (present-day Guyana) in northeastern South America.

In 1831–35, Schomburgk traveled to the upper Essequibo River, the longest river in British Guiana, in the course of which he determined its source and discovered a

giant water lily, which he named the *Victoria Regia*. In 1837, he ventured into the Guiana Highlands, exploring the Kanuku Mountains, then undertook an overland journey from Lake Amicu northwestward through difficult terrain to the ORINOCO RIVER. In 1839, he nearly traced the Orinoco River to its source, in a journey that took him through the Casiquiare Canal into the Río Negro.

Back in England in 1840, Schomburgk received a gold medal from the Royal Geographical Society for his work in British Guiana. He was soon appointed to lead a British government survey to establish the colony's boundary with Venezuela. In 1841, he traveled through the Pakaraima Mountains of western British Guiana and also explored the upper Courantyne and Berbice Rivers along British Guiana's border with Brazil. Schomburgk returned to England in 1844. He had become a naturalized British subject, and that year, he was knighted by Queen Victoria.

In 1848, Schomburgk entered the British diplomatic service with an appointment as British consul to Santo Domingo. Starting in 1857, while serving as British consul in Bangkok, he undertook explorations into Southeast Asia, including a survey of the Isthmus of Kra, in connection with a proposed ship canal through the Malay Peninsula. He returned to Europe in 1864 and settled in Berlin, where he died the following year.

In his 1831–35 explorations into the interior of northeastern South America, Sir Robert Schomburgk established a line of astronomically determined points delineating the watershed region between the Essequibo and Orinoco Rivers. Along with an account of his own explorations, *Voyage in Guiana and upon the Shores of the Orinoco during the Years 1835–39* (1840), he also edited a history of the earliest British explorations into the region, *The Discovery of the Empire of Guiana by Sir Walter Raleigh* (1848). His 1841–44 survey along the Venezuela-British Guiana frontier resulted in the establishment of the Schomburgk Line, which became significant in the final resolution of the boundary in the 1890s. In addition to his discovery of the *Victoria Regia* water lily, he also classified many previously unknown varieties of orchids in South America, one of which has since been named the *Schomburgkia* orchid in his honor.

Schoolcraft, Henry Rowe (1793–1864)

American geologist, ethnologist on the upper Mississippi River
Henry Rowe Schoolcraft was born in Albany County, New York, where his father was involved in the glassmaking business. He attended Union College, then went on to Middlebury College, studying the natural sciences, especially geology and mineralogy.

Schoolcraft worked as a glassmaker for a time before 1817, then embarked on a trip down the Ohio River to Missouri. In Missouri and Arkansas, he undertook geological

and mineralogical surveys, which served as the basis for his 1819 book, *A View of the Lead Mines of Missouri*.

In 1820, Schoolcraft served as a geologist for Michigan territorial governor Lewis Cass in his expedition in the region of the upper Great Lakes in search of the source of the MISSISSIPPI RIVER. Cass's expedition explored the upper Great Lakes and incorrectly identified the source of the Mississippi River as Upper Red Cedar Lake. Schoolcraft published an account of this expedition in 1821, entitled *A Narrative Journal of Travels from Detroit through the Great Chain of American Lakes to the Sources of the Mississippi*.

In 1822, Schoolcraft undertook further geological surveys of the Lake Superior region. That same year, he was appointed Indian agent for the tribes of northern Michigan Territory and Lake Superior.

Ten years later, in 1832, Schoolcraft again ventured up the Mississippi River in search of its actual source in Minnesota. With a small party of explorers and scientists, he entered the St. Louis River at Fond du Lac in northeastern Minnesota, then portaged westward to Sandy Lake and into the Mississippi. From Cass Lake, a Chippewa (Ojibway) Indian guided him to the lake that was the Mississippi's true source, which he reached on July 13, 1832. Originally known as Elk Lake (Lac la Biche), it was rechristened Lake Itasca by Schoolcraft, from the Latin words *veritas* for "truth" and *caput* for "head." Schoolcraft wrote an account of his second Mississippi exploration, entitled *Narrative of an Expedi-*



Henry Rowe Schoolcraft (New York State Library, Albany)

tion through the Upper Mississippi to Itasca Lake, the Actual Source of the Mississippi. It was first published in 1834.

Schoolcraft became superintendent of Indian affairs for Michigan in 1836, serving until 1841. He moved back to New York, where he began a comprehensive study of the Indian tribes of the United States, a project that resulted in a multivolume study published in 1851–57.

Henry Rowe Schoolcraft is credited with locating the source of the Mississippi River. The Schoolcraft River in Minnesota, which joins the Mississippi near its source at Lake Itasca, was named in his honor.

Schouten, Willem Cornelis (Willem Cornelius Schouten, Willem Coreliszoon van Schouten)

(ca. 1580–1625) *Dutch mariner in the South Atlantic and South Pacific*

Willem Schouten was a native of the seaport town of Hoorn in the northern Netherlands. An accomplished seafarer, he served with the DUTCH EAST INDIA COMPANY and visited the WEST INDIES in 1601–03.

Schouten commanded the *Hoorn* in JAKOB LE MAIRE'S 1615–16 expedition in search of an alternative to the STRAIT OF MAGELLAN route around the tip of South America.

In addition to the European discovery of Le Maire Strait and CAPE HORN (which he named after his birthplace), Willem Schouten, with Le Maire, explored various island chains in the Pacific. Off the northwest coast of New Guinea, he located an island group that afterward became known as the Schouten Islands. He also located the Bismarck Archipelago.

Schwatka, Frederick (1849–1892) *U.S. Army officer, American lawyer, physician in the Canadian Arctic, Alaska, and northern Mexico*

Born in Galena, Illinois, Frederick Schwatka was 10 years old when he moved with his family to Salem, Oregon. He entered West Point in 1867, graduating in 1871 as a second lieutenant in the U.S. Army, attached to the cavalry. Over the next several years, he served at various posts throughout the United States and also pursued the study of law and medicine. In 1875, he was admitted to the bar in Nebraska, and, in 1876, he was granted a medical degree from New York's Bellevue Hospital Medical College.

Schwatka had in the meantime developed a keen interest in confirming the fate of SIR JOHN FRANKLIN and his expedition, which had been missing in the Canadian Arctic since 1845. After nearly three decades of search efforts, it was known that the ships had become icebound near King William Island and some of the 127 members of the expedition had perished, but remains of many of the crew had never been found.

In 1878, Schwatka secured the support of the AMERICAN GEOGRAPHICAL SOCIETY and a whaling company for a search effort of his own, hoping to finally resolve the mystery of what had happened to Franklin. He sailed from New York on June 19, 1878, accompanied by William H. Gilder, a newspaperman who covered the expedition for the *New York Herald*.

Schwatka planned to establish a base camp at Repulse Bay on the northwest corner of HUDSON BAY, then travel overland to the Back River Estuary and King William Island. Rough weather and ice conditions led to a change of plans, and the camp was set up farther to the south near Chesterfield Inlet. The expedition wintered there, making friendly contacts with Inuit.

In spring 1879, Schwatka, Gilder, and a party of 12 Inuit, including women and children, set out on a sledge journey to the northwest. They reached a river that they named the Hayes River after President Rutherford B. Hayes; they descended it northward, then went overland to the Back River Estuary. From elderly Inuit in the area, Schwatka heard eyewitness accounts of whites dying on the shores of the northern Adelaide Peninsula many years before.

As planned, Schwatka reached King William Island in summer 1879. With the ground then clear of snow and ice, he was able to find several graves and artifacts of the Franklin expedition that previous search expeditions had missed. Moreover, Schwatka learned from Inuit on King William Island that books and papers, probably the expedition's official journals, had been left abandoned on the shore at a site near Starvation Cove by the last of the dying men.

Schwatka's intensive exploration of King William Island also yielded some exposed human remains which, on the basis of personal effects found nearby, were subsequently identified as those of one of Franklin's officers. His men also scoured King William Island as far as Cape Felix, its northernmost point. After covering almost 3,000 miles in nearly a year, the expedition traveled back to the base camp on Hudson Bay. Schwatka and his expedition returned to New York in spring 1880, where his exploits were related in Gilder's stories in the *New York Herald*. Popularly known as "Schwatka's Search," the expedition had the distinction of making the longest sledge journey on record.

Schwatka explored the Yukon River in Alaska in 1883–84, and in 1886, after resigning from the army, he undertook an expedition to Alaska, sponsored by the *New York Times*. In 1890, he went to northern Mexico's Chihuahua state, where he visited the land of the Tarahumari Indians. He wrote about his Arctic experiences in his book *Children of the Cold* (1886) and described his explorations on the Yukon in his *Along Alaska's Great River* (1885). An account of his expedition into northern Mexico was published posthumously in *Land of the Cave and Cliff Dweller* in 1893.

Frederick Schwatka's 1878–80 expedition about what happened to the Franklin expedition, ended 30 years of

continuing speculation and confirmed what SIR LEOPOLD FRANCIS McCLINTOCK had determined in 1859. Schwatka also demonstrated that one could survive in the Arctic for extended periods, unaided from the outside world, with the adoption of Inuit survival skills.

Schweinfurth, Georg August (1836–1925)

German naturalist in East Africa

Born in the Latvian city of Riga to a family of German descent, Georg Schweinfurth attended universities in Heidelberg, Munich, and Berlin, where he studied the natural sciences, specializing in geology and botany.

Schweinfurth first traveled to Africa on a specimen-collecting expedition in 1862, in which he ascended the NILE RIVER as far as Khartoum in the Sudan. Based on the results of his botanical research there, he subsequently won the support of a Berlin scientific institute for an extensive exploration into the equatorial region of East Africa.

In 1864, Schweinfurth traveled down the east coast of the RED SEA, then headed inland across northern Ethiopia, returning to Khartoum after a westward trek through the Sudan.

Schweinfurth's most extensive exploration into East Africa began in 1868. He sailed south from Suez, and, after again reaching the Nile from the east, ascended the river to its northern tributaries. He continued southward, then headed westward from the White Nile toward what is now the Central African Republic and Democratic Republic of the Congo. After exploring the watershed region between the White Nile River and the upper CONGO RIVER (Zaire River), he reached the Bahr-el-Jebel River.

On March 19, 1870, Schweinfurth came upon a previously uncharted river, which he believed to be the Chari, flowing northward into Lake Chad. It was later determined that he had actually located the Uele River, a tributary of the Ubangi-Congo river system.

After 1871, Schweinfurth turned his attention to the unknown desert regions of northeastern Africa, accompanying FRIEDRICH GERHARD ROHLFS in his expedition across Libya into western Egypt in the mid-1870s. In 1875, he established a geographical society in Cairo, which served as his base of operations for a number of expeditions into the Arabian Peninsula, including an exploration into Yemen in 1888.

Georg Schweinfurth detailed his explorations in East Africa in his two-volume work *The Heart of Africa*, first published in 1873. His 1868–71 explorations along the White Nile and into the Congo marked the first time both rivers had been reached within the course of a single expedition. In his journey into the watershed region between the upper Congo and White Nile, he made the first European contact with the Mittoo and Loobah tribes, the women members of which practiced the art of lip enlargement to enhance their

appearance. He was also the first modern European to encounter the Akka Pygmies of East Africa, whose existence had been mentioned in the ancient Greek writings of Homer and HERODOTUS.

Scoresby, William, Jr. (1789–1857) *British mariner, scientist in the Arctic, son of William Scoresby, Sr.*

Born in the seaport town of Whitby in Yorkshire, England, William Scoresby, Jr., was the son of whaling captain and Arctic navigator WILLIAM SCORESBY, SR. The younger Scoresby developed an early interest in science, studying under the naturalist SIR JOSEPH BANKS of the ROYAL SOCIETY. Starting in 1803, he accompanied his father on annual whaling voyages to the polar seas between Spitsbergen (present-day Svalbard) and the east coast of GREENLAND, in the course of which he undertook field studies in meteorology, oceanography, and the natural history of the Arctic. He joined his father in an Arctic whaling expedition in 1806, during which they reached, east of Greenland, the northernmost point anyone had been until that time.

On a voyage in 1813, Scoresby's ocean-temperature readings revealed the Arctic seas to be warmer at great depths than they were at the surface. In 1817, after returning from an Arctic voyage, Scoresby and his father informed Joseph Banks that the climate in the Arctic was moderating, and that the PACK ICE north of Spitsbergen appeared to be receding. Banks related the news to SIR JOHN BARROW of the British navy, who immediately initiated a campaign of Arctic exploration, including an assault on the NORTH POLE, as well as renewed efforts to locate the NORTHWEST PASSAGE in the Canadian Arctic. In 1818, an expedition commanded by SIR JOHN ROSS, assisted by SIR WILLIAM EDWARD PARRY, set out to search for the Northwest Passage in Baffin Bay and Lancaster Sound, while another expedition, commanded by DAVID BUCHAN and SIR JOHN FRANKLIN, attempted to sail northward from Spitsbergen and cross the Arctic Ocean by way of the North Pole.

Scoresby made his last Arctic voyage in 1822, in which he reached Greenland's east coast as far as 75° north latitude, then explored southward, examining over 400 miles of coastline.

William Scoresby, Jr., pioneered the scientific study of the Arctic. In 1825, he left the whaling business to become an Anglican priest, remaining a strong supporter of British naval efforts to find the Northwest Passage. He continued his scientific work, undertaking a voyage to Australia in 1856 to study terrestrial magnetism. His 1820 book, *Account of the Arctic Regions with a History and Description of the Northern Whale-Fishery*, was the first modern geographic and scientific study of the Arctic, providing details on terrestrial magnetism, Arctic plant and animal life, climate, and ocean temperatures.

Scoresby, William, Sr. (1760–1829) *British whaler in the Arctic, father of William Scoresby, Jr.*

William Scoresby, Sr., was born in Whitby, in Yorkshire, England, the son of a farmer. He first went to sea in his early twenties, and by 1791, he was the captain of his own whaling ship, the *Resolution*.

In his career as a whaler, Scoresby made annual voyages to the Greenland Sea, between eastern GREENLAND and Spitsbergen (present-day Svalbard), accompanied after 1803 by his son, WILLIAM SCORESBY, JR. On one expedition in these waters, he set a farthest-north record, sailing his ship to 81°30' north latitude, which he reached on May 25, 1806—a point within 500 miles of the NORTH POLE.

In 1817, following another voyage to the Arctic, Scoresby and his son reported to SIR JOSEPH BANKS on the moderating ice conditions north of Spitsbergen, information that subsequently inspired renewed interest in Arctic exploration by the British navy.

William Scoresby, Sr., retired from the sea in 1823. In his years in the Arctic, he had pioneered techniques of ice navigation that proved to be essential to Arctic seaward exploration throughout the rest of the 19th century. His report with his son on ice conditions inspired the great land and sea expeditions into the Arctic regions undertaken by the British navy for the next 60 years. In recognition of the geographic and scientific reconnaissance undertaken by Scoresby and his son, the coastal region of that part of eastern Greenland is called Scoresby Land, and an arm of the Greenland Sea, which extends inland into the region for more than 180 miles, is known as Scoresby Sound.

Scott, Robert Falcon (1868–1912) *British naval officer, explorer in Antarctica*

Robert Falcon Scott was born at Davenport in Devonshire, England. At the age of 14, he entered the Royal Navy as a cadet, and later, promoted to lieutenant, served with the British fleet in the Caribbean.

In 1899, with the help of Sir Clements Markham of the ROYAL GEOGRAPHICAL SOCIETY, Scott won an appointment as commander of the British National Antarctic Expedition. Jointly sponsored by the ROYAL SOCIETY and the Royal Geographical Society, and equipped with the Royal Navy vessel the *Discovery*, Scott and the expedition departed England in August 1901.

Scott sailed to Antarctica by way of NEW ZEALAND, landing at Cape Adare on the edge of the Ross Sea in January 1902. He proceeded to Ross Island, where he established a base camp at Hut Point on McMurdo Sound.

From his McMurdo Sound base, Scott undertook several explorations of the Antarctic interior. With expedition members ERNEST HENRY SHACKLETON, EDWARD ADRIAN WILSON, and Frank Wild, he explored the coast of Victoria

Land and the Ross Ice Shelf. He reached a peninsula, which he named Edward VII Land. He also proved that Mount Erebus and Mount Terror were not on the mainland but were situated on an island, which he named Ross Island, after SIR JAMES CLARK ROSS. Additionally, his explorations revealed that McMurdo Sound, then thought to be a bay, was actually a strait between Ross Island and the Antarctic mainland.

Scott's chief accomplishment on his first Antarctic expedition was a 200-mile trek southward across the Ross Ice Shelf toward the SOUTH POLE. Accompanied by Shackleton and Wilson, Scott reached a latitude of 82° 17' south, 500 miles from the South Pole, and the farthest point south reached until then. During the Antarctic summer season of 1903, Scott explored westward from McMurdo Sound into the Ferrar Glacier and explored the Polar Plateau region to an altitude of over 9,000 feet.

With the arrival of relief ships in early 1904, Scott and the expedition left the Antarctic, returning to England with a great deal of scientific and topographic data.

Promoted to captain, Scott returned to naval service. In 1909, he began to organize another expedition, this time with plans to reach the South Pole. In June 1910, Scott sailed from England aboard the *Terra Nova*, accompanied by some veteran members of his first expedition, including scientist Edward Wilson. En route, while stopping at Melbourne, Australia, Scott received a telegram from Norwegian polar explorer ROALD ENGELBREGT GRAVNING AMUNDSEN, stating that he also was headed for the Antarctic and, like Scott, intended to make an attempt on the South Pole.

By late January 1911, Scott's second Antarctic expedition reached Ross Island on McMurdo Sound and established its headquarters at Cape Evans. Amundsen had meanwhile set up his base at the Bay of Whales, on the opposite side of the Ross Ice Shelf, 60 miles closer to the South Pole.

Over the next year, Scott and his party established a series of food and fuel depots along their proposed route to the South Pole. In June 1911, Wilson led a party investigating Cape Crozier, where they studied the breeding habits of the emperor penguins.

On November 1, 1911, Scott's team set out from McMurdo Sound, equipped with Manchurian ponies, motorized sledges (tractor-type vehicles), and dogs. He intended to reach the Polar Plateau by way of the Beardmore Glacier, a route Shackleton had pioneered several years earlier. By January 4, Scott's party reached the edge of the Polar Plateau. By then the motorized sledges had broken down. The ponies, weakened by the ordeal, had to be destroyed. The support group returned to McMurdo Sound on sledges pulled by the dogs.

Scott, Wilson, and expedition members Lawrence Oates, Edgar Evans, and Henry Bowers proceeded onward

to the South Pole, hauling sledges themselves. On January 12, 1912, they reached the South Pole, only to find a marker and letters from Amundsen, indicating that the Norwegian expedition had been there 33 days earlier. On the return journey, Scott and his party were plagued by severe weather conditions. At the end of March, they were delayed by a nine-day blizzard. Exhausted and suffering from frostbite and starvation, Scott and his men had perished when a search party located their bodies in November, at a point only 11 miles from a supply depot. Diaries and letters left by Scott and his companions revealed what had happened.

Although Amundsen won the race to the South Pole, it was Robert Falcon Scott and his party who first reached this objective solely by manpower, without sled dogs. In addition, Scott's two expeditions brought back a great deal of scientific and topographical data.

Scylax (Scylax of Caria, Scylax of Caryanda)

(fl. late 500s B.C.) *Greek mariner along the Indus River, Arabian Sea, and Red Sea, in service to Persia*

Scylax was a Greek from Caria, an ancient region settled by Greeks and located in present-day southwest Turkey. He became an accomplished mariner.

According to the Greek historian HERODOTUS of the fifth century B.C., Scylax was sent by Darius I, emperor of Persia (present-day Iran), on an exploratory expedition to determine the course of the INDUS RIVER in 510 B.C. After traveling overland through the Near East, he is thought to have entered the Indus from the Kabul River near the present-day town of Attock, Pakistan. He then reportedly followed it to the Arabian Sea, proceeded westward along the coast of what is now southwestern Pakistan and southeastern Iran, continued southwestward along the coast of present-day Oman to the Gulf of Aden, then went up the RED SEA to the Gulf of Suez from where he returned to Persia in 507.

Scylax provided valuable geographic material for Darius's military endeavors. Some of his descriptions were fantastic, such as those of one-eyed men or giant-eared men. He was the first European observer to give an account of India and the first known Greek to sail in the Red Sea.

Selkirk, Alexander (Alexander Sealchriag, Alexander Selcraig) (1676–1721) *Scottish mariner in the eastern Pacific*

Alexander Selkirk was born in Largo on the east coast of Scotland, the seventh son of a shoemaker. At the age of 19, he went to sea to avoid facing criminal charges for an incident in which he allegedly behaved indecently at church.

Selkirk returned to Largo in 1701. He soon found himself in trouble with local authorities again, reportedly for fighting in public along with his brothers. In 1703, he

joined an expedition of PRIVATEERS under WILLIAM DAMPIER to the Pacific coast of South America, serving as sailing master on the *Cinque Ports Gallery*.

In September 1704, while off Mas Tierra, one of the Juan Fernandez Islands, about 400 miles west of Valparaíso, Chile, Selkirk became embroiled in a dispute with the ship's captain, which led to his being put ashore at his own request. Although he later changed his mind, he was left behind when the ship sailed.

Selkirk managed to survive fairly well on Mas Tierra over the next four years. He built a shelter and hunted the island's wild goats. In January 1709, he was picked up by another British privateering vessel, commanded by Captain Woodes Rogers and piloted by Dampier. On Dampier's recommendation, Selkirk was made an officer on the ship. After taking part in a series of lucrative raids on Spanish shipping, he returned to England by way of the CAPE OF GOOD HOPE, completing a journey that had taken him around the world.

Selkirk landed in London on October 14, 1711. In spring 1712, he returned to his hometown in Scotland, after an absence of 10 years. His share of the booty taken on his return voyage amounted to £800, which at that time was enough money to make him a man of moderate wealth. He stayed in Largo for only a brief time, reportedly living as a recluse. He took to practicing meditation in a cave-like refuge he built in his father's garden. His behavior at this time may have been a result of his four years of isolation on Mas Tierra Island.

Accounts of Selkirk's experience marooned on an East Pacific island began to appear soon after his return to England. His story was included in Captain Woodes Rogers's *A Cruising Voyage round the World*, published in 1712. The work describes how, in the first days after his rescue, Selkirk had trouble returning to the use of speech and could not immediately get accustomed to eating the food on board the ship. Also in 1712, Selkirk's own account was published as a pamphlet entitled, *Providence Displayed, or a Surprising Account of One Alexander Selkirk . . . written by his own hand*.

By September 1713, Selkirk had left Largo with a young woman named Sophia Bruce. They first went to Bristol, where court records indicate Selkirk was charged with assaulting a shipwright named Richard Nettle. He and Sophia next went to London where they lived together in a common-law marriage for the next several years.

London journalist Sir Richard Steele interviewed Selkirk, publishing an account of the Scottish sailor's adventures in his periodical *The Englishman* in December 1713. Selkirk's story came to the attention of English journalist and novelist Daniel Defoe, who used it as a source for his 1719 novel *Robinson Crusoe*.

In about 1718, Selkirk left Sophia and married a widow named Frances Candis. He then resumed his seafaring ca-

reer, and in October 1720, he sailed as a lieutenant on a British naval vessel, the *Weymouth*. This proved to be his last ship. He died while on board in December 1721.

The island on which Alexander Selkirk was marooned became known as Isla Robinson Crusoe, and another of the Juan Fernandez islands was renamed Isla Alejandro Selkirk, after him. In 1868, the crew of a visiting British navy vessel left a plaque on Mas Tierra, proclaiming it as the site of his four-year stay. In addition, the town of Largo, Scotland, erected a bronze statue in his honor, commemorating him as the real-life inspiration for the fictional character Robinson Crusoe.

Semyonov, Pyotr Petrovich (Peter Semenov, Pyotr Semyonov-Tianshansky) (1827–1914)

Russian geographer, astronomer in central Asia

Pyotr Semyonov was born in the Russian town of Urusovo. A member of an aristocratic family, he studied geography and natural history in Russia and went on to study astronomy in Berlin, where he became acquainted with German naturalist and explorer ALEXANDER VON HUMBOLDT.

Semyonov was among the first Europeans to venture into the little-known Tian Shan Mountains along Russia's frontier with northwestern China. This range, known as the "Celestial Mountains," comprises a mountain system larger than all the mountain ranges of Europe combined. In his 1857 expedition into the region, Semyonov made an ascent of Khan Tengri, one of the highest peaks in the Tian Shan range.

In 1858, Semyonov extended his explorations into northwestern China, traveling throughout the Dzungaria region and the Altai Mountains. Thirty years later, in 1888, he took part in a scientific survey into Russian Turkestan and the territory east of the Caspian Sea.

Pyotr Semyonov initiated modern Russian exploration of central Asia. In the years when Russia was pushing eastward in its campaign of conquest and expansion in south-central Asia, his explorations provided vital geographic information about the region between the Pamirs and western China. As the first European known to have traversed the Tian Shan Mountains, he was referred to as Pyotr Semyonov-Tianshansky. He also made the first known identification of several mountains and glaciers in the Tian Shan and Altai ranges, and these were later also named in his honor.

Sequeira, Diego López de (Diego López de Sequeira) (ca. 1465–ca. 1520) *Portuguese mariner, soldier in India and the East Indies*

Diego López de Sequeira was a soldier and seafarer in service to King Manuel I of Portugal. In 1508, he was given com-

mand of a naval expedition to reconnoiter the port city of Malacca, an important center for the SPICE TRADE on the southern end of the Malay Peninsula.

Sequeira and his fleet sailed from Lisbon in summer 1508, arriving at Calicut on the west coast of India in April 1509. From there, he rounded the tip of India, and, after making an eastward crossing of the Bay of Bengal, he arrived at Malacca in September 1509.

Sequeira and his men encountered a variety of kinds of ships from Middle Eastern and Asian ports, including Arab DHOWS, Japanese or Chinese JUNKS—and outrigger CANOES from the South Pacific islands. At that time, in addition to spices, Malacca was a center for the trade in sandalwood from Indonesia, porcelain from China, precious stones from CEYLON (present-day Sri Lanka), as well as concubines from the Circassian region, east of the Black Sea.

Although Sequeira made an attempt to pose as a merchant trader, the local sultan had been warned in advance of his true purpose, based on earlier Portuguese conquests along India's Malabar Coast. A Portuguese delegation ashore was massacred in a surprise attack, and, in the ensuing battle aboard his ships in the harbor, Sequeira lost one-third of his crew. Forced to withdraw eastward through the Strait of Malacca, he rounded the southeastern tip of Sumatra and returned to the Portuguese trading settlement at Calicut on India's southwest coast, thus completing the first European circumnavigation of Sumatra.

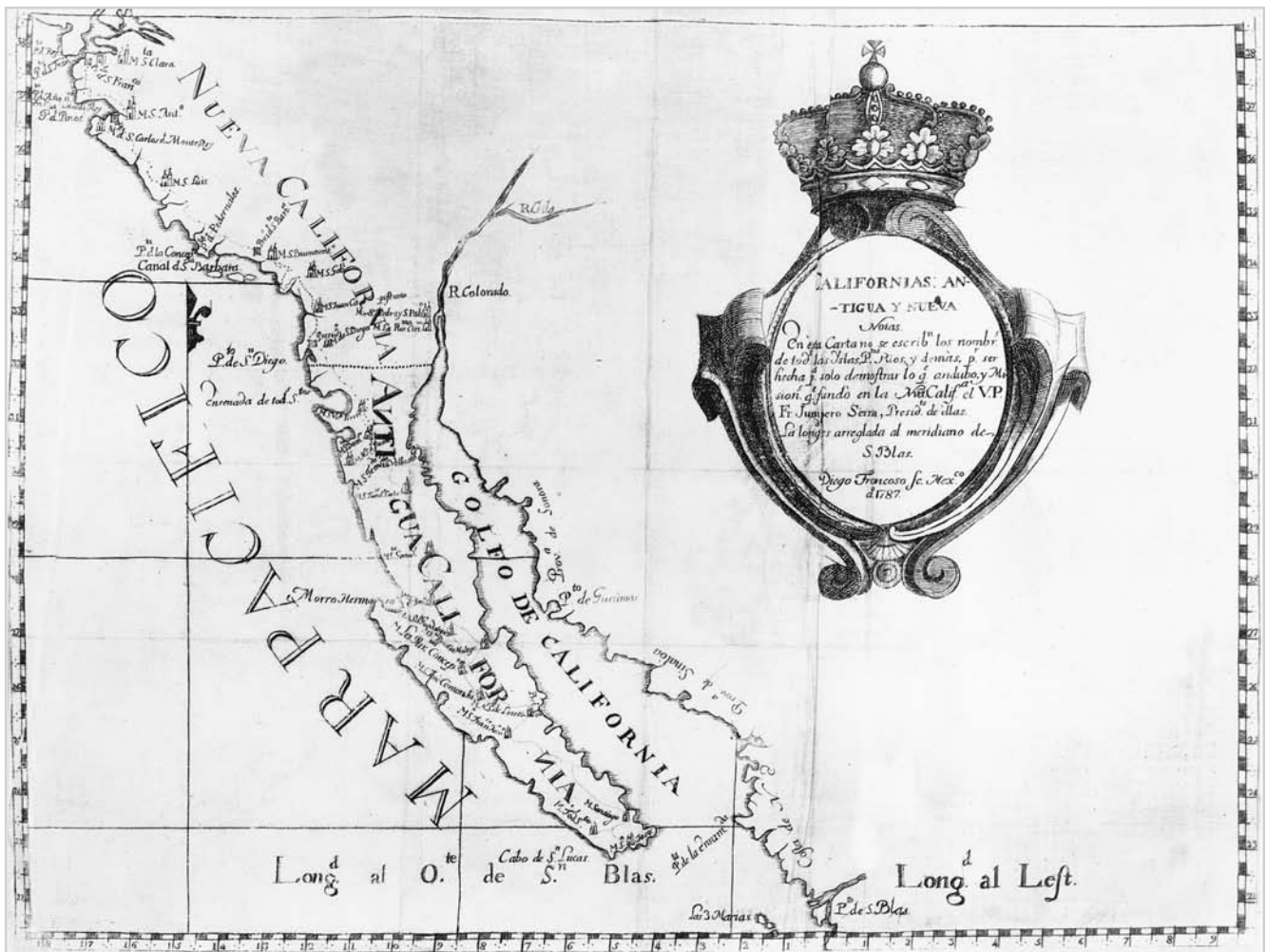
Diego López de Sequeira's expedition brought back to Europe the first news of the riches of the EAST INDIES. Among his officers were FERDINAND MAGELLAN and FRANCISCO SERRANO. Inspired by his experience in Malacca with Sequeira, Magellan launched his own expedition to the East Indies, resulting in the first round-the-world voyage in history.

Serra, Junípero (Miguel José Serra) (1713–1784)

Spanish missionary in California

Junípero Serra was born on the Spanish Mediterranean island of Majorca. Originally known as Miguel José Serra, he adopted the religious name Junípero on entering the Franciscan order in 1730. He eventually became a professor of theology and philosophy at the university in Palma, Majorca's main city.

In 1749, Serra left the academic life, sailing that year from Cádiz, Spain, for Mexico as a Franciscan missionary. He arrived in Mexico City in early 1750, and during the next 18 years, he worked among the Indians of the Sierra Gordo region and also taught at Mexico City's College of San Fernando. In 1768, following the removal of the Jesuits, Serra was named head of the Franciscan missions in Baja California.



Detail of map showing the California missions of Junípero Serra (1787) (Library of Congress)

In 1769, Serra was appointed by Spanish colonial administrator José de Galvez to lead a contingent of missionaries as part of GASPAR DE PORTOLÁ's overland expedition into what is now the state of California. From Loreto, Mexico, on the lower end of the Baja California peninsula, Serra and a small group of priests headed northward. Traveling by land and sea for six weeks, they arrived at San Diego Bay in early July 1769. There, on July 16, 1769, Serra founded San Diego de Alcalá, the first mission and church in present-day California.

Serra remained at the San Diego settlement, while Portolá explored northward in search of Monterey Bay, which supposedly had been reached by Spanish explorer SEBASTIÁN VISCAÍNO in 1602. A supply ship, the *San Antonio*, reached San Diego in March 1770. Serra sailed on it northward along the coast, joining Portolá at Monterey. There, on June 3, 1770, Serra founded the second Franciscan mission in California, San Carlos de Borromeo. In December 1771, he moved it several miles to the north near what is now Carmel, California.

In 1772, when Indian attacks led to shortages of food and other supplies at the San Diego colony, Serra walked almost 250 miles into Sonora, Mexico, to obtain aid. He was accompanied on this journey by only one Indian boy. From Sonora, Serra went to Mexico City, where he urged Spanish colonial officials to establish overland supply routes to California from northern Mexico and present-day Arizona.

Serra returned to the Carmel mission to continue his work among the Indians. Over the next decade, he established seven more missions between Monterey and San Diego. Among these were San Gabriel Arcangel, founded in September 1771, which subsequently developed into the city of Los Angeles. Other well-known missions established by Serra were San Luis Obispo in 1772, and San Juan Capistrano and San Francisco de Asis in 1776.

To link the settlements, Serra oversaw the development of a trail along the California coast, which came to be known as El Camino Real (the royal road, or king's highway). Along this route, also known as the Old Mission

Trail, the earliest established north-south road in California, Serra founded additional missions, approximately one day's journey, or 30 miles, apart, between San Diego and San Carlos de Borromeo at Carmel.

Serra died at the Carmel mission in 1784. In 1985, in recognition of his work as a missionary to the Indians, the Catholic Church beatified him, a preliminary step in elevation to sainthood.

Father Junípero Serra's successful colonizing efforts inspired JUAN BAUTISTA DE ANZA's overland expedition from Arizona to the California coast in 1774. The 500-mile-long El Camino Real that he developed became a key transportation and communication link in California and was extended by his successors northward beyond the Golden Gate of San Francisco Bay. The San Gabriel Arcangel mission at present-day Los Angeles became the western terminus for



Junípero Serra (Library of Congress)

the Old Spanish Trail and for the emigrant route from Salt Lake City.

Serrano, Francisco (Francisco Serrão)

(unknown–1521) *Portuguese mariner, trader in the East Indies*

Francisco Serrano was probably born in Portugal, although there are few details of his origins or early life. Starting in 1505, Serrano, together with his long-time friend FERDINAND MAGELLAN, took part in Portuguese voyages to the Malabar Coast of southwestern India, where he fought in the conquest of the trading centers at Goa, Calicut, and Cochin. In 1508–09, he joined Magellan in DIEGO LÓPEZ DE SEQUIRA's expedition to the Malayan port of Malacca, narrowly escaping with his life when the sultan's forces launched a surprise attack against the visiting Portuguese.

In 1511, Serrano returned to Malacca with a naval force under AFONSO DE ALBUQUERQUE and António de Abreu, which brought that strategically located port under Portuguese domination. Later that year, he commanded the *Sabaia*, one of a fleet of Portuguese vessels sent to investigate the SPICE ISLANDS (the Moluccas) of present-day Indonesia to the east. Another of the expedition's ships was captained by Magellan.

At Amboina in the Spice Islands, Serrano obtained a valuable cargo of nutmeg. On the homeward voyage, his ship was wrecked on a reef and lost, while the other vessels continued back to India. Serrano meanwhile managed to capture a Malay pirate ship with which he explored the north coast of Java, then returned to Amboina. The local sultan on Amboina appointed him as his viceroy to the island of Ternate, where he married a native princess and settled.

In 1513, Serrano established a Portuguese trading fort on Ternate. Over the next several years, he wrote letters to Magellan in Portugal describing the abundance of nutmeg in the Spice Islands and the great commercial potential for European traders.

In early 1521, soon after he had concluded a trade agreement with the nearby island of Tidore, Serrano was poisoned, either on orders of the sultan of Tidore or by rival Portuguese merchants jealous of his influence with the native rulers. Serrano died on Ternate a few days afterward. Eight months later, the remaining ships of Magellan's fleet arrived at Ternate from the Philippines, after the first navigation of the STRAIT OF MAGELLAN. Magellan, who had been killed in the Philippines several months earlier, had planned to meet his old friend on Ternate and, with his help, initiate a lucrative trade in spices.

Francisco Serrano was one of the first Europeans to visit Java, as well as the islands of Ternate and Tidore, since the homeward voyage of MARCO POLO in the early 1290s. Magellan, informed by Serrano of the latitude of Ternate and

Tidore, was inspired to seek a westward route through the Americas, and across the South Pacific Ocean, to the Spice Islands. In this way, Serrano's reports to Magellan helped lead to the first round-the-world voyage.

Shackleton, Sir Ernest Henry (1874–1922)

British mariner, explorer in the Antarctic and South Atlantic

Ernest Henry Shackleton was born in Kilkee, Ireland, the son of a doctor. At the age of 16, after attending Dulwich College in London, he went to sea with the merchant marine.

After 10 years of service on merchant vessels, Shackleton secured an appointment as one of ROBERT FALCON SCOTT's lieutenants in the British National Antarctic Expedition of 1901–04. While at the McMurdo Sound base camp in February 1902, he made a BALLOON ascent in which he took the first aerial photos of the Antarctic.

In November 1902, Shackleton accompanied Scott and the expedition's zoologist, EDWARD ADRIAN WILSON, on an exploration of the Ross Ice Shelf. Using dog sledges, they headed southward, attaining 82°71' south latitude, within 500 miles of the SOUTH POLE and setting a new record for the farthest point south ever reached. They turned back at a location on the Ross Ice Shelf known afterward as Shackleton Inlet, unable to find a pass through the high mountain barrier blocking progress toward the South Pole.

Shackleton, Scott, and Wilson all suffered from SCURVY on the journey back to McMurdo Sound. While Scott and Wilson soon recovered, Shackleton did not and, still in a weakened state, he was compelled to return to England aboard the supply ship *Morning* in March 1903.

On regaining his health, Shackleton tried without success to obtain a commission in the British navy. In 1904, he married and settled in Edinburgh. While serving as secretary to the Scottish Geographical Society, he raised support for his own Antarctic expedition. By 1907, with the financial backing of British industrialist William Beardmore, Shackleton was able to organize what became known as the British Antarctic Expedition.

In July 1907, Shackleton and his team sailed from England on the *Nimrod*. Following a stopover in New Zealand, they reached Antarctica's Ross Sea coast in January 1908, where they established a base at Hut Point, the site of Scott's former encampment. One group, which included SIR DOUGLAS MAWSON, ascended Mount Erebus and reached the SOUTH MAGNETIC POLE; Shackleton and another team set out for the geographic South Pole in fall 1908.

Using sledges pulled by Manchurian ponies, the Shackleton party headed southward across the Ross Ice Shelf. Although their progress was blocked by the 10,000-foot-high Transantarctic Range, they managed to continue southward by ascending a glacier, which Shackleton called the Beard-

more Glacier after his patron. The two-week ascent cost Shackleton and his companies valuable time. Although they continued their trek across the Polar Plateau to within 97 miles of the South Pole, on January 9, 1909, Shackleton decided to turn back, determining that, with the loss of the ponies and their food supplies running low, they would not reach their goal with enough provisions to survive a return trip to base camp.

Upon his return to England in June 1909, Shackleton was heaped with honors, including a knighthood. He had brought back fossils from deep within the interior of the Antarctic and had reported the discovery of seams of coal in the Transantarctic Range. His 1,725-mile trek inland had revealed that the South Pole was located on the 10,000-foot-high Polar Plateau. Moreover, his expedition had taken the first motion pictures in Antarctica and made the first use of an automobile on the continent.

Less than three years after ROALD ENGELBREGT GRAVNING AMUNDSEN had reached the South Pole in 1911, Shackleton set out on the Imperial Trans-Antarctic Expedition, in which he planned to cross the Antarctic continent, from the Weddell Sea to the Ross Sea. With a crew of 27 men, he sailed from England in August 1914, just days after the outbreak of World War I. His ship, the *Endurance*, entered the Weddell Sea, where ice conditions prevented a landing. In January 1915, the ship became icebound off Vahsel Bay and, after 11 months of drifting, it was crushed. Meanwhile, Shackleton and his crew had abandoned the vessel, taking to the surrounding ice floes with small boats and what provisions they could salvage. They drifted for another three months on the ice, and, in April 1915, they managed to land on Elephant Island, off the tip of the Antarctic Peninsula.

Shackleton left 22 of his men on Elephant Island and with five others undertook a hazardous voyage in the *James Caird*, a modified open boat, across almost 1,000 miles of Antarctic seas, to the whaling station on South Georgia Island. They landed on the uninhabited side of South Georgia and had to make an overland crossing of the glaciers and mountains of the island's interior to reach the whaling settlement at Stromness. Using improvised ice-climbing equipment, Shackleton made the trip and sent a ship to pick up the men on the opposite side of the island. After several attempts, he managed to reach the men he had left on Elephant Island, rescuing them with the Chilean tugboat *Yelcho* in August 1916.

Shackleton returned to England to take part in the last phase of World War I, serving with a naval expedition to northern Russia in 1917–18. In 1921, he mounted his last Antarctic expedition, intending to explore Enderby Land on the little-known Indian Ocean coast of the continent. While aboard his ship, the *Quest*, off South Georgia Island, he died of a heart attack in early January 1922.

Sir Ernest Henry Shackleton recounted his 1907–09 expedition in his book *The Heart of the Antarctic* (1909) and told the story of his exploits in the Weddell Sea and South Georgia Island in *South* (1919). The overland crossing of Antarctica, the object of his 1914–16 expedition, was not achieved until the INTERNATIONAL GEOPHYSICAL YEAR of 1957–58, by SIR EDMUND PERCIVAL HILLARY and SIR VIVIAN ERNEST FUCHS. Shackleton pioneered the Beardmore Glacier route in 1908–09, which the ill-fated Scott expedition used to reach the South Pole in 1911–12. In the course of his disastrous 1914–17 expedition, Shackleton carried out one of the most heroic and dangerous rescue missions in the history of Antarctic exploration. He made the first examination of the Atlantic coast of Antarctica since it was explored by JAMES WEDDELL in 1822. Along that section of the Weddell seacoast, he discovered an uncharted section of shoreline, which he named the Caird Coast after the small boat on which he had made his heroic voyage to South Georgia Island. On the final leg of that journey, he made the first crossing of South Georgia Island. The Shackleton Ice Shelf on the Indian Ocean coast of Antarctica was later named for him.

Sheldon, May French (Mary French Sheldon, Bebe Bwana) (1847–1936) *American publisher, writer in central Africa*

May French Sheldon (her original given name was Mary) was born in Beaver, Pennsylvania, near Pittsburgh. Her father, Joseph French, was an engineer; her mother, Dr. Elizabeth Poorman French, was a physician. After her formal education, Sheldon entered the publishing business; by 1876, she was the owner of Saxon & Company, a London publishing house. That year, she married Eli Lemon Sheldon, an American banker and publisher living in London.

In London, Sheldon became a friend of SIR HENRY MORTON STANLEY, and she was inspired by his accounts of his years of exploration and travel in central Africa. Soon after Stanley had returned from his final expedition in 1890, she resolved to undertake an African journey of her own, financed by her husband.

Sheldon's interest in Africa was not limited to exploration. She was also concerned over the impact of colonization on the native population, especially in east-central Africa, where, by 1890, both England and Germany had each established a strong colonial foothold. She hoped her expedition would demonstrate that Europeans could gain the native people's cooperation with friendship instead of force.

In 1891, Sheldon arrived in Mombasa on the coast of what is now Kenya. She planned to travel inland to MOUNT KILIMANJARO in central Africa and, along the way, establish friendly contacts with many of the tribes of the surround-

ing territory. The expedition that she organized and led inland from Mombasa included 103 porters, guides, and servants, whom Sheldon had hired with the help of the sultan of Zanzibar. He also provided her with a letter of safe conduct to ensure her peaceful passage through his domain in what is now Tanzania.

Near Mount Kilimanjaro, Sheldon visited the village of Taveta, where she found a recently established British trading post. There were also plantations producing corn, tobacco, and sugar cane. She became the first European to witness a native rite known as the "moon dance," performed by men at a funeral ceremony.

While her expedition remained at Taveta, Sheldon explored the surrounding territory with a small group of porters and an official from the British trading post. She came upon Lake Chala, a circular lake formed from the crater of an extinct volcano. In a copper boat left behind by SAMUEL TELEKI's expedition of several years before, she explored the waters, becoming one of the first Europeans to do so. She then rejoined the rest of the expedition and ascended 4,700 feet up the slopes of Kilimanjaro to the native settlement of Kimangelia, where she met with the local sultan. Sheldon became an object of great curiosity for the people from the region, who flocked to the village by the thousands to catch their first glimpse of a white woman. She became known locally as Bebe Bwana for "woman master" in Swahili.

Sheldon had contact with 35 different tribes on her African journey and distributed many gifts among them. She had intended to visit the Masai, a warlike people much feared by the neighboring tribes. Yet she was forced to turn back at the edge of their territory, when her porters and servants threatened to mutiny if she continued. Near the village of Pangani, Sheldon was hurt in a fall down a ravine. Taken to a nearby German trading post, she recovered enough to return to Mombasa, then travel home to England by ship.

Sheldon soon recovered fully from her injuries and began writing an account of her experiences in east-central Africa. Her work, *Sultan to Sultan*, published in 1892, was a great success in both England and the United States. In 1892, she was made a member of the ROYAL GEOGRAPHICAL SOCIETY. That same year, she embarked on a lecture tour in the United States and presented her experiences to the Congress of Women at the Chicago Columbian Exposition. The text of this address was published in 1894 as "An African Expedition."

Sheldon opposed the creation of plantations in the interior of central Africa and the exploitation of its peoples. Instead, she urged that European powers establish industrial training centers, medical facilities, and churches to improve the lives of its indigenous peoples. In 1903, Sheldon traveled to the Belgian Congo (present-day Democratic

Republic of the Congo), where she observed and supported the Belgian government's colonizing efforts.

Sheldon raised money for the Belgian Red Cross during World War I, and after the war, in 1921, she was awarded the Chevalier de l'Ordre de la Couronne by the Belgian government. She continued to lecture on Africa until the age of 78. She died in London in her 90th year.

May French Sheldon was the first European woman to visit many native villages in present-day Kenya and Tanzania. In addition to winning friends among them, she succeeded in gaining the obedience and support of the natives who accompanied her, with equal measures of unwavering authority and concern for their welfare.

Shelikov, Grigory Ivanovich (Grigori Shelekhov, Gregori Shelikof, Gregor Shelikhov)

(1747–1795) *Russian fur trader in Alaska*

Grigory Shelikov was born at Rylsk in European Russia, just north of the Ukraine. In 1773, he headed eastward to Irkutsk, the Siberian center of the FUR TRADE at the southern end of Lake Baikal.

At Irkutsk, Shelikov was employed by Russian fur-trading entrepreneur Ivana L. Golikov, eventually becoming a partner in Golikov's firm. In 1775, Shelikov traveled to Okhotsk on the Pacific coast of SIBERIA, using it as a base to expand his fur-trading enterprise to the Kamchatka Peninsula, the Kuril Islands to the south, and across the Bering Sea to the westernmost Aleutian Islands.

In 1783, Shelikov organized a trading expedition from Siberia to the Gulf of Alaska. Three ships were specially built at Okhotsk for the voyage. On August 27, he left Okhotsk aboard the *Three Saints*, along with Russian mariners GERASIM ALEKSEYEVICH IZMAILOV and DMITRY IVANOVICH BOCHAROV. They reached Bering Island off the west coast of the Kamchatka Peninsula, where they wintered.

The next spring, Shelikov and his expedition sailed across the Bering Sea to Unalaska Island. From there, they reached Kodiak Island in mid-August 1784.

Shelikov had married a successful Irkutsk businesswoman, Natalia Aleksievna, in 1781. His wife joined him on the 1783 voyage, becoming the first known European woman to visit Alaska.

On September 22, 1784, Shelikov established a settlement on Kodiak Island at a harbor he named Three Saints Bay. During the next two years, he initiated additional explorations of the islands and the coastline of the Gulf of Alaska.

In 1786, Shelikov returned to Irkutsk. He sought backing for a royal trade monopoly from Russian empress Catherine the Great. In 1790, he appointed ALEKSANDR ANDREYEVICH BARANOV as director of his fur-trading enterprise in Alaska.

Shelikov died at Irkutsk in 1795. Four years after his death, Czar Paul I granted his widow and son-in-law, Nikolay Petrovich Rezanov, a royal charter for the RUSSIAN-AMERICAN COMPANY.

Grigory Shelikov's fur-trading post on Kodiak Island became the first permanent non-Indian settlement in what is now the state of Alaska. His fur-trading enterprise firmly established Russian sovereignty over Alaska until 1867, when it was purchased by the United States. Shelikov Strait, which separates Kodiak Island from the mainland, is named in his honor. His book, published in London in 1795 as *Journal of the Voyages to the Coast of North America in 1783–87*, provides one of the earliest accounts of Alaska.

Shepard, Alan Bartlett, Jr. (1923–1998)

American astronaut, first American in space

Alan Shepard was born in East Derry, New Hampshire. He pursued his undergraduate studies at the U.S. Naval Academy, graduating in 1944. After service on a destroyer in World War II, he attended the Navy Test Pilot School in Patuxent River, Maryland, and the Naval War College in Newport, Rhode Island.

In 1959, Shepard was selected as one of the original seven ASTRONAUTS in the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) and soon afterward, as the pilot of the first manned American space mission, part of the MERCURY PROGRAM. The former Union of Soviet Socialist Republics (USSR, or the Soviet Union) launched the first human in space, YURY ALEKSEYEVICH GAGARIN, on April 12, 1961. Three weeks later, on May 5, 1961, Shepard became the first American in space. In the *Freedom 7* capsule, he reached a suborbital altitude of 115 miles. The flight lasted 15 minutes, 22 seconds, before the capsule's splash-down by parachute in the Atlantic Ocean, where Shepard was retrieved by helicopter. Virgil Grissom also accomplished a suborbital flight in 1961. JOHN HERSCHELL GLENN, JR., became the first American to orbit Earth in February 1962.

Following surgery to correct an ear condition, Shepard was chosen as commander on the *Apollo 14* Moon mission. The APOLLO PROGRAM had successfully put Americans on the Moon: first, NEIL ALDEN ARMSTRONG and Edwin "Buzz" Aldrin in July 1969, then Pete Conrad and Alan La Vern Bean in November 1969 in the *Apollo 11* and *Apollo 12* missions. *Apollo 13* had been discontinued prematurely. *Apollo 14* took off on January 31, 1971. Shepard and Edgar D. Mitchell landed in the *Antares* lunar module near the Moon's Fra Mauro Crater on February 5, 1971, while Stuart A. Roosa orbited in the *Kitty Hawk* command module. Shepard and Mitchell, transporting equipment in a two-wheeled cart, walked 2.1 miles, and reached a distance of some 4,600 feet from the lunar module. They spent a record



Alan Shepard (Library of Congress)

33.5 hours on the lunar surface, conducting numerous experiments. Splashdown was accomplished in the Pacific Ocean nine days after takeoff.

Alan Shepard was the first American in space and one of the first men to walk on the Moon. He especially captured the public's imagination during the *Apollo 14* mission when he hit golf balls on the Moon.

Sherley, Sir Anthony (Sir Anthony Shirley)

(ca. 1565–ca. 1635) *English soldier of fortune, diplomat in Persia, Russia, and Morocco*

Anthony Sherley was born at Wiston in Sussex, England, the son of a nobleman. He embarked on a military career, serving with the British army in the Netherlands and France in the late 1580s and early 1590s. In 1596, he commanded an expedition of PRIVATEERS against Spanish shipping and settlements in the Caribbean.

Sherley traveled to Persia (present-day Iran) with his brother Robert Sherley in 1598, where he succeeded in ob-

taining some trade concessions for English merchants. He was then made an ambassador by the Persian ruler, Shah Abbas the Great, who sent him on a diplomatic mission to Europe. In 1600, he traveled from the Persian capital at Esfahan, across the Caspian Sea to Moscow, and on to Prague and Rome. His attempts to raise military support in Europe for a proposed Persian campaign against the Turks met with little success.

In 1605, Sherley entered the service of Holy Roman Emperor Rudolf II, who sent him to Morocco. He stayed until 1606, in an abortive attempt to incite the Arabs against the Turks. In 1609, Sherley commanded a Spanish naval expedition in the MEDITERRANEAN SEA against the Turks, which also met with little success. He later retired in Madrid.

Sir Anthony Sherley (who had been knighted early in his career by Henry IV of France, much to the displeasure of his own sovereign, Elizabeth I) was one of the first Englishmen to travel in Persia. His brother Robert remained in Persia as an ambassador until 1627, when he returned to England with THOMAS HERBERT. Sherley's account of his travels in Persia appeared in London in 1613 as *Sir Anthony Sherley: His Relation of his Travels into Persia, the Dangers and Distresses which Befel him in his Passage*.

Shirase, Nobu (1861–1946) *Japanese explorer of the Antarctic*

Nobu Shirase participated in an exploration of the Kuril Islands to the north of Japan in 1893. As a lieutenant in the army, he presented a plan for the first Japanese expedition to the Antarctic and an attempt to reach the SOUTH POLE. He finally gained the support of Shigenobu Okuma, an influential statesman, and managed to raise the necessary funds.

Shirase departed from Tokyo aboard the tiny *Kainan Maru* in December 1910 and after a brief stopover in Wellington, NEW ZEALAND, headed for Antarctica the following February. The expedition sighted Victoria Land in early March but because of poor weather conditions, did not attempt to land. Continuing on through the Ross Sea, they eventually found their passage blocked by PACK ICE, leading to Shirase's decision to turn back for Australia. They reached Sydney at the beginning of May. The ship's captain and several crew members returned to Japan to raise additional funds, while Shirase and the others waited. Living in poverty, they were ridiculed in the Australian and New Zealand press and distrusted by the Australian public. Professor Edgeworth David of the University of Sydney, a former associate of SIR ERNEST HENRY SHACKLETON, became involved, however, and reassured the public regarding the scientific goals of their expedition. Shirase, meanwhile,

abandoned the idea of trying to reach the South Pole and scaled back the expedition to an exploration of King Edward VII Land and the Ross Ice Shelf.

The Japanese expedition set sail for the Antarctic once again in November 1911, reaching the Ross Ice Shelf the following January. At Kainan Bay, so named by the expedition, a party was sent ashore. The expedition then continued westward. Shirase and his men soon encountered another ship, the *Fram*, whose crew awaited ROALD ENGELBREGT GRAVNING AMUNDSEN's return from the South Pole.

While the *Kainan Maru* was moored in the Bay of Whales, Shirase headed the Dash Patrol, as it was called, consisting of seven men, two of whom stayed at a base camp at the edge of the ice shelf, while the others proceeded southward with dog sledges. At the end of January 1912, enduring blizzard conditions, Shirase and his four companions planted a Japanese flag at the top of the ice shelf some 160 miles from their starting point. In the meantime, a second party landed at Biscoe Bay in King Edward VII Land, climbed an ice slope, and reached the foot of the Alexandra Range before returning to the ship. The *Kainan Maru* then returned to the Bay of Whales to pick up the Dash Patrol. After a return stopover at Wellington, the ship reached Japan in June 1912. They were treated as heroes on their return.

Nobu Shirase had the vision to recognize a role for Japan in Antarctic exploration.

Sidi Bombay See BOMBAY, SIDI.

Silva Porto, Antonio Francisco da (1817–1890)
Portuguese trader in central Africa

Antonio da Silva Porto was born in Porto, Portugal, the son of an industrialist. He left home in his early teens, immigrating to Brazil. In 1832, he settled in Portuguese West Africa, present-day Angola.

Silva Porto became a trader, venturing into regions seldom visited by Europeans and dealing with the natives of the interior of the colony. In 1853, at the request of the Portuguese colonial governor, he undertook an expedition inland to locate the source of the ZAMBEZI RIVER. Although he penetrated the upper Zambezi country, he was unable to determine the river's source. Yet, in traveling from the Atlantic coast of Angola to the Zambezi's outlet on the Indian Ocean, he completed the first European crossing of Central Africa from west to east.

Soon after his 1853–54 exploration of the Zambezi River and his crossing of Africa, Antonio da Silva Porto provided assistance to Scottish missionary and physician DAVID LIVINGSTONE, who had also just undertaken an examination of the Zambezi.

Simpson, Sir George (ca. 1792–1860)
Scottish-Canadian director of the Hudson's Bay Company in North America, cousin of Thomas Simpson

George Simpson was born at Loch Broom in western Scotland. In 1809, he went to London, where he worked for his uncle's West Indies Trading Company. In 1820, he joined the HUDSON'S BAY COMPANY, and, that year, he traveled to Canada to take charge of the company's Lake Athabasca posts.

Simpson spent the winter of 1820–21 at Lake Athabasca, and, following the Hudson's Bay Company's merger with the NORTH WEST COMPANY in 1821, he was appointed head of the vast northern department.

In 1824–25, Simpson made his first overland journey across Canada, from York Factory on HUDSON BAY to the company's post on the COLUMBIA RIVER. In 1826, he became governor of all the Hudson's Bay Company operations in North America.

On July 12, 1828, Simpson started out from Hudson Bay on a second cross-continental trip across Canada. Traveling by CANOE with overland portages, he covered 3,260 miles in less than three months, reaching the Pacific coast of British Columbia via the Thompson and Fraser Rivers on October 10, 1828. At that time, it was the longest overland voyage across Canada attempted in one season.

In the mid-1830s, Simpson organized and supported exploring expeditions to the Canadian Arctic, including those of his cousin THOMAS SIMPSON. For his efforts in support of Arctic exploration, Simpson was knighted in 1841. That same year, he undertook a mostly overland trip around the world. Starting out from Liverpool, England, in March 1841, he sailed to Canada by way of Halifax and Boston. He then took the canoe-and-portage route across Canada to Vancouver, from where he went to Sitka, Alaska, and the Aleutian Islands. He crossed the Bering Sea to Okhotsk in SIBERIA, then traveled the length of Asiatic and European Russia to St. Petersburg on the Baltic, and sailed back to England.

After 1833, Simpson lived in Montreal, directing the Hudson's Bay Company operations. During the 1840s and early 1850s, he sponsored additional explorations of the Canadian Arctic, including JOHN RAE's 1846 journey. In his later years, Simpson was prominent in banking and railroad development.

Sir George Simpson's accounts of his overland journeys across Canada were published in 1931. His 1841–42 overland journey around the world was until that time the first such expedition. He published an account of this trip in his 1847 book, *Narrative of a Journey Round the World in 1841 and 1842*. Simpson Falls on western Canada's Peace River and Cape George Simpson in the Canadian Arctic were both named in his honor.

Simpson, James Hervey (1813–1883) *U.S. Army officer, American topographer in the American West*

James H. Simpson, a native of New Brunswick, New Jersey, entered West Point when he was 15. Four years later, in 1832, he graduated as a second lieutenant in the artillery. In 1837, he served in Florida in the campaign against Seminole Indians, and, the following year, he transferred to the U.S. Army Corps of Topographical Engineers.

Throughout the 1840s, Simpson supervised government construction projects in the East and South. In 1849, he accompanied Captain RANDOLPH BARNES MARCY's expedition blazing a wagon route from Fort Smith, Arkansas, to Santa Fe, New Mexico.

In August 1849, Simpson took part in a military expedition against Navajo (Dineh) Indians in the region northwest of Santa Fe. En route, he led a reconnaissance of the upper Chaco River and came upon the ancient Anasazi ruins of Chaco Canyon, New Mexico. He continued westward with the military expedition into present-day northeastern Arizona and accompanied the first known group of Anglo-Americans to penetrate the Navajo stronghold at Canyon de Chelly. He undertook an exploration of the canyon and located more pueblo ruins unknown to non-Indians.

In 1853, Simpson became a captain in the Topographical Corps. In August 1858, he began a series of explorations of Utah's Great Basin. From Camp Floyd, south of Salt Lake City, he led an expedition north and east into Timpanogos Canyon and the Wasatch Mountains, to Fort Bridger.

In October 1858, Simpson explored westward from the Great Salt Lake across northern Nevada and proceeded to Carson City, via Reynolds Pass. Along the way, the expedition blazed a trail along the Walker River, an alternative to the Humboldt River route into the Sierra Nevada.

In May 1859, Simpson led another expedition south and west across the Great Basin to the Mormon settlement at Genoa near Lake Tahoe.

In the Civil War, Simpson was commissioned a colonel of volunteers. Captured by Confederate forces in the Virginia campaign, he was released in a prisoner exchange in 1862. Simpson went on to serve as chief topographical engineer in the Ohio Valley and in Kentucky. After the war, he was appointed chief engineer of the Department of the Interior, and in that capacity he oversaw the construction of the Union Pacific Railroad in 1865–67. He retired from the service in 1880, after a period in which he directed road construction and harbor development in the South and Midwest.

James H. Simpson's explorations of New Mexico, Arizona, Utah, and Nevada spanned more territory in the American West than those of any other army topographer of the time. His exploration of Native American antiquities in New Mexico and Arizona contributed greatly to the archaeological understanding of the Southwest. The first drawings



James H. Simpson (Library of Congress)

of the Chaco Canyon and Canyon de Chelly ruins were made by artist-topographer RICHARD HOVENDON KERN, who accompanied Simpson in 1849. Simpson's report of his expeditions between Fort Bridger, the Great Basin, and the Sierra Nevada was published in 1876, and his findings led to the establishment of direct wagon and mail routes between Salt Lake City and California. In 1871, Simpson published *Coronado's March In Search of the Seven Cities of Cibola*, an account of the Spanish CONQUISTADORES' first journey into the region Simpson himself had explored.

Simpson, Thomas (1808–1840) *Scottish fur trader, surveyor in the Canadian Arctic and Alaska, cousin of Sir George Simpson*

Thomas Simpson was born at Dingwall in northern Scotland, a descendant of Scottish statesman Duncan Forbes. He

was educated at Aberdeen University, where he earned a master's degree. In 1829, he immigrated to Canada and entered the service of the HUDSON'S BAY COMPANY.

Simpson gained his initial experience in wilderness travel by commanding CANOE convoys between Montreal and the Hudson's Bay Company post at Fort Garry (present-day Winnipeg, Manitoba). From there, he regularly traveled on snowshoes to Fort York on HUDSON BAY, 700 miles to the northeast.

In 1836, to fulfill the Hudson's Bay Company's obligation to continue the search for the NORTHWEST PASSAGE, Simpson's older cousin, Hudson's Bay Company governor SIR GEORGE SIMPSON, sent him and a fellow company employee, PETER WARREN DEASE, to explore the remaining unknown segments of Canada's Arctic coastline.

After undergoing training in surveying techniques at Fort Garry, the younger Simpson joined Dease at Great Bear Lake, where they established a base camp, Fort Confidence. In spring 1837, accompanied by a party of VOYAGEURS, they descended the Mackenzie River to the Arctic coast, then explored westward, reaching the northernmost point of Alaska, Point Barrow, on August 4, 1837. This location was the farthest east FREDERICK WILLIAM BEECHEY had reached in his 1826 seaward exploration of the eastern entrance to the Northwest Passage; it was also the farthest west attained that same year by SIR JOHN FRANKLIN and SIR GEORGE BACK.

After another winter at Great Bear Lake, Simpson and Dease set out again in spring 1838. They descended the Coppermine River, then surveyed the coastline eastward, reaching 100 miles beyond Point Turnagain. The next year, they explored even farther to the east, reaching the south coast of King William Island and the west coast of the Boothia Peninsula. On the return journey, they explored the south shore of Victoria Island.

Although Simpson had planned to extend his explorations eastward as far as Fury and Hecla Strait and into northern Hudson Bay, by the end of 1839 he had still not received authorization for another expedition from his cousin, Sir George. He therefore resolved to return to England and there apply in person to the directors of the Hudson's Bay Company. He began the journey with a 1,500-mile hike southward to the Red River Settlement in present-day Manitoba, which he reached in February 1840. He continued his eastward journey toward Montreal in the spring, accompanied by several mixed-blood Indians. On June 14, 1840, in the lands of the Sioux (Dakota, Lakota, Nakota) Indians, he was found shot to death in his tent. The circumstances of his death are unclear, although the local U.S. territorial authorities declared it a suicide.

Thomas Simpson died without learning that the Hudson's Bay Company board of directors had already assented to his proposed expedition, and that, in recognition of his

exploits, he had been awarded the Queen's Arctic Medal. His explorations of the Canadian Arctic filled in details about the last remaining stretch of unknown coastline between the Mackenzie River delta and Point Barrow, Alaska. In the eastern Canadian Arctic, he surveyed and charted the coastline between Point Turnagain and the west coast of the Boothia Peninsula, providing vital geographic details for the British navy's subsequent attempts to navigate the Northwest Passage during the 1840s.

Sinclair, James (1811–1856) *Canadian pioneer in the Rocky Mountains and Pacific Northwest*

James Sinclair was born at Oxford House, a HUDSON'S BAY COMPANY fur-trading settlement in what is now northeastern Manitoba, Canada. His father, an official with the trading company, was from Scotland, and his mother was a Métis.

After attending school in Edinburgh, Scotland, Sinclair returned to central Canada at the age of 15, eventually becoming a partner in a trading enterprise out of the Red River Settlement. As both merchant and shipper of goods, he traveled widely in central Canada and in what is now the north-central United States, undertaking journeys by CANOE from the Red River Settlement northward to HUDSON BAY and leading wagon caravans southward to settlements in present-day south-central Minnesota.

In 1841, Sinclair was commissioned by the Hudson's Bay Company to lead a group of emigrants from the Red River Settlement westward to the Oregon Country. The project had been instigated by the British government, hoping to reinforce its claim on Oregon with a sudden influx of British settlers from Canada. There were 23 families in the party, which numbered 121 men, women, and children, with 55 wagons and several hundred head of cattle.

Sinclair and the wagon train left the Red River Settlement on June 5, 1841. With the help of the Indian guide Bras Croche, he located White Man Pass, which proved to be a suitable wagon route through the ROCKY MOUNTAINS to the upper COLUMBIA RIVER. They followed the river to Fort Vancouver, opposite present-day Portland, Oregon, arriving on October 13, 1841.

Sinclair soon returned to the Red River Settlement, where he had become a prominent voice in the Métis community. He undertook a second westward expedition in 1850, in which he returned to Oregon, again crossing the Rockies by way of White Man Pass. After two years in Oregon and California, he sailed for Panama, returning to the Red River Settlement by way of New York.

In May 1854, Sinclair set out with another emigrant wagon train, again accompanied by Bras Croche. On this expedition, which reached Walla Walla on December 24, 1854, he pioneered a wagon route through the Kananaskis

Valley and across the Rockies to the Kootenay River Valley and the upper reaches of the Columbia River.

Sinclair stayed in Oregon throughout 1855. Before he could return to the Red River Settlement, from where he planned to lead more emigrant wagon trains into Oregon by way of his newly discovered Rocky Mountain pass, he was killed by Yakama Indians in the Cascade Range in 1856.

The route James Sinclair pioneered through the Canadian Rockies, known afterward as Sinclair's Canyon, was later developed into the highway linking the cities of Banff, Alberta, and Windemere, British Columbia. While the Hudson's Bay Company had developed its network of trails across western Canada primarily as portages for the canoe routes between its various fur-trading forts, Sinclair's explorations led to new overland communication and transportation routes between central Canada and the Pacific Northwest.

Singh, Kishen (Kish Singh, Krishna Singh)

(unknown–1921) *Indian surveyor in western China and Tibet, in service to Great Britain, cousin of Nain Singh*

Kishen Singh was probably a native of northern India's Kashmir region. During the mid-1860s, he entered the service of the British colonial authorities, who trained him as one of their native surveyors, known as the PUNDITS (Hindi for "learned expert").

In 1869, Singh explored westward from the northern Indian city of Dehra Dun into the northern Punjab region of present-day Pakistan. Like other native explorers working for Great Britain at that time, such as KINTUP, he used only basic surveying instruments, measuring the distances he covered by counting his footsteps.

Singh undertook his first exploration of the HIMALAYAS in 1871. Disguised as a Buddhist pilgrim, he started out from Katmandu, Nepal, and investigated a large area of Tibet and southern China extending westward from the Tibetan capital at LHASA and Nam Tso Lake, as far as the eastern edge of Chinese Turkestan. In 1873, he joined his cousin NAIN SINGH in an expedition from the upper Indus city of Leh deep into Chinese Turkestan, to the city of Yarkand in the Taklimakan Desert.

On his own in 1874, Kishen Singh explored the region southwest of Yarkand and Kashgar into the Pamir region of south-central Asia before returning eastward to Leh in northern India. But his most ambitious journey began in 1878, when he set out from Darjeeling in extreme northeastern India to Shigatse and Lhasa in Tibet. Over the next several years, he explored northward as far as the Tsaidam Depression, the swampy region between the branches of western China's Kunlun mountain range. On reaching a point as far north as the southwestern edge of Mongolia's GOBI DESERT, he made his way back to India by

way of Tibet's Tsangpo River, arriving in Darjeeling in 1882.

Kishen Singh's explorations into western China from India provided accurate information about the northern extent of the subcontinent for the British Great Trigonometrical Survey of India, an undertaking that lasted through much of the 19th century.

Singh, Nain (ca. 1826–1882) *Indian surveyor in central Asia, in service to Great Britain, cousin of Kishen Singh*

Nain Singh was a native of the eastern Himalayan kingdom of Bhutan. In 1854–57, he served as a guide in the HIMALAYAS for the German mountaineers, the brothers ADOLF VON SCHLAGINTWEIT, HERMANN VON SCHLAGINTWEIT, and ROBERT VON SCHLAGINTWEIT.

During the early 1860s, Singh entered the British school for native surveyors at the northern Indian city of Dehra Dun. He had been recruited to carry out explorations north of the Himalayas for the ongoing Great Trigonometrical Survey formerly headed by SIR GEORGE SIMPSON. At that time, with the Chinese government forbidding Europeans entry into China and Tibet from India, the British directors of the survey had resorted to employing natives from the mountains of northern India and adjacent lands to carry out a surreptitious reconnaissance of the lands beyond the Himalayas.

In 1864, Singh set out from Bareilly, India, for Tibet, accompanied by his cousin Mani Singh, also a British-trained native surveyor. On being turned back by Chinese border guards, they disguised themselves as merchants from Ladakh and succeeded in penetrating Tibet as far as the Tashilhumpo monastery near Shigatse. Singh met with the 11-year-old Panchen Lama, then continued on to the Tibetan capital at LHASA, which he reached on January 10, 1866. Based on observations of the sun and the stars, he established the city's geographic coordinates. By noting with a thermometer the temperature at which water came to a boil, he also determined its altitude.

After three months, Singh traveled to Lake Mansowar, then traced the upper course of the Brahmaputra River and charted the range of mountains north of the Himalayas, known as the Nyenchentanglhas. He recrossed the Himalayas back to Bareilly, India, having surveyed the trade route into Tibet and having accurately measured 1,200 miles of mountainous territory by counting his footsteps.

In 1867, Singh undertook a survey of the upper Indus Valley, then entered western China by way of the 18,400-foot Mana Pass. He traversed the Tibetan Plateau to Thok-Jalung, where he observed gold-mining operations. In 1873, with his cousin KISHEN SINGH, he traveled from Leh in northern India to Khotan and the edge of western China's

Taklimakan desert. From there, they went to the city of Yarkand.

Nain Singh was the foremost of British India's PUNDITS (Hindi for "learned expert"). In fact, it was his code name, "the Pundit," which came to be used for all the Indian explorers. Along with KINTUP and Kishen Singh, he provided British geographers and cartographers with enough information to produce the first modern maps of the regions north of the Himalayas. His measurements of distances, mostly carried out by counting his footsteps, provided data on more than 3,000 miles of previously uncharted country. The Aling Kangri mountains, which he explored while on the northern edge of the Tibetan Plateau, were formerly known as the Nain Singh range. He received a medal from the ROYAL GEOGRAPHICAL SOCIETY in 1877.

Sitgreaves, Lorenzo (ca. 1811–1888) *U.S. Army officer in the American Southwest*

Lorenzo Sitgreaves was born in Pennsylvania, the son of prominent congressman and lawyer Samuel Sitgreaves. An 1832 graduate of West Point, Lorenzo served as an artillery officer for several years, then left the military to practice engineering. Rejoining the army in 1840, he was appointed a second lieutenant in the U.S. Army Corps of Topographical Engineers.

In the early 1840s, Sitgreaves took part in coastal surveys in the North and South. In September 1846, at the outbreak of the U.S.-Mexican War, he accompanied Captain George W. Hughes and a company of Topographical Engineers into Mexico from Presidio del Rio Grande in western Texas. The expedition blazed a trail south and east for advancing U.S. forces to a point between Chihuahua and Monterrey in Mexico. After participating in the Battle of Buena Vista in February 1847, Sitgreaves was breveted a captain.

In September 1851, Sitgreaves commanded a Topographical Engineers unit accompanying Colonel Edwin V. Sumner's military expedition into the Navajo (Dineh) lands west of the Zuni Indian pueblos of New Mexico. With Sitgreaves was frontier artist and topographer RICHARD HOVENDON KERN; his guide was Antoine Leroux.

Sitgreaves had been ordered to follow up the earlier explorations of Lieutenant JAMES HERVEY SIMPSON and survey a wagon route between Santa Fe, New Mexico, and San Diego, California. Starting out from Santa Fe, he went first to the Zuni pueblos of northwestern New Mexico, then southwestward along the Zuni River as far as its confluence with the Little Colorado River in present-day eastern Arizona.

Near present-day Flagstaff, Arizona, Sitgreaves was advised by Leroux that traveling farther up the Little Colorado would take him into the Grand Canyon. He left the Little

Colorado and led his command westward across a country of high tablelands and lava beds that was totally devoid of water. Suffering repeated Indian attacks along the way, Sitgreaves and his party eventually reached the Colorado River near Mojave Indian villages. With Chief IRATEBA's help they followed the COLORADO RIVER south to Fort Yuma, then crossed overland to San Diego.

In his subsequent report, published by the government in 1853, Sitgreaves provided scientifically charted maps and information on existing Indian settlements and trails in northern Arizona. Sitgreaves went on to serve in the Civil War as an engineering officer, and, by 1864, he had attained the rank of lieutenant colonel. He retired from the army in 1866.

Lorenzo Sitgreaves contributed much in the way of detailed geographic knowledge of the Southwest. His 1849 map of the route taken by U.S. forces on their 1846 drive into Mexico was one of the first to describe the little-known Chihuahua region. His 1851 expedition from Zuni, New Mexico, to San Diego, California, later provided a basis for the Pacific Railroad Surveys along the 35th parallel. Although Sitgreaves did not find a direct route across Arizona to the Pacific coast in 1851, his trail as far as the Colorado River was subsequently adopted by the Santa Fe Railroad.

Smet, Pierre-Jean de See DE SMET, PIERRE-JEAN.

Smith, James (1737–1812) *American frontiersman, guide, politician in Kentucky*

James Smith was born in Franklin County in south-central Pennsylvania. At the age of 18, he was taken captive by Indians; he lived with them until he managed to escape four years later. In the early 1760s, he served as a guide under Colonel Henry Bouquet in campaigns against the tribes of the Ohio Valley.

In 1766, Smith and four companions undertook a hunting expedition into the region beyond the CUMBERLAND GAP, even though such forays had been expressly forbidden by the British with the imposition of the Proclamation Line of 1763. They were among the few non-Indians to do so since the start of the French and Indian War in 1754.

Smith later settled in eastern Virginia, where he took part in Lord Dunmore's War of 1774 as a captain in the colonial militia. He also served as a colonel with patriot forces in the American Revolution of 1775–83, commanding frontier campaigns against the Indians. In 1788, he moved to Bourbon County in what is now northeastern Kentucky, where he became prominent in state politics, serving for many years in the state legislature. Smith's own account of his explorations beyond the Appalachian frontier,

Remarkable Adventures in the Life and Travels of Colonel James Smith, was first published in 1799.

James Smith's 1766 hunting expedition marked the resumption of exploration west of the APPALACHIAN MOUNTAINS, which had been halted by a decade of warfare between Indians and non-Indians. Soon afterward, inspired by reports brought back by Smith and others, other "long-hunters" ventured into Kentucky, most notably frontiersman DANIEL BOONE.

Smith, Jedediah Strong (Jed Smith) (1799–1831)

American fur trader, trapper in the American West

Jedediah "Jed" Smith was born near what is now Bainbridge, New York. With his family, he migrated to Pennsylvania, where he worked on a Lake Erie trading vessel before moving west to St. Louis to take part in the burgeoning FUR TRADE along the MISSOURI RIVER.

In 1822 and 1823, Smith joined WILLIAM HENRY ASHLEY's fur-trading expeditions to the upper Missouri region of what is now South Dakota. When Ashley's traders were attacked by Arikara Indians on the Missouri, Smith was dispatched upriver to seek help. In summer 1823, he took part in the punitive expedition against the tribe under Colonel HENRY LEAVENWORTH.

With the upper Missouri route to the northern Rocky Mountains cut off by Indian hostility, Smith led a group of MOUNTAIN MEN west from Fort Kiowa in present-day South Dakota, along the White River, into the Badlands and Black Hills. His group included JAMES CLYMAN, THOMAS FITZPATRICK, and WILLIAM LEWIS SUBLETTE. While exploring the Black Hills, Smith was nearly killed in an attack by a wounded grizzly bear. He soon recovered, and, after crossing the Belle Fourche River, he led his party into what is now eastern Wyoming, where they purchased horses from the Cheyenne and Sioux (Dakota, Lakota, Nakota) Indians, then proceeded westward across the Great Plains.

Smith and his men reached Wyoming's Powder River Valley, then crossed the Bighorn Mountains by way of Granite Pass into the Bighorn Basin. Heavy snows prevented further progress through Union Pass, and Smith and the others were forced to encamp for a time near what is now Dubois, Wyoming. From the Indians, Smith learned of a route to the south that led through the ROCKY MOUNTAINS. In February 1824, after following the Wind River, his men reached the Sweetwater River. By following it, they located the SOUTH PASS, which took them west to the abundant beaver hunting grounds of the Green River Valley near the present Wyoming-Utah border.

Smith and his party trapped as far south as the northern end of the Uinta Mountains. From there, they headed north and west to the Snake River, where they met up with a group of Iroquois (Haudenosaunee) Indians trapping for the HUD-

SON'S BAY COMPANY and rescued them from attack by Paiute Indians. Smith escorted the Iroquois to the Hudson's Bay Company post at Flathead Lake in what is now western Montana. There, ALEXANDER ROSS, director of the Flathead Lake post, hosted Smith and the Americans in the winter of 1824–25. From Flathead Lake, Smith headed northward as far as the Canadian border and explored the upper Snake River region of Idaho. By summer 1825, Smith and his trappers had returned to the Green River, and, at Henry's Fork, attended the first annual fur traders' rendezvous.

Smith returned to St. Louis by way of the Missouri and subsequently became a full partner with Ashley. The next summer, he, DAVID E. JACKSON, and William Sublette bought out Ashley's interests in what was known as the ROCKY MOUNTAIN FUR COMPANY. He set out for the Rockies again in August 1826, from the Cache Lake rendezvous in present-day Utah, and explored south and west to the Great Salt Lake. From the Ute Indians, he heard reports of the fabled Buenaventura River, which supposedly flowed out of the Great Salt Lake to the Pacific Ocean. David E. Jackson and a small party explored for this stream but were unable to locate it. Smith headed south to Utah Lake, then followed the Sevier and Virgin Rivers, eventually reaching the COLORADO RIVER and following it to the Mojave River. Guided by Mission Indians, Smith and his party crossed the Mojave Desert to the San Bernardino Mountains and reached the Mexican settlement of San Gabriel near Los Angeles, California, on November 27, 1826.

Smith ran into difficulties with Mexican authorities, who took a dim view of any American encroachment into their territory. At San Diego, Smith was told by the Mexican governor to leave California over the same route he had come. Instead, he led his men northward into the San Joaquin Valley, as far as the American River near Sacramento. He left some of his party there to trap, then explored for a route east through the Sierra Nevada. On finding Ebbett's Pass, Smith made the first eastward crossing of the Sierra Nevada into what is now Nevada. He traversed central Nevada, and, after nearly dying of thirst in Utah's Great Salt Lake Desert, reached the fur-trading rendezvous at Bear Lake, Utah, on July 3, 1827.

Less than two weeks later, Smith set off again for California. He retraced his earlier route to the Mojave villages on the Colorado River. While crossing the Colorado on rafts, Smith lost 10 of his men in an attack by Mojave warriors. Smith and the survivors made their way through the San Bernardino Mountains to San Gabriel, where the Mexicans jailed the trespassers for almost two months. They were finally released in the custody of an American sea captain in January 1827, who transported them north to Monterey. From there, they headed into the Tehachapi Mountains to the Sacramento Valley, where they rejoined the men left behind the previous year.

Still searching for the Pacific outlet of the Buenaventura River, Smith and his men explored the American, Merced, and Stanislaus Rivers of northern California, then headed northward into the Oregon Country. On the Umpqua River, most of Smith's 18 men were killed in an attack by Indians. Smith and three other survivors made their way to Fort Vancouver on the COLUMBIA RIVER, where JOHN MCLOUGHLIN of the Hudson's Bay Company provided them with assistance and helped recover the furs stolen by the Indians.

Smith trapped in the Wyoming-Montana region in 1828–29, then returned to St. Louis with the intention of farming and entering the mercantile business.

In 1830, Smith conferred with President Andrew Jackson's secretary of war, John Eaton, on the extent of British occupation in the Oregon Country. The following year, he joined David Jackson, William Sublette, and Thomas Fitzpatrick in a trading venture along the Santa Fe Trail to New Mexico. On May 27, 1831, while scouting ahead in the arid region between the Arkansas and Cimarron Rivers of present-day southwestern Kansas, Smith was killed in an attack by Comanche Indians. Smith's journal of his explorations, *The Travels of Jedediah Smith: A Documentary Outline* (edited by Maurice S. Sullivan), was published posthumously in 1934.

Among his contemporaries in the fur trade, Jed Smith was known as the "Knight of the Buckskin." In the course of his explorations of the West, he covered more than 16,000 miles. Smith led the first non-Indians westward through the South Pass and reported on its feasibility as a wagon route for emigrants on the way to Oregon and California. His 1826 expedition across the Southwest from the Great Salt Lake was the first known overland journey to California on that route. His route from the Colorado River to the San Bernardino Mountains developed into the Mormon Cutoff. On his return, Smith undertook the first successful crossing of the Great Salt Lake Desert, the largest desert in North America. Historians also credit Smith with locating the Old Spanish Trail and providing the first precise information about the geography of the American Southwest.

Smith, John (ca. 1580–1631) *English soldier, colonizer in Virginia, explorer of coastal North America*

John Smith was a native of Willoughby in Lincolnshire, England. He spent his early years as a merchant's apprentice in King's Lynn. In 1596, at the age of 16, he left England for the Continent, where he served as a mercenary with the French army in its wars against Spain in the Low Countries. Smith later fought along with Austrian forces against the Crimean Tartars at the Battle of Rotenthurn Pass in the Transylvania region of what is now Hungary. He was taken prisoner and sold as a slave to a Turkish pasha. According to

his own account, an influential Turkish woman saved him by having him sent to the Don River region, from where he was able to escape.

By 1604, Smith was back in England. He soon became a shareholder of the newly chartered VIRGINIA COMPANY of London, a syndicate of merchants licensed to establish a colony in North America. As military captain, he sailed from England with the company's colonizing expedition under CHRISTOPHER NEWPORT in December 1606.

Arriving on the Virginia coast in spring 1607, Smith helped establish the Jamestown colony several miles up the James River. The next year, he explored Chesapeake Bay, as well as the Potomac and Rappahannock Rivers, in search of gold and a route to the Pacific Ocean.

With food supplies dwindling and the colony facing starvation, Smith undertook an expedition up the Chickahominy River, seeking to purchase corn from Indians of the Powhatan Confederacy, headed by Chief Powhatan. He was soon taken prisoner by Indians, however. According to some accounts, he was about to be clubbed to death by Powhatan's warriors when the chief's 13-year-old daughter, Pocahontas, interceded. Smith then returned to the Jamestown settlement, and, under his command, the colony managed to survive.

In 1609, Smith returned to England because of an injury sustained in a gunpowder explosion. Five years later, in



John Smith (New York State Library, Albany)

1614, he undertook a second expedition to North America, during which he charted the coast from Cape Cod to the mouth of the Penobscot River, naming the region New England. After establishing trade relations with the Indians, he returned to England with a valuable cargo of furs and salted fish. The next year, Smith attempted to return to the New England coast, but his ship was captured by French pirates. Following a shipwreck on the French coast, Smith reached England.

In 1616, Pocahontas and her husband, Jamestown colonist John Rolfe, visited Smith in England. Smith planned another voyage to North America that year, but poor weather conditions forced him to abandon the project. He subsequently became a writer and promoter of English colonization in the New World.

Jamestown, the colony John Smith helped found and helped to survive in its early years, went on to flourish as the first permanent English settlement in North America. John Smith's 1608 book, *Generall Historie of Virginia*, provides the earliest firsthand account of the Jamestown colony. Smith was a friend of HENRY HUDSON and supplied him with information and maps vital to Hudson's 1609 explorations of the North American coast on behalf of England. Smith's descriptions of the New England coast influenced the later colonizing efforts of the Pilgrims in present-day Massachusetts. Smith also wrote the earliest English handbook for seamen, *A Sea Grammar* (1627).

Solander, Daniel Carl (1733–1782) *Swedish naturalist in South America and the South Pacific*

Daniel Solander was born at Pitea in northern Sweden. At the age of 17, he entered the University of Uppsala, where he had planned to study theology. Instead, as a student of the Swedish botanist Carl Linnaeus, he concentrated on natural history.

Starting in 1753, Solander took part in botanical research expeditions to Lapland, Russia, and the CANARY ISLANDS. In 1760, he went to London, where he introduced Linnaeus's system for naming and classifying plants and animals to British naturalists. Three years later, he was appointed to the staff of the British Museum, and he became assistant curator in 1766. In England, Solander became associated with SIR JOSEPH BANKS, a patron of naturalist studies, who engaged him as principal botanist for his scientific team accompanying JAMES COOK's first voyage of exploration to the South Pacific Ocean in 1768–71.

Solander and Banks collected plant specimens throughout the voyage, beginning on the Atlantic island of Madeira, and also in Brazil around Rio de Janeiro. He later took part in the first scientific examination and systematic classification of plant and animal life in Tierra del Fuego. While in Tahiti, he and Banks extended their studies to include the

life and culture of the island's native people. Among the animals they encountered on Tahiti was an unclassified variety of parakeet, which was to become extinct less than 75 years later.

Solander continued his naturalist studies on NEW ZEALAND's North Island, where he and Banks encountered the Kea, the only parrot known to be carnivorous. While the *Endeavor* was in southeastern Australia. Solander and the scientific team found so many unclassified species of plants at a landing site originally known as Stingray Harbor that they renamed it Botany Bay.

On their return to England in July 1771, Solander and Banks received honorary degrees from Oxford University and met with King George III to discuss the scientific results of the voyage. Of the thousands of plant and animal specimens they brought back, almost 1,000 were new to science. They also had collected artifacts of the native culture of the South Pacific islanders, including clothing, weapons, jewelry, and musical instruments, and had undertaken linguistic studies of languages unknown in Europe.

In 1772, Solander accompanied Banks on scientific expeditions to the Hebrides Islands, off western Scotland, and to ICELAND. The next year, he was appointed curator of the British Museum's natural history collection, the holdings of which were largely the result of his efforts on the Cook voyage.

Dr. Daniel Solander's work in the South Pacific set a precedent for all subsequent voyages of exploration, which thereafter regularly included at least one naturalist. The tremendous amount of plant and animal specimens collected on the 1768–71 expedition afforded him an opportunity to apply the classification and nomenclature system developed by Linnaeus. CARL PETER THUNBERG and ANDERS SPARRMAN were also Linnaeus's pupils.

Soleyman (Soleyman the Merchant, Soliman, Sulaimen el Tagir, Suleyman) (fl. 850s) *Arab trader in southern Asia*

Soleyman the Merchant, an Arab trader, was born in the Persian Gulf city of Siraf. In about 850, he undertook a sea voyage to the Far East.

After sailing to India, Soleyman traveled on a Chinese JUNK to the Laccadive and Maldivé Islands off the southwest coast of India and then went on to CEYLON (present-day Sri Lanka). He entered the Bay of Bengal, where he made stops in the Andaman Islands, and continued to Malacca and the Chinese port of Khanfu (present-day Guangzhou).

On his return to Siraf in 851, Soleyman related details of his journey to an Arab scholar, who recorded them in a book that came to be known as *Sequence of Historical Events*. It tells of the ruby mines and pearl fisheries he had seen in Ceylon, as well as the sea routes traveled by junk between Khantu and the ports of Basra on the northern end of the

Persian Gulf, and Jidda on the Arabian coast of the RED SEA. In addition to trade information, the work also provides some of the earliest commentary about the society of the Maldives, in which women held political power, and that of the Andaman Islands, in which cannibalism was practiced. Soleyman's description of Khantu includes details on Chinese society, including its sometimes brutal system of justice and the practice of legalized prostitution.

Soleyman the Merchant provided the earliest description by Muslims of India and China. His travel account and the reports of other Arab travelers, together with the works of ancient Greek geographers translated into Arabic, enabled medieval Arab geographers to develop an idea of the world beyond the Middle East. In contrast, Europe remained largely isolated and ignorant of the outside world.

Soto, Hernando de (ca. 1499–1542) *Spanish colonial official, conquistador in the American Southeast, brother-in-law of Vasco Núñez de Balboa*

Hernando de Soto was born into a minor noble family in Badajoz in Spain's west-central Estremadura region. In 1514, he arrived in the Americas and served as an officer under PEDRO ARIAS DE ÁVILA in Panama. In 1516–20, he took part in naval expeditions charting the Central American coastline.

In 1523, de Soto served as a captain under FRANCISCO FERNÁNDEZ DE CORDOBA in the conquest of what is now Nicaragua. He later took part in the conquest of both Guatemala and the Yucatán.

In late 1531, de Soto accompanied FRANCISCO PIZARRO in the conquest of Peru. At his own expense, he took armed men and horses down the coast from Panama and Nicaragua to the island of Puna off the coast of northern Peru. He was with Pizarro's forces when the Inca Empire fell in July 1533. At that time, de Soto, who would later be known for his harsh treatment of the Indians of what is now the southeastern United States, was one of the few Spanish officers who opposed Pizarro's execution of the Inca Indian emperor Atahualpa.

By 1536, de Soto was back in Spain, now wealthy from his exploits in Peru. As a reward for his service, he was appointed governor of Cuba and royal deputy of Florida by Spain's king Charles I. He was given an official license to conquer all of the uncharted lands lying north of Florida.

ÁLVAR NÚÑEZ CABEZA DE VACA had recently returned from his eight years of wandering from Florida to the Gulf of California. On hearing reports of the fabled Seven Cities of CIBOLA, de Soto was inspired to seek gold and silver, as had been found among the Aztec Indians by HERNÁN CORTÉS and among the Inca Indians by Pizarro. Cabeza de Vaca declined de Soto's offer to join a new expedition to Florida.



Hernando de Soto (*Library of Congress*)

In April 1538, de Soto's expedition left the Spanish port of Sanlúcar de Barrameda. His nine ships carried soldiers, colonists, and livestock. The ships stopped at Cuba, where de Soto spent the next year making final preparations for his expedition to Florida and the lands beyond. In early May 1539, the military portion of his expedition—600 soldiers—set sail from Havana, reaching the west coast of Florida on May 28. The exact site of his landing is not known, but it is thought to have been Charlotte Harbor, north of the present-day port of Fort Myers.

De Soto led his men along the same path PÁNFILO DE NARVÁEZ had followed 11 years earlier, heading north and west toward Apalachee Bay on the Florida Panhandle. It was during this march that de Soto encountered one of the survivors of the Narváez expedition, a man named Juan Ortiz, who had been held captive by Indians since 1528. Ortiz had learned several Indian languages and joined the de Soto expedition as an interpreter.

By fall 1539, de Soto and his men had reached the Apalachee Indian village of Apalachen, near present-day Tallahassee. As Narváez had done a decade earlier, de Soto spent the winter there. Although he had been charged by the Spanish Crown to locate suitable sites for colonization and

seek a water route to the Pacific Ocean, de Soto's main preoccupation was locating gold and silver among the Indians. He soon heard reports of a rich domain to the north, ruled by an Indian princess.

Traveling northward into what is now Georgia in spring 1540, de Soto soon reached an Indian village called Cofitachequi. The tribal leader, a woman named Cutifachiqui, whose people probably were part of the Creek Confederacy, welcomed de Soto and his men with gifts of food as well as a quantity of freshwater pearls. Even though these pearls, taken from freshwater mussels, would later prove to be worthless, de Soto interpreted them as proof of riches nearby. De Soto and his soldiers, having the advantage of horses, firearms, and crossbows, managed to take Cutifachiqui hostage, as they would do repeatedly to tribal leaders in order to force the Indians to provide food and slaves.

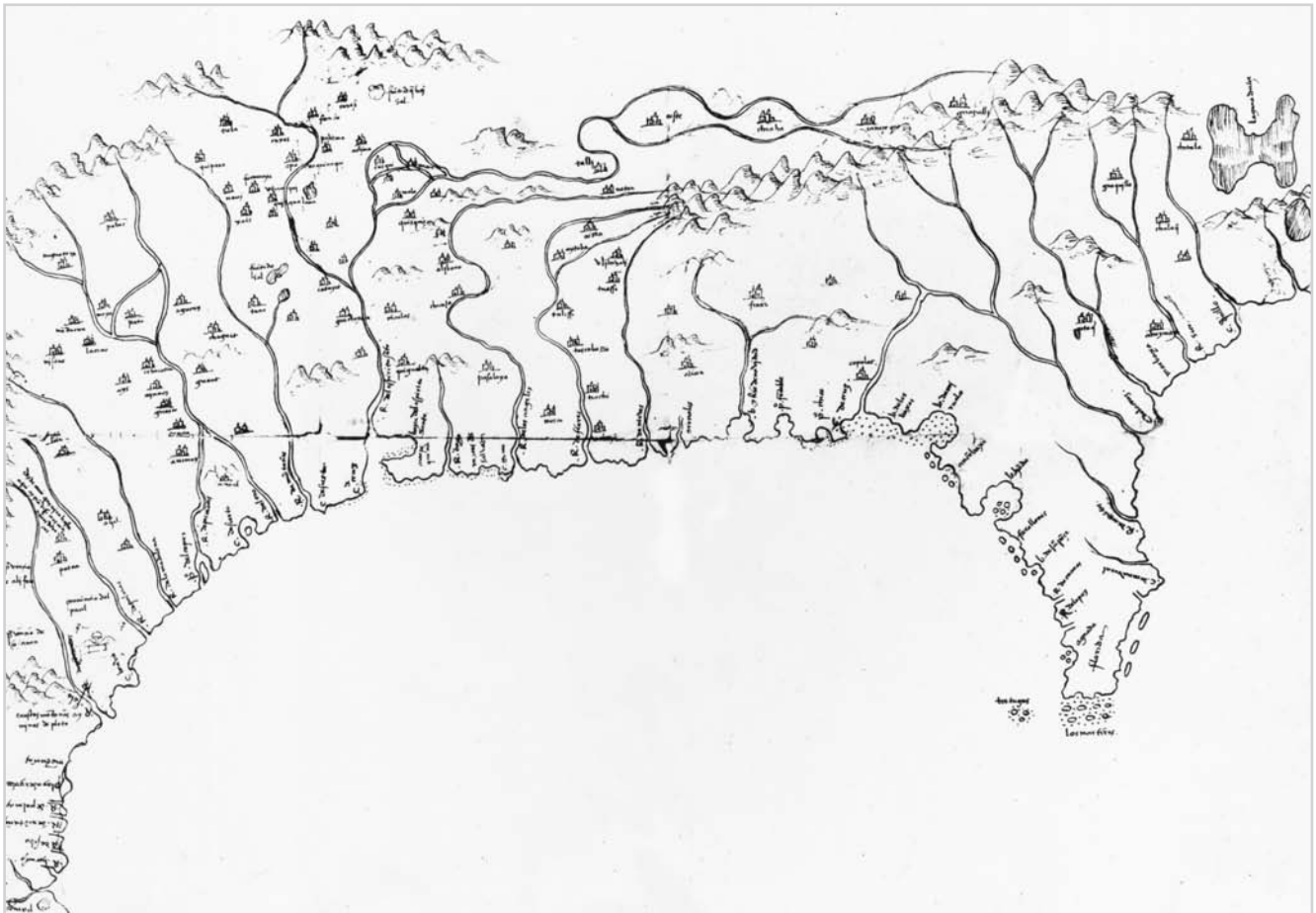
The CONQUISTADORES proceeded up the Savannah River into the APPALACHIAN MOUNTAINS of what is now western North Carolina. They crossed the Appalachians, probably through the Blue Ridge or Great Smoky Mountains, and entered what is now eastern Tennessee. De Soto soon heard reports of another Indian village and followed

the Tennessee River southward, reaching Chiaha at present-day Burns Island, Tennessee, in early June 1540. Finding no gold or other riches among these people, he pushed farther southward into central Alabama and reached the Indian village of Coosa near present-day Childersburg.

In addition to living off the Indians, the Spaniards bred the small herd of swine they had brought with them from Spain into a herd of some 700 during the course of the expedition. It is said that the pigs that escaped from the de Soto expedition were the ancestors of the wild hogs now inhabiting Georgia's Okefenokee Swamp.

In summer 1540, the Spanish encountered resistance among Choctaw, Alabama, and Chickasaw Indian bands as they plundered their way across Alabama. A captured Mobile chief named Tascalusa escaped from de Soto and led an unsuccessful counterattack against the Spaniards at a point north of the head of Mobile Bay.

In fall 1540, de Soto received word that relief ships from Cuba were waiting for him at Mobile Bay. Rather than turn back without any riches, he decided to keep the news of the ships secret. He led his men north and west into what is now the state of Mississippi, spending the winter of



Map based on the explorations of Hernando de Soto (1544) (Library of Congress)



Hernando de Soto's discovery of the Mississippi River (*Library of Congress*)

1540–41, at a site near present-day Pontotoc, west of the Tombigbee River.

In the spring, de Soto pushed westward, and on May 8, 1541, he came upon the MISSISSIPPI RIVER at a point south of present-day Memphis, Tennessee, making the first recorded sighting of the river by non-Indians. After constructing barges, the expedition crossed the Mississippi on June 18, 1541.

On the west bank of the Mississippi, the de Soto expedition marched northward, then westward, into what is now Arkansas. Along the way, his men came into contact with the Quapaw, Caddo, Wichita, and other Indians of the lower Mississippi and Arkansas River Valleys. Upon reaching the Arkansas River, the expedition followed it westward.

During this leg of the expedition, de Soto and his men noted the appearance of buffalo goods and heard reports of large herds of these animals to the west. De Soto sent scouting parties westward into the Ozark Mountains to see if a route to the sea could be found. At this time, Europeans knew little about the extent of the North American continent; de Soto and other explorers still believed that much of North America was an appendage of Asia.

De Soto and his men may have reached as far west as the Caddo Mountains of eastern Oklahoma by late 1541. At the same time, FRANCISCO VÁSQUEZ DE CORONADO was several hundred miles away in central Kansas, also searching for Cibola. Although both expeditions knew of each other, no attempt was made to establish contact.

Facing mountain terrain and canebrakes to the west, with supplies low and many weapons damaged, de Soto decided to head southward for the Gulf to obtain additional goods from Cuba. He traveled down the Ouachita River to what is now Camden, Arkansas, where his expedition spent the winter of 1541–42.

De Soto began to lose more and more of his men to fever and Indian attacks, including the interpreter Juan Ortiz. Near the confluence of the Red River and the Mississippi, de Soto himself succumbed to fever on May 21, 1542. To prevent the Indians from learning of the Spanish leader's death and the resulting disarray, the conquistadores weighted his body with rocks and disposed of it in the Mississippi under cover of darkness.

Command of the expedition fell to LUIS DE MOSCOSO, de Soto's chief lieutenant. He decided to lead the survivors

westward in the hope of reaching Mexico. The expedition headed into what is now Texas, reaching as far as the upper Brazos River region near the Trinity. Discouraged by the vastness of the land, Moscoso decided to try again for the Gulf of Mexico to the south and returned to the Mississippi.

After wintering on the Mississippi in 1542–43, the Spanish built seven crude barges and, when the river flooded on July 2, 1543, embarked on them, reaching the Gulf of Mexico on July 18. They followed the Texas coastline west and south, until they came to the Spanish settlement of Tampico at the mouth of Mexico's Panuco River. Of the more than 600 members of the de Soto expedition, only 311 returned to Mexico.

Hernando de Soto's failure to find Indian civilizations and riches similar to those in Mexico and Peru plus the expedition's losses halted Spanish exploration of the North American interior for the next century. The Mississippi River would not be visited by non-Indians again until the French voyages of exploration out of Canada a century later. The journals from the de Soto expedition are read for the most part for their ethnological information on Southeast Indians. In 1935–39, the United States government undertook to retrace de Soto's route, publishing its results in the *Final Report of the United States De Soto Commission*.

Spalding, Henry Harmon (1803–1874)

American missionary in the Pacific Northwest

Henry Spalding was born near Bath, New York. He graduated from Western Reserve University in 1833, then attended Lane Theological Seminary until 1836, receiving an appointment by the American Board for Foreign Missions as a Presbyterian missionary to the Indians of the Pacific Northwest.

On March 31, 1836, Spalding and his wife, the former Eliza Hart, set out from St. Louis for the West, traveling with the AMERICAN FUR COMPANY trade caravan to that year's fur-trading rendezvous on the Green River, near the present-day Utah-Wyoming state line. Missionary MARCUS WHITMAN and his wife, the former Narcissa Prentiss, along with a farmer-mechanic named William Gray, were also part of this group. From the Green River, the Spaldings, the Whitmans, and Gray continued westward with a group of HUDSON'S BAY COMPANY traders as far as Fort Boise in what is now southern Idaho.

The Spalding-Whitman party continued into the Oregon Country to Fort Walla Walla, and down the COLUMBIA RIVER to Fort Vancouver, where they were assisted by JOHN M'CLOUGHLIN of the Hudson's Bay Company. While the Whitmans went on to establish a mission at Waiilatpu, near Walla Walla, among the Cayuse Indians, Spalding and his wife journeyed to Lapwai, near what is now Lewiston, Idaho, where he established a mission to the Nez Perce Indians.

In 1842, Spalding received word of his dismissal by the American Board for Foreign Missions because of critical reports about him from Whitman and other missionary workers. Nevertheless, during his trip to the East that year, Whitman had a change of heart and succeeded in obtaining Spalding's reinstatement.

Shortly after Marcus Whitman, his wife, and others at the Walla Walla mission were killed in a surprise attack by Cayuse Indians in 1847, Spalding and his wife left Idaho and moved to Oregon's Willamette Valley, where he became a school administrator and Indian agent. He returned to Lapwai, Idaho, in 1862 and resumed his missionary work among the Nez Perce, while also serving as superintendent of schools for that tribe. He remained at Lapwai until his death in 1874.

In their 1836 overland journey from St. Louis to the Columbia River, Henry Spalding and Marcus Whitman pioneered the Oregon Trail as an emigrant route, and they were the first party to use wagons in traveling west of Fort Hall. Moreover, Eliza Spalding and Narcissa Whitman were the first non-Indian women to cross the Continental Divide. Spalding's mission at Lapwai was the first permanent non-Indian settlement in what is now Idaho. In 1839, as part of his effort to create a written version of the Nez Perce language, Spalding introduced the first printing press in the Pacific Northwest.

Sparrman, Anders (1747–1820) *Swedish naturalist in South Africa and the South Pacific, in service to Great Britain*

Anders Sparrman was born in Upplands, Sweden. At the age of 17, he served aboard a Swedish merchant ship as an assistant surgeon, returning with a large collection of botanical and zoological specimens from East Asia.

In 1768, Sparrman entered the University of Uppsala, where he studied medicine and became a pupil of the Swedish botanist Carl Linnaeus. He received a medical degree in 1770, and, the following year, he sailed to Cape Town, South Africa, as part of a scientific expedition sponsored by the Swedish government. His work included studies with fellow Swede CARL PETER THUNBERG. While in Cape Town, he met JOHANN REINHOLD FORSTER and his son, JOHANN GEORG ADAM FORSTER, the principal naturalists with JAMES COOK'S second expedition, which had stopped there on its way to the South Pacific Ocean. The elder Forster was impressed by Sparrman's abilities as a naturalist, especially his wide knowledge of birds, and soon enlisted him as his assistant aboard the *Resolution*. Over the next two-and-a-half years, Sparrman sailed around the world with the Cook expedition, collecting and identifying hundreds of specimens of flora and fauna throughout the South Pacific. In NEW ZEALAND, he discovered several birds new to science, including the New Zealand parakeet, the spotted cormorant, and

the wekas, a type of flightless rail. On the last part of the voyage, at Christmas Channel near CAPE HORN, Sparrman and the Forsters made a study of the region's seals and other marine mammals and discovered two previously unclassified varieties of penguin, the Papua penguin and the Magellan penguin.

Sparrman left the *Resolution* when it returned to Cape Town in March 1775. He resumed his naturalist studies in South Africa and also undertook ethnological research among the region's native Khoikhoi (Hottentot) people.

In 1778, Sparrman was back in Sweden, where he had been appointed president of the natural history collection of Stockholm's Academy of Sciences. In 1787, he traveled to Senegal in West Africa, where he conducted additional natural history and ethnological studies. Sparrman's map of the South African coastline proved that the southernmost tip of Africa was located at Cape Agulhas and not at the CAPE OF GOOD HOPE.

Anders Sparrman's account of Cook's voyage of 1772–75, *A Voyage round the World with Captain James Cook in H.M.S. Resolution*, first published in 1783, includes some of the earliest ethnological studies of the native peoples of South Africa. Like fellow Linnaeus disciple DANIEL CARL SOLANDER, who had sailed with Cook on his 1768–71 voyage, Sparrman helped popularize the newly devised Linnaean system of classification and nomenclature by applying it to the new varieties of plants and animals he had collected.

Speke, John Hanning (1827–1864) *British soldier, sportsman in Africa*

John Hanning Speke was born near Bath in southwestern England, the son of upper-class parents. He embarked on a career as an officer with the British army in India when he was 17, serving in the Punjab region and taking part in the Second Sikh War of 1849. While in northern India, Speke, an avid hunter and sportsman, and fellow officer JAMES AUGUSTUS GRANT undertook hunting and exploring expeditions into the HIMALAYAS in which they crossed into Tibet, later producing some of the first modern maps of the region.

On a visit to Aden in 1854, Speke met SIR RICHARD FRANCIS BURTON and joined his planned expedition into what is now Somalia and Ethiopia. Soon after landing on the Somalian coast, both Speke and Burton were wounded in a native attack at Berbera, and Speke was briefly taken captive.

Speke recovered and went on to serve with a Turkish regiment in the closing months of the Crimean War of 1853–56. In December 1856, he returned to Africa with Burton, as coleader of an expedition in search of the source of the NILE RIVER, sponsored by the ROYAL GEOGRAPHICAL SOCIETY. Starting from Zanzibar on the Indian Ocean coast of present-day Tanzania, they traveled inland. In February

1858, they reached Ujiji and the shores of Africa's second largest lake, Lake Tanganyika, becoming the first Europeans to see it.

Speke explored Lake Tanganyika in a dugout CANOE, while Burton recovered from an infected jaw in Ujiji. Nearly blind from malaria and other ailments himself at this time, Speke was unable to circumnavigate Lake Tanganyika in search of an outlet that might be the Nile. Yet he noted that the lake was scarcely 10 feet higher above sea level than the Nile at Gondokoro in the Sudan, leading him to conclude that it was not the great river's source.

In spring 1858, Speke and Burton began the return journey to Zanzibar. At Tabora, about halfway to the Indian Ocean coast, Speke decided to investigate reports he had heard from Arab slave traders of a larger lake to the north. Burton, too ill with malaria to travel, remained at Tabora, while Speke proceeded about 200 miles northward. On August 3, 1858, he came upon what the natives called Lake Ukerewe, and what he called Lake Victoria after the reigning queen of England. He mapped what he could of the lake, then rejoined Burton at Tabora.

Speke believed that Lake Victoria, by its immensity, was the source of the Nile, but his view was not shared by Burton. As it turned out, Speke arrived back in England two weeks ahead of Burton, who had remained behind for a time in Aden. Although Speke had agreed not to divulge the results of the expedition until they had both reached England, he related his findings to the Royal Geographical Society. As a result, most of the credit for the European discovery of Africa's two greatest lakes went to Speke.

Speke soon raised support for another expedition in which he planned to further examine Lake Victoria and ascertain if it was indeed the long-sought source of the Nile. Joining him was his former partner in India and the Himalayas, James Augustus Grant. In October 1860, he and Grant headed westward into the interior of East Africa from Zanzibar. After a stopover at Tabora, they traveled northward to Lake Victoria. Grant had problems with an old leg injury and remained behind at Karagwe on the west shore of Lake Victoria, while Speke explored northward around the lake.

On July 21, 1862, Speke came upon a river that appeared to flow from Lake Victoria at what he called Ripon Falls, after George Frederick Samuel Robinson, the second earl of Ripon, then president of the Royal Geographical Society. With Grant, he traced the river from the northern end of Lake Victoria, following its course into present-day Uganda. Tribal warfare slowed their progress, and, by the time they had reached Gondokoro in the Sudan, they had already made several detours away from what turned out to be the White Nile.

Near Gondokoro, Speke and Grant met up with SIR SAMUEL WHITE BAKER and his wife, FLORENCE BAKER, who

were traveling upriver on their own expedition in search of the source of the Nile. The Bakers provided Speke and Grant with fresh supplies and boats to continue the downriver journey to Khartoum. Before they departed for Europe, Speke and Grant related information to the Bakers, which led the Bakers to reach Lake Albert and Murchison Falls.

Back in England, Speke announced that he had discovered Lake Victoria to be the source of the Nile. Burton, among others, challenged his claim, arguing that Speke had not examined Lake Victoria to see if the Nile flowed into it from a point farther south. Moreover, since Speke had left the Nile at various points on his downstream journey with Grant into the Sudan, there was no certainty that it was actually the same river he had seen flowing out of Lake Victoria. The British Association for the Advancement of Science arranged for Speke and Burton to debate the issue publicly. On September 15, 1864, one day before the debate, Speke was killed in a shooting accident while hunting near his home in Bath. Some speculated his death to be a suicide.

John Hanning Speke's *Journal of the Discovery of the Source of the Nile* was published in 1863. He was the first European to see Lake Victoria, the largest lake in Africa and the second largest freshwater lake in the world. The explorations of SIR HENRY MORTON STANLEY and DAVID LIVINGSTONE in the 1870s confirmed that Lake Victoria was actually one of the principal sources of the White Nile, flowing over Ripon Falls into Lake Albert. With Burton, and later with Grant, Speke pioneered the exploration route from the Indian Ocean westward into central and East Africa.

Speyer, Georg Hohermuth von See
HOHERMUTH VON SPEYER, GEORG.

Spotswood, Alexander (Alexander Spottswood) (1676–1740) *British colonial governor on the Virginia frontier*

Born in Tangier, Morocco, Alexander Spotswood was the son of a doctor serving there with British troops. At the age of 17, he embarked on a military career and went on to serve in the War of the Spanish Succession, suffering a wound at the Battle of Blenheim in 1704.

In 1710, Spotswood was named lieutenant governor of Virginia. Although under the nominal governorship of George Hamilton, Earl of Orkney, Spotswood was the colony's principal royal administrator. As such, he instituted tighter regulations on the FUR TRADE with the Indians, and, with tax abatements as an incentive, encouraged settlement on Virginia's frontier.

In 1716, Spotswood organized an official expedition to explore the frontier region himself. With a party he called the "Knights of the Golden Horseshoe"—a group of landed gentry, frontiersmen, German indentured servants, and Indian guides—he traveled through the watergap of the James River into the Shenandoah Valley. The party descended the Shenandoah River, which they dubbed the "Euphrates," after the river of ancient Mesopotamia, and sighted a peak in the Blue Ridge they named Mount George, in honor of the British monarch, King George I.

In 1722, his last year in office, Spotswood entered into a peace treaty with the Iroquois (Haudenosaunee) in Albany, under the terms of which the Indians agreed to stay west of the Potomac River and the Blue Ridge. In addition to promoting frontier settlement, Spotswood was a major land speculator of his day, amassing an estate of over 80,000 acres near Spotsylvania, Virginia.

Alexander Spotswood's 1716 expedition with the Knights of the Golden Horseshoe marked one of the first European explorations into the Blue Ridge.

Spruce, Richard (1817–1893) *British botanist in South America*

Born at North Riding in Yorkshire, England, Richard Spruce was the son of a local schoolteacher. He became a teacher himself at a school in York, where he taught mathematics. He also had an interest in collecting and identifying botanical specimens, especially mosses and liverworts, and undertook his first collecting expeditions on the moors near his home.

Starting in 1846, Spruce spent 12 months in the Pyrenees, between France and Spain, having gone there for health reasons. He carried on additional botanical research and collecting. His work soon came to the attention of a group of leading British botanists, and, as a result, in 1849, with the support of London's Kew Gardens, he embarked on a scientific expedition up the lower AMAZON RIVER.

At Santarem, a town at the junction of the Amazon and the Tapajos River, Spruce met naturalists ALFRED RUSSEL WALLACE and HENRY WALTER BATES; at their suggestion, he continued his botanical explorations farther up the Amazon and into the Río Negro at Manaus. Over the next few years, he investigated the Uaupes River, a tributary of the Río Negro, as well as the Casiquiare, the natural canal linking the Orinoco with the Río Negro and the Amazon.

In 1854, Spruce traveled to the upper Amazon Basin by steamer, extending his botanical research to the Marañón and Huallaga Rivers. He then spent two years collecting moss specimens on the eastern slopes of the Peruvian ANDES MOUNTAINS and in the northern Ecuadorian Andes.

In 1859, after 10 years of scientific work in the Amazon Basin, Spruce was commissioned by the British Foreign

Office, on the recommendation of Wallace and CHARLES ROBERT DARWIN, to collect seeds of the cinchona, or red bark tree, the principal natural source of quinine. He was to acquire the seeds from around Chimborazo, the 20,577-foot inactive volcano in central Ecuador, then ship them from the port of Guayaquil to India, where the colonial government hoped to introduce production of the antimalarial drug.

It took Spruce the next two years to fulfill this government mission, during which he risked the hazards of traveling into the Pastaza River region of central Ecuador, a country inhabited by headhunters. An additional danger was posed by the violent revolution then going on in Ecuador. Despite these difficulties, Spruce had managed to collect more than 100,000 cinchona seedlings and send them off to India by ship by 1861. In the course of this work he had explored the little-known Puyu River, a tributary of the Pastaza, and made studies of Indian dialects.

Spruce returned to England in 1864. Although he had been paid a substantial sum by the British government for collecting the cinchona seeds in the Andes, he had lost it all as a result of a bank failure in Guayaquil. With his health weakened from his 15 years in the Amazon Basin and the Andes, he retired to his home in Yorkshire, where he lived on a small government stipend. He had collected more than 30,000 specimens of rare plants. Furthermore, he had explored and mapped three rivers of the upper Amazon Basin previously unknown to Europeans. He was elected a fellow of the ROYAL GEOGRAPHICAL SOCIETY, and, over the next three decades, he produced many scientific papers as well as a major volume on his study of mosses in South America, *The Hepatics of the Amazons and Andes*, published in 1884–85.

Along with his South American botanical and geographic discoveries, Richard Spruce's efforts in the northern Andes of Ecuador directly led to the initiation of quinine production in Asia, especially in India. In recognition of his scientific work, the *Sprucea* moss and the *Sprucella* liverwort were named after him.

Squanto (Tisquantum) (ca. 1580–1622)

Wampanoag traveler to Europe, interpreter, guide for Pilgrims in Massachusetts

Squanto was a member of the Pawtuxet band of Indians, part of the Wampanoag Confederacy, living along coastal New England. According to some sources, he was among the Indians kidnapped from the Maine coast by English navigator GEORGE WEYMOUTH in 1605. Other sources indicate Squanto was one of a group of Indians abducted by Captain Thomas Hunt in 1615, near what is now Plymouth, Massachusetts. According to still another account,

Captain JOHN SMITH captured Squanto during his 1615 expedition along the New England coast.

Squanto is thought to have been sold into slavery in Spain by the English, then to have escaped on his own or to have been ransomed by a sympathetic Englishman. In any case, he made his way back to England in 1617. Squanto reportedly lived in London for the next two years with John Slany, the treasurer of the Newfoundland Company, and then possibly made a voyage to Newfoundland and back to England with Captain Thomas Dermer.

In summer 1619, Squanto sailed to New England with Captain Dermer, serving as a pilot when their ship approached the coast north of Cape Cod. Upon reaching his homeland, he found that his people had been wiped out by an epidemic, possibly smallpox.

Squanto had learned English during his years in England, and, in 1621, he became an interpreter for Wampanoag grand sachem Massasoit in his dealings with the PILGRIMS at their Plymouth colony in present-day Massachusetts. Squanto also provided the Pilgrims with instructions in agriculture, fishing, and wilderness survival skills.

In 1622, Squanto became embroiled in a tribal power struggle. He was held as a prisoner by the Wampanoag for a short time before being released through the efforts of Pilgrim military leader Miles Standish. In the fall of that year, he served as a guide and interpreter for Plymouth colony governor William Bradford's expedition around Cape Cod. At Chatham harbor, on the east shore of Cape Cod, he became ill with fever and died.

Squanto played a vital role in maintaining peaceful relations between the Pilgrims and the Indians. The assistance he provided the settlers contributed to the survival of the Plymouth colony. He was one of the first Native Americans to travel in Europe, survive conditions of slavery and exposure to disease, then return to North America.

Stadukhin, Mikhail (Mikhailo Stadukhin)

(unknown–1666) *Russian Cossack in northeastern Siberia*

Mikhail Stadukhin was a Cossack from the Siberian town of Yakutsk. Starting in 1630, he initiated a series of expeditions of exploration and conquest northward, along the Lena River, toward the Arctic coast of SIBERIA. In 1633, with a party of Cossacks, he traveled westward across north-central Siberia to the Vilyuy River.

In 1641, Stadukhin began expanding his activities into northeastern Siberia. He sailed down the Indigirka River, then pushed eastward along the Siberian Arctic coast. In 1644, he reached the Kolyma River, and, near its mouth on the East Siberian Sea, he established the settlement of Nizhnekolymsk. From there, he returned westward by sea to the Lena, which he ascended on his return to Yakutsk.

Stadukhin next turned his attention to the Gulf of Anadyr, drawn by reports that it was an abundant source of walrus ivory. His unsuccessful attempt to reach Anadyr Island by sea in 1649 was followed by a successful land journey there the following year. In 1659, he returned to Yakutsk, where he later commanded an outlying settlement. In 1666, he died while en route to the Kolyma River.

Nizhnekolymsk, the outpost Mikhail Stadukhin had founded at the mouth of the Kolyma River, served as the starting point for SEMYON IVANOVICH DEZHNEV's 1648 voyage around the northeasternmost tip of Asia, in which he explored Cape Dezhnev and what later came to be known as the BERING STRAIT.

Stanhope, Hester Lucy (Lady Hester Stanhope) (1776–1839) *British traveler in the Middle East*

Born at Chevening in Kent, England, Lady Hester Stanhope was the daughter of British statesman and inventor Charles, third earl of Stanhope.

In 1803, at the age of 27, Stanhope went to live with her maternal uncle, William Pitt, then British prime minister, for whom she worked as official hostess and secretary. Pitt died three years later, leaving her a substantial trust that made her financially independent.

In 1809, Stanhope's brother, a major in the army, and his commanding officer, General Sir John Moore, with whom Stanhope had been romantically linked, were both killed fighting the French at the Battle of La Coruña in the Peninsular War of 1808–14. The double tragedy led her to withdraw first to Wales, then in 1810, to the Middle East. Accompanying her were her physician, Charles Lewis Meryon, and a Welsh woman named Williams.

After surviving a shipwreck in the eastern MEDITERRANEAN SEA off the island of Rhodes, Stanhope and her party arrived in present-day southern Lebanon. Stanhope made a pilgrimage to Jerusalem, then embarked on extensive travel throughout the region, often dressed in native male attire. In January 1813, she crossed the Syrian Desert to the ruins of the ancient city of Palmyra, where she lived among a band of bedouin and, according to her own later account, was proclaimed "Queen of the Desert."

In summer 1814, Stanhope acquired an abandoned convent in the country around Mount Lebanon, upon which she had built a fortress-like residence, surrounded by a garden and a wall. She soon developed a charismatic reputation among the region's Druse people, who came to regard her as a prophetess. Stanhope herself was something of a mystic, an avid adherent of astrology, and a believer in the transmigration of souls. She developed a unique system of religious thought combining elements of local Christian and Muslim sects.

During the next two decades, Stanhope held a commanding position amid the political struggles over Lebanon that periodically erupted between the Ottoman Empire, the rulers of Egypt, and the European powers. She was visited by leading literary figures from Europe, including the French poet Alphonse de Lamartine and English travel writer William Kinglake.

By 1838, Stanhope had fallen severely into debt, and her creditors in Lebanon were awarded what remained of her trust. Left virtually penniless, she walled herself up in her castle-like home, and, after almost a year of self-imposed confinement, she died there in June 1839. Her physician, Charles Lewis Meryon, published two accounts of her life, *Memoirs of Lady Hester Stanhope* (1845) and *Travels of Lady Hester Stanhope* (1846).

Lady Hester Stanhope departed England reportedly to remove herself from the constraints imposed on her by society. Her journeys in the Middle East were made at a time when most private travel into the region was fraught with difficulties and perils. Even more remarkable was her ability to live for an extended time within a culture wary of non-Muslim Europeans and disapproving of females living independently.

Stanley, David Sloan (1828–1902) *U.S. Army officer in American West*

Born in Cedar Valley, Ohio, David S. Stanley was an 1852 West Point graduate. Commissioned a second lieutenant, he began his frontier military career when he was assigned to an exploring expedition westward along the 35th parallel for a proposed transcontinental railroad route.

In 1853, Stanley, accompanying Lieutenant AMIEL WEEKS WHIPPLE and a detachment of the army's Corps of Topographical Engineers, traveled westward from Fort Smith, Arkansas, over the southern plains to Albuquerque, then continued to Fort Yuma on the COLORADO RIVER. They crossed the Mojave Desert and, traversing the Sierra Nevada by way of Cajon Pass, arrived in Los Angeles.

Stanley remained in western military posts throughout the 1850s, serving with a cavalry regiment against the Cheyenne and Comanche Indians on the southern plains. In 1862, during the Civil War, he was breveted a major general; he served with distinction in command of Union forces in Georgia and Missouri and was wounded in an engagement near Nashville.

In 1865, at the war's end, Stanley was assigned to Texas. Soon afterward, he was promoted to the regular rank of lieutenant colonel, in command of frontier garrisons in the Dakota Territory. During this posting, he commanded what was known as the Yellowstone Expedition of 1873, which explored into the unknown parts of Montana and

Wyoming, as he detailed in his *Report on the Yellowstone Expedition*, published in 1874.

Stanley's later military career took him to western Texas in 1879. He was appointed a brigadier general in the regular army in 1884.

David S. Stanley's favorable reports about the country he explored with the Yellowstone Expedition of 1873 inspired a new influx of settlers onto the northern plains.

Stanley, Sir Henry Morton (John Rowlands, Bula Matari) (1841–1904) *Anglo-American journalist, colonizer in central Africa*

Born in Denbigh, Wales, Henry Morton Stanley was the illegitimate son of John Rowlands and Elizabeth Parry. He was given his father's name at birth. He spent his early years at the St. Asaph Union Workhouse, a local charitable institution, where he received some formal education.

Stanley left St. Asaph's when he was 15 and worked briefly for a haberdasher and then a butcher before going to sea as a cabin boy on a vessel bound for the United States. In 1859, he jumped ship in New Orleans, where he found employment with cotton broker Henry Hope Stanley, who became his benefactor and from whom Stanley adopted the name by which he became known.

At the outbreak of the American Civil War in 1861, Stanley enlisted in the Confederate army; he was taken prisoner at the Battle of Shiloh in April 1862. He gained his release by joining a Union artillery unit, but he was discharged on becoming ill with dysentery. After recovering, Stanley went back to Wales, then traveled in Europe before returning to the United States in 1864. He served briefly in the U.S. Navy before deserting.

Stanley embarked on a career as a journalist in 1865. He covered General Winfield Scott Hancock's campaign against the Indians in Kansas in 1867, and, the following year, as a correspondent for the *New York Herald*, he reported on a British military expedition in what is now Ethiopia.

In 1869, while reporting on a revolution in Spain, Stanley received orders from publisher James Gordon Bennett, Jr., of the newspaper the *New York Herald* to undertake a search for the Scottish missionary and explorer, DAVID LIVINGSTONE, who had been missing in East Africa for three years. Stanley did not immediately begin his search for Livingstone, since Bennett hoped a delay might improve Stanley's chances of returning with a great story, rather than merely with the news that Livingstone was still lost.

As instructed, Stanley first traveled to Egypt, where he covered the opening of the Suez Canal and met with SIR SAMUEL WHITE BAKER, who was planning an expedition up the NILE RIVER. Stanley then traveled into the Crimea, where he reported on the battle sites of the Crimean War of 1853–56.

Stanley toured the region around the Caspian Sea before heading southward into Persia (present-day Iran). Continuing to Baghdad, he sent back dispatches on the newly developed railroad through the Euphrates Valley. He later sailed to India, from where he reached the coast of East Africa, arriving in Zanzibar on January 26, 1871, 18 months after Bennett had first commissioned him to look for Livingstone. By then, reports by Arab slave traders indicated that a white fitting Livingstone's description was at Ujiji on the east shore of Lake Tanganyika.

Stanley, who had been provided with almost limitless financial resources by his New York publisher, organized a small army of porters, guides, hunters, and armed escorts, along with pack animals. He departed Bagamoyo on the mainland of present-day Tanzania on March 21, 1871. He followed the Arab slave caravan route inland to Tabora, then continued toward Lake Tanganyika. On November 10, 1871, in Ujiji, he located the missionary, addressing the Scotsman with the now famous greeting, "Dr. Livingstone, I presume?"

Stanley soon learned that Livingstone did not consider himself lost, only temporarily weakened by disease and short on supplies. Moreover, Livingstone was still committed to exploring the great lakes of East Africa, especially in ascertaining their exact connection to the CONGO RIVER (Zaire River) and Nile River. Over the next few months, Stanley accompanied Livingstone in an examination of the northern end of Lake Tanganyika, and, although they found no evidence of a major river flowing out of the lake, they learned that the Ruzizi River flowed into it.

Stanley left Livingstone at Tabora on March 14, 1872, then traveled back to the Indian Ocean coast of present-day Tanzania, arriving there in May. His news of finding Livingstone reached Europe and New York in August 1872. He was greeted with much acclaim when he later arrived in England. His account of the exploit, *How I Found Livingstone* (1872), became an instant best-seller. In 1873, Stanley was awarded a gold medal by the ROYAL GEOGRAPHICAL SOCIETY, and, that same year, he went to what is now Ghana in West Africa to cover Sir Garnet Wolseley's military campaign against the Ashanti.

Stanley had by this time resolved to complete the exploration of central Africa begun by Livingstone. In November 1874, in command of a large expedition jointly sponsored by the *New York Herald* and the *Daily Telegraph* of London, he set out from Bagamoyo for Lake Victoria, planning to confirm whether Lake Victoria was the principal source of the Nile and to establish the exact geographic location of East Africa's other great lakes. Moreover, he planned to find the source of the Congo River and, if possible, follow it to the Atlantic Ocean. Arriving at Lake Victoria in late February 1875, Stanley undertook a circumnavigation of the lake in the *Lady Alice*, a portable

steamboat that had been carried in pieces into the interior. He then visited a native kingdom to the north in what is now Uganda, coming upon an uncharted lake, which he named Lake Edward.

Stanley headed southward along Africa's Great Rift Valley and, in spring 1876, he arrived at Lake Tanganyika, which he also circumnavigated in the *Lady Alice*. He then found the lake's principal outlet to be the Lukuga River, which he followed to its confluence with the Lualaba River. Descending the Lualaba northward, he came to Nyangwe, the farthest inland point known to both Arab traders and Europeans. There, he recruited a small armed force, under a local Arab slaver named Tippoo Tib, who guided his expedition to a series of cataracts, later known as Stanley Falls, which they portaged around with considerable difficulty.

Abandoned by Tippoo Tib and his men soon afterward, Stanley and his expedition nevertheless pushed onward, traveling on the river when they could or following its banks. Upon reaching the site of present-day Kisangani in what is now the west-central Democratic Republic of the Congo, Stanley determined that the river could not flow into the Nile, since at that point it was 14 feet lower in elevation than the larger river. He soon found that the river turned sharply west and south and widened to allow relatively easy travel by boat. After a few more months of down-river travel, he discovered a large lake-like expanse, later known as Stanley Pool. On August 9, 1877, Stanley and his party reached the Atlantic at Boma. In his 999-day journey, he had crossed Africa from east to west and had determined that the Congo flowed from the Lualaba River. With this finding, he dispelled Livingstone's theory that the Lualaba was a source of the Nile. Of the original 356 men in the expedition, only 114 remained with him when he reached Boma, the rest having died or deserted. Stanley related his 1874–77 journey across Africa in his book *Through the Dark Continent* (1878).

Stanley's exploration of the Congo in 1874–77 sparked the interest of King Leopold II of Belgium, who commissioned Stanley to direct the development of the Congo Free State. With King Leopold's support, Stanley undertook his next expedition in 1879, retracing his route up the Congo River. During the next five years, he explored the interior of present-day Democratic Republic of the Congo, making the European discovery of Lake Tumba and Lake Leopold II, and directed the construction of overland routes around the Congo River's unnavigable sections.

Stanley's last African expedition began in 1887 as a relief mission to aid MEHMED EMIN PASHA, the German-born governor of southern Sudan's Equatoria province, who had been cut off from Anglo-Egyptian forces to the north since the outbreak of a Muslim revolt six years earlier. Stanley again ascended the Congo, then marched across central Africa toward Emin Pasha's stronghold on Lake Albert. Along the

way, he lost nearly half of the 700 members of the expedition, with the survivors trailing behind him over several hundred miles. Ironically, by the time Stanley reached Lake Albert, he was critically low on provisions and had to be resupplied by Emin Pasha, the man he had come to rescue. Stanley and Emin Pasha explored the Semliki River, establishing it as the principal connection between Lake Albert and Lake Edward. In 1889, while in the region, Stanley came upon the Ruwenzori Mountains, thought to be the fabled MOUNTAINS OF THE MOON, which had been described by the second-century geographer PTOLEMY. After a 3,000-mile journey, in which he had traversed Africa from west to east, Stanley and the survivors of his expedition, along with Emin Pasha and the remainder of the Equatoria garrison, reached Zanzibar in late 1889.

Stanley settled in England and married soon after departing Africa. Although he had been naturalized as a U.S. citizen, he again became a British subject, and he served in the House of Commons from 1895 to 1900. He made a brief visit to South Africa in the 1890s, and was knighted in 1899.

Sir Henry Morton Stanley was known by the African natives as Bula Matari (breaker of bones) after the single-minded and often brutal determination with which he conducted his expeditions. In the history of exploration, he is most famous for locating David Livingstone, but he was also the first European to descend the length of the Congo River, and, after VERNEY LOVETT CAMERON, the second European to cross central Africa from east to west. In locating the source of the Congo, he completed the exploration of Africa's last remaining unknown river system, and he later encouraged its development as the main entry route into the interior of Africa. Stanley is also generally credited with having finally resolved the question of the Nile's source, confirming JOHN HANNING SPEKE's contention that the main branch of the world's longest river flowed from Lake Victoria.

Stansbury, Howard (1806–1863) *U.S. Army officer in Utah*

Howard Stansbury was born in New York City. Trained as a civil engineer, he took part in surveying projects for canals and railroads in the Ohio Valley and Lake Erie region from 1828 to 1838.

In 1838, Stansbury joined the U.S. Army Corps of Topographical Engineers as a second lieutenant, and, two years later, he was promoted to captain. During the next nine years, he supervised army topographic and engineering projects from the Great Lakes to the New England coast.

In 1849, Stansbury was directed to lead an exploring expedition across the plains from Fort Leavenworth to Utah's Salt Lake Valley, and there survey the topography as well as make a study of the Mormon settlements.

Stansbury and his 18-man party left Fort Leavenworth on May 31, 1849, heading westward along the Oregon Trail. They reached Fort Bridger in southwestern Wyoming's Green River country on August 11, where Stansbury engaged former mountain man JAMES BRIDGER as a guide.

From Fort Bridger, Stansbury sent half his party southward along the known trail to Salt Lake City, under the command of his assistant, Lieutenant JOHN WILLIAMS GUNNISON. Stansbury, Bridger, and the rest of the expedition then headed westward into the northern Wasatch Mountains. Guided by Bridger, Stansbury explored the eastern slopes of the Wasatch Mountains in search of a route to the north shore of the Great Salt Lake. He followed the Bear River to Ogden's Hole and located a pass through the mountains, which led them to the lake's east shore, near what is now Ogden, Utah. Stansbury's group then went northward to Fort Hall and explored the Cache Valley.

The two groups joined up at Salt Lake City. In October 1849, Stansbury undertook a reconnaissance of the Great Salt Lake's west shore. He led his men northward, then circled around into the Lake Bonneville salt flats. From there, they headed westward as far as Pilot Peak near the present-day Utah-Nevada border, then returned eastward across the Great Salt Lake Desert to Salt Lake City, where they wintered.

In spring 1850, Stansbury completed his surveys in Utah with explorations of Utah Lake and the River Jordan. Although he had been instructed to return via the Old Spanish Trail to Santa Fe, Stansbury instead chose to search for a new pass through the ROCKY MOUNTAINS south of the usual route through the SOUTH PASS. At Fort Bridger, he again engaged Jim Bridger as a guide; together they proceeded through the Green River Valley and across south-central Wyoming to Fort Laramie by way of Bridger's Pass and Cheyenne Pass.

Throughout the 1850s, until the outbreak of the Civil War, Stansbury was engaged in government construction projects and topographic surveys in the Great Lakes country and Minnesota. During the Civil War, he directed mustering operations in Ohio and Minnesota.

Howard Stansbury's 1849–50 Utah expedition established a more direct route from Fort Bridger to the Humboldt River by way of Salt Lake City, providing a shorter alternative to the roundabout trail north to Soda Springs and Fort Hall. Stansbury also undertook the first organized exploration of the west shore of the Great Salt Lake. His return trip from Salt Lake to Fort Laramie, through Cheyenne Pass, established a trail 60 miles shorter than the established South Pass route. In the following years, it was adopted by the Overland Stage Line, the Pony Express, and the Union Pacific Railroad. Stansbury's map of the Great Salt Lake and Great Basin region guided topographers in the Pacific Railroad Surveys throughout the 1850s. His ac-

count of his Utah expedition, *Exploration and Survey of the Valley of the Great Salt Lake Including a Reconnaissance of a New Route through the Rocky Mountains*, was first issued as a government publication in 1852 and went on to become a literary success in the United States and Great Britain. The work expresses one of the earliest views that the region around the Great Salt Lake was once the site of a great inland sea.

Stark, Freya Madeline (Dame Freya Stark)

(1893–1993) *British traveler, writer, archaeologist in the Middle East and central Asia*

Freya Stark was born in Paris, France, where her parents, Robert and Flora Stark, were pursuing careers as painters. She spent time at both her father's Devon home in England and her mother's Genoa home in Italy. For most of her childhood, she lived in the Italian village of Asolo, near Venice. She attended Bedford College in England, studying English and history. During World War I, she worked as a censor in London and as a nurse in Italy. Proficient in English, Italian, French, and German, she also decided to study Arabic in her late 20s, enrolling at the School of Oriental and African Studies in London.

In 1927, Stark visited countries of the eastern MEDITERRANEAN SEA region. She later traveled to Iraq and worked for a time as a writer for the *Baghdad Times*. She visited Turkey, Syria, Persia (present-day Iran), Kuwait, and Arabia (present-day Saudi Arabia). In 1935, she explored the fertile valley of the Wadi Hadhramaut in present-day Yemen inland from the Gulf of Aden. She frequently stayed on the island of Cyprus between travels. In 1937, she participated, along with Dr. Gertrude Caton-Thompson and Eliner Gardner, in the first archaeological excavations in Yemen, excavating the Moon Temple of Hureidha. During World War II, she worked for British intelligence in the Middle East. After the war, she spent significant time in Turkey. In later life, Stark traveled to central Asia and the Far East, visiting Cambodia, China, Nepal, and Kashmir, and crossed the HIMALAYAS.

Stark's prolific writing included *The Valley of the Assassins* (1934), *Southern Gates of Arabia* (1936), *Baghdad Sketches* (1937), and *Winter in Arabia* (1940). Stark was also known for her photography, her pictures taken with a Leica camera. She worked with and was married for a time to the Arabist and historian Steward Perowne. She lived to the age of 100, dying in Asolo.

Stark's most famous book, *Southern Gates of Arabia*, informed Europeans of the little-known Hadhramaut region. Her work mapping the routes of the Assassins, a society of bandits who traded in hashish and preyed on Europeans during the CRUSADES, as recorded in *The Valley of the Assassins*, led to a medal in 1942 from the ROYAL GEOGRAPHICAL

SOCIETY. She was knighted at the age of 82. In many of the remote places she visited, she was the first European woman to have ventured there.

Stefansson, Vilhjalmur (1879–1962)

Canadian anthropologist, historian in the Canadian Arctic
Vilhjalmur Stefansson was born near Gimli in Manitoba, Canada, the son of Icelandic immigrants. As an infant, he moved with his family to North Dakota, where he was raised.

Stefansson attended the University of North Dakota and the University of Iowa, graduating from the latter in 1903. Two years later, he took part in archaeological studies in ICELAND.

In 1906, Stefansson descended the Mackenzie River to its delta, where he lived for over a year with the region's Inuit, learning their language and Arctic survival skills. In May 1908, he journeyed with HUDSON'S BAY COMPANY supply boats northward from Edmonton, Alberta, to Canada's western Arctic coast, where he made an extensive study of the different Inuit peoples living between Point Barrow and Cape Parry. In 1910–12, he extended his study eastward to Coronation Gulf, where he lived among the Copper Inuit, a people living isolated from non-natives.

Stefansson commanded the Canadian Arctic Expedition of 1913–18, an undertaking sponsored by the Canadian government in which he explored the westernmost regions of the Canadian Arctic Archipelago. With a group of ships, he sailed northward through the BERING STRAIT, then eastward into the Beaufort Sea. He reached as far as 81° north latitude, sighting some uncharted islands to the north of Prince Patrick Island, including Meighen Island, Borden Island, and Brock Island. Some of these sightings were made while adrift on ice floes in the Beaufort Sea. Among the scientific and technical team with Stefansson was SIR GEORGE HUBERT WILKINS, the expedition's photographer, who was later knighted for his polar explorations.

From 1921 to 1925, Stefansson directed expeditions to northeastern SIBERIA's Wrangel Island and Alaska. He later created an international dispute when he attempted to claim Wrangel Island in the Siberian Arctic for Canada. Soon afterward, he settled in New York City, where he continued to lecture and write on polar exploration. The Stefansson Collection, which he established at Dartmouth College, became one of the world's most comprehensive libraries dealing with polar exploration.

Stefansson related his experiences among the native people of the Arctic in his book *My Life with the Eskimos* (1913). In his 1921 book, *The Friendly Arctic*, he made the case that the Arctic was a habitable region with abundant resources waiting to be developed. He later was a consultant



Vilhjalmur Stefansson (*Library of Congress*)

for airlines developing transpolar routes and also advised the U.S. Navy on Arctic survival techniques.

Vilhjalmur Stefansson's 1913–18 expedition set a record for Arctic exploration by spending five consecutive winters above the ARCTIC CIRCLE. The islands Stefansson found in the Canadian Arctic archipelago in the course of that expedition were among the last uncharted landmasses explored on Earth. In 1952, the Canadian government gave his name to Stefansson Island, off the northeastern corner of Victoria Island. Stefansson's approach to Arctic exploration and his ideas on the industrial development of the polar regions had a great impact on Soviet expansion into the Siberian Arctic in the 1920s and 1930s. In addition to being an explorer in his own right, Stefansson was a leading historian of exploration and edited the firsthand accounts of the major voyages in his 1947 book *Great Adventures and Explorations*.

Stein, Sir Marc Aurel (Sir Mark Aurel Stein)

(1852–1943) *Anglo-Hungarian historian, archaeologist in central Asia*

Born in Budapest, Hungary, Aurel Stein immigrated to England, where he became a scholar of ancient Asian history, culture, and art. In 1888, after attending universities in

Hungary, England, and Germany, he traveled to Lahore in what was then northwestern British India (present-day northern Pakistan), where he had been appointed principal of Oriental College.

Stein, an archaeologist as well as a historian, was a member of the Indian Archaeological Survey. In 1900, inspired by SVEN ANDERS HEDIN's reports of ancient ruins in western China, he set out on his first Indian government-sponsored archaeological expedition into central Asia. From Srinagar in northern India's Punjab region, he traveled northward to Gilgit on the edge of the Pamirs, then westward through the Hindu Kush range into northeastern Afghanistan. He turned eastward across the Pamirs into western China's Taklimakan Desert. Accompanying him were surveyors who later produced the first accurate maps of the region. His route back to India took him through Kashgar and Samarkand.

Stein's next archaeological foray into central Asia, in particular western China, began in 1906. Starting out again from the Punjab region, he crossed the Hindu Kush into northeastern Afghanistan, and, by late winter 1907, after traveling around the Taklimakan Desert, he reached Lop Nor, the shifting, shallow lake of western China. Soon afterward, Stein crossed from Russian central Asia along 3,000 miles of the ancient SILK ROAD and reached Tunhuang.

In his archaeological investigations, Stein determined that in ancient times Tunhuang had been the westernmost extent of the Great Wall of China. Outside the town, located in an oasis, he found a series of temples built into caves, known as the Caves of the Thousand Buddhas. Within a walled-up section of one of the caves, he located as many as 9,000 ancient Buddhist texts and paintings, which had been preserved in sealed jars for more than 800 years. Among these was a copy of the Diamond Sutra dating back to A.D. 868; this was later determined to be the oldest existing printed book. With the cooperation of a local official, Stein was able to acquire many of these ancient documents and paintings, which he then sent back to the British Museum in London. He later determined that many of the texts were connected to those brought back from India by the Buddhist monk and pilgrim HSÜAN-TSANG in his travels of 629–645.

From Tunhuang, Stein crossed the southern reaches of the GOBI DESERT, then headed back to India by way of the Taklimakan Desert and the Kunlun mountains. While crossing the Kunluns in 1908, he suffered frostbite and lost all the toes on one foot.

In 1909, in recognition of his discovery at Tunhuang, which has been hailed as one of the greatest archaeological finds in Asia, the ROYAL GEOGRAPHICAL SOCIETY awarded Stein its Founder's Medal. Over the next 20 years, Stein undertook several more expeditions into western China from northern India, exploring the Karakoram Mountains and

the region around the Tarim River. In 1913, he explored the Nan Shan Mountains. In 1915, he traveled from Kashgar into the Pamirs and the Hindu Kush. In 1926, he retraced the route that the army of ALEXANDER THE GREAT had followed as it returned from the Indus Valley to Persia (present-day Iran).

Sir Aurel Stein's primary archaeological interest was uncovering the links between the ancient civilizations of the MEDITERRANEAN SEA and those of central Asia. He applied the results of his travels and archaeological inquiries in central Asia to a historical interpretation of the impact that East-West contacts had on the ancient civilizations of the Indus Valley and Mesopotamia. Among his many published works on the subject are *Ruins of Desert Cathay* (1912), *Innermost Asia* (1928), and *On Alexander's Track to the Indus* (1929).

Steller, Georg Wilhelm (1709–1746)

German physician, naturalist in Kamchatka, Alaska, and the islands of the Bering Sea, in service to Russia

Originally from Germany, Georg Wilhelm Steller was a physician and naturalist, who began practicing medicine in St. Petersburg, Russia, in 1734. Three years later, he was appointed to the natural history department of the Academy of Sciences, and before long he was accepted as one of the scientists for the Second Kamchatka Expedition under the command of VITUS JONASSEN BERING.

In 1740, after an overland journey across Russia and Siberia, Steller arrived at the port of Okhotsk. He sailed from there across the Sea of Okhotsk to the Kamchatka Peninsula, where, for the next few months, he collected plant and animal specimens. He was next assigned as ship's surgeon and naturalist for a reconnaissance voyage eastward across what is now known as the Bering Sea. In June 1741, aboard the *St. Peter*, under Bering's command, Steller sailed from Avacha Bay on Kamchatka's Pacific coast.

By late July, the Alaskan mainland was sighted, and soon afterward Steller went ashore on Kayak Island, where he collected specimens of animal and plant life. On the voyage back to Kamchatka, Steller had the opportunity to make observations of the Aleut people he saw on the Kenai Peninsula. In mid-November 1741, the *St. Peter* was wrecked on an island about 100 miles east of Kamchatka, later known as Bering Island. SCURVY soon became a severe problem, and many of the crew succumbed, including Bering.

Steller kept a journal of his experience on Bering Island in winter 1741–42 and continued to carry out natural history studies. He wrote a study of the marine mammals in which he provided the first description of a type of sea lion later known as Steller's sea lion. Furthermore, he made the earliest report of a giant species of dugong, a sea mammal since identified as Steller's sea cow.

In August 1742, Steller and the survivors of Bering's voyage reached Avacha Bay in a small boat they had managed to construct with wreckage salvaged from the *St. Peter*. Of the 77 men who had set out with Bering, only 45 returned.

Steller remained in Kamchatka for the next two years, during which he undertook studies of the region's birds, identifying species later known as Steller's eagle, Steller's eider, and Steller's white raven. In November 1746, while traveling back to St. Petersburg, he died at the western Siberian town of Tyumen.

Georg Wilhelm Steller was the first scientist to make a study of Alaska's wildlife and provided the earliest ethnological details about the Aleut. His *Description of Kamchatka* was published in 1744, and his study of the animals he had observed on Bering Island, *On Sea Animals*, first appeared in 1751. Steller also wrote the earliest account of the life and habits of the sea otter, the hunting of which became the focal point of Russia's subsequent colonizing efforts in Alaska. The giant sea mammal he had discovered, Steller's sea cow, fell prey to the hunters who soon poured into the region; by 1800, it had become extinct.

Stevens, Thomas (unknown–1619)

English missionary in India

Thomas Stevens was an English Jesuit priest who was compelled to leave his native land in the 1570s. After residing in Italy for a time, he sailed from Lisbon, Portugal, aboard a Portuguese ship bound for India in 1579.

Stevens settled at the Portuguese trading port of Goa on the west coast of India, where he embarked on a career as a missionary. He later mastered the Marathi language, in which he wrote religious poetry for his native converts.

In 1583, Stevens helped gain the release of RALPH FITCH, JOHN NEWBERRY, and other members of an English trade and diplomatic mission to the Mogul emperor, after they had been detained by Portuguese authorities in Goa.

Thomas Stevens was the first Englishman known to have reached India. Soon after his arrival there in 1579, he reportedly sent back to Europe details of Portuguese sailing routes to India, information that the Portuguese government had been keeping as state secrets for almost a century.

Strabo (ca. 63 B.C.–ca. A.D. 21) *Greek traveler in Europe, Africa, and Asia, geographer in ancient Rome*

Strabo, a Greek, was born in Amasia, a city in the region south of the Black Sea in what is now northeastern Turkey and then was part of the ancient Roman province of Pontus. Strabo studied history and philosophy in his native city, as well as in Alexandria and Greece. He also traveled widely in the Middle East, North Africa, and Europe. Eventually he

settled in Rome, where he became a noted historian and authority on the geography of the Roman world.

In about A.D. 18, Strabo completed his *Geography*, a work in 17 books encompassing most of what was then known about the lands of the Roman Empire and the world beyond. In addition to his own travel experiences, Strabo drew from the works of earlier geographers, including Eratosthenes, Polybius, and Posidonius, although he rejected most of HERODOTUS. Moreover, he incorporated as fact geographic information gleaned from the epic poetry of Homer and other mythic and traditional sources.

As background for his geographic descriptions, Strabo provided historical accounts of Greeks and Romans, including NEARCHUS's voyage from the Indus River delta to the Persian Gulf. He was highly skeptical of what the Greek navigator PYTHEAS reported concerning his voyage to Britain. Ironically, it was only through the sometimes scathing criticism leveled against him in Strabo's *Geography* that any record of Pytheas's exploits as an explorer of western Europe and the Atlantic Ocean survived.

Strabo's report that the NILE RIVER's main eastern tributary, the Blue Nile, flowed from a lake in Ethiopia was confirmed by JAMES BRUCE's exploration of Lake Tana in 1770.

Strabo's works were translated into Latin in 1469, and copies began to circulate in Europe after 1472. He provided descriptions of the ancient shipping routes between the Roman Empire and India and further suggested that the Indies, the elusive origin of the SPICE TRADE, might be reached by sailing westward from Spain, although he maintained that such a voyage had never been successfully attempted because of the great expanse of open sea that had to be crossed. Nevertheless, Strabo's theories came to the attention of CHRISTOPHER COLUMBUS, and, along with the writings of PTOLEMY, helped inspire him to attempt a westward crossing to the Orient in his 1492 voyage, resulting in the European discovery of the Americas.

Strzelecki, Sir Paul Edmund (Count Paul Edmund de Strzelecki, Paweł Strzelecki)

(1797–1873) *Polish geologist in Australia*

Paul Strzelecki was born in Gluszyna, near Poznań, in western Poland, then under Prussian rule. His aristocratic parents died when he was 10, and he was raised by his mother's family. It is thought that he was educated at Piarists Fathers College in Warsaw. He served for a time in the Prussian cavalry. He traveled in eastern Europe, where he met Prince Francis Sapieha, who hired him to manage his estates in Poland and upon his death, left him a sum of money.

In 1829, Strzelecki departed Poland, traveling first to France, then England and Scotland. Over the years, he pursued an interest in geology and mineralogy. He later visited North and South America, the Marquesas, the HAWAIIAN

ISLANDS (where he studied the volcano of Kilauea), Tahiti, NEW ZEALAND, and, in 1839, Australia.

Strzelecki planned a series of geological surveys of the largely unexplored continent. His first expedition was to the BLUE MOUNTAINS west of Sydney, where he found veins of gold and silver. Although he reported his discovery, the governor of the New South Wales colony, Sir George Gipps, requested he not publicize it because of the difficulty in controlling the colonists, many of them convicts. (Edward Hargraves would receive credit for locating gold in 1851 and starting the Australian gold rush.)

Strzelecki's second Australian expedition, beginning in December 1839, took him to the Snowy Mountains in the southeast. He traveled with James Macarthur and two Aborigine guides. He named one of the peaks he climbed Mount Kosciuszko (the highest peak in Australia) in honor of the Polish patriot Tadeusz Kościuszko. In southeastern Victoria, he named the coastal plain along Bass Strait in what is now southeastern Victoria Gippsland for Governor Gipps. He named Lake King after his friend PHILIP PARKER KING and also the La Trobe River. His work included the creation of topographic and geological maps, based on astronomical observations. The party reached Melbourne in May 1840. In July, Strzelecki traveled by boat across Bass Strait to Van Diemen's Land (present-day TASMANIA).

In Van Diemen's Land, Strzelecki carried out extensive explorations, some of them sponsored by SIR JOHN FRANKLIN, then governor of the colony. One such expedition was to the islands in Bass Strait. He sailed to Sydney in September 1842, where he stayed with King. He continued his geological investigations, exploring the Hunter and Karuah river valleys.

Strzelecki departed Australia in April 1843 and reached Europe by way of the EAST INDIES and China. He settled in England, where he wrote two books about Australia: *Physical Description of New South Wales and Van Diemen's Land* (1845), the first such work on Australian geology, and *Gold and Silver* (1856), arguing his claim to having discovered gold in Australia. He received a commendation from CHARLES ROBERT DARWIN and was awarded the gold Founder's Medal of the ROYAL GEOGRAPHICAL SOCIETY for the 1845 book. In 1853, he was elected a Fellow of the Royal Geographical Society and a Fellow of the ROYAL SOCIETY. Other projects during this period included working on behalf of victims of the Irish famine of 1845–47, traveling to the Crimea on behalf of the British government in 1856, and helping JANE FRANKLIN raise funds to search for her husband, missing in the Arctic.

In addition to his geographic and geological discoveries in Australia and Tasmania, Sir Paul Strzelecki promoted a vision of development of an Australian economy with conservation of resources in mind. He was knighted in 1869 for "five years' explorations in Australia, the discovery of gold,

the discovery of new territory accessible to colonization and finally for the construction of topographical and geological maps, based on astronomical observations."

Stuart, John McDouall (John M'Doual Stuart)

(1815–1866) *Scottish surveyor in Australia*

John McDouall Stuart was born at Dysart in eastern Scotland, the son of a British army officer. Educated at a military academy in Edinburgh, he later went into business, then immigrated to South Australia in 1838.

In Adelaide, Stuart went to work for the South Australian Survey Department, serving as a draftsman with CHARLES STURT on an 1844–46 expedition in which they ventured into the interior of the continent north of Lake Eyre, as far as the Simpson Desert.

Stuart went on to become a surveyor and sheep farmer in the bush country west of Lake Torrens. In 1858, in search of new pasture lands, he explored westward to Streaky Bay on the Great Australian Bight. A year later, he undertook an examination into the region west of Lake Eyre, locating the Neales River.

On March 2, 1860, Stuart began the first of a series of attempts to cross the continent from south to north, a feat for which the South Australian government had offered a reward of £2,000. Leaving a sheep ranch at Chambers Creek, about 300 miles north of Adelaide, Stuart and a small party headed northward. Several weeks later, they reached a chain of mountains that Stuart called the Macdonnell Ranges after South Australian governor Sir Richard Macdonnell.

On April 22, 1860, Stuart reached the geographic center of Australia, and, to mark the occasion, he planted a British flag atop a nearby hill, which he had named Central Mount Sturt, after Charles Sturt. (For this achievement, the ROYAL GEOGRAPHICAL SOCIETY awarded Stuart its Patron's Medal in 1861.)

In June 1860, Stuart and his companions arrived at Tennant Creek, a place that he called Attack Creek because of a hostile encounter with Aborigines. At this point, running low on supplies, they were forced to turn back.

Within a month of his return to Adelaide in October 1860, Stuart organized a second attempt to traverse the continent, this time aided by a government grant. He set out on November 29, 1860, and, by the following May, he had reached beyond the farthest point north of his previous expedition, an area now known as Sturt Plain. There, his progress was halted by an impenetrable expanse of thorny scrublands. Although he was then only about 300 miles from Australia's coast, he had run critically short of food and water, and, unable to find a way through the scrublands, he was again compelled to return southward to Adelaide.

Stuart's next attempt to cross Australia began in October 1861, and, after traveling northward from Adelaide, he

was back at the edge of the scrublands in early April 1862. This time, he managed to find a route through the scrub to the headwaters of the Roper River. Traveling northward to the Daly River on July 24, 1862, he reached the Indian Ocean at Van Diemen Gulf, near the mouth of the Adelaide River and present-day Darwin.

Stuart's health had steadily declined on this last expedition, and, by the time he returned to Adelaide in December 1862, he was practically paralyzed and nearly blind as a result of the combined privations of over three years of continuous explorations in the outback. Just over a week after his return, a search party arrived back in Adelaide with the bodies of ROBERT O'HARA BURKE and WILLIAM JOHN WILLS, who had perished on a similar attempt to cross the continent farther to the east.

Stuart was awarded the South Australian government's prize and a grant of land for making the first south-to-north crossing of the continent. WILLIAM LANDSBOROUGH made the first north-to-south crossing that same year, 1862. Stuart returned to England in 1864 to recover his health, but he died there in 1866.

The trail that John McDouall Stuart had blazed on his trek across the heart of Australia was soon adopted as the route of the Central Overland Telegraph Line, extending northward from Adelaide, through Alice Springs, to Darwin on the Indian Ocean coast. From there, the line continued by way of an undersea cable to the East Asian mainland, providing Australia with its first direct link to British India. The hill he located near the exact geographic center of Australia was later renamed Central Mount Stuart in his honor.

Stuart, Robert (1785–1848) *Scottish fur trader in the Pacific Northwest and northern Rocky Mountains*

A native of Scotland, Robert Stuart arrived in Montreal in 1807, where he entered the FUR TRADE with his uncle, a partner in the NORTH WEST COMPANY. Three years later, he was recruited by JOHN JACOB ASTOR to lead the seaward segment of his Pacific Fur Company (a subsidiary of the AMERICAN FUR COMPANY) venture to the Oregon coast.

On September 8, 1810, Stuart and his party, including GABRIEL FRANCHÈRE, sailed from New York on the *Tonquin*. They arrived at the mouth of the COLUMBIA RIVER in March 1811, after a voyage around CAPE HORN and a stopover in the HAWAIIAN ISLANDS. He supervised the construction of the company's trading fort, Astoria, and directed fur-trading expeditions into the interior. The next year, WILSON PRICE HUNT, in command of the overland contingent of Astorians, arrived in Astoria.

Stuart, accompanied by fur traders Ramsay Crooks and three others, set out on an overland journey to the East with reports for Astor on the progress of the Oregon enterprise. They traveled through the Blue Mountains and the Snake

River Valley of what is now southern Idaho. On October 23, 1812, they located an Indian trail (later known as the SOUTH PASS) that took them eastward through a break in the mountains and around the southern end of the Wind River Range and across the Continental Divide. They spent the winter of 1812–13 in the lands of the Arapaho Indians in what is now west-central Wyoming.

In spring 1813, Stuart and his party resumed their journey eastward, traveling by CANOE down the Sweetwater River to its junction with the North Platte River, then down the MISSOURI RIVER to St. Louis, arriving in late August 1813. In St. Louis, Stuart first learned of the outbreak of the War of 1812, and that Astor's agents, anticipating British seizure of his Oregon enterprise, had sold Astoria to the British-owned North West Company.

Stuart was still with Astor's parent company, the American Fur Company, when the fur trade resumed after the war's end in 1815. Two years later, he and Ramsay Crooks became partners in that firm, directing its operations in the Great Lakes from the company's trading fort on Mackinac Island. He later expanded the American Fur Company's trade contacts to Indian tribes living across a wide area of the upper Mississippi Valley and northern plains, from the Wabash River Valley south of Michigan to the Red River Valley in what is now eastern North Dakota.

Stuart left the fur trade in 1834 when Astor sold his western fur enterprise to St. Louis fur-trading firms. Stuart settled in Detroit, where he entered the real estate business. From 1841 to 1848, he served as the federal superintendent of Indian affairs for Michigan.

By the early 1840s, the route Robert Stuart had pioneered in his 1812–13 overland trip from Oregon to St. Louis had developed into the Oregon Trail, a major wagon route for emigrants bound for the fertile valleys of Oregon and California. He is also credited with being the first non-Indian to travel through the ROCKY MOUNTAINS by way of the South Pass.

Stuck, Hudson (1863–1920) *Anglo-American clergyman, mountain climber on Mount McKinley in Alaska*

Born in London, England, Hudson Stuck immigrated to the United States in 1885. He attended the University of the South in Sewanee, Tennessee, graduating in 1892. In 1894–1904, he served as dean of the Episcopal cathedral in Dallas, Texas. In 1905, he was reassigned to Alaska as an Episcopal archdeacon, where he spent the remainder of his life.

In addition to his church responsibilities, Stuck developed an interest in the geography and native peoples of Alaska and traveled extensively. He also became proficient in MOUNTAIN CLIMBING. In 1913, along with Harry Karstens, Robert Tatum, and Walter Harper, Stuck accomplished the ascent of MOUNT MCKINLEY (named after

President William McKinley in 1897; also known as Denali, “the High One,” an Athapascan Indian name), the highest mountain in North America at 20,320 feet above sea level.

Hudson Stuck wrote a number of books about his Alaskan explorations: *The Ascent of Denali (Mount McKinley)* (1914), *Ten Thousand Miles with a Dog Sled* (1914), *Voyages on the Yukon and Its Tributaries* (1917), and *A Winter Circuit of Our Arctic Coast* (1920). Yet it is as one of the first men to reach the summit of Mount McKinley that assured his place in the history of exploration.

Sturt, Charles (1795–1869) *British colonial official in Australia*

Charles Sturt was born in India, the son of an official of the BRITISH EAST INDIA COMPANY. At the age of 18, he joined the British army, serving as an officer in the last years of the Napoleonic Wars in Spain and France, and then in Canada and Ireland.

By 1827, Sturt had reached the rank of captain. That year, he arrived in New South Wales, Australia, attached to a military unit sent to guard convicts in the penal colony. Earlier in his career, he had known the colony’s governor, Ralph Darling, who soon appointed Sturt as his military secretary.

Sturt came into contact with ALLAN CUNNINGHAM, HAMILTON HUME, and JOHN JOSEPH WILLIAM MOLESWORTH OXLEY, all of whom had undertaken explorations into the BLUE MOUNTAINS and along the lower reaches of the rivers to the west. Their reports suggested to Sturt that the interior of the continent might contain a network of westward-flowing rivers emptying into a great inland sea.

In his second year in Australia, Sturt led his own exploration in search of the source of the Macquarie River, which had been reached a decade before by Oxley. In November 1828, Sturt left Sydney in command of a small group of soldiers and convicts and, guided by Hume, made his way across the Blue Mountains to the Bogan, Castlereagh, and Macquarie Rivers. That year, the Macquarie had been reduced by severe drought conditions to a series of marshes. He followed the riverbed northwestward, still believing it might lead to an inland sea. Instead, in early January 1829, he came upon the banks of a great river flowing southwestward, which Sturt named the Darling after the colony’s governor. They then headed back to Sydney, arriving three months later.

Finding the Darling River reinforced Sturt’s belief that the rivers of southeastern Australia drained into an inland sea. In November 1829, he led a second expedition into the interior, this time to the Murrumbidgee River, southwest of Sydney. With boats built on the river’s banks, he

and some of the men from his first expedition descended the Murrumbidgee to its junction with the Murray River, which he entered in mid-January 1830. A week later, he determined that a river found flowing into the Murray further downstream was actually the outlet of the Darling River.

Sturt and his companions made an easy passage along the Murray to its outlet on a nearly landlocked tidal lagoon on the coast, south of present-day Adelaide, which he named Lake Alexandrina. Although a ship had been sent to meet them at the nearby Gulf of St. Vincent’s, Sturt’s men were unable to cross an intervening mountain range, and the rough surf made the only entrance to Lake Alexandrina un-navigable for any small craft sent to look for them. As a result, Sturt and his party decided to return the same way they had come, rowing upstream for nearly 900 miles to a supply station in the Hamilton Plains. They returned to Sydney on May 25, 1830.

The trip had weakened Sturt’s health, and his eyesight had begun to fail. After serving briefly as commandant at the penal settlement on Norfolk Island, he sailed to England in 1831. Soon afterward, he left the army. In 1834, with his health somewhat recovered, he returned to New South Wales, where he had obtained a land grant, and took up sheep farming.

In 1838, Sturt was appointed to a post with the South Australia Survey Department, directing explorations for new pasture lands north of Adelaide. On August 10, 1844, he left Adelaide in command of an expedition to explore the country west of the Darling River. His 16-man party included the young JOHN MCDOUALL STUART, who served as the expedition’s draftsman.

Sturt and his expedition ascended the Murray to the upper Darling region, where they were halted by drought for six months. In July 1845, Sturt and a small group set out westward and traversed the Stony Desert from Cooper’s Creek to the Diamantina River. Although he had hoped to make a dash into the center of Australia, territory never before seen by Europeans, he and his men were by then suffering from SCURVY and were unable to find a way around the barren expanse of the Simpson Desert. They were compelled to head back to Adelaide, arriving there on January 19, 1846.

Sturt was nearly blind after this expedition. He served as secretary of South Australia until 1851, then returned to England, settling at the health resort of Cheltenham. He died there in 1869, just before he was to be knighted.

Charles Sturt recounted his first explorations of 1828–30 in his book *Two Expeditions into the Interior of Southern Australia* (1833). The European discovery of the Darling River, the longest river in Australia, revealed that the river system, which originated in the Blue Mountains and Australian Alps and was once thought to flow into an

inland sea, actually drained into the Indian Ocean near Adelaide, by way of the Murray River. In his last expedition of 1844–46, detailed in his *Narrative of an Expedition into Central Australia* (1849), Sturt survived 18 months in the desert, explored more than 3,000 miles of territory and came close to reaching the center of the continent. The Sturt Desert, spanning the border between western Queensland and northeastern South Australia, was named in his honor.

Sublette, William Lewis (1799–1845)

American fur trader, merchant in the American West

William (“Bill”) Sublette was born in Lincoln County, Kentucky. He was a descendant of Virginia pioneers and a relative of frontiersman and explorer WILLIAM CLARK.

In about 1818, Sublette moved with his family to St. Charles in the Missouri Territory, where his father opened a tavern. William served there for a time as the local constable. Four years later, both his parents now deceased, he joined up with WILLIAM HENRY ASHLEY’s fur-trading enterprise to the upper MISSOURI RIVER.

In spring 1823, Sublette survived an attack against Ashley’s fur traders by Arikara Indians on the Missouri River in present-day South Dakota. That summer, he took part in Colonel HENRY LEAVENWORTH’s punitive military expedition against the tribe. Then, in September 1823, he joined mountain man JEDEDIAH STRONG SMITH’s overland expedition westward from Fort Kiowa across the Wyoming plains to the Rocky Mountains, in the course of which the SOUTH PASS was explored.

Sublette, Smith, and DAVID E. JACKSON bought out Ashley’s ROCKY MOUNTAIN FUR COMPANY in 1826. Over the next several years, Sublette undertook several fur-trading expeditions into the northern ROCKY MOUNTAINS, financed in part by Ashley.

In 1830, Sublette became a supplier of goods to the fur traders in the northern Rockies. That year, he organized and led the first wagon caravan from St. Louis across the plains and into the Rockies, arriving at that summer’s trappers’ rendezvous on the Wind River in what is now southwestern Wyoming.

In 1831, Sublette took part in a trading expedition along the Santa Fe Trail from St. Louis, during which Jedediah Smith was killed by Comanche Indians. The next year, Sublette attended the trappers’ rendezvous at Pierre’s Hole, where he was wounded in an attack by Gros Ventre Indians.

Later, in 1832, Sublette entered into a partnership with fur trader ROBERT CAMPBELL, with whom he established a trading post, Fort William, near the confluence of the Yellowstone and Missouri Rivers in what is now northwestern North Dakota. In 1834, he and Campbell founded another

post near the junction of the North Platte and Laramie Rivers in present-day eastern Wyoming. This post, Fort Laramie, was eventually purchased by the AMERICAN FUR COMPANY, as was Fort William.

After 1836, Sublette left the frontier and settled in St. Louis, where he became prominent in business and politics. In 1844, he married Frances Hereford. In 1845, he was stricken with tuberculosis; he was en route to Cape May, New Jersey, to recover his health, when he died in Pittsburgh, Pennsylvania.

William Sublette played an active role in the development of the Rocky Mountain FUR TRADE, taking part in expeditions to the northern Rockies. He helped open up trails that later developed into important overland routes for wagon trains. A stretch of the Oregon Trail was known for a time as Sublette’s Cutoff or Sublette’s Trace. Fort Laramie, his post on the Platte River, became one of the key stopover points on the Oregon Trail and figured prominently in the settlement of the American West. Sublette’s four brothers—Milton, Andrew, Pinckney, and Solomon—also were active in the fur trade during the 1820s and 1830s, operating throughout the West, from Santa Fe to Oregon and California.

Sueur, Pierre-Charles Le See LE SUEUR, PIERRE-CHARLES.

Sulaiman el Tagir See SOLEYMAN.

Svarsson, Gardar (Gardar Svavarsson the Swede) (fl. 860s) *Norse mariner in Iceland*

In about 860, Gardar Svarsson, a Swedish Viking, sailed from Norway on a voyage to the Hebrides. While in Pentland Firth, off the north coast of Scotland, he was driven northwestward by a storm to the east shore of ICELAND, where he made a landing.

Svarsson next sailed completely around Iceland, determining that it was an island, and he named it Gardarsholm (Gardar’s island). He spent the winter on the north coast at present-day Husavik, where he reportedly constructed the first Viking house on the island. In the spring, Svarsson sailed back to Norway, where he related his adventure.

An account of Gardar Svarsson’s voyage appears in traditional Norse literature along with a nearly identical story attributing the Norse discovery of Iceland to the Viking NADDOD. Nonetheless, Svarsson is credited with being the first Viking to winter in Iceland and with making the first circumnavigation of the island. Svarsson’s reports may have led to the Norse settlement of Iceland soon afterward.

Sverdrup, Otto Neumann (1855–1930)

Norwegian mariner in Greenland, the Canadian Arctic, and Spitsbergen

A native of Bindalen, Norway, Otto Sverdrup went to sea as a teenager, then returned to work on his family's farm. In 1888, Sverdrup, an expert Nordic skier, began his career in Arctic exploration when he was recruited by FRIDTJOF NANSEN for the first crossing of southern GREENLAND. He again joined Nansen in the 1893–96 voyage of the *Fram*, taking command of the vessel when Nansen undertook his trek over the frozen Arctic Ocean in an unsuccessful attempt on the NORTH POLE. After drifting far to the west, Sverdrup managed to free the icebound *Fram* and return to northern Norway in 1896, where he soon made contact with Nansen, who had by then safely reached Spitsbergen (present-day Svalbard).

In 1898, Sverdrup was commissioned by the Norwegian brewers Amund and Ellef Ringnes, along with the Norwegian government official Axel Heiberg, to lead an expedition to Ellesmere Island and the northwest coast of Greenland. He was again in command of the *Fram*; his 16-man expedition included mariners, scientists, and sportsmen. Sverdrup first attempted to navigate through Kane Basin, hoping to find an ice-free passage leading to Greenland's north coastline. Pushed back by the PACK ICE, he withdrew to winter at Rice Strait. In 1899, he entered Jones Sound and began the first of three summers of methodical exploration along the west coast of Ellesmere Island and the uncharted regions to the west.

Sverdrup and his companions conducted field research in all aspects of Arctic natural history. They also came upon three uncharted islands, which were named Axel Heiberg, Ellef Ringnes, and Amund Ringnes Islands, after the expedition's sponsors. In 1902, Sverdrup returned to Norway with a great number of zoological and botanical specimens, as well as samples of Arctic minerals.

In 1903, Great Britain's ROYAL GEOGRAPHICAL SOCIETY awarded Sverdrup its Patron's Medal in recognition of his achievements in polar exploration. He described his Arctic experiences in his book *New Land* (1904).

Sverdrup operated a plantation in the WEST INDIES for several years before returning to the Arctic in 1914 to take part in several rescue expeditions. In 1921, he commanded a voyage from England to seaports on the Ob River and Yenisey River deltas, in an attempt to open a commercial sea route to the Kara Sea in the Siberian Arctic. Then, in 1928, he took part in search efforts for the Italian aviator UMBERTO NOBILE after his airship the *Italia* had crashed onto the frozen Arctic Ocean, north of Spitsbergen.

The archipelago in the Canadian Arctic that Otto Sverdrup located west of Ellesmere Island later became known as the Sverdrup Islands in his honor. Together with the Parry

Islands, they comprise Arctic Canada's Queen Elizabeth Islands.

Sykes, Sir Percy Molesworth (1867–1945)

British surveyor, diplomat in Persia and southwestern Asia

In 1893, British career diplomat and surveyor Percy Sykes left the port of Baku on the Caspian Sea, and sailed south-eastward to Asterabad (present-day Gorgan) in northeastern Persia (present-day Iran). He then traveled eastward along the Atrek River to Meshed.

Sykes next made a north-to-south crossing of Persia's great central desert, the Dashti-e-Lut, to Kerman, in the south-central part of the country. In 1894, he traveled in the southern Persian province of Baluchistan, where he became the first European to climb to the top of 13,261-foot Kuhl-i-Taftan, an extinct volcano.

In 1894–96, as diplomatic consul, Sykes covered a wide-ranging area of Persia, extending from Rasht on the Caspian Sea, through central Persia, to Teheran, Yazd, Kerman, and Baluchistan. He was accompanied on this journey by his sister, Ella Constance Sykes, who chronicled her experiences in her book *Through Persia on a Side-Saddle* (1898). In 1896, Sykes took part in a government survey with the Perso-Baluch Boundary Commission, in which he explored much of southeastern Persia, along the border with present-day Pakistan.

Sykes also visited ports along the Persian Gulf, crossing the Strait of Hormuz to Muscat on the Arabian Peninsula. As a surveyor developing a route for the Central Persian Telegraph Line in 1898, he covered a wide area of territory between Kerman, in the interior of what is now southern Iran, and Bandar Abbas at the southern end of the Persian Gulf.

Sykes returned to northeastern Persia in 1906 as British consul at Meshed. During the next four years, he used Meshed as a base for a number of expeditions into the northeastern Persian province of Khorasan. Again Sykes traveled with his sister Ella, who related their journey in her book *Through Deserts and Oases of Central Asia* (1920).

During World War I (1914–18), Sykes organized a Persian military unit in support of British forces and took part in British government surveys throughout a wide area of southwestern Asia, from the Caspian Sea and Baghdad, eastward to the Hindu Kush mountain range.

In 1902, Sir Percy Sykes was awarded a gold medal from the ROYAL GEOGRAPHICAL SOCIETY in recognition of his extensive travels in Persia, which he recounted in his book *Ten Thousand Miles in Persia*, published that same year. In his more than two decades in southwestern Asia, he traveled extensively in nearly every part of Persia, presenting in his published reports geographic observations together with historical and archaeological details.



Tasman, Abel Janszoon (Abel Janzoon Tasman) (ca. 1603–1659) *Dutch mariner in Tasmania, New Zealand, Australia, and the southwestern Pacific Ocean*
Abel Tasman was born in Lutjegast, a village near Groningen in the northeastern Netherlands. A seafarer, he entered the service of the DUTCH EAST INDIA COMPANY; by 1634, he had risen to the rank of captain, commanding the trading vessel *Mocha* out of Amboina in the SPICE ISLANDS (the Moluccas) of present-day eastern Indonesia.

In 1639, Tasman served as second in command on a voyage of exploration to the North Pacific Ocean, led by Dutch East India Company sea captain Matthijs Quast. Seeking two fabled islands, Rica de Oro (rich in gold) and Rica de Plata (rich in silver), with which the Dutch East India Company hoped to open trade contacts, they sailed along the coasts of the Philippines, Taiwan, Korea, and Japan, then headed eastward into the Pacific for several thousand miles. Although they located no new lands of any commercial value, the voyage brought Tasman's abilities as a mariner to the attention of Anton van Diemen, governor general of the Dutch East Indies at Batavia (present-day Jakarta, Indonesia).

In 1642, Anton van Diemen commissioned Tasman to explore southward for the legendary GREAT SOUTHERN CONTINENT, or Terra Australis, which was then thought to occupy much of the unexplored Southern Hemisphere.

Van Diemen instructed Tasman to determine if Australia, then known as New Holland, was the northern extent of the Great Southern Continent; to discern whether New Guinea was an island or was joined to Australia; and to seek a shorter

sea route from the southern Indian Ocean to the Pacific coast of Chile.

Tasman embarked from Batavia on August 14, 1642, in command of two ships, the *Heemskerck* and the *Zeehaen*, accompanied by Frans Jacobszoon Visscher, a leading Dutch pilot and mapmaker. After sailing westward across the Indian Ocean to the island of Mauritius, he headed southward in early October 1642, hoping to strike the Great Southern Continent somewhere below 54° south latitude, a point farther south than anyone had yet reached. At about 42° south latitude, however, the prevailing winds blew Tasman's ships eastward, well beyond Australia's south coast, until November 24, 1642, when land was sighted. Although rough surf prevented sending a landing party ashore, the ship's carpenter managed to swim to the beach and plant a flag, taking possession of the uncharted land in the name of the Netherlands and the Dutch East India Company.

Tasman named the newly located land Van Diemen's Land (present-day TASMANIA), after the Dutch East Indies governor general. Finding a suitable anchorage on the southeast coast near present-day Hobart, the Dutch explorer and some of his crew briefly went ashore, where they found evidence of human inhabitants, although the natives declined to show themselves.

Continuing eastward, Tasman and his expedition approached the coastline of yet another uncharted land, sighting the peaks of a mountain range later known as the Southern Alps on December 13, 1642. Tasman made a landing at Cape Farewell on the northwestern corner of

NEW ZEALAND's South Island. He came upon what he thought was a large bay, which he named Murderers' Bay (also known as Massacre Bay) after four of his men were killed there by the Maori in the first European encounter with New Zealand's native peoples. Because he could not explore it thoroughly at the time, he was unaware that this was actually a strait (Cook Strait), separating the South Island and the North Island. Tasman continued northward along the west coast of New Zealand's North Island. He named the newly found land Staten Landt, apparently mistaking it for the western side of Staten Island, which had been discovered off the southern tip of South America by JAKOB LE MAIRE and WILLEM CORNELIS SCHOUTEN in their 1615–16 voyage. At the time, Tasman believed he had come upon the western extent of the Great Southern Continent.

Tasman sailed past the northern tip of New Zealand's North Island, which he named Cape Maria van Diemen, after the wife of the Dutch colonial governor, and, on January 6, 1643, he sighted a group of islands he called the Three Kings Islands, because he had reached them on the day of the Epiphany. From there, he sailed northeastward, soon coming upon Tongatapu in the Friendly Islands, where he took on supplies of fresh food and water.

Turning northwestward, Tasman next located the Fiji Islands, although he was unable to land there because of hazardous offshore reefs. After sighting the large atoll of Ontong Java, he made for the coast of northern New Guinea and sighted nearby New Britain and New Ireland, which he erroneously took to be one island.

By the time Tasman had returned to Batavia in June 1643, he had covered more than 5,000 miles of the southern Indian Ocean and southwestern Pacific. He had sailed around Australia without realizing it. By doing so, however, he had demonstrated that it was bounded by water on the south and thus could not be part of the much-sought-after Great Southern Continent.

Governor van Diemen, unsatisfied with these results, sent Tasman out on another voyage in February 1644, hoping he might discover new geographic details of more commercial value to the Dutch. The question of whether New Guinea and Australia were connected was still not resolved, and Tasman was directed to explore New Guinea's south coast, then continue southward into the Gulf of Carpentaria in search of a possible channel through Australia to Van Diemen's Land and the Pacific Ocean.

Accompanied again by the Dutch cartographer Visscher, Tasman sailed from Batavia in February 1644 with three small vessels, the *Limmen*, the *Zeemeeuw*, and the *Bracq*. Heading eastward along New Guinea's south coast, he missed the Torres Strait between New Guinea and Australia, which would have led him into the Coral Sea and the Pacific. Instead, he sailed southward and explored the Gulf of Carpentaria. Determining that it had no southern outlet,

he continued westward along the north coast of the Australian mainland, as far as North West Cape, Shark Bay, and Dirk Hartogs Island, where the coastline of western Australia begins to angle southward. After making the first continuous exploration along Australia's north and northwest coast, he returned northward to Batavia, by way of the Moluccas and the Ceram Sea.

Tasman soon resumed his career with the Dutch East India Company. In about 1649, while in command of an expedition of privateers against a Spanish treasure fleet in the Philippines, he hanged one of his crewmen for deserting his post, an act for which he was admonished by Dutch colonial authorities at Batavia and eventually suspended from the company. Reinstated after several years, he remained in the EAST INDIES, where he acquired great wealth as a trader.

It was not until 1798, more than a century and a half after Tasman had explored Van Diemen's Land, that GEORGE BASS and MATTHEW FLINDERS circumnavigated the island and learned that it was not attached to the Australian mainland. The island, first settled by the British as a penal colony in the early 1800s, became notorious for the cruel treatment of convicts and corrupt administration. It was opened to free settlers in 1853, and the newly organized colonial government changed its name to Tasmania in honor of Tasman, in an attempt to sever its ties with the unsavory past.

Abel Tasman's two voyages in 1642–44 were among the first scientific attempts to explore the Pacific Ocean. Nonetheless, they marked the end of major Dutch exploring efforts in that part of the world for the remainder of the 17th century. Tasman's findings, although at the time not fully appreciated by his superiors in the Dutch East Indies and in the Netherlands, greatly expanded European geographic knowledge of the southwestern Pacific, especially by revealing that the portions of the Australian coastline previously explored by Dutch navigators DIRK HARTOG and FREDERICK HOUTMAN were actually one continuous mainland. In a map of their explorations, Tasman and Visscher delineated for the first time the continental dimensions of western and northern Australia. Tasman's first expedition established the southern limit of Australia, showing that much of the Southern Hemisphere, once thought to contain a great landmass, was actually covered by the southern reaches of the Indian and Pacific Oceans. Further exploration of New Zealand did not occur until the 1769 visit of Captain JAMES COOK. The Tasman Sea, the arm of the Pacific between Australia and New Zealand, was named after the Dutch explorer.

Taylor, Annie Royle (1855–after 1907)

British missionary in India, China, and Tibet

Annie Taylor was born at Egremont in northern England. Her father was the director of a British international steam-

ship line, and a member of the ROYAL GEOGRAPHICAL SOCIETY. Her mother was a Brazilian-born French Huguenot.

In about 1876, Taylor began doing charity work in London, visiting the sick in poor areas. In 1884, she studied midwifery and basic medicine at London's Queen Charlotte Hospital and later that year she joined the China Inland Mission. In September 1884, she sailed to Shanghai, China; she stayed at a Christian mission on the lower YANGTZE RIVER (Chang) for five months, learning basic Chinese and becoming familiar with native customs. She then traveled up the Yangtze to a more remote mission, where she gave medical advice and taught the Gospel.

In 1887, Taylor took her missionary work to Kansu (Gansu) province in central China. From there, she traveled to the large Tibetan Buddhist monastery of Kum Bum, becoming one of the first Europeans to do so.

After a year in Kansu province, Taylor became ill, probably with tuberculosis. She returned to Shanghai via the Yangtze, surviving the sinking of her boat in the Han Rapids. Taylor sailed from Shanghai to Australia, where she joined her parents, who were vacationing there.

By 1889, Taylor had sufficiently recovered. From Australia, she went to join her sister in the northern Indian city of Darjeeling, remaining there as a missionary for two years and learning the Tibetan language from nomadic Tibetans. In Darjeeling, she acquired the services of a young Tibetan from Lhasa, named Pontso, who became her guide, servant, and traveling companion for the next 20 years.

In March 1891, Taylor left India for China, resolved to make a journey to Tibet, which was then forbidden to foreigners, and to enter LHASA. She returned to western Kansu province in March 1892 and crossed the border into Tibet. She and her small party were soon attacked by bandits and robbed of nearly all their possessions. Nevertheless, disguised in native dress, she pushed onward toward Lhasa for the next four months.

In January 1893, just three weeks from Lhasa, Taylor was arrested by Tibetan officials and sent back to China. She reached Szechwan (Sichuan) province in April 1893 and returned to Great Britain soon afterward. Later in 1893, she lectured on her Tibetan exploits at the Scottish Royal Geographical Society in Edinburgh.

Early in 1894, Taylor took her own missionary group, the Tibetan Pioneer Band, back to India. In Sikkim, a principality of northern India, the Tibetan Pioneer Band was soon reorganized as part of the China Inland Mission, and Taylor set out northward on her own for Tibet. She traveled through the Jelep Pass and reached the Tibetan border city of Yatung. She subsequently served as a nurse in a nearby British army field hospital.

Annie Taylor returned to England in 1907, where she presumably spent the rest of her life. Taylor's diary of her travels, later edited and transcribed by William Carey

in his *Adventures in Tibet* (1901), details the everyday life of Tibetans. Her career was also recounted in Isabel Robson's book *Two Lady Missionaries in Tibet* (1909). Although Taylor failed to reach Lhasa, her seven-month, 1,300-mile journey from western China in 1892–93 marked the first visit by a European woman into then-forbidden Tibet.

Teixeira, Pedro de (Pedro Teixeira) (1575–1640)

Portuguese army officer in South America

In 1616, Captain Pedro de Teixeira, a Portuguese army officer in Brazil, helped establish Fort Presepio, a garrison on the southern Amazon delta, which eventually became the site of the city of Belém.

Six years later, Teixeira accompanied Luis Aranha de Vasconcelos in an exploration of the lower Amazon Basin, resulting in the first detailed mapping of the region. Throughout the 1620s, he participated in military actions aimed at evicting French, Dutch, and English trading settlements encroaching upon Portuguese territory on the Xingu River, a southern tributary of the lower AMAZON RIVER, as well as in the northern Amazon delta region, near the Guianas.

In 1637, the local Portuguese colonial governor, Jacome Raimundo Noronha, appointed Teixeira commander of an expedition to explore and map the Amazon from its delta to its upper reaches in the Andes. The project had been instigated by the arrival at Fort Presepio that year of two Spanish Franciscan missionary priests, who had descended the Amazon from their mission on the Napo River in Ecuador, arousing Portuguese concern over possible Spanish designs on the entire Amazon Basin.

Teixeira's party included more than 1,200 Indians and Africans, as well as about 70 Portuguese soldiers, traveling by CANOE, the largest European expedition to embark on an upstream exploration of the Amazon to that time. The group departed Fort Presepio on October 28, 1637, accompanied by Father Domingos Brieve, one of the two Spanish priests who had arrived at the mouth of the Amazon earlier that year, and who would serve as a guide for the upriver expedition back to Quito.

Teixeira and his armada of canoes came upon the mouth of the Rio Negro in early 1638. He claimed it for Portugal, then continued to the Napo River, which he reached in July 1638, encountering another Portuguese expedition led by Pedro de Costa Favela. After ascending the Napo to the Quijos River with an advance party, Teixeira made the last leg of the journey though the ANDES MOUNTAINS to Quito on foot. His arrival in late summer 1638 marked the first time a contingent of Europeans had reached the city from the east. He was received with much acclaim in Quito, the inhabitants celebrating with fireworks, bullfights, and banquets.

Yet, just as the appearance of the two Spanish priests at Fort Presepio the year before had alarmed the Portuguese about Spanish advancement from the west, Teixeira's arrival caused concern for Spanish colonial authorities over possible Portuguese expansion into the upper Amazon from the east. The Spanish soon ordered that he retrace his route down the Amazon, escorted by a group of Spanish observers, headed by Jesuit priest CRISTOBAL DE ACUÑA, brother of Quito's colonial governor.

Teixeira left Quito for Napo and the Amazon on February 16, 1639. He rejoined the bulk of the expedition on the upper Napo, then began his down-river journey to the Amazon. Along the way, he took possession of the region around the mouth of the Rio de Oro in the name of King Philip III of Portugal (who also ruled Spain as King Philip IV). He also marked a site at the mouth of the Aguarico River, a tributary of the upper Napo in what is now northeastern Ecuador, as the point through which passed the north-south demarcation line established by the Treaty of Tordesillas of 1494, dividing Spanish and Portuguese territory in the New World. By October 15, 1639, he was back at the mouth of the Rio Negro, and, although his men wanted to undertake a slave-hunting expedition up that river, he yielded to the wishes of the Jesuit priest Acuña and continued his journey down the Amazon.

About 100 miles farther downstream, Teixeira and his expedition stopped at the large Amazon River island of Tupinambarana, where the natives reported the existence of a tribe of warrior women who lived to the north, echoing the tales of FRANCISCO DE ORELLANA of nearly a century before.

Teixeira returned to the mouth of the Amazon on December 12, 1639. For his efforts, he was rewarded with a promotion to captain major, and, in February 1640, he was appointed governor of the province of Pará. However, he had become too ill to assume the office, possibly suffering from the rigors of his more than two years of travel in the Amazon Basin and the Andes, and he died soon afterward.

Pedro de Teixeira completed the first known continuous ascent of the Amazon, and in so doing undertook the first significant Portuguese exploration into the interior of Brazil since PEDRO ÁLVARS CABRAL landed on the Brazilian coast in 1500. Unlike the earlier downriver voyages of Orellana and LOPE DE AGUIRRE, which were guided by the direction of the river's flow to the sea, Teixeira's upstream expedition had to scout ahead in order to determine whether a particular stretch was a tributary or part of the main stream. As a result of his explorations, much of the upper Amazon Basin came under Portuguese sovereignty when, in 1641, a year after Teixeira's death, Spain and Portugal again became separate kingdoms, with John IV crowned as king of Portugal as well as Brazil.

Teleki, Samuel (Count Teleki) (1845–1916)

Hungarian explorer in East Africa

Samuel Teleki was born to a noble Hungarian family in Szaromberke, located in the Transylvania region of what is now Romania. From 1886 to 1889, Count Teleki explored central East Africa's Great Rift Valley with Baron LUDWIG VON HOEHNEL, traveling from Zanzibar to Nairobi, and climbed MOUNT KILIMANJARO. In northern Kenya in 1888, they located and named Lake Rudolf as well as its major affluent, the Omo River. North and east of Lake Rudolf, the Hungarians came upon another lake in southern Ethiopia, which they named Lake Stefanie.

In locating Lakes Rudolf and Stefanie, Samuel Teleki and Hoehnel made the last major European geographic discoveries in East Africa.

Tenzing Norgay (Tenzing Norkey, Tensing Norkay, Tensing Bhotia, Namgyal Wangdi)

(1919–1986) *Nepalese mountain climber on Mount Everest in the Himalayas*

Tenzing Norgay was born in a village in Nepal; his birth name was Namgyal Wangdi. Like many of his people, the SHERPAS, he became a professional mountain porter and participated in a number of foreign-sponsored climbs in the HIMALAYAS.

In the spring of 1952, Tenzing accompanied Raymond Lambert on a Swiss expedition to within 800 feet of the summit of MOUNT EVEREST, a world record at the time. Based on his earlier climbs, he was invited to be a full-fledged member, rather than a porter, of the British Mount Everest Expedition, sponsored by the Joint Himalayan Committee of the Alpine Club of Great Britain and the ROYAL GEOGRAPHICAL SOCIETY.

The expedition approached from the south side; in 1924, a climb on the north side had cost the life of GEORGE HERBERT LEIGH MALLORY. On May 29, 1953, Tenzing and New Zealander SIR EDMUND PERCIVAL HILLARY reached Mount Everest's summit. Tenzing continued climbing for 20 more years and reached the top of Mount Everest many times, along with other peaks in the Himalayas.

Although much of the international attention went to Hillary, Tenzing Norgay was actually the first man to reach the summit. At the top of the world's highest point, at 29,028 feet above sea level, he buried food as a Buddhist offering.

Tereshkova, Valentina Vladimirovna

(1937–) *Soviet cosmonaut, first woman in space*

Valentina Tereshkova was born near Yaroslavl, north of Moscow, in the former Union of Soviet Socialist Republics (USSR, or Soviet Union); her parents were farmers. She found work in a textile factory at the age of 18. As an ama-



Valentina Tereshkova (Library of Congress)

teur parachutist with a local club, she became interested in aviation.

In 1961, on learning that the Soviet Union was seeking female cosmonauts (see ASTRONAUTS), she wrote a letter to the space agency volunteering her services. YURY ALEKSEYEVICH GAGARIN, the first human in space, oversaw the selection process. In 1963, after extensive interviewing and testing, Tereshkova was one of four women selected for training to be the first woman in space, part of the VOSTOK PROGRAM. All four women were commissioned as second lieutenants in the Soviet air force, which then ran the cosmonaut program. Amidst great secrecy, Tereshkova won the spot for the *Vostok 6* flight, which would be in space at the same time as *Vostok 5*.

Vostok 5, piloted by cosmonaut Valeriy Bykovsky, was launched on June 14, 1963. *Vostok 6*, piloted by Tereshkova, was launched two days later, on June 16, 1963. She orbited the Earth 48 times. *Vostok 5* and *6*, in different orbits, passed within three miles of each other, and Bykovsky and Tereshkova were able to communicate with each other. On June 19, after 70 hours and 50 minutes in space, Tereshkova ejected from the capsule at an altitude of about 20,000 feet and descended by parachute, landing about 380 miles northeast of Karaganda, Kazakhstan.

Tereshkova married fellow cosmonaut Andrian Nikolayev later that year. Their daughter, Elena Andriionovna, was born in 1964, the first child born to parents who had both been in space. Tereshkova was bestowed the title Hero of the Soviet Union and received the Order of Lenin. The United Nations honored her with the Gold Medal of Peace. Staying in the military, she eventually reached the rank of

colonel. She went on to graduate from the Zhuykosky Air Force Engineering Academy in 1969. In 1976, Tereshkova also earned a degree in technical science. She later served as the president of the Soviet Women's Committee and became a member of the Supreme Soviet, the Soviet Union's national parliament, and the Presidium, a governmental panel.

Valentina Tereshkova, whose radio call name was *Chaika*, Russian for "seagull," has a place in the history of exploration as the first woman in space. She proved the ability of women to function under difficult conditions by spending more time in orbit than all the astronauts of the United States's Mercury program combined. The second woman in space was Soviet cosmonaut Svetlana Savitskaya on board a Soyuz flight in 1982. SALLY KRISTEN RIDE became the first American woman in space in 1983, aboard the SPACE SHUTTLE *Challenger*.

Thesiger, Wilfred Patrick (1910–) *British traveler in the Middle East*

Wilfred Thesiger was born in Addis Ababa, Ethiopia; his father was an official for the British government and a close friend of the Ethiopian emperor Haile Selassie. Thesiger studied at Eton and Oxford University, then, at the age of 24, he returned to Ethiopia, where he explored the Awash River. He later served as a district commissioner in the Sudan, during which time he made expeditions into the Tibesti Mountains. Thesiger also served in the British army in North Africa and the Middle East.

In 1946–47, Thesiger made his first journey into the Rub' al-Khali, the EMPTY QUARTER—the 250,000-square-mile desert area of the southeastern Arabian Peninsula—dressed in bedouin clothing and with Rashid native guides, making a giant circle from Salahah in present-day Oman on the Arabian Sea. He made a second journey across it in 1947–48, also with Rashid tribesmen, from Mukalla in present-day Yemen on the Gulf of Aden to the Persian Gulf in present-day United Arab Emirates.

In the 1950s, Thesiger worked among the Marsh Arabs of southern Iraq, paddling to their homes by CANOE. With the vice consul of Basra, Iraq, Frank Steele, Thesiger explored Lake Rudolf (Lake Turkana) in Ethiopia and Kenya.

Wilfred Thesiger continued the tradition of his fellow countrymen in the Empty Quarter—BERTRAM SYDNEY THOMAS in 1930–31 and HARRY ST. JOHN BRIDGER PHILBY in 1932. Thesiger wrote about his travels and the nomads he encountered in *Arabian Sands*, published in 1964.

Thomas, Bertram Sydney (1892–1950) *British explorer in Arabia*

Bertram Thomas served as a British political officer in the Persian Gulf region for many years before entering the

service of the government of Oman, on the southeast coast of the Arabian Peninsula.

In 1926, Thomas traveled northward from Muscat on the east coast of Oman, to Ash Shariqah in what is now the United Arab Emirates. A year later, he landed at Ras al Hadd on the southeastern tip of the Arabian Peninsula, then traveled along the south coast of Oman to Salalah. From there, he undertook preliminary journeys northward in preparation for an exploration of the Rub' al-Khali, the so-called EMPTY QUARTER, a 250,000-square-mile expanse, nearly devoid of water, encompassing roughly one-quarter of the Arabian Peninsula.

Thomas headed northward from Salalah in October 1930, accompanied by Sheikh Salih Bin Yakut and a party of Rashidi bedouins, and soon began his trek northward across the Rub' al-Khali. Traveling on camels, Thomas and his Arab companions reached the waterhole at Shana, near the desert's center, in early January 1931. Continuing northeastward, they arrived at Doha on the Persian Gulf coast of Qatar a few weeks later.

Bertram Thomas was the first European known to have crossed the Empty Quarter, Arabia's last unexplored region, and he did so without the aid of motorized vehicles or aircraft.

Thompson, David (Koo-Koo-Sint) (1770–1857)

British fur trader, geographer, cartographer in western Canada and northern United States

David Thompson was born in the Westminster section of London, England. He came from a poor family of Welsh descent and was left fatherless at an early age. Despite his family's financial hardship, he managed to receive a good education, attending London's Grey Coat School, where he concentrated in mathematics and geography.

In 1784, at the age of 14, Thompson was apprenticed to the HUDSON'S BAY COMPANY, and in September of that year, he arrived at the company's trading post, Fort Churchill, on the southwest shore of HUDSON BAY. For the next three years, under the command of SAMUEL HEARNE, he worked as a trader in the region west and southwest of Fort Churchill, along the Churchill and Nelson Rivers.

In 1787–88, Thompson journeyed as far west as present-day Calgary, Alberta, where he spent the winter and established the earliest trade contacts with the Blackfoot Indians. Back at Hudson Bay in 1789, he broke his leg in a fall and, while recovering, studied surveying and "practical astronomy" under the Hudson's Bay Company's official surveyor, Philip Turnor.

Skilled as a cartographer and surveyor, Thompson was sent out in 1793 to locate a more direct route from Hudson Bay to Lake Athabasca. Over the next several years, he explored up the Saskatchewan River into the ROCKY MOUN-

TAINS and developed a CANOE and portage route to Lake Athabasca from the upper Churchill River by way of the Reindeer River, Reindeer and Wollaston Lakes, and the Black River. During this period, he also surveyed and charted the region between York Factory on Hudson Bay and Cumberland House in what is now eastern Saskatchewan.

Thompson left the Hudson's Bay Company to join the NORTH WEST COMPANY in 1797. Starting that year, he embarked on explorations that took him on an expedition from Lake Superior to Lake Winnipeg and Lake Winnipegosis. He also surveyed the upper Red River and the Assiniboine River. Thompson crossed into what is now North Dakota and explored the upper MISSOURI RIVER, where he made trade contacts with the Mandan Indians. His interpreter to the Mandan was RENÉ JUSSEAUME, who later accompanied the expedition of MERIWETHER LEWIS and WILLIAM CLARK.

In the course of his 1797–98 expedition, Thompson explored what is now northern Minnesota along the headwaters of the MISSISSIPPI RIVER. He may have located the actual source of the Mississippi, but his geographic findings were not revealed until several decades after his death, and he was never credited with the discovery. Before returning to Grand Portage on Lake Superior, Thompson descended downriver as far south as St. Louis.

Thompson set out again in 1798–99. From Île-a-la-Crosse Lake, he followed the Beaver River into what is now north-central Alberta's Lesser Slave Lake region, then explored the Athabasca River. In 1800, Thompson followed the Saskatchewan River into the Rockies, becoming the first non-Indian to find its source.

Soon after becoming a partner in the North West Company in 1804, Thompson began expanding his trade and exploration expeditions west into the Rockies. He had married Charlotte Small, the daughter of a fur trader and an Indian woman, at Île-a-la-Crosse in 1799. In 1807, Thompson, his wife, and their small children made a westward crossing of the Rockies. He was the first non-Indian to locate and use Howse Pass, which led him into the upper COLUMBIA RIVER, where he established the first trading post on the Columbia, Kootenay House.

Thompson was unaware that the Columbia at that point flowed northward before making a hairpin turn around the Selkirk Mountains. Seeking to follow what he thought was the south-flowing Columbia to the Pacific Ocean, he inadvertently explored the Kootenay, Pend Oreille, and the Clark's Fork Rivers into present-day Idaho and Montana. There, he established the earliest non-Indian trading settlements.

In 1810–11, Thompson undertook an exploration of the Columbia River Basin, possibly seeking to assert a British claim to the Pacific Northwest before JOHN JACOB ASTOR's seaward expedition could reach the mouth of the

Columbia. The Howse Pass route through the Rockies was blocked that season by hostile Piegan Indians, part of the Blackfoot Confederacy. Instead, Thompson headed northward along the eastern slopes of the Canadian Rockies until he came upon a route he called Athabasca Pass. He followed it to a south-flowing river, just above the Selkirk Mountains, which he correctly identified as the Columbia. Thompson then descended the Columbia, reaching its junction with the Snake River in what is now southeastern Washington on July 9, 1811. He set up a small marker and claimed the territory for Great Britain and the North West Company. He continued down the Columbia and, several days later, reached the Oregon coast, where he discovered that the American expedition had already established its post at Astoria. He conferred with the AMERICAN FUR COMPANY'S ROBERT STUART at Astoria for a short time, then embarked up the Columbia to undertake a survey to its source.

Thompson left the FUR TRADE at the outbreak of the War of 1812. He settled near Montreal, where he drafted the first accurately detailed map of the Canadian West. After the war, in 1816, he began 10 years of service as a surveyor with the British Boundary Commission, during which he charted the U.S.-Canada border from St. Regis on the St. Lawrence to Lake of the Woods in northern Minnesota.

After 1826, Thompson's financial situation declined. He supported himself as a surveyor, but his failing eyesight soon left him without a profession. He died in poverty near Montreal at age 86. His geographic accomplishments were not fully appreciated until the posthumous publication of his personal account, *David Thompson's Narrative*, in 1916. During the 1880s, years after Thompson's death, Canadian researchers revealed that late-18th-century London mapmaker Aaron Arrowsmith had actually based his map of North America on Thompson's charts made in 1787–1800, without crediting Thompson at all. President Thomas Jefferson subsequently used Arrowsmith's map in planning the Lewis and Clark Expedition of 1803–06.

David Thompson was the first non-Indian to travel the entire course of the Columbia River and was the first Englishman to travel southward across the 49th parallel, west of the Continental Divide. His comprehensive map of Canada revealed that although the Columbia did not provide a western outlet for a navigable Northwest Passage, there existed a canoe route through North America that, with short portages, led from the western St. Lawrence, through the Great Lakes and across central Canada into the Pacific via the Columbia. Thompson's explorations in Canada and the United States covered more than 50,000 miles. Based on his surveys, he subsequently mapped a region of North America that encompassed some 1.7 million square miles. The Thompson River in British Columbia was named in his honor by his friend and associate SIMON

FRASER. Among the Indians, Thompson was known as Koo-Koo-Sint, "the Man Who Looks at the Stars," because of his extensive use of basic surveying and astronomical instruments to determine his precise position while exploring in the Canadian West.

Thomson, Sir Charles Wyville (1830–1882)

Scottish naturalist, oceanographer on round-the-world scientific voyage

Originally from Scotland, at the age of 24, Charles Wyville Thomson became a university professor of natural history in Belfast, Ireland, specializing in marine animal life.

Thomson was especially interested in life forms existing at great ocean depths and in the deep-sea environment in general. In 1868, with the support of the ROYAL SOCIETY, he obtained the use of a British naval vessel, the *Lightning*, with which he undertook underwater studies of the North Atlantic Ocean. As a result of the deep-sea dredging operations he undertook on this voyage, he determined that life existed at far greater depths than had previously been thought. On a similar expedition in summer 1869 aboard the British navy's *Porcupine*, his dredging operations and deep-sea observations revealed that ocean temperatures were not constant beyond a certain depth, contrary to what most scientists of the time had theorized.

In 1872–76, Thomson sailed around the world as head of the civilian scientific team on the *Challenger*, a steam-driven British warship, again with the support of the Royal Society. Under the command of Captain SIR GEORGE STRONG NARES, the *Challenger* Expedition made three crossings of the Atlantic before sailing to Australia and NEW ZEALAND by way of the CAPE OF GOOD HOPE. Additional research was conducted in the waters of the EAST INDIES, Japan, Tahiti, the HAWAIIAN ISLANDS, and off the southernmost coast of Chile.

In the course of the voyage, Thomson directed depth soundings and temperature studies at more than 350 sites around the globe, undertaking comparative studies in the Atlantic, Pacific, and Indian Oceans. The zoologists aboard retrieved more than 4,000 species of marine life new to science. Thomson also initiated the first comprehensive study of ocean currents, and his deep-sea dredging operations provided a profile of the composition of the ocean floors. One of his most significant findings revealed that the Pacific was much deeper than the Atlantic, and that its bottom was covered with clay containing manganese, quartz, pumice, and mica.

The expedition returned to England by way of the STRAIT OF MAGELLAN having crossed the EQUATOR six times and having covered more than 60,000 miles of the world's oceans. It had also made the first passage across the ANTARCTIC CIRCLE aboard a steam-powered vessel.

Knighted soon after his return, Thomson was appointed director of the government's commission assigned to study and publish the results of the voyage. His two-volume *Voyage of the Challenger* appeared in 1877. From 1870 to 1882, he held a professorship in natural history at the University of Edinburgh.

Sir Charles Wyville Thomson drew upon concepts from geography, geology, physics, marine biology, and meteorology to make the first accurate scientific study of the world's oceans. His work on the *Challenger* Expedition initiated what later became known as the science of oceanography. In pioneering efforts to discover the nature of the ocean depths, he inaugurated the exploration of a region that, although covering most of the Earth's surface, still remains largely unknown.

Thomson, Joseph (1858–1895) *Scottish geologist in Africa*

Born near Thornhill in southern Scotland, Joseph Thomson attended the University of Edinburgh, where he studied under the great Scottish geologist, Sir Archibald Geikie. In 1878, on Geikie's recommendation, the ROYAL GEOGRAPHICAL SOCIETY recruited Thomson as a geologist for an expedition into East Africa, the aim of which was to seek a route from the Indian Ocean coast westward to Lake Nyasa (Lake Malawi). When Alexander Keith Johnston, the group's leader, died six months after they had set out from Dar es Salaam, Thomson assumed command of the project, and in 1879, although only 21 years old, he managed to lead the team across the breadth of what is now southern Tanzania to the north shores of Lake Nyasa.

Thomson next headed northward, making the European discovery of Lake Rukwa before reaching Ujiji on the east shore of Lake Tanganyika. He then traveled to Tanganyika's west shore and its main outlet, the Lukuga River. Although encounters with hostile natives soon led him to cut short his exploration of the Lukuga, he correctly surmised that the river was a tributary of the Lualaba River and Congo River (Zaire River) system. The expedition then returned to the coast at Bagamoyo, traveling by way of Tabora through central Tanzania.

In 1881, while Thomson was still in Africa, the sultan of Zanzibar, impressed by the young Scottish geologist's abilities as a traveler in central Africa as well as by his scientific background, commissioned Thomson to survey the Ruvuma River region of present-day southeastern Tanzania for reported deposits of coal. Although he discovered no mineral resources, he had the opportunity to further augment his understanding of the geological makeup of East Africa.

Soon after his return to England in 1882, Thomson was commissioned by the Royal Geographical Society to seek a route that could be developed into a major transportation

link between Mombasa, on the Indian Ocean coast of Kenya, and Lake Victoria.

Accompanied by a seafarer from Malta named James Martin, Thomson started out from Mombasa in March 1883, heading westward to MOUNT KILIMANJARO, which he climbed. From there, he headed northward into the country of the Masai, a nomadic and fiercely territorial people who took a dim view of foreigners traversing their range lands in central Kenya. Despite frequent encounters with openly belligerent natives, Thomson and his companion succeeded in crossing Masai country, traveling by way of Lake Naivasha, the first Europeans to do so. Turning northward, they traveled with a Swahili caravan up the Great Rift Valley, making the European discovery of Lake Baringo along the way, and traversing a group of mountains he named the Abedare Range, after Lord Abedare, a prominent member of the Royal Geographical Society.

In December 1883, Thomson arrived at the northeast shore of Lake Victoria. On the return journey, following a more easterly route, he came upon an extinct volcano, the 14,178-foot Mount Elgon, north of Lake Victoria on the present Uganda-Kenya border, which he climbed and around the base of which he explored a number of prehistoric cave dwellings. Soon afterward, Thomson was seriously injured when a buffalo gored him. After six weeks, he had recuperated enough to resume the journey, arriving back at Mombasa at the end of May 1884.

Back in England in 1885, Thomson received a gold medal from the Royal Geographical Society for being the first European to travel through the lands of the Masai. That same year, he went to West Africa and ascended the NIGER RIVER into the western Sudan, where he negotiated commercial treaties with native rulers at Sokoto and Gando in present-day northern Nigeria on behalf of a British trading firm.

In 1888, Thomson explored the Atlas Mountains in Morocco and Algeria. Two years later, in the service of Cecil Rhodes, he led a trading and diplomatic mission into present-day Zimbabwe in south-central Africa, during which he explored the upper ZAMBEZI RIVER and the southern end of Lake Nyasa, and crossed the Muchinga Mountains to Lake Bangweulu.

Joseph Thomson died when he was just 37, probably from a kidney ailment and complications from pneumonia and tuberculosis. By that time, he had undertaken extensive explorations in all parts of Africa. He detailed his wide-ranging experiences in three books: *To the Central African Lakes and Back* (1880), *Through Masailand* (1885), and *Travels in the Atlas and Southern Morocco* (1889). In his journey of 1878–79, he led the first European expedition to reach Lake Nyasa from the north. In the year after Thomson's death in 1895, construction began on the railroad linking Mombasa and Lake Victoria, which, when completed in 1901, followed portions of the route Thomson had pioneered across

Masai country in his 1883–84 expedition. Based on his geological observations, he was able to formulate one of the earliest scientific explanations for the formation of the Great Rift Valley in central East Africa. The Thomson's gazelle, a type of antelope found in central Africa, was later named in his honor.

Thorvald Ericsson See ERICSSON, THORVALD.

Thorvaldsson, Eirik See ERIC THE RED.

Thunberg, Carl Peter (1743–1828) *Swedish naturalist in Japan and South Africa, in service to the Netherlands*

Carl Peter Thunberg was born in the city of Jönköping in southern Sweden. He studied under the Swedish botanist Carl Linnaeus at the University of Uppsala. After obtaining his degree as a doctor of medicine in 1770 (which, at the time, included the fields of botany and zoology), he studied botany in the Netherlands and in France. He received a commission from the DUTCH EAST INDIA COMPANY to collect plant specimens for Dutch botanical gardens in Japan. In order to convince the Japanese that he was Dutch, however, he had to master the language and traveled first to Cape Town in Africa, arriving in 1772.

While studying the Dutch language, Thunberg carried out three expeditions into the South African interior, traveling in a covered wagon drawn by oxen. During his stay in South Africa, he worked in conjunction with fellow Swede ANDERS SPARRMAN, who had also been a student of Linnaeus. He also worked with Francis Masson, an Englishman who was in the employ of the Royal Gardens at Kew in England.

Traveling on one of the Dutch East India Company ships as a surgeon, Thunberg traveled first to Java, then on to Japan in 1775, where he carried out extensive studies of flora and fauna. He returned to Europe by way of Java and CEYLON (present-day Sri Lanka). In 1784, Thunberg was appointed to the chair of medicine and botany at the University of Uppsala, a position he held for 44 years.

Carl Peter Thunberg was a prolific writer, and his *Flora Japonica* (1784) and *Flora Capensis* (1807–13) are considered classics. He has been referred to as the “father of South African botany” for his pioneering work in that country’s natural science.

Thyssen, François (fl. 1620s) *Dutch mariner in Australia*

In a 1627 voyage from the Netherlands to the EAST INDIES on the *Gulden Zeepaard*, Dutch navigator François Thyssen

sailed eastward across the southern Indian Ocean along 35° south latitude. Following this bearing, which was somewhat farther south than the usual route used by Dutch trading vessels, Thyssen came upon Cape Leeuwin, Australia’s southwesternmost point. After rounding Cape Leeuwin, he sailed eastward into the Great Australian Bight, naming the mainland along the southwest coast Nuyts Land, after a passenger aboard the ship. With no end of the mainland in sight, however, he turned about, completing the journey to the East Indies by sailing northward along the west coast of Australia.

Had François Thyssen continued eastward, he might have determined the true dimensions of Australia. He was, nonetheless, the first European to sail into the Great Australian Bight, providing later Dutch, English, and French navigators with one of the earliest reports of the continent’s southern and eastern extent.

Timofeyevich, Yermak See YERMAK.

Tinné, Alexandrine Petronella Francina (Alexine Tinné, Alexandrina Pieterella Françoise Tinné) (1835–1869) *Dutch explorer in Africa*

Alexandrine, or Alexine, Tinné was born in The Hague into an aristocratic Dutch family. She reportedly was drawn to African exploration after the breakup of a love affair.

In 1862, Tinné went to Egypt, from where she planned to explore the NILE RIVER and take part in the search for its source. At Cairo, she engaged a small fleet of boats and embarked upriver, accompanied by her mother and aunt, a small team of scientists, a staff of European attendants, and about 200 African servants. Her voyage was conducted with some degree of luxury, her own riverboat being equipped with a grand piano.

At Gondokoro, near the head of navigation on the Nile, Tinné hoped to meet with English explorers JOHN HANNING SPEKE and JAMES AUGUSTUS GRANT, who had set out to find the river’s source from the East African coast two years earlier. She wanted to bring them assistance, believing they would pass by Gondokoro on their way north from the interior. In the course of the trip, both her mother and aunt, as well as two of the scientists, died of fever in the Nile swamps. With no sign of Speke or Grant, she began to seek the source of the Nile herself, traveling into the Mongalla Mountains of the southern Sudan and southward into the watershed region of the CONGO RIVER (Zaire River) and the Nile in what is now the Democratic Republic of the Congo.

Tinné returned to Gondokoro in September 1862. Learning that Speke and Grant had still not arrived, she headed downriver to Cairo. (The two Englishmen did eventually reach Gondokoro six months later, where they were



Alexandrine Tinné (Library of Congress)

met by SAMUEL WHITE BAKER and his wife, FLORENCE BAKER.)

In the mid-1860s, Tinné turned her attention to North Africa; she traveled to Algeria, planning to cross the SAHARA DESERT southward to the Bornu Kingdom of northern Nigeria. Her first attempt from Algiers was not successful, and, in early 1869, she went on to Tripoli, where she met the German explorer GUSTAV NACHTIGAL, who was then planning a similar journey. Meeting up again several months later in the oasis city of Murzuk in southwestern Libya, Tinné and Nachtigal agreed to travel southward together with the first Arab caravan headed that way. As before, Tinné was accompanied by a large following, this time including servants, Algerian women, and some Dutch sailors.

In the meantime, while Nachtigal went eastward on his own into the Tibesti region, Tinné went to visit with the nomadic Tuareg tribes out on the desert. Although a Tuareg chieftain had provided her with a letter of safe conduct, her camel drivers murdered her en route to the Tuareg encampment for valuables they believed she was carrying.

In her African travels, Alexine Tinné entered regions only recently explored by Europeans. Her voyage up the Nile in 1862 took her to the river's navigable limits, and her later overland journey into the Congo-Nile watershed region was into territory still not mapped. Tinné's sudden

end in the Sahara cut short a career in exploration that may have rivaled that of some of the leading male explorers of her day.

Toll, Eduard von (Baron von Toll) (1858–1902)

Russian geologist in the Siberian Arctic

Baron Eduard von Toll was born in Tallinn, Estonia. He was drawn to exploration in the Siberian Arctic by his interest in geology, especially in the study of fossil remains from earlier geological periods.

Toll took part in a scientific expedition to the New Siberian Islands in 1885–86, sponsored by the St. Petersburg Academy of Sciences. From 1892 to 1894, he undertook geological research around the deltas of eastern SIBERIA's Yana, Indigirka, and Kolyma Rivers. In the course of this expedition, he set up supply depots in the New Siberian Islands in support of FRIDTJOF NANSEN's attempt on the NORTH POLE aboard the *Fram*.

Toll's last expedition embarked in 1900 aboard the Russian research vessel *Zarya*. After two winters, he managed to navigate around Cape Chelyuskin, the northernmost point of the Asian continent. In spring 1902, Toll set out with three others in his party to explore north of the New Siberian Islands in search of "Sannikov Land," a landmass that had been reported in the early 1800s by Russian Arctic explorer Yakov Sannikov. When he did not return, a search party was sent out in spring 1903, led by NIKIFOR ALEKSEYEVICH BEGICHEV. On Bennett Island, letters left by Toll were found at his encampment, indicating that he and his party had died the previous year.

Baron Eduard von Toll made significant fossil discoveries on the Arctic coast of eastern Siberia and in the New Siberian Islands. His search for Sannikov Land was carried on by other Russian explorers for four decades after his death, and it was not determined until 1938 that the supposed Arctic landmass was nonexistent.

Tonti, Henri de (Henri de Tonty) (ca. 1650–1704)

French soldier, fur trader in the Mississippi Valley, cousin of Daniel Greysolon Duluth

Henry de Tonti was the son of Italian banker Lorenzo Tonti, originator of the life insurance annuity plan known as the "tontine." He was born in the Italian city of Gaeta, near Naples, and moved to France as a boy when his family was forced to flee Italy for political reasons.

At the age of 18, Tonti embarked on a military career as a junior officer in the French army. He subsequently was appointed a midshipman in the French navy, taking part in the 1672–78 conflict between France and Spain, the last phase of the Dutch Wars. During an engagement with the Spanish in Sicily, he lost part of his right arm in a grenade

explosion and was taken prisoner, later winning release in a prisoner exchange.

In 1678, Tonti became a lieutenant under RENÉ-ROBERT CAVELIER DE LA SALLE and accompanied him from France to Quebec. By December 1678, Tonti was at the mouth of the Niagara River, where, under La Salle's command, he supervised the building of Fort Conti, as well as the construction of the ship the *Griffon*, the first European vessel to sail the western Great Lakes.

Tonti left the Niagara Falls post in summer 1679, and, in search of deserters from La Salle's expedition, explored the north shore of Lake Erie by CANOE. At Lake St. Clair, between Lake Erie and Lake Huron, he rejoined La Salle, and aboard the *Griffon*, they sailed to Green Bay on Lake Michigan's west shore. From there, he scouted ahead to the southern end of Lake Michigan and explored the St. Joseph and upper Illinois Rivers. At what is now Fort Wayne, Indiana, Tonti established Fort Miami, and, on the Illinois River, he founded the settlement of Crèvecoeur near present-day Peoria, Illinois.

While La Salle returned to France for additional support for his proposed expedition to the mouth of the MISSISSIPPI RIVER, Tonti remained in command at the Crèvecoeur post, where he developed fur-trading contacts with the Illinois tribes. In 1681, Iroquois (Haudenosaunee) hostility forced him to leave northern Illinois, and he went to Mackinac Island at the northern end of Lake Michigan, joining up with La Salle at the end of the year. From there, Tonti led an advance party to the Chicago Portage, and, in February 1682, he set out with La Salle on his famous journey from the Illinois post down the Mississippi to the Gulf of Mexico, which they reached in April.

Tonti accompanied La Salle on his return journey up the Mississippi as far as Starved Rock on the Illinois River, where he established Fort St. Louis. The next few years, Tonti operated between this settlement and Mackinac, developing the FUR TRADE with the Illinois tribes.

In February 1686, Tonti set out from his Illinois River post and descended the Mississippi in search of La Salle, who was then stranded at Matagorda Bay on the Texas coast. In early April 1686, he reached the mouth of the Mississippi, but his efforts to locate La Salle were unsuccessful. Tonti planned to follow the Gulf Coast to the Atlantic Ocean and return to Montreal by way of New York, but at the insistence of his men, he returned up the Mississippi to Starved Rock.

In 1687, after taking part in additional campaigns against the Iroquois, he attempted another expedition in search of La Salle, this time reaching the mouth of the Arkansas River, where he established Aux Arcs, also known as Fort Arkansas. (Aux Arcs, which in French signifies "at the Arkansas," was anglicized to denote the Ozarks, the mountain range to the west.) Tonti eventually met up with

survivors of La Salle's expedition, among them La Salle's brother and nephew and his assistant HENRI JOUTEL.

In 1689, Tonti, having learned of La Salle's death, led an expedition into Texas in search of other survivors, reaching as far as what is now northern Houston County.

In 1690, back at his post on the Illinois, Tonti received a trade monopoly over the Mississippi River, and, the following year, he established a settlement at Pimitoui near what is now Peoria, Illinois. However, he was unsuccessful in gaining support for the development of the lower Mississippi as a southern outlet for the fur trade, meeting resistance from rival traders in Montreal and the Great Lakes.

In 1695, Tonti went to the Lake Superior region, established trade contacts with the Assiniboine Indians and explored the upper Nelson River, seeking a way to attack the English fur-trading posts on HUDSON BAY.

In the last years of his life, Tonti joined with PIERRE LE MOYNE, sieur d'Iberville, in establishing French colonies along the Gulf coast of what is now Alabama, Mississippi, and Louisiana. In 1704, at Fort Louis-de-la-Louisiane (present-day Mobile, Alabama), he contracted yellow fever and died.

Henri de Tonti carried out many of La Salle's plans to develop French influence in the lower Mississippi Valley. Following La Salle's death in 1687, his efforts led to French dominance over the region between the Great Lakes and the Gulf of Mexico. Among the Indians, Tonti was known as Bras de Fer, or "Iron Arm," because of his artificial right arm. His ability with this artificial limb led the Indians to believe he had supernatural powers and helped gain their loyalty in trade and in military actions against the Iroquois.

Torres, Luis Váez de (unknown–ca. 1615)

Spanish mariner in the South Pacific

Luis Váez de Torres was a leading Spanish sea captain and a friend of PEDRO FERNÁNDEZ DE QUIRÓS. In December 1605, he sailed from Callao, Peru, in command of the *Almirante*, one of the three vessels in Quirós's expedition into the Pacific Ocean in search of Terra Australis, the GREAT SOUTHERN CONTINENT.

In early May 1606, Torres and Quirós landed on the island of Espiritu Santo in the New Hebrides, which Quirós had mistaken for the mainland of the Great Southern Continent. An attempt to establish a settlement there was short-lived; Quirós abandoned the colony in early June 1606. At the start of the return voyage, the ships became separated. Torres waited offshore for 15 days; Quirós headed eastward across the Pacific toward Mexico.

Torres had been provided with sealed instructions from the viceroy of Peru for just such an event. Following these orders, he sailed southwestward as far as 20°30' south latitude, still searching for the Great Southern Continent. He may have sighted the Great Barrier Reef off the coast of

Queensland, Australia, although he reported finding no land.

Torres next turned northwestward and made the European discovery of what later became known as the Louisiade Archipelago off the east coast of New Guinea. Although he had planned to sail northward around New Guinea on his way to the Philippines, strong currents caused him to coast along the south shore of New Guinea, through the Gulf of Papua and into an uncharted passage separating southern New Guinea from northern Australia's Cape York. He then headed for Ternate in the Moluccas, then northward for the Philippines.

When Torres arrived in Manila, his ship was requisitioned by Spanish authorities, and he was compelled to remain there. In July 1607, he sent a letter to King Philip III of Spain relating that he had determined New Guinea to be an island, and that it therefore could not be the northern end of the Great Southern Continent, as had been thought.

Although Luis Vázquez de Torres had also described the passage he found along New Guinea's south coast, the information was kept secret by Spanish authorities. It was not until after the capture of Manila by British forces in 1762, in which Spanish navigational documents were recovered, that the news of the strait separating New Guinea from Australia became widely known. The first European to confirm the existence of what became known as Torres Strait was JAMES COOK, who passed through it in 1770.

Tovar, Pedro de (Pedro de Tobar) (fl. 1540s)

Spanish army officer in the American Southwest

Pedro de Tovar, a Spanish soldier, was one of FRANCISCO VÁSQUEZ DE CORONADO's lieutenants in his 1540–42 expedition into what is now the southwestern United States. A week after the Spaniards had conquered the Zuni Indian pueblo of Hawikuh in what is now northwestern New Mexico, Coronado detailed Tovar to undertake an exploration to the north and west.

Accompanied by Friar JUAN DE PADILLA, a Franciscan missionary, and a small detachment of soldiers, Tovar set out from Hawikuh on July 15, 1540, and traveled into a region known by the Indians as Tusayan. Within a few weeks, the party came upon the large Hopi Indian pueblo at Awatovi in present-day northeastern Arizona. Although the Hopi at first attacked Tovar and his party, they were quickly subdued in a brief skirmish. Five nearby Hopi pueblos also surrendered, offering the Spaniards gifts of cloth, animal skins, turquoise, and corn.

When Tovar returned to Hawikuh later that summer, he reported to Coronado that he had learned from the Hopi of a great river to the west, in a region supposedly inhabited by giants. The news prompted Coronado to send out GAR-

CÍA LOPÉZ DE CÁRDENAS to investigate, resulting in the Spanish discovery of the Grand Canyon and upper portion of the COLORADO RIVER.

Pedro de Tovar and his party were the first Europeans to make contact with the Hopi. His explorations into northern Arizona were not followed up until ANTONIO ESTEVAN DE ESPEJO visited the region in 1582–83.

Tristão, Nuño (Nuno Tristan) (fl. 1440s)

Portuguese mariner on the coast of West Africa

Nuño Tristão was a member of the royal household of HENRY THE NAVIGATOR, Prince of Portugal.

In 1441, with the support of Prince Henry, Tristão undertook a voyage of exploration along the coast of West Africa. He reached as far south as Cape Blanco. Antão Gonçalves, who was part of the expedition, returned to Portugal with a number of native people.

On a second voyage in 1443, Tristão made the European discovery of Arguin Island, just beyond Cape Blanco. The next year, he landed on the northern delta of the Senegal River, becoming the first modern European to visit West Africa south of the SAHARA DESERT.

Tristão returned in 1448 to Arguin Island, where he established the first Portuguese slaving station on the coast of West Africa.

Nuño Tristão's voyages brought about the first contacts between Europeans and non-Muslim black Africans. The Portuguese SLAVE TRADE, which he had been instrumental in initiating, became a strong incentive for later Portuguese explorations along the African coast. His exploration of Cape Blanco was a significant step in the progression of Portuguese travel along the coast of West Africa, indicating to navigators and geographers that beyond that point, the African mainland began to extend southward.

Truteau, Jean-Baptiste (Jean-Baptiste

Trudeau) (1748–1827) *French-Canadian fur trader on the Missouri River, schoolteacher*

Originally from Montreal, Jean-Baptiste Truteau had been an Indian trader in the Des Moines River region of present-day central Iowa before settling in St. Louis in 1774, where he became the town's first schoolmaster.

In 1794, the company of explorers of the upper Missouri (the Missouri Trading Company) commissioned Truteau to lead a trading and exploring expedition up the MISSOURI RIVER. The enterprise had been organized in part by the lieutenant governor of Spanish Louisiana, Zenon Trudeau, a distant relative, who wanted to drive out British fur traders encroaching on Spanish territory in the upper Missouri region. In addition to opening up fur-trading contacts with the upper Missouri tribes, Truteau had been in-

structed to travel to the source of the Missouri and determine if it led to the Pacific Ocean.

Truteau, accompanied by Jacques Clamorgan of the Missouri Trading Company and a small party, set out from St. Louis on June 7, 1794, traveling up the Missouri by CANOE with trade goods. In what is now southern South Dakota, the expedition encountered Sioux (Dakota, Lakota, Nakota) Indians, with whom they traded for beaver pelts. They continued upstream to the Arikara Indian villages at the mouth of the Grand River near the present South Dakota-North Dakota border.

Truteau and his party spent the winter of 1794–95 at a post they established on the Missouri, south of Sioux country, in what is now south-central South Dakota. In spring 1795, he again visited the Arikara and traveled with a group of them into the Black Hills. He made contact with the Cheyenne and learned of other Plains Indians with whom the French and Spanish could extend their influence in the FUR TRADE on the upper Missouri and the northern plains.

Truteau returned to St. Louis at the end of summer 1795, reporting to Zenon Trudeau that, according to the Indians, large boats could navigate far up the river to its source. He also related what he had learned about the extent of British influence in the fur trade on the upper Missouri.

Jean-Baptiste Truteau resumed his teaching career in St. Louis, serving as the village schoolmaster until the early 1800s. The journal that he had kept of his trip up the Missouri came to the attention of President Thomas Jefferson who in winter 1803–04, sent an English translation of it to MERIWETHER LEWIS at his encampment near St. Louis, where he was preparing for his expedition to the Oregon coast with WILLIAM CLARK. Along with other sources, Truteau's account may have provided the American explorers with information about the Indian tribes they could expect to encounter, as well as geographic details about the little-known country of the upper Missouri River.

Tschudi, Johann Jakob von (1818–1889)

Swiss naturalist, diplomat in South America

Born at Glaurus in northeastern Switzerland, Johann Jakob von Tschudi received his early scientific training as a student of the naturalist Louis Agassiz.

In 1838, at the age of 20, Tschudi traveled to the Pacific coast of South America. In the course of the next four years, he roamed over a wide area of Peru, studying the native culture and visiting sites of archaeological interest. He toured the mining country of the Cerro de Pasco region of central Peru and explored parts of the Peruvian ANDES MOUNTAINS never before visited by Europeans. On his second trip to South America in 1857, Tschudi landed at Buenos Aires, then made a mid-winter crossing of South America to Chile,

during which he traveled through the upper Rio de la Plata region of northern Argentina.

In 1860, Johann von Tschudi became Swiss ambassador to Brazil, and he later went on to a diplomatic post in Austria. Among his works on his experiences in South America are *Travels in Peru* and *Travels in South America* (1847), in which he relates his impressions of Spanish and Indian culture and provides descriptions of exotic animals and plants.

Tsybikov, Gombozhab (1873–1930)

Russian historian, anthropologist in Tibet

Gombozhab Tsybikov was born in Burjatija in southeastern Russia near the Mongolian border. In 1895, he joined the faculty of the Oriental Department of St. Petersburg University. Four years later, he received a commission from the Russian Imperial Geographical Society to travel to Tibet in order to counter British interests. Great Britain had successfully sponsored surveys carried out by the Indian surveyors known as PUNDITS, among them NAIN SINGH, KISHEN SINGH, and KINTUP.

Tsybikov, disguised as a Buddhist pilgrim and traveling with a Mongolian caravan, entered Tibet in 1900. He spent two years based in LHASA and traveled to a number of monasteries, including those at Tashi Lhunpo, Tsetan, and Samye. Returning to Russia, he later taught at universities in Vladivostok and Irkutsk.

Although the Russian government had hoped that Gombozhab Tsybikov's stay in Tibet would lead to political ties, his primary interest was scholarly, and his writings on Tibetan culture and history are a major contribution to the field. A subsequent visit was carried out by another Buddhist scholar, Agran Dorjiev, who proposed a Russian-Tibetan alliance. These activities led to a British military expedition headed by SIR FRANCIS EDWARD YOUNGHUSBAND.

Tudela, Benjamin of See BENJAMIN OF TUDELA.

Turk (The Turk, El Turco) (unknown–1541) *Plains*

Indian guide for Spanish under Francisco Vásquez de Coronado
The American Indian known as the Turk was probably a Pawnee from the Great Plains region of what is now Kansas or Oklahoma.

In 1540, the Turk was living as a slave to Towa Indians at their pueblo on the Pecos River, near present-day Las Vegas, New Mexico. That year, HERNANDO DE ALVARADO, leading a contingent of FRANCISCO VÁSQUEZ DE CORONADO's exploring expedition, arrived at Cicuye Pueblo (Pecos Pueblo) and conquered it.

The Turk, so named by the Spaniards because of his Turkish-style headdress, told Alvarado of QUIVIRA, an Indian land of great wealth far to the north and east.

The Turk led Alvarado and his men eastward along the Pecos and Canadian Rivers onto the Great Plains, then was taken back to Coronado's headquarters at Tiguex on the Rio Grande, near what is now Albuquerque. Coronado's efforts to find the fabled Seven Cities of CIBOLA, with their hoped-for gold and other riches, had so far been fruitless. The Turk's tales rekindled Coronado's hopes of finding an Indian civilization as rich as the Aztec of Mexico or the Inca of Peru.

In spring 1541, the Turk guided Coronado and a large company of soldiers northeastward from Tiguex into the barren Staked Plains region of the Texas Panhandle. Another Plains Indian, named Ysopete, accompanied the expedition.

The Turk led the Spanish northward from Texas, through Oklahoma, to the Arkansas River, which they crossed near what is now Dodge City, Kansas. By that time, Coronado had grown to doubt the truth of Turk's stories and had him placed in chains. The Spaniards continued into Kansas, now led by Ysopete. A small party was sent ahead to what was thought to be Quivira, near present-day Lindsborg, Kansas. The village turned out to be an impoverished settlement probably of the Wichita Indian, on the Kansas plains. Soon afterward, the Spaniards encountered a party of 200 Pawnee warriors. When Coronado learned that the Turk had attempted to incite the Pawnee against his men, he had him executed by the garrote. He then led the expedition back to the Southwest.

The Turk's death at the hands of the Spanish may have stemmed more from their disappointment at not finding gold than from his suspected treachery. Some historians suggest that the Turk may have been sincere about the "riches" of Quivira, intending to take the Spaniards to the Pawnee, whose magic and medicine were highly valued by the Plains Indians. Or he may have been part of a scheme of the Towa Indians to send the Spanish far from their homeland, where

they might perish. In any case, the Turk's knowledge of the region's geography was invaluable to the Spaniards in their explorations.

Turner, Samuel (ca. 1749–1802) *British army officer in India and Tibet*

Samuel Turner was born near Gloucester, England. He was a relative of Warren Hastings, governor general of British India and a high-ranking BRITISH EAST INDIA COMPANY official.

Turner himself entered the service of the British East India Company in 1780. In Calcutta, in January 1783, he was put in charge of a diplomatic mission to the "newly reincarnated" Tashi Lama in Tibet. From Calcutta, he followed the route GEORGE BOGLE had taken in his 1774 journey to Tibet. Turner reached Bhutan in June 1783, and, that August, he arrived in the Tibetan city of Shigatse. In December 1783, Turner was granted an audience with the Tashi Lama, who then was only 18 months old. Instructed that the child could understand him, Turner presented the Tibetan leader with greetings from the governor general of India; he then sought to establish diplomatic ties with the Tibetan regency. Turner retraced his route back to India, where he reported the results of his mission to Governor General Hastings at Patna in northeastern India in March 1784.

Throughout the 1790s, Turner took part in military engagements in India under the command of General Charles Cornwallis. In 1800, he retired from the British East India Company at the rank of captain and returned to England, where he was elected a fellow of the ROYAL SOCIETY the following year.

Samuel Turner's *An Account of an Embassy to the Court of the Teshoo Lama in Tibet, containing a Narrative of a Journey through Bootan and part of Tibet* (1800) was the first published description of Tibet written by an Englishman.



Ulloa, Francisco de (unknown–ca. 1540)

Spanish mariner in North America

Francisco de Ulloa was an officer with HERNÁN CORTÉS in the conquest of Mexico in 1519–21, commanding naval forces on Lake Texcoco in the final siege of Mexico City in 1521.

Ulloa went on to accompany Cortés in several voyages of exploration into the lower Gulf of California in the early 1530s, and, in 1535, he was left in charge at Santa Cruz (present-day La Paz), Cortés's settlement on the east shore of southern Baja California.

In 1539, Cortés placed Ulloa in command of a seaward expedition to explore northward along the west coast of Mexico, interest in the region having been sparked by ALVAR NÚÑEZ CABEZA DE VACA's reports describing the supposed riches of the fabled Seven Cities of CIBOLA. Cortés directed Ulloa to conduct a reconnaissance along the Pacific coast of Mexico as far north as possible.

On July 8, 1539, Ulloa embarked from Acapulco in command of three ships, the *Santo Tomás*, the *Santa Águeda*, and the *Trinidad*. In late August, the *Santo Tomás* became separated from the fleet in a storm and sought shelter on the Mexican coast. The vessel was soon seized by government authorities on the order of the viceroy of New Spain, ANTONIO DE MENDOZA, who had forbidden any seaward exploration without his authorization—something Cortés had neglected to obtain. Only a few months earlier, Mendoza himself had sent Fray MARCOS DE NIZA and ESTEVAN-ICO northward on an overland expedition in search of

Cibola, and he was concerned that Ulloa might find it first on behalf of Cortés.

Ulloa and his two remaining ships sailed northward to the head of the Gulf of California, making several landings in which he claimed the northern Mexican coast for the king of Spain. Upon reaching the mouth of the COLORADO RIVER, he observed that the outflow of the river made the waters of the gulf appear to be red in color, prompting him to name the area the Vermillion Sea. He explored up the Colorado River for a few miles in one of the ship's boats, reaching far enough upriver to see mountain peaks in the southeasternmost corner of what is now the state of California.

Ulloa then turned southward and surveyed the east coast of Baja. After a stopover at Santa Cruz, he rounded Cape San Lucas, Baja California's southernmost point, and proceeded up the Pacific coast, reaching and naming Cape Santo Lazaro and Punta Santa Eugenia, as well as an island he called Isla de Cedros, after the groves of cedar trees there.

In April 1540, Ulloa sent back one of his ships with a report to Cortés of what he had observed, then continued northward. After this point in the voyage, accounts vary as to what happened next. Some sources suggest Ulloa failed to return from the voyage and nothing was heard of him afterward. Other accounts indicate he sailed up the California coast to a point just south of present-day San Diego, California, and, on encountering unfavorable winds, returned to Acapulco in late May 1540, where he died soon afterward in a fight with another soldier.

Francisco de Ulloa is credited with making the first known European sighting of territory within the present state of California. He was the first to circumnavigate the Gulf of California, and, as a result, made the earliest determination that Baja California, thought to be an island since it was first sighted in 1533, was actually a peninsula. This finding did not become widely known until the 1690s, when Father EUSEBIO KINO mapped the region in his overland travels around the mouth of the Colorado River. A firsthand account of Ulloa's expedition, prepared by his secretary, Francisco Preciado, was translated into English by JAMES BURNEY and published in England in 1803, as *The Voyage of the Right Worshipful Knight Francisco de Ulloa*. . . .

Urdaneta, Andrés de (Andrés Urdaneta, André de Urdaneta, Andrys de Urdaneta)

(1498–1568) *Spanish mariner in the South Pacific, priest*
 Andrés de Urdaneta was born near Guernica in the Basque country of northern Spain. In 1525, he sailed with JUAN SEBASTIÁN DEL CANO as his page on a voyage to the SPICE ISLANDS (the Moluccas in present-day Indonesia). In the course of the expedition, intended as a follow-up to the FERDINAND MAGELLAN voyage of 1519–22, Urdaneta explored the STRAIT OF MAGELLAN in a small boat. Then, beginning in fall 1526, he undertook navigational surveys in the Spice Islands.

Urdaneta remained in the Spice Islands for the next seven years, during which he took part in military campaigns against the Portuguese and also studied mathematics and compiled geographic and navigational information about the region. In 1534, more than four years after Spain had relinquished its claim on the Spice Islands to Portugal, he sailed back to Europe on a Portuguese ship, by way of India and the CAPE OF GOOD HOPE, arriving at Lisbon in June 1536 and thereby completing a round-the-world journey begun more than 10 years earlier.

Urdaneta was detained by Portuguese authorities in Lisbon for seven months before he was permitted to continue to Spain. They also confiscated all the maps and journals he had kept of his travels in the Moluccas and the Philippines. Nevertheless, after he reached the Spanish capital at Valladolid at the end of February 1537, he recreated his work from memory and presented it to Spain's Royal Council. For his exploits in the southwestern Pacific, King Charles I of Spain (also Holy Roman Emperor Charles V) presented him with a substantial cash grant.

Urdaneta soon became known as one of Spain's leading explorers of the southwestern Pacific Ocean, and as a result he was recruited to join with PEDRO DE ALVARADO in a westward voyage to the Philippines from Mexico planned for 1540. He sailed that year to Mexico, where he soon became involved in suppressing an Indian revolt that became

known as the Mixtón War. In 1541, when Alvarado was killed in the course of that campaign, the planned expedition into the Pacific was abandoned.

Urdaneta remained in Mexico, serving in various administrative posts until 1552, when he entered the Augustinian order. He became a priest in 1557. Two years later, King Philip II of Spain called upon him to take part in another expedition to the western Pacific. Although his having become a priest excluded him from command of the voyage, he was instead named as "Prior of the Armada," and, in effect, chief pilot. On Urdaneta's recommendation, his friend and fellow Basque MIGUEL LOPEZ DE LEGAZPI was placed in charge of the expedition.

Urdaneta and Legazpi embarked from Navidad on Mexico's Pacific coast in November 1564 and, after stopping at Guam, they arrived in the Philippines in February 1565. There, on the island of Cebu, they established the first permanent Spanish settlement.

On June 1, 1565, Urdaneta sailed from the Philippines aboard the *San Pedro*, commanded by Legazpi's grandson Felipe de Salgado, in an attempt to navigate eastward across the Pacific and back to Mexico, a feat that until then had not been possible due to the adverse effect of the northeast trade winds. Urdaneta, as pilot, set a course far to the north of earlier attempts, and, at the latitude of northern Japan, picked up the prevailing easterly winds and the Japan Current, which carried the ship to the California coast, off present-day Santa Barbara. From there the expedition followed the coastline southward, arriving at the port of Acapulco on September 18, 1565.

Although Urdaneta had planned to return to the Philippines to carry on missionary work, his health began to decline. He died in Mexico City in 1568.

Andrés de Urdaneta's voyage on the *San Pedro* was the second eastward crossing of the Pacific Ocean. Another vessel of Legazpi's fleet, the *San Lucas*, under the command of Alonzo de Arellano, had returned to Mexico from the Philippines just several weeks ahead of the *San Pedro*. Only Urdaneta had kept a careful account of the course, however, and his sailing directions enabled the Spanish treasure fleet, the "Manila Galleon," to sail eastward regularly across the Pacific. The sea route he had pioneered across the Pacific, utilized by the Spanish until 1815, made the long, round-about homeward voyage by way of the Cape of Good Hope unnecessary and completed a practical, two-way link between Spain and the Orient through Mexico.

Ursúa, Pedro de (ca. 1526–1561)

Spanish conquistador in South America

Pedro de Ursúa arrived at Cartagena on the Caribbean coast of present-day Colombia in 1545, where he joined his uncle, Miguel Díaz de Armendariz, a colonial administrator of

what was then the province of New Granada. Although then only 20 years of age, he was appointed governor of what is now Bogotá by Arméndariz.

In the Bogotá area, Ursúa asserted Spanish authority, leading several successful campaigns against the Musos Indians and establishing several new settlements. He was made mayor of the coastal town of Santa Marta in 1549, where he was less successful in subduing the Tairona.

Ursúa set out for Peru in 1552, drawn there by the prospect of new adventures and possible wealth. Along the way, he stopped in Panama, where he remained for two years, taking part in the suppression of a slave revolt. In Peru, he entered the service of the Spanish viceroy, the Marquis de Cuñete, who, in 1558, commissioned Ursúa to lead an expedition across the ANDES MOUNTAINS and into the Amazon Basin in search of the fabled wealth of the Omagua Indians and the fabled land of EL DORADO.

Ursúa, in command of 300 Spaniards and a number of Indians and slaves, left Lima in February 1559. Traveling with him was his mistress, Doña Inez de Atienza. After a series of delays, caused mainly by difficulties in obtaining sufficient financing and equipment, as well as problems with

his lieutenants, he set out down the Huallaga River in October 1560. A contingent of carpenters had been sent ahead to construct boats for the main river journey down the AMAZON RIVER.

From the Huallaga, Ursúa and his expedition made their way into the Marañon and Ucayali Rivers, entering the main course of the Amazon by December 1560. On January 1, 1561, near the Amazon's confluence with the Putumayo River in present-day western Brazil, Ursúa was murdered by mutineers led by LOPE DE AGUIRRE, who soon afterward killed Doña Inez as well. Aguirre then led the expedition down the Amazon and the ORINOCO RIVER to the coast of Venezuela, intent on returning to Peru to stage a full-scale rebellion against the Spanish viceroy.

Pedro de Ursúa led one of the first organized attempts to find the fabled El Dorado, inspired by the earlier tales of FRANCISCO DE ORELLANA. After his murder, the men with whom he had set out from Lima went on to make the second European crossing of South America. Ursúa's death at the hands of Aguirre and his men marked the beginning of one of the bloodiest episodes in the history of Amazon exploration.



Vaca, Álvar Núñez Cabeza de See CABEZA DE VACA, ÁLVAR NÚÑEZ DE.

Valcavado, Beatus of See BEATUS OF VALCAVADO.

Valdez, Gonzalo Fernández de Oviedo y
See FERNÁNDEZ DE OVIEDO Y VALDEZ, GONZALO.

Valdivia, Pedro de (ca. 1500–1553)

Spanish conquistador in South America

Pedro de Valdivia was born at Villanueva de la Serena in the Estremadura region of west-central Spain. In his early military career, he served with the Spanish army in Italy and Flanders, and, in 1535, he left Spain for the northeast coast of South America, where he took part in the conquest of what is now Venezuela.

In 1537, Valdivia arrived in Peru, becoming an officer under FRANCISCO PIZARRO. The next year, he played a prominent role in the defeat of Pizarro's chief rival, DIEGO DE ALMAGRO. As a reward for Valdivia's support, Pizarro consented to his request to lead an expedition into the lands south of Peru in present-day Chile.

In January 1540, Valdivia set out from Cuzco in command of a party of 24 Spaniards and a contingent of 1,000 Indians. He followed the Inca Road southward along the coast, a route Almagro had previously taken in his unsuccessful

probe into Chile five years earlier. After crossing the Atacama Desert, Valdivia founded Copiapó and explored southward into the Coquimbo region, which he named Nueva Estremadura after his homeland. Joined there by another 100 Spaniards, he continued his march southward.

On February 12, 1541, Valdivia established Santiago, the first permanent European settlement in Chile. During the following years, he brought in European settlers to develop the area agriculturally after it had become apparent that the region, unlike Peru, did not contain an abundance of mineral wealth. He also undertook explorations eastward across the ANDES MOUNTAINS into the Pampas of what is now western Argentina and continued to push southward along the coast. In 1544, Valdivia reestablished the seaport at Valparaíso, and, by 1546, he had taken control of the country as far southward as the Bío-bío River.

In 1547, Valdivia returned to Peru to aid in suppressing GONZALO PIZARRO's rebellion against the Spanish viceroy. Named as Chile's first governor general in 1549, in recognition of his loyal service in Peru, Valdivia returned to Santiago and resumed his explorations southward. On October 15, 1550, he established the city of Concepción at the mouth of the Bío-bío, and soon afterward, he initiated coastal explorations by ship, which led to his founding the city of Valdivia in 1552.

Valdivia soon traveled again across the Andes, where he founded the city of Santiago del Estero in 1553, in what is now the Gran Chaco region of Argentina. That same year, he sent out ships to explore southward along the

coast, one of which located the western entrance to the STRAIT OF MAGELLAN, making the first west-to-east passage through it. Valdivia himself explored southward along the coast, reaching Reloncavi Bay, and also traversed the Andes again to examine the upper Río Negro in what is now Argentina.

Valdivia's efforts to colonize Chile were continually hampered by Araucanian Indian uprisings. One of his former Araucanian servants, Lautaro, led a rebellion in which the Indians captured Valdivia in an ambush near Concepción in December 1553 and soon executed him.

By the 1550s, Pedro de Valdivia's explorations along the coast and into the interior of Chile had delineated the last remaining geographic details of South America west of the Andes and as far southward as the Strait of Magellan. Valdivia was unique among the other early Spanish CONQUISTADORES in South America in that he established seaports and agricultural settlements rather than just seeking gold. Santiago, Concepción, La Serena, and Valdivia, all founded by him, endured to become the most important cities in Chile. He was later immortalized as the hero of Chilean poet Alonso de Ercilla y Zúñiga's epic work on the Araucanian Indian wars in Chile, *La Araucana*, completed in 1589.

Vambéry, Armin (Arminius Vambéry, Hermann Vambéry) (1832–1913) *Hungarian linguist, traveler in central Asia*

Born in the Hungarian city of Szerdahely, Armin Vambéry was a student of languages. In 1857, Turkish statesman and grammarian Fuad Pasha engaged him as his secretary and French instructor in Constantinople (present-day Istanbul), and while residing there, Vambéry learned several Turkic languages of central Asia.

From 1861 to 1864, Vambéry undertook a series of travels into Armenia, Persia (present-day Iran), Uzbekistan, and Turkistan. Using the alias Rustem Effendi and disguised as a Turkish dervish, he traveled into regions little known to Europeans. Aided by his facility with the local languages, he managed to visit Bukhara and Samarkand, cities that were then forbidden to non-Muslims.

Vambéry had journeyed into central Asia to expand his knowledge of Turkish languages. Yet published accounts of his experiences gained him world-wide renown as a traveler to exotic places. In 1865, he was appointed professor of Oriental languages at the University of Budapest, a position he held until 1905.

Armin Vambéry was one of the first Europeans to travel across Turkistan since the days of MARCO POLO, and one of the last to visit Samarkand and Bukhara before those ancient caravan centers came under Russian domination in the later 1860s.

Vancouver, George (1757–1798) *British naval officer in the Pacific and along the west coast of North America*
Born in King's Lynn on the east coast of England, George Vancouver entered the British navy in 1770. He served as a midshipman with JAMES COOK's second voyage to the South Pacific Ocean in 1772–75, as well as with Cook's third voyage of 1776–80, in the course of which he first sailed along the Pacific coast of North America.

Commissioned a lieutenant in 1780, Vancouver served on naval escorts in the Caribbean Sea and North Sea throughout the 1780s.

Promoted to commander, Vancouver sailed from Falmouth, England, on April 1, 1791, in command of Cook's former ship, the *Discovery*, accompanied by the *Chatham*, under the command of Lieutenant WILLIAM ROBERT BROUGHTON. Vancouver had been directed to survey the west coast of North America in support of British fur-trading interests and continue the search for the western entrance to the NORTHWEST PASSAGE, as well as to carry out a diplomatic mission in the region. He entered the Pacific by way of the CAPE OF GOOD HOPE, and as he sailed northward, he charted the coasts of NEW ZEALAND and Australia and established the exact positions of the HAWAIIAN ISLANDS. By spring 1792, he was off the North American coast at San Francisco Bay. Broughton, meanwhile, had reached North America and explored the mouth of the COLUMBIA RIVER.

Vancouver undertook a detailed coastal survey in which he charted the Strait of Juan de Fuca and the Strait of Georgia on the coast of present-day Washington State. He thoroughly explored a long coastal inlet, naming it Puget Sound in honor of Peter Puget, one of his officers. A glacier-covered mountain on the mainland was sighted, which he named Mount Rainier after another of his officers, Peter Rainier.

At the end of August 1792, Vancouver sailed into Nootka Sound on the coast of present-day British Columbia, where he met with Spanish naval officer JUAN FRANCISCO DE LA BODEGA Y QUADRA and conferred over the Nootka Sound Crisis of 1789, an international dispute between England and Spain concerning territorial rights in those waters.

Vancouver spent the next two summer seasons exploring and charting the coast of North America, from Cook Inlet near present-day Anchorage, Alaska, as far south as San Diego, California. He wintered in the Hawaiian Islands. In charting the coast of what is now British Columbia, Vancouver circumnavigated the largest island on the Pacific coast of North America. It was later named Vancouver Island in his honor.

Vancouver sailed eastward around the tip of South America on the homeward voyage, and, on arriving back in England in September 1795, he had completed a CIRCUM-

NAVIGATION OF THE WORLD. His account of his 1791–95 expedition, *A Voyage of Discovery to the North Pacific Ocean and Round the World*, was first published in 1798, only a few months before his death at the age of 41.

George Vancouver's explorations firmly established that no Northwest Passage linking the Atlantic and Pacific Oceans existed south of the icebound regions of the Bering Sea. The charts he produced of the lower Columbia River based on Broughton's explorations were of help to MERIWETHER LEWIS and WILLIAM CLARK in 1805, during the final stage of their overland journey to the Oregon coast. England's later claim on the Oregon Country was based partly on Vancouver's extensive survey along the coast of what is now Oregon, Washington, British Columbia, and southeastern Alaska.

Vanderburgh, William Henry (ca. 1798–1832)

American fur trader, trapper on the upper Missouri River and in the northern Rocky Mountains

Born at Vincennes in the Indiana territory, William Vanderburgh was the son of a territorial judge and former Revolutionary War army officer from New York State. He entered West Point in 1813 but left before graduation to embark on a career in the FUR TRADE along the MISSOURI RIVER.

Vanderburgh went to work for WILLIAM HENRY ASHLEY's fur company, taking part in expeditions up the Missouri into the Dakotas. In 1823, he was a captain of volunteers in Colonel HENRY LEAVENWROTH's punitive expedition against the Arikara Indians in what is now north-central South Dakota.

By 1829, Vanderburgh had joined up with JOHN JACOB ASTOR's AMERICAN FUR COMPANY and operated out of Fort Union at the mouth of the Yellowstone River, under the direction of KENNETH MCKENZIE. He was put in charge of the company's activities in the northern ROCKY MOUNTAINS, competing directly with independent fur traders such as JAMES BRIDGER and THOMAS FITZPATRICK. In 1829–30, Vanderburgh penetrated deep into Blackfoot Indian territory in western Montana, where he was involved in a skirmish with the Indians.

In 1832, Vanderburgh followed Bridger and Fitzpatrick into the Rockies, thereby learning the locations of some of the best fur-trapping areas. The two veteran mountain men soon caught on to Vanderburgh's tactic. When they left that year's annual fur traders' rendezvous at Pierre's Hole in what is now western Wyoming, they deliberately led him northward into hostile Blackfoot country. On October 14, 1832, near present-day Three Forks, Montana, Vanderburgh and his party were caught in a Blackfoot ambush. Vanderburgh was killed, along with one of his men; four others with him managed to escape, later returning to recover his remains.

William Vanderburgh's career in the fur trade took him into the upper Missouri and into the northern Rockies at a time when the region was all but unsettled and largely unexplored by non-Indians. His exploits brought him into contact with some well-known frontier figures who played key roles in the exploration of the American West.

Van Noort, Oliver See NOORT, OLIVER VAN.

Varthema, Ludovico di (Lodovico di Varathema, Lodovico de Barthema)

(ca. 1470–ca. 1517) *Italian traveler in the Middle East, India, and Southeast Asia*

Ludovico di Varthema was born in the northern Italian city of Bologna. Little is known of his life before 1502, when he sailed from Venice into the eastern MEDITERRANEAN SEA, beginning his extensive travels into the Middle East and Asia.

Varthema first visited the Egyptian cities of Cairo and Alexandria, then sailed to the coast of Lebanon, disembarking in Beirut. He headed northward to Tripoli, then entered Syria, arriving in Damascus in April 1503. Having learned enough Arabic to pass himself off as a Muslim, Varthema joined a group of Mameluke soldiers hired as armed escorts for a party of pilgrims heading for the holy cities of Mecca and Medina to the south.

Varthema arrived in Mecca with the pilgrims in late May 1503, the first European non-Muslim known to have reached that sacred city. He remained for almost three weeks. After continuing to Medina, he deserted the Mamelukes and boarded a ship at the RED SEA port of Jidda, with plans to sail to India.

At the port of Aden near the mouth of the Red Sea, Varthema was arrested on orders of the sultan, who suspected that the Italian traveler was a Christian spy. According to his own account, Varthema was at first imprisoned, then managed to gain his release through romantic involvement with one of the sultan's wives. He then traveled extensively in southwestern Arabia and Yemen, heading inland to the city of Sanaa.

After several months in Arabia, Varthema sailed from Aden by way of the Ethiopian coast and the Arabian Sea, landing at the northwestern Indian port of Diu in early 1504. Instead of continuing into India, however, he went up through the Strait of Hormuz and into the Persian Gulf. He then traveled eastward across Persia (present-day Iran) and into Afghanistan, visiting Herat in an unsuccessful attempt to reach the legendary city of Samarkand.

Back at Shiraz in Persia, Varthema befriended a wealthy Persian merchant, with whom he sailed to India, visiting the Malabar Coast city of Calicut before going on to CEYLON (present-day Sri Lanka) and the Madras region on India's

southeast coast. From Madras, Varthema and his Persian companion sailed eastward across the Bay of Bengal to Malaya, Burma, and the islands of Java and Sumatra in present-day Indonesia. They traveled into Southeast Asia, touring Siam (present-day Thailand), and probably sailed to the SPICE ISLANDS (the Moluccas) and Celebes Island, also in present-day Indonesia.

Varthema was back in India by 1505, where he entered the service of the Portuguese, taking part in military actions against the local natives at the Malabar Coast city of Cannanore. For his efforts, the Portuguese viceroy of India awarded him a knighthood.

In December 1507, Varthema sailed back to Europe on a Portuguese vessel, making stops at Moçambique and other East African coastal ports, before rounding the CAPE OF GOOD HOPE and reaching Lisbon by way of the AZORES. After a royal reception by King Manuel I of Portugal, Varthema returned to Italy in 1508.

Ludovico di Varthema settled in Rome, where he soon set to work on an account of his exploits. Published in 1510, his *Travels of Ludovico di Varthema in Egypt, Syria, Arabia Deserta and Arabia Felix, in Persia, India, and Ethiopia, A.D. 1503 to 1508* was very well received; the first English edition appeared in 1576–77. Although the Portuguese had perfected a sea route around Africa to India by the time of his visit, Varthema's travels marked the first time a European had reached the Far East by way of the Mediterranean and Red Seas and then had returned to Europe in a sea voyage around Africa. Moreover, Varthema's travel account provided 16th-century European cartographers with a better idea of the geography of Asia.

Vasquez, Louis (1798–1868) *American fur trader, merchant in the Rocky Mountains*

Louis Vasquez, a native of St. Louis, became involved in the FUR TRADE on the nearby MISSOURI RIVER at an early age. In the early 1820s, he worked for WILLIAM HENRY ASHLEY'S AMERICAN FUR COMPANY, taking part in trading expeditions up the Missouri River into present-day South and North Dakota and into the northern ROCKY MOUNTAINS in what is now northern Utah and southwestern Wyoming.

Vasquez went into business in the 1830s with ROBERT CAMPBELL, with whom he brought goods and supplies to the annual rendezvous of fur traders on the Green River in 1833. Two years later, together with Andrew Sublette, brother of WILLIAM LEWIS SUBLETTE, Vasquez established a post on the South Platte River, near the site of what later became Denver, Colorado. Known as Fort Vasquez, it soon became a trading hub in the southern Rockies; from there, Vasquez shipped furs and hides down the South Platte and Platte Rivers to the Missouri and on to St. Louis. He also pioneered an overland route southward to Bent's Fort, thereby

linking his post with the Santa Fe Trail and the Arkansas River.

In 1843, Vasquez, in partnership with JAMES BRIDGER, established Fort Bridger on Black's Fork of the Green River in present-day southwest Wyoming. Located near the SOUTH PASS, the settlement served as a key stopping and resupply point along the Oregon and California Trails throughout the 1840s and 1850s. Vasquez sold his interest in Fort Bridger to Mormons in 1855, settling with his family in Westport, Missouri.

Louis Vasquez's frontier business enterprises included the establishment of outposts vital to the development of regular travel and communication in the Rockies. The trail he blazed in the late 1830s between Bent's Fort on the Arkansas River northward and Fort Vasquez on the South Platte became a key route for prospectors in the Pikes Peak (Colorado) gold rush of 1859.

Vásquez de Ayllón, Lucas See AYLLÓN, LUCAS VÁSQUEZ DE.

Vavasour, Mervin (1819–1866) *British army officer in the Pacific Northwest*

In 1845, Mervin Vavasour, a British army officer in Canada, was directed to undertake a military reconnaissance of the Oregon Country, which was then jointly administered by Great Britain and the United States. On May 5, Vavasour, accompanied by fellow officer HENRY JAMES WARRE, left Montreal, traveling westward along the CANOE-and-portage route to the Great Lakes, the Red River of the North, and Fort Garry (present-day Winnipeg, Manitoba). On this first half of the trip, they were joined by HUDSON'S BAY COMPANY governor SIR GEORGE SIMPSON, who strongly favored establishing a transcontinental military supply route to Oregon. They continued the journey westward from Fort Garry, guided by Hudson's Bay Company officer PETER SKENE OGDEN, with whom they traveled on horseback across the plains. They then traversed the Canadian ROCKY MOUNTAINS by way of White Man Pass and boated down the Columbia River to Fort Vancouver, near present-day Portland, Oregon, arriving there on August 25, 1845.

That winter, Vavasour and Warre visited the American settlement at Oregon City and toured the Pacific coast of Oregon and Washington, including Puget Sound, Vancouver Island, and the area around the mouth of the COLUMBIA RIVER. Vavasour and Warre returned to eastern Canada the following spring, traveling by way of the Athabasca Pass to the Saskatchewan River.

Mervin Vavasour's and Warre's mission had been to determine if British troops could be rapidly deployed to the

Oregon Country in an overland march across the Great Plains and Canadian Rockies, should the need arise. To carry out this assignment without arousing American concerns, they traveled under the guise of being British sportsmen on a hunting trip in the American West. In the report they filed, they concluded that the vast distances involved, the rough terrain, and the lack of abundant food supplies en route made such a plan highly impractical.

Velásquez, Diego (Diego Velázquez de Cuéllar, Diego de Velázquez) (1465–1524)

Spanish conquistador, colonial administrator in the West Indies, uncle of Juan de Grijalva

Diego Velásquez was born into a noble family at Cuéllar in north-central Spain. He embarked on a military career in his early teens, serving in the Spanish army against the Moors in the reconquest of Spain for King Ferdinand and Queen Isabella.

In 1493, Velásquez sailed to the WEST INDIES on CHRISTOPHER COLUMBUS's second voyage of exploration. He settled on Hispaniola (present-day Haiti and the Dominican Republic) and played a leading role in the conquest of the island under Columbus's brother, Bartholomew Columbus. Velásquez prospered as a colonist, establishing the towns of Azua and Jacmel in 1502.

In 1511, Velásquez was commissioned by Hispaniola's governor Diego Columbus (Christopher Columbus's son) to begin the conquest of Cuba. Later that year, in command of a fleet of four ships, he landed on Cuba's eastern end, with a force of 300 men, including HERNÁN CORTÉS, who was one of his chief officers. Velásquez had little difficulty in subduing Cuba's natives. The only significant resistance was overcome when the leader of the uprising, the native cacique (ruler) Hatuey, who had previously fled Hispaniola to escape the Spaniards, was captured and executed by burning at the stake.

In February 1513, Velásquez founded Baracoa, the first permanent European settlement on Cuba. Aided later that year by reinforcements under the command of PÁNFILO DE NARVÁEZ, Velásquez soon completed the conquest of all of Cuba and declared himself governor general of the island—a claim that was upheld by the Spanish government. By the end of 1514, he had established the cities of Bayamo and Santiago de Cuba, which he made his capital.

In 1517, Velásquez sent out a slave-hunting expedition to the Bahamas, commanded by FRANCISCO FERNÁNDEZ DE CÓRDOBA. On that voyage, Fernández de Córdoba's ships were blown far to the south and west, and, on his return to Cuba, he reported to Velásquez the existence of the mainland of Yucatán. Prompted by this news, as well as tales of an advanced Indian civilization possessing quantities of gold and other riches, Velásquez sent out a small

fleet under the command of his nephew JUAN DE GRIJALVA in spring 1518.

When Grijalva sent back word to Cuba that he had indications of wealthy Indian civilizations on the Mexican mainland, Velásquez immediately organized a large force of CONQUISTADORES under the command of Cortés, who sailed for Mexico and the land of the Aztec in fall 1518.

In 1519, Velásquez founded the city of Havana on Cuba. That same year, he sent to the Council of the Indies in Spain one of the earliest detailed maps of the island of Cuba.

In 1520, Velásquez learned that Cortés was seeking the endorsement of King Charles I of Spain (Holy Roman Emperor Charles V) for his claim to the newly explored land of Mexico, territory that Velásquez considered to be rightfully his by virtue of having sponsored the expedition. He soon dispatched Pánfilo de Narváez and a large military force to Veracruz on the Mexican mainland, seeking the arrest of Cortés. Most of Narváez's men, after defeat by Cortés, joined him in the campaign against the Aztec.

Velásquez lost his post as Cuba's governor in 1521, the year of Cortés's great triumph in Mexico. He regained the position two years later and served for one more year, until his death.

Diego Velásquez played a vital role in establishing the initial settlements on both Hispaniola and Cuba, the first permanent European colonies in the Western Hemisphere. The seaward probes he sent out under Fernández de Córdoba, Grijalva, and Cortés helped reveal the extent of Mexico's gulf coast and led to the destruction of the Aztec Empire.

Vérendrye, Louis-Joseph Gaultier de la

See LA VÉRENDRYE, LOUIS-JOSEPH GAULTIER DE.

Vérendrye, Pierre Gaultier de Varennes de la

See LA VÉRENDRYE, PIERRE GAULTIER DE VARENNES DE.

Verrazano, Giovanni da (Giovanni da Verrazzano) (ca. 1485–ca. 1528) *Italian-born mariner in Americas, in service to France*

Born into an upper-class family, Giovanni da Verrazano was a native of Val di Greve in the Tuscany region of northern Italy and was educated in Florence. Embarking on a seafaring career, he undertook several voyages across the MEDITERRANEAN SEA to the Middle East before moving to Dieppe, a seaport on the Normandy coast of France.

In 1522, on an expedition of PRIVATEERS in the service of France, Verrazano captured two of Spanish conquistador HERNÁN CORTÉS's ships, of the GALLEON design, laden with

gold and were returning from Mexico. This achievement brought him to the attention of King Francis I of France. At that time, news of FERDINAND MAGELLAN's route around the tip of South America to the Far East had just reached Europe. In 1523, Francis I commissioned Verrazano to undertake a voyage westward across the Atlantic Ocean in the hope of finding a sea passage through the Americas to Asia.

Verrazano sailed from Dieppe in command of a fleet of four ships. A storm soon drove his expedition back to the Brittany coast. In January 1524, he left Dieppe again with one ship, *La Dauphine*, and a crew of 50 men. After a stopover on the Portuguese island of Madeira, he crossed the Atlantic. A storm drove his ship northward from his intended course, causing him to reach the North American coast at Cape Fear in present-day North Carolina in early March 1524.

Verrazano made a landing and had friendly contacts with Indians. He then headed southward in search of a passage to the Pacific Ocean. Fearing an encounter with the Spanish to the south, he turned northward near present-day Charleston, South Carolina. While exploring the coast along Cape Hatteras, he saw Pamlico Sound across a narrow strip of land and took it to be the western ocean.

On April 17, 1524, Verrazano reached the entrance to New York Bay. He anchored at a point in the harbor known as the Narrows, then explored the lower Hudson River in a small boat, making contact with Indians. He and his men remained in New York Bay for two weeks before heading northward along the coast.

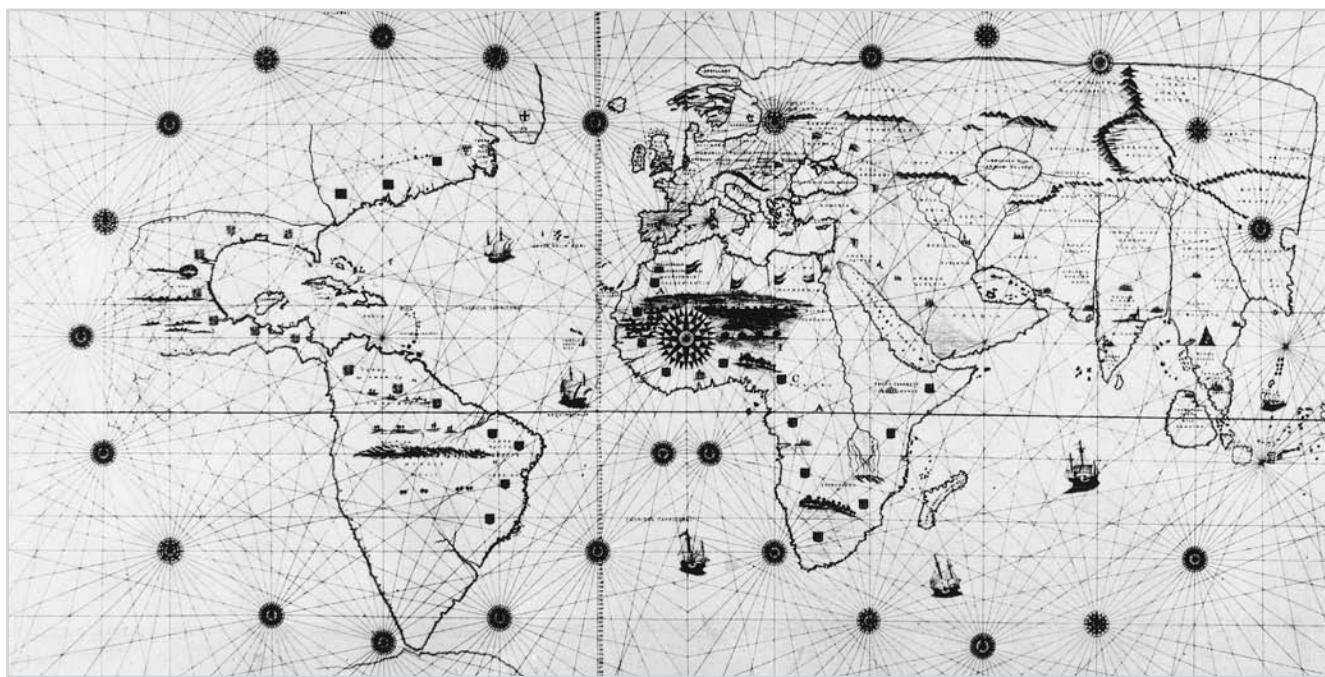
Verrazano reached Block Island, and, with the assistance of a local Indian, explored Narragansett Bay, making a landing at the site of present-day Newport, Rhode Island. He then proceeded up the coast of Maine, where he traded with the Abenaki Indians. From there, he sailed to the east shore of Newfoundland, and, from Cape Breton Island, headed back to Europe. After a two-week crossing of the Atlantic, he arrived in Dieppe on July 8, 1524. He claimed all the territory he had explored for France, calling it "Francesca" in honor of French king Francis I.

Verrazano undertook a second voyage across the Atlantic sponsored in part by French admiral Philippe de Chabot, probably in 1526 or 1527. Following a more southerly course, Verrazano reached the coast of Brazil and returned to France with a cargo of tropical lumber, which was highly valued in Europe as a source of dye.

Verrazano made his final voyage to the Americas in spring 1528. He sailed southwest from Dieppe to the Florida coast and the Bahamas, then sailed southward along the Lesser Antilles, still hoping to find a passage to the Orient.

At the island of Guadeloupe, Verrazano went ashore with a small party. They were set upon by Carib Indians; Verrazano was killed and reportedly eaten by the natives. The expedition continued on to Brazil before returning to France.

Verrazano's brother, cartographer Girolamo da Verrazano, who accompanied him on his voyages, produced the first map of North America that identified part of the coast with a Native American name—Oranbega—an Abenaki name for a site in what is now Maine.



Map of the world by Giovanni da Verrazano (Library of Congress)

Giovanni da Verrazano himself was the first to name places in the Americas after locations and people in Europe, although these names did not long endure. Verrazano brought back a description of North America as a large landmass, becoming the first European to base such an interpretation on actual exploration. As a result of his voyages, European geographers learned that the North American coastline was continuous, from the English discoveries in Newfoundland in the north to those of the Spanish in Florida to the south. His report of an inland sea at Pamlico Sound in present-day North Carolina wrongly influenced mapmakers, who, for the next 50 years, indicated the Pacific Ocean as lying not far beyond the east coast of North America. Verrazano, who inspired the explorations of JACQUES CARTIER, was the first European to visit New York Bay, predating HENRY HUDSON's expedition by more than 80 years. The Verrazano-Narrows Bridge, which spans New York Bay at the point where Verrazano anchored in 1524, was named in his honor.

Vespucci, Amerigo (1454–1512) *Italian navigator in the Americas, in service to Spain and Portugal*

Amerigo Vespucci was born in the Italian city-state of Florence, the son of prominent parents with close ties to the ruling Medici. He was educated in astronomy, geography, and natural philosophy under the supervision of his uncle, a Dominican priest and associate of religious reformer Girolamo Savonarola.

Vespucci was employed by the Medici family's banking firm, serving for more than 20 years in Italy before he was sent to Spain in 1492 to help manage the Medici's merchant-banking and ship-outfitting operations in Seville. In Spain, he became acquainted with CHRISTOPHER COLUMBUS; Vespucci, as agent for the Medici firm, provided supplies for Columbus's second voyage of exploration in 1493 as well as his third voyage in 1498.

According to his own account (as yet unsubstantiated), Vespucci sailed with Columbus as a commercial observer on the 1493 voyage, after which he embarked on a series of exploring expeditions of his own. He claimed that he sailed from the Spanish port of Cádiz on May 10, 1497, and that, after crossing the Atlantic Ocean by way of the CANARY ISLANDS, he reached the south coast of Mexico at Campeche Bay. After reportedly following the shoreline of the Gulf of Mexico north and east, he rounded Florida, then sailed northward along the coast of what is now the southeastern United States, as far as Cape Hatteras, North Carolina, before returning to Spain later that same year.

Vespucci related that he next took part in a voyage of exploration with Spanish navigator ALONSO DE OJEDA and cartographer JUAN DE LA COSA. On May 16, 1499, the expedition's three vessels sailed from Cádiz. They reached the Americas separately, with Vespucci arriving on the coast of



Amerigo Vespucci (*Library of Congress*)

Brazil near a point known as Cape São Roque, about five degrees of latitude below the EQUATOR. He then supposedly explored the coastline northwestward, locating the mouth of the AMAZON RIVER, which he explored upstream for a short distance before turning back and meeting up with Ojeda and the rest of the expedition in Santo Domingo. He then sailed back to Spain, arriving in Cádiz on September 8, 1500.

In service to King Manuel I of Portugal, Vespucci commanded an expedition aimed at following up PEDRO ÁLVARS CABRAL's European discovery of eastern Brazil in 1500. He sailed from Lisbon on May 10, 1501, reaching his supposed previous landfall at Cape São Roque on August 16, 1501. From there, the northeasternmost point of South America, he headed southward to determine the extent of the mainland. On January 1, 1502, he reached a harbor he named Rio de Janeiro in honor of New Year's Day. He also reported reaching the mouth of the Río de la Plata, and, after following the Patagonian coast due south, reaching as far as 50° south latitude, the southernmost point achieved by Europeans up to that time. If his account is true, the land he reported sighting in those waters may have been South Georgia Island, only a few degrees of latitude north of the ANTARCTIC CIRCLE.

Vespucci arrived back in Portugal on September 7, 1502. He later returned to Spain, where he became a naturalized

Spanish subject and a member of the Casa de Contratación, a government clearinghouse for geographic and navigational knowledge. In 1508, King Ferdinand II appointed him as Spain's first pilot major, a position he held until his death four years later from malaria, which he had contracted in his explorations in South America.

Amerigo Vespucci's fame in the history of exploration is largely due to the work of German geographer MARTIN WALDSEEMÜLLER. In 1507, Vespucci's accounts of his voyages, contained in his letters to Lorenzo di Pier Francisco de Medici, were included in Waldseemüller's *Cosmographia Introductio* (Introduction to cosmography), along with updated maps of the world based on the recent explorations of Columbus and other navigators. Vespucci's descriptions were the first to use the phrase *New World*, as well as the first to suggest that the newly explored lands comprised a new continent, not merely an outlying archipelago of Japan or China. For this reason, Waldseemüller named the foreign lands America, after the Latinized version of Vespucci's first name, Amerigo. When GERARDUS MERCATOR published his world atlas in the 1580s–90s, he applied the name to the northern continent as well, and the two have since become known as South America and North America. While Vespucci's actual contributions as an explorer and navigator are still not clear, he was among the first to comprehend the greater implications of the earliest European discoveries in the Western Hemisphere, and the first to conclude that the new lands were of continental proportions. More so than Columbus, who died convinced he had reached the western fringes of the Orient, Vespucci applied the principals of modern scientific inquiry, then still emerging from the constraints of medieval thought, to ascertain the significance of the geographic findings of his day.

Vial, Pedro (Pierre Vial) (ca. 1746–1814)

French-born guide, interpreter in the American Southwest, in service to Spain

Born in Lyons, France, Pedro Vial immigrated to the Louisiana country sometime before the early 1770s. He settled on the MISSOURI RIVER, where he lived and worked among the Indians as a gunsmith.

In 1786, Vial was commissioned by the Spanish government of Texas to blaze a trail from San Antonio north to Santa Fe, New Mexico; he was chosen for this assignment because of his knowledge of Indian languages and his familiarity with the geography of the Southwest. From San Antonio, Vial went northward to the Red River then headed westward, arriving at Santa Fe on May 26, 1787.

Soon afterward, the governor of New Mexico hired Vial to undertake an expedition eastward from Santa Fe and establish a route to Natchitoches in what is now western Louisiana. The trip took him across the entire width of

Texas. From Natchitoches, Vial headed back to San Antonio, then returned to Santa Fe.

In 1792, New Mexico's governor commissioned Vial to undertake an expedition in search of a route eastward across the southern plains as far as St. Louis on the MISSISSIPPI RIVER. On this trip, Vial was captured by Indians in what is now Kansas, but he managed to escape with the help of some traders, arriving in St. Louis in October 1792.

Vial subsequently settled in Santa Fe, where he served as a guide and interpreter in other explorations of the Southwest and southern plains.

Pedro Vial pioneered the first overland route between the provincial capitals of Texas and New Mexico. His 1792 expedition from Santa Fe to St. Louis was one of the earliest recorded eastward crossings of the southern plains, and it closely followed the route that later became the Santa Fe Trail.

Viale, Agostinho (ca. 1620–1667) *Brazilian colonial official in South America*

Agostinho Viale was born in São Paulo, Brazil, south of Rio de Janeiro. In 1664, King Alfonso VI of Portugal appointed him as Brazil's administrator general of mines and commissioned him to explore the dense forests of the Mato Grosso, to the north and west of São Paulo, in search of emerald mines reported to lie deep in the interior of the little-known region.

Authorized to grant pardons to fugitive outlaws who had fled into the forests of the Mato Grosso, Viale actively sought out desperados to obtain vital geographic information about the west-central Brazilian wilderness, the only other inhabitants of which were the warlike Aymora Indians.

In 1666, Viale led a force of 50 soldiers and about 150 Indians into the Mato Grosso from São Paulo. After 13 months, he managed to penetrate as far as the marshy country near the Serra das Esmeraldas, where he succumbed to malaria, as did a large segment of his expedition. His lieutenant, Barbalho Bezena, then assumed command and led the survivors back to São Paulo.

Agostinho Viale's expedition of 1666–67 was the first European probe into the inland regions of Brazil, south of the AMAZON RIVER. In the years that followed, great mineral wealth was discovered in the Mato Grosso, which led to São Paulo's becoming an important base for subsequent penetrations into the interior.

Viele, Arnaud Cornelius (Cornelissen Arnout Viele) (ca. 1620–ca. 1700) *Dutch trader, interpreter to Indians of Ohio Valley*

Born at Brabant in the Netherlands, Arnaud Cornelius Viele immigrated with his father to the Dutch colony of New Netherland, now New York State, in the early 1630s. They

settled at Fort Orange on the site of what became the city of Albany, where the elder Viele operated an Indian trading post.

From his extensive contacts with the Indians who came to trade at his father's post, the younger Viele became proficient in Indian languages and knowledgeable about Indian culture and customs. He went on to become a government interpreter, first for the Dutch, then for the British.

In the early 1680s, Viele served as British colonial governor Thomas Dongan's official envoy to the Iroquois (Haudenosaunee) Indians. Later, under the insurrectionist administration of Jacob Leisler in 1689–91, he was appointed governor of the Iroquois League of Six Nations.

Soon after Leisler's government was overthrown in New York City in 1691, Viele headed westward to the Ohio Valley. The next year, with a party of Indian traders, he traveled down the Ohio River into present-day Kentucky.

Arnaud Cornelius Viele was among the first Europeans to approach the Ohio River from the Hudson Valley, and among the first non-Indians to explore what is now northern Kentucky.

Villalón, Pedro de Rivera y. See RIVERA Y VILLALÓN, PEDRO DE.

Viscaíno, Sebastián (Sebastien Vizcaino)

(ca. 1550–ca. 1628) *Spanish mariner, merchant on the Pacific coast of Mexico and California*

Sebastián Viscaíno was born in Corcho, Spain, into a family of modest means. When about 17, he served with the Portuguese army. Then, in the mid-1580s, he settled in Mexico.

Viscaíno became a successful merchant, involved in the transpacific trade between Mexico, the Philippines, and China. He sailed from Mexico to the Philippines himself in about 1586; on the return voyage in 1587, his ship, the *Santa Ana*, was captured by one of the English PRIVATEERS, Thomas Cavendish, off the southern end of the Baja California peninsula. Viscaíno was put ashore with the rest of the passengers and crew. After making repairs to the ship, which Cavendish had attempted to burn, Viscaíno sailed back to a port on the west coast of Mexico.



Sebastián Viscaíno's landing at Monterey (painting by Albert Bierstadt) (Library of Congress)

In 1594, Viscaíno sent out an expedition under the command of his subordinate Pérez del Castillo to explore the upper Gulf of California and evaluate the region as a source of pearls. Because of dissension among the crew, the attempt was abandoned. Two years later, he led another attempt himself, sailing from Acapulco in June 1596 in command of three ships and 230 men. On this voyage, which had been commissioned by the Spanish viceroy of Mexico, Viscaíno examined the coast of Baja California in search of harbors where Spanish ships returning from the Philippines could find protection from marauding English pirates, who had recently begun to operate in those waters. He reportedly reached as far north along the coast of Baja California as 29°30' north latitude. He found no adequate anchorages and returned southward, reaching Acapulco at the end of 1596.

In 1602, Viscaíno set out again, this time to explore the Pacific coast north of Baja. Instructions from the Spanish viceroy directed him to survey and chart the coast as far northward as Cape Mendocino, as well as to locate safe harbors for Spanish shipping. He was also to carry on the search for the fabled STRAIT OF ANIAN, the mythical passage linking the Atlantic Ocean and the Pacific Ocean, which the Spanish feared had already been located by the English privateer SIR FRANCIS DRAKE, when he sailed the first English vessel into the Pacific in the 1570s.

Viscaíno sailed from the Pacific port of Acapulco on May 5, 1602, in command of a fleet of three ships. Among his crew were missionaries and cosmographers. After an extensive survey of Baja, the expedition began to explore northward; in November 1602, it reached San Diego Bay in present-day California, which Viscaíno charted and named. Soon afterward, he explored the Santa Barbara Islands, which had been visited 60 years earlier by JUAN RODRÍGUEZ CABRILLO; Viscaíno also explored and named Santa Catalina.

On December 15, 1602, Viscaíno came upon a large natural harbor he called Monterey Bay, first spotted seven years before by SEBASTIÁN MELÉNDEZ RODRÍGUEZ CERMENHO. Viscaíno later cited it as the best anchorage for large ships he had ever seen. At this point in the voyage, he sent back one of his ships with those members of the expedition who had become weakened by SCURVY. Heading northward with his two remaining vessels, Viscaíno sailed past San Francisco Bay without seeing it because of bad weather. North of San Francisco Bay, he explored Drakes Bay and sighted and named Punta de los Reyes, now known as Point Reyes.

By January 12, 1603, Viscaíno had reached as far northward as Cape Mendocino. He explored a little beyond that point to the coast of what is now southern Oregon before turning back for Mexico. En route, he charted the Farallon Islands, just west of the Golden Gate, but he again failed to see San Francisco Bay.

Viscaíno arrived at the Mexican port of Mazatlán on February 18, 1603. Soon afterward, he sailed for Spain to report on his exploration of Monterey Bay to the Council of the Indies and propose the establishment there of a permanent colony and port for Spanish ships returning from the Philippines.

Although Viscaíno's proposal to colonize Monterey Bay was approved by 1607, the planned expedition was subsequently canceled by the Spanish viceroy of Mexico, who objected to the project's excessive cost. To make up for the abandoned enterprise, Viscaíno was commissioned in 1611 to explore the Pacific Ocean in search of the fabled islands of Rica de Oro and Rica de Plata (rich in gold and in silver). In the course of the three-year voyage, he failed to find these lands. Moreover, his attempt to open up Spanish trade contacts with Japan was unsuccessful. After 1615, Viscaíno settled in the Mexican province of Avalos.

Sebastián Viscaíno's explorations of 1602–03 resulted in the production of the first reliable maps of the California coast and helped dispel the idea of the Strait of Anian. Despite the fact that he had returned with a slightly favorable description of the lands and climate of what the Spanish came to refer to as Alta California, Spanish interest in the region began to wane soon afterward. With the English maritime menace ended by a treaty between Spain and England, Spain's colonial interests began to focus more on Florida. As a result, no other serious colonization efforts in California were attempted by the Spanish until the expedition of GASPARE DE PORTOLÁ and JUNÍPERO SERRA, more than a century and a half later.

Vivaldi, Ugolino (fl. 1290s) *Italian mariner in the Atlantic*

Ugolino Vivaldi and his brother Guido (or Vadino) were navigators from the Italian city of Genoa. In 1291, they sailed from Genoa in command of two ships, intending to reach India by way of the Atlantic Ocean.

After passing through the STRAIT OF GIBRALTAR, the Vivaldi brothers followed the Moroccan coast southward to Gozara near the CANARY ISLANDS. Nothing was heard from them after that, although later accounts suggest that they may have circumnavigated Africa to Ethiopia, where they were taken prisoner by the legendary PRESTER JOHN, dying while in captivity.

It is not clear whether Ugolino and Guido Vivaldi intended to sail westward across the Atlantic, or around Africa. In any event, their 1291 voyage from Genoa was the first known attempt by Europeans to find a seaward route to India, preceding CHRISTOPHER COLUMBUS and VASCO DA GAMA by two centuries.



Waldseemüller, Martin (Martin Waltzemüller, Hylacomylus) (ca. 1470–ca. 1522) *German geographer, cartographer*

Martin Waldseemüller was originally from the city of Freiburg in northern Germany. Educated at the university in Freiburg, he became a clergyman at Saint-Die, a small town in the duchy of Lorraine in what is now northeastern France.

Waldseemüller became associated with a small college (or learned society) known as the Gymnasium Vosagense, and served as a professor of geography. The group acquired a printing press, with plans to produce a new edition of the geographic works of the ancient geographer PTOLEMY.

Waldseemüller had obtained copies of AMERIGO VESPUCCI's letters describing his explorations of the Western Hemisphere, and he included them as part of the text for *Cosmographiae Introductio* (Introduction to cosmography). Published in 1507, the book included information on winds, the distances between known places on the Earth, and geographic principles, as well as an account of the "New World," based on the voyages of CHRISTOPHER COLUMBUS, JOHN CABOT, and the brothers GASPAR CÔRTE-REAL and MIGUEL CÔRTE-REAL.

Waldseemüller also included a large map of the world, printed from 12 woodcuts, which measured 36 square feet when put together. On his world map, he cited the great landmass that Vespucci had called the "New World" as *America*, in honor of Vespucci, whom he deemed to be its discoverer. Moreover, he depicted the South American con-

continent as separated from Asia by a great sea to the west. This was a wholly new concept in Europe since most geographers considered the so-called New World to be an eastern extension of Asia.

In 1513, Waldseemüller published another geographic work in which he depicted the newly discovered lands as "Terra Incognita," or "unknown land," apparently having developed doubts about the authenticity of Vespucci's accounts. Yet his original designation "America," on more than 1,000 copies of the 1507 map, had become widely accepted throughout Europe. In the 1580s, *America* was also applied by GERARDUS MERCATOR to the landmass to the north, the two continents eventually becoming known as North America and South America.

Through his publications, Martin Waldseemüller helped disseminate geographic knowledge of European discoveries in the Americas and helped inspire further exploration.

Walker, Joseph Reddeford (Joe Walker)

(1798–1876) *American fur trader, trapper, guide in the Rocky Mountains and California*

Born in Virginia, Joseph "Joe" Walker was raised in Tennessee. By the time he was 20 years old, he had settled at Fort Osage on the Missouri frontier.

In 1820, Walker traveled with a trading caravan across the southern plains to Santa Fe. He was arrested and held for a while by Spanish authorities, but he soon won his release

by agreeing to take part in a military campaign against the Pawnee Indians.

In 1824, while operating in the FUR TRADE out of present-day Independence, Missouri, Walker guided a federally sponsored surveying expedition along the Santa Fe Trail. From 1827 to 1832, he served as the sheriff at Independence.

In 1832, Captain BENJAMIN LOUIS EULALIE DE BONNEVILLE hired Walker as a guide for his fur-trading enterprise to what is now northern Utah and southern Wyoming. On July 24, 1833, Walker led an expedition of 50 MOUNTAIN MEN westward from Fort Bonneville in Utah's Green River Valley for the Great Salt Lake, seeking the fabled Buenaventura River, which was believed to flow to the Pacific Ocean. Walker's chief clerk on this trip was ZENAS LEONARD; mountain man WILLIAM SHERLEY WILLIAMS also participated.

From the Great Salt Lake, Walker and his men traveled across Utah's Great Basin into what is now northeastern Nevada. From there, they explored the Humboldt River westward to its sink near the eastern slopes of the Sierra Nevada, where they survived a hostile encounter with Indians, possibly Paiute.

Walker and his party then headed southward in search of a route through the Sierra Nevada. In exploring part of the range, they came upon the lake that now bears his name. The party followed a river through the mountains, also named after Walker, which took them to the watershed between the Merced and Tuolumne Rivers and into the Yosemite Valley.

Walker and his men entered the San Joaquin Valley, and, by November 1833, they had reached Monterey on the Pacific coast. Soon afterward, Walker sought a more southerly route eastward through the Sierra Nevada. Guided by Indians, his party followed the Kern River's South Fork into the mountains through what is now known as Walker Pass. After descending into the Mojave Desert, Walker led his men north and east back to northern Utah, arriving at the annual fur traders' rendezvous on the Bear River on July 3, 1834.

Walker continued as a trapper and trader in the northern and middle Rocky Mountains until the decline in the fur trade in the late 1830s and early 1840s. He then worked as a guide for emigrant wagon trains traveling westward. In spring 1844, he guided JOHN CHARLES FRÉMONT in his explorations into Utah's Great Basin. Walker was again with Frémont in his 1845–46 expedition to California. During this expedition, Walker led a party through the Sierra Nevada by way of Walker Pass.

In 1849, Walker was one of the first to arrive at Sutter's Fort in California following the discovery of gold there, leading to the gold rush. He subsequently led trade caravans through Walker Pass to the goldfields of northern Cal-

ifornia. He settled in California, where he established ranches first near Monterey and then in Contra Costa County. In 1861–62, he returned to the Southwest as guide for a gold-prospecting expedition into Arizona. He spent his remaining years at his ranch near Oakland, California.

Joe Walker was among the first non-Indians to see California's Yosemite Valley and lead the first non-Indian party eastward across the Sierra Nevada. The route he pioneered across Nevada became a significant part of one of the most important emigrant wagon roads in the West, the California Trail. Walker also played a major role in John Charles Frémont's explorations of the American West.

Walker, Thomas (1715–1794) *American physician, surveyor on the Appalachian frontier*

Thomas Walker was born in King and Queen County in eastern Virginia. He attended the College of William and Mary, then studied medicine under his brother-in-law, a physician in Williamsburg, and he later opened his own medical practice in Fredericksburg.

In addition to gaining prominence as a physician and surgeon, Walker operated a general store and import and export business. From his marriage to a landed widow, in 1741, he acquired more than 11,000 acres near present-day Charlottesville, Virginia, an estate known as Castle Hill.

In the late 1740s, Walker became associated with several prominent members of Virginia's House of Burgesses who were involved with obtaining huge tracts of land in western Virginia for speculative purposes. In 1749, he was named as chief agent for the Loyal Land Company, which had received from the colonial government a grant of 800,000 acres in western Virginia.

On March 6, 1750, Walker and a small party set out from Staunton, Virginia, to survey the Loyal Land Company's claim. They crossed the Blue Ridge into the Holston River Valley, then over Powell's Mountain into Powell's Valley. In early April 1750, near the point where the present-day states of Kentucky, Virginia, and Tennessee meet, he located a natural passage through the mountain barrier, which he called the CUMBERLAND GAP in honor of William Augustus, Duke of Cumberland, a prominent British general of that time.

Walker and his expedition passed through the Cumberland Gap and descended the Cumberland River, in the hope of finding the "bluegrass" country, the fertile, level region he had heard of from the Indians, and that Walker hoped to claim as part of the Loyal Land Company's grant. On finding only mountainous, rough country, unsuitable for settlement, he turned back north and east along an ancient Indian trail known as the "Warriors' Path." North of the Cumberland Gap, he constructed what came to be known as "Walker's Cabin," to assert the Loyal Land Company's claim

to the region in the Clinch and Holston River Valleys. He returned to Staunton, Virginia, on July 13, 1750.

In 1752, Walker was appointed deputy surveyor for Augusta County, Virginia, a position he held until the outbreak of the French and Indian War. He became commissary-general for George Washington and his Virginia militia forces in 1755, taking part in Braddock's retreat from Fort Duquesne that year. He later became a member of Virginia's colonial legislature.

In the 1760s, Walker took part in negotiations with the Cherokee and Iroquois (Haudenosaunee) Indians to extend the Proclamation Line of 1763 westward, hoping to open up the lands he had surveyed in western Virginia to new settlement. In 1768, he represented Virginia at the Treaty of Fort Stanwix, in New York.

Dr. Thomas Walker's probe into western Virginia and eastern Kentucky, which he recorded in his *Journal of an Exploration in the Spring of the Year 1750, by Dr. Thomas Walker* (1888), resulted in the non-Indian discovery of the Cumberland Gap. This natural passage through the mountains became the principal avenue for westward settlement across the APPALACHIAN MOUNTAINS, as well as a vital segment of DANIEL BOONE'S Wilderness Road.

Wallace, Alfred Russel (1823–1913) *British naturalist in South America and Southeast Asia*

Alfred Russel Wallace was born near the town of Monmouth in the south of Wales into a family of limited means. His formal education ended when he was 14, after which he trained himself in the natural sciences and other subjects.

Wallace became a schoolteacher in Leicester, England, where he became acquainted with fellow self-taught naturalist HENRY WALTER BATES. Inspired by the accounts of ALEXANDER VON HUMBOLDT and CHARLES ROBERT DARWIN, they resolved to travel to the Amazon Basin in South America to collect specimens of insects, especially butterflies.

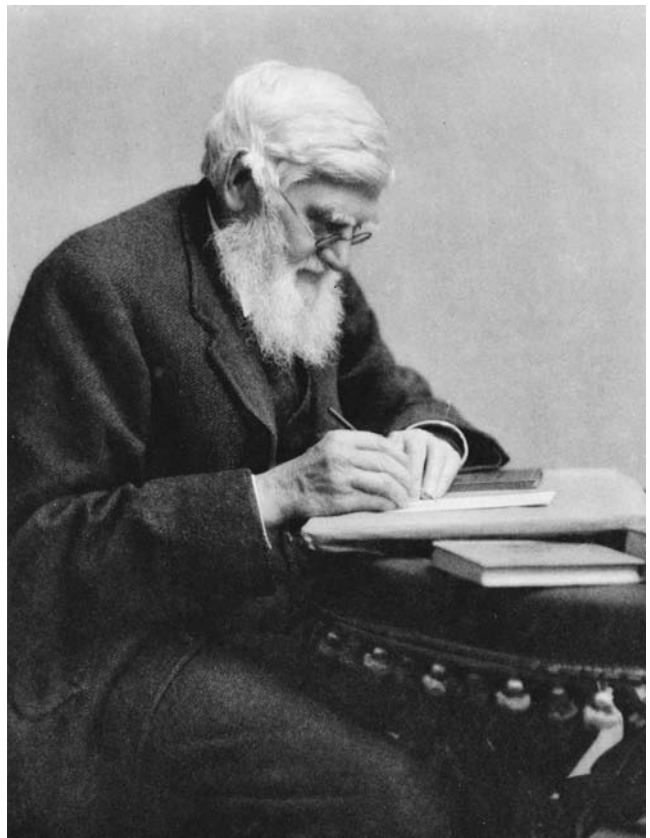
In 1848, Wallace and Bates sailed from England to the mouth of the AMAZON RIVER at Pará (present-day Belem), Brazil. From there, they traveled southward along the Tocantins River for most of that year, collecting specimens of insects. The following year, they ascended the Amazon to Manaus, where they split up. While Bates went farther up the Amazon, Wallace carried out his entomological research along the Río Negro and into the ORINOCO RIVER by way of the Casiquiare, the natural canal linking the two streams. He also traveled on the Uaupes River before returning to Manaus and the seacoast. Herbert Wallace, Alfred's brother, had joined him in 1849 but died of yellow fever at Pará in 1851.

Wallace sailed for England in 1852. He had collected thousands of specimens and made extensive notes detailing

his observations on how geography had an impact on the distribution of species throughout the Amazon. In the course of the homeward voyage, the ship caught fire and sank, and although Wallace was rescued after more than two weeks in an open boat, all of his collections and writings were lost. Despite this setback, on his return to England he published an account of his four years of research in South America, *A Narrative of Travels on the Amazon and Rio Negro* (1853).

Wallace next set out for the Malay Archipelago of Southeast Asia. Starting in 1854, he began a scientific survey of life forms, which took him more than 14,000 miles, from Timor and the Moluccas to Malacca on the Malay Peninsula. From his findings on this expedition, during which he collected more than 127,000 specimens, Wallace developed a theory of natural selection, independently of Darwin. His conclusions, jointly published with those of Darwin in 1858, laid the basis for the theory of natural selection and provided the foundation for an understanding of the distribution and evolution of species based on geographic factors.

Wallace returned to England in 1862, where he continued his scientific writings. From his research in Southeast Asia, he had developed an idea of a theoretical boundary, known as Wallace's Line, running through Asia,



Alfred Russel Wallace (Library of Congress)

the Malay Archipelago, and Australia, geographically dividing Asian and Australian fauna.

Along with the work of Darwin and Bates, Alfred Russel Wallace's scientific explorations in South America and Southeast Asia had resulted in a new perspective on Earth's life forms and the natural forces determining their development and distribution throughout the world.

Wallis, Samuel (1728–1795) *British naval officer in the South Pacific*

Samuel Wallis was born near Camelford on the northwest coast of Cornwall, England. He joined the British navy in his early teens, and by the age of 20, he had been promoted to the rank of lieutenant. Made a captain in 1756, he served throughout the Seven Years' War of 1756–63 in command of British warships off the coast of Canada and in the English Channel.

In 1766, the British Admiralty appointed Wallis to command a voyage of exploration to the South Pacific Ocean. The expedition had been planned as a follow-up to Commodore JOHN BYRON's 1764–66 voyage in search of the elusive Terra Australis, the GREAT SOUTHERN CONTINENT—the huge, theoretical landmass then thought to occupy much of the largely unexplored Southern Hemisphere.

Wallis sailed from the port of Plymouth on August 22, 1766, in command of Byron's former ship, the *Dolphin*, accompanied by the *Swallow* commanded by PHILIP CARTERET. Three months later, they reached the Atlantic entrance to the STRAIT OF MAGELLAN. During the next four months, Wallis examined the maze of channels of the strait and made landings to study the physical stature of the Patagonian natives. Contrary to reports dating back to FERDINAND MAGELLAN's voyage of 1519–22, Wallis concluded that the Patagonians were not giants, finding most to measure no more than five feet, seven inches tall.

In April 1767, shortly before Wallis and Carteret had entered the Pacific, strong winds and currents separated their ships, and Wallis continued on alone with the *Dolphin*. Instead of following the well-established sea route northward along the coast of Chile, Wallis headed northwestward, traversing a vast, little-known area of the South Pacific. He made landings for fresh provisions in the Tuamotu Islands, then continued northward to the TROPIC OF CAPRICORN, where he turned westward.

On June 23, 1767, Wallis made the first confirmed European sighting of Tahiti, which he named King George the Third's Island to honor his sovereign. After some initial skirmishes caused mainly by misunderstandings, the British established friendly relations with the natives, with Wallis being personally welcomed by Oberea, the queen of Tahiti. The Tahitians provided the expedition with fresh food, trading for nails and other goods made of iron.

Wallis and his men spent five weeks in Tahiti before continuing their voyage westward across the Pacific. Having found a place of such unique beauty and abundance, Wallis decided to return to England to report his findings rather than continue combing the Pacific in search of Terra Australis. They stopped at Tonga and Tinian Islands, then sailed to the Dutch East Indian port of Batavia (present-day Jakarta, Indonesia). Throughout the voyage, Wallis had averted the ravages of SCURVY by introducing sauerkraut and other foods rich in vitamin C into his crew's diet, and it was only in Batavia that he lost any of his men to disease, mainly tropical fever and dysentery incurred in that port.

Wallis and the *Dolphin* completed the round-the-world voyage by way of Cape Town, South Africa, and the island of St. Helena, arriving back in England on May 20, 1768. His report about Tahiti aroused the interest of the Admiralty, which decided that the island was a suitable spot from which to observe the Transit of Venus. It was there that JAMES COOK was sent that same year on the first of his three voyages of exploration.

Wallis remained on active duty with the British navy until 1772. The next year, he saw the publication of his *Account of the Voyage Undertaken for Making Discoveries in the Southern Hemisphere*, detailing his CIRCUMNAVIGATION OF THE WORLD in 1766–68.

Samuel Wallis is credited with the European discovery of Tahiti, even though a French expedition under the command of LOUIS-ANTOINE DE BOUGAINVILLE arrived there only several months afterward and claimed the island for France. Soon after he had left Tahiti, Wallis located a group of islands west of Samoa and north of Fiji, which are known today as the Wallis Archipelago in his honor. Although his voyage provided no conclusive evidence of the existence or nonexistence of Terra Australis, he had nonetheless explored a large and previously unknown portion of the South Pacific, revealing that it contained thousands of square miles of open sea.

Warburton, Peter Egerton (1813–1889)

British army officer in South and Western Australia

Peter Warburton was an officer with the British army in India before settling in South Australia in the early 1850s. In 1857–58, Warburton undertook a series of explorations into the country north of Adelaide and Spencer Gulf, traversing the region between the northern end of Lake Torrens and the southern part of Lake Eyre. From these explorations, he determined that South Australia's central region was open country, dispelling the earlier notion of SIR EDWARD JOHN EYRE who, in examining the region nearly 20 years earlier, had erroneously concluded that an impassable barrier of salt lakes and marshes lay to the north of Spencer Gulf.

Warburton extended his probes deeper into the interior of South Australia. In 1866, he explored the region northeast of Lake Eyre, locating a river flowing between Lake Eyre and Goyders Lagoon, afterward known as the Warburton River.

Warburton's most ambitious undertaking began in mid-April 1873, when he set out westward from the newly established telegraph relay station at Alice Springs, near the center of the Australian continent, in an attempt to reach the Indian Ocean coast at Perth in Western Australia. In addition to his son, two other European companions, and a young Aborigine boy, the expedition included two Afghani camel-drivers and 17 camels.

After skirting the northern edge of the Macdonnell Ranges, Warburton and his companions proceeded past Mount Wedge, then northwestward to Lake Mackay. They crossed into barren country, nearly devoid of usable water, and entered the Great Sandy Desert.

Although Warburton had planned to cross southwestward to Perth, he pushed northwestward because of the lack of water. In December 1873, after 10 months of traveling across 2,000 miles of some of the most inhospitable desert country in the world, the expedition arrived at Roebourne, about 750 miles north of Perth, on Western Australia's Indian Ocean coast.

Peter Warburton made the first successful east-to-west crossing of Western Australia, from the center of the continent at Alice Springs to the west coast. Moreover, he was the first to make extensive use of camels to explore the vast arid expanses of the plains and deserts of the Northern Territory and Western Australia.

Warre, Henry James (1819–1898) *British soldier, artist in the Pacific Northwest*

Henry James Warre, a lieutenant in the British army, served in Canada starting in the late 1830s. A sportsman, he took part in a hunting expedition to the northern plains, west of the upper reaches of the MISSOURI RIVER, in 1840.

In 1845, Warre served as aide de camp to his uncle, the commander in chief of British forces in Canada. That year, he was detailed, along with Lieutenant MERVIN VAVASOUR, on a military reconnaissance into the Oregon Country. Throughout the expedition, they pretended to be civilians on a hunting trip, hoping to avoid arousing the suspicions of U.S. officials in the region, which was then jointly governed by Great Britain and the United States.

Henry James Warre was an artist as well as a soldier, and, in the course of his 1845–46 travels through the Pacific Northwest, he produced a series of sketches of the region. Made into engravings, they were published in book form in London, as *Sketches in North America and the Oregon Territory* (1848). They provide a pictorial record of the

Oregon Country on the eve of the region's acquisition by the United States.

Watkins, Henry George (Gino Watkins)

(1907–1932) *British scientist, surveyor in Labrador and Greenland*

In 1928, Henry George "Gino" Watkins, a 21-year-old undergraduate at Cambridge University of England, began his explorations into the subarctic regions by examining the interior of Labrador, inland from Hamilton Inlet on the east coast, along the Churchill River.

In 1930, Watkins organized the British Arctic Air Route Expedition in order to survey a proposed airline link between London and Canada by way of ICELAND, GREENLAND, Baffin Bay, and HUDSON BAY. With 13 others, he landed at Angmagssalik, on Greenland's largely uncharted southeast coast, and, over the next year and a half, he directed meteorological studies and coastal surveys.

Watkins himself led a group that penetrated the Greenland ice cap 250 miles inland from Angmagssalik, while another party trekked across Greenland's southern region to Ivigtut on the southwest coast. A weather observation station was established high on the ice cap, which expedition member AUGUSTINE COURTAULD manned throughout one winter season.

Watkins's coastal explorations made use of aircraft, motorboats, and kayaks. In one survey, he traveled along 600 miles of the south coast, rounding Cape Farewell on Greenland's southern tip, to arrive at Julianehab on the southwest coast.

Gino Watkins was drowned in 1932, while hunting seals from a kayak off Angmagssalik. In his brief career as an explorer, he made extensive use of Inuit survival techniques to carry out some of the first modern meteorological studies in southern Greenland.

Webber, John (Johann Waber) (1751–1793)

British artist in the South Pacific and on the northwest coast of North America

Born in London, John Webber was the son of a Swiss sculptor who had settled in England. While very young, he was sent to Berne, Switzerland, to be raised by his aunt. He showed an early talent for art, studying under the Swiss landscape and portrait painter Johann Ludwig Aberli. In 1769–70, he was in Paris, where he continued his art training under Johann Georg Wille.

In 1771, Webber returned to London to attend the Royal Academy of Arts, and he later found work creating interior decorations for a house builder. His first show of landscapes and portraits at the Royal Academy of Arts in 1776 caught the attention of naturalists SIR JOSEPH BANKS and

DANIEL CARL SOLANDER, and, on their recommendation, he was recruited as an artist for Captain JAMES COOK's third voyage of exploration to the Pacific Ocean.

From July 1776 to August 1780, Webber sailed on the *Resolution*, sketching scenes and native people in the Tongatapu Islands, Tahiti, and the HAWAIIAN ISLANDS. On the Pacific coast of what is now British Columbia, he made extensive pictorial studies of the Nootka Indians of Nootka Sound.

Back in England in 1780, Webber's work was very well received, and many of his original drawings were engraved and published as illustrations in the official journals of Cook's voyage. He was made an associate of the Royal Academy of Arts in 1785; soon afterward, he undertook sketching trips in the English countryside and in Switzerland.

John Webber's career as an artist was cut short at the age of 41, when he died in London of a kidney ailment. His works on Cook's third voyage contained some of the first depictions of the life and culture of the Nootka, including studies of the interiors of their dwellings and ceremonial items such as masks and rattles. He produced one of the first illustrations of the sea otters of the Pacific Northwest, creatures whose fur later provided the main impetus for subsequent exploration and settlement in the region. Among his most dramatic renderings of the voyage was his "Death of Cook," later published by Florentine engraver Francesco Bartolozzi.

Weber, John H. (1799–1859) *Danish fur trader in the northern Rocky Mountains*

John Weber left his native Denmark at an early age to go to sea. In about 1822, soon after he had arrived in the United States, he joined with ANDREW HENRY and WILLIAM HENRY ASHLEY in the FUR TRADE on the upper MISSOURI RIVER.

In 1824–25, Weber commanded one of Ashley's expeditions into the northern ROCKY MOUNTAINS, which included among its members frontiersman JAMES BRIDGER. While exploring south of the Green River in what is now northern Utah, Weber and his party may have been the first non-Indians to come upon the Great Salt Lake.

John Weber was among the first fur traders to work the western slopes of the Rockies and visit the Great Salt Lake region, helping open the region to further non-Indian development.

Weddell, James (1787–1834) *Scottish mariner, sealer in the South Atlantic and Antarctic*

James Weddell was born in the Netherlands to Scottish parents. At an early age, he went to sea with the British sealing fleet; by the time he was in his early 30s, he had made two

voyages to the South Atlantic Ocean and was commander and part-owner of his own vessel.

In 1821, Weddell sailed his ship, the *Jane*, from England. After a stopover at South Georgia Island, he ventured southward into the subantarctic region of the South Atlantic, in search of richer sealing grounds. Before he returned to England at the end of the Southern Hemisphere's summer season of 1821–22, he had located and named the South Orkney Islands.

Weddell was back in South Georgia in 1822–23. Accompanied by the escort vessel *Beaufoy*, under the command of Captain Matthew Brisbane, he sailed the *Jane* farther south than any other mariner had in that longitude. In February 1823, he found the sea to be ice-free as far southward as 74°15'. He named this arm of the South Atlantic, east of the Antarctic Peninsula, King George IV Sea in honor of the reigning king of England. Weddell returned to England later in 1823, having broken the farthest-south record set by JAMES COOK in the late 1770s.

In addition to having made some of the most accurate navigational studies in the Antarctic to that time, James Weddell took back to England one of the first specimens of the leopard seal. His voyage also demonstrated that the ocean extended much farther southward than had previously been thought, greatly reducing the size of the supposed Antarctic landmass. In the early 1840s, British naval commander SIR JAMES CLARK ROSS made use of Weddell's records for his own voyages into the Antarctic. In 1900, the large, ice-free expanse of ocean that Weddell had reached was renamed the Weddell Sea. The adjoining Antarctic mainland was not explored until SIR ERNEST HENRY SHACKLETON's expedition of 1914–17.

Wegener, Alfred Lothar (1880–1930)

German geologist, meteorologist in Greenland

Born in Berlin, Germany, Alfred Wegener was educated at the University of Marburg, where he studied meteorology, astronomy, and geology. Wegener made his first trip to Greenland as a meteorologist with LUDWIG MYLIUS-ERICHSEN's expedition of 1906–08. In 1912–13, he took part in a Danish government-sponsored exploration of GREENLAND's inland ice with Johann Peter Koch. Together, they traversed the width of central Greenland, traveling 700 miles from Upernavik to the east coast. In the course of this trek, Wegener made weather observations and undertook studies of ice conditions.

In 1924, Wegener was appointed professor of meteorology at the University of Graz in Austria. Five years later, having been named leader of the German Greenland Expedition, he went to western Greenland and established two permanent weather stations. One of them, Weststation, was located on the west coast near Godhavn, north of the ARC-

TIC CIRCLE. The other base, Eismitte, was located 250 miles inland near the geographic center of the Greenland ice cap. From these stations, in 1929–30, Wegener conducted the first year-round climate and weather studies made in Greenland.

In November 1930, Wegener, along with an Inuit companion named Rasmus Willemsen, died of exposure while attempting to return to the west coast of Greenland from Eismitte.

By the time of his death, Alfred Wegener had become famous for his geological theories on continental drift, postulating that the world's oceans and continents had been created by displacements in the Earth's crust. Some of his geological ideas had been developed from his explorations in Greenland, during which he studied the thickness of the ice cap and calculated Greenland's rate of drift. His account of his last expedition, published posthumously, appeared in an English edition entitled *Greenland Journey* (1939).

Weiser, Conrad (Johann Conrad Weiser)

(1696–1760) *German-American interpreter, guide in colonial New York and Pennsylvania*

Conrad Weiser was born in the village of Astaedt in Württemberg, Germany, where his father was prominent as a local judge. In 1710, he immigrated with his family to North America, settling in Livingston Manor, New York. After being befriended by the Mohawk Indian chief Quagnant, Weiser went to live with the Indians in 1713. He became proficient in the Iroquoian language, and the next year he settled at an Indian village near Schoharie, New York.

From 1719 to 1729, Weiser aided colonists on the New York frontier as an interpreter to the Indians. In 1729, he traveled down the Susquehanna River into Pennsylvania, settling at Tulpehocken. Two years later, the Pennsylvania colonial government appointed him as its official interpreter to the Indians, and throughout the 1730s, he took part in many diplomatic conferences with the tribes of central and western Pennsylvania. In 1737, on a diplomatic trip to the Iroquois (Haudenosaunee) Indian council at Onondaga, near present-day Syracuse, New York, he located ancient Indian mounds, similar to those later found in southern Ohio.

Weiser accompanied Lutheran and Moravian missionaries to the Indians of Pennsylvania and New York, including the evangelical expeditions of Count Zinzendorf and David Zeisberger in the early 1740s. He was associated for a time with the religious community of Ephrata on the Pennsylvania frontier. In 1741, Weiser became Pennsylvania's principal Indian agent, and in that capacity he helped negotiate various treaties with the Iroquois against the French.

In 1755, Weiser was commissioned a colonel in the colonial militia, but deteriorating health prevented him

from taking an active part in the French and Indian War of 1754–63. He helped establish the settlement of Reading, Pennsylvania, where he died in 1760, the victim of a cholera outbreak.

In his time, Conrad Weiser was known as the foremost expert on the Indians of colonial New York and Pennsylvania. His diplomatic ability, his facility with Native American languages, and his knowledge of Indian trails helped open the frontier of western Pennsylvania to non-Indian settlement in the years immediately before the French and Indian War.

Wellsted, James (unknown–1836) *British naval officer in southern Arabia*

In 1834, James Wellsted, a lieutenant with the Bombay Marine, the naval branch of the British East India Company, began an extended survey along the little-known south coast of the Arabian Peninsula. The expedition had been undertaken at the behest of the BRITISH EAST INDIA COMPANY, which was then interested in establishing coaling stations along the shipping route between Suez and Bombay. To this end, it was necessary to learn the extent of the political influence that the sultan of Muscat had over the region known as the Hadhramaut.

Aboard the ship *Palinurus*, Wellsted coasted along the shore of Yemen. He landed at Bir Ali to study some ancient ruins, where he recorded inscriptions written in Hiyaritic, the Arabic language of southern Arabia. He later visited Oman, where he undertook excursions deep into the interior.

Wellsted later returned to Yemen, where he made additional archaeological investigations of the ruins at Nakab-al-Hayar. He committed suicide in 1836 while on the Hadhramaut coast.

In his journeys in Oman, James Wellsted traveled inland as far as the edge of the Rub' al-Khali, or EMPTY QUARTER, becoming the first European to see that vast desert region of southeastern Arabia. He left two accounts of his experiences, both published posthumously, *Travels in Arabia* (1838) and *Travels to the City of Caliphs* (1840).

Wen-chi (Lady Wen-chi, Wenji) (ca. 178–unknown) *Chinese poet in Mongolia*

Wen-chi was born into a noble family of the Han dynasty, her father a well-respected scholar and statesman among the Chinese. She grew up in the village of Honan (present-day Luoyang) in east-central China.

In about A.D. 190, when Wen-chi was 12, she was taken captive by the Hsiung-nu, a branch of the Huns living to the northwest beyond the Great Wall on the steppes of Mongolia. There, she became the wife of the chieftain and lived as

a nomad. She bore him two children. About 15 years after her abduction, Chinese officials arranged for her ransom, forcing her to choose between her homeland and her family. She chose the latter and henceforth wrote a series of poems about her experiences and travels. In the 12th century, her writings were transferred to a painted scroll. The work has survived as *Eighteen Songs of the Nomad Flute*.

Because of her poems, which provide details of nomadic life on the Mongolian steppes, Wen-chi is one of the earliest women known for travel writing.

Wentworth, William Charles (1790–1872)

Australian colonist in the Blue Mountains, statesman

William Charles Wentworth, among the first generation of Australian-born English, was probably born on Norfolk Island, east of Australia, the location of a British colony where his Irish father, D'Arcy Wentworth, served as an assistant surgeon. Some sources indicate he was born in Port Jackson (present-day Sydney). His mother, Catherine Crowley, had arrived in Australia as a convict. Wentworth traveled to England for studies, including the University of Cambridge. On returning to Australia at the age of 20, he worked on his father's estates on the Cumberland Plain west of Sydney.

The governor of New South Wales, Lachlan Macquarie, encouraged exploration of the BLUE MOUNTAINS, part of the GREAT DIVIDING RANGE west of Port Jackson, in order to locate new grazing lands. In 1813, Wentworth, GREGORY BLAXLAND, a surveyor by the name of William Lawson, an Aborigine guide known as James Burnes, and British convicts acting as servants and bearers departed Blaxland's farm at South Creek with packhorses. The party followed ridges, managing to make their way westward without having to descend into the valleys. Finally, from one peak (now known as Mount Blaxland), they were able to see Bathurst Plain, virgin grazing lands naturally irrigated by the Lett River.

In 1816, Wentworth traveled again to England to study law. Back in Australia in 1824, in addition to practicing as an attorney, he founded the newspaper the *Australian*. He used the newspaper and his legal skills to campaign on behalf of emancipists, as former convicts were called, as well as Australian-born colonists. His efforts helped lead to New South Wales having a representative government. As a member of the Legislative Council, he also helped create a formal constitution in 1854. In 1862, Wentworth retired to England. After his death 10 years later, his body was returned to Australia for burial.

William Charles Wentworth was part of the first significant inland exploration of Australia, one that led to expansion westward of colonists hoping to claim a homestead. His work in journalism and politics has led to his being known as the "Australian Patriot."

Westall, William (1781–1850) *British landscape artist in Australia*

William Westall was born in Hertford, England, near London. He studied art under his older brother, Richard Westall, a painter of historical scenes, and, at the age of 19, he was engaged as a landscape painter under Captain MATTHEW FLINDERS for his voyage of exploration to Australia.

In July 1801, Westall sailed from England aboard the *Investigator*. In February 1802, he joined Flinders, along with the expedition's naturalist ROBERT BROWN, and natural history artist FERDINAND LUCAS BAUER, in an expedition to the upper reaches of Spencer Gulf on the coast of what is now South Australia, north of present-day Adelaide. Near present-day Port Augusta at the gulf's northernmost end, they landed and scaled a peak Flinders had named Mount Brown.

Westall was among those shipwrecked on the Great Barrier Reef for two months; he was sent back to Sydney on a rescue vessel in October 1803, while Flinders continued on to Île de France (Mauritius). From Australia, the young artist went to China, then to India, returning to England from Bombay in 1805. Back in London, Westall went on to a long career as a landscape artist, regularly exhibiting his work until his death in 1850.

From drawings he made on Flinders's expedition, William Westall produced oil paintings of scenes of the Australian coastline. Some of the best-known of these are "Wreck Reef Bank," depicting the temporary encampment on the Great Barrier Reef, where the crew awaited rescue; "Site of Port Jackson in 1802"; and "View of Port Lincoln," one of the first artistic renderings of the area around the mouth of South Australia's Spencer Gulf.

Weymouth, George (George Weymouth)

(fl. early 1600s) *English mariner, trader on the New England coast*

English navigator George Weymouth made his first expedition to North America in 1602, during which he explored Hudson Strait in search of the NORTHWEST PASSAGE. Then, in 1605, he was commissioned by a group of merchants in Bristol, England, to explore the coast of Maine and establish trading contacts with the region's Indians.

In command of the ship the *Archangel*, Weymouth sailed from Dartmouth, England, in March 1605 and reached Nantucket Island, off the New England coast, in early May. On May 12, he landed on Monhegan Island off the Maine coast, which he explored. He then made a reconnaissance of some other islands off the south coast of Maine and explored parts of the mainland, including the mouth of the Penobscot River. He traded with the Indians, dispensing sugar candy and raisins, items that were very well received.

Weymouth and his men captured five of the Maine Indians and took them back to England in mid-July 1605. One of them is thought to have been SQUANTO, who later returned to New England and aided the PILGRIMS in their 1620 colonizing expedition in Massachusetts.

George Weymouth was one of the earliest British navigators to explore the Atlantic coast of New England, helping open up the region to European settlement in the following decades.

Weyprecht, Karl (1838–1881)

German-born Austrian army officer in the Arctic

A native of the German city of Koenig, Karl Weyprecht embarked on a military career as an officer with the army of Austria-Hungary. In 1871, Weyprecht and fellow army officer JULIUS VON PAYER became the coleaders of the Austro-Hungarian Arctic Expedition, the aim of which was to navigate the NORTHEAST PASSAGE, and, if possible, determine whether there were an ice-free polar sea between Europe and North America. After a preliminary journey to Spitsbergen (present-day Svalbard) and Novaya Zemlya in 1871, they embarked on the main expedition in 1872. Their vessel became icebound and they drifted northward for more than a year. In summer 1873, they reached an uncharted Arctic archipelago, which they called Franz Josef Land in honor of the emperor of Austria-Hungary.

After spending the winter aboard the icebound ship off Franz Josef Land, Weyprecht and Payer had the expedition abandon the ship and head southward over the ice, hauling sledges and small boats. When they reached open water, they took to the boats. After continuing southward to the coast of Novaya Zemlya, they were picked up by a passing Russian whaling vessel, which carried them to safety on the north coast of Lapland.

Throughout the 1870s, Karl Weyprecht became a leading advocate for international cooperation in Arctic exploration and was instrumental in promoting the first International Polar Year of 1882–83. The Arctic islands he explored with Payer served as a base for LUIGI AMEDEO DI SAVOIA D'ABRUZZI's expedition in 1899–1900.

Wheeler, George Montague (1842–1905)

U.S. Army engineer, American topographer in the American West

Originally from Hopkinton, Massachusetts, George M. Wheeler graduated from West Point in 1866 as a second lieutenant in the U.S. Army Corps of Engineers. From 1866 to 1871, he took part in military surveys and engineering projects near California's San Francisco Bay.

In 1871, Wheeler, now a first lieutenant, was given command of an army project to map the entire West, known

as the U.S. Geographic Surveys West of the One-Hundredth Meridian. That year, and continuing over the next eight years, Wheeler directed comprehensive surveys of the West, gathering topographic data as well as zoological, geological, and ethnological information.

In May 1871, Wheeler led one of his surveying expeditions up the COLORADO RIVER into the Grand Canyon, as far as Diamond Creek, retracing Lieutenant JOSEPH CHRISTMAS IVES's route of 1858. On subsequent explorations, Wheeler traversed Death Valley and surveyed the area of the Comstock Lode in Nevada.

Wheeler was promoted to captain in 1879, and his project was consolidated under the U.S. Geological Survey. He spent the rest of his military career involved in the preparation and publication of his official report. He retired from the army in 1888, at the rank of major.

In all, Wheeler undertook 14 expeditions covering much of California, Arizona, Nevada, Colorado, and Utah. He led his men across territory that ranged in altitude from 200 feet below sea level in Death Valley to 15,000 feet above sea level in the Sierra Nevada and Cascade Range. His subsequent maps detailed the topography of one-third of the continental United States west of the 100th meridian of longitude and south of the 40th parallel of latitude; these are the earliest contour maps of the American West. His official account, *Report upon United States Geographical Surveys West of the One-Hundredth Meridian*, included pictures derived from the earliest photographs of Death Valley and the Grand Canyon, taken by frontier photographers Timothy O'Sullivan and William Bell.

Whipple, Amiel Weeks (1816–1863) *U.S. Army officer in the American Southwest*

Amiel Weeks Whipple was born in Greenwich, Massachusetts. He attended Amherst College, then went on to West Point. Graduating in 1841 as a second lieutenant in the artillery, he was soon transferred to the United States Army Corps of Topographical Engineers.

In 1844–49, Whipple took part in a survey of the northeastern portion of the U.S.–Canada international border. In 1849–53, he served under Lieutenant WILLIAM HEMPLEY EMORY in the Mexican Boundary Commission Survey from the Rio Grande to what is now western Arizona. While engaged in this project, he led an expedition that succeeded in locating the confluence of the Gila River and COLORADO RIVER.

In 1853–56, Whipple commanded one of the Pacific Railroad Surveys. In the course of this project, he led a party of soldiers, topographers, and scientists westward from Fort Smith, Arkansas, along the Canadian River route across the southern plains to Albuquerque. He was joined there by a detachment under the command of Lieutenant JOSEPH

CHRISTMAS IVES. The Mojave Indian chief IRATEBA served as guide.

Whipple had been instructed to evaluate the feasibility of a railroad west to the Pacific Ocean along the 35th parallel. From Albuquerque, he led his command to the Zuni pueblos in what is now northwestern New Mexico, then traveled across present-day Arizona to the San Francisco Mountains and the Bill Williams Fork of the Colorado. He located a pass through the mountains and found his way to the Colorado River. Heading northward, Whipple and his party crossed the Colorado at Needles, then followed the Mojave River through the desert. For the final leg, they traveled the Old Spanish Trail and the Mormon wagon road to San Bernardino. Whipple was able to confirm an earlier report that the Cajon Pass through the southern Sierra Nevada was unsuitable for railroads.

From 1856 until the outbreak of the Civil War in 1861, Whipple participated in government engineering projects in the Great Lakes. In 1861, he was chief topographical engineer for Union forces at the Battle of Bull Run. Promoted to major and breveted a brigadier general of volunteers, he took part in balloon reconnaissances over Confederate lines. In May 1863, Whipple was wounded in the Battle of Chancellorsville; he died soon afterward in Washington, D.C.

Amiel Weeks Whipple led one of the principal military expeditions of the American West preceding extensive non-Indian settlement and development. In his official report of his 35th Parallel Survey, he provided detailed information on Indian tribes along the proposed route, describing them as distinct and diverse cultures. Moreover, he reported that the region of the Southwest he surveyed was far more suitable to agricultural development than had previously been reported.

White, Edward Higgins, II (1930–1967)

American astronaut, first American to walk in space

Edward White was born in San Antonio, Texas. He attended the U.S. Military Academy at West Point, graduating in 1952, and later earned a master's degree in aeronautical engineering from the University of Michigan. In 1959, he attended the Air Force Test Pilot School at Edwards Air Force Base in California and later served at Wright-Patterson Air Force Base in Ohio, as an experimental test pilot with the Aeronautical Systems Division. In 1962, he was selected for the team of ASTRONAUTS in the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA).

White first traveled into space on June 3, 1965, as pilot of the *Gemini 4* capsule, part of the GEMINI PROGRAM. On day one of the mission, he became the first American to perform extravehicular activity (EVA), that is, floating freely in space, popularly known as a "space-

walk." Although the first human to walk in space was the cosmonaut ALEXEI ARKHIPOVICH LEONOV, on March 18, 1965, as part of the VOSKHOD PROGRAM of the Union of Soviet Socialist Republics (USSR, or the Soviet Union), White was the first human to control himself in space outside a capsule, tethered to the capsule by a lifeline that supplied him with oxygen. To move he used a handheld maneuvering unit that fired bursts of compressed oxygen. The EVA lasted about 22 minutes while *Gemini 4* was over the Pacific Ocean. *Gemini 4* orbited Earth 62 times before landing on June 7.

White's next assignment was as backup commander for *Gemini 7* the following December. He was also selected as command module pilot on the first manned orbital test of the APOLLO PROGRAM, scheduled for launch in February 1967. It would have been the first three-man U.S. flight; White's fellow astronauts on this mission were to be Virgil "Gus" Grissom and Roger Chaffee. On January 26, 1967, however, during a training simulation on the launch pad at the Kennedy Space Center in Florida, a spark led to a flash fire, which killed all three men. After the *Apollo 1* disaster, Apollo capsules were redesigned; materials were made more flame resistant, the atmosphere was under lower pressure, and the escape system was more efficient.

As the first American to walk in space, Edward White has a special place in the history of SPACE EXPLORATION. SALLY KRISTEN RIDE became the first American woman to carry out EVA in 1983.

White, John (fl. 1580s–1590s) *English artist, colonist in eastern North America*

Little is known of John White's origins and early life. By 1577, he had become an accomplished artist and cartographer, and that year, he accompanied SIR MARTIN FROBISHER on his voyage to GREENLAND and Baffin Island. On this expedition, White produced some of the earliest paintings of Inuit (Eskimos).

In 1585, White sailed with SIR RICHARD GRENVILLE as part of SIR WALTER RALEIGH's first colonizing venture to the coast of present-day North Carolina. The colonists stayed on Roanoke Island for a year, but because of conflicts with Roanoke Indians, they returned to England the following summer with SIR FRANCIS DRAKE.

Raleigh selected White as leader of a second colonizing attempt in North America. White's expedition left Plymouth, England, on May 8, 1587. His fleet of three ships sailed first to the Caribbean Sea, stopping briefly at Dominica and St. Croix, then headed through the Bahamas and along the Florida coast. White had planned to establish the new colony on Chesapeake Bay, near the mouth of the James River. But, on July 22, 1587, the pilot of the fleet, Simon Fernandes, refused to take the colonists any farther to

the north and left them at Roanoke Island in the Outer Banks of North Carolina, the site of Raleigh's earlier and unsuccessful colony.

White helped organize a plantation on Roanoke, founding a settlement known as the City of Raleigh. White's married daughter Eleanor, along with her husband, Ananias Dare, were part of the colonizing expedition. On August 18, 1587, she gave birth to a daughter, Virginia Dare, the first English child born in North America.

Chosen by the colonists to return to England and seek additional supplies from Raleigh, White sailed in late August 1587. The interceding naval war with Spain, including the battle with the Spanish Armada in 1588, delayed his return for three years.

Finally, in March 1590, White sailed from Plymouth, England, aboard the ship *Hopewell* and crossed the Atlantic Ocean by way of the CANARY ISLANDS. The relief expedition first cruised the Caribbean, pillaging Spanish settlements and capturing some Spanish ships. On August 17, 1590, White and his party reached Roanoke, but they found the colony abandoned. The only trace of the colonists was the inscription "CROATOAN"—the name of an Indian village near Cape Hatteras, North Carolina—carved on a tree. With a storm approaching and the ship in need of repairs, the captain of White's ship, John Watts, declined to investigate Croatoan and sailed for the Caribbean. Although he intended to return the following spring, no subsequent relief expeditions were made. The fate of the LOST COLONY, as it came to be known, remains unknown. It is speculated that the colonists intermarried with Native Americans and settled somewhere along the Outer Banks or inland, or were wiped out in a raid. Some may have built a boat in an attempt to reach Chesapeake Bay.

White returned to England, and in 1593, he settled in Ireland. Few details are known about his later life.

John White produced an early map of the North American coast, detailing the region between Florida and Chesapeake Bay. He also painted watercolors of the native peoples, animals, and plant life that he saw on his voyages to the Caribbean and the Virginia coast. Published by German engraver Theodore de Bry in the 1590s, they provided Europeans with some of the first pictorial renderings of the Americas.

Whitman, Marcus (1802–1847) *American physician, missionary, guide on the Oregon Trail, pioneer in the Pacific Northwest*

Marcus Whitman was born in the central New York State town of Rushville, near Ithaca. He attended the College of Physicians and Surgeons of the Western District of New York at Fairfield, receiving the degree of doctor of medicine in 1832.

Whitman practiced medicine in Canada for several years, then returned to Rushville, New York, where he operated a sawmill with his brother. He was active in the Presbyterian Church, and, by 1835, he had been appointed a deacon and authorized as a missionary. That year, he became associated with fellow missionary Samuel Parker, who arranged to have Whitman accompany him on an expedition to the Pacific Northwest to investigate sites for proposed missions to the Indians.

In April 1835, Whitman and Parker left St. Louis and traveled up the MISSOURI RIVER with that year's AMERICAN FUR COMPANY trading expedition. After reaching what is now Omaha, Nebraska, on June 22, 1835, they headed overland westward to Fort Laramie. They crossed through the SOUTH PASS of the Wind River range of the ROCKY MOUNTAINS and arrived for that summer's fur traders rendezvous at Ham's Fork of the Green River in what is now southwestern Wyoming. While there, Whitman removed the arrowhead that had been lodged in mountain man JAMES BRIDGER's back since his fight with Indians at Pierre's Hole three years earlier.

While Parker remained in the Northwest, Whitman returned to New York, where he married Narcissa Prentiss, also a missionary. In spring 1836, Whitman, his wife, and another missionary couple, HENRY HARMON SPALDING and his wife Eliza, set out from St. Louis to establish missions to the Indians of the Oregon Country. They traveled with the American Fur Company's trade caravan along the Oregon Trail to the Green River rendezvous, where they then joined HUDSON'S BAY COMPANY traders on their way to the COLUMBIA RIVER. They were guided along the Oregon Trail by THOMAS FITZPATRICK.

Following a stopover at Fort Vancouver, the Whitmans headed to the junction of the Columbia and Walla Walla Rivers in present-day southeastern Washington State, where he established his mission to the Cayuse Indians at Waiilatpu. Spalding and his wife meanwhile opened a missionary settlement to the Nez Perce Indians near present-day Lewiston, Idaho.

By 1842, Whitman's main sponsors, the American Board of Commissioners for Foreign Missions in Boston, had decided to close the Pacific Northwest missions. To regain their support, Whitman undertook a midwinter journey to the East. Traveling on horseback, he left Waiilatpu on October 3, 1842, and traveled as far as Fort Hall, Idaho. At that point, Indian hostility forced him to go south to Taos. From there, he reached Bent's Fort on the Arkansas River, then proceeded to St. Louis and Boston. Making his case in person, he succeeded in regaining support for the Oregon Country missions.

Before returning west, Whitman visited Washington, D.C., where he conferred with War Department officials on the necessity of establishing forts and supply posts for

future emigrants on the Oregon Trail. In spring 1843, at Elm Grove, Missouri, he joined the first large overland party of settlers bound for Oregon, known as the Great Migration, for whom he served as a guide along the Oregon Trail. Pioneer trailblazer JESSE APPLGATE was one of the group's leaders.

Following his return to the mission on the Walla Walla, Whitman faced increasing difficulties with the Cayuse. Blaming Whitman for an outbreak of measles among their people, warriors under Chief Tiloukaikt killed Whitman, his wife, and a number of other settlers on November 29, 1847. Frontiersman JOSEPH L. MEEK subsequently made an overland journey to Washington, D.C., to summon military aid.

Marcus Whitman was one of the few non-Indians not involved in the fur trade to play a significant role in the opening of the Oregon Country to further settlement. His 1836 expedition brought the first wagons along the Oregon Trail. His wife, Narcissa Whitman, and Eliza Spalding were the first non-Indian women to cross the Rockies and the Continental Divide.

Whymper, Edward (1840–1911) *British mountain climber in the Alps and Andes Mountains*

Edward Whymper was born in London. He pursued a career as an illustrator, and in 1860, he was commissioned by a British publisher to sketch scenes in the French Alps for the book *Peaks, Passes and Glaciers*. This experience sparked an interest in MOUNTAIN CLIMBING.

In 1861–64, Whymper scaled Mont Pelvoux and Barre des Écrins, as well as numerous other peaks in the Dauphiné Alps. He then decided to attempt the as-yet-unscaled Matterhorn (14,780 feet above sea level) in Switzerland's Western Alps, near the Swiss-Italian border. He failed to do so in six tries on the southwestern face. Attempting the eastern face, considered more difficult, he and his party finally succeeded in 1865. During the descent, however, four of his six companions died in a fall, among them Lord Francis Douglas. Whymper was heavily criticized for the Matterhorn incident, one of the most famous disasters in mountain-climbing history.

In 1880, Whymper became the first climber to reach the summit of Chimborazo, at 20,702 feet above sea level, the highest peak in the Ecuadorean ANDES MOUNTAINS. Whymper climbed other major Andean peaks, including ACONCAGUA, in Argentina, the highest mountain in South America; Tupungato, located on the Chilean-Argentine border; and Cotopaxi, in Ecuador, the world's highest active volcano. He wrote about his expeditions in *Scrambles Amongst the Alps in the Years 1860–69* (1871), with his own illustrations; and *Travels Amongst the Great Andes of the Equator* (1892). Whymper also visited GREENLAND and the Canadian ROCKY MOUNTAINS.

During his time in Ecuador, Edward Whymper made a study of mountain sickness and determined that the reason it affected humans more in the Andes than at comparable heights in the Alps was related to barometric pressure. He made recommendations for acclimatization that helped future climbers deal with this condition and for improvements in the aneroid barometer, a device for measuring air pressure. His pioneering work helped in Arctic exploration as well as mountain climbing. He also contributed to natural science with his detailed notes on flora and fauna.

Wickham, Sir Henry Alexander (1846–1928)

British traveler in South America

Born in England, Henry Wickham first traveled to the WEST INDIES and South America in 1866, at the age of 20. In South America, he explored the Orinoco River and its tributaries, the Atabapo River and Río Negro. By 1869, he was operating a rubber plantation on the AMAZON RIVER near Santarém, Brazil.

Wickham made a return visit to England in 1871, where he published an account of his travels, entitled *Rough Notes of a Journey Through the Wilderness from Trinidad to Para, Brazil, by way of the Great Cataracts of the Orinoco, Atabapo, and Rio Negro* (1872). The work contained illustrations by Wickham himself, one of which, that of a sprouting rubber tree seedling, came to the attention of SIR JOSEPH DALTON HOOKER, director of London's Kew Gardens. Hooker contacted Wickham and commissioned him to ship back a quantity of living rubber tree seedlings to England.

Wickham was back in the lower Amazon region in 1873. After a year spent organizing the project, he managed to load as many as 7,000 rubber tree seedlings aboard the British steamer *Amazonas*, at a site near the junction of the Tapajos and Amazon Rivers. Despite prohibitions by the Brazilian government against such exports, Wickham slipped his illegal cargo by customs authorities at Pará (Belém), and, several months later, he arrived in Liverpool, from where the trees were hurried to London's Kew Gardens.

Three years later, the seedlings Wickham had taken back to England had developed into trees, and, in 1876, the first group was transported to CEYLON (present-day Sri Lanka), thus initiating the rubber industry in the Far East. Wickham himself, amply rewarded for the achievement, settled in Queensland, Australia, for several years, where he had little success as a tobacco and coffee grower. He later went to Ceylon and served in the colonial government.

Henry Wickham, whose travels in the Amazon Basin had resulted in the introduction of the rubber industry to Ceylon and Malaya, was knighted for his efforts in 1920.

Wilkes, Charles (1798–1877) *U.S. Navy officer in the Antarctic, the Pacific, and South and North America*

Charles Wilkes was born in New York City, the son of a prominent businessman. After receiving an education in mathematics, modern languages, and navigation from his father, he went to sea at the age of 17. Three years later, in 1818, he was appointed a midshipman in the U.S. Navy. After attending a naval school in Boston, Wilkes took part in cruises in the MEDITERRANEAN SEA and the Pacific Ocean. In 1826, he was promoted to lieutenant.

In 1832–33, Wilkes undertook a navigational survey of Narragansett Bay and was named director of the U.S. Navy's Depot of Charts and Instruments, the precursor to the U.S. Naval Observatory.

In 1838, Wilkes took command of the United States South Sea Surveying and Exploring Expedition. The goals of this project, first proposed 10 years earlier, included the charting of Antarctic waters for U.S. merchant ships and whalers and the exploration of the islands of the Pacific and the northwest coast of North America.

Wilkes left Norfolk, Virginia, in August 1838, in command of a fleet of six ships: his flagship the *Vincennes*, the *Peacock*, the *Relief*, the *Porpoise*, the *Sea Gulf*, and the *Flying Fish*. After stops in the AZORES off Portugal and in the Cape Verde Islands off Africa's west coast, Wilkes and his expedition headed southward along the east coast of South America to CAPE HORN, where they established a base camp. From there, he undertook a survey of the islands in the waters bordering the Antarctic, including the South Orkney and South Shetland Islands. He then explored and charted part of the coast of Antarctica.

After more than a month of exploring in Antarctic waters, without sighting land beyond the PACK ICE, Wilkes headed northward along the west coast of South America. At Valparaíso, Chile, Wilkes sent a scientific party inland to explore the ANDES MOUNTAINS. During another stopover at Lima, Peru, scientists with the expedition examined the ruins of the Inca Indian civilization.

Wilkes then headed westward across the Pacific to Australia and NEW ZEALAND. He made stops at Tahiti, Samoa, and other island groups, where teams of scientists went ashore for observations. The expedition then headed southward once again and undertook a second exploration of Antarctica. In January 1840, after traveling 1,600 miles along the icebound and fog-shrouded coastline, the expedition sighted land jutting out of what appeared to be a continental landmass.

After returning to Sydney, Australia, Wilkes visited the Fiji Islands and the Sandwich Islands (Hawaii), then sailed for the northwest coast of North America. In April 1841, he reached the mouth of the COLUMBIA RIVER, where one of the ships, the *Peacock*, was wrecked.

Wilkes sent parties inland to explore the Oregon Country between the Columbia and Sacramento Rivers. One of

the parties, led by Lieutenant GEORGE FOSTER EMMONS, explored the Willamette and Sacramento River Valleys, as far south as Sutter's Fort near present-day Sacramento, California. The Wilkes expedition also undertook an exploration and survey of the Columbia River to the mouth of the Snake River in what is now southeastern Washington State. Ethnologists and anthropologists attached to the Wilkes expedition obtained some of the earliest scientific data on the life and culture of the Northwest Coast Indians. Naturalists and painters also made observations; among the artists with the Wilkes expedition was Titian Ramsey Peale.

Wilkes charted 800 miles of the coastline, from San Francisco to the Strait of Juan de Fuca and Puget Sound. The remaining ships then headed westward across the Pacific, and, accomplishing a CIRCUMNAVIGATION OF THE WORLD, arrived at New York City in June 1842. Only two of the original ships completed the entire voyage, the *Vincennes* and the *Porpoise*. The others had either been wrecked or suffered so much damage that they were sold en route.

The Wilkes expedition covered more than 80,000 miles in less than four years. Wilkes was promoted to the rank of commodore upon his return, and, over the next 17 years, he helped write the 20-volume government report of his round-the-world voyage. His account, *Narrative of the United States Exploring Expedition*, was published in 1844.

At the outbreak of the Civil War in 1861, Wilkes, in command of the U.S. warship the *San Jacinto*, stopped the British commercial vessel *Trent* in international waters and arrested two Confederate government officials. The incident, which became known as the "*Trent* Affair," raised international tensions and nearly led to war with Great Britain.

Wilkes was then assigned to command U.S. naval forces in the Caribbean Sea and provide protection for U.S. shipping. On this assignment, he also overstepped his authority and infringed upon the rights of neutral ships. He was later court-martialed and demoted. He retired from the navy as a rear admiral in 1866.

The expedition of 1838–42 led by Charles Wilkes succeeded in making the first U.S. government-sponsored circumnavigation of the world. Scientists with the expedition brought back more than 5,000 species of plants and made extensive meteorological, geological, and ethnological studies of the Pacific islanders and the Indians of the American Northwest. Among the major scientific results of the expedition were the findings of JAMES DWIGHT DANA, whose studies of marine biology confirmed CHARLES ROBERT DARWIN's theories on the formation of coral islands. Although Wilkes's reported discovery of an Antarctic landmass was disputed by both JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE and SIR JAMES CLARK ROSS, his findings were later confirmed by SIR ERNEST HENRY SHACKLETON. In 1848, Wilkes was awarded the Founder's Medal by Great Britain's ROYAL GEOGRAPHICAL SOCIETY. Wilkes's charts of

the South Pacific island groups he visited were so accurate that they were used 100 years after his expedition to guide U.S. military operations in World War II. Wilkes's explorations also inspired the 1843–44 expedition of JOHN CHARLES FRÉMONT. The part of the Antarctic coast that Wilkes explored in 1840 was named Wilkes Land in his honor.

Wilkins, Sir George Hubert (1888–1958)

Australian photographer, aviator in the Arctic and Antarctic

Hubert Wilkins was born at Mount Bryan East, a sheep ranching settlement in South Australia. Trained in engineering and photography, he left Australia in 1908 for a career as a photojournalist.

In 1913, after service as a war correspondent in the Balkans, Wilkins was attached to the Canadian Arctic Expedition, under the leadership of VILHJALMUR STEFANSSON, as a photographer and reporter for the London *Times*. During the next five years, under Stefansson's direction, he learned polar survival skills while taking both still photos and motion pictures in the Canadian Arctic Archipelago.

A trained aviator, Wilkins was a captain in the Royal Australian Flying Corps in World War I, serving in the final months of the war as an aerial photographer in France. In 1919, he competed in an air race between England and Australia, in which his aircraft was forced down on Crete in the eastern MEDITERRANEAN SEA.

Wilkins's first venture in the Antarctic was as second in command with the British Imperial Antarctic Expedition of 1919–20. He then served as a naturalist with SIR ERNEST HENRY SHACKLETON's last Antarctic expedition of 1921–22.

Back in Australia in 1923, Wilkins undertook a study of the tropical region along the continent's north coast for the British Museum, an experience he detailed in his 1928 book *Undiscovered Australia*.

Starting in 1926, Wilkins became involved with aerial exploration of the Arctic, and, on April 15, 1928, he flew from Point Barrow, Alaska, to Spitsbergen (present-day Svalbard), north of Norway, making the first trans-Arctic flight from North America to Europe.

Later in 1928, after being knighted for his contributions to polar exploration, Wilkins returned to the Antarctic. In November of that year, he made the first airplane flight in Antarctica, flying over Palmer Land and the Antarctic Peninsula, in the course of which he sighted several uncharted islands off the Antarctic Peninsula and determined that Graham Land was actually two distinct islands.

Inspired by Jules Verne's *Twenty Thousand Leagues Under the Sea*, Wilkins next turned his attention to undersea polar exploration. He acquired a former U.S. Navy submarine he renamed the *Nautilus*, after the undersea vessel in



Sir George Hubert Wilkins (Library of Congress)

Verne's novel, and in June 1931, he embarked from Spitsbergen in an attempt to reach the NORTH POLE by sailing under the ice of the Arctic Ocean. Mechanical problems with the craft forced him to turn back from beyond 82° north latitude, the farthest north a vessel had reached under its own power until that time. He detailed the experience in his book *Under the North Pole* (1931).

From 1933 to 1936, Wilkins assisted American aviator LINCOLN ELLSWORTH in planning for aerial exploration of Antarctica. In 1938, he was in the Siberian and North American Arctic, taking part in search efforts for a downed Soviet aviator. Although no trace of the missing pilot was found, Wilkins's flights resulted in the mapping of large areas of the previously unknown Arctic Ocean. He had experimented with mental telepathy in the search, an experience he related in *Thoughts Through Space* (1942), which he coauthored with H. M. Sherman.

During World War II, Wilkins served as an adviser on arctic survival techniques for the U.S. Navy and as an intelligence officer in the Middle East and Far East.

Sir Hubert Wilkins died in November 1958. Six months later, the U.S. nuclear submarine *Skate* surfaced at the North Pole, where, according to his wishes, Wilkins's ashes were scattered. His wideranging exploits in the Arctic and Antarctic included his pioneer flight over the Arctic

Ocean and the first aerial sighting of uncharted islands off the Antarctic Peninsula.

William of Rubrouck (William of Rubruck, William of Rubruk, William of Rubrouc, William of Ruysbroeck, William de Rubrick, Willem van Rujsbroek, Willem van Rusbroeck, Wilhelmus Rubruquis, Guillaume de Rubruquis)

(ca. 1215–ca. 1270) *Flemish missionary in central Asia*
William of Rubrouck was originally from Flanders in what is now northern France. Little is known about his early life except that he entered the Franciscan Order sometime before 1250.

In 1252, William was summoned to Acre on the coast of present-day Israel to meet with King Louis IX of France (Saint Louis), then engaged in a crusade in the Holy Land. The French monarch directed William to undertake a missionary expedition to the Mongols, hoping to dissuade the central Asian nomads from continuing their eastward campaign of conquest toward Europe and to win their allegiance against the Muslim Turks.

William sailed from Constantinople (present-day Istanbul) in May 1253, accompanied by a small party that included another Franciscan friar Bartholomew of Cremona, an interpreter, and several servants. After a voyage across the Black Sea to the Crimea, he and his party traveled in carts along the Don and Volga Rivers to the Ural River, which they followed to its mouth on the Caspian Sea. In his later account of the trip, William made the first confirmed report that the Caspian was an enclosed sea and not an arm of the northern ocean, as was thought in Europe.

William and his party then made a crossing of the steppes of Kazakhstan and into the Pamir region of central Asia, where they became the first Europeans to see such creatures as the wild ass and wild long-horned mountain sheep. At the end of December 1253, after traversing the Tara Tau Range in what is now Kirghizia, he reached the encampment of the Mongol leader Mangu Khan, and soon afterward he was received by Mangu, the latest in a long line of Great Khans, at his capital at Karakorum. William later observed that the Mongol ruler, well aware of the proselytizing efforts of both Christians and MUSLIMS, was mainly interested in these religions for the purpose of political advantage.

William made an extensive study of the life and society of the Mongols, before setting out on his return journey in early July 1254. Friar Bartholomew had decided to remain behind to preach among the Mongols.

Upon reaching the city of Serai on the Volga River near present-day Volgograd, William traveled into Armenia and crossed what is now northeastern Turkey to the eastern MEDITERRANEAN SEA, hoping to meet with Louis in the

Holy Land. The French king, however, had since returned to Paris, where William eventually went after spending time at a monastery in Acre.

In Paris, William wrote an account of his travels, entitled *Journey to the Eastern Parts of the World*. One of the earliest medieval travel accounts, it includes the first suggestions that silk originated from a land to the east of Mongolia, which he identified as Cathay.

William of Rubrouck, as well as GIOVANNI DA PIAN DEL CARPINI and MARCO POLO and his father and uncle, were among the first Europeans to travel overland into central Asia, and William was one of the first Europeans to see the Mongol capital at Karakorum.

Williams, William (fl. 1830s–1840s) *British settler in New Zealand*

In 1839, William Williams, one of the earliest European settlers on NEW ZEALAND's North Island, undertook an exploration of the island's interior. From the site of the settlement of Wellington on the island's southern tip, Williams followed the Rangitikei River northward to Lake Taupo, then continued northeastward to the Bay of Plenty.

In addition to locating the Hot Springs District around Lake Taupo, William Williams was the first European known to have made a south-to-north crossing of the North Island of New Zealand.

Williams, William Sherley (Old Bill Williams)

(1787–1849) *Fur trader, trapper, interpreter, guide in the Rocky Mountains*

William "Bill" Williams may have been born in Rutherford County, North Carolina, although some sources indicate he was a native of Kentucky. He became an itinerant Baptist preacher, and, by 1813, he had settled in the then-frontier region of what is now western Missouri and eastern Kansas. He lived among that region's Osage Indians and reportedly married an Indian woman.

In 1825–26, Williams acted as an interpreter to the Osage for a U.S. government surveying expedition of the Santa Fe Trail led by Joseph C. Brown. Williams then embarked on a career as a fur trader and trapper in the ROCKY MOUNTAINS, ranging across a wide area of the West, from the Gila River in what is now southern Arizona to the Yellowstone River in what is now Wyoming.

Williams was part of JOSEPH REDDEFORD WALKER's 1833–34 expedition across Utah's Great Basin and the Sierra Nevada into California. Upon his return from the Pacific coast, Williams settled among the Ute Indians of western Colorado.

Williams returned to Missouri for a brief visit in 1841, but he set out the next year from Bent's Fort on the Arkansas

River in Colorado, accompanied by WILLIAM THOMAS HAMILTON. During the next three years, Williams and Hamilton traveled throughout the North Platte River region and Green River Valley in present-day Wyoming and Utah, before returning to Colorado and Santa Fe.

In 1846, Williams was a guide in the Rockies for JOHN CHARLES FRÉMONT's third expedition, but he did not travel to California with him. He again settled for a time with the Ute Indians, then went into the FUR TRADE out of Taos, New Mexico.

Williams's last expedition into the Rockies began in fall 1848. Again acting as a guide for Frémont, he set out from Bent's Fort and made an extremely hazardous crossing of the Sangre de Cristo Range, in search of an all-weather railroad pass through the mountains. The expedition crossed the Continental Divide and reached the headwaters of the Rio Grande, but it then became lost in a blizzard. Short of adequate clothing and supplies, 11 members of the party died of starvation or exposure. Forced to abandon the enterprise, Frémont and the other survivors retreated to Taos. Frémont reportedly blamed the disaster on Williams, who had claimed to know of a route through the San Juan Mountains.

In March 1849, Williams accompanied one of the survivors, BENJAMIN JORDAN KERN, back into the mountains to retrieve papers and equipment that had been left behind. Along the way, they were killed in an attack by a band of Ute warriors in retaliation for a recent raid on a Ute village by a U.S. Army detachment.

Bill Williams covered a wide area of the American West in his years as a trapper and guide. With Walker in 1833–34, he was among the first non-Indians to visit California's Yosemite Valley, and he took part in the first eastward crossing of the Sierra Nevada. Southern Arizona's Bill Williams River, a tributary of the COLORADO RIVER, is named in his honor.

Willoughby, Sir Hugh (ca. 1516–1554)

English mariner in the European Arctic

Hugh Willoughby was born near Nottingham, England, the son of a soldier and baronet. He became a soldier himself, serving as an officer with English forces in Scotland, for which he was knighted in 1544. After commanding a garrison on the Scottish border in 1548–49, he became associated with SEBASTIAN CABOT and the MUSCOVY COMPANY of merchants in London.

In 1553, Willoughby was named as captain-general of the company's first expedition, a voyage that was intended to navigate the NORTHEAST PASSAGE across the top of Europe and Asia to the Orient and thereby open English trade contacts with China and India. Three ships were assembled for the voyage: the *Edward Bonaventure*, captained by STEPHEN

BOROUGH and with the expedition's chief pilot, RICHARD CHANCELLOR; the *Bona Confidentia*, captained by Cornelius Durforth; and the flagship, the *Bona Esperanza*, commanded by Willoughby.

Willoughby and his fleet sailed from London on May 10, 1553, although they did not leave the English coast until more than a month later. Off northern Norway's Lofoten Islands, the ships became separated in a storm. While Willoughby's ship and the *Bona Confidentia* remained together, the *Edward Bonaventure* continued on alone into the White Sea. Willoughby then proceeded eastward. Although he made the first known sighting of what turned out to be the southwest coast of Novaya Zemlya, he was unable to land there because of ice and shallow waters along the shore. Instead, he turned back westward across the Barents Sea to the northern end of the Kola Peninsula, part of Russian Lapland. He found a harbor where he planned to winter, near the mouth of the Arzina River, east of the present-day Russian port of Murmansk.

The two ships soon became icebound, and, during the winter of 1553–54, Willoughby and all the men on both vessels died. Although the likely causes of the disaster were the extreme cold and SCURVY, some sources suggest that carbon monoxide fumes emitted from stoves used to heat the interior of the ships may have killed the crew. Meanwhile, Chancellor and Borough had landed near what is now Archangel and succeeded in reaching Moscow, where they established commercial ties with the Russian monarch, Czar Ivan IV (Ivan the Terrible).

In spring 1554, Willoughby's fate became known when Russian fishermen found his ships, containing the frozen corpses of Willoughby and the more than 60 men with him. His journal, which was recovered and sent back to England, revealed the eastward extent of his explorations in the Barents Sea, indicating that he had survived until at least January 1554.

Sir Hugh Willoughby commanded the first English expedition to sail northward across the ARCTIC CIRCLE in the first attempt to find the Northeast Passage. Although he did not survive to report his finding, he is considered the first European known to have sighted the islands of Novaya Zemlya.

Wills, William John (1834–1861) *British surveyor in Australia*

A native of Devonshire, England, William Wills immigrated to Victoria, Australia, at the age of 18. He settled in Melbourne, where he studied medicine and worked as a surveyor, eventually finding employ for the government's meteorological office.

In 1860, Wills was commissioned as second in command to ROBERT O'HARA BURKE in an expedition, spon-

sored by the government of Victoria, aimed at making the first south-to-north crossing of Australia. The group left Melbourne in August 1860, arriving two months later at Menindee on the Darling River in west-central New South Wales. From there, they pressed on to Cooper's Creek in central Queensland, from where Burke, Wills, and two others, John King and Charles Gray, headed for the north coast, reaching the estuary of the Flinders River, near the coast of the Gulf of Carpentaria, in February 1861.

Wills returned to Cooper's Creek with Burke and King in April 1861. Gray had died on the trip back from the gulf. The relief party that was supposed to have waited for them had departed only hours before their arrival. Short on food and supplies, they made a desperate attempt to reach a settlement to the south. By the end of June 1861, both Wills and Burke had died of starvation; only one member of the expedition, the camel driver John King, survived, having been kept alive by Aborigines until he was rescued by a search party from Melbourne. The search party also found the bodies of Burke and Wills and recovered Wills's extensive journal, detailing the outbound journey and the expedition's last desperate days.

Along with Robert O'Hara Burke, William Wills is credited with taking part in a south-to-north crossing of Australia.

Wilson, Edward Adrian (1872–1912)

British physician, zoologist in Antarctica

Edward Wilson was a British medical doctor who accompanied ROBERT FALCON SCOTT on his first explorations of Antarctica in 1901–04.

In addition to serving as the expedition's surgeon, Wilson, a zoologist, was part of the group's scientific team. In 1902, on the coast of Antarctica's Ross Sea, he made the first known discovery of an emperor penguin rookery.

Later in 1902, Wilson accompanied Scott and another of the expedition's members, SIR ERNEST HENRY SHACKLETON, on the first exploration into Antarctica, setting a farthest-south record in a trek across the Ross Ice Shelf.

In 1910, Wilson returned to Antarctica as the chief of the scientific team with Scott's second expedition. In June 1911, he and a small party traveled to Cape Crozier, where he obtained the first samples of emperor penguin eggs.

Wilson accompanied Scott to the SOUTH POLE in January 1912. On the return trek, he was among the last of the five-man party to perish in a blizzard two months later.

When the group's remains were found by a search party in November 1912, it was learned that just prior to his death, Wilson had continued his scientific studies, making notes on the fossils and geological specimens he had collected near the South Pole.

Winslow, Edward (1595–1655) *English colonial leader in Massachusetts, explorer in Connecticut*

Edward Winslow was born in Droitwich in Worcestershire, England, the son of affluent parents. In 1617, he moved to Leyden in the Netherlands to attend that city's university. He soon joined the English Protestant group known as the PILGRIMS, who were then living in voluntary exile in Leyden.

Winslow sailed to New England with the Pilgrims aboard the *Mayflower*, landing at present-day Plymouth, Massachusetts, on December 21, 1620. He was elected as one of the ruling council of the Plymouth colony, and in 1621, aided by SQUANTO, he negotiated an important treaty with Massasoit, grand sachem of the Wampanoag Confederacy.

Winslow returned to England in 1623, where he acted as an agent for the Plymouth colony and also wrote and published an account of the colony's progress, entitled *Good News From New England or a True Relation of Things very remarkable at the Plantation of Plimoth in New England* (1624).

Winslow returned to the Plymouth colony in 1624. Over the next 20 years, he served a number of terms as the colony's governor and made several return trips to England to obtain additional support. He also explored and traded along the New England coast.

In 1632, Winslow headed south and west from the Plymouth colony into what is now Connecticut. Although Dutch navigator ADRIAEN BLOCK had explored the Connecticut River from Long Island Sound in 1614, no steps had been taken to assert Dutch sovereignty there. The next year, 1633, Winslow sent William Holmes to establish a trading post on the Connecticut River near present-day Windsor, Connecticut.

Winslow was imprisoned in England for a short time in 1635, accused of having performed marriage ceremonies in New England without clerical authority. He won his release based on the argument that he acted in a civil capacity as a magistrate.

Winslow left the Plymouth colony for the last time in 1646. Back in England, he became prominent in the government of Oliver Cromwell after 1649 and continued to serve as the principal agent for the Plymouth colony in New England.

In 1655, Cromwell appointed Winslow one of the commissioners in a naval expedition against the Spanish in the Caribbean Sea. While en route with the fleet to attack Jamaica, Winslow contracted a fever and died.

Edward Winslow, unlike most of the Pilgrim founders, came from an upper-class background. He was the first Englishman to visit the upper Connecticut River Valley, and his explorations led to the establishment of the first European settlement in Connecticut.

Wissmann, Hermann von (1853–1905)

German army officer, colonial administrator in central Africa
Born in Frankfurt, Germany, Hermann von Wissmann was an officer in the German army. He undertook explorations in central Africa on behalf of the German Africa Society. In 1880, Wissmann set out from Luanda on the Atlantic coast of Angola, along the Lulua and Kasai Rivers, to Nyangwe in present-day Republic of the Congo. From there, he continued eastward by way of Lake Tanganyika and the region of Tabora, and reached Zanzibar (part of present-day Tanzania) on the Indian Ocean coast in 1882, completing a west-to-east crossing of central Africa.

Wissmann returned to the Congo region in 1883. During the next two years, in the service of King Leopold II of Belgium, he explored the Kasai River system. In addition to determining that the river was mostly navigable, he also came upon an uncharted branch of the Kasai, known as the Sankuru.

Wissmann made an unsuccessful attempt to reach the Lomami River in 1886–87. Soon afterward, he was appointed as a colonial commissioner in German East Africa. In this role, he succeeded in suppressing an Arab revolt in present-day Tanzania in 1889–92; during the same period, he brought the Masai people of what is now Kenya under German colonial rule.

Largely as a result of Wissmann's efforts, the region between Lake Nyasa and Lake Tanganyika was brought under German colonial administration. He also founded several settlements in the interior, including Moshi at the base of MOUNT KILIMANJARO and Langenburg on Lake Nyasa. Wissmann served as governor of German East Africa in 1895–96, before he was compelled by illness to return to Europe.

Hermann von Wissmann's exploits were recounted in his book *My Second Journey Through Equatorial Africa* (1891). His explorations resulted in the expansion of European colonial influence over a wide area of central Africa, including much of what is now the Democratic Republic of the Congo, Tanzania, and Kenya.

Wolfskill, William (1798–1866) *American fur trader, frontiersman in the American Southwest*

William Wolfskill was born in Richmond, Kentucky, which was then a settlement on the Appalachian frontier. When about 10 years old, he moved with his family to what is now north-central Missouri. As a teenager, he returned to Kentucky to attend school for several years, then was back on the Missouri frontier in the early 1820s.

In 1822, Wolfskill first visited the Southwest with WILLIAM BECKNELL's second trading expedition from Franklin, Missouri, along the Santa Fe Trail to the newly opened markets in New Mexico. He later settled in Taos, where he trapped the Rio Grande and other rivers of north-

eastern New Mexico with EWING YOUNG. In an 1824 trapping expedition north and west of Taos, Wolfskill worked alongside the first party of Americans to explore what is now southern Utah.

In 1830–31, Wolfskill, in partnership with GEORGE CONCEPCION YOUNT, led a caravan of packhorses along the Old Spanish Trail, from Taos to California along a route meandering north and west into Utah, across northern Arizona, and through the San Bernardino Mountains to San Gabriel Mission and Los Angeles. Wolfskill eventually settled in California, where he helped develop California's citrus and winemaking industries.

Although far longer and less direct than the westward route across the deserts of southern Arizona, the Old Spanish Trail route pioneered by Wolfskill and Young had abundant sources of water along the way, making it practical as a route for both caravans of goods-laden packhorses and for cattle herds being driven between New Mexico and California. Moreover, travelers along the Old Spanish Trail were less subject to Indian attacks.

Wood, Abraham (1608–ca. 1680) *English colonial military leader in Virginia, sponsor of trading expeditions*

There are few details of Abraham Wood's origins or early life. In 1646, as a captain in the Virginia colonial militia, he was commissioned by the Virginia Assembly to establish Fort Henry, a military outpost at the falls of the Appomattox River near present-day Petersburg, Virginia. This was one of a series of forts erected along the fall line of the rivers leading into the Piedmont region. Wood was granted a large tract of land near the fort, where he established a lucrative farming and trading business.

In 1650, Wood, along with James Bland and a number of other English colonists, set out from Fort Henry and explored the region between the upper James and Roanoke Rivers. They were in search of a river that, according to Indian reports, might lead them to a great "South Sea"—the Pacific Ocean—and the Spanish silver mines in Mexico. They penetrated the Piedmont for a distance of about 100 miles, then returned to Fort Henry after five days. Civil strife in England during the 1650s halted Wood's further explorations in Virginia.

It was not until 1671 that Wood, by then a major general, was able to sponsor subsequent expeditions into the APPALACHIANS. That year, he sent THOMAS BATTS and ROBERT FALLAM to explore south from Fort Henry to the Blue Ridge of what is now North Carolina. They crossed the Appalachians and returned to Fort Henry with reports of rivers flowing into the Ohio Valley.

In 1673, Wood sent out two more Englishmen, GABRIEL ARTHUR and JAMES NEEDHAM, to explore beyond the Allegheny Mountains in an attempt to expand the FUR TRADE to the Indians west of the Piedmont. They pene-

trated the interior as far as what is now western North Carolina and eastern Tennessee. Although Needham was killed by his Indian guide on this expedition, Arthur survived Indian captivity and traveled from Florida to the Ohio River before returning to Fort Henry in 1674.

Bacon's Rebellion of 1676–77 halted further efforts by Wood to send expeditions into the Appalachian frontier. Of his later life little is known.

Abraham Wood was one of the earliest settlers on the Virginia frontier. The expeditions he undertook himself, as well as those he sponsored, increased geographic knowledge of the interior of Virginia beyond the coastal plain and into the Piedmont. Two of his men, Batts and Fallam, were the first Englishmen to cross the Appalachians into the Ohio Valley from the Atlantic seaboard.

Woodward, Henry (unknown–ca. 1686)

British surgeon, colonist in South Carolina and Georgia

Little is known of the early life of Dr. Henry Woodward before 1664, when he arrived in North America at the Carolina colony near Cape Fear in what is now North Carolina. Two years later, he landed in what is present-day South Carolina, near the Georgia border, with an expedition that had originated in Barbados at Port Royal. Having a grant as a "tenant at will" of the Lord Proprietors of Carolina, he settled among the Yamasee Indians in Santa Elena, a town established by Spanish missionaries.

In 1667, the Yamasee turned Woodward over to the Spanish, who, after he professed being Catholic, let him work as a surgeon at their settlement of St. Augustine in Florida. He managed to escape the next year, however, during an attack by English pirates and returned to the north.

In 1670, Charles Town (now Charleston, South Carolina) was founded as the capital of the Carolina colony. That year, Woodward carried out an exploratory expedition from Charles Town into the interior, traveling up the Wateree River. In 1674, he cut southwestward to the site of present-day Augusta, Georgia, on the Savannah River and negotiated trade relations with Westo Indians. He returned to England three years later, where he received a commission from the Lord Proprietors to explore beyond the Savannah. In 1680, he led colonists and Westo and other Indian allies in their attacks on Spanish missions and their Indian converts in Georgia. In 1685–86, he led Charles Town traders southwestward and negotiated trade relations with the Creek (Muskogee) Indians living in the Lower Villages on the Chattahoochee River in Georgia. It is thought he died soon after his return to Charles Town.

Henry Woodward was the individual most responsible for opening up trade routes westward from Charles Town. In the ensuing years, English traders spread throughout the Southeast. JOHN LAWSON would explore the territory northwest of Charles Town, starting in 1701.

Wootton, Richens Lacy (Uncle Dick)

(1816–1893) *American trader, fur trapper, entrepreneur in the West*

Richens Lacy Wootton was born in Mecklenburg County in southern Virginia. While still a child, he moved west with his family to Kentucky and spent part of his teens on a cotton plantation operated by a relative in Mississippi.

In 1836, at the age of 20, Wootton set out for the western frontier, traveling by way of Independence, Missouri, to Bent's Fort on the Arkansas River, near present-day La Junta, Colorado. There, he became a trapper for the fur-trading firm of Bent, St. Vrain & Company, owned by CHARLES BENT and CÉRAN DE HAULT DE LASSUS ST. VRAIN.

After a year of trapping in the Colorado ROCKY MOUNTAINS, Wootton and a party of mountain men undertook an extensive trapping expedition into every major river region of the American West. Starting in 1838, they traveled from Bent's Fort to the upper reaches of the Arkansas River, then crossed the Rockies to the Green River region of what is now northern Utah and southwestern Wyoming. From there, they went on to trap in the Big Horn River region of what is now southern Montana. They hunted beaver in the upper Yellowstone River, before turning westward for the Snake River and COLUMBIA RIVER in present-day Idaho, Washington, and Oregon.

After a stopover at the HUDSON'S BAY COMPANY'S Fort Vancouver, near present-day Portland, Oregon, Wootton and his party made their way southward through central California to Los Angeles. They then returned eastward, trapping along the Colorado and Gila Rivers in southern Arizona, before traversing Utah's Great Basin and arriving at Bent's Fort on the Arkansas River in 1840.

In the early 1840s, Wootton became a rancher near present-day Pueblo, Colorado, raising buffalo cows and calves and trading in buffalo skins with the Comanche Indians. In the U.S.-Mexican War of 1846–48, he took part in Alexander Doniphan's campaign into Chihuahua in 1847, serving as a scout. At the war's end, he settled for a time in Taos, New Mexico, and, in 1852, he undertook a highly profitable cattle drive to California.

Wootton returned to Pueblo in the early 1850s, where he operated a ranch as well as several other business enterprises. During the Pikes Peak (Colorado) gold rush of 1859, he had a hotel and saloon business in Denver. Beginning in 1866, he operated a toll road that traversed 27 miles of rough terrain in Raton Pass to link the Santa Fe Trail and the Canadian River, an enterprise that lasted until he was bought out in 1879 by the Atchison, Topeka, & Santa Fe Railroad, which constructed a rail line along his right-of-way.

Richens Lacy Wootton's career as a mountain man and fur trapper was highlighted by his spectacular 1838–40 expedition, in which he traversed the entire American West, taking in much of the Rockies, the Pacific Northwest, and

California, as well as the Southwest. He was a veritable legend in his own time; his life spanned most of the major periods of the history of the American West, from the height of the FUR TRADE in the 1830s to just after the official end of the frontier period in 1890. Known familiarly as “Uncle Dick,” he related his western experiences in interviews included in *Uncle Dick Wootton* (1890), a biography by H. L. Conrad.

Work, John (ca. 1792–1861) *Irish fur trader in the Pacific Northwest*

Born in County Donegal, Ireland, where his family was known as Wark, John Work entered the FUR TRADE in 1814, as an employee of the HUDSON’S BAY COMPANY in the HUDSON BAY region. In 1823, soon after the Hudson’s Bay Company had merged with the NORTH WEST COMPANY, Work was sent west to the COLUMBIA RIVER region. Over the next seven years, under the direction of PETER SKENE OGDEN, he trapped and explored from the Oregon coast to the Fraser River in British Columbia.

In 1830, Work took charge of the Hudson’s Bay Company’s operations in the Snake River region of what is now eastern Washington and western Idaho. That year, he led an expedition eastward from Walla Walla into the Salmon River region of central Idaho, then southward to trap in the Humboldt River valley of present-day northern Nevada. He later returned to his base at Fort Spokane by way of central Oregon’s John Day River.

Work led a party of trappers into western Montana in 1831, reaching the upper reaches of the MISSOURI RIVER before being forced to withdraw because of repeated attacks by Blackfoot Indian war parties. The next year, he went southward into Oregon and northern California’s Sacramento Valley. He stopped at San Francisco Bay and the Russian settlement at Fort Ross before returning northward in 1833.

In 1846, Work succeeded JOHN MCLOUGHLIN as the Hudson’s Bay Company’s chief factor in the Pacific Northwest. He later settled in Victoria, British Columbia, where he became prominent in provincial politics.

In his career as a fur trader, John Work covered a wide area of the Pacific Northwest and northern plains. His personal account of his experiences was published in 1923 as *The Journal of John Work*, which includes a detailed account of his travels from 1830 to 1833.

Workman, Fanny Bullock (1859–1925)

American traveler, mountain climber, writer in Europe, North Africa, and central Asia

Fanny Workman, née Bullock, came from a wealthy Worcester, Massachusetts, family that was involved in trade and the manufacture of gunpowder. In 1866, her father was elected governor of the state.

Workman was educated in New York, Paris, and Dresden and became fluent in both French and German. She returned to the United States in 1879; two years later, she married Dr. William Hunter Workman, a prominent physician.

In the 1880s, Workman was introduced by her husband to mountain climbing in New Hampshire’s White Mountains. She climbed 6,293-foot Mount Washington several times. In 1888, she and her husband went to Europe and together embarked on a 20-year career of travel and mountaineering.

In the 1890s, the Workmans undertook a series of mountain-climbing expeditions in the Alps, during which Fanny climbed such peaks as Zinal Rothorn, the Matterhorn, and MONT BLANC. In 1895–96, the Workmans bicycled through Spain and also toured the Atlas Mountains of Morocco and Algeria. In 1897, they went to India and bi-



Fanny Workman (Library of Congress)

cycled through the Indian subcontinent to Burma, then traveled to Java. They returned to India the next year and undertook mountaineering expeditions into the HIMALAYAS, including the Karakoram Range.

From 1899 to 1912, Workman participated with her husband in six more expeditions in central Asia, during which she set mountain-climbing altitude records for women. The Swiss mountaineer MATTHIAS ZURBRIGGEN served as her guide. The Workmans contributed geographic data on these uncharted mountainous regions to Britain's Great Trigonometrical Survey of India.

In 1905, Workman became the second woman, after ISABELLA LUCY BIRD BISHOP, to address the ROYAL GEOGRAPHICAL SOCIETY on her travels. At the outbreak of World War I, Workman and her husband settled in the south of France, where she died in 1925.

With her husband, Fanny Workman authored a number of books detailing their travels, including *Algerian Memories: A Bicycle Tour Over the Atlas Mountains to the Sahara* (1895), *Sketches Awheel in Modern Iberia* (1897), *In the Ice World of the Himalaya* (1900), and *Through Town and Jungle: 14,000 Miles A-wheel among the Temples and Peoples of the Indian Plain* (1904). The Workmans took portable Kodak cameras on their expeditions, and their travel books were among the first to be illustrated with photographs taken en route.

Wyeth, Nathaniel Jarvis (1802–1856)

American entrepreneur, fur trader in the Pacific Northwest

Nathaniel Wyeth was born in Cambridge, Massachusetts, into a family prominent in the hotel business in nearby Boston. As a young man, he became a partner in a business that supplied ice from New England to the WEST INDIES.

In 1831, inspired by earlier efforts to promote American settlement in the Oregon Country, Wyeth organized a colonizing and trading expedition of his own to the Pacific Northwest. He sent a ship, the *Sultana*, around CAPE HORN to the Pacific Ocean; he intended to meet the vessel at the mouth of the COLUMBIA RIVER, where he planned to sell its cargo of trade goods and send it back loaded with furs.

In May 1832, Wyeth and a party of trappers and artisans left Independence, Missouri, for the Oregon Country, accompanying a supply wagon led by WILLIAM LEWIS SUBLETTE of the ROCKY MOUNTAIN FUR COMPANY. They followed the North Platte River northwestward to the Sweetwater, then traveled through the SOUTH PASS to the Teton Mountains. At the fur traders' rendezvous at Pierre's

Hole, a number of Wyeth's party decided to abandon the venture. Soon afterward, he took part in a skirmish with the Gros Ventre Indians that became known as the Battle of Pierre's Hole.

Wyeth and the remaining 18 members of his expedition continued to the Snake River without Sublette, reaching Fort Vancouver on the Columbia River, opposite the future site of Portland, Oregon, in October 1833. Wyeth learned that the *Sultana* had been wrecked in the South Pacific, causing him to curtail the enterprise for that year.

On his overland journey back to Boston in spring and summer 1833, Wyeth met with fur trader THOMAS FITZPATRICK on the Green River and entered into an agreement to supply trade goods for the summer 1834 rendezvous.

Wyeth was in Boston in winter 1833–34, where he organized the Columbia River Fishing and Trading Company. Another ship, the *May Dacre*, was sent to the Pacific Northwest in order to bring back a cargo of pickled Columbia River salmon. On his second overland journey to Oregon, which left from Boston in spring 1834, Wyeth was accompanied by naturalist THOMAS NUTTALL, as well as a group of settlers headed by Methodist missionary Jason Lee.

When Wyeth reached the summer 1834 rendezvous at Ham's Fork of the Green River, Fitzpatrick reneged on his promise to buy his goods. In response, planning to sell his merchandise to other fur traders, Wyeth, along with OSBORNE RUSSELL, established Fort Hall on the Snake River in what is now southern Idaho. He then resumed the westward journey to the Columbia River's mouth, which he reached in September 1834. Another setback occurred when Wyeth's ship arrived on the Oregon coast too late for that year's salmon fishing season, having stopped in Chile for repairs. Wyeth remained in the Pacific Northwest for another year, returning to Boston in spring 1836 to resume his career as an ice dealer. Soon afterward, he sold Fort Hall to the HUDSON'S BAY COMPANY.

Although Nathaniel Wyeth's enterprises in the Pacific Northwest were less than commercially successful, the route he blazed in his two expeditions west of the South Pass soon became well established as the Oregon Trail. Starting in the early 1840s, Fort Hall, his trading settlement on the Snake River near what is now Pocatello, Idaho, became an important stopping point for pioneers heading to California and Oregon. Jason Lee and the migrants who traveled to the West with Wyeth in 1834 went on to establish the first permanent American settlement in Oregon. Wyeth left an account of his transcontinental journeys, published in 1899 as *The Correspondence and Journals of Captain Nathaniel J. Wyeth*.



Xavier, Francis (Saint Francis Xavier, Francisco Javier, Francisco de Yasu y Javier) (1506–1552)

Spanish missionary in India, Indonesia, and Japan

Francis Xavier was born into a noble Basque family in Spain's province of Navarre. In 1525, he began studying in Paris, eventually becoming an associate of Spanish churchman Ignatius of Loyola. In 1534, with Loyola, he was one of the seven founding members of the Society of Jesus, the Jesuit order.

Ordained as a priest in Venice in 1537, Xavier spent several years in service to his order in Rome. In 1540, he was named papal nuncio to the Indies, and the following year, under the sponsorship of King John III of Portugal, he set out on a missionary expedition to India from Lisbon.

After a voyage around the CAPE OF GOOD HOPE, Xavier arrived at the Portuguese colony of Goa on the west coast of India in 1542. For the next three years, he traveled along the south coast of India, winning many converts and establishing missions. He also undertook missionary work on the island of CEYLON (present-day Sri Lanka).

In 1545, Xavier sailed for Malacca at the southern end of the Malay Peninsula, where he carried on missionary work. He continued eastward into the Indonesian archipelago, visiting Ternate in the Moluccas, then known as the SPICE ISLANDS, in 1546.

Returning to India, Xavier supervised the assignment of additional Jesuit missionaries to posts in India. In 1549, he led a group of missionaries to Japan, landing at

Kagoshima on southernmost Kyushu Island, where he met up with the Portuguese traveler FERNÃO MENDES PINTO. After two years in Japan, during which he was permitted to open a number of missions and Christian settlements, Xavier returned to India.

In 1552, Xavier was named as superior of the Jesuit Province of the Indies. With plans to take his missionary work to China, he set out from Goa. He contracted fever en route and died on Shangchuan Island near the Chinese port of Canton (Guangzhou).

Canonized in 1622, Saint Francis Xavier became known as the Apostle to the Indies. After Pinto, he was one of the first Europeans to visit Japan, providing an early description of that land and its people in his letters to his fellow Jesuits in Europe.

Xenophon (ca. 430–355 B.C.) *Greek soldier, historian in the Middle East*

Xenophon was born in ancient Athens, a son of one of that city-state's prominent families. In his youth, he studied under the Athenian Greek philosopher Socrates.

In 401 B.C., Xenophon embarked on a military career as a young officer with a Greek mercenary force in service to the Persian prince Cyrus the Younger. He was among the so-called Ten Thousand Greeks who took part in a military expedition that marched eastward across present-day Syria and Iraq in an attempt to defeat the ruler of Persia (present-day Iran), Artaxerxes II, Cyrus's older brother.

Xenophon traveled with the Greek army from Anatolia through the Cilician Gates, the pass in the Taurus Mountains of what is now southern Turkey. They followed the Euphrates River southward toward the Persian capital at Babylon. In the ensuing Battle of Cunaxa, near what is now Fallujah, northeast of present-day Baghdad, Iraq, Cyrus was killed by Persian forces. Afterward, although the Persians agreed to escort the Greeks back to the MEDITERRANEAN SEA, they instead murdered most of the remaining officers.

Command of the Greek forces then went to Xenophon. He led the army northward up the Tigris River, through the ruins of the ancient Assyrian capital at Nineveh, across the Kurdistan region of northern Iraq and southern Turkey, and into the mountains of present-day Armenia and Georgia. Eventually, the forces reached Trabzon on the central Black Sea coast of what is now northern Turkey. From there, they sailed back to Greece, arriving

at Lake Scutari on the northern border of Albania. The five-month journey had taken them through more than 2,000 miles of territory unknown to the Greeks.

Xenophon continued his military career in the service of Sparta before returning to Athens, where he settled in 365 B.C. Thereafter, he devoted himself to historical writing. Among his work was his *Anabasis* (Upmarch), chronicling his experiences leading the Ten Thousand Greeks back from the Persian campaign.

As a result of Xenophon's report on the retreat across Persia, Greek geographic knowledge was extended eastward to include much of present-day Turkey and large portions of southeastern Europe and the Middle East. His east-to-west march back to Greece was followed some 70 years later by the west-to-east campaign of conquest by ALEXANDER THE GREAT.



Yaqut al-Rumi, Shihab al-Din Abu Abd Allah (Yaqut al-Hamawi) (1179–1229) *Greek-born traveler in the Middle East*

Yaqut al-Rumi was born a Christian to a Greek family in what is now western Turkey, at that time a province of the Byzantine Empire. As a child, he was taken captive by Muslim maidens and sold into slavery.

Purchased by a Baghdad merchant named al-Hamawi (whose name he apparently adopted), Yaqut was raised and educated as a Muslim. He later undertook commercial journeys on behalf of his owner, traveling widely into the regions of Persia (present-day Iran) and Arabia adjoining the Persian Gulf.

Granted his freedom in 1196, Yaqut continued to travel in the Middle East for his former owner, operating out of Baghdad until al-Hamawi's death in 1213. By that time, he had developed an interest in geography, and, over the next 20 years, he extended his travels in the Middle East to include visits to cities and small villages in Egypt and Mesopotamia (present-day Iraq and Syria).

Yaqut al-Rumi eventually settled in Aleppo, where, in 1228–29, he completed his great geographic work *Muʿjam al-Buldan* (Dictionary of countries). In it, he provided an index of place names he had compiled in his travels, along with topographic, historical, and economic details. One of the most comprehensive geographic works of the Islamic medieval period, it was also the first gazetteer-type geographic study ever produced.

Yermak (Timofeyevich, Timofeevich, Timofeiev, Ermak) (unknown–ca. 1584) *Russian Cossack in western Siberia*

Details of Yermak's origins and early life are obscure. By the 1570s, he was a leading commander among the Cossack bands of the Volga and Don Rivers. His name sometimes appears as Yermak Timofeyevich in historical writings.

In about 1579, Yermak and some 1,000 of his followers, who had been raiding merchant vessels along the Volga River, withdrew up the Volga, pursued by a Russian government military expedition. They reached the region of the upper Kama and Chusovaya Rivers, where the Stroganov family had established a series of trading settlements on the extensive land grants they had received from Czar Ivan IV (Ivan the Terrible).

Yermak and his Cossack army were soon engaged by the Stroganovs to defend their lands against the Tatar tribes from the east. In 1581, Yermak led as many as 1,600 Cossacks eastward across the Ural Mountains in a campaign of conquest against the Khanate of Siber. With superior military force, he soon succeeded in overthrowing the Tatar ruler, Kuchum Khan, and, in 1582, occupying his capital on the Irtysh River, known then as the Tatar city of Siber. The Stroganovs sent news of Yermak's victory to Ivan in Moscow, along with furs from the newly conquered lands. Accepting the territory as part of his domain, the Russian monarch dispatched an army to occupy the region.

Probably in 1584 or 1585, before Russian reinforcements reached Yermak at Sibir, he was killed in a native uprising. Nonetheless, within two years, the region had come under Russian control, and Sibir was replaced by nearby Tobolsk, the new capital city that the Russians established in 1587.

The conquests of Yermak marked the beginning of Russian eastward expansion across central Asia to the Pacific Ocean. The Sibir region, which he had brought under Russian rule, gave its name to the vast land stretching eastward to the Pacific, known thereafter as SIBERIA. Yermak's route eastward from the Stroganov settlements at present-day Perm, through the Urals to present-day Tobolsk, was adopted by the Trans-Siberian Railroad in the 1890s.

Young, Brigham (1801–1877) *American religious leader, territorial governor of Utah*

Brigham Young was born to a farming family in Whittingham, Vermont. He had little formal education, and by the time he was 16, he was self-employed as a painter, carpenter, and glazier. By 1824, he had moved into western New York, settling at Mendon, near Rochester. In 1832, Young became a member of the Church of Jesus Christ of Latter Day Saints—the Mormons—which had been established in nearby Palmyra, New York, two years earlier by Joseph Smith.

Throughout the 1830s, Young rose to prominence as a leader in the Mormon movement, organizing a settlement at Kirtland in northeastern Ohio and taking part in evangelical expeditions to England. He was instrumental in the establishment of the large Mormon settlement at Nauvoo, Illinois, and, in 1844, following the murder of Joseph Smith, he became the church's principal leader.

Facing persecution by civil authorities and resentful non-Mormon settlers in Illinois, Young evacuated the 16,000 Mormons from Nauvoo, crossed the MISSISSIPPI RIVER into Missouri, then set up temporary settlements at Council Bluffs, Iowa, as well as at Winter Quarters, Nebraska, on the MISSOURI RIVER not far from present-day Omaha.

In April 1847, Young led an advance party of 148 Mormon men and women, known as the "Pioneer Band," westward from Winter Quarters to the Platte River. Influenced by the recently published reports by JOHN CHARLES FRÉMONT, Young had decided to establish a homeland for the Mormons in the remote and arid Great Salt Lake Valley. They traveled in 72 wagons and drove a large cattle herd with them across the Nebraska plains.

Young followed the north bank of the Platte, a departure from the south bank route usually taken by emigrants heading for the Oregon and California Trails. They proceeded along the Platte and North Platte Rivers north and



Brigham Young (New York State Library, Albany)

west into what is now Wyoming. Near present-day Casper, Wyoming, they crossed the North Platte in a boat they had carried with them, the *Revenue Cutter*. A small group from the Pioneer Band party remained at this point, where they established a profitable ferry service that charged non-Mormon emigrants a fee to cross the river, an enterprise that would continue for the next 20 years.

Young and the Pioneer Band arrived at Fort Laramie in June 1847 and from there followed the Oregon Trail to Fort Bridger. Mountain man JAMES BRIDGER warned Young that the route he planned to take to the Great Salt Lake led into mountains and deserts that would be difficult to cross with wagons. Nevertheless, Young led his party southwestward from Fort Bridger into the Uinta and Wasatch Mountains, making a perilous crossing of 120 miles of desert. In early July 1847, the first Mormons reached the tablelands southeast of the Great Salt Lake. Young, stricken with mountain fever, did not arrive until July 24, 1847, at which time he reportedly declared, "This is the place."

Young oversaw the establishment of the Mormon settlement at Great Salt Lake, and soon afterward, he headed back East to organize the subsequent migration of the bulk of the Mormons who had begun to follow his route westward from the Missouri River. As a result of Young's efforts, thousands of Mormons poured into the Great Salt Lake settlement during the next several years. In 1851, he was named governor of the newly organized territory of Utah.

Seeking to provide the Mormon settlement with an outlet to the Pacific Ocean, he organized parties of Mormon emigrants that established communities south and southwest of the Great Salt Lake—from Utah Lake, across northern Nevada, to Cajon Pass into the Sierra Nevada, where the Mormons established San Bernardino. By that time, the rest of the route westward to San Diego and the Pacific coast was well known, having been blazed in 1826 by JEDEDIAH STRONG SMITH.

Although conflicts with federal authorities led to Young's removal as Utah governor in 1858, he remained a dominant force in the Mormon community until his death in 1877.

The route along the north bank of the Platte established by Brigham Young in 1847 became known as the Mormon Trail. It provided expanded access to the Oregon and California Trails for westbound emigrants until the advent of the transcontinental railroad in 1869. The route across the Great Basin established in the 1850s became known as the Mormon Corridor.

Young, Charles Denton (1864–1922) *U.S. Army officer, American cartographer in Haiti and Liberia*

Charles Young was born in Mays Lick, Kentucky; both his parents were African-American slaves. They gained their freedom at the end of the Civil War, in which his father, Gabriel Young, served in the Fifth U.S. Colored Artillery. After the war, the family moved to Ripley, Ohio, where Young graduated from high school with honors, then taught at his grammar school. He later applied to the U.S. Military Academy at West Point and was admitted in 1884. He graduated in 1889, despite the hostility of some of his peers, becoming the ninth African American to be enrolled and the third to graduate.

Young's first assignment was as a second lieutenant with the Buffalo Soldiers in the Ninth Cavalry in Nebraska, then in Utah. In 1894, he was assigned as a teacher of tactics and military science at Wilberforce University in Ohio. In 1898, with the outbreak of the Spanish-American War, he was given training duty at Camp Algiers in Virginia. In 1901–02, he saw active duty in the Philippines. In 1903, he was acting superintendent of Sequoia and General Grant National Parks in California, then a troop commander at the Presidio of San Francisco.

In 1904–07, Young, at the rank of captain, served in Port-au-Prince, Haiti, as one of the army's first military attachés for the newly founded Military Information Division, observing the training of Haitian troops and writing reports on the political situation and geography as well as producing maps. He also traveled to the Dominican Republic. During his time there, he wrote his book *Military Morale of Nations and Races*, published in 1912.

Subsequent postings included Washington, D.C., the Philippines, Wyoming, and Texas. In 1912–15, Young was sent to Liberia in West Africa as a military attaché and helped reorganize the Liberian Frontier Force and Constabulary. He traveled throughout the country, again drafting maps. For his work there he was given the Spingarn Medal by the National Association for the Advancement of Colored People (NAACP), awarded annually to an African American for distinguished achievement.

In 1916–17, Young served in Mexico, commanding a cavalry squadron in pursuit of the bandit Pancho Villa, whose forces had crossed the border and murdered American citizens. His successes in battle led to a promotion to lieutenant colonel, the first African American to reach that rank.

Although Young was the highest-ranking African-American officer in the army, he was denied a leadership role in World War I on grounds of high blood pressure. Despite his protests and those of others who believed the decision to be racially motivated, he was retired in 1917. He was returned to active duty the next year, and, in 1919, he went again to Liberia as a military attaché. In 1921, he reported to the U.S. government on mistreatment of Liberians by non-natives. He died in Lagos, Nigeria, three years later, while on an inspection visit. He was buried at Arlington National Cemetery.

In addition to his many academic and military accomplishments, as well as his firsts as an African American, Charles Young became accomplished in mapmaking and helped chart wilderness areas in Haiti, the Dominican Republic, and Liberia.

Young, Ewing (ca. 1792–1841) *American fur trader, pioneer in the Southwest, California, and Oregon*

Ewing Young was born in eastern Tennessee; his parents were among the original frontier settlers of the region. When about 18, he moved westward himself, settling for a time in north-central Missouri, where he took up farming.

In 1822, Young became a trader, traveling westward with WILLIAM BECKNELL's wagon caravan along the Santa Fe Trail to New Mexico. He remained in Taos, where, in the 1820s, he became associated with GEORGE CONCEPCION YOUNT and WILLIAM WOLFSKILL, with whom he trapped beaver along the rivers of northeastern New Mexico.

By 1826, Young had become a seasoned fur trapper as well as a veteran trader, plying the Santa Fe Trail between St. Louis and the settlements of northern New Mexico. That year, he embarked with a large brigade of trappers southward from Taos into the Gila River and Salt River region of what is now south-central Arizona. On this expedition, he rescued JAMES OHIO PATTIE and Michel

Robidoux, a brother of ANTOINE ROBIDOUX, survivors of an Indian attack.

After trapping along the Gila to the lower COLORADO RIVER, Young turned northward to the Green River region of what is now northern Utah. He returned to Taos in 1827, by way of the Old Spanish Trail, where local New Mexican authorities confiscated his furs, charging him with having operated in the Gila River region without proper authorization.

Young's next major fur-trapping expedition left Taos in August 1829. The young CHRISTOPHER HOUSTON CARSON (Kit Carson) was among the party of MOUNTAIN MEN he led across Arizona by way of the Mojave River, and through Cajon Pass to San Gabriel Mission, near Los Angeles, California. He spent the next year leading his trappers into central California's San Joaquin River region. In 1831, he drove the first herds of mules and horses from California back to New Mexico along the Old Spanish Trail.

In 1832, Young duplicated this expedition, this time in partnership with DAVID E. JACKSON. He remained in California to hunt sea otters in the islands off the southern California coast, then undertook additional beaver-trapping expeditions into northern California as well as eastward along the lower Colorado River.

In San Diego, in summer 1834, Young met Oregon settlement promoter Hall Jackson Kelley, who induced Young to head northward with him to Oregon. When he and Kelley arrived at Fort Vancouver in October 1834, they had with them a small herd of horses they had brought from California. JOHN M'CLOUGHLIN, the HUDSON'S BAY COMPANY factor there, having been incorrectly informed that the livestock had been stolen in California, refused to allow Young to stay at the post, making him one of the few travelers ever to have been refused his assistance and hospitality at Fort Vancouver. Undaunted, Young established a ranch in the Oregon Country, which soon developed into a small community of American settlers, complete with a gristmill and a sawmill.

In 1837, Young returned to California to drive the first large cattle herd back to Oregon. At the time of his death in 1841, he had considerable holdings in both land and cattle. Because Young had died without a will, the American community was prompted to organize an ad hoc probate court to administer his estate, an event that marked the first official action of what was to become Oregon's provisional government.

In his westward journeys from St. Louis to New Mexico and California, Ewing Young was instrumental in developing several central routes. He revived the Old Spanish Trail as a cattle trail to California and developed the trail along the Gila River, in effect extending the Santa Fe Trail westward to Los Angeles.

Younghusband, Sir Francis Edward

(1863–1942) *British army officer and diplomat in central and Southeast Asia*

Born to a British colonial family at Murree in what is now northern Pakistan, Francis Younghusband attended schools in England before entering the British army as a commissioned officer in 1882.

In 1886, Younghusband began his travels in Asia with a journey to Peking (Beijing). From there, he went northward into Manchuria, and, the next year, he made an east-to-west crossing of China and Mongolia, traversing the GOBI DESERT and skirting the Altai Mountains to the Tarim Basin and the ancient SILK ROAD cities of Kashgar and Yarkand. He then headed southward into the Karakoram range, where he made the European discovery of the Mustagh Pass, which he followed into northern India's Kashmir region.

In 1888, while serving with British forces in Burma, Younghusband traveled the length of the country, from Moulmein, up the Salween River and across to the upper reaches of the Mekong River, into southeastern China.

Back in India in 1889, Younghusband repeated his earlier journey across the Karakoram range in reverse, traveling from Rawalpindi northward to Yarkand in western China. He then undertook a topographic survey in the Pamir region.

Younghusband was awarded a gold medal by the ROYAL GEOGRAPHICAL SOCIETY in 1890, and transferred that same year to the political department of the army. He continued to travel and explore, extending the Great Trigonometrical Survey of India into the Hindu Kush, Karakoram, and Pamir mountain ranges. In 1892–94, he undertook a two-year exploration and survey expedition along the Amu Darya River in northern Afghanistan.

In 1902, Younghusband was sent on a diplomatic mission to Tibet, the British foreign office having become concerned over Russian designs on the remote Himalayan principality. When Russian expansion into Tibet seemed imminent, Younghusband was placed in command of a large military force that occupied the country. On August 2, 1904, he led his command into Tibet's capital at LHASA, a city forbidden to outsiders.

While in Lhasa, Younghusband directed the first scientific survey of the area, making the first accurate determination of the city's precise geographic position. Other surveying teams under his command explored the Tsangpo and Brahmaputra Rivers, upstream from Shigatse.

Younghusband retired from the army after 1908, at the rank of lieutenant colonel. He had recounted his explorations in Asia in his books *Heart of a Continent* (1898) and *India and Tibet* (1912). He served as president of the Royal Geographical Society in 1919–22. During the 1920s, he turned his attention to the ascent of MOUNT EVEREST, making three unsuccessful attempts.

In his 1904 expedition into Tibet, Sir Francis Younghusband became the first European to enter Lhasa since the visit of ÉVARISTE-RÉGIS HUC in 1846.

Yount, George Concepcion (1794–1865)

American fur trader, trailblazer in the American Southwest

George Yount was born in western North Carolina's Burke County, the son of an American Revolutionary War veteran. At the age of 10, he moved west with his family to the newly acquired Louisiana Territory and settled in Cape Girardeau on the MISSISSIPPI RIVER in what is now southeastern Missouri.

During the War of 1812, Yount and his father and brothers served with a local militia unit, defending the surrounding region against attacks by British-allied Indians. Married in 1818, Yount moved with his new wife to Howard County in north-central Missouri, where he became a cattle rancher.

As a result of a severe financial setback in 1825, Yount was compelled to leave his family and seek his fortune in New Mexico. He traveled with a trading caravan along the Santa Fe Trail into the Southwest, and, after establishing himself in Taos, became a trapper with EWING YOUNG.

In 1827, Yount accompanied JAMES OHIO PATTIE and his father, Sylvester Pattie, in a fur-trapping expedition to the Gila River, which they followed to its mouth on the COLORADO RIVER in western Arizona. The next year, he trapped in the northern ROCKY MOUNTAINS, attending the 1828 fur traders' rendezvous near Bear Lake on the present Utah-Wyoming border. He trapped for beaver around the upper reaches of the Yellowstone River in northwestern Wyoming, where a mountain in the region was named Younts Peak in his honor.

While in the northern Rockies, Yount met JEDEDIAH STRONG SMITH, from whom he heard accounts of his 1826–29 explorations across the Great Basin and the Sierra Nevada into California and Oregon.

Back in Taos in 1830, Yount joined with mountain man WILLIAM WOLFSKILL in a packhorse expedition along the Old Spanish Trail to California. In September 1830, they left Taos and traveled northwestward to the Green River, then turned southwestward across Utah and into Arizona. After crossing the San Bernardino Mountains by way of Cajon Pass, they arrived at the San Gabriel Mission, near Los Angeles, in February 1831.

Yount decided to remain in California, where he worked in the early 1830s as a carpenter in the settlements along the south coast. In 1834, he moved to northern California, where he obtained a land grant from the Mexican government in the Napa Valley region. In honor of his converting to Catholicism, he adopted the middle name Concepcion. In 1844, he was joined in northern California by his two daughters from Missouri, although his wife, believing that he had died, had since remarried.

In his 1830–31 expedition with William Wolfskill, George Yount made the first known journey along the entire length of the Old Spanish Trail. More than 50 years after it had first been explored by Spanish missionaries FRANCISCO SILVESTRE VÉLEZ DE ESCALANTE, FRANCISCO ATANASIO DOMÍNGUEZ, and FRANCISCO TOMÁS HERMENEGILDO GARCÉS in the 1770s, Yount and Wolfskill demonstrated that the trail was suitable for packhorses carrying trade goods from New Mexico to California. Their efforts led to the development of the first direct overland link between the settlements of northern New Mexico and southern California.

Z



Zagoskin, Lavrenty Alekseyevich **(Lavrenti Alekseev Zagoskin)** (1807–1890)

Russian naval officer in Alaska

Lavrenty Alekseyevich Zagoskin grew up to become a lieutenant in the Russian navy. In 1838, he joined the RUSSIAN-AMERICAN COMPANY. After an overland journey from European Russia to the Pacific coast of SIBERIA, he sailed to Alaska in command of the company's vessel the *Okhotsk*, arriving in Sitka in summer 1839.

During the next three years, Zagoskin commanded company ships in voyages between the fur-trading settlements in the eastern Gulf of Alaska and in northern California, and back to Siberia. In 1842, he won approval for a plan to explore the two great rivers of Alaska's interior, the largely unknown Yukon and Kuskokwim.

In summer 1842, Zagoskin sailed to St. Michael on the south shore of Norton Sound, where he explored the Unalakleet River. The next winter, he traveled inland by dogsled to Nulato, near the confluence of the Yukon and the Koyukuk Rivers. In spring 1843, he examined the Koyukuk, the Yukon's main northern tributary, and that summer, he undertook the first of a series of extensive explorations by kayak along the middle and lower reaches of the Yukon River, exploring its course from the mouth of the Tanana River to its great bend westward near Anvik. In summer 1844, he turned his attention to the Kuskokwim and the lower Yukon Rivers. The next year, he left the Russian-American Company, returning to European Russia by way of Okhotsk and Siberia.

Lavrenty Alekseyevich Zagoskin's account of his inland journeys, published in 1847–48, provides a contemporary view of the later period of Russian settlement in Alaska. He is credited with making the most extensive explorations into the interior of Alaska until that time, and, by his own account, he made the European discovery of the Yukon River in 1842.

Zheng He See CHENG HO.

Zhu Siben See CHU SSU-PEN.

Zurbriggen, Matthias (1856–1917) *Swiss mountain climber and guide in the Alps, Himalayas, Southern Alps, and Andes Mountains*

Born in the village of Macugnaga in northern Italy, Matthias Zurbriggen was a Swiss citizen. He developed skills as a mountain climber in the Alps and found work as a guide to expeditions.

In 1892, Zurbriggen and the British mountaineer Sir William Martin Conway set the record for altitude by reaching the summit of Pioneer Peak in the Karakoram Range of the HIMALAYAS. In 1894, Zurbriggen, as part of British climber Edward Fitzgerald's expedition, made climbs in NEW ZEALAND's Southern Alps. He made a solo ascent of Mount Cook, the highest peak in New Zealand, only three

months after the New Zealanders T. C. Fyfe, Peter Graham, and J. Clark first conquered it. Zurbriggen and Fitzgerald made the first ascents of Mount Tasman and Mount Haidinger that same year.

In 1897, Zurbriggen, once again as part of a Fitzgerald expedition, completed a solo ascent of ACONCAGUA, the highest peak in the ANDES MOUNTAINS and the entire Western Hemisphere, at 22,834 feet above sea level. He later worked for the American FANNY BULLOCK WORKMAN in

the Himalayas and helped her set an altitude record for women.

Matthias Zurbriggen became legendary as a mountain climber and guide for completing ascents that his employers and companions could not. He was also the first mountaineering guide to publish his autobiography, *From the Alps to the Andes: Being the Autobiography of a Mountain Guide* (1899).

Appendix A

EXPLORERS BY MOST RELEVANT OCCUPATION



Some of the “occupations” listed below might be better described as “activities,” nor are they exclusive since many individuals had more than one occupation. Those indicated are most relevant to exploration. Some individuals are listed under “explorers” because they considered exploration as their only or primary calling. Since many of the individuals wrote about their explorations, there is no separate entry for writers other than “travelers and travel writers.”

ARTISTS

Arago, Jacques
Atkinson, Thomas Wittlam
Baines, Thomas
Bauer, Ferdinand Lucas
Bodmer, Karl
Catlin, George
Choris, Louis
Kane, Paul
Kern, Richard Hovendon
Kurz, Rudolph Friederich
Le Moyne de Morgues, Jacques
Mee, Margaret Ursula
Miller, Alfred Jacob
Roerich, Nikolay Konstantinovich
Warre, Henry James
Webber, John
Westall, William
White, John

AVIATORS, ASTRONAUTS, AND COSMONAUTS

Andrée, Salomon August
Armstrong, Neil Alden

Byrd, Richard Evelyn
Ellsworth, Lincoln
Gagarin, Yury Alekseyevich
Glenn, John Herschell, Jr.
Leonov, Alexei Arkhipovich
Nobile, Umberto
Piccard, Auguste
Ride, Sally Kristen
Shepard, Alan Bartlett, Jr.
Tereshkova, Valentina Vladimirovna
White, Edward Higgens, II
Wilkins, Sir George Hubert

COLONISTS AND PIONEERS

Alfinger, Ambrosius
Applegate, Jesse
Arthur, Gabriel
Ayllón, Lucas Vásquez de
Batts, Thomas
Beutler, August
Blaxland, Gregory
Bozeman, John Merin
Burke, Robert O’Hara

Cabral, Gonçalo Velho
 Colenso, William
 Eiríksdóttir, Freydis
 Escandón, José de
 Eyre, Sir Edward John
 Fallam, Robert
 Federmann, Nikolaus
 Hohermuth von Speyer, Georg
 Landsborough, William
 Laudonnière, René Goulaine de
 Le Moyne, Jean-Baptiste
 Needham, James
 Oñate, Juan de
 Portolá, Gaspar de
 Raleigh, Sir Walter
 Robertson, James
 Roberval, Jean-François de La Roque de
 Sinclair, James
 Smith, John
 Wentworth, William Charles
 Williams, William
 Winslow, Edward
 Woodward, Henry

EXPLORERS (ONLY OR PRIMARY OCCUPATION)

Amundsen, Roald Engelbregt Gravning
 Baker, Florence
 Baker, Sir Samuel White
 Baumann, Oskar
 Binger, Louis-Gustave
 Borchgrevink, Carsten Egeberg
 Boyd, Louise Arner
 Bruce, James
 Bruce, William Spiers
 Burton, Sir Richard Francis
 Caillié, René-Auguste
 Charcot, Jean-Baptiste-Étienne-Auguste
 Cook, Frederick Albert
 Courtauld, Augustine
 Crevaux, Jules-Nicolas
 Drygalski, Erich Dagobert von
 Duveyrier, Henri
 Espejo, Antonio Estevan de
 Forrest, Alexander
 Forrest, John
 Fuchs, Sir Vivian Ernest
 García, Alejo
 Giles, Ernest
 Gordon, Robert
 Hall, Charles Francis
 Hayes, Isaac Israel
 Hedin, Sven Anders

Henson, Matthew Alexander
 Hoehnel, Ludwig von
 Hornemann, Friedrich Conrad
 Hovell, William Hilton
 Hume, Hamilton
 Jackson, Frederick George
 Junker, Wilhelm Johann
 Kennedy, Edmund
 Koldewey, Karl Christian
 Lander, Richard Lemon
 Lederer, John
 Lenz, Oskar
 Mylius-Erichsen, Ludwig
 Nansen, Fridtjof
 Nordenskjöld, Nils Adolf Erik
 Park, Mungo
 Penha, Joseph de la
 Rae, John
 Schwatka, Frederick
 Shackleton, Sir Ernest Henry
 Shirase, Nobu
 Speke, John Hanning
 Stanley, Sir Henry Morton
 Teleki, Samuel
 Tinné, Alexandrine Petronella Francina

GUIDES AND INTERPRETERS

Black Beaver
 Boone, Daniel
 Bombay, Sidi
 Carson, Christopher Houston
 Charbonneau, Jean-Baptiste
 Charbonneau, Toussaint
 Donnaconna
 Dorion, Marie
 Dorion, Pierre, Jr.
 Dorion, Pierre, Sr.
 Drouillard, George
 Estevanico
 Guancanagari
 Irateba
 Jusseume, René
 Kenton, Simon
 Malinche
 Matonabee
 Pascoe, William
 Rose, Edward
 Sacajawea
 Smith, James
 Squanto
 Turk
 Vial, Pedro
 Weiser, Conrad

MARINERS

(see also MILITARY—NAVAL)

Adams, William
 Álvarez de Pineda, Alonso
 Baffin, William
 Bakhov, Ivan
 Baldaya, Afonso Gonçalves
 Barents, Willem
 Batakov, Anton
 Begichev, Nikifor Alekseyevich
 Bekovich-Cherkassky, Aleksandr
 Bering, Vitus Jonassen
 Bernier, Joseph Elzéar
 Berrío, Antonio de
 Billings, Joseph
 Biscoe, John
 Block, Adriaen
 Bocharov, Dmitry Ivanovich
 Borough, Stephen
 Borough, William
 Brunel, Olivier
 Bylot, Robert
 Cabot, John
 Cabot, Sebastian
 Cabral, Pedro Álvares
 Cabrillo, Juan Rodríguez
 Cadamosto, Alvise da
 Cano, Juan Sebastián del
 Cão, Diogo
 Cartier, Jacques
 Cermenho, Sebastián Meléndez Rodríguez
 Chancellor, Richard
 Chelyuskin, Simeon
 Columbus, Christopher
 Côte-Real, Gaspar
 Côte-Real, Miguel
 Cosa, Juan de la
 Dallman, Eduard
 Dampier, William
 Davis, John
 Dias, Bartolomeu
 Dias, Dinís
 Díaz de Solís, Juan de
 Diogenes
 Drake, Sir Francis
 Eannes, Gil
 Ericsson, Leif
 Ericsson, Thorvald
 Eric the Red
 Etholen, Arvid Adolf
 Eudoxus
 Fanning, Edmund
 Fernandes, Álvaro
 Fernandes, João
 Ferrelo, Bartolomé
 Foxe, Luke
 Frobisher, Sir Martin
 Fuca, Juan de
 Gama, Vasco da
 Gomes, Diogo
 Gomes, Estevão
 Gosnold, Bartholomew
 Gray, Robert
 Hall, James
 Hannu
 Hartog, Dirk
 Hawkins, Sir John
 Herjulfsson, Bjarni
 Himilco
 Hippalus
 Houtman, Cornelius
 Houtman, Frederik
 Hudson, Henry
 Izmailov, Gerasim Alekseyevich
 James, Thomas
 Jansz, Willem
 Jörgenson, Jörgen
 Jourdain, John
 Jourdain, Silvester
 Karlsefni, Thorfinn
 Kashevarov, Aleksandr Filippovich
 Kerguelen-Trémarec, Yves-Joseph de
 Knight, John
 Krenitsyn, Pyotr Kuzmich
 Kupe
 Lancaster, Sir James
 Ledyard, John
 Legazpi, Miguel López de
 Le Maire, Jakob
 Magellan, Ferdinand
 Mendaña, Álvaro de
 Middleton, Christopher
 Moor, William
 Munk, Jens Eriksen
 Naddod
 Nearchus
 Newport, Christopher
 Niebuhr, Sigismund
 Niño, Andrés
 Noort, Oliver van
 Pacheco, Duarte
 Palmer, Nathaniel Brown
 Pinzón, Arias Martín
 Pinzón, Francisco Martín
 Pinzón, Martín Alonso
 Pinzón, Vicente Yáñez

Popham, George
 Pribylov, Gavriilo Loginovich
 Pring, Martin
 Quirós, Pedro Fernández de
 Roe, Sir Thomas
 Roggeveen, Jakob
 Rut, John
 Saavedra Cerón, Álvaro de
 Schouten, Willem Cornelis
 Scoresby, William, Jr.
 Scoresby, William, Sr.
 Scylax
 Selkirk, Alexander
 Sequira, Diego López de
 Serrano, Francisco
 Svarsson, Gardar
 Sverdrup, Otto Neumann
 Tasman, Abel Janszoon
 Thyssen, François
 Torres, Luis Váez de
 Tristão, Nuño
 Ulloa, Francisco de
 Urdaneta, Andrés de
 Verrazano, Giovanni da
 Vespucci, Amerigo
 Viscaíno, Sebastián
 Vivaldi, Ugolino
 Weddell, James
 Weymouth, George
 Willoughby, Sir Hugh

Cooper, Thomas Thornville
 Cresap, Thomas
 Croghan, George
 Dease, Peter Warren
 Dubuque, Julien
 Duluth, Daniel Greysolon
 Dupuis, Jean
 Finley, John
 Fitch, Ralph
 Franchère, Gabriel
 Fraser, Simon
 Gist, Christopher
 Glazunov, Andrey
 Gomes, Fernão
 Hearne, Samuel
 Henday, Anthony
 Henry, Alexander (the elder)
 Henry, Alexander (the younger)
 Hunt, Wilson Price
 Ibn Rusta, Abu Ali Ahmad
 Jolliet, Louis
 Kelsey, Henry
 Khabarov, Yerofey Pavlovich
 Kittson, Norman Wolfred
 Knight, James
 Laclede, Pierre Liguette
 La Harpe, Jean-Baptiste Bénard de
 La Salle, René-Robert Cavelier de
 La Vérendrye, Louis-Joseph Gaultier de
 La Vérendrye, Pierre Gaultier de Varennes de
 Le Sueur, Pierre-Charles
 Lisa, Manuel
 Mackenzie, Sir Alexander
 Mackenzie, Donald
 Mallet, Pierre-Antoine
 McKenzie, Kenneth
 McLoughlin, John
 Menard, Antoine Pierre
 Newberry, John
 Nicolet, Jean
 Ogden, Peter Skene
 Perrot, Nicolas
 Polo, Maffeo
 Polo, Marco
 Polo, Niccolò
 Pond, Peter
 Popov, Fyodot Alekseyev
 Radisson, Pierre-Esprit
 Ross, Alexander
 Sable, Jean Baptist Point
 St. Denis, Louis Juchereau de
 St. Vrain, Céran de Hault de Lassus de
 Saris, John
 Shelikov, Grigory Ivanovich

MERCHANTS AND TRADERS

General

Aco, Michel
 Adair, James
 Anabara, Semyon
 Ashley, William Henry
 Astor, John Jacob
 Baranov, Aleksandr Andreyevich
 Bashmakov, Pyotr
 Basov, Emelyan
 Bent, Charles
 Bent, William
 Boller, Henry A.
 Bourgmont, Étienne-Veniard de
 Campbell, Robert (Scottish)
 Chisholm, Jesse
 Chouart des Groseilliers, Médard
 Chouteau, Auguste Pierre
 Chouteau, Jean Pierre
 Chouteau, Pierre
 Chouteau, René Auguste
 Conti, Niccolò di

Silva Porto, Antonio Francisco da
 Simpson, Sir George
 Simpson, Thomas
 Soleyman
 Stuart, Robert
 Thompson, David
 Tonti, Henri de
 Truteau, Jean-Baptiste
 Viele, Arnaud Cornelius
 Work, John
 Wyeth, Nathaniel Jarvis

**Mountain Men
 (Fur Traders and Trappers in Rocky Mountains
 and American West)**

Álvarez, Manuel
 Baker, James
 Becknell, William
 Beckwourth, James Pierson
 Bridger, James
 Campbell, Robert (American)
 Chatillon, Henri
 Clyman, James
 Colter, John
 Ferris, Warren Angus
 Fitzpatrick, Thomas
 Fontenelle, Lucien
 Fowler, Jacob
 Fraeb, Henry
 Glass, Hugh
 Greenwood, Caleb
 Hamilton, William Thomas
 Henry, Andrew
 Jackson, David E.
 Larpenteur, Charles
 Leonard, Zenas
 Meek, Joseph L.
 Newell, Robert
 Pattie, James Ohio
 Pilcher, Joshua
 Provost, Étienne
 Robidoux, Antoine
 Russell, Osborne
 Smith, Jedediah Strong
 Sublette, William Lewis
 Vanderburgh, William Henry
 Vasquez, Louis
 Walker, Joseph Reddeford
 Weber, John H.
 Williams, William Sherley
 Wolfskill, William
 Wootton, Richens Lacy
 Young, Ewing
 Yount, George Concepcion

MILITARY

General

AMERICAN

Abbott, Henry Larcom
 Abert, James William
 Allen, Henry Tureman
 Atkinson, Henry
 Beckwith, Edward Griffin
 Bonneville, Benjamin Louis Eulalie de
 Clark, William
 Dodge, Henry
 Emory, William Hemsley
 Frémont, John Charles
 Greely, Adolphus Washington
 Gunnison, John Williams
 Ives, Joseph Christmas
 Kearny, Stephen Watts
 Leavenworth, Henry
 Lewis, Meriwether
 Long, Stephen Harriman
 Macomb, John N.
 Marcy, Randolph Barnes
 Parke, John Grubb
 Pike, Zebulon Montgomery
 Pope, John B.
 Reynolds, William Franklin
 Rogers, Robert
 Simpson, James Hervey
 Sitgreaves, Lorenzo
 Stanley, David Sloan
 Stansbury, Howard
 Wheeler, George Montague
 Whipple, Amiel Weeks
 Young, Charles Denton

AUSTRIAN

Payer, Julius von
 Weyprecht, Karl

BRITISH

Carver, Jonathan
 Chaillé-Long, Charles
 Denham, Dixon
 Fawcett, Percy Harrison
 Grant, James Augustus
 Hearsey, Hyder Jung
 Houghton, Daniel
 Laing, Alexander Gordon
 Lawrence, Thomas Edward
 McLeod, William C.
 Pottinger, Sir Henry
 Sadlier, George Foster
 Turner, Samuel
 Vavasour, Mervin

Warburton, Peter Egerton
 Younghusband, Sir Francis Edward

FRENCH

Brûlé, Étienne
 Champlain, Samuel de
 Flatters, Paul-Xavier
 Joutel, Henri
 Lahontan, Louis-Armand de Lom d'Arce de
 Marchand, Jean-Baptiste
 Rohlf, Friedrich Gerhard

GERMAN

Filchner, Wilhelm
 Hutten, Philip von
 Wissmann, Hermann von

GREEK AND MACEDONIAN

Alexander the Great
 Xenophon

MONGOL

Genghis Khan

PORTUGUESE

Teixeira, Pedro de

ROMAN

Agricola, Gnaeus Julius
 Caesar, Gaius Julius
 Gallus, Gaius Aelius
 Maternus, Julius
 Paulinus, Suetonius

RUSSIAN

Andreyev, Stepan
 Atlasov, Vladimir Vasilyevich
 Beketov, Pyotr
 Bukhgalts, Ivan Dmitryevich
 Daurkin, Nikolay
 Dezhnev, Semyon Ivanovich
 Morozko, Luka
 Poyarkov, Vasily Danilovich
 Stadukhin, Mikhail
 Yermak

SPANISH

Aguirre, Lope de
 Alarcón, Hernando de
 Almagro, Diego de
 Alvarado, Hernando de
 Alvarado, Pedro de
 Anza, Juan Bautista de
 Ávila, Pedro Arias de
 Ayolas, Juan de
 Bastidas, Rodrigo de
 Benalcázar, Sebastián Moyano de
 Cabeza de Vaca, Álvar Núñez
 Coronado, Francisco Vásquez de
 Cortés, Hernán

Díaz, Melchor
 Díaz del Castillo, Bernal
 Erauso, Catalina de
 Fernández de Córdoba, Francisco (in Yúcatan)
 Fernández de Córdoba, Francisco (in
 Panama/Nicaragua)
 Garay, Juan de
 Grijalva, Juan de
 Guzmán, Nuño Beltrán de
 Ibarra, Francisco de
 Jiménez de Quesada, Gonzalo
 León, Alonso de
 López de Cárdenas, García
 Martínez de Irala, Domingo
 Mendoza, Pedro de
 Montejó, Francisco de
 Montejó y León, Francisco de
 Moscoso, Luis de
 Narváez, Pánfilo de
 Nicuesa, Diego de
 Núñez de Balboa, Vasco
 Ojeda, Alonso de
 Ordaz, Diego de
 Orellana, Francisco de
 Pizarro, Francisco
 Pizarro, Gonzalo
 Pizarro, Hernando
 Ponce de León, Juan
 Rivera y Villalón, Pedro de
 Soto, Hernando de
 Tovar, Pedro de
 Ursúa, Pedro de
 Valdivia, Pedro de
 Velásquez, Diego

Naval**AMERICAN**

De Haven, Edwin Jesse
 De Long, George Washington
 Emmons, George Foster
 Kane, Elisha Kent
 Peary, Robert Edwin
 Wilkes, Charles

BELGIAN

Gerlache de Gomery, Adrien-Victor-Joseph de

BRITISH

Anson, George
 Back, Sir George
 Bass, George
 Beechey, Frederick William
 Belcher, Sir Edward
 Bligh, William
 Bransfield, Edward

Broughton, William Robert
 Buchan, David
 Burney, James
 Button, Sir Thomas
 Byron, John
 Cameron, Verney Lovett
 Carteret, Philip
 Clapperton, Hugh
 Clerke, Charles
 Collinson, Sir Richard
 Cook, James
 Crozier, Francis Rawdon Moira
 Fitzroy, Robert
 Flinders, Matthew
 Franklin, Sir John
 Furneaux, Tobias
 Gore, John
 Grenville, Sir Richard
 Hood, Robert
 King, James
 King, Philip Parker
 Lyon, George Francis
 McClintock, Sir Francis Leopold
 McClure, Sir Robert John le Mesurier
 Musters, George Chaworth
 Nares, Sir George Strong
 Parry, Sir William Edward
 Phillip, Arthur
 Phipps, Constantine John
 Ross, Sir James Clark
 Ross, Sir John
 Scott, Robert Falcon
 Vancouver, George
 Wallis, Samuel
 Wellsted, James

CARTHAGINIAN

Hanno

CHINESE

Cheng Ho

FRENCH

Auribeau, Alexandre Hesmivy d'
 Baudin, Thomas-Nicolas
 Bougainville, Hyacinthe-Yves-Philippe Potentien de
 Bougainville, Louis-Antoine de
 Bouvet de Lozier, Jean-Baptiste-Charles
 Bruni, Antoine-Raymond-Joseph de
 Chesnard de la Giraudais, François
 Doudart de Lagrée, Ernest-Marc-Louis de Gonzague
 Duclos-Guyot, Pierre-Nicolas
 Dumont d'Urville, Jules-Sébastien-César
 Duperrey, Louis-Isadore
 Dupetit-Thouars, Abel-Aubert
 Fleuriot de Langlé, Paul-Antoine-Marie

Freycinet, Louis-Claude de Saulces de
 Galaup, Jean-François de
 Huon de Kermadec, Jean-Michel
 Jacquinet, Charles-Hector
 Le Moyne, Pierre
 Ribault, Jean
 Rossel, Elisabeth-Paul-Edouard de

PORTUGUESE

Albuquerque, Afonso de
 Almeida, Francisco de
 Almeida, Lourenço de

RUSSIAN

Basargin, Grigory Gavrilovich
 Bellingshausen, Fabian Gottlieb Benjamin von
 Chirikov, Aleksey Ilyich
 Davydov, Gavriil Ivanovich
 Golovnin, Vasily Mikhailovich
 Kotzebue, Otto von
 Krusenstern, Adam Ivan Ritter von
 Lazarev, Mikhail Petrovich
 Lisiansky, Yury Fyodorovich
 Litke, Fyodor Petrovich
 Nevelskoy, Gennady Ivanovich
 Sarychev, Gavriil Andreyevich
 Zagoskin, Lavrenty Alekseyevich

SPANISH

Andagoya, Pascual de
 Bodega y Quadra, Juan Francisco de la
 Heceta, Bruno
 Malaspina, Alessandro
 Menéndez de Avilés, Pedro
 Pérez Hernández, Juan Josef

MISSIONARIES AND RELIGIOUS LEADERS

(see also SCHOLARS—RELIGIOUS SCHOLARS)

Acosta, José de
 Acuña, Cristóbal de
 Albanel, Charles
 Allouez, Claude-Jean
 Álvares, Francisco
 Andrade, Antonio de
 Arculf
 Azevado, Francisco de
 Bar Sauma, Rabban
 Benavides, Alonzo de
 Benjamin of Tudela
 Brébeuf, Jean de
 Bréhant de Galinée, René de
 Brendan, Saint
 Bressani, Francesco-Gioseppe
 Bruyas, Jacques
 Cabral, João
 Cacella, Estevão

Campbell, John
 Carpini, Giovanni da Pian del
 Davion, Albert
 Desideri, Ippolito
 De Smet, Pierre-Jean
 Dollier de Casson, François
 Domínguez, Francisco Atanasio
 Egede, Hans
 Escalante, Francisco Silvestre Vélez de
 Fritz, Samuel
 Garcés, Francisco Tomás Hermenegildo
 Gibault, Pierre
 Gões, Bento de
 Grenfell, George
 Grueber, Johann
 Hennepin, Louis
 Huc, Évariste-Régis
 Jogues, Isaac
 John of Montecorvino
 Kino, Eusebio Francisco
 Krapf, Johann Ludwig
 Lalemant, Gabriel
 Le Moyne, Simon
 Livingstone, David
 Lobo, Jerónimo
 Marignolli, Giovanni de
 Marquette, Jacques
 Marsden, Samuel
 Ménard, René
 Moffat, Mary
 Moffat, Robert
 Niza, Marcos de
 Noué, Charles-Edouard de la
 Odoric of Pordenone
 Orville, Albert d'
 Padilla, Juan de
 Páez, Pedro
 Palgrave, William Gifford
 Rebmann, Johann
 Ricci, Matteo
 Richardson, James
 Serra, Junípero
 Spalding, Henry Harmon
 Stevens, Thomas
 Taylor, Annie Royle
 Whitman, Marcus
 William of Rubrouck
 Xavier, Francis
 Young, Brigham

MOUNTAIN CLIMBERS

Abruzzi, Luigi Amedeo di Savoia
 Balmat, Jacques

Hillary, Sir Edmund Percival
 Mallory, George Herbert Leigh
 Meyer, Hans
 Peck, Annie Smith
 Schlagintweit, Adolf von
 Schlagintweit, Hermann von
 Schlagintweit, Robert von
 Stuck, Hudson
 Tenzing Norgay
 Whymper, Edward
 Workman, Fanny Bullock
 Zurbriggen, Matthias

POLITICAL LEADERS, OFFICIALS, AND DIPLOMATS

Arias de Saavedra, Hernando
 Baptista, Pedro João
 Barrow, Sir John
 Bogle, George
 Brazza, Pierre-Paul-François-Camille Savorgnan de
 Brydges, Harford Jones
 Burnes, Sir Alexander
 Chang Ch'ien
 Clavijo, Ruy González de
 Covilhã, Pero da
 Elias, Ney
 Emin Pasha, Mehmed
 Fernández de Oviedo y Valdez, Gonzalo
 Garnier, Marie-Joseph-François
 Grey, Sir George
 Hatshepsut
 Henry the Navigator
 Herkhuf
 Jenkinson, Anthony
 Johnston, Sir Harry Hamilton
 Kaempfer, Engelbrecht
 Kan Ying
 Lacerda, Francisco de
 La Mothe, Antoine Laumet de
 Langford, Nathaniel Pitt
 Leo Africanus
 Lesseps, Jean-Baptiste-Barthélemy de
 Megasthenes
 Mendoza, Antonio de
 Mitchell, Sir Thomas Livingstone
 Nachtigal, Gustav
 Necho II
 Oxley, John Joseph William Molesworth
 Pavie, Auguste-Jean-Marie
 Perrin du Lac, François-Marie
 Philby, Harry St. John Bridger
 Pires, Tomé
 Sargon

Sherley, Sir Anthony
 Spotswood, Alexander
 Sturt, Charles
 Sykes, Sir Percy Molesworth
 Thomas, Bertram Sydney
 Viale, Agostinho
 Wood, Abraham

SCHOLARS

Archaeologists

Bell, Gertrude Margaret Lowthian
 Bent, James Theodore
 Stein, Sir Marc Aurel

Anthropologists

Heyerdahl, Thor
 Rasmussen, Knud Johan Victor
 Stefansson, Vilhjalmur

Astronomers

Hipparchus
 Holywood, John
 Nicollet, Joseph Nicolas
 Schmidt, Otto Y.

Geographers and Cartographers

Anville, Jean-Baptiste Bourguignon d'
 Barth, Heinrich
 Beatus of Valcavado
 Beaupré, Charles-François
 Behaim, Martin
 Biruni, Abu ar-Rayhan Muhammad ibn Ahmad al-
 Blaeu, Willem Janszoon
 Brocchi, Charles de
 Chu Ssu-pen
 Cresques, Abraham
 Eratosthenes
 Galton, Sir Francis
 Gilbert, Sir Humphrey
 Gutiérrez, Diego
 Hakluyt, Richard
 Idrisi, Abu Abd Allah Muhammad ash-Sharif al-
 Indicopleustes, Cosmas
 Kropotkin, Peter
 Linschoten, Jan Huyghen van
 Llewellyn, Martin
 Mercator, Gerardus
 Ortelius, Abraham
 Petermann, August Heinrich
 Pliny the Elder
 Ptolemy
 Pytheas
 Semyonov, Pyotr Petrovich

Strabo
 Waldseemüller, Martin
 Yaqut al-Rumi, Shihab al-Din Abu Abd Allah

Geologists

Hind, Henry Youle
 Mawson, Sir Douglas
 Newberry, John Strong
 Nordenskjöld, Nils Otto Gustaf
 Overweg, Adolf
 Powell, John Wesley
 Richthofen, Ferdinand Paul Wilhelm von
 Schoolcraft, Henry Rowe
 Strzelecki, Sir Paul Edmund
 Thomson, Joseph
 Toll, Eduard von
 Wegener, Alfred Lothar

Historians

Bingham, Hiram
 Burckhardt, Johann Ludwig
 Charlevoix, Pierre-François-Xavier de
 Hecataeus of Miletus
 Herodotus
 Masudi, Abu al-Hasan Ali al-
 Tsybikov, Gombozhab

Linguists

Vambéry, Armin

Naturalists (including Botanists and Zoologists)

Akeley, Carl Ethan
 Akeley, Delia Denning
 Akeley, Mary Leonore Jobe
 Audubon, John James
 Azara, Félix de
 Baikie, William Balfour
 Banks, Sir Joseph
 Bartram, John
 Bartram, William
 Bates, Henry Walter
 Berlandier, Jean-Louis
 Bradbury, John
 Brown, Robert
 Burchell, William John
 Catesby, Mark
 Chamisso de Boncourt, Louis-Charles-Adélaïde
 Commerson, Joseph-Philibert
 Cunningham, Allan
 Dana, James Dwight
 Darwin, Charles Robert
 Dietrich, Koncordie Amalie Nelle
 Eschscholtz, Johann Friedrich
 Fedchenko, Aleksey Pavlovich

Fedchenko, Olga
 Ferreira, Alexandre Rodrigues
 Forbes, Edward
 Forster, Johann Georg Adam
 Forster, Johann Reinhold
 Gaimard, Joseph-Paul
 Gaudichaud-Beaupré, Charles
 Gmelin, Johann Georg
 Harriot, Thomas
 Hooker, Sir Joseph Dalton
 Humboldt, Alexander von
 Kern, Benjamin Jordan
 Krashennikov, Stepan Petrovich
 La Billardière, Jacques-Julien Houtou de
 La Condamine, Charles-Marie de
 Langsdorff, Georg Heinrich Ritter von
 Leichhardt, Friedrich Wilhelm Ludwig
 Lesson, René-Primevère
 Lesueur, Charles-Alexandre
 Martius, Carl Friedrich Phillipp von
 Maximilian, Alexander Philipp
 Mertens, Karl Heinrich
 Messerschmidt, Daniel Gottlieb
 Moorcroft, William
 Moreno, Francisco
 Mouhot, Henri
 Muir, John
 Nuttall, Thomas
 Orbigny, Alcide-Charles-Victor Dessalines d'
 Oudney, Walter
 Pavy, Octave
 Péron, François
 Porte, François de la
 Przhevalsky, Nikolay Mikhailovich
 Quoy, Jean-René-Constant
 Richardson, Sir John
 Riche, Claude-Antoine-Gaspard
 Schomburgk, Sir Robert Hermann
 Schweinfurth, Georg August
 Solander, Daniel Carl
 Sparrman, Anders
 Spruce, Richard
 Steller, Georg Wilhelm
 Thomson, Sir Charles Wyville
 Thunberg, Carl Peter
 Tschudi, Johann Jakob von
 Wallace, Alfred Russel
 Wilson, Edward Adrian

Oceanographers

Beebe, Charles William
 Cousteau, Jacques-Yves
 Marsili, Luigi Ferdinando

Maury, Matthew Fontaine
 Piccard, Jacques Ernest-Jean

Religious Scholars

Ch'ang-ch'un
 Fa-hsien
 Hsüan-tsang
 Ibn Battutah, Abu Abd Allah Muhammad
 Ibn Fadlan, Ahmad
 Ibn Hawqal, Abu al-Qasim ibn Ali al-Nasibi
 Ibn Jubayr, Abu al-Hasan Muhammad
 I-ching

Surveyors and Topographers

Beale, Edward Fitzgerald
 Brunner, Thomas
 Christie, Charles
 Dunbar, Sir William
 Everest, Sir George
 Foureau, Fernand
 Freeman, Thomas
 Gosse, William Christie
 Gregory, Sir Augustus Charles
 Gregory, Francis Thomas
 Hayden, Ferdinand Vandever
 Kern, Edward Meyer
 King, Clarence
 Kintup
 Lawson, John
 Niebuhr, Carsten
 Palliser, John
 Rice, Alexander Hamilton
 Sarmiento de Gamboa, Pedro
 Singh, Kishen
 Singh, Nain
 Stuart, John McDouall
 Walker, Thomas
 Watkins, Henry George
 Wills, William John

TRAVELERS AND TRAVEL WRITERS

Adams, Harriet Chalmers
 Atkinson, Lucy
 Baret, Jeanne
 Beltrami, Giacomo Costantino
 Bishop, Isabella Lucy Bird
 Blunt, Anne Isabella
 Blunt, Wilfrid Scawen
 Bonin, Charles
 Brackenridge, Henry Marie
 Cheadle, Walter Butler
 Ctesias of Cnidus
 David-Néel, Alexandra

Doughty, Charles Montagu
Du Chaillu, Paul Belloni
Eberhardt, Isabelle
Evliya, Çelebi
Fiennes, Celia
Franklin, Jane
Godin des Odanais, Isabela
Herbert, Thomas
Irving, John Treat
Kingsley, Mary Henrietta
Livingstone, Mary Moffat
Manning, Thomas
Mazuchelli, Elizabeth Sarah

Milton, William-Wentworth Fitzwilliam
Pethahia of Regensburg
Pfeiffer, Ida Reyer
Pigafetta, Francesco Antonio
Pinto, Fernão Mendes
Ritchie, Joseph
Sheldon, May French
Stanhope, Hester Lucy
Stark, Freya Madeline
Thesiger, Wilfred Patrick
Varthema, Ludovico di
Wen-chi
Wickham, Sir Henry Alexander

Appendix B

EXPLORERS BY REGION OF ACTIVITY



Note: Certain individuals appear on more than one list.

EUROPE, ICELAND, AND EASTERN ATLANTIC ISLANDS

Agricola, Gnaeus Julius
Balmat, Jacques
Banks, Sir Joseph
Bar Sauma, Rabban
Behaim, Martin
Brendan, Saint
Brunel, Olivier
Cabral, Gonçalo Velho
Caesar, Gaius Julius
Eric the Red
Evliya, Çelebi
Fiennes, Celia
Forbes, Edward
Gore, John
Hecataeus of Miletus
Herodotus
Himilco
Ibn Battutah, Abu Abd Allah Muhammad
Ibn Fadlan, Ahmad
Ibn Hawqal, Abu al-Qasim ibn Ali al-Nasibi
Ibn Jubayr, Abu al-Hasan Muhammad
Ibn Rusta, Abu Ali Ahmad
Idrisi, Abu Abd Allah Muhammad ash-Sharif al-
Jenkinson, Anthony
Jörgenson, Jörgen

Kropotkin, Peter
Masudi, Abu al-Hasan Ali al-
Naddod
Paulinus, Suetonius
Peck, Annie Smith
Pethahia of Regensburg
Pfeiffer, Ida Reyer
Pytheas
Sargon
Squanto
Stefansson, Vilhjalmur
Strabo
Svarsson, Gardar
Whymper, Edward
Zurbriggen, Matthias

NORTH AFRICA

Alexander the Great
Arculf
Barth, Heinrich
Blunt, Anne Isabella
Blunt, Wilfrid Scawen
Burckhardt, Johann Ludwig
Clapperton, Hugh
Covilhã, Pero da
Denham, Dixon
Duveyrier, Henri

Eberhardt, Isabelle
 Evliya, Çelebi
 Flatters, Paul-Xavier
 Foureau, Fernand
 Gallus, Gaius Aelius
 Hecataeus of Miletus
 Herodotus
 Hornemann, Friedrich Conrad
 Ibn Battutah, Abu Abd Allah Muhammad
 Ibn Hawqal, Abu al-Qasim ibn Ali al-Nasibi
 Ibn Jubayr, Abu al-Hasan Muhammad
 Idrisi, Abu Abd Allah Muhammad ash-Sharif al-
 Indicopleustes, Cosmas
 Leo Africanus
 Lyon, George Francis
 Masudi, Abu al-Hasan Ali al-
 Maternus, Julius
 Nachtigal, Gustav
 Oudney, Walter
 Overweg, Adolf
 Paulinus, Suetonius
 Richardson, James
 Ritchie, Joseph
 Rohlf, Friedrich Gerhard
 Sherley, Sir Anthony
 Stark, Freya Madeline
 Strabo
 Tinné, Alexandrine Petronella Francina
 Workman, Fanny Bullock

COASTAL AFRICA

Albuquerque, Afonso de
 Almeida, Francisco de
 Baldaya, Afonso Gonçalves
 Beechey, Frederick William
 Belcher, Sir Edward
 Cadamosto, Alvise da
 Cão, Diogo
 Cheng Ho
 Covilhã, Pero da
 Dias, Bartolomeu
 Dias, Dinís
 Eannes, Gil
 Eudoxus
 Fernandes, Álvaro
 Gama, Vasco da
 Gomes, Diogo
 Gomes, Fernão
 Hanno
 Hannu
 Indicopleustes, Cosmas
 Masudi, Abu al-Hasan Ali al-
 Pacheco, Duarte

Tristão, Nuño
 Vivaldi, Ugolino

SUB-SAHARAN AFRICA

Abruzzi, Luigi Amedeo di Savoia d'
 Akeley, Carl Ethan
 Akeley, Delia Denning
 Akeley, Mary Leonore Jobe
 Álvares, Francisco
 Baikie, William Balfour
 Baines, Thomas
 Baker, Florence
 Baker, Sir Samuel White
 Baptista, Pedro João
 Barth, Heinrich
 Baumann, Oskar
 Bent, James Theodore
 Beutler, August
 Binger, Louis-Gustave
 Bombay, Sidi
 Brazza, Pierre-Paul-François-Camille Savorgnan de
 Bruce, James
 Burchell, William John
 Burton, Sir Richard Francis
 Cadamosto, Alvise da
 Caillié, René-Auguste
 Cameron, Verney Lovett
 Campbell, John
 Chaillé-Long, Charles
 Clapperton, Hugh
 Denham, Dixon
 Diogenes
 Du Chaillu, Paul Belloni
 Emin Pasha, Mehmed
 Foureau, Fernand
 Fuchs, Sir Vivian Ernest
 Galton, Sir Francis
 Gordon, Robert
 Grant, James Augustus
 Grenfell, George
 Herkhuf
 Hoehnel, Ludwig von
 Hornemann, Friedrich Conrad
 Houghton, Daniel
 Ibn Battutah, Abu Abd Allah Muhammad
 Ibn Hawqal, Abu al-Qasim ibn Ali al-Nasibi
 Johnston, Sir Harry Hamilton
 Junker, Wilhelm Johann
 Kingsley, Mary Henrietta
 Krapf, Johann Ludwig
 Lacerda, Francisco de
 Laing, Alexander Gordon
 Lander, Richard Lemon

Lenz, Oskar
 Leo Africanus
 Livingstone, David
 Livingstone, Mary Moffat
 Lobo, Jerónimo
 Marchand, Jean-Baptiste
 Meyer, Hans
 Moffat, Mary
 Moffat, Robert
 Nachtigal, Gustav
 Oudney, Walter
 Overweg, Adolf
 Páez, Pedro
 Park, Mungo
 Pascoe, William
 Rebmann, Johann
 Richardson, James
 Schweinfurth, Georg August
 Sheldon, May French
 Silva Porto, Antonio Francisco da
 Sparrman, Anders
 Speke, John Hanning
 Stanley, Sir Henry Morton
 Teleki, Samuel
 Thomson, Joseph
 Tinné, Alexandrine Petronella Francina
 Thunberg, Carl Peter
 Wissmann, Hermann von
 Young, Charles Denton

NEAR EAST

Alexander the Great
 Arculf
 Bar Sauma, Rabban
 Bell, Gertrude Margaret Lowthian
 Benjamin of Tudela
 Bent, James Theodore
 Bishop, Isabella Lucy Bird
 Blunt, Anne Isabella
 Blunt, Wilfrid Scawen
 Brydges, Harford Jones
 Burckhardt, Johann Ludwig
 Burton, Sir Richard Francis
 Cabot, John
 Cheng Ho
 Christie, Charles
 Conti, Niccolò di
 Covilhã, Pero da
 Ctesias of Cnidus
 Doughty, Charles Montagu
 Evliya, Çelebi
 Franklin, Jane
 Gallus, Gaius Aelius

Grueber, Johann
 Hannu
 Hecataeus of Miletus
 Herbert, Thomas
 Herodotus
 Ibn Battutah, Abu Abd Allah Muhammad
 Ibn Hawqal, Abu al-Qasim ibn Ali al-Nasibi
 Ibn Jubayr, Abu al-Hasan Muhammad
 Ibn Rusta, Abu Ali Ahmad
 Idrisi, Abu Abd Allah Muhammad ash-Sharif al-
 John of Montecorvino
 Kan Ying
 Lawrence, Thomas Edward
 Leo Africanus
 Nearchus
 Newberry, John
 Niebuhr, Carsten
 Palgrave, William Gifford
 Pethahia of Regensburg
 Pfeiffer, Ida Reyer
 Philby, Harry St. John Bridger
 Pottinger, Sir Henry
 Sadlier, George Foster
 Sargon
 Scylax
 Sherley, Sir Anthony
 Stanhope, Hester Lucy
 Stark, Freya Madeline
 Strabo
 Sykes, Sir Percy Molesworth
 Thesiger, Wilfred Patrick
 Thomas, Bertram Sydney
 Varthema, Ludovico di
 Wellsted, James
 Xenophon
 Yaqut al-Rumi, Shihab al-Din Abu Abd Allah

CENTRAL ASIA AND THE INDIAN SUBCONTINENT

Abruzzi, Luigi Amedeo di Savoia d'
 Albuquerque, Afonso d'
 Alexander the Great
 Almeida, Francisco de
 Almeida, Lourenço de
 Andrade, Antonio de
 Atkinson, Lucy
 Atkinson, Thomas Wittlam
 Azevado, Francisco de
 Basargin, Grigory Gavrilovich
 Bekovich-Cherkassky, Aleksandr
 Benjamin of Tudela
 Biruni, Abu ar-Rayhan Muhammad ibn Ahmad al-
 Bishop, Isabella Lucy Bird

Bogle, George
 Bonin, Charles
 Brydges, Harford Jones
 Bukhgolts, Ivan Dmitriyevich
 Burnes, Sir Alexander
 Burton, Sir Richard Francis
 Cabral, João
 Cabral, Pedro Álvares
 Cacella, Estavão
 Carpini, Giovanni da Pian del
 Chang Ch'ien
 Ch'ang-ch'un
 Cheng Ho
 Christie, Charles
 Clavijo, Ruy González de
 Conti, Niccolò di
 Cooper, Thomas Thornville
 Covilhã, Pero da
 Ctesias of Cnidus
 David-Néel, Alexandra
 Desideri, Ippolito
 Elias, Ney
 Eudoxus
 Everest, Sir George
 Fa-hsien
 Fedchenko, Aleksey Pavlovich
 Fedchenko, Olga
 Filchner, Wilhelm
 Fitch, Ralph
 Gama, Vasco da
 Genghis Khan
 Gmelin, Johann Georg
 Gões, Bento de
 Grueber, Johann
 Hearsey, Hyder Jung
 Hedin, Sven Anders
 Hippalus
 Hillary, Sir Edmund Percival
 Hooker, Sir Joseph Dalton
 Hsüan-tsang
 Huc, Évariste-Régis
 Humboldt, Alexander von
 Ibn Battutah, Abu Abd Allah Muhammad
 I-ching
 Indicopleustes, Cosmas
 Jenkinson, Anthony
 John of Montecorvino
 Jourdain, John
 Kan Ying
 Kintup
 Krashennikov, Stepan Petrovich
 Leo Africanus
 Linschoten, Jan Huyghen van

Mallory, George Herbert Leigh
 Manning, Thomas
 Marignolli, Giovanni de
 Masudi, Abu al-Hasan Ali al-
 Mazuchelli, Elizabeth Sarah
 Megasthenes
 Messerschmidt, Daniel Gottlieb
 Moorcroft, William
 Nearchus
 Newberry, John
 Odoric of Pordenone
 Orville, Albert d'
 Pacheco, Duarte
 Pfeiffer, Ida Reyer
 Polo, Maffeo
 Polo, Marco
 Polo, Niccolò
 Pottinger, Sir Henry
 Przhevalsky, Nikolay Mikhailovich
 Ricci, Matteo
 Roe, Sir Thomas
 Roerich, Nikolay Konstantinovich
 Schlagintweit, Adolf von
 Schlagintweit, Hermann von
 Schlagintweit, Robert von
 Scylax
 Semyonov, Pyotr Petrovich
 Sequira, Diego López de
 Singh, Kishen
 Singh, Nain
 Soleyman
 Stark, Freya Madeline
 Stein, Sir Marc Aurel
 Stevens, Thomas
 Strabo
 Taylor, Annie Royle
 Tenzing Norgay
 Tsybikov, Gombozhab
 Turner, Samuel
 Vambéry, Armin
 Varthema, Ludovico di
 William of Rubrouck
 Workman, Fanny Bullock
 Xavier, Francis
 Yermak
 Younghusband, Sir Francis Edward
 Zurbriggen, Matthias

FAR EAST AND SIBERIA

Adams, William
 Albuquerque, Afonso d'
 Anabara, Semyon
 Anson, George

- Atlasov, Vladimir Vasilyevich
 Auribeau, Alexandre Hesmivy d'
 Baranov, Aleksandr Andreyevich
 Basov, Emelyan
 Batakov, Anton
 Baudin, Thomas-Nicolas
 Beechey, Frederick William
 Beketov, Pyotr
 Bering, Vitus Jonassen
 Billings, Joseph
 Bishop, Isabella Lucy Bird
 Bonin, Charles
 Broughton, William Robert
 Cano, Juan Sebastián del
 Chaillé-Long, Charles
 Chamisso de Boncourt, Louis-Charles-Adélaïde
 Chirikov, Aleksey Ilyich
 Choris, Louis
 Clerke, Charles
 Conti, Niccolò di
 Cook, James
 Daurkin, Nikolay
 David-Néel, Alexandra
 Davydov, Gavriil Ivanovich
 Dezhnev, Semyon Ivanovich
 Doudart de Lagrée, Ernest-Marc-Louis de Gonzague
 Dupuis, Jean
 Etholen, Arvid Adolf
 Fitch, Ralph
 Galaup, Jean-François de
 Garnier, Marie-Joseph-François
 Gmelin, Johann Georg
 Gões, Bento de
 Golovnin, Vasily Mikhailovich
 Grueber, Johann
 Houtman, Cornelius
 Houtman, Frederik
 Ibn Battutah, Abu Abd Allah Muhammad
 Ibn Rusta, Abu Ali Ahmad
 I-ching
 Izmailov, Gerasim Alekseyevich
 John of Montecorvino
 Jourdain, John
 Kaempfer, Engelbrecht
 Khabarov, Yerofey Pavlovich
 Krashennnikov, Stepan Petrovich
 Kropotkin, Peter
 Krusenstern, Adam Ivan Ritter von
 Lancaster, Sir James
 Langsdorff, Georg Heinrich Ritter von
 Ledyard, John
 Lesseps, Jean-Baptiste-Barthélemy de
 Linschoten, Jan Huyghen van
 Magellan, Ferdinand
 Marignolli, Giovanni de
 Masudi, Abu al-Hasan Ali al-
 McLeod, William C.
 Mertens, Karl Heinrich
 Messerschmidt, Daniel Gottlieb
 Morozko, Luka
 Mouhot, Henri
 Nevelskoy, Gennady Ivanovich
 Newport, Christopher
 Odoric of Pordenone
 Orville, Albert d'
 Pavie, Auguste-Jean-Marie
 Pfeiffer, Ida Reyer
 Pinto, Fernão Mendes
 Pires, Tomé
 Polo, Maffeo
 Polo, Marco
 Polo, Niccolò
 Popov, Fyodot Alekseyev
 Poyarkov, Vasily Danilovich
 Ricci, Matteo
 Richthofen, Ferdinand Paul Wilhelm von
 Saris, John
 Sarychev, Gavriil Andreyevich
 Sequira, Diego López de
 Serrano, Francisco
 Shelikov, Grigory Ivanovich
 Simpson, Sir George
 Soleyman
 Stadukhin, Mikhail
 Stark, Freya Madeline
 Steller, Georg Wilhelm
 Taylor, Annie Royle
 Thunberg, Carl Peter
 Varthema, Ludovico di
 Wallace, Alfred Russel
 Wen-chi
 William of Rubrouck
 Workman, Fanny Bullock
 Xavier, Francis
 Younghusband, Sir Francis Edward

WEST INDIES, CENTRAL AMERICA, AND MEXICO

- Acosta, José de
 Alvarado, Pedro de
 Álvarez de Pineda, Alonso
 Ávila, Pedro Arias de
 Baldaya, Afonso Gonçalves
 Bastidas, Rodrigo de
 Baudin, Thomas-Nicolas
 Belcher, Sir Edward

Benalcázar, Sebastián Moyano de
 Cabrillo, Juan Rodríguez
 Cacella, Estevão
 Catesby, Mark
 Catlin, George
 Columbus, Christopher
 Cortés, Hernán
 Cosa, Juan de la
 Desideri, Ippolito
 Díaz, Melchor
 Díaz del Castillo, Bernal
 Díaz de Solís, Juan
 Drake, Sir Francis
 Fernández de Córdoba, Francisco (in Yucatán)
 Fernández de Córdoba, Francisco (in Panama,
 Nicaragua)
 Fernández de Oviedo y Valdez, Gonzalo
 Ferrelo, Bartolomé
 Grijalva, Juan de
 Guancanagari
 Guzmán, Nuño Beltrán de
 Hawkins, Sir John
 Humboldt, Alexander von
 Ibarra, Francisco de
 Kino, Eusebio Francisco
 Malinche
 Montejó, Francisco de
 Montejó y León, Francisco de
 Narváez, Pánfilo de
 Nicuesa, Diego de
 Niño, Andrés
 Núñez de Balboa, Vasco
 Ojeda, Alonso de
 Ordaz, Diego de
 Padilla, Juan de
 Pinzón, Arias Martín
 Pinzón, Francisco Martín
 Pinzón, Martín Alonso
 Pinzón, Vicente Yáñez
 Ponce de León, Juan
 Popham, George
 Porte, François de la
 Schwatka, Frederick
 Soto, Hernando de
 Velásquez, Diego
 Young, Charles Denton

SOUTH AMERICA, SOUTH ATLANTIC, AND EAST PACIFIC ISLANDS

Acosta, José de
 Acuña, Cristóbal de
 Adams, Harriet Chalmers
 Aguirre, Lope de

Alfínger, Ambrosius
 Almagro, Diego de
 Alvarado, Pedro de
 Andagoya, Pascual de
 Anson, George
 Arias de Saavedra, Hernando
 Ayolas, Juan de
 Azara, Félix de
 Banks, Sir Joseph
 Baret, Jeanne
 Bastidas, Rodrigo de
 Bates, Henry Walter
 Baudin, Thomas-Nicolas
 Beechey, Frederick William
 Belcher, Sir Edward
 Benalcázar, Sebastián Moyano de
 Berrío, Antonio de
 Bingham, Hiram
 Bougainville, Louis-Antoine de
 Bouvet de Lozier, Jean-Baptiste-Charles
 Burchell, William John
 Burton, Sir Richard Francis
 Byron, John
 Cabeza de Vaca, Álvar Núñez
 Cabot, Sebastian
 Cabral, Pedro Álvares
 Cano, Juan Sebastián del
 Castelnau, François de la Porte de
 Catlin, George
 Chamisso de Boncourt, Louis-Charles-Adélaïde
 Chesnard de la Giraudais, François
 Choris, Louis
 Clerke, Charles
 Columbus, Christopher
 Commerson, Joseph-Philibert
 Cook, James
 Cosa, Juan de la
 Crevaux, Jules-Nicolas
 Darwin, Charles
 Davis, John
 Dias, Bartolomeu
 Díaz de Solís, Juan
 Drake, Sir Francis
 Duclos-Guyot, Pierre-Nicolas
 Dumont d'Urville, Jules-Sébastien-César
 Duperrey, Louis-Isadore
 Dupetit-Thouars, Abel-Aubert
 Erauso, Catalina de
 Fawcett, Percy Harrison
 Federmann, Nikolaus
 Ferreira, Alexandre Rodrigues
 Fitzroy, Robert
 Fritz, Samuel

Garay, Juan de
 García, Alejo
 Gaudichaud-Beaupré, Charles
 Godin des Odanais, Isabela
 Gomes, Estevão
 Hawkins, Sir John
 Heyerdahl, Thor
 Hohermuth von Speyer, Georg
 Humboldt, Alexander von
 Hutten, Phillip von
 Jiménez de Quesada, Gonzalo
 King, Philip Parker
 La Condamine, Charles-Marie de
 Lancaster, Sir James
 Langsdorff, Georg Heinrich Ritter von
 Le Maire, Jakob
 Lesson, René-Primevère
 Magellan, Ferdinand
 Malaspina, Alessandro
 Martínez de Irala, Domingo
 Martius, Carl Friedrich Phillipp von
 Maximilian, Alexander Philipp
 Mee, Margaret Ursula
 Mendoza, Pedro de
 Mertens, Karl Heinrich
 Meyer, Hans
 Moreno, Francisco
 Musters, George Chaworth
 Niebuhr, Sigismund
 Niza, Marcos de
 Noort, Oliver van
 Noué, Charles-Edouard de la
 Ojeda, Alonso de
 Orbigny, Alcide-Charles-Victor Dessalines d'
 Ordaz, Diego de
 Orellana, Francisco de
 Peck, Annie Smith
 Pfeiffer, Ida Reyer
 Pigafetta, Francesco Antonio
 Pinzón, Arias Martín
 Pinzón, Francisco Martín
 Pinzón, Vicente Yáñez
 Pizarro, Francisco
 Pizarro, Gonzalo
 Pizarro, Hernando
 Popham, George
 Raleigh, Sir Walter
 Rice, Alexander Hamilton
 Roe, Sir Thomas
 Sarmiento de Gamboa, Pedro
 Schomburgk, Sir Robert Hermann
 Schouten, Willem Cornelis
 Selkirk, Alexander

Solander, Daniel Carl
 Soto, Hernando de
 Spruce, Richard
 Teixeira, Pedro de
 Tschudi, Johann Jakob von
 Ursúa, Pedro de
 Valdivia, Pedro de
 Vespucci, Amerigo
 Viale, Agostinho
 Wallace, Alfred Russel
 Weddell, James
 Wickham, Sir Henry Alexander
 Wilkes, Charles
 Whympers, Edward
 Zurbriggen, Matthias

NORTH AMERICA, EAST OF THE MISSISSIPPI RIVER

Aco, Michel
 Adair, James
 Albanel, Charles
 Allouez, Claude-Jean
 Álvarez de Pineda, Alonso
 Arthur, Gabriel
 Audubon, John James
 Ayllón, Lucas Vásquez de
 Banks, Sir Joseph
 Bartram, John
 Bartram, William
 Batts, Thomas
 Beltrami, Giacomo Costantino
 Block, Adriaen
 Boone, Daniel
 Brébeuf, Jean de
 Bréhant de Galinée, René de
 Bressani, Francesco-Gioseppe
 Brûlé, Étienne
 Bruyas, Jacques
 Cabeza de Vaca, Álvar Núñez
 Cabot, John
 Cabot, Sebastian
 Cartier, Jacques
 Carver, Jonathan
 Castelnau, François de la Porte de
 Catesby, Mark
 Catlin, George
 Champlain, Samuel de
 Charlevoix, Pierre-François-Xavier de
 Chouart des Groseilliers, Médard
 Cook, James
 Côte-Real, Gaspar
 Côte-Real, Miguel
 Cresap, Thomas

Croghan, George
 Davion, Albert
 Dollier de Casson, François
 Donnaconna
 Drake, Sir Francis
 Duluth, Daniel Greysolon
 Eiríkisdottir, Freydis
 Ericsson, Leif
 Ericsson, Thorvald
 Estevanico
 Fallam, Robert
 Finley, John
 Gibault, Pierre
 Gilbert, Sir Humphrey
 Gist, Christopher
 Gomes, Estevão
 Gosnold, Bartholomew
 Grenville, Sir Richard
 Harriot, Thomas
 Hawkins, Sir John
 Hennepin, Louis
 Henry, Alexander (the elder)
 Herjulfsson, Bjarni
 Hind, Henry Youle
 Hudson, Henry
 James, Thomas
 Jogues, Isaac
 Jolliet, Louis
 Jourdain, Silvester
 Karlsefni, Thorfinn
 Kenton, Simon
 Knight, John
 Lahontan, Louis-Armand de Lom d'Arce de
 Lalemant, Gabriel
 La Mothe, Antoine Laumet de
 La Salle, René-Robert Cavelier de
 Laudonnière, René Goulaine de
 Lawson, John
 Lederer, John
 Le Moyne, Jean-Baptiste
 Le Moyne, Pierre
 Le Moyne, Simon
 Le Moyne de Morgues, Jacques
 Lesueur, Charles-Alexandre
 Le Sueur, Pierre-Charles
 Marquette, Jacques
 Ménard, René
 Menéndez de Avilés, Pedro
 Middleton, Christopher
 Moor, William
 Moscoso, Luis de
 Munk, Jens Eriksen
 Narváez, Pánfilo de

Needham, James
 Newport, Christopher
 Nicolet, Jean
 Nuttall, Thomas
 Penha, Joseph de la
 Perrot, Nicolas
 Ponce de León, Juan
 Popham, George
 Pring, Martin
 Radisson, Pierre-Esprit
 Ribault, Jean
 Rivera y Villalón, Pedro de
 Robertson, James
 Roberval, Jean-François de la Roque de
 Rogers, Robert
 Rut, John
 Sable, Jean Baptist Point
 St. Denis, Louis Juchereau de
 Schoolcraft, Henry Rowe
 Smith, James
 Smith, John
 Soto, Hernando de
 Spotswood, Alexander
 Squanto
 Tonti, Henri de
 Verrazano, Giovanni da
 Vespucci, Amerigo
 Viele, Arnaud Cornelius
 Walker, Thomas
 Weiser, Conrad
 Weymouth, George
 White, John
 Winslow, Edward
 Wood, Abraham
 Woodward, Henry

NORTH AMERICA, WEST OF MISSISSIPPI RIVER

Abbott, Henry Larcom
 Abert, James William
 Akeley, Mary Leonore Jobe
 Alarcón, Hernando de
 Allen, Henry Tureman
 Alvarado, Hernando de
 Álvarez, Manuel
 Álvarez de Pineda, Alonso
 Anza, Juan Bautista de
 Applegate, Jesse
 Ashley, William Henry
 Astor, John Jacob
 Atkinson, Henry
 Audubon, John James
 Baker, James

Baranov, Aleksandr Andreyevich
 Bashmakov, Pyotr
 Beale, Edward Fitzgerald
 Becknell, William
 Beckwith, Edward Griffin
 Beckwourth, James Pierson
 Beechey, Frederick William
 Belcher, Sir Edward
 Benavides, Alonzo de
 Bent, Charles
 Bent, William
 Bering, Vitus Jonassen
 Berlandier, Jean-Louis
 Billings, Joseph
 Bishop, Isabella Lucy Bird
 Black Beaver
 Bligh, William
 Bocharov, Dmitry Ivanovich
 Bodega y Quadra, Juan Francisco de la
 Bodmer, Karl
 Boller, Henry A.
 Bonneville, Benjamin Louis Eulalie de
 Bourmont, Étienne-Veniard de
 Bozeman, John Merin
 Brackenridge, Henry Marie
 Bradbury, John
 Bridger, James
 Broughton, William Robert
 Cabeza de Vaca, Álvar Núñez
 Cabrillo, Juan Rodríguez
 Campbell, Robert (American)
 Campbell, Robert (Scottish)
 Carson, Christopher Houston
 Castelnau, François de la Porte de
 Catlin, George
 Cermenho, Sebastián Meléndez Rodríguez
 Chamisso de Boncourt, Louis-Charles-Adélaïde
 Charbonneau, Jean-Baptiste
 Charbonneau, Toussaint
 Chatillon, Henri
 Cheadle, Walter Butler
 Chirikov, Aleksey Ilyich
 Chisholm, Jesse
 Chouteau, Auguste Pierre
 Chouteau, Jean Pierre
 Chouteau, Pierre
 Chouteau, René Auguste
 Clark, William
 Clerke, Charles
 Clyman, James
 Cocking, Matthew
 Colter, John
 Cook, James
 Coronado, Francisco Vásquez de
 Dana, James Dwight
 Daurkin, Nikolay
 Davydov, Gavriil Ivanovich
 De Haven, Edwin Jesse
 De Smet, Pierre-Jean
 Díaz, Melchor
 Dodge, Henry
 Domínguez, Francisco Atanasio
 Dorion, Marie
 Dorion, Pierre, Jr.
 Dorion, Pierre, Sr.
 Drake, Sir Francis
 Drouillard, George
 Dubuque, Julien
 Dunbar, Sir William
 Emmons, George Foster
 Emory, William Hemsley
 Escalante, Francisco Silvestre Vélez de
 Escandón, José de
 Eschscholtz, Johann Friedrich
 Espejo, Antonio Estevan de
 Estevanico
 Etholen, Arvid Adolf
 Ferrelo, Bartolomé
 Ferris, Warren Angus
 Fitzpatrick, Thomas
 Fontenelle, Lucien
 Fowler, Jacob
 Fraeb, Henry
 Franchère, Gabriel
 Fraser, Simon
 Freeman, Thomas
 Frémont, John Charles
 Fuca, Juan de
 Galaup, Jean-François de
 Garcés, Francisco Tomas Hermenegildo
 Glass, Hugh
 Glazunov, Andrey
 Golovnin, Vasily Mikhailovich
 Gore, John
 Gray, Robert
 Greenwood, Caleb
 Gunnison, John Williams
 Hamilton, William Thomas
 Hayden, Ferdinand Vandever
 Hearne, Samuel
 Heceta, Bruno
 Henry, Alexander (the elder)
 Henry, Alexander (the younger)
 Heday, Anthony
 Henry, Andrew
 Hind, Henry Youle

- Hooker, Sir Joseph Dalton
 Hunt, Wilson Price
 Irateba
 Irving, John Treat
 Ives, Joseph Christmas
 Jackson, David E.
 Kane, Elisha Kent
 Joutel, Henri
 Jusseaume, René
 Kane, Paul
 Kashevarov, Aleksandr Filippovich
 Kearny, Stephen Watts
 Kelsey, Henry
 Kern, Benjamin Jordan
 Kern, Edward Meyer
 Kern, Richard Hovendon
 King, Clarence
 Kino, Eusebio Francisco
 Kittson, Norman Wolfred
 Knight, James
 Kotzebue, Otto von
 Krenitsyn, Pyotr Kuzmich
 Krusenstern, Adam Ivan Ritter von
 Kurz, Rudolph Friederich
 Laclede, Pierre Liguete
 La Harpe, Jean-Baptiste Bénard de
 Langford, Nathaniel Pitt
 Langsdorff, Georg Heinrich Ritter von
 Larpenteur, Charles
 La Vérendrye, Louis-Joseph Gaultier de
 La Vérendrye, Pierre Gaultier de Varennes de
 Leavenworth, Henry
 León, Alonso de
 Leonard, Zenas
 Lewis, Meriwether
 Lisa, Manuel
 Lisiansky, Yury Fyodorovich
 Litke, Fyodor Petrovich
 Long, Stephen Harriman
 López de Cárdenas, García
 Mackenzie, Sir Alexander
 Mackenzie, Donald
 Macomb, John N.
 Malaspina, Alessandro
 Mallet, Pierre Antoine
 Marcy, Randolph Barnes
 Matonabee
 Maximilian, Alexander Philipp
 McKenzie, Kenneth
 McLoughlin, John
 Meek, Joseph L.
 Menard, Antoine Pierre
 Mertens, Karl Heinrich
 Miller, Alfred Jacob
 Milton, William-Wentworth Fitzwilliam
 Moscoso, Luis de
 Muir, John
 Nárvaez, Pánfilo de
 Newberry, John Strong
 Newell, Robert
 Nicollet, Joseph Nicolas
 Niza, Marcos de
 Nuttall, Thomas
 Ogden, Peter Skene
 Oñate, Juan de
 Padilla, Juan de
 Palliser, John
 Parke, John Grubb
 Pattie, James Ohio
 Pérez Hernández, Juan Josef
 Perrin du Lac, François Marie
 Pike, Zebulon Montgomery
 Pilcher, Joshua
 Pond, Peter
 Pope, John B.
 Portolá, Gaspar de
 Powell, John Wesley
 Pribylov, Gavriilo Loginovich
 Provost, Étienne
 Reynolds, William Franklin
 Robidoux, Antoine
 Rose, Edward
 Ross, Alexander
 Russell, Osborne
 Sacajawea
 St. Denis, Louis Juchereau de
 St. Vrain, Céran de Hault de Lassus
 Sarychev, Gavriil Andreyevich
 Serra, Junípero
 Shelikov, Grigory Ivanovich
 Simpson, Sir George
 Simpson, James Hervey
 Simpson, Thomas
 Sinclair, James
 Sitgreaves, Lorenzo
 Smith, Jedediah Strong
 Soto, Hernando de
 Spalding, Henry Harmon
 Stanley, David Sloan
 Stansbury, Howard
 Steller, Georg Wilhelm
 Stevens, Thomas
 Stuart, Robert
 Stuck, Hudson
 Sublette, William Lewis
 Thompson, David

Tovar, Pedro de
 Truteau, Jean Baptiste
 Turk
 Ulloa, Francisco de
 Vancouver, George
 Vanderburgh, William Henry
 Vasquez, Louis
 Vavasour, Mervin
 Vial, Pedro
 Viscaíno, Sebastián
 Walker, Joseph Reddeford
 Warre, Henry James
 Webber, John
 Weber, John H.
 Wheeler, George Montague
 Whipple, Amiel Weeks
 Whitman, Marcus
 Wilkes, Charles
 Williams, William Sherley
 Wolfskill, William
 Wootton, Richens Lacy
 Work, John
 Wyeth, Nathaniel Jarvis
 Young, Brigham
 Young, Ewing
 Yount, George Concepcion
 Zagoskin, Lavrenty Alekseyevich

COASTAL AUSTRALIA, SOUTH AND WEST PACIFIC ISLANDS

Arago, Jacques
 Auribeau, Alexandre Hesmivy d'
 Banks, Sir Joseph
 Baret, Jeanne
 Barrow, Sir John
 Bass, George
 Baudin, Thomas-Nicolas
 Bauer, Ferdinand Lucas
 Beautemps-Beaupré, Charles François
 Beechey, Frederick William
 Belcher, Sir Edward
 Bellingshausen, Fabian Gottlieb Benjamin von
 Bishop, Isabella Lucy Bird
 Bligh, William
 Bougainville, Hyacinthe-Yves-Philippe Potentien de
 Bougainville, Louis-Antoine de
 Broughton, William Robert
 Brown, Robert
 Bruni, Antoine-Raymond-Joseph de
 Burney, James
 Byron, John
 Cano, Juan Sebastián del
 Carteret, Philip

Chamisso de Boncourt, Louis-Charles-Adélaïde
 Chesnard de la Giraudais, François
 Choris, Louis
 Clerke, Charles
 Commerson, Joseph-Philibert
 Cook, James
 Dallman, Eduard
 Dampier, William
 Dana, James Dwight
 Darwin, Charles Robert
 De Haven, Edwin Jesse
 Drake, Sir Francis
 Duclos-Guyot, Pierre-Nicolas
 Dumont d'Urville, Jules-Sébastien-César
 Duperrey, Louis-Isadore
 Dupetit-Thouars, Abel-Aubert
 Emmons, George Foster
 Eschscholtz, Johann Friedrich
 Eyre, Sir Edward John
 Fanning, Edmund
 Fitzroy, Robert
 Fleuriot de Langlé, Paul-Antoine-Marie
 Flinders, Matthew
 Forster, Johann Georg Adam
 Forster, Johann Reinhold
 Franklin, Sir John
 Freycinet, Louis-Claude de Saulces de
 Furneaux, Tobias
 Gaimard, Joseph-Paul
 Galaup, Jean-François de
 Gaudichaud-Beaupré, Charles
 Gore, John
 Hartog, Dirk
 Hooker, Sir Joseph Dalton
 Houtman, Frederik
 Huon de Kermadec, Jean-Michel
 Jacquinet, Charles-Hector
 Jansz, Willem
 Jörgenson, Jörgen
 King, James
 King, Philip Parker
 Kotzebue, Otto von
 Krusenstern, Adam Ivan Ritter von
 Kupe
 La Billardière, Jacques-Julien Houtou de
 Lazarev, Mikhail Petrovich
 Ledyard, John
 Legazpi, Miguel López de
 Le Maire, Jakob
 Lesseps, Jean-Baptiste-Barthélemy de
 Lesson, René-Primevère
 Lesueur, Charles-Alexandre
 Lisiansky, Yury Fyodorovich

Litke, Fyodor Petrovich
 Magellan, Ferdinand
 Malaspina, Alessandro
 Mendaña, Álvaro de
 Mertens, Karl Heinrich
 Noort, Oliver van
 Péron, François
 Pfeiffer, Ida Reyer
 Phillip, Arthur
 Pigafetta, Francesco Antonio
 Quirós, Pedro Fernández de
 Quoy, Jean-René-Constant
 Riche, Claude-Antoine-Gaspard
 Roggeveen, Jakob
 Rossel, Elisabeth-Paul-Edouard de
 Saavedra Cerón, Álvaro de
 Sarmiento de Gamboa, Pedro
 Schouten, Willem Cornelis
 Solander, Daniel Carl
 Sparrman, Anders
 Tasman, Abel Janszoon
 Thyssen, François
 Torres, Luis Váez de
 Urdaneta, Andrés de
 Vancouver, George
 Wallis, Samuel
 Webber, John
 Westall, William
 Wilkes, Charles

CONTINENTAL AUSTRALIA AND NEW ZEALAND

Baines, Thomas
 Bass, George
 Bauer, Ferdinand Lucas
 Bishop, Isabella Lucy Bird
 Blaxland, Gregory
 Brown, Robert
 Brunner, Thomas
 Burke, Robert O'Hara
 Colenso, William
 Cunningham, Allan
 Dietrich, Koncordie Amalie Nelle
 Eyre, Sir Edward John
 Flinders, Matthew
 Forrest, Alexander
 Forrest, John
 Franklin, Jane
 Franklin, Sir John
 Giles, Ernest
 Gosse, William Christie
 Gregory, Sir Augustus Charles
 Gregory, Francis Thomas

Grey, Sir George
 Hovell, William Hilton
 Hume, Hamilton
 Kennedy, Edmund
 Kupe
 Landsborough, William
 Leichhardt, Friedrich Wilhelm Ludwig
 Marsden, Samuel
 Mitchell, Sir Thomas Livingstone
 Oxley, John Joseph William Molesworth
 Strzelecki, Sir Paul Edmund
 Stuart, John McDouall
 Sturt, Charles
 Warburton, Peter Egerton
 Wentworth, William Charles
 Williams, William
 Wills, William John
 Zurbriggen, Matthias

CANADIAN, EUROPEAN, AND SIBERIAN ARCTIC, GREENLAND, AND THE NORTH POLE

Abruzzi, Luigi Amedeo di Savoia d'
 Amundsen, Roald Engelbregt Gravning
 Andrée, Salomon August
 Andreyev, Stepan
 Back, Sir George
 Baffin, William
 Bakhov, Ivan
 Barents, Willem
 Batakov, Anton
 Beechey, Frederick William
 Begichev, Nikifor Alekseyevich
 Belcher, Sir Edward
 Bering, Vitus Jonassen
 Bernier, Joseph Elzéar
 Billings, Joseph
 Borough, Stephen
 Borough, William
 Boyd, Louise Arner
 Bruce, William Spiers
 Brunel, Olivier
 Buchan, David
 Button, Sir Thomas
 Bylot, Robert
 Byrd, Richard Evelyn
 Cabot, Sebastian
 Campbell, Robert (Scottish)
 Chancellor, Richard
 Chelyuskin, Simeon
 Chirikov, Aleksey Ilyich
 Clerke, Charles
 Collinson, Sir Richard
 Cook, Frederick Albert

Cook, James
 Côte-Real, Gaspar
 Courtauld, Augustine
 Crozier, Francis Rawdon Moira
 Davis, John
 Dease, Peter Warren
 De Haven, Edwin Jesse
 De Long, George Washington
 Dezhnev, Semyon Ivanovich
 Drygalski, Erich von
 Egede, Hans
 Ellsworth, Lincoln
 Eiríksdóttir, Freydis
 Ericsson, Leif
 Ericsson, Thorvald
 Eric the Red
 Fernandes, João
 Foxe, Luke
 Franklin, Sir John
 Frobisher, Sir Martin
 Fuchs, Sir Vivian Ernest
 Gerlache de Gomery, Adrien-Victor-Joseph de
 Greely, Adolphus Washington
 Hall, Charles Francis
 Hall, James
 Hayes, Isaac Israel
 Hearne, Samuel
 Henson, Matthew Alexander
 Herjulfsson, Bjarni
 Hood, Robert
 Hudson, Henry
 Jackson, Frederick George
 James, Thomas
 Kane, Elisha Kent
 Karlsefni, Thorfinn
 Knight, John
 Koldewey, Karl Christian
 Kropotkin, Peter
 Linschoten, Jan Huyghen van
 Litke, Fyodor Petrovich
 Mackenzie, Sir Alexander
 McClintock, Sir Francis Leopold
 McClure, Sir Robert John le Mesurier
 Messerschmidt, Daniel Gottlieb
 Middleton, Christopher
 Moor, William
 Munk, Jens Eriksen
 Mylius-Erichsen, Ludwig
 Nansen, Fridtjof
 Nares, Sir George Strong
 Nobile, Umberto
 Nordenskjöld, Nils Adolf Erik
 Nordenskjöld, Nils Otto Gustaf

Parry, Sir William Edward
 Pavy, Octave
 Payer, Julius von
 Peary, Robert Edwin
 Phipps, Constantine John
 Popov, Fyodot Alekseyev
 Rae, John
 Rasmussen, Knud Johan Victor
 Richardson, Sir John
 Ross, Sir James Clark
 Ross, Sir John
 Sarychev, Gavriil Andreyevich
 Schmidt, Otto Y.
 Schwatka, Frederick
 Scoresby, William, Jr.
 Scoresby, William, Sr.
 Simpson, Thomas
 Stadukhin, Mikhail
 Stefansson, Vilhjalmur
 Sverdrup, Otto Neumann
 Toll, Eduard von
 Watkins, Henry George
 Wegener, Alfred Lothar
 Weyprecht, Karl
 White, John
 Wilkins, Sir George Hubert
 Willoughby, Sir Hugh

ANTARCTIC AND SOUTH POLE

Amundsen, Roald Engelbregt Gravning
 Bellingshausen, Fabian Gottlieb Benjamin von
 Biscoe, John
 Borchgrevink, Carsten Egeberg
 Bransfield, Edward
 Bruce, William Spiers
 Byrd, Richard Evelyn
 Charcot, Jean-Baptiste-Étienne-Auguste
 Cook, Frederick Albert
 Cook, James
 Crozier, Francis Rawdon Moira
 Dallman, Eduard
 De Haven, Edwin Jesse
 Drygalski, Erich von
 Dumont d'Urville, Jules-Sébastien-César
 Ellsworth, Lincoln
 Filchner, Wilhelm
 Fuchs, Sir Vivian Ernest
 Furneaux, Tobias
 Gerlache de Gomery, Adrien-Victor-Joseph de
 Hillary, Sir Edmund Percival
 Hooker, Sir Joseph Dalton
 Jacquinet, Charles-Hector
 Kerguelen-Trémarec, Yves-Joseph de

Lazarev, Mikhail Petrovich
 Mawson, Sir Douglas
 Nordenskjöld, Nils Otto Gustaf
 Palmer, Nathaniel Brown
 Ross, Sir James Clark
 Scott, Robert Falcon
 Shackleton, Sir Ernest Henry
 Shirase, Nobu
 Weddell, James
 Wilkes, Charles
 Wilkins, Sir George Hubert
 Wilson, Edward Adrian

UNDERSEA

Beebe, Charles William
 Cousteau, Jacques-Yves
 Marsili, Luigi Ferdinando
 Maury, Matthew Fontaine
 Piccard, Jacques Ernest-Jean

SPACE

Armstrong, Neil Alden
 Gagarin, Yury Alekseyevich
 Glenn, John Herschell, Jr.
 Leonov, Alexei Arkhipovich
 Piccard, Auguste
 Ride, Sally Kristen
 Shepard, Alan Bartlett, Jr.
 Tereshkova, Valentina Vladimirovna
 White, Edward Higgins, II

CARTOGRAPHY, GEOGRAPHY, AND SPONSORSHIP

Anville, Jean-Baptiste Bourguignon d'
 Astor, John Jacob

Banks, Sir Joseph
 Barrow, Sir John
 Beatus of Valcavado
 Behaim, Martin
 Blaeu, Willem Janzoon
 Brosse, Charles de
 Cabot, Sebastian
 Chu Ssu-pen
 Cresques, Abraham
 Eratosthenes
 Franklin, Jane
 Gilbert, Sir Humphrey
 Gutiérrez, Diego
 Hakluyt, Richard
 Hatshepsut
 Henry the Navigator
 Herodotus
 Hipparchus
 Holywood, John
 Idrisi, Abu Abd Allah Muhammad ash-Sharif al-
 Indicopleustes, Cosmas
 Lancaster, Sir James
 Llewellyn, Martin
 Mendoza, Antonio de
 Mercator, Gerardus
 Necho II
 Ortelius, Abraham
 Petermann, August Heinrich
 Pliny the Elder
 Ptolemy
 Raleigh, Sir Walter
 Strabo
 Waldseemüller, Martin
 Wood, Abraham

Appendix C

EXPLORERS BY SPONSORING COUNTRY OR BY NATIONALITY/NATIVE LAND



Explorers are listed by countries sponsoring their most important expeditions or activities relating to exploration, or they are listed by their ancestry when their expeditions or activities relating to exploration were not government-backed. (Government sponsorship in some instances means official sanctioning or partial support.)

SPONSORING COUNTRIES (GOVERNMENT-BACKED EXPLORATION)

Australia (Colonial)

Burke, Robert O'Hara
Cunningham, Allan
Eyre, Sir Edward John
Forrest, Alexander
Forrest, John
Gosse, William Christie
Gregory, Sir Augustus Charles
Gregory, Francis Thomas
Grey, Sir George
Kennedy, Edmund
Landsborough, William
Leichhardt, Friedrich Wilhelm Ludwig
Mawson, Sir Douglas
Mitchell, Sir Thomas Livingstone
Oxley, John Joseph William Molesworth
Stuart, John McDouall
Sturt, Charles
Wills, William John

Austria

Martius, Carl Friedrich Phillipp von
Payer, Julius von
Weyprecht, Karl

Belgium

Gerlache de Gomery, Adrien-Victor-Joseph de
Grenfell, George

Canada

Bernier, Joseph Elzéar
Hind, Henry Youle
Stefansson, Vilhjalmur

Carthage

Hanno
Himilco

China

Chang Ch'ien
Cheng Ho
Chu Ssu-pen
Kan Ying

Denmark

Hall, James
 Munk, Jens Eriksen
 Mylius-Erichsen, Ludwig
 Niebuhr, Carsten
 Rasmussen, Knud Johan Victor

Egypt

Eudoxus
 Hannu
 Hatshepsut
 Herkhuf
 Hippalus
 Necho II

France

Aco, Michel
 Albanel, Charles
 Arago, Jacques
 Auribeau, Alexandre Hesmiv d'
 Baudin, Thomas-Nicolas
 Beautemps-Beaupré, Charles François
 Binger, Louis-Gustave
 Bougainville, Hyacinthe-Yves-Philippe Potentien de
 Bougainville, Louis-Antoine de
 Bourgmont, Étienne-Veniard de
 Bouvet de Lozier, Jean-Baptiste-Charles
 Brazza, Pierre-Paul-François-Camille Savorgnan de
 Brosse, Charles de
 Brûlé, Étienne
 Bruni, Antoine-Raymond-Joseph de
 Caillié, René-Auguste
 Cartier, Jacques
 Champlain, Samuel de
 Charcot, Jean-Baptiste-Étienne-Auguste
 Chesnard de la Giraudais, François
 Commerson, Joseph-Philibert
 Donnacona
 Doudart de Lagrée, Ernest-Marc-Louis de Gonzague
 Duclos-Guyot, Pierre-Nicolas
 Duluth, Daniel Greysolon
 Dumont d'Urville, Jules-Sébastien-César
 Duperrey, Louis-Isadore
 Dupetit-Thouars, Abel-Aubert
 Duveyrier, Henri
 Flatters, Paul-Xavier
 Fleuriot de Langlé, Paul-Antoine-Marie
 Foureau, Fernand
 Freycinet, Louis-Claude de Saulces de
 Gaimard, Joseph-Paul
 Galaup, Jean-François de
 Garnier, Marie-Joseph-François
 Gaudichaud-Beaupré, Charles

Hennepin, Louis
 Huon de Kermadec, Jean-Michel
 Jacquinet, Charles-Hector
 Jolliet, Louis
 Joutel, Henri
 Kerguelen-Trémarec, Yves-Joseph de
 La Billardière, Jacques-Julien Houtou de
 La Condamine, Charles-Marie de
 La Harpe, Jean-Baptiste Bénard de
 Lahontan, Louis-Armand de Lom d'Arce de
 La Mothe, Antoine Laumet de
 La Salle, René-Robert Cavelier de
 Laudonnière, René Goulaine de
 Le Moyne, Jean-Baptiste
 Le Moyne, Pierre
 Le Moyne de Morgues, Jacques
 Lesseps, Jean-Baptiste-Barthélemy de
 Lesson, René-Primevère
 Lesueur, Charles-Alexandre
 Marchand, Jean-Baptiste
 Marquette, Jacques
 Nicolet, Jean
 Noué, Charles-Edouard de la
 Palgrave, William Gifford
 Pavie, Auguste-Jean-Marie
 Péron, François
 Perrin du Lac, François-Marie
 Perrot, Nicolas
 Porte, François de la
 Quoy, Jean-René-Constant
 Ribault, Jean
 Riche, Claude-Antoine-Gaspard
 Roberval, Jean-François de la Roque de
 Rossel, Elisabeth-Paul-Edouard de
 St. Denis, Louis Juchereau de
 Tonti, Henri de
 Verrazano, Giovanni da

Germany

Baumann, Oskar
 Drygalski, Erich Dagobert von
 Filchner, Wilhelm
 Koldewey, Karl Christian
 Wegener, Alfred Lothar
 Wissmann, Hermann von

Great Britain

Anson, George
 Back, Sir George
 Baffin, William
 Baikie, William Balfour
 Baines, Thomas
 Banks, Sir Joseph

Barrow, Sir John
 Barth, Heinrich
 Bass, George
 Bauer, Ferdinand Lucas
 Beechey, Frederick William
 Belcher, Sir Edward
 Bent, James Theodore
 Biscoe, John
 Bligh, William
 Bogle, George
 Bombay, Sidi
 Borough, Stephen
 Borough, William
 Bransfield, Edward
 Broughton, William Robert
 Brown, Robert
 Bruce, James
 Bruce, William Spiers
 Brydges, Harford Jones
 Buchan, David
 Burchell, William John
 Burnes, Sir Alexander
 Burney, James
 Burton, Sir Richard Francis
 Button, Sir Thomas
 Bylot, Robert
 Byron, John
 Cabot, John
 Cabot, Sebastian
 Cameron, Verney Lovett
 Carteret, Philip
 Chaillé-Long, Charles
 Chancellor, Richard
 Christie, Charles
 Clapperton, Hugh
 Clerke, Charles
 Collinson, Sir Richard
 Cook, James
 Courtauld, Augustine
 Crozier, Francis Rawdon Moira
 Dampier, William
 Darwin, Charles Robert
 Davis, John
 Denham, Dixon
 Drake, Sir Francis
 Emin Pasha, Mehmed
 Everest, Sir George
 Fawcett, Percy Harrison
 Fitch, Ralph
 Fitzroy, Robert
 Flinders, Matthew
 Forster, Johann Georg Adam
 Forster, Johann Reinhold
 Foxe, Luke
 Franklin, Sir John
 Frobisher, Sir Martin
 Fuchs, Sir Vivian Ernest
 Furneaux, Tobias
 Gilbert, Sir Humphrey
 Gore, John
 Gosnold, Bartholomew
 Grant, James Augustus
 Grenville, Sir Richard
 Hakluyt, Richard
 Harriot, Thomas
 Hawkins, Sir John
 Hearne, Samuel
 Hearsey, Hyder Jung
 Hillary, Sir Edmund Percival
 Hood, Robert
 Hooker, Sir Joseph Dalton
 Hornemann, Friedrich Conrad
 Houghton, Daniel
 James, Thomas
 Jenkinson, Anthony
 Johnston, Sir Harry Hamilton
 Jourdain, John
 Jourdain, Silvester
 King, James
 King, Philip Parker
 Kintup
 Knight, John
 Laing, Alexander Gordon
 Lancaster, Sir James
 Lander, Richard Lemon
 Lawrence, Thomas Edward
 Lederer, John
 Livingstone, David
 Lyon, George Francis
 Matonabbee
 McClintock, Sir Francis Leopold
 McClure, Sir Robert John le Mesurier
 McLeod, William C.
 Middleton, Christopher
 Moor, William
 Moorcroft, William
 Musters, George Chaworth
 Nares, Sir George Strong
 Newberry, John
 Newport, Christopher
 Nuttall, Thomas
 Oudney, Walter
 Overweg, Adolf
 Palliser, John
 Park, Mungo
 Parry, Sir William Edward

Pascoe, William
 Penha, Joseph de la
 Philby, Harry St. John Bridger
 Phillip, Arthur
 Phipps, Constantine John
 Popham, George
 Pottinger, Sir Henry
 Pring, Martin
 Rae, John
 Raleigh, Sir Walter
 Richardson, James
 Richardson, Sir John
 Ritchie, Joseph
 Roe, Sir Thomas
 Ross, Sir James Clark
 Ross, Sir John
 Rut, John
 Sadlier, George Foster
 Saris, John
 Schlagintweit, Adolf von
 Schlagintweit, Hermann von
 Schlagintweit, Robert von
 Schomburgk, Sir Robert Hermann
 Scoresby, William, Jr.
 Scoresby, William, Sr.
 Scott, Robert Falcon
 Shackleton, Sir Ernest Henry
 Sherley, Sir Anthony
 Singh, Kishen
 Singh, Nain
 Smith, John
 Solander, Daniel Carl
 Sparrman, Anders
 Speke, John Hanning
 Spotswood, Alexander
 Spruce, Richard
 Stein, Sir Marc Aurel
 Sykes, Sir Percy Molesworth
 Tenzing Norgay
 Thomson, Sir Charles Wyville
 Thomson, Joseph
 Turner, Samuel
 Vancouver, George
 Vavasour, Mervin
 Wallis, Samuel
 Warre, Henry James
 Watkins, Henry George
 Webber, John
 Weddell, James
 Wellsted, James
 Westall, William
 Weymouth, George
 White, John
 Wilkins, Sir George Hubert

Willoughby, Sir Hugh
 Wilson, Edward Adrian
 Younghusband, Sir Francis Edward

Greece

Alexander the Great
 Megasthenes
 Nearchus
 Pytheas
 Xenophon

Italy

Abruzzi, Luigi Amedeo di Savoia d'
 Nobile, Umberto

Japan

Shirase, Nobu

Mesopotamia

Sargon

Mexico

Berlandier, Jean-Louis

Mongolia

Ch'ang-ch'un
 Genghis Khan

Morocco

Leo Africanus

Netherlands

Adams, William
 Barents, Willem
 Block, Adriaen
 Brunel, Olivier
 Hartog, Dirk
 Houtman, Cornelius
 Houtman, Frederik
 Hudson, Henry
 Jansz, Willem
 Le Maire, Jakob
 Niebuhr, Sigismund
 Noort, Oliver van
 Roggeveen, Jakob
 Schouten, Willem Cornelis
 Tasman, Abel Janszoon
 Thunberg, Carl Peter
 Thyssen, François

New Zealand (Colonial)

Brunner, Thomas

Norway

Amundsen, Roald Engelbregt Gravning
 Nansen, Fridtjof
 Sverdrup, Otto Neumann

Oman

Thomas, Bertram Sydney

Persia

Scylax

Portugal

Albuquerque, Afonso de
 Almeida, Francisco de
 Almeida, Lourenço de
 Álvares, Francisco
 Baldaya, Afonso Gonçalves
 Baptista, Pedro João
 Behaim, Martin
 Cabral, Gonçalo Velho
 Cabral, Pedro Álvares
 Cadamosto, Alvise da
 Cão, Diogo
 Côte-Real, Gaspar
 Côte-Real, Miguel
 Covilhã, Pedro da
 Dias, Bartolomeu
 Dias, Dinís
 Eannes, Gil
 Fernandes, Álvaro
 Fernandes, João
 Gama, Vasco da
 Gões, Bento de
 Gomes, Diogo
 Gomes, Estevão
 Gomes, Fernão
 Henry the Navigator
 Lacerda, Francisco de
 Pacheco, Duarte
 Pires, Tomé
 Sequira, Diego López de
 Serrano, Francisco
 Silva Porto, Antonio Francisco da
 Teixeira, Pedro de
 Tristão, Nuño
 Vespucci, Amerigo
 Viale, Agostinho

Prussia

Nachtigal, Gustav

Rome

Agricola, Gnaeus Julius
 Caesar, Gaius Julius
 Gallus, Gaius Aelius
 Maternus, Julius
 Paulinus, Suetonius
 Pliny the Elder

Russia

Andreyev, Stepan
 Atlasov, Vladimir Vasilyevich
 Bakhov, Ivan
 Baranov, Aleksandr Andreevich
 Basargin, Grigory Gavrilovich
 Basov, Emelyan
 Batakov, Anton
 Begichev, Nikifor Alekseyevich
 Beketov, Pyotr
 Bekovich-Cherkassky, Aleksandr
 Bellingshausen, Fabian Gottlieb Benjamin von
 Bering, Vitus Jonassen
 Billings, Joseph
 Bocharov, Dmitr Ivanovich
 Bukhgolts, Ivan Dmitryevich
 Chamisso de Boncourt, Louis-Charles-Adélaïde
 Chelyuskin, Simeon
 Chirikov, Aleksey Ilyich
 Choris, Louis
 Daurkin, Nikolay
 Davydov, Gavriil Ivanovich
 Dezhnev, Semyon Ivanovich
 Eschscholtz, Johann Friedrich
 Etholen, Arvid Adolf
 Fedchenko, Aleksey Pavlovich
 Fedchenko, Olga
 Glazunov, Andrey
 Gmelin, Johann Georg
 Golovnin, Vasily Mikhailovich
 Izmailov, Gerasim Alekseyevich
 Kashevarov, Aleksandr Filippovich
 Khabarov, Yerofey Pavlovich
 Kotzebue, Otto von
 Krasheninnikov, Stepan Petrovich
 Krenitsyn, Pyotr Kuzmich
 Kropotkin, Peter
 Krusenstern, Adam Ivan Ritter von
 Langsdorff, Georg Heinrich Ritter von
 Lazarev, Mikhail Petrovich
 Lisiansky, Yury Fyodorovich
 Litke, Fyodor Petrovich
 Mertens, Karl Heinrich
 Messerschmidt, Daniel Gottlieb
 Morozko, Luka
 Nevelskoy, Gennady Ivanovich
 Popov, Fyodot Alekseyev
 Poyarkov, Vasily Danilovich
 Pribylov, Gavriilo Loginovich
 Przhevalsky, Nikolay Mikhailovich
 Sarychev, Gavriil Andreyevich
 Shelikov, Grigory Ivanovich
 Stadukhin, Mikhail
 Steller, Georg Wilhelm

Tsybikov, Gombozhab
Yermak
Zagoskin, Lavrenty Alekseyevich

Sicily

Idrisi, Abu Abd Allah Muhammad ash-Sharif al-

Union of Soviet Socialist Republics

Gagarin, Yury Alekseyevich
Leonov, Alexei Arkhipovich
Schmidt, Otto Y.
Tereshkova, Valentina Vladimirovna

Spain

Acuña, Cristóbal de
Aguirre, Lope de
Alarcón, Hernando de
Almagro, Diego de
Alvarado, Hernando de
Alvarado, Pedro de
Álvarez de Pineda, Alonso
Andagoya, Pascual de
Anza, Juan Bautista de
Arias de Saavedra, Hernando
Ávila, Pedro Arias de
Ayllón, Lucas Vázquez de
Ayolas, Juan de
Bastidas, Rodrigo de
Benalcázar, Sebastián Moyano de
Berrío, Antonio de
Bodega y Quadra, Juan Francisco de la
Cabeza de Vaca, Álvar Núñez
Cabrillo, Juan Rodríguez
Cano, Juan Sebastián del
Cermenho, Sebastián Meléndez Rodríguez
Clavijo, Ruy González de
Columbus, Christopher
Coronado, Francisco Vázquez de
Cortés, Hernán
Cosa, Juan de la
Cresques, Abraham
Díaz, Melchor
Díaz del Castillo, Bernal
Díaz de Solís, Juan
Domínguez, Francisco Atanasio
Escalante, Francisco Silvestre Vélez de
Escandón, José de
Estevanico
Fernández de Córdoba, Francisco (in Yucatán)
Fernández de Córdoba, Francisco (in Panama,
Nicaragua)
Fernández de Oviedo y Valdez, Gonzalo
Ferrelo, Bartolomé

Fritz, Samuel
Fuca, Juan de
Garay, Juan de
Garcés, Francisco Tomás Hermenegildo
Grijalva, Juan de
Guancanagari
Gutiérrez, Diego
Guzmán, Nuño Beltrán de
Heceta, Bruno
Ibarra, Francisco de
Jiménez de Quesada, Gonzalo
Kino, Eusebio Francisco
Legazpi, Miguel López de
León, Alonso de
López de Cárdenas, García
Magellan, Ferdinand
Malaspina, Alessandro
Malinche
Martínez de Irala, Domingo
Mendaña, Álvaro de
Mendoza, Antonio de
Mendoza, Pedro de
Menéndez de Avilés, Pedro
Montejo, Francisco de
Montejo y León, Francisco de
Moscoso, Luis de
Narváez, Pánfilo de
Nicuesa, Diego de
Niño, Andrés
Niza, Marcos de
Núñez de Balboa, Vasco
Ojeda, Alonso de
Oñate, Juan de
Ordaz, Diego de
Orellana, Francisco de
Padilla, Juan de
Pérez Hernández, Juan Josef
Pigafetta, Francesco Antonio
Pinzón, Arias Martín
Pinzón, Francisco Martín
Pinzón, Martín Alonso
Pinzón, Vicente Yáñez
Pizarro, Francisco
Pizarro, Gonzalo
Pizarro, Hernando
Ponce de León, Juan
Portolá, Gaspar de
Quirós, Pedro Fernández de
Rivera y Villalón, Pedro de
Saavedra Cerón, Álvaro de
Sarmiento de Gamboa, Pedro
Serra, Junípero
Soto, Hernando de

Torres, Luis Vázquez de
 Tovar, Pedro de
 Turk
 Ulloa, Francisco de
 Urdaneta, Andrés de
 Ursúa, Pedro de
 Valdivia, Pedro de
 Velásquez, Diego
 Viscaíno, Sebastián

Sweden

Andrée, Salomon August
 Kaempfer, Engelbrecht
 Nordenskjöld, Nils Adolf Erik
 Nordenskjöld, Nils Otto Gustaf

United States (Colonial)

Adair, James
 Arthur, Gabriel
 Batts, Thomas
 Carver, Jonathan
 Croghan, George
 Fallam, Robert
 Lawson, John
 Needham, James
 Rogers, Robert
 Squanto
 Walker, Thomas
 Weiser, Conrad
 Wood, Abraham
 Woodward, Henry

United States (Post Colonial)

Abbott, Henry Larcom
 Abert, James William
 Allen, Henry Tureman
 Armstrong, Neil Alden
 Atkinson, Henry
 Beale, Edward Fitzgerald
 Beckwith, Edward Griffin
 Black Beaver
 Bonneville, Benjamin Louis Eulalie de
 Boyd, Louise Arner
 Byrd, Richard Evelyn
 Carson, Christopher Houston
 Charbonneau, Toussaint
 Clark, William
 Dana, James Dwight
 De Haven, Edwin Jesse
 De Long, George Washington
 Dodge, Henry
 Dorion, Pierre, Jr.
 Dorion, Pierre, Sr.

Drouillard, George
 Ellsworth, Lincoln
 Emmons, George Foster
 Emory, William Hemsley
 Freeman, Thomas
 Frémont, John Charles
 Glenn, John Herschell, Jr.
 Gray, Robert
 Greely, Adolphus Washington
 Gunnison, John Williams
 Hall, Charles Francis
 Hayden, Ferdinand Vandever
 Henson, Matthew Alexander
 Irving, John Treat
 Ives, Joseph Christmas
 Jusseaume, René
 Kane, Elisha Kent
 Kearny, Stephen Watts
 Kern, Benjamin Jordan
 Kern, Edward Meyer
 Kern, Richard Hovendon
 King, Clarence
 Langford, Nathaniel Pitt
 Leavenworth, Henry
 Lewis, Meriwether
 Long, Stephen Harriman
 Macomb, John N.
 Marcy, Randolph Barnes
 Maury, Matthew Fontaine
 Newberry, John Strong
 Nicollet, Joseph Nicolas
 Palmer, Nathaniel Brown
 Parke, John Grubb
 Pavy, Octave
 Peary, Robert Edwin
 Piccard, Jacques Ernest-Jean
 Pike, Zebulon Montgomery
 Pope, John B.
 Powell, John Wesley
 Reynolds, William Franklin
 Ride, Sally Kristen
 Schoolcraft, Henry Rowe
 Schwatka, Frederick
 Shepard, Alan Bartlett, Jr.
 Simpson, James Hervey
 Sitgreaves, Lorenzo
 Stanley, David Sloan
 Stansbury, Howard
 Wheeler, George Montague
 Whipple, Amiel Weeks
 White, Edward Higgins, II
 Wilkes, Charles
 Young, Charles Denton

**NATIONALITY/NATIVE LAND
(INDEPENDENT EXPLORATION)****American (Colonial)**

Boone, Daniel
Gist, Christopher
Kenton, Simon

American (Post Colonial)

Adams, Harriet Chalmers
Akeley, Carl Ethan
Akeley, Delia Denning
Akeley, Mary Leonore Jobe
Álvarez, Manuel
Applegate, Jesse
Ashley, William Henry
Astor, John Jacob
Audubon, John James
Baker, James
Bartram, John
Bartram, William
Becknell, William
Beckwourth, James Pierson
Beebe, Charles William
Bent, Charles
Bent, William
Bingham, Hiram
Boller, Henry A.
Bozeman, John Merin
Brackenridge, Henry Marie
Bridger, James
Campbell, Robert (American)
Catlin, George
Charbonneau, Jean-Baptiste
Chatillon, Henri
Chisholm, Jesse
Chouteau, Auguste Pierre
Chouteau, Jean Pierre
Chouteau, Pierre
Chouteau, René Auguste
Clyman, James
Colter, John
Cook, Frederick Albert
Dorion, Marie
Fanning, Edmund
Ferris, Warren Angus
Fitzpatrick, Thomas
Fontenelle, Lucien
Fowler, Jacob
Fraeb, Henry
Fraser, Simon
Glass, Hugh
Greenwood, Caleb
Hamilton, William Thomas

Hayes, Isaac Israel
Henry, Alexander (the elder)
Henry, Alexander (the younger)
Henry, Andrew
Hunt, Wilson Price
Irateba
Jackson, David E.
Larpenteur, Charles
Ledyard, John
Leonard, Zenas
Lisa, Manuel
Meek, Joseph L.
Miller, Alfred Jacob
Muir, John
Newell, Robert
Pattie, James Ohio
Peck, Annie Smith
Pilcher, Joshua
Pond, Peter
Provost, Étienne
Rice, Alexander Hamilton
Robertson, James
Robidoux, Antoine
Rose, Edward
Russell, Osborne
Sacajawea
St. Vrain, Cérán de Hault de Lassus de
Sheldon, May French
Smith, James
Smith, Jedediah Strong
Spalding, Henry Harmon
Stanley, Sir Henry Morton
Stuck, Hudson
Sublette, William Lewis
Vanderburgh, William Henry
Vasquez, Louis
Walker, Joseph Reddeford
Weber, John H.
Whitman, Marcus
Williams, William Sherley
Wolfskill, William
Wootton, Richens Lacy
Workman, Fanny Bullock
Wyeth, Nathaniel Jarvis
Young, Brigham
Young, Ewing
Yount, George Concepcion

Argentine

Moreno, Francisco

Australian (Colonial)

Blaxland, Gregory
Grueber, Johann

Hume, Hamilton
Wentworth, William Charles

Austrian

Pfeiffer, Ida Reyer

Belgian

De Smet, Pierre-Jean

Brazilian

Ferreira, Alexandre Rodrigues

British

Atkinson, Lucy
Atkinson, Thomas Wittlam
Baker, Sir Samuel White
Bates, Henry Walter
Bell, Gertrude Margaret Lowthian
Bishop, Isabella Lucy Bird
Blunt, Anne Isabella
Blunt, Wilfrid Scawen
Bradbury, John
Campbell, John
Campbell, Robert (Scottish)
Catesby, Mark
Cheadle, Walter Butler
Colenso, William
Cooper, Thomas Thornville
Cresap, Thomas
Doughty, Charles Montagu
Dunbar, Sir William
Elias, Ney
Fiennes, Celia
Forbes, Edward
Franklin, Jane
Galton, Sir Francis
Giles, Ernest
Gordon, Robert
Henday, Anthony
Herbert, Thomas
Holywood, John
Hovell, William Hilton
Jackson, Frederick George
Kelsey, Henry
Kingsley, Mary Henrietta
Knight, James
Livingstone, Mary Moffat
Llewellyn, Martin
Mackenzie, Sir Alexander
Mackenzie, Donald
Mallory, George Herbert Leigh
Manning, Thomas
Marsden, Samuel
Mazuchelli, Elizabeth Sarah
McKenzie, Kenneth

Mee, Margaret Ursula
Milton, William-Wentworth Fitzwilliam
Moffat, Mary
Moffat, Robert
Ross, Alexander
Selkirk, Alexander
Simpson, Sir George
Simpson, Thomas
Stanhope, Hester Lucy
Stark, Freya Madeline
Stevens, Thomas
Stuart, Robert
Taylor, Annie Royle
Thesiger, Wilfred Patrick
Thompson, David
Wallace, Alfred Russel
Warburton, Peter Egerton
Whymper, Edward
Wickham, Sir Henry Alexander
Williams, William
Winslow, Edward

Canadian (Colonial)

Dease, Peter Warren
Dubuque, Julien
Franchère, Gabriel
Gibault, Pierre
Kittson, Norman Wolfred
La Vérendrye, Louis-Joseph Gaultier de
La Vérendrye, Pierre Gaultier de Varennes et de
Mallet, Pierre-Antoine
McLoughlin, John
Menard, Antoine Pierre
Ogden, Peter Skene
Sinclair, James
Truteau, Jean-Baptiste

Chinese

Fa-hsien
Hsüan-tsang
I-ching
Wen-chi

Danish

Jørgenson, Jørgen

Dutch

Beutler, August
Blaeu, Willem Janzoon
Linschoten, Jan Huyghen van
Tinné, Alexandrine Petronella Francina
Viele, Arnaud Cornelius

Egyptian

Indicopleustes, Cosmas

Flemish

Mercator, Gerardus
Orville, Albert d'
Ortelius, Abraham
William of Rubrouck

Frankish

Arculf

French

Allouez, Claude-Jean
Anville, Jean-Baptiste Bourguignon d'
Balmat, Jacques
Baret, Jeanne
Bonin, Charles
Brébeuf, Jean de
Bréhant de Galinée, René de
Bruyas, Jacques
Charlevoix, Pierre-François-Xavier de
Chouart des Groseilliers, Médard
Crevaux, Jules-Nicolas
Cousteau, Jacques-Yves
David-Néel, Alexandra
Davion, Albert
Dollier de Casson, François
Du Chaillu, Paul Belloni
Dupuis, Jean
Huc, Évariste-Régis
Jogues, Isaac
Laclede, Pierre Liguette
Lalemant, Gabriel
Le Moyne, Simon
Le Sueur, Pierre-Charles
Ménard, René
Mouhot, Henri
Orbigny, Alcide-Charles-Victor Dessalines d'
Radisson, Pierre-Esprit
Vial, Pedro

German

Alfinger, Ambrosius
Dallman, Eduard
Dietrich, Koncordie Amalie Nelle
Federmann, Nikolaus
Hohermuth von Speyer, Georg
Humboldt, Alexander von
Hutten, Philip von
Junker, Wilhelm Johann
Krapf, Johann Ludwig
Lenz, Oskar
Maximilian, Alexander Philipp
Meyer, Hans
Petermann, August Heinrich
Pethahia of Regensburg

Rebmann, Johann
Richtofen, Ferdinand Paul Wilhelm von
Rohlf, Friedrich Gerhard
Schweinfurth, Georg August
Waldseemüller, Martin

Greek

Ctesias of Cnidus
Diogenes
Eratosthenes
Hecataeus of Miletus
Herodotus
Hipparchus
Ptolemy
Strabo
Yaqut al-Rumi, Shihab al-Din Abu Abd Allah

Haitian

Sable, Jean Baptist Point

Hungarian

Baker, Florence
Hoehnel, Ludwig von
Teleki, Samuel
Vambéry, Armin

Irish

Brendan, Saint
Finley, John
Kane, Paul
Work, John

Italian

Beltrami, Giacomo Costantino
Bressani, Francesco-Gioseppe
Carpini, Giovanni da Pian del
Conti, Niccolò di
Desideri, Ippolito
Marignolli, Giovanni de
Marsili, Luigi Ferdinando
John of Montecorvino
Odoric of Pordenone
Polo, Maffeo
Polo, Marco
Polo, Niccolò
Ricci, Matteo
Varthema, Ludovico di
Vivaldi, Ugolino

Middle Eastern/North African (Muslim)

Biruni, Abu Ar-Rayhan Muhammad ibn Ahmad al-
(Arabic) (Persian Empire)
Ibn Battutah, Abu Abd Allah Muhammad (Arabic)
(Morocco)

Ibn Fadlan, Ahmad (Baghdad)
 Ibn Hawqal, Abu al-Qasim ibn Ali al-Nasibi (Arabic)
 (Mesopotamia)
 Ibn Jubayr, Abu al-Hasan Muhammad (Valencia)
 Ibn Rusta, Abu Ali Ahmad (Arabic)
 Masudi, Abu al-Hasan Ali al- (Arabic) (Baghdad)
 Soleyman (Arabic) (Persian Gulf)

Norwegian

Borchgrevink, Carsten Egeberg
 Egede, Hans
 Heyerdahl, Thor

Peruvian

Godin des Odanais, Isabela

Polish

Strzelecki, Sir Paul Edmund

Polynesian

Kupe

Portuguese

Andrade, Antonio de (Portuguese or Spanish)
 Azevado, Francisco de (Portuguese or Spanish)
 Cabral, João
 Cacella, Estevão
 García, Alejo
 Lobo, Jerónimo
 Pinto, Fernão Mendes

Russian

Anabara, Semyon
 Bashmakov, Pyotr
 Roerich, Nikolay Konstantinovich
 Semyonov, Pyotr Petrovich
 Toll, Eduard von

Scandinavian (Viking)

Eiríksdóttir, Freydis
 Ericsson, Leif
 Ericsson, Thorvald
 Eric the Red
 Herjulfsson, Bjarni
 Karlsefni, Thorfinn
 Naddod
 Svarsson, Gardar

Spanish

Acosta, José de
 Andrade, Antonio de (Portuguese or Spanish)
 Azara, Félix de
 Azevado, Francisco de (Portuguese or Spanish)
 Beatus of Valcavado
 Benavides, Alonzo de
 Benjamin of Tudela
 Erauso, Catalina de
 Espejo, Antonio Estevan de
 Páez, Pedro
 Xavier, Francis

Swedish

Hedin, Sven Anders

Swiss

Bodmer, Karl
 Burckhardt, Johann Ludwig
 Eberhardt, Isabelle
 Kurz, Rudolph Friederich
 Piccard, Auguste
 Tschudi, Johann Jakob von
 Zurbriggen, Matthias

Turkish

Bar Sauma, Rabban
 Evliya, Çelebi

Appendix D

EXPLORERS IN CHRONOLOGICAL ORDER BY BIRTH DATE



Names are listed under century or, later, decade of birth, unless information is incomplete; incomplete dates, marked by asterisks, are listed at end of centuries, except B.C.

B.C.

Hannu (fl. 2750s)*
 Sargon (fl. 2340s–2300s)*
 Herkhuf (fl. 2270s)*
 Hatshepsut (1501–1479)
 Necho II (unknown–593)*
 Hecataeus of Miletus (fl. 520s–490s)*
 Scylax (fl. late 500s)*
 Herodotus (490–420)
 Himilco (fl. 480s)*
 Hanno (fl. 470s)*
 Xenophon (ca. 430–355)
 Ctesias of Cnidus (fl. 420s–410s)*
 Nearchus (ca. 360–312)
 Alexander the Great (356–323)
 Pytheas (fl. 320s)*
 Megasthenes (fl. 290s)*
 Eratosthenes (ca. 276–ca. 195)
 Hipparchus (ca. 190–ca. 120)
 Eudoxus (fl. 120s–110s)*
 Chang Ch'ien (unknown–ca. 107)*
 Caesar, Gaius Julius (100–44)

Strabo (ca. 63 B.C.–ca. A.D. 21)
 Gallus, Gaius Aelius (fl. 20s)*

A.D. 1–99

Pliny the Elder (ca. 23–79)
 Agricola, Gnaeus Julius (ca. 37–93)
 Ptolemy (ca. 90–ca. 150)
 Paulinus, Suetonius (unknown–ca. 70)*
 Hippalus (fl. 40s)*
 Diogenes (fl. 40s–50s)*
 Maternus, Julius (fl. 50s)*
 Kan Ying (fl. 90s)*

100–199

Wen-chi (fl. 190s)

300–399

Fa-hsien (319–414)

400–499

Brendan, Saint (ca. 484–ca. 578)

500–599

Indicopleustes, Cosmas (fl. 540s)*

600–699

Hsüan-tsang (ca. 600–664)

I-ching (634–ca. 700)

Arculf (fl. ca. 680s)*

700–799

Beatus of Valcavado (fl. 770s)*

Izmailov, Gerasim Alekseyevich (fl. 770s–790s)*

800–899

Soleyman (fl. 850s)*

Svarsson, Gardar (fl. 860s)*

Naddod (fl. 860s–870s)*

900–999

Eric the Red (ca. 950–1010)

Biruni, Abu ar-Rayhan Muhammad ibn Ahmad al- (973–1048)

Ericsson, Leif (ca. 975–ca. 1020)

Ibn Rusta, Abu Ali Ahmad (fl. 900s–920s)*

Ibn Fadlan, Ahmad (fl. 920s)*

Ibn Hawqal, Abu al-Qasim ibn Ali al-Nasibi (fl. 940s–970s)*

Masudi, Abu al-Hasan Ali al- (unknown–ca. 956)*

Kupe (fl. ca. 950)*

Herjulfsson, Bjarni (fl. 980s)*

1000–1099

Idrisi, Abu Abd Allah Muhammad ash-Sharif al- (ca. 1099–ca. 1165)

Ericsson, Thorvald (unknown–ca. 1007)*

Eiríksdóttir, Freydis (fl. 1010s)*

Karlsefni, Thorfinn (fl. 1010s)*

1100–1199

Ibn Jubayr, Abu al-Hasan Muhammad (1145–1217)

Ch'ang-ch'un (1148–1227)

Genghis Khan (ca. 1162–1227)

Yaqut al-Rumi, Shihab al-Din Abu Abd Allah (1179–1229)

Carpini, Giovanni da Pian del (1182–1252)

Benjamin of Tudela (unknown–1173)*

Pethahia of Regensburg (fl. 1180s–1190s)*

1200–1299

Hollywood, John (ca. 1200–ca. 1250)

William of Rubrouck (ca. 1215–ca. 1270)

Bar Sauma, Rabban (1220–1294)

John of Montecorvino (1247–1328)

Polo, Marco (1254–1324)

Odoric of Pordenone (ca. 1265–1331)

Chu Ssu-pen (1273–1337)

Marignolli, Giovanni de (ca. 1290–unknown)*

Polo, Maffeo (fl. 1260s–1290s)*

Polo, Niccolò (fl. 1260s–1290s)*

Vivaldi, Ugolino (fl. 1290s)*

1300–1399

Ibn Battutah, Abu Abd Allah Muhammad (1304–1378)

Cheng Ho (1371–1435)

Cabral, Gonçalo Velho (ca. 1386–ca. 1447)

Henry the Navigator (1394–1460)

Eannes, Gil (ca. 1395–ca. 1445)

Conti, Niccolò di (ca. 1395–1469)

Cresques, Abraham (fl. 1370s)*

1430–1439

Cadamosto, Alvise da (1432–1488)

Behaim, Martin (ca. 1436–ca. 1506)

1440–1449

Gomes, Diogo (ca. 1440–ca. 1482)

Pinzón, Martín Alonso (ca. 1441–1493)

Ávila, Pedro Arias de (ca. 1442–1531)

1450–1459

Cão, Diogo (ca. 1450–1486)

Cabot, John (ca. 1450–ca. 1499)

Dias, Bartolomeu (ca. 1450–1500)

Côrte-Real, Gaspar (ca. 1450–ca. 1501)

Almeida, Francisco de (1450–1510)

Columbus, Christopher (1451–1506)

Albuquerque, Afonso de (1453–1515)

Vespucci, Amerigo (1454–1512)

1460–1469

Côrte-Real, Miguel (ca. 1460–ca. 1502)

Cosa, Juan de la (ca. 1460–1510)

Ponce de León, Juan (ca. 1460–1521)

Gama, Vasco da (ca. 1460–1524)

Bastidas, Rodrigo de (1460–1526)

Covilhã, Pero da (ca. 1460–ca. 1530)

Pinzón, Francisco Martín (1462–1500)

Pinzón, Vicente Yáñez (1463–ca. 1523)

Pinzón, Arias Martín (1465–1510)

Ojeda, Alonso de (ca. 1465–ca. 1515)

Sequeira, Diego López de (ca. 1465–ca. 1520)

Velásquez, Diego (1465–1524)

Cabral, Pedro Álvarez (ca. 1467–ca. 1520)

Pires, Tomé (ca. 1468–ca. 1540)

1470–1479

Díaz de Solís, Juan (ca. 1470–1516)
 Varthema, Ludovico di (ca. 1470–ca. 1517)
 Waldseemüller, Martin (ca. 1470–ca. 1522)
 Núñez de Balboa, Vasco (ca. 1475–1519)
 Ayllón, Lucas Vázquez de (ca. 1475–1526)
 Fernández de Córdoba, Francisco (ca. 1475–ca. 1526)
 Niño, Andrés (1475–ca. 1530)
 Pizarro, Francisco (ca. 1475–1541)
 Cabot, Sebastian (ca. 1475–1557)
 Cano, Juan Sebastián del (ca. 1476–1526)
 Almagro, Diego de (ca. 1478–1538)
 Fernández de Oviedo y Valdez, Gonzalo (1478–1557)
 Pizarro, Hernando (ca. 1478–1578)
 Montejo y León, Francisco de (ca. 1479–ca. 1549)
 Benalcázar, Sebastián Moyano de (ca. 1479–1551)

1480–1489

Magellan, Ferdinand (ca. 1480–1521)
 Narváez, Pánfilo de (ca. 1480–ca. 1528)
 Ordaz, Diego de (1480–1535)
 Gomes, Estevão (ca. 1484–ca. 1538)
 Verrazano, Giovanni da (ca. 1485–ca. 1528)
 Alvarado, Pedro de (ca. 1485–1541)
 Cortés, Hernán (1485–1547)
 Leo Africanus (ca. 1485–ca. 1554)
 Mendoza, Pedro de (ca. 1487–1537)
 Grijalva, Juan de (ca. 1489–1527)

1490–1499

Donnaconna (ca. 1490–ca. 1539)
 Álvares, Francisco (ca. 1490–1540)
 Orellana, Francisco de (ca. 1490–ca. 1546)
 Mendoza, Antonio de (ca. 1490–1552)
 Cabeza de Vaca, Álvar Núñez (ca. 1490–ca. 1560)
 Pigafetta, Francesco Antonio (ca. 1491–ca. 1535)
 Cartier, Jacques (1491–1557)
 Díaz del Castillo, Bernal (ca. 1492–ca. 1584)
 Andagoya, Pascual de (ca. 1495–1548)
 Niza, Marcos de (ca. 1495–1558)
 Urdaneta, Andrés de (1498–1568)
 Soto, Hernando de (ca. 1499–1542)
 Ferrelo, Bartolomé (1499–1548)

1400–1499, INCOMPLETE

Clavijo, Ruy González de (unknown–1412)*
 Baldaya, Afonso Gonçalves (fl. 1430s)*
 Dias, Dinís (fl. 1440s)*
 Fernandes, Álvaro (fl. 1440s)*
 Tristão, Nuño (fl. 1440s)*
 Gomes, Fernão (fl. 1470s)*
 Guancanagari (fl. 1490s)*

1500–1509

Estevanico (ca. 1500–1539)
 Padilla, Juan de (ca. 1500–1542)
 Cabrillo, Juan Rodríguez (ca. 1500–1543)
 Valdivia, Pedro de (ca. 1500–1553)
 Roberval, Jean-François de la Roque de (ca. 1500–1561)
 Federmann, Nikolaus (1501–1542)
 Pizarro, Gonzalo (ca. 1506–1548)
 Xavier, Francis (1506–1552)
 Malinche (ca. 1508–1528)
 Montejo, Francisco de (1508–1565)
 Martínez de Irala, Domingo (ca. 1509–1557)
 Jiménez de Quesada, Gonzalo (ca. 1509–1579)
 Pinto, Fernão Mendes (1509–1583)

1510–1519

Coronado, Francisco Vázquez de (1510–1554)
 Aguirre, Lope de (ca. 1510–1561)
 Legazpi, Miguel López de (1510–1572)
 Hutten, Philip von (1511–1546)
 Mercator, Gerardus (1512–1594)
 Willoughby, Sir Hugh (ca. 1516–1554)
 Menéndez de Avilés, Pedro (1519–1574)

1520–1529

Chancellor, Richard (ca. 1520–1556)
 Ribault, Jean (ca. 1520–1565)
 Berrío, Antonio de (ca. 1520–1598)
 Borough, Stephen (1525–1584)
 Ursúa, Pedro de (ca. 1526–1561)
 Garay, Juan de (ca. 1528–1583)

1530–1539

Ibarra, Francisco de (ca. 1530–1575)
 Sarmiento de Gamboa, Pedro (ca. 1530–ca. 1592)
 Hawkins, Sir John (1532–1595)
 Frobisher, Sir Martin (ca. 1535–1594)
 Borough, William (1536–1599)
 Fuca, Juan de (1536–1602)
 Gilbert, Sir Humphrey (ca. 1537–1583)
 Acosta, José de (1539–1600)

1540–1549

Brunel, Olivier (ca. 1540–1585)
 Grenville, Sir Richard (1540–1591)
 Drake, Sir Francis (ca. 1540–1596)
 Houtman, Cornelius (ca. 1540–1599)
 Mendaña, Álvaro de (ca. 1541–1595)

1550–1559

Davis, John (ca. 1550–1605)
 Popham, George (ca. 1550–1608)

Fitch, Ralph (ca. 1550–1611)
 Hudson, Henry (ca. 1550–ca. 1611)
 Viscaíno, Sebastián (ca. 1550–ca. 1628)
 Oñate, Juan de (ca. 1550–ca. 1630)
 Ricci, Matteo (1552–1610)
 Hakluyt, Richard (ca. 1552–1616)
 Lancaster, Sir James (ca. 1554–1618)
 Raleigh, Sir Walter (ca. 1554–1618)

1560–1569

Harriot, Thomas (1560–1621)
 Arias de Saavedra, Hernando (1561–1634)
 Gões, Bento de (1562–1607)
 Linschoten, Jan Huyghen van (1563–1611)
 Adams, William (ca. 1564–1620)
 Páez, Pedro (1564–1622)
 Quirós, Pedro Fernández de (ca. 1565–1615)
 Le Maire, Jakob (ca. 1565–1616)
 Newport, Christopher (ca. 1565–1617)
 Sherley, Sir Anthony (ca. 1565–ca. 1635)
 Champlain, Samuel de (1567–1635)
 Noort, Oliver van (1568–ca. 1622)

1570–1579

Houtman, Frederik (1571–1627)
 Blaeu, Willem Janszoon (1571–1638)
 Gosnold, Bartholomew (ca. 1572–1607)
 Teixeira, Pedro de (1575–1640)
 Azevado, Francisco de (1578–1660)
 Munk, Jens Eriksen (1579–1628)

1580–1589

Squanto (ca. 1580–1622)
 Schouten, Willem Cornelis (ca. 1580–1625)
 Smith, John (ca. 1580–1631)
 Andrade, Antonio de (ca. 1580–1634)
 Roe, Sir Thomas (ca. 1581–1644)
 Baffin, William (ca. 1584–1622)
 Cacella, Estevão (1585–1630)
 Erauso, Catalina de (1585–1650)
 Foxe, Luke (1586–1635)

1590–1599

Brûlé, Étienne (ca. 1592–1633)
 James, Thomas (ca. 1593–ca. 1635)
 Brébeuf, Jean de (1593–1649)
 Lobo, Jerónimo (1593–1678)
 Winslow, Edward (1595–1655)
 Acuña, Cristóbal de (1597–ca. 1676)
 Nicolet, Jean (ca. 1598–1642)
 Cabral, João (ca. 1599–1669)

1500–1599, INCOMPLETE

Alarcón, Hernando de (1500–unknown)*
 João Fernandes (unknown–ca. 1501)*
 Almeida, Lourenço de (unknown–1508)*
 Nicuesa, Diego de (unknown–1511)*
 Fernández de Córdoba, Francisco (unknown–1518)*
 Álvarez de Pineda, Alonso (unknown–ca. 1519)*
 Serrano, Francisco (unknown–1521)*
 García, Alejo (unknown–ca. 1526)*
 Saavedra Cerón, Álvaro de (unknown–1529)*
 Pacheco, Duarte (unknown–ca. 1530)*
 Alfinger, Ambrosius (unknown–1533)*
 Ayolas, Juan de (unknown–ca. 1538)*
 Díaz, Melchor (unknown–1540)*
 Hohermuth von Speyer, Georg (unknown–1540)*
 Ulloa, Francisco de (unknown–ca. 1540)*
 Turk (unknown–1541)*
 Guzmán, Nuño Beltrán de (unknown–1544)*
 Gutierrez, Diego (unknown–1554)*
 Yermak (unknown–ca. 1584)*
 Newberry, John (unknown–ca. 1585)*
 Le Moyne de Morgues, Jacques (unknown–1588)*
 Barents, Willem (unknown–1597)*
 Rut, John (fl. 1520s)*
 Moscoso, Luis de (fl. 1530s–1540s)*
 López de Cárdenas, García (fl. 1540s)*
 Tovar, Pedro de (fl. 1540s)*
 Laudonnière, René Goulaine de (fl. 1560s)*
 Espejo, Antonio Estevan de (fl. 1580s)*
 White, John (fl. 1580s–1590s)*
 Cermenho, Sebastián Meléndez Rodríguez (fl. 1590s)*

1600–1609

Tasman, Abel Janszoon (ca. 1603–1659)
 Ménard, René (1604–1661)
 Le Moyne, Simon (1604–1665)
 Dezhnev, Semyon Ivanovich (ca. 1605–1672)
 Jogues, Isaac (1607–1646)
 Wood, Abraham (1608–ca. 1680)

1610–1619

Lalemant, Gabriel (1610–1649)
 Evliya, Çelebi (1611–1684)
 Bressani, Francesco-Gioseppe (1612–1672)
 Albanel, Charles (ca. 1613–1696)
 Chouart des Groseilliers, Médard
 (ca. 1618–ca. 1697)

1620–1629

Viale, Agostinho (ca. 1620–1667)
 Viele, Arnaud Cornelius (ca. 1620–1700)
 Orville, Albert d' (1621–1662)

Allouez, Claude-Jean (1622–1689)
 Grueber, Johann (1623–1680)
 Noué, Charles-Edouard de la (1624–1691)
 Hennepin, Louis (1626–ca. 1705)

1630–1639

Radisson, Pierre-Esprit (ca. 1630–1710)
 Niebuhr, Sigismund (1631–1699)
 Bruyas, Jacques (1635–1712)
 Dollier de Casson, François (1636–1701)
 Duluth, Daniel Greysolon (1636–1710)
 Marquette, Jacques (1637–1675)

1640–1649

León, Alonso de (ca. 1640–1691)
 Knight, James (ca. 1640–ca. 1721)
 La Salle, René-Robert Cavelier de (1643–1687)
 Perrot, Nicolas (ca. 1644–1717)
 Bréhan de Galinée, René de (ca. 1645–1678)
 Jolliet, Louis (1645–1700)
 Kino, Eusebio Francisco (ca. 1645–1711)
 Joutel, Henri (ca. 1645–ca. 1730)

1650–1659

Tonti, Henri de (ca. 1650–1704)
 Dampier, William (ca. 1651–1715)
 Kaempfer, Engelbrecht (1651–1716)
 Le Sueur, Pierre-Charles (ca. 1657–ca. 1705)
 La Mothe, Antoine Laumet de (1658–1730)
 Marsili, Luigi Ferdinando (1658–1730)
 Fritz, Samuel (ca. 1659–1725)
 Roggeveen, Jakob (1659–1729)

1660–1669

Le Moyne, Pierre (1661–1706)
 Fiennes, Celia (1662–1741)
 Rivera y Villalón, Pedro de (ca. 1664–1744)
 Lahontan, Louis-Armand de Lom d'Arce de (ca. 1666–1716)

1670–1679

Kelsey, Henry (ca. 1670–1729)
 Selkirk, Alexander (1676–1721)
 Spotswood, Alexander (1676–1740)
 St. Denis, Louis Juchereau de (1676–1744)
 Catesby, Mark (ca. 1679–1749)

1680–1689

Bourgmont, Étienne-Veniard de (1680–ca. 1730)
 Le Moyne, Jean-Baptiste (1680–1768)
 Bering, Vitus Jonassen (1681–1741)
 Charlevoix, Pierre-François-Xavier de (1682–1761)

Desideri, Ippolito (1684–1733)
 Messerschmidt, Daniel Gottlieb (1685–1735)
 La Vérendrye, Pierre Gaultier de Varennes de (1685–1749)
 Egede, Hans (1686–1758)

1690–1699

Weiser, Conrad (1696–1760)
 Anson, George (1697–1762)
 Anville, Jean-Baptiste Bourguignon d' (1697–1782)
 Bartram, John (1699–1777)

1600–1699, INCOMPLETE

Knight, John (unknown–ca. 1606)*
 Jenkinson, Anthony (unknown–1611)*
 Hall, James (unknown–1612)*
 Torres, Luis Váez de (unknown–ca. 1615)*
 Jourdain, John (unknown–1619)*
 Stevens, Thomas (unknown–1619)*
 Button, Sir Thomas (unknown–1634)*
 Llewellyn, Martin (unknown–1634)*
 Saris, John (unknown–1646)*
 Jourdain, Silvester (unknown–1650)*
 Stadukhin, Mikhail (unknown–1666)*
 Needham, James (unknown–1673)*
 Woodward, Henry (unknown–ca. 1686)*
 Batts, Thomas (unknown–1698)*
 Morozko, Luka (unknown–ca. 1699)*
 Jansz, Willem (fl. early 1600s)*
 Pring, Martin (fl. early 1600s)*
 Weymouth, George (fl. early 1600s)*
 Block, Adriaen (fl. 1610s)*
 Bylot, Robert (fl. 1610s)*
 Hartog, Dirk (fl. 1610s)*
 Benavides, Alonzo de (fl. 1620s)*
 Herbert, Thomas (fl. 1620s)*
 Thyssen, François (fl. 1620s)*
 Beketov, Pyotr (fl. 1620–1660s)*
 Popov, Fyodot Alekseyev (fl. 1640s)*
 Poyarkov, Vasily Danilovich (fl. 1640s)*
 Khabarov, Yerofey Pavlovich (fl. 1650s)*
 Lederer, John (fl. 1660s–1670s)*
 Arthur, Gabriel (fl. 1670s)*
 Fallam, Robert (fl. 1670s)*
 Aco, Michel (fl. 1680s–1690s)*
 Penha, Joseph de la (fl. 1680s–1690s)*

1700–1799

Mallet, Pierre-Antoine (1700–ca. 1751)
 Escandón, José de (1700–1770)
 Middleton, Christopher (ca. 1700–1770)
 La Condamine, Charles-Marie de (1701–1774)

Cresap, Thomas (ca. 1702–ca. 1790)
 Chirikov, Aleksey Ilyich (1703–1748)
 Bouvet de Lozier, Jean-Baptiste-Charles
 (1704–1786)
 Basov, Emelyan (ca. 1705–ca. 1765)
 Gist, Christopher (ca. 1706–1759)
 Steller, Georg Wilhelm (1709–1746)
 Gmelin, Johann Georg (1709–1755)
 Brosse, Charles de (1709–1777)

1710–1719

Carver, Jonathan (1710–1780)
 Krasheninnikov, Stepan Petrovich (1711–1755)
 Serra, Junípero (1713–1784)
 Walker, Thomas (1715–1794)
 La Vérendrye, Louis-Joseph Gaultier de (1717–1761)

1720–1729

Adair, James (ca. 1720–1783)
 Finley, John (1722–ca. 1769)
 Portolá, Gaspar de (ca. 1722–ca. 1784)
 Duclos-Guyot, Pierre-Nicolas (1722–1794)
 Byron, John (1723–1786)
 Laclede, Pierre Liguette (1724–1778)
 Pérez Hernández, Juan Josef (ca. 1725–1775)
 Commerson, Joseph-Philibert (1727–1773)
 Cook, James (1728–1779)
 Wallis, Samuel (1728–1795)
 Godin des Odanais, Isabela (1729–1792)
 Forster, Johann Reinhold (1729–1798)
 Bougainville, Louis-Antoine de (1729–1811)

1730–1739

Gore, John (1730–1790)
 Bruce, James (1730–1794)
 Rogers, Robert (1731–1795)
 Solander, Daniel Carl (1733–1782)
 Carteret, Philip (ca. 1733–1796)
 Niebuhr, Carsten (1733–1815)
 Kerguelen-Trémarec, Yves-Joseph de (1734–1797)
 Boone, Daniel (1734–1820)
 Furneaux, Tobias (1735–1781)
 Anza, Juan Bautista de (1735–1788)
 Matonabee (ca. 1736–1782)
 Gibault, Pierre (1737–1804)
 Smith, James (1737–1812)
 Garcés, Francisco Tomás Hermenegildo
 (1738–1781)
 Phillip, Arthur (1738–1814)
 Bruni, Antoine-Raymond-Joseph de (1739–1793)
 Bartram, William (1739–1823)
 Henry, Alexander (the elder) (1739–1824)

1740–1749

Houghton, Daniel (ca. 1740–1791)
 Baret, Jeanne (ca. 1740–ca. 1803)
 Domínguez, Francisco Atanasio (ca. 1740–1805)
 Pond, Peter (1740–1807)
 Clerke, Charles (1741–1779)
 Galaup, Jean-François de (1741–ca. 1788)
 Robertson, James (1742–1814)
 Cocking, Matthew (1743–1799)
 Banks, Sir Joseph (1743–1820)
 Thunberg, Carl Peter (1743–1828)
 Fleuriot de Langlé, Paul-Antoine-Marie (1744–1787)
 Bodega y Quadra, Juan Francisco de la
 (ca. 1744–1794)
 Escalante, Francisco Silvestre Vélez de (ca. 1745–1780)
 Hearne, Samuel (1745–1792)
 Sable, Jean Baptist Point (ca. 1745–1818)
 Bogle, George (1746–1781)
 Azara, Felix de (1746–1811)
 Vial, Pedro (ca. 1746–1814)
 Shelikov, Grigory Ivanovich (1747–1795)
 Baranov, Aleksandr Andreyevich (1747–1819)
 Sparrman, Anders (1747–1820)
 Huon de Kermadec, Jean-Michel (1748–1793)
 Truteau, Jean-Baptiste (1748–1827)
 Turner, Samuel (ca. 1749–1802)
 Dunbar, Sir William (1749–1810)
 Chouteau, René Auguste (1749–1829)

1750–1759

King, James (1750–1784)
 Dorion, Pierre, Sr. (ca. 1750–ca. 1820)
 Burney, James (1750–1821)
 Ledyard, John (1751–1789)
 Webber, John (1751–1793)
 Heceta, Bruno (1751–1807)
 Lacerda, Francisco de (1753–1798)
 Forster, Johann Georg Adam (1754–1794)
 Baudin, Thomas-Nicolas (1754–1803)
 Bligh, William (1754–1817)
 Gray, Robert (1755–1806)
 Malaspina, Alessandro (ca. 1755–1810)
 La Billardière, Jacques-Julien Houtou de (1755–1834)
 Kenton, Simon (1755–1836)
 Ferreira, Alexandre Rodrigues (1756–1815)
 Vancouver, George (1757–1798)
 Billings, Joseph (ca. 1758–1806)
 Charbonneau, Toussaint (ca. 1758–ca. 1840)
 Chouteau, Jean Pierre (1758–1849)

1760–1769

Bauer, Ferdinand Lucas (1760–1826)
 Scoresby, William, Sr. (1760–1829)

Riche, Claude-Antoine-Gaspard (1762–1797)
 Dubuque, Julien (1762–1810)
 Broughton, William Robert (1762–1821)
 Balmat, Jacques (1762–1834)
 Sarychev, Gavriil Andreyevich (1763–1831)
 Astor, John Jacob (1763–1848)
 Greenwood, Caleb (1763–1850)
 Mackenzie, Sir Alexander (1764–1820)
 Marsden, Samuel (1764–1838)
 Barrow, Sir John (1764–1848)
 Moorcroft, William (1765–1825)
 Rossel, Elisabeth-Paul-Edouard de (1765–1829)
 Fowler, Jacob (1765–1850)
 Perrin du Lac, François-Marie (1766–1824)
 Lesseps, Jean-Baptiste-Barthélemy de (1766–1834)
 Campbell, John (1766–ca. 1840)
 Menard, Antoine Pierre (1766–1844)
 Beauteemps-Beaupré, Charles-François (1766–1854)
 Bradbury, John (1768–1823)
 Fanning, Edmund (1769–1841)
 Humboldt, Alexander von (1769–1859)

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Drouillard, George (ca. 1770–1810)
 Clark, William (1770–1838)
 Krusenstern, Adam Ivan Ritter von (1770–1846)
 Thompson, David (1770–1857)
 Bass, George (1771–ca. 1803)
 Park, Mungo (1771–1806)
 Hornemann, Friedrich Conrad (1772–1801)
 Lisa, Manuel (1772–1820)
 Manning, Thomas (1772–1840)
 Lisiansky, Yury Fyodorovich (1773–1839)
 Brown, Robert (1773–1858)
 Lewis, Meriwether (1774–1809)
 Flinders, Matthew (1774–1814)
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 Colter, John (ca. 1775–1813)
 Rose, Edward (ca. 1775–ca. 1832)
 Henry, Andrew (ca. 1775–1833)
 Golovnin, Vasily Mikhailovich (1776–1831)
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 Ashley, William Henry (ca. 1778–1838)
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 Bellingshausen, Fabian Gottlieb Benjamin von
 (1778–1852)
 Blaxland, Gregory (1778–1853)
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Freycinet, Louis-Claude de Saulces de
 (1779–1842)
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Glass, Hugh (ca. 1780–1833)
 Jörgenson, Jörgen (1780–1841)
 Chamisso de Boncourt, Louis-Charles-Adélaïde
 (1781–1836)
 Westall, William (1781–1850)
 Hearsey, Hyder Jung (1782–1840)
 Atkinson, Henry (1782–1842)
 Hunt, Wilson Price (ca. 1782–1842)
 Bougainville, Hyacinthe-Yves-Philippe Potentien de
 (1782–1846)
 Provost, Étienne (1782–1850)
 Burchell, William John (ca. 1782–1863)
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 Oxley, John Joseph William Molesworth
 (ca. 1783–1828)
 Leavenworth, Henry (1783–1834)
 Mackenzie, Donald (1783–1851)
 Ross, Alexander (1783–1856)
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 Sacajawea (ca. 1784–1812)
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 Ritchie, Joseph (ca. 1788–1819)
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 Lazarev, Mikhail Petrovich (1788–1851)
 Dease, Peter Warren (1788–1863)
 Jusseume, René (ca. 1789–ca. 1830)
 Gaudichaud-Beaupré, Charles (1789–1854)
 Pottinger, Sir Henry (1789–1856)

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Oudney, Walter (1790–1824)
 Dumont d'Urville, Jules-Sébastien-César (1790–1842)
 Pilcher, Joshua (1790–1843)
 Buchan, David (1790–1845)
 Arago, Jacques (1790–1855)
 Parry, Sir William Edward (1790–1855)
 Becknell, William (ca. 1790–1865)
 Everest, Sir George (1790–1866)
 Quoy, Jean-René-Constant (1790–1869)
 Wentworth, William Charles (1790–1872)
 Cunningham, Allan (1791–1839)
 Young, Ewing (ca. 1792–1841)
 Mitchell, Sir Thomas Livingstone (1792–1855)
 Simpson, Sir George (ca. 1792–1860)
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 Franklin, Jane (1792–1875)
 Clyman, James (1792–1881)
 Laing, Alexander Gordon (1793–1826)
 Eschscholtz, Johann Friedrich (1793–1831)
 King, Philip Parker (1793–1856)
 Dupetit-Thouars, Abel-Aubert (1793–1864)
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 Lesson, René-Primevère (1794–1849)
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 Davion, Albert (unknown–1726)*
 Bakhov, Ivan (unknown–1762)*
 Moor, William (unknown–1765)*
 Krenitsyn, Pyotr Kuzmich (unknown–1770)*
 Croghan, George (unknown–1782)*
 Auribeau, Alexandre Hesmiv d' (unknown–1794)*
 Anabara, Semyon (fl. 1710s)*
 Bukhgofts, Ivan Dmitriyevich (fl. 1710s)*
 La Harpe, Jean-Baptiste Bénard de (fl. 1710s)*
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 Bashmakov, Pyotr (fl. 1750s)*
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 Spruce, Richard (1817–1893)
 Hooker, Sir Joseph Dalton (1817–1911)
 Kennedy, Edmund (1818–1848)
 Kern, Benjamin Jordan (1818–1849)
 Kurz, Rudolph Friederich (1818–1871)
 Beckwith, Edward Griffin (1818–1881)
 Tschudi, Johann Jakob von (1818–1889)
 Baker, James (1818–1898)
 Vavasour, Mervin (1819–1866)
 Warre, Henry James (1819–1898)
 Gregory, Sir Augustus Charles (1819–1905)
 McClintock, Sir Francis Leopold (1819–1907)

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Kane, Elisha Kent (1820–1857)
 Abert, James William (1820–1871)
 Rebmann, Johann (1820–1876)
 Reynolds, William Franklin (1820–1894)
 Kern, Richard Hovendon (1821–1853)
 Burke, Robert O'Hara (ca. 1821–1861)
 Livingstone, Mary Moffat (1821–1862)
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 Hall, Charles Francis (1821–1871)
 Gregory, Francis Thomas (1821–1888)
 Burton, Sir Richard Francis (1821–1890)
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Doudart de Lagrée, Ernest-Marc-Louis de Gonzague
(1823–1868)

Hind, Henry Youle (1823–1908)

Wallace, Alfred Russel (1823–1913)

Baikie, William Balfour (1825–1864)

Landsborough, William (1825–1886)

Bates, Henry Walter (1825–1892)

Mouhot, Henri (1826–1861)

Singh, Nain (ca. 1826–1882)

Palgrave, William Gifford (1826–1888)

Speke, John Hanning (1827–1864)

Grant, James Augustus (1827–1892)

Parke, John Grubb (1827–1900)

Moreno, Francisco (1827–ca. 1905)

Semyonov, Pyotr Petrovich (1827–1914)

Ives, Joseph Christmas (1828–1868)

Stanley, David Sloan (1828–1902)

Schlagintweit, Adolf von (1829–1857)

Hayden, Ferdinand Vandeveer (1829–1887)

Dupuis, Jean (1829–1912)

1830–1839

Thomson, Sir Charles Wyville (1830–1882)

Dallman, Eduard (1830–1896)

Rohlf's, Friedrich Gerhard (1831–1896)

Du Chaillu, Paul Belloni (ca. 1831–1903)

Bishop, Isabella Lucy Bird (1831–1904)

Nares, Sir George Strong (1831–1915)

Abbott, Henry Larcom (1831–1927)

Flatters, Paul-Xavier (1832–1881)

Hayes, Isaac Israel (1832–1881)

Nordenskjöld, Nils Adolf Erik (1832–1901)

Langford, Nathaniel Pitt (1832–1911)

Vambéry, Armin (1832–1913)

Mazuchelli, Elizabeth Sarah (1832–1914)

Schlagintweit, Robert von (1833–1885)

Richthofen, Ferdinand Paul Wilhelm von
(1833–1905)

Wills, William John (1834–1861)

Nachtigal, Gustav (1834–1885)

Powell, John Wesley (1834–1902)

Bozeman, John Merin (1835–1867)

Giles, Ernest (1835–1897)

Cheadle, Walter Butler (1835–1919)

Schweinfurth, Georg August (1836–1925)

Koldewey, Karl Christian (1837–1908)

Blunt, Anne Isabella (1837–1917)

Weyprecht, Karl (1838–1881)

Muir, John (1838–1914)

Tinné, Alexandrine Petronella Francina (1839–1869)

Garnier, Marie-Joseph-François (1839–1873)

Milton, William-Wentworth Fitzwilliam
(1839–1877)

Cooper, Thomas Thornville (1839–1878)

Przhevalsky, Nikolay Mikhailovich (1839–1888)

1840–1849

Duveyrier, Henri (1840–1892)

Emin Pasha, Mehmed (1840–1892)

Junker, Wilhelm Johann (1840–1892)

Whymper, Edward (1840–1911)

Blunt, Wilfrid Scawen (1840–1922)

Musters, George Chaworth (1841–1879)

Stanley, Sir Henry Morton (1841–1904)

Baker, Florence (ca. 1841–1918)

Gosse, William Christie (1842–1881)

King, Clarence (1842–1901)

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Teleki, Samuel (1845–1916)

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Crevaux, Jules-Nicolas (1847–1882)

Forrest, John (1847–1918)

Pavie, Auguste-Jean-Marie (1847–1925)

Sheldon, May French (1847–1936)

Lenz, Oskar (1848–1925)

Schwatka, Frederick (1849–1892)

Forrest, Alexander (1849–1901)

Grenfell, George (1849–1906)

1850–1859

Foureau, Fernand (1850–1914)

Peck, Annie Smith (1850–1935)

Bent, James Theodore (1852–1897)

Brazza, Pierre-Paul-François-Camille Savorgnan de
(1852–1905)

Bernier, Joseph Elzéar (1852–1934)

Stein, Sir Marc Aurel (1852–1943)

Wissmann, Hermann von (1853–1905)

Andrée, Salomon August (1854–1897)

Taylor, Annie Royle (1855–ca. 1909)

Sverdrup, Otto Neumann (1855–1930)

Zurbriggen, Matthias (1856–1917)

Peary, Robert Edwin (1856–1920)

Binger, Louis-Gustave (1856–1936)

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 Allen, Henry Tureman (1859–1930)

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 Nansen, Fridtjof (1861–1930)
 Shirase, Nobu (1861–1946)
 Kingsley, Mary Henrietta (1862–1900)
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 Bonin, Charles (1865–1929)
 Cook, Frederick Albert (1865–1940)
 Drygalski, Erich Dagobert von (1865–1949)
 Hedin, Sven Anders (1865–1952)
 Gerlache de Gomery, Adrien-Victor-Joseph de
 (1866–1934)
 Henson, Matthew Alexander (1866–1955)
 Bruce, William Spiers (1867–1921)
 Fawcett, Percy Harrison (1867–ca. 1925)
 Charcot, Jean-Baptiste-Étienne-Auguste
 (1867–1936)
 Sykes, Sir Percy Molesworth (1867–1945)
 Scott, Robert Falcon (1868–1912)
 Bell, Gertrude Margaret Lowthian (1868–1926)
 David-Néel, Alexandra (1868–1969)
 Nordenskjöld, Nils Otto Gustaf (1869–1928)

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Mylius-Erichsen, Ludwig (1872–1907)
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 Begichev, Nikifor Alekseyevich (1874–1927)
 Roerich, Nikolay Konstantinovich (1874–1947)
 Adams, Harriet Chalmers (1875–1937)
 Bingham, Hiram (1875–1956)
 Rice, Alexander Hamilton (1875–1956)
 Akeley, Delia Denning (1875–1970)
 Eberhardt, Isabelle (1877–1904)
 Filchner, Wilhelm (1877–1957)
 Beebe, Charles William (1877–1962)

Rasmussen, Knud Johan Victor (1879–1933)
 Stefansson, Vilhjalmur (1879–1962)

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Wegener, Alfred Lothar (1880–1930)
 Ellsworth, Lincoln (1880–1951)
 Mawson, Sir Douglas (1882–1958)
 Piccard, Auguste (1884–1962)
 Philby, Harry St. John Bridger (1885–1960)
 Nobile, Umberto (1885–1980)
 Mallory, George Herbert Leigh (1886–1924)
 Akeley, Mary Leonore Jobe (1886–1966)
 Boyd, Louise Arner (1887–1972)
 Lawrence, Thomas Edward (1888–1935)
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 Wilkins, Sir George Hubert (1888–1958)

1890–1899

Schmidt, Otto Y. (1891–1956)
 Thomas, Bertram Sydney (1892–1950)
 Stark, Freya Madeline (1893–1993)

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 Dorion, Pierre, Jr. (unknown–1814)*
 Henry, Alexander (the younger) (unknown–1814)*
 Freeman, Thomas (unknown–1821)*
 Pascoe, William (unknown–1833)*
 Wellsted, James (unknown–1836)*
 Jackson, David E. (unknown–1837)*
 Fraeb, Henry (unknown–1841)*
 Basargin, Grigory Gavrilovich (unknown–1853)*
 McLeod, William C. (unknown–1880)*
 Bombay, Sidi (unknown–1885)*
 Baptista, Pedro João (fl. early 1800s)*
 Sadlier, George Foster (fl. 1810s)*
 Atkinson, Lucy (fl. 1820s–1860s)*
 Glazunov, Andrey (fl. 1830s–1840s)*
 Williams, William (fl. 1830s–1840s)*
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Courtauld, Augustine (1904–1959)
 Watkins, Henry George (1907–1932)
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Cousteau, Jacques-Yves (1910–1997)
 Thesiger, Wilfred Patrick (1910–)
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 Hillary, Sir Edmund Percival (1919–)
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Glenn, John Herschell, Jr. (1921–)
Piccard, Jacques Ernest-Jean (1922–)
Shepard, Alan Bartlett, Jr. (1923–1998)
Singh, Kishen (unknown–1921)

1930–1939

Armstrong, Neil Alden (1930–)
White, Edward Higgins, II (1930–1967)

Gagarin, Yury Alekseyevich (1934–1968)
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For Dylan Sikelianos . . . with his exploring mind
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For Frieda C. Hall, Eloise Cunningham,
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Preface



The term *exploration* comprises the concepts of traveling and seeking. *Discovery*, a term associated with exploration, refers to “finding.” But the latter term has often been misused. One cannot “find” or “discover” a land that is already inhabited. But one can “discover” knowledge of that land and take it back to one’s place of origin and pass on that knowledge. The history of exploration can therefore be characterized as the record of the diffusion of knowledge. The knowledge most relevant to exploration is geographic; how the world came to be mapped is thus central to chronicling exploration. In exploratory expeditions, information passes back and forth between continents and between cultures, affecting the realities both of the exploring and of the explored.

People have participated in exploration for a variety of reasons over the ages. Two basic human traits—curiosity and the desire for personal accomplishment—must be taken into account in all types of exploration. More specific motives include geographic and scientific inquiry, seeking a new homeland, conquest and/or colonization, commerce and profit, religious zeal, finding others who have gone missing, and searching for new literary or artistic themes. Those who explore come from diverse social and vocational backgrounds, among them, navigators, sailors, soldiers, officials, diplomats, colonists, missionaries, religious scholars, merchants, hunters, fur trappers, whalers, sealers, pirates, guides, interpreters, tribal leaders, cartographers, writers, painters, naturalists, geologists, historians, archaeologists, oceanographers, astronomers, aviators, astronauts, and mountain climbers. Some individuals contributed to exploration by promoting, organizing, and financing expeditions or by making technological breakthroughs, although they themselves may not have ventured far from their homelands.

Explorers lead fascinating, driven lives, and the stories of their expeditions are filled with adventure and danger. Many individuals have died in the pursuit of their dreams. Some have inflicted death, either directly or indirectly, on fellow explorers and especially on indigenous peoples. It can be said that explorers are at the head of the historical curve, the forerunners of good or bad. It also can be said that exploration is the starting point of many historical and cultural themes.

The explorers and the particular expeditions discussed in this work are only part of the story of exploration. Many more individuals have a role in the exploring and charting of the Earth and, in recent decades, outer space.



Map of the world by John Speed (1626) (Library of Congress)

The general topics examined and the terms defined offer some context to the field of exploration, but it is important to remember that the scope of the story of exploration includes the entire historical record, and its sphere of action encompasses the entire world and the solar system. So, in chronicling exploration, particular time periods, cultures, activities, and technologies are given great weight. But one should perceive exploration as a single window into humankind's larger journey through time.

Volume I of the *Encyclopedia of Exploration* presents biographical entries about explorers, organized alphabetically. Volume II, also organized alphabetically, presents various subjects related to exploration: types of exploration, activities relating to exploration, groupings of peoples known for exploration, historical periods, organizations, legends, places, routes, natural phenomena, cartographic terms, oceanographic equipment, navigational tools, and crafts used in transportation.

In the biographical entries of Volume I, expeditions are more likely to be described in detail than in Volume II's entries. At the beginning of each biographical entry can be found the following: alternate names and spellings of names, birth and death dates (when known), nationality (and, if different, the country for whom explorations were carried out), occupations, places of the

world explored, and familial relationships to other explorers with entries. After an opening discussion of the individual's background, there follows a description of his or her career in exploration and, if applicable, voyages and routes. Each entry closes with a summary of the person's accomplishments and his or her broader relevance to the history of exploration.

Some of the entries in Volume II provide overviews of historical or geographic information; others are definitions of terms relating to exploration. Geographic terms include continents, regions, islands, capes, oceans, straits, mountain ranges, mountains, mountain passes, deserts, rivers, cities, and routes. In addition to the obvious choices for geographic entries on continents and oceans, which provide overviews, some places have been selected as entries because they generated many expeditions or are central to periods of exploratory history. It should be kept in mind that other such places without their own entries have fascinating stories of exploration attached to them; many such stories can be found in Volume I (see the cumulative index).

Cross-references, indicated by a term set in SMALL CAPITAL letters the first time it appears in an entry, are meant to guide a reader/researcher through the complex material in both volumes. The cross-references run across both volumes; the reader should remember to look for entries on people in Volume I and all other entries in Volume II. A reader should understand that for the sake of convenience, not all terms that are discussed in entries in Volume II are presented as cross-references. For example, the terms *Africa* and *Atlantic Ocean* are mentioned in passing throughout the book, yet their entries appear as "Africa, exploration of" or "Atlantic Ocean, exploration of the" and are not necessarily cross-referenced. It is unlikely that a reader will choose to look up Africa for a general discussion of its geography and exploration every time the term relates peripherally to an entry. But the reader should know that Volume II includes overview entries of every continent, as well as the Arctic region and the Atlantic, Pacific, and Indian Oceans. More-specific places that have their own entries, such as the Himalayas and the Mississippi River, are cross-referenced. Certain terms, such as *colonization*, are not cross-referenced since the heading might appear as "colonization and exploration." A glance at the appendices organized by categories or the List of Entries for Volume II will help clarify questions of organization. Each volume also lists all the entries in both volumes in the "List of Entries" in the front matter.

Appendices in Volume I include a list of explorers with entries organized by region explored (with some names listed more than once, plus a section on cartographers, geographers, and sponsors where relevant); a list of explorers with entries organized chronologically by birth date; a list of explorers with entries organized by sponsoring country, or, when no sponsoring nation can be cited, by nationality or native land; and a list of explorers with entries organized by most relevant occupation. Appendices in Volume II include a chronology based on the explorations of all the individuals in Volume I, a general bibliography, and the already mentioned list of the entries organized by categories. Each volume contains a general index of the material in that volume.

Maps are essential tools in studies of exploration. The photographs of period maps that accompany some of the entries in both volumes offer a glimpse of the evolving cartographic view of the world. Original maps in an appendix in Volume II serve to illustrate the subject matter. A bibliography, in which books are listed by geographic and other general groupings, is provided to encourage and facilitate additional study of the vast and fascinating subject matter.

Acknowledgments



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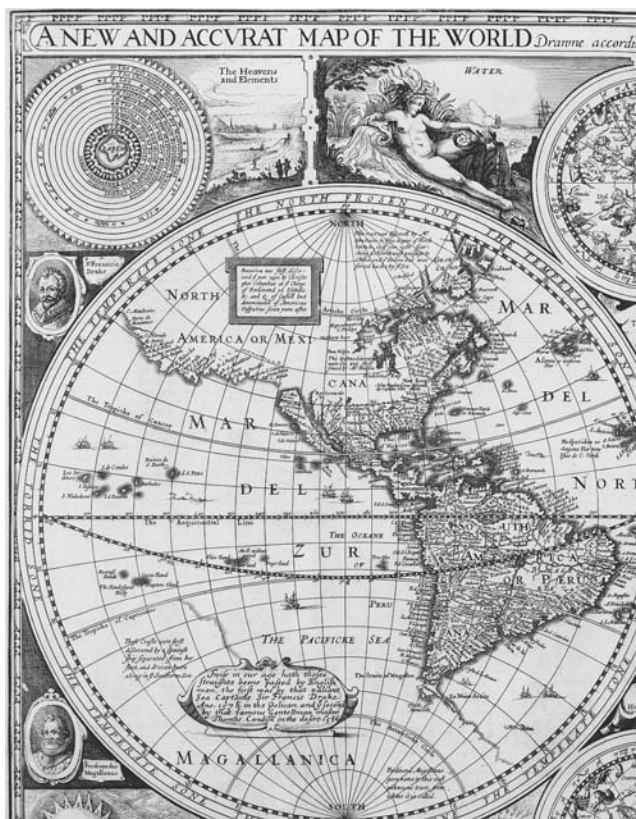
Aconcagua

Aconcagua is a peak in the ANDES MOUNTAINS of western Argentina, near the border with Chile. At 22,834 feet above sea level, it is the highest mountain in South America and in the Western Hemisphere. Fourteen other peaks in the Andes are more than 20,000 feet above sea level and taller than Mount McKinley (see MCKINLEY, MOUNT), the highest peak in North America, at 20,320 feet.

In 1897, Italian mountaineer MATTHIAS ZURBRIGGEN first reached Aconcagua's snowcapped summit by the north face. His British companions, Edward Fitzgerald and Stuart Vines, had abandoned the climb because of altitude sickness. The Englishman EDWARD WHYMPER summited Aconcagua soon afterward. Being the tallest peak in the Americas—taller than Ojos del Salado by 295 feet—Aconcagua has represented a special challenge in the history of MOUNTAIN CLIMBING.

aerial photography

Aerial photography involves taking photographs from aircraft or spacecraft. It is used in mapmaking; studying weather, wildlife, agriculture, urban areas, road systems, and pollution; and locating mineral resources and archaeological ruins. Yet another application is military surveillance and documenting events, such as disasters. The related term *aerial survey* refers to the study of Earth's surface using photographic or other images from aircraft. The term *photogrammetry* refers to the science of making measurements and maps from photographs.



Sometime in the early 20th century, this photographer, apparently hanging from a crane, attempted to obtain an aerial view. (Library of Congress, Prints and Photographs Division [LC-USZ62-61731])

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Early aerial photography, starting in the mid-19th century, was conducted from a kite or a BALLOON. Along with advancements in aviation and SPACE EXPLORATION in the 20th century came those in aerial photography. Aerial photography, in conjunction with computers, is especially effective in the making of topographic maps and has allowed for the accurate mapping of most of Earth's surface. Aerial photography has also been used to map the surface of the Moon and other planets and to record geological data.

See also AVIATION AND EXPLORATION; GEOGRAPHY AND CARTOGRAPHY; MAPS AND CHARTS; PHOTOGRAPHY AND EXPLORATION; SURVEYING AND EXPLORATION.

Africa, exploration of

Africa, the second-largest continent after Asia, covers some 11,677,000 square miles, including its adjacent islands, and makes up almost one-quarter of the world's total land area. It is bounded by the Atlantic Ocean on the west and south; the Indian Ocean and RED SEA on the east; and the MEDITERRANEAN SEA on the north. It lies in both the Northern and Southern Hemispheres, with the EQUATOR running through it. The largest island is Madagascar off the southeast coast in the Indian Ocean.

The African coastline has few indentations, and the coastal plain is generally narrow except on the Mediterranean. The continent consists mostly of a rolling plateau with an average height of some 2,000 feet above sea level. Mountain ranges include the Atlas Mountains in the northwest, the Ruwenzori Mountains in the east, and the Drakensberg Mountains in the southeast. The High Veld, an arid plateau, covers much of South Africa. The Eastern Highlands, with an average height of more than 5,000 feet, are the highest portion of Africa; Mount Kilimanjaro (see KILIMANJARO, MOUNT), the continent's tallest peak, is part of them.

Major rivers include the NILE RIVER in the north, the CONGO RIVER (Zaire River) in equatorial Africa, the NIGER RIVER in the west, and the ZAMBEZI RIVER in the southwest. The largest lakes in eastern central Africa—Lakes Albert, George, Tanganyika, Rudolph, and Victoria—feed the Nile or the Congo. Lake Nyasa in the southeast has an outlet to the Zambezi. Lake Chad in northern central Africa has no outlet but, since it is fed by many streams, remains fresh.

Although mostly in the Tropics, Africa has a variety of climates. Arid regions include the SAHARA DESERT and the Kalahari Desert in the south. Open savannas flank the arid regions. In the western equatorial regions, where there is an abundance of rainfall, can be found dense jungle.

Africa's animal life can be separated into two zones: that in the north, including the Sahara Desert, and the sub-Saharan zone. The northern area has animals similar to those in Europe, such as deer, sheep, hare, and fox. It is south of

the Sahara that the large African mammals are found, such as the elephant, rhinoceros, giraffe, zebra, lion, leopard, cheetah, hyena, baboon, and gorilla.

Some 3,000 ethnic groups have been identified in Africa, speaking more than 1,000 languages. The indigenous Negroid peoples were hunter-gatherers, often organized in villages or tribes. Some of these tribes developed into powerful kingdoms. The most powerful and wide-ranging African people in ancient times were the Egyptians, who farmed along the Nile Valley and delta. North of the Sahara, the aboriginal groups came to be replaced by Arabic peoples migrating from the east and Berbers, a non-Arabic people thought to be from the eastern Mediterranean region. In other parts of Africa many different peoples established powerful kingdoms, such as the kingdoms of Ghana in the fifth century, Mali in the 13th and 14th centuries, and Songhai in the 15th and 16th centuries, all in West Africa. In the 19th century, the Fulani were dominant in the western Sudan, and the Zulu in South Africa.

The exploration of North Africa's coastal areas, separated from Europe by the 36-mile-wide Strait of Gibraltar (see GIBRALTAR, STRAIT OF) in the northwest and actually linked to Asia by the Sinai Peninsula in the northeast, is part of the story of the entire Mediterranean region, with extensive contacts among ancient peoples. In the 15th century, during the EUROPEAN AGE OF EXPLORATION, other coastal areas became charted. Yet much of Africa's interior remained a mystery to other than indigenous peoples until the late 19th century, leading to Africa being known historically as the "Dark Continent."

Ancient Exploration and Migration

Africa holds a special place in the story of humankind since the earliest human life has been traced to there. Moreover, one of the first written languages was developed in North Africa in Egypt in about 6000 B.C., and the wheel was invented there 3,000 years later. HANNU, the first individual explorer known to history, from relief carvings with hieroglyphic text, was from Egypt. In about 2750 B.C., Hannu, sent by Pharaoh Sahure, journeyed 400 miles by way of the Nile River south to the land of PUNT, which extended beyond the southern end of the Red Sea. Even then, Punt was already a center of trade. Hannu arranged for a ship to be built there, then returned home to Egypt and to the king, who had sponsored his trip, bearing gold, silver, myrrh, and ebony (see EGYPTIAN EXPLORATION).

Another early journey of the ancient Egyptians dates to about 2270 B.C., when HERKHUF, a governor in the southern part of Egypt, traveled the Nile to explore central East Africa and trade for the luxury goods that Egypt could not produce itself. Seven centuries later, in about 1492 B.C., the Egyptian queen HATSEPSUT commissioned a trading expedition to the land of Punt. The ancient Egyptians also traded

with the Minoans of the island of Crete. Minoan pottery dating from about 2000 B.C. has been found in Egypt, indicating Minoan voyages along Africa's north coast (see MINOAN EXPLORATION). As for the ancient Greeks, it is known that, by the seventh century B.C., they had established an outpost in the Egyptian port city of Naucratis on the Nile's delta (see GREEK EXPLORATION). Over the next several centuries, the shifting course of the Nile and the ascendancy of the city of Alexandria led to the decline of Naucratis as both a colony and a trading post. There is some evidence to suggest the Greeks were familiar with areas farther west on the north coast of Africa as well. In the mythological *Odyssey*, for example, Homer refers to the "Lotus Eaters." Lotus grows in and is eaten on the Tripoli coast.

Other early voyages to Africa were undertaken by Phoenicians from the eastern Mediterranean, their homeland located roughly where Lebanon is today (see PHOENICIAN EXPLORATION). Known as wide-ranging mariners and traders, as well as colonizers, by the sixth century B.C., they controlled much of Africa's north shore. They also reportedly ventured much farther. In the writings of fifth-century Greek historian HERODOTUS appears an account of a journey commissioned in about 600 B.C. by Pharaoh NECHO II of Egypt. The expedition reportedly traveled down the Red Sea, around the African continent, through the Pillars of Hercules (the modern Strait of Gibraltar), and along the north coast until they arrived home. The crew went ashore to grow provisions, and the trip was said to have lasted three years. Not only does the length of the journey make sense but so do their observations on the relative position of the Sun. Furthermore, the winds and OCEAN CURRENTS would have been favorable for an east-to-west circumnavigation as described by Herodotus. Other ancient explorers reportedly had tried and failed to circumnavigate Africa in the opposite direction, from west to east. In about 485 B.C., a Persian nobleman named Sastapes attempted to atone for a crime by such a journey; his failure to do so resulted in his execution. In the latter part of the second century B.C., Greek EUDOXUS of Cyzicus disappeared during an attempt to sail around Africa from the west.

The fifth-century B.C. Carthaginian HANNO, from the city of Carthage, founded by the Phoenicians near present-day Tunis, was another ancient explorer of Africa. According to his account, as passed down in Greek translation, in about 470 B.C., he commanded 60 GALLEY ships carrying some 30,000 Carthaginians on a mission to establish cities along the West African coast. At present-day Mehdia, Morocco, Hanno founded the city of Thymiaterium. At Cape Cantin, he built a temple to Poseidon, Greek god of the sea. The Carthaginians encountered elephants farther down the coast, passed the Sahara Desert, and went on to establish another colony on what is probably the modern island of Herne. In all, Hanno founded seven cities and is thought to

have voyaged as far south as modern-day Sierra Leone (see CARTHAGINIAN EXPLORATION).

One of the earliest accounts of an expedition to Africa's interior comes from the Greek DIOGENES of the first century A.D. A merchant trading along the east shore of Africa, he claims to have been caught in a storm. Unable to control his direction for 25 days, he eventually managed to land ashore at what is now Dar es Salaam, Tanzania. Diogenes traveled from there into the interior, where he saw two great lakes (probably Lake Victoria and Lake Albert) and snow-covered mountains (probably the Ruwenzori Range), which the second-century PTOLEMY, from the North African city of Alexandria, referred to as the MOUNTAINS OF THE MOON.

The Romans had more extensive contacts with Africa than did the Greeks, in their case through conquest rather than commerce (see ROMAN EXPLORATION). At the conclusion of the three Punic Wars (which ended in 146 B.C. with the burning of Carthage), Rome assumed Carthage's dominance over its territories along much of the Mediterranean. They then consolidated their power by trading with and exacting tribute from conquered peoples. Many of the most significant forays by the Romans into Africa took place during the Augustan Age (48 B.C. to A.D. 68). In 31 B.C., Octavian defeated Marc Antony and Cleopatra and incorporated Egypt into the Roman Empire. In A.D. 29, Petronius led a military campaign to the upper Nile to quell tribal infighting and to assert control in Ethiopia. In A.D. 42, SUE-TONIUS PAULINUS crossed the Atlas Mountains on the northwest coast and explored the fringes of the Sahara. A Roman military expedition of A.D. 61–63 may have gone farther down the Nile than any other previous European trip did, returning with a variety of goods. At its peak in the second century A.D., the Roman Empire controlled the entire North African coast bordered by the Mediterranean, from Egypt to the land just beyond the Strait of Gibraltar, modern-day Morocco.

The first evidence of the movement of peoples in the equatorial regions of Africa dates to the first century A.D. In their drive to dominate the lower portion of the continent, the Bantu-speaking peoples pushed the Mbuti and the San cultures away from the Benue River Valley of modern-day Nigeria. This is the time period when villages developed into powerful political units, such as the kingdoms of Monomotapa and Kongo. Written records are scarce, and knowledge must be reconstructed from ethnographic studies and archaeological findings, but there is little doubt that these migrations and conquests helped shape the present-day ethnic composition and distribution on the African continent.

The Spread of Islam

The next great chapter in the exploration of Africa began with the establishment of Islam in A.D. 622 by the Prophet

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Muhammad and continued into the 1300s (see MUSLIM EXPLORATION). The breakup of the Roman Empire by the fifth century had left North Africa vulnerable to conquest. By A.D. 641, the Muslims had taken control of Egypt and begun their trek along the north coast. By the eighth century, they had invaded Morocco. Their zeal came partly from the promise of paradise after death (if death came in the service of Allah), but there is no doubt the missionaries also were spurred on by the prospect of trade. Although Arabs gained control of the lands around Ethiopia, the established Christian communities within that enclave resisted conversion and became isolated. The Arabs introduced camels (and methodical breeding methods) into the Sudan Desert, and they reinvigorated trading routes, increasing trade between Arabia, Egypt, and the Sudan. Islam also expanded into Turkey, Persia, India, and beyond while retaining its foothold in northern Africa.

Increased traffic by mariners along the African coast and the large number of caravans traversing the desert solidified the Arab hold on African trade. Africa had been a source of slaves through ancient times, and the Muslims joined in this trade. Other commodities that proved economically viable to the Arabs included gold and ivory. Salt was so highly valued that it was traded for gold. A source of gold was the western kingdom of Mali. In 1324, after the mansa (or ruler) of Mali, Mansa Musa, an Islamic convert, had made his pilgrimage to Mecca, he gave away so much of the precious metal he caused its value to decrease by 25 percent in Egypt. The Arabs and their fellow Muslims, the Moors of North Africa (who also, from 711 to 1492, held territory on the Iberian Peninsula), had a monopoly on the gold trade. Although they jealously guarded their routes, they faced increasing challenges from Europeans.

One of the great unifying forces of Islam is the obligation of the faithful to make a pilgrimage to the holy city of Mecca in what is now western Saudi Arabia at least once during their lifetime. This Islamic tenet thus broke down barriers of world travel and helped create a cosmopolitan culture. Two Arab travelers known to history, from the 10th century, are historian ABU AL-HASAN ALI AL-MASUDI, who visited Islamic cities in North Africa; and merchant and scholar ABU AL-QASIM IBN ALI AL-NASIBI IBN HAWQAL, who reportedly traveled across the Sahara Desert. ABU ABD ALLAH MUHAMMAD IBN BATTUTAH, active in the 14th century, is the most renowned of all Muslim travelers. Born in Tangier in 1304, by the time of his death in 1378, he may have been the most widely traveled person to that date, covering an estimated 75,000 miles, including all the regions where Islam was practiced. Traveling overland along Africa's north coast, Ibn Battutah made his pilgrimage to the Holy Land in 1325. After studying in Mecca for three years, he visited the port cities on the east coast of Africa. In

1352–53, he made an excursion to Mali, which was then at the height of its powers, and he wrote a detailed account of the trip, *Rihla*, published in 1357.

LEO AFRICANUS was another widely traveled Arab. In the early 16th century, as a diplomat in the service of the sultan of Morocco, he visited countries in North and central Africa. An English edition of his writings on Africa, now commonly known as *Description of Africa*, published in 1600, became the primary source for information on lands south of the Sahara in the Sudan and the city of TIMBUKTU.

Early Portuguese Expeditions

HENRY THE NAVIGATOR, prince of Portugal, was born in 1394, 17 years after King Fernando I had begun intensive efforts to enhance Portuguese trading enterprises. Among other achievements, that king had developed an innovative form of maritime insurance and had distributed free lumber for the production of any ships over 100 tons. Before he was 20, the young prince had helped capture the Moroccan city of Ceuta; by the time he was 26, Henry had been named Grand Master of the Order of Christ, a neo-Crusader group sponsored by the pope. His association with the Order of Christ aided two of Henry's goals: It gave him the opportunity to advance religious conversion (all Henry's ships bore sails with red crosses), and it provided him with funds to finance further explorations.

Henry established a school of navigation and geographic research at Sagres, and he set to work gathering information on the seas beyond his homeland (see NAVIGATION AND EXPLORATION). The school had strict policies on secrecy, and violators faced death. This interest in secrecy was born in nationalism; the Portuguese thought they needed to control their hard-won knowledge if they were to compete with other, more powerful European nations. Records of some expeditions were entirely destroyed by the Portuguese, and data on others remains known only to a small academic community to this day.

Prince Henry faced both physical barriers and psychological barriers in persuading his sailors to explore the unknown reaches of the west coast of Africa. To the medieval mind, Europe was a temperate land placed between the eternal cold of the north and the intense heat of the south, where the Sun came so close to Earth that the sea was at a continuous boil. These boiling waters of the middle were considered an impenetrable barrier to the lands of the Southern Hemisphere. In fact, the West African coast off the Sahara was dubbed the "Green Sea of Darkness" by the Arabs. The currents struck the shore in a manner very dangerous to ships, and the wind-borne sand of the desert often decreased visibility.

By the 14th century, the existence of the CANARY ISLANDS, 70 miles from Africa's northwest coast, was well known. Among the first accomplishments of Henry's

mariners was the discovery in 1418 of the Madeira Islands to the northwest of the Canaries, much farther out to sea. The founding of his school and these early expeditions can be considered the start of the European age of exploration.

A major goal of the Portuguese of this period was to sail beyond Cape Bojador—the “Bulging Cape”—located on a particularly dangerous stretch of coast on what is now Western Sahara, and then known to Arabs as Abu Khatar, “the father of danger.” Henry recruited an international crew of experienced seamen and sent them off. It took at least 14 attempts before the Portuguese navigator GIL EANNES finally succeeded in 1434. The fact that the “Green Sea of Darkness” could be navigated reinvigorated Prince Henry’s naval academy, and Eannes was sent out again. This time he landed at a bay where he saw tracks of humans and camels. In 1435, AFONSO GONÇALVES BALDAYA traveled even farther, encountering native people, who injured one of his crew. Baldaya retreated, then continued to an area south of the TROPIC OF CANCER, to the north of Cape Blanco. In 1441, NUÑO TRISTÃO reached Cape Blanco.

In 1443, Prince Henry obtained special dispensations from the pope, including the exclusive right to sail past Cape Bojador. Determined to beat back the Muslims, bring Christianity to pagan tribes, and establish direct links with the gold trade, Henry sponsored even more ambitious maritime expeditions. Another dream of his was to locate PRESTER JOHN, a legendary Christian ruler whose name had endured for centuries as possibly sympathetic to European interests in Asia and Africa.

In 1444, Nuño Tristão reached the Senegal River Delta, the green part of Africa beyond the barren desert coastline. It was there that Muslim power ended and tribal cultures held sway. In 1444–45, DINÍS DIAS reached the westernmost point of Africa and named it Cape Verde. It was during this period that the Portuguese entered the institutionalized SLAVE TRADE. Slave ships would begin frequenting these coastal areas.

One of the first interior journeys of this period, in 1455, was made by the Venetian ALVISE DA CADAMOSTO. Prince Henry commissioned him to explore the trade routes that wound through Mauritania. In Mauritania, silver and copper were exchanged for slaves and gold from farther inland, and salt was traded for gold. When he sailed even farther south, to the mouth of the Gambia River, Cadamosto became one of the first Europeans to see the Southern Cross, a constellation not visible from the Northern Hemisphere. The next year, on a subsequent expedition, Cadamosto reached an island group directly to the west of Cape Verde, to which he gave the same name.

The last significant Portuguese journey under Prince Henry’s sponsorship took place in 1458, when DIOGO GOMES traveled up the Gambia River. He met a king interested in Christianity, obtained some gold, and learned about

gold mines in Sierra Leone. This trip resulted in an influx of Portuguese missionaries and brought new life to the hope of profitable commercial ventures in Africa.

By the time of Prince Henry’s death in 1460, Portuguese explorers had reached as far south as Sierra Leone. The next Portuguese explorer of note was FERNÃO GOMES, who was granted exclusive trading rights along the coast of Guinea by King Alfonso in 1469. The contract was a privilege of unknown value, and it was up to Gomes to make it lucrative. But sailing south of the Gambia River below Cape Verde proved difficult. For five years, Gomes tried to explore the coastline south of Africa’s western bulge. He encountered intense winds, tornadoes, and unpredictable fog, and his attempts to land were hampered by heavy surf and the shallow coastal waters of the continental shelf. Although Gomes succeeded in describing the south coast of Africa’s bulge, his contract with the king was not renewed.

The Portuguese success in Africa led other European countries to challenge Portugal’s monopoly there. The 1470s saw incursions into Africa by the English, the Flemish, and, most vexing of all to the Portuguese, the Spanish. In 1479, after losing a war with Spain, Portugal negotiated the Treaty of Alcacovas, which allowed it to retain its possessions in Africa. Portugal soon moved to assert control of its territories by building factory-fortresses, facilities where ships were repaired and resupplied and trade goods gathered from the African interior were stored for shipment back home. Among the most important of these were Elmina, located just east of Cape Three Points on the Gold Coast, and Gato, built in Benin. These ports soon became profitable centers where gold, ivory, pepper, and palm oil changed hands. These ports also were associated with such frightening diseases as malaria, and they inspired one of Europe’s enduring nicknames for Africa: “the white man’s grave.”

The next significant travels by the Portuguese were credited to DIOGO CÃO, sponsored by King John I, in 1482 and 1485. A member of Prince Henry’s retinue, Cão had studied at Henry’s school at Sagres and was an experienced seaman by the time he was given command of these two expeditions. Sailing farther down the coast in the Southern Hemisphere than any before him, he came upon the mouth of the Congo River. He sent a small group of men up the river, where he hoped to make contact with Prester John and to acquire gold. Cão continued sailing southward while the men traveled inland. He found Africa to be larger than imagined and, after traveling 500 miles beyond the Congo, decided to backtrack. He returned to the river but could not find his men. Instead, he took several princes from the region back with him to Portugal, where they were well treated. On the follow-up trip in 1485, the African princes were returned home, and Cão recovered his men. He then traveled even farther down the coast, giving subsequent

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explorers an idea of the great distances involved in sailing around the continent.

Because of rumors of a Christian ruler in the interior, interest in the fabled Prester John was once again revived. Under the auspices of King John II, a delegation of two was formed to try to locate him. PERO DA COVILHÃ would travel first to the Arab lands, then to India, and finally back to Africa, while Afonso de Pavia, an Arabic speaker from the Canary Islands, would scout in Ethiopia. While traveling through Egypt, disguised as Muslims, they arrived in Suakin, Sudan's main port. Pavia disappeared there; Covilhã sailed on to India. Upon his return to Africa, Covilhã made his way to Ethiopia in 1493, where he was detained by a ruler—a Coptic Christian, but not the legendary figure Prester John. Twenty-seven years later, a Portuguese official reported seeing Covilhã there, apparently living comfortably.

Around the Cape of Good Hope

Even in the 1400s, it was still unclear to Europeans whether Africa was entirely surrounded by water. Earlier geographers had speculated the southern part of the continent might be connected to another large landmass, possibly the GREAT SOUTHERN CONTINENT, or Terra Australis. However, the dream of a sea route to the SPICE ISLANDS (the Moluccas) of the East, bypassing Arab merchants controlling the trade—a possibility envisioned by Henry the Navigator—remained extremely alluring.

In 1487, the experienced mariner BARTOLOMEU DIAS set out with three ships to find the southernmost point of Africa and possibly a route to India. By early January 1488, Dias and his crew found themselves in inhospitable southern waters. After being battered about, they eventually made land at Mossel Bay, an inlet of the Indian Ocean, then continued on to the Great Fish River. At that point, his men became restless and persuaded him to turn back. On the return trip, observing a cape and taking notice of the readings in his logbook, Dias realized he had rounded the southern tip of Africa. He set up a marker at the CAPE OF GOOD HOPE, claimed the land for Portugal, and returned to Lisbon in December 1488.

Instability between Portugal and the recently united lands of Aragon and Castile (Spain) delayed the next voyage by several years. In 1494, King John II of Portugal signed the Treaty of Tordesillas with Spain, securing (at least on paper) the rights for the sea lane to India. John died the following year and was succeeded by Manuel I. King Manuel I selected VASCO DA GAMA, a high-ranking naval officer and member of the royal staff, to establish ties with the rulers of the Orient. Da Gama decided the expedition needed larger vessels than those used by Dias if the men were to successfully round the tip and make the long journey.

The expedition of four ships set sail in July 1497. After the first leg of the journey, they spent a week in the Cape

Verde Islands taking on fresh supplies and repairing damage to their ships. Next, to avoid the DOLDRUMS at the equator, the explorers cut a wide circular path southward, away from the coastline. In early November, they made landfall at Mossel Bay. The expedition had been on the open ocean for 96 days, a new record for Europeans. The ships then stayed closer to shore, meeting and exchanging small items with the native peoples. The winds and the weather made it slow going, and then SCURVY struck. The disease was not well understood at the time, and da Gama advised his men to cut out their sores with a knife. Many died during this part of the journey. In February 1498, they landed at Mozambique and took on much-needed fresh food. The Portuguese were now in Arab territory. They continued on to the port of Malindi in present-day Kenya, an active trading hub, where the visitors were well received and where they hired a Moor to guide them to India, their final destination. After waiting for the monsoon winds to become favorable, the fleet set out across the Indian Ocean and reached the west coast of India in May. Unfortunately for the Europeans, the experienced merchants in Calicut, the trading center on the Malabar Coast, were uninterested in the goods they had brought to trade. After trying unsuccessfully for three months to establish an outpost, da Gama and his entourage eventually gave up and set sail across the Indian Ocean in August.

The winds were not so favorable on this leg of the trip. Scurvy killed another 30 sailors, and it was only with luck that they made it back to Malindi. They then abandoned one of the ships, continued down the east coast of Africa, reaching the Cape of Good Hope in March 1499 and making it back to Portugal in September 1499. Da Gama and his remaining crew were warmly welcomed, not only because they had succeeded at reaching (and returning from) India, but also because they could offer a rough picture of Africa's east coast.

King Manuel I did not wait to take advantage of the route his country had been seeking for nearly a century. The next year, 1500, he sent out a fleet of 13 ships under the command of PEDRO ÁLVARS CABRAL. After traveling farther west than instructed (there is some debate about whether this detour was deliberate), Cabral reached the continent of South America, becoming the first European to land in Brazil, which he duly claimed for Portugal. In any case, Cabral continued on and came upon stormy weather at the Cape of Good Hope. Four ships were lost, including one with Bartolomeu Dias, who had sighted and identified the southernmost tip of Africa a dozen years earlier. Making several stops on the way, the remaining ships landed in Calicut, India. Again, the Portuguese were rebuffed in their efforts to trade with Arab merchants, and a post they established was attacked. In response, Cabral destroyed Arab trading vessels and bombarded Calicut. Farther south at the

port of Cochin, he did manage to secure a cargo of spices before returning home to Portugal. Trade had been opened with the East, but so had warfare. The Portuguese then turned their attention to applying their naval power to establish their dominance in the Spice Islands and their interest in Africa waned.

The Growing Slave Trade

European exploration and colony building on the other side of the world fostered interest in the African slave trade. The Europeans looked to Africa for cheap labor for their newly established plantations and mines in the WEST INDIES and the Americas. Beginning in the 1560s, the English and French began to raid Portuguese slave ships; after Portugal was sufficiently weakened, other European countries established their own “legitimate” trading posts on the African coast. SIR JOHN HAWKINS, an Englishman, was one of the early innovators of the slave trade. In 1562, he took a shipload of slaves from Sierra Leone to the island of Hispaniola (present-day Haiti and the Dominican Republic), where he traded them for sugar and other goods. He then set sail for England, thus inaugurating the infamous triangular trade. In the last two decades of the 16th century, Queen Elizabeth I chartered a number of companies to do business on the African coast from the Mediterranean to Sierra Leone. The Dutch established their first outpost in 1612 in Guinea. Other European nations built trading centers in Africa throughout the 1600s, and the African slave trade continued for centuries.

The Challenge of the Interior

When it comes to understanding the subsequent exploration of interior Africa, it is instructive to recall the formidable barriers facing the Europeans. The vast Sahara Desert, spreading over 3.3 million square miles, covered almost all of northern Africa, extending 3,000 miles west to east and between 800 and 1,200 miles north to south. The temperature could vary by 80 degrees over a 12-hour period, and water was scarce. Travelers needed to know where the next oasis could be found, and they needed to know which foods and clothes were appropriate. Arab explorers, accustomed to a similar climate in the Middle East, had the advantage over Europeans. In addition, because Muslims in the Sahara were hostile to Europeans, European visitors were forced to disguise themselves as Muslims to travel in the region.

Africa’s tropical regions imposed another set of hardships on Europeans. The heat and humidity demanded new approaches to dress and equipment, and the dense vegetation made clearing trails for exploratory expeditions (which typically included soldiers, native guides, porters, and pack animals) quite difficult. Most devastating of all, the African climate provided fertile breeding grounds for insects harboring diseases new to Europeans. These included yellow

fever, encephalitis (sleeping sickness), and the dreaded malaria. It was not until the second half of the 19th century that Europeans learned to use quinine and mosquito netting to manage this often fatal disease. Moreover, the tsetse fly carried a protozoan that was destructive to the native livestock used to carry supplies, and frequently all the animals on an expedition would succumb to it (see DISEASE AND EXPLORATION).

The fact that much of Africa is located on a plateau did not make traveling any easier. While it is true the rivers wound their way from the highlands to the sea, they did not provide easy access to the continent’s interior. As many explorers discovered, the rivers and their environs could be maddening barriers. The Falls, or Cataracts of Aswan, presented a challenge to would-be explorers of the Nile. The Nile also clogged with sudd (literally, “obstruction” in Arabic), large masses of rotting vegetation floating downstream. The Niger River proved just as confounding. Europeans were familiar with certain inland portions of that 2,600-mile river, but locating its outlet proved difficult. In fact, the Niger empties into a vast delta region, a swamp where it is nearly impossible to discern the direction of the current. The Congo River could be navigated from its mouth, but, after 100 miles, it formed a long stretch of falls known as the “Cauldron of Hell,” where boats smashed on its rocks or were sucked into whirlpools. The Zambezi River was particularly uninviting at its mouth, where the pounding surf and swirling coastal waters created shifting sandbars. Upstream, explorers faced dangerous rapids and waterfalls.

Europeans also faced resistance from aboriginal peoples. Africans had been victimized by Arabs for millennia and were naturally suspicious of outsiders. The prejudices of Europeans, along with their guns and diseases (especially smallpox), confirmed native peoples’ suspicions.

After the sea route to the Spice Islands was established in 1500, European exploration of Africa’s interior slowed for more than 150 years. The exception to this was Catholic missionaries. In the early 1600s, the Spanish Jesuit PEDRO PÁEZ was active in Ethiopia and searched for the source of the Nile, while other Jesuits explored parts of present-day Zimbabwe and Angola.

Mysteries of Africa

During the 18th century, the concept of the “noble savage” came into vogue in Europe, and the British became fascinated with Africa, not for economic reasons, but out of intellectual curiosity. Much of the credit for this new enthusiasm belongs to JAMES BRUCE. A Scotsman who grew up in England, Bruce headed to Africa in 1768 with the goal of resolving the mystery of the source of the Nile. He and his assistant, Italian artist Luigi Balugani, traveled from Alexandria to Aswan, where the presence of hostile tribes caused them to head eastward across the desert to the Red

Sea. They then took a boat down the Red Sea to Ethiopia. The pair then resumed their inland trek to the Ethiopian capital of Gondar, where Bruce earned royal favor by instituting sanitary measures that helped stem an outbreak of smallpox at the palace. In late 1770, he left Gondar, moving northwestward until he came upon the Springs of Geesh emerging from underground streams. He mistakenly took this to be the source of the Nile and named it the Fountains of the Nile. In fact, he had located the source of the Blue Nile, a principal tributary of the Nile. Bruce returned home in 1774, where his findings were received skeptically. Nonetheless, he was elected a fellow of the ROYAL SOCIETY, England's oldest scientific organization, and his five-volume work, *Travels to Discover the Source of the Nile*, was praised.

In June 1788, nine members of an exclusive dining club in London founded the Association for Promoting the Discovery of the Interior Parts of Africa, which is better known as the AFRICAN ASSOCIATION. The leader of the organization, SIR JOSEPH BANKS, had excellent exploration credentials: He was then president of the Royal Society, and he had been a naturalist on JAMES COOK's first expedition. The questions that most interested members of the African Association concerned Timbuktu and the nearby Niger River. Timbuktu, the locus of trade for the kingdom of Mali, had been described in writings centuries earlier, but no European had ever seen it. The Niger captured the imagination because neither the source nor the outlet of that long river were known.

That year, 1788, the African Association soon dispatched two explorers. American JOHN LEDYARD was sent to travel westward from Cairo, and Englishman Simon Lucas was directed to begin his journey in Tripoli and head southward across the Sahara. Both trips relied on the spirit of the travelers, since the gentry of the African Association were parsimonious with their resources. Unfortunately, spirit could not make up for the lack of planning and modest size of these expeditions. Ledyard took ill and died in Cairo. Regional conflicts waging several hundred miles south of Tripoli forced Lucas into an early retreat. These initial failures mobilized the African Association to change its approach, and the group decided to avoid Muslim-controlled territory whenever possible.

The first expedition under their sponsorship to explore new territory was made by British army officer DANIEL HOUGHTON in 1790. Houghton began his journey at the mouth of the Gambia, which he took upstream for more than a hundred miles. He then crossed overland to the Senegal River. At this point, he was taken into the desert, robbed, and killed, but the reports that came back to his sponsors suggested he had penetrated the region farther than had any European before him. Information he had gathered on the Niger also helped subsequent explorers.

The Niger River and Timbuktu

MUNGO PARK, a Scottish surgeon, was the African Association's next recruit. The adventure-loving Park had acquired navigational skills on a trip to Sumatra while in the employ of the BRITISH EAST INDIA COMPANY. In May 1795, he began retracing Houghton's footsteps in search of the Niger. Despite resistance from Moors, who controlled this region, as well as local African tribes, he successfully traveled eastward and reached the Niger River at Segou in July 1795. He became the first European to see the Niger that far inland, which he described as "broad as the Thames at Westminster." He also noted that the Niger flowed eastward. Continuing in his mission to find Timbuktu, Park again followed the river into lands controlled by Moors. In August 1796, he was robbed of everything he had, including his clothes. In Silla, only 400 miles shy of his goal, but lacking supplies, Mungo Park turned back. After nearly a year, the explorer arrived at the mouth of the Gambia, where he boarded a vessel bound for America. In South Carolina, he secured passage on a ship to England, where he landed in December 1797.

Park had been gone for two and a half years and had been given up for dead, so his reappearance was greeted with delight by the British public. Two years later, his book, *Travels in the Interior Parts of Africa*, became a best-seller. Park married, had children, and opened a medical practice in Scotland. He also set to work developing a theory on the course of the Niger. Integrating his personal experiences and geographic knowledge with ideas from fellow Scotsman George Maxwell, Mungo surmised the Niger River first flows east for a distance, then turns south and then, farther on, turns southwest. Park's hypothesis was correct, although he would perish before proving it.

In an effort to test his theory, Park, with some help from the British government, put together a large expedition consisting of carpenters, soldiers, and sailors, many of whom were convicts who were to receive pardons upon the completion of the expedition. They were unable to induce any native people to accompany them as they made their way up the Gambia in March 1805. At the town of Kayee, they found and hired Issaco, an English-speaking guide who proved invaluable. Nonetheless, as they traveled east, the rainy season, disease, and an attack by the Moors took their toll. By the time the expedition made it to the Niger, only 10 of the original 40 men were still alive. Finally arriving in Segou, the group came into contact with unfriendly tribesmen, and Park's brother-in-law succumbed to illness. Issaco was sent back to the coast with the news in November 1805, and Park and the remaining members of his expedition set sail, never to be heard from again. In 1808, Issaco agreed to retrace their journey and attempt to learn what had become of the expedition. According to his reports, Park had suffered continual assaults along the course of the river but

had managed to add 1,500 miles to the trek. His travels ended at the Bussa Rapids (now covered by Lake Kainji), where he and his group were overcome and killed by tribesmen. There was no physical evidence to support Issaco's accounts, but even if the final leg of the trip had been shorter, Park would still be counted one of the great pioneers in the history of African exploration.

British naval officer HUGH CLAPPERTON continued the European efforts to master the Niger River. As part of the Bornu Mission of 1821–25, sponsored by the British government, Clapperton, together with WALTER OUDNEY and DIXON DENHAM, pioneered the use of Tripoli as a staging area for African exploration. Although their primary objective was to study the Niger, the Bornu Mission covered a great deal of other territory. Traveling south and west across the Sahara, the expedition first investigated the Ahaggar Mountains. In February 1823, they made the European discovery of Lake Chad. The following year, on his way to the Niger, Clapperton reached the city of Sokoto, where slave traders prevented him from further exploration. He returned to England by traveling back through the Sahara, then mounted a second expedition later the same year, 1825. This time he made the approach from the Bight of Benin in the south. This new route led him to the Niger River at Bussa. He then explored inland, revisiting Sokoto, where he died from illness in 1827.

Clapperton had been accompanied on his last journey by RICHARD LEMON LANDER. Together with his brother John, Lander traveled to Bussa in 1830. They first traveled 100 miles up the Niger River and then began a dangerous CANOE trip down it. They followed the river to its outlet, a swampy delta with no discernible flow. Although Richard Lander was then held captive by native peoples of the delta until a large ransom was paid, he had determined the exact mouth of the Niger River. Four years later, Lander was attacked and killed on a trading mission up the Niger.

Meanwhile, in 1825, ALEXANDER GORDON LAING, a Scottish-born British army officer, was sent to make contact with the ancient city of Timbuktu. Laing followed Clapperton's route from Tripoli on the north coast of Africa and crossed the Sahara Desert. Attacked and severely wounded just outside Timbuktu, he pressed on, becoming the first European known to reach that city. After spending a month there, he headed home but was murdered en route, probably by Tuareg tribesmen. Although Laing had reached Timbuktu in 1826, reports of his visit did not reach Europe until two years after his death.

Its remote location and centuries of strong Muslim control had made Timbuktu more legendary than real to Europeans, and rumors of the city captured the European imagination. Frenchman RENÉ-AUGUSTE CAILLIÉ learned Arabic, studied Islam, and disguised himself as an Egyptian who had been held captive in France in order to make

his way there in 1828. His ruse gave him safe passage through various lands, and he spent two weeks in Timbuktu before returning home, disappointed by the humble state of the city. His compatriots had difficulty accepting his accounts.

In 1830, the ROYAL GEOGRAPHICAL SOCIETY was founded in England by SIR JOHN BARROW and others. The next year, it merged with the African Association. The European exploration of Africa would continue, with much of the activity British-sponsored.

Southern Africa

Of all the lands of Africa, the countryside and climate most familiar to the European were those in South Africa. During the centuries that the major European powers had been preoccupied with trade, the southernmost region of Africa was viewed as a way station for the repair and resupply of ships. To do this effectively meant persuading farmers and craftspeople to establish settlements there, but the chartered companies who needed the way station were slow to invest. Finally, in 1657, with their colony on the verge of failure, the DUTCH EAST INDIA COMPANY worked out a plan allowing their settlers to own land in exchange for provisioning ships. These Dutch and French settlers came to be known as the Boers (literally "farmers" in Dutch). Once the Boers were permitted to own land, they enslaved the native Hottentots, claiming this was justified—even a divine right—according to their Calvinist religion. The Boers then proceeded to use native slave labor to create farms and establish cattle herds, and they developed their own subculture, including their own language, Afrikaans. In 1806, after the Napoleonic Wars, Britain assumed control of the Boer territory. Twenty-seven years later, in 1833, Britain outlawed slavery in its colonies. This, combined with the British move to physically circumscribe Boer lands, resulted in rebellion. Between 1835 and 1843, more than 10,000 Boers left the cape and headed northward in what came to be known as the Great Trek. During these years, the Boers defeated the Bantu-speaking Zulus in a series of battles, and they went on to establish more settlements.

Scotsman DAVID LIVINGSTONE arrived on the continent in 1841, a few years after these battles. A strict Presbyterian with some medical training, Livingstone came to Africa as a missionary. After arriving at the Kuruman mission on the southern border of the Kalahari Desert, Livingstone established his own outpost among the Kwena at Kolobengto to the northeast. Considerable tension existed between Livingstone and the Boers: He strongly disapproved of their slavery, and the Boers destroyed his house, threatened his friends, and pushed him north. By 1842, he had traveled farther north into the treacherous Kalahari region than any other European to date, and he had learned a great deal about local languages and customs.

Livingstone began his first true journeys of exploration in 1849, when he moved north across the Kalahari Desert in search of new territory to conduct his missionary activities and influence politics. That year, accompanied by British sportsman William Oswell, he made the European discovery of Lake Ngami. Two years later, this time accompanied by his wife, MARY MOFFAT LIVINGSTONE, daughter of the British missionaries to Africa, ROBERT MOFFAT and MARY MOFFAT, he made a second crossing of the Kalahari and reached a tributary of the upper Zambezi River. Livingstone received recognition and money from the British Royal Geographical Society for having reached Lake Ngami, and he began his lifelong association with that group.

In November 1853, Livingstone began the first known European crossing of the southern portion of Africa from west to east. Starting from Linyanti, the capital of the Makololo kingdom, he followed the Upper Zambezi north and then west to the port of Luanda on the Atlantic Ocean. The expedition traversed more than 1,500 miles of uncharted land over six months, but it was a very difficult trip, with food in short supply and fever plaguing the members of the party, including Livingstone. Livingstone was impressed, however, with the friendliness of many of the tribes he encountered. After a three-month rest in Luanda, he headed eastward in fall 1854. A year later, he was back in Linyanti, again beset by fever. However, he pressed on, again heading east. In November 1855, on the Zambezi River, Livingstone made the European discovery of what he named Victoria Falls. He then crossed the Kafue and Luangwa tributaries and ended his journey near the mouth of the Quelimane River in May 1856. In December 1856, Livingstone returned to England, where he was lauded as the new hero of African exploration. Accounts of his travels were instant best-sellers, and his missionary zeal at public appearances inspired future explorers.

In 1858, Livingstone and his family returned to Africa. Outfitted with a paddle-wheel steamer named the *Ma-Robert* (in honor of Livingstone's wife, mother of Robert), the well-equipped expedition, sponsored by the British government, began investigating the Zambezi River. They were halted at the Quebrabasa Rapids but continued their explorations on the Shire River, another Zambezi tributary. In 1859, accompanied by the naturalist John Kirk, Livingstone traveled overland and made the European discovery of Lake Nyasa (present-day Lake Malawi). The next goal was the exploration of the Ruvuma River, east of Lake Nyasa. In 1862, while on the Zambezi, his wife succumbed to tropical fever. With his basic work on the Zambezi completed, Livingstone again returned to England to rest.

Source of the Nile

Other explorers meanwhile had been continuing the search for the source of the Nile. The well-traveled Englishman

SIR RICHARD FRANCIS BURTON and a former soldier in the British army, JOHN HANNING SPEKE, commissioned by the Royal Geographical Society, set about the task in 1856 with a new approach. Instead of following the river from its mouth, which had been done many times in the previous century, they used reports of lakes to the south to estimate the location of its source and then traveled inland from the east coast. After becoming the first Europeans to see Lake Tanganyika, the world's longest freshwater lake, and visiting Ujiji in spring 1858, they headed back to the coast. While Burton was recovering from illness in Tabora, Speke struck out on his own and made the European discovery of Lake Victoria, Africa's largest freshwater lake. Although he had little evidence, Speke declared this to be the source of the Nile. Burton and Speke had never been close, and their relationship rapidly deteriorated after Speke's claim, which Burton disputed. Speke returned to England before Burton, telling of his findings and igniting a controversy.

Speke's flimsy evidence necessitated another expedition. In 1860, Speke, accompanied by JAMES AUGUSTUS GRANT, retraced his path and returned to Lake Victoria. In July 1862, after traveling along the lake's shores, they discovered where the Nile left the lake and named it Ripon Falls. The men followed this outlet, the Victoria Nile, as far as Lake Kyoga, but left the river before seeing it connect with Lake Albert. This gap in information perpetuated the controversy. Speke did not live to be proven correct. On the eve of an 1864 debate over the Nile with his former partner Burton, he was killed in a hunting accident. It fell to the British couple SIR SAMUEL WHITE BAKER and FLORENCE BAKER to describe the river's course between the Victoria Nile and the Albert Nile, after they completed their own expedition in 1865.

While David Livingstone is most closely associated with the Zambezi River, his disciple, Anglo-American journalist SIR HENRY MORTON STANLEY, is linked to the Congo, as both explorer and developer. Livingstone's final years in Africa, from 1866 to 1873, involved a number of journeys around the lakes north of the Zambezi River. He was interested in describing their relationships with the major rivers, particularly the Nile. In April 1867, he reached Lake Tanganyika. Despite recurring bouts of illness, Livingstone continued exploring and came upon Lake Mweru in November 1867. In July 1868, he made the European discovery of Lake Bangweulu, a reservoir between the Chambezi and Lualaba Rivers, which form the Upper Congo. He next visited Ujiji, a center of the slave trade on the east shores of Lake Tanganyika, which reenergized his commitment to eradicate such trafficking. In November 1871, low on supplies and without European contact for more than three years, Livingstone was found in Ujiji by Stanley. Together the men explored Lake Tanganyika and determined it was not the source of the Nile. Stanley went back to England to write his

adventures while Livingstone labored on. In May 1873, near Tabora on the Lualaba River, Livingstone died of dysentery. His African companions Susi and Chuma carried his body to the east coast, where it was returned to England and buried in Westminster Abbey.

That year, Englishman VERNEY LOVETT CAMERON was sent by the Royal Geographical Society to take supplies to the missing Livingstone and to do some exploring. While in Tabora in October, Cameron learned Livingstone had died five months earlier. Cameron arranged to have the late explorer's journals returned to England, and then he continued to investigate the regions containing the Nile and Congo watersheds. He learned that the Lukuga River was the outlet to Lake Tanganyika, and he helped define the separation between the two great rivers. His work on the Lualaba River, which converges with the Lukuga, helped set the stage for Stanley's later exploration of the Congo River. His mapping skills were excellent, and, in the course of his travels, he became the first European to make an east-to-west equatorial crossing of the African continent.

After Livingstone's death, Stanley returned to Africa in 1874 to complete work on his mentor's projects. He traveled to Lake Victoria, where he confirmed Speke's claim that it was indeed the source of the Nile, and then circumnavigated Lake Tanganyika, confirming that lake was not linked to the Nile. Stanley then headed west to follow the Congo River from its headwaters at the Lualaba River to its outlet in the Atlantic. This task was rife with dangers ranging from cannibalistic and hostile native peoples along the river's banks to a 200-mile stretch of rapids. But Stanley persevered. He named Livingstone Falls and arrived on the west coast of Africa in August 1877, more than two and a half years later.

Stanley went on to even more arduous adventures in the Congo region. In 1879, after England revealed it had little interest in the region, Stanley signed on with Belgium's King Leopold II to build a road. In the meantime, Italian-born Frenchman PIERRE-PAUL-FRANÇOIS-CAMILLE SAVORGNAN DE BRAZZA had convinced France that the area was worthy of attention, if for no other reason than to keep other countries from claiming too large a territory. Exploring from the north of the Congo River, he arrived at the north shore of Stanley Pool (now Malebo Pool) as Stanley was building a road up from the lower Congo to that same point, hacking his way through the jungle. The Frenchman's treaty with the local chief formed the basis for the colony of French Equatorial Africa. The lands where Leopold retained control, which became the Belgian Congo, experienced a period of ruthless enslavement, where nearly 1 million Africans were killed in Leopold's quest to harvest rubber.

Natural Science

A number of explorers made their contribution to African exploration through a focus on science (see NATURAL SCI-

ENCE AND EXPLORATION). Swedes CARL PETER THUNBERG and ANDERS SPARRMAN, both students of renowned Swedish botanist Carl Linnaeus, conducted studies north of Cape Town in South Africa, in the early 1770s. Thunberg would become known as the "father of Cape Botany."

The Englishman SIR FRANCIS GALTON, a cousin of CHARLES ROBERT DARWIN, traveled in southwestern Africa along with amateur naturalist Karl Johan (Charles) Anderson, in 1850–52, to pursue studies in geography and wildlife. Galton's work *Narrative of an Explorer in Tropical South Africa* was widely read in Europe.

German GEORG AUGUST SCHWEINFURTH had a broad education in botany, zoology, and geology, and he became interested in other disciplines, such as anthropology, as his career progressed. Schweinfurth was also an artist who made drawings of plants and animals he encountered on his travels in the 1860s–70s. In his expedition of 1868–71, he explored the central tropical regions of the continent. He delineated the watersheds between the Nile and the Congo and made the European discovery of the Uele River (which feeds the Congo). Schweinfurth was the first to make contact with the Mbuti of the Congo, and he studied a number of other tribes as well. His two-volume book, *The Heart of Africa*, represented a significant leap forward in the European understanding of the diversity of life in Africa.

The travels of another German, OSKAR LENZ, a geologist, also added to the European knowledge of Africa. After three years in central Africa, he turned his attention to the Sahara Desert. In 1879, he traveled from Casablanca in Morocco, over the Grand Atlas Mountains and south through the Sahara to Timbuktu. In 1885, he made a two-year exploration of the Congo region, and he is noted as one of a handful, along with the Scottish geologist JOSEPH THOMSON, who traveled widely between 1879 and 1890, to visit both tropical and desert regions on the continent.

From Exploration to Colonization

In 1886–89, Hungarians LUDWIG VON HOEHNEL and SAMUEL TELEKI made the European discovery of Lake Rudolf, the Omo River, and Lake Stefanie in northern Kenya and southern Ethiopia, helping in the mapping of the "Dark Continent." By this time, Africa's major geographic mysteries had been solved, and the era of colonization had begun. From 1880 to 1912, the entire continent came under the domination of one European country or another. The French sought to build a railway across the Sahara, encountering fierce resistance from the nomadic peoples they tried to dominate. The British consolidated their control over South Africa by winning the South African War (1899–1902). Until the treaty ending World War I, Germany possessed Togoland, the Cameroons, German South-West Africa, and German East Africa. Italy held Libya, Eritrea, and Italian Somaliland. Many of the borders of these

countries appear arbitrary, negotiated in Europe without consideration of geography or the ethnicity and history of the native peoples. Undoubtedly, the strategy of “divide and conquer” was employed to keep tribes from united action and to encourage in-fighting among subjugated groups. The refugee movements and political turmoil of today are the continuing legacy of colonial Africa. Although the last of the African colonies gained their political independence in the mid-1970s, the economic independence of most of the countries on the continent has yet to be achieved.

African Association (Association for Promoting the Discovery of the Interior Parts of Africa)

Due to the excitement generated by the explorations of the Scotsman JAMES BRUCE, and with the recent loss of their colonies in America, a number of Englishmen of high position founded the Association for Promoting the Discovery of the Interior Parts of Africa in London on June 9, 1788. It would become known simply as the African Association. The principal founder was SIR JOSEPH BANKS, a naturalist who had been the chief scientist on JAMES COOK’S first expedition to the South Pacific Ocean in 1768–71 and was then president of the ROYAL SOCIETY, Great Britain’s oldest and most prestigious scientific organization.

The immediate goals of the organization were the mapping of the NIGER RIVER and locating the city of TIMBUKTU in the kingdom of Mali, the supposed center of trade in West Africa. The British government, seeking opportunities for colonization as a result of British explorations, worked closely with the African Association. The first two expeditions dispatched to Africa—that of American JOHN LEDYARD and Englishman Simon Lucas—failed in their intended goals, with the death of Ledyard and Lucas being forced to turn back because of a regional conflict.

The first important expedition sponsored by the African Association was that of British army officer DANIEL HOUGHTON in 1790–91. He traveled on the Gambia, Senegal, and Niger Rivers and is credited with being the first to record that the Niger flowed from west to east. FRIEDRICH CONRAD HORNEMANN, a German who had long been fascinated with Africa, headed up another important trip for the association in 1798–1801. Leaving from Cairo, he was the first European in modern history to cross the SAHARA DESERT, and, based on accounts from his journals, found after his death in the field and later published, he was probably the first European to see Lake Chad in the northwestern corner of present-day Nigeria.

Perhaps the most famous explorer to work under the auspices of the African Association was MUNGO PARK, a Scottish surgeon. He made two trips sponsored by the group. The first, in 1795–97, started with ascending the

Gambia. He fell into the hands of hostile Muslims but managed to escape, making his way to the Niger. Battling fever, he returned to the Gambia and made it back to England after 30 months, having been given up for dead. His subsequent book, *Travels in the Interior Districts of Africa* (1799), helped further interest in African exploration. His second journey, in 1805–06, was much more extensive and better financed, yet more tragic in its outcome. Taking the Gambia to the town of Kaiaf, then traveling overland to the Senegal, and on to the Niger at Bamako, the entourage took heavy losses from disease. After continuing on the Niger, Park was not heard from again. The best information indicates that his party was ambushed at Bussa, and that, in attempting escape, he drowned.

The travels of Swiss-born JOHANN LUDWIG BURCKHARDT on behalf of the African Association—on the NILE RIVER in Syria, Egypt, the Sudan, and Arabia in 1809–15—yielded much new information to Europeans, including the rediscovery of the city of Petra (Wadi Musa) in present-day Jordan.

Although resulting in many insights into the topography and human populations of Africa, the expeditions sponsored by the African Association were filled with bad luck and often the death of their leaders. In 1831, the African Association merged with the recently formed and more broadly defined ROYAL GEOGRAPHICAL SOCIETY, which went on to sponsor many expeditions to Africa as well as to other parts of the world.

See also AFRICA, EXPLORATION OF.

Age of Exploration See EUROPEAN AGE OF EXPLORATION.

airship (dirigible)

An airship is a self-propelled and steerable BALLOON. Like a balloon, an airship uses lighter-than-air gases to create lift. The main body, the bag or envelope containing gas, is elongated, however, for aerodynamics. The engines plus propellers are suspended from the bag, as are the gondolas (cabins), carrying crew, passengers, and cargo. As in the case of a balloon, the ballast, usually sand or water, is released to increase lift; gas is released to decrease it. *Dirigible*, or *dirigible balloon*, the alternative term for an airship, is from the Latin *dirigere* for “to direct, to steer,” in reference to the airship’s directional capabilities, provided by one or more vertically hinged rudders. Horizontally hinged elevators give additional control for climbing or descending.

There are three basic types of airship construction: non-rigid, semi-rigid, and rigid. In the nonrigid class of airships, also known as *blimps*, the shape of the body is maintained by the pressure of the gas. In the semi-rigid class, referred by the

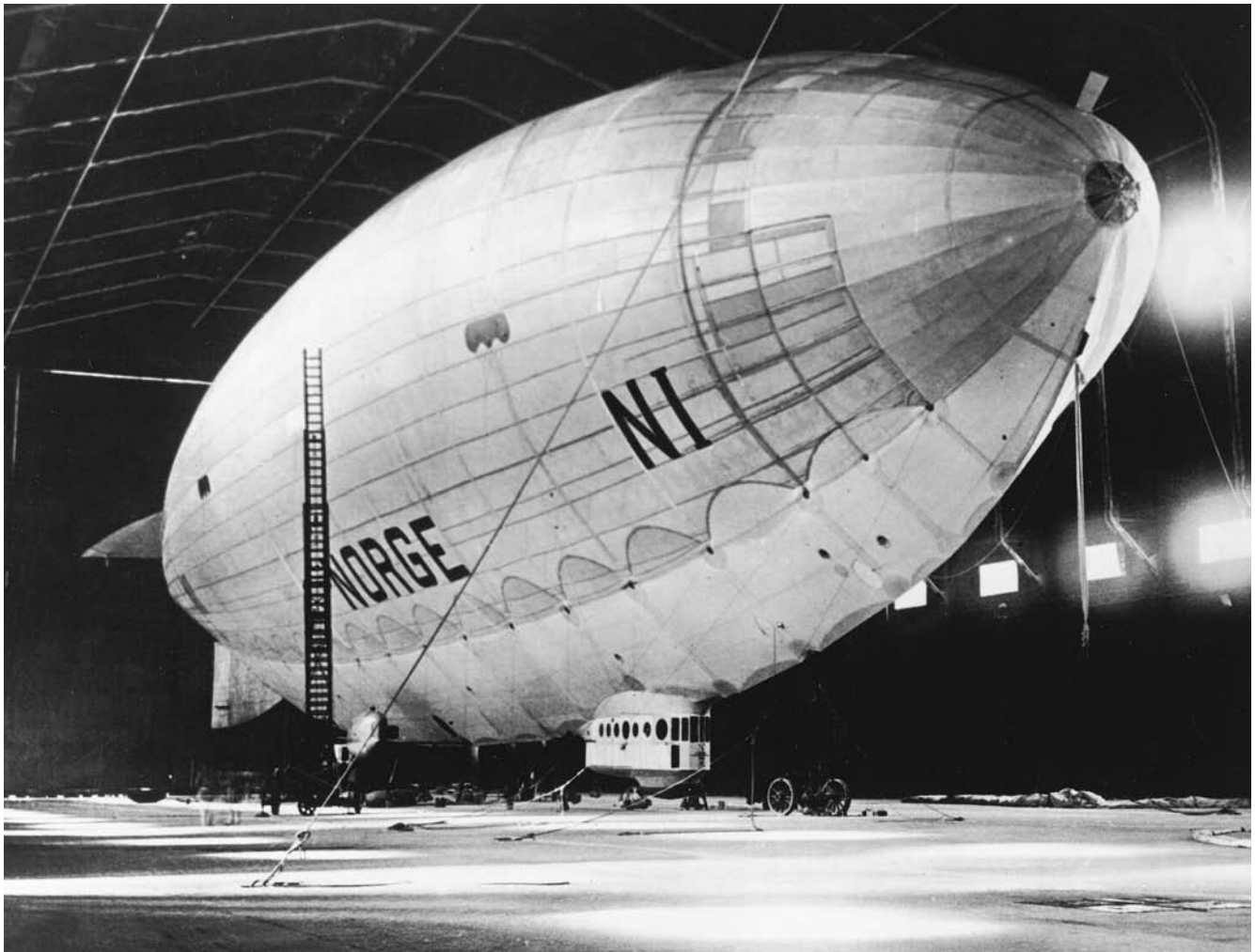
general name *airship*, the shape of the body is also maintained by the gas, but in conjunction with a keel running the body's length. In the rigid class of airships, known as *zeppelins*, a rigid scaffolding-like frame maintains the body shape, with lift provided by individual gas cells. The earliest airships used the highly flammable hydrogen for their lighter-than-air gas; later ones used the safer helium.

A French engineer by the name of Henri Gifford constructed the first airship, drawing on balloon technology. It was a nonrigid type, with a cigar-shaped envelope and a single screw propeller driven by a steam engine. In 1852, he flew over Paris at about six miles per hour, though his craft could not be steered in a breeze. Two other Frenchmen, Charles Renard and Arthur Krebs, built a blimp that was steerable in light winds. In a flight in 1884, they proved that it could successfully return to its starting place. Airship technology developed rapidly over the next decades. A German, Count Ferdinand von Zeppelin, completed his first rigid air-

ship in 1900. For a time afterward, zeppelins were used for commercial transportation in Germany.

Germany used rigid craft in World War I; France developed semi-rigid airships. All proved vulnerable to airplanes, however. Nonrigid airships proved the most useful because they could best hover over a location for aerial observation and were often used to patrol coasts. In 1919, after the war, a British-developed rigid airship made the first transatlantic crossing, from East Fortune, Scotland, by way of Newfoundland to Mineola, New York, on Long Island; it completed a transoceanic return flight to Pulham, England.

Airships have played a part in the history of polar exploration. After the war, an Italian, UMBERTO NOBILE, became an accomplished pilot and designer of airships. In 1926, in the *Norge*, a semi-rigid craft he had designed, he flew from the Norwegian islands of Spitsbergen (present-day Svalbard) over the NORTH POLE, to Teller, Alaska,



Umberto Nobile's airship *Norge* is tethered in its hangar in 1926. (Library of Congress, Prints and Photographs Division [LC-USZ62-107120])

where the ship was dismantled. The expedition had been organized by the Norwegian polar explorer ROALD ENGELBREGT GRAVNING AMUNDSEN and the American aviator LINCOLN ELLSWORTH, who had purchased the craft from the Italian government and hired Nobile as pilot on the expedition.

Nobile organized another flight two years later with plans to land at the North Pole. He designed another semi-rigid craft, the *Italia*, with polar conditions in mind. His crew consisted mostly of Italians with mountaineering experience in the Alps; three scientists went along for polar studies. Again departing from Spitsbergen, the *Italia* successfully circled the North Pole, but because of ice buildup on the craft, plans were abandoned to land there. The airship broke apart and was wrecked on the ice. Nobile and eight others in the gondola survived a crash landing; one of the crew later died before being rescued. Seven others perished, however, when the airship's bag drifted out of control. Amundsen, although not part of this expedition, died when his airplane crashed as he was on his way to Spitsbergen to join the search for survivors.

For a time, airships were used for commercial transatlantic crossings. But the frequency of crashes—including the 1937 disaster, in which the German-built *Hindenburg*, a rigid airship containing hydrogen gas, was enveloped in flame in Lakehurst, New Jersey, killing 36 of its 92 passengers—led to a decline in the use of airships following their heyday earlier in the 1930s. The nonrigid class, with helium as gas, became the norm. Some were used in World War II in the 1940s for observation purposes. Today blimps are used primarily for advertising as well as camerawork at sporting events. In 1997, the Zeppelin Company of Germany unveiled a new generation of airships, the first of the rigid class to fly since 1940.

See also AVIATION AND EXPLORATION.

alidade

The term *alidade* is derived from an Arabic phrase meaning “the revolving radius of a circle.” First appearing in English in the 1400s, the term came to be applied to specific surveying and navigational instruments. One early device known as an alidade consisted of a surveying rule equipped with simple or telescopic sights; it was used to determine direction. An early navigational alidade was a straight bar with sights on both ends and a pivot in the middle; it was used to measure the angle of a celestial body in relation to the observer.

The term *alidade* is also applied to the central measuring component of other instruments. These include the ASTROLABE used in navigation; the plane table, a drawing board on a tripod, with a ruler for plotting the lines of a survey directly from observations; the theodolite, or transit,

a telescope mounted on a tripod used in surveying; and a number of modern sighting tools.

An early astronomical alidade was described by PTOLEMY, a second-century Hellenized Egyptian living in Alexandria; it was referred to in some texts as “Ptolemy’s ruler.” During the Middle Ages, the Arabs used versions of the alidade in a variety of applications. In the early 17th century, telescopic sights were added to alidades.

See also NAVIGATION AND EXPLORATION; SURVEYING AND EXPLORATION.

Amazon River

The Amazon River is the longest river in South America and the second-longest in the world (after the NILE RIVER), extending some 4,000 miles across the continent. The Amazon drains 2.7 million square miles, from near the Pacific Ocean on the inter-Andean plateau to the Atlantic Ocean. It flows through Peru, eastward across Brazil, and enters the Atlantic at the EQUATOR, where it discharges roughly a fifth of all the freshwater that drains into the oceans. The river has hundreds of tributaries; of these, 17 are more than 1,000 miles long. The main headwaters of the Amazon, the Ucayali and Marañón Rivers, have their source in the snows of the high ANDES MOUNTAINS of Peru. During the wet season, the Amazon varies in width from five to 40 miles. Near the Atlantic, it opens into an estuary about 150 miles wide, scattered into many branches by islands formed from silt deposits. Often called the “Ocean River” because of its vastness, the Amazon is highly navigable, and large ships can reach Iquitos in northeastern Peru, 2,300 miles from the sea. Before the European conquest of South America, the Amazon had no single name; its different sections were known to native peoples by specific names. The name of the river is probably derived from the native word *amassona* for “boat destroyer,” although others claim it was named by Europeans after the Amazons of Greek mythology.

Early Expeditions

VICENTE YÁÑEZ PINZÓN, a Spanish navigator, was the first European to visit the Amazon River Delta, in 1500. Pinzón accompanied CHRISTOPHER COLUMBUS on his first voyage to the Americas, as captain of the *Niña*. In November 1499, he set out on his own voyage with four ships. He landed in northeastern Brazil toward the end of January 1500, then sailed along the coast to the northwest. Pinzón ascended the river about 30 leagues, calling it the “Freshwater Sea,” because of its size and amount of freshwater. Later reports by Pinzón’s companions refer to the Amazon as the Río Marañón, a name later applied to one of its tributaries. Marañón is either a native word or perhaps is derived from the Spanish *maraña* for a “tangle.” For explorers of the Amazon, the latter was appropriate, for the river’s tangle of

streams and islands is a challenge to the best navigators. Pinzón's landing in Brazil was long disputed because the Portuguese claimed discovery of Brazil with PEDRO ÁLVARS CABRAL's landing in April 1500.

The second exploration of the Amazon occurred almost a half-century later and from the other end of the river. GONZALO PIZARRO, the half brother of FRANCISCO PIZARRO, who took part in the Spanish conquest of Peru, was named governor of Quito in 1539, in what is now Ecuador. In 1541, Pizarro set out for an expedition into the forests to the east of the Andes in search of La Canela, the "Land of Cinnamon," which was reportedly rich in spices, and EL DORADO, a famed city of gold according to native stories. FRANCISCO DE ORELLANA, a Spanish explorer and relative of Pizarro, accompanied the expedition as second in command. When provisions ran out, Orellana and 50 to 60 companions broke off from the expedition with commands to search for food but did not return, as Orellana's ships were swept into the fast-flowing Napo River. Orellana and his men followed it into the Amazon. Along the way to the Atlantic, they encountered tribes whose women fought alongside the men (like the mythical Amazons, leading to one interpretation of the river's name). Orellana's expedition was the basis for the description of the Amazon River included in the Spanish cartographer DIEGO GUTIERREZ's 1562 map of South America, the first description of the continent's interior.

The Amazon River runs through wet and densely forested plain and to this day remains one of the most sparsely populated areas on Earth. Parts of the river system today still remain unexplored. For the Spanish settlers of Peru, the Amazon valley was a source of mystery and possessed the lure of hidden treasure, spurred on by native accounts and the reports of explorers such as Orellana. In 1558, the Spanish conquistador PEDRO DE URSÚA was commissioned by Marquis de Cunete, the Spanish viceroy in Peru, to find the fabled city of El Dorado in the forested Amazon basin of Peru. In command of 300 Spaniards and a number of native people and slaves, Ursúa left Lima in 1559, but due to delays he was unable to sail until October 1560. A mutiny erupted, led by LOPE DE AGUIRRE, and Ursúa was murdered. Aguirre led the men down the river and laid waste to several Indian villages along the way. The next year, the expedition became the second to cross South America from the Andes to the Caribbean.

Politics and Exploration

Politics played an important role, with and above the lure of treasure, in spurring on exploration. Budding empires such as Spain and Portugal attempted to spread their spheres of influence in South America, which promised to provide not only riches of spices and precious metals but also new outlets for trade and the simple commodity of free land—

the supply of which had been long lost in Europe. After Christopher Columbus landed in the Americas in 1492, Spain petitioned Pope Alexander VI for a monopoly on trade in the western Atlantic, which resulted in a line of demarcation to the west of which Spain was given trading rights, and to the east of which rights were granted to Portugal, Spain's chief rival. After the Treaty of Tordesillas, this longitudinal line was fixed at 370 leagues west of the AZORES.

The landing of Pedro Álvares Cabral in Brazil in 1500, in territory allowed to the Portuguese, seemed to give them rights to Brazil, while the headwaters of the Amazon were planted firmly in Spanish territory. In 1545, King Charles I of Spain sent Francisco de Orellana back to the Amazon to act as governor to assert Spanish control over the river and halt Portuguese expansion. But Orellana died while exploring the mouth of the river, and the expedition dissolved in failure. Meanwhile, among the Portuguese was a great effort to gain control of the Amazon, first by PEDRO DE TEIXEIRA. Originally part of an effort to expel British, Dutch, and French from encroaching on Portuguese territory in South America, Teixeira became, in 1618, the governor of the territory of Pará at the mouth of the Amazon. He made expeditions on the lower Amazon, mapping and aiming to remove French, Dutch, and British trading settlements for Portugal. In 1629, he commanded a major expedition up the Amazon with 120 Portuguese and 1,600 native people. After the expulsion of other European rivals, Portugal turned its attention to Spanish holdings in South America; the arrival of two Spanish friars from Peru in Pará raised concerns among the Portuguese that the Spanish had designs on the Amazon River. In 1637 Teixeira was sent by the new colonial governor, Jacome Raimundo Noronha, to explore and map the length of the Amazon and especially to scout locations for Portuguese fortification. Teixeira followed the reverse of Orellana's route, using one of the missionaries for a guide, and, in 1638, claimed for Portugal the Río Negro, one of the main northern tributaries of the Amazon with its source in the Colombian Andes. He sailed up the Napo in July 1638. After traveling to Quito on foot, he and his party became the first Europeans to reach that city from the east, and the first to sail up the Amazon.

Increasing Knowledge

The Spanish viceroy in Peru, perhaps unnerved by Teixeira's arrival, sent two Jesuits to accompany him on his return journey. Jesuit father CRISTÓBAL DE ACUÑA made surveys and kept a record of his voyage down the Amazon, and, in 1639, his account of the journey, *New Discovery of the Great River of the Amazons*, was printed, becoming the first published account of the river.

The Amazon was frequented by Portuguese slavers and by missionaries, but maps and descriptions of the river

continued to be inaccurate and contained tantalizing blanks even a little more than a century later. Discoveries were often made by accident, as when Jesuit Father Roman in 1744 accompanied a group of Portuguese slavers through a passage called the Casiquiare Canal that connects the ORINOCO RIVER, another major South American river, to the Río Negro, a tributary of the Amazon, and which had been mentioned by Cristobal de Acuña but never verified. Roman's description was one of the many pieces of information reported by French explorer CHARLES-MARIE DE LA CONDAMINE to the French Academy of Sciences.

La Condamine first set out in 1734 for the equatorial region of South America as part of a French expedition to measure the difference of the curvature of the Earth at the equator and the polar region to determine the true shape of the Earth. When the project had been completed, La Condamine resolved to voyage down the Amazon to its mouth, obtaining maps of the Amazon from the Jesuits. He set out in 1743, traveling through the treacherous Andes to the Marañón River, one of the Amazon's tributaries, on which he set sail. The Marañón is a river extremely difficult to navigate, filled with dangerous reefs, dozens of arduous rapids, and high cataracts. Finally, La Condamine passed through the Pongo de Manseriche, a narrows three miles long. The Pongo de Manseriche is about 2,000 feet deep, surrounded on both sides by high precipices and narrowing to a width of as little as 100 feet. The Marañón squeezes through the pass rushing up to 12 miles an hour.

La Condamine made the first systematic scientific observations of the river, and the native peoples. He even applied his skills to resolving the boundary established between Spanish and Portuguese territory by the Treaty of Tordesillas, which almost 300 years later still remained disputed. On his return to France in 1745, he wrote an account of his explorations in South America, including a map of his journey along the Amazon, which was published in 1751.

Almost a half-century later, German naturalist and geographer ALEXANDER VON HUMBOLDT and French botanist Aimé Bonpland were given permission by the king of Spain, Charles IV, to explore Spain's possessions in the Americas. Humboldt had undertaken a geological survey of Spain's central plateau region, and, with his knowledge of geology, astronomy, and biology, he was well suited and driven to make a thorough investigation in South America. After some exploration along the coasts, Humboldt and Bonpland traveled into the Orinoco Basin, studying in detail the unique flora and fauna of the region as well as fixing the many geographic discrepancies of maps of the region. Humboldt crossed the Casiquiare Canal, which had been reported by La Condamine in a CANOE, proving finally that it connected the Orinoco and Río Negro, the only known connection between two major river systems. Throughout 1800, Humboldt explored this

region, vastly increasing scientific knowledge of the lower Amazon Basin.

Inspired by Humboldt's account, as well as Englishman CHARLES ROBERT DARWIN's account of the voyage of the *Beagle*, two other British naturalists, ALFRED RUSSEL WALLACE and HENRY WALTER BATES, endeavored to collect insect specimens in the Amazon Basin. In 1848, they sailed to the mouth of the Amazon in Pará, Brazil. In 1852, Wallace sailed for England with his notes and specimens while Bates remained. Wallace's ship, however, caught fire and sank, along with his notes and specimens. Wallace himself was rescued after spending two weeks in an open boat on the sea. He published his account of his travels and research as *A Narrative of Travels on the Amazon and Río Negro* in 1853. Bates meanwhile had explored the Amazon 400 miles west from Manaus, the Amazon's juncture with the Río Negro. Afterward, he remained between Manaus and the mouth of the river at Pará, collecting specimens until 1855. In 1859, Bates returned to England and published *The Naturalist on the River Amazon* in 1863. In 10 years on the Amazon, Bates collected 14,000 insect specimens, including 8,000 newly discovered species. While Wallace's observations in the Amazon and southeast Asia led him to formulate a theory of natural selection independently of Darwin, which was published at the same time, Bates's collections lent strong support to the idea of natural selection.

Since then, the Amazon River and its basin have prompted much scientific exploration. However, many native tribes still live in relative isolation. The tropical rain forests house amazing biological diversity, with new species still to be discovered.

See also SOUTH AMERICA, EXPLORATION OF.

American Fur Company

Established in 1808 to take advantage of reports from the 1804–06 MERIWETHER LEWIS and WILLIAM CLARK expedition to rich beaver country west of the ROCKY MOUNTAINS, the American Fur Company and its various subsidiaries—the Pacific Fur Company, founded in 1810, and the South West Fur Company, founded in 1811—were an ambitious operation. The founder, JOHN JACOB ASTOR, born in Germany, had migrated to America from England. He had made his first profits in the FUR TRADE in 1784 by exporting furs from America to England. Over time, he perfected his business by brokering furs from Montreal and the Great Lakes region in America, but he was unhappy with the control his rivals—the HUDSON'S BAY COMPANY and the NORTH WEST COMPANY—had over prices.

The findings of Lewis and Clark inspired the plan of a chain of trading posts gathering furs from inland to the mouth of the COLUMBIA RIVER on the Pacific coast. Taking advantage of his contacts in Canton, Astor stood to reap

handsome profits from the Chinese, who were especially fond of sea otter pelts. This venture was carried out by a new subsidiary, the Pacific Fur Company, with its immediate goal of establishing a trading post at the mouth of the Columbia River. To accomplish his mission, Astor outfitted two expeditions, one by sea and one overland. On September 8, 1810, Astor's ship, the *Tonquin*, set out from New York City, sailing around South America and arriving at the mouth of the Columbia in March of the following year. The captain, Jonathan Thorn, was a strict disciplinarian and did not get along with investors, who were members of the expedition. Upon arrival, a crew of builders under ROBERT STUART began construction of Fort Astoria while Captain Thorn commenced trading with the Nootka Indians. Relations deteriorated, however, when the quick-tempered captain slapped the face of an Indian chief at Nootka Sound, leading to the destruction of the vessel.

Meanwhile, the overland expedition had problems of its own. Led by businessman and the less-than-experienced woodsman WILSON PRICE HUNT, the group of 56, plus Indian guides, including Ioway MARIE DORION and her husband, PIERRE DORION, JR., had set out from St. Louis in spring 1811. They had intended to follow the trail of the Lewis and Clark Expedition, but fear of the unfriendly Blackfoot Indians caused them to take a less direct path. Upon reaching the Snake River, they sought to continue by CANOE and managed to trade with Indians for craft. After several days, however, the river proved unnavigable, and several members of the party drowned. The expedition split into groups and continued on foot. Those who survived reached Astoria in February 1812. Despite their hardships, they managed several important geographic discoveries, which included charting the Green River, Union Pass, and SOUTH PASS, a shortcut through the southern end of the Wind River Mountains.

Although the establishment of Fort Astoria resulted in the first permanent American settlement in the Pacific Northwest, the post did not fulfill Astor's ambitions. By June 1812, America was at war with England—in the War of 1812. Interference from the British navy and likely loss of their property led Astor's men to sell the outpost to the North West Company. A treaty with Britain in 1818 returned possession of Astoria to the American Fur Company, but, by that time, the Nor'westers (as the employees of the North West Company were known) were established in the area, and Astor's company was concentrating its efforts in the Great Lakes region.

With the help of a law barring foreigners from trading with American Indians, Astor consolidated his holdings. He bought out the assets of his partners in the South West Company. Then, pursuing the goal of monopoly power, he proceeded to buy out strong competitors and to crush weaker ones. Independent traders were also targeted.

The American Fur Company soon turned to the lucrative market in American bison (buffalo) hides harvested from the Great Plains. Through the formidable personality of KENNETH MCKENZIE at Fort Union in the 1830s, permission was secured from the formerly intractable Blackfoot to exploit the buffalo.

In 1834, Astor, having anticipated the turn of fashions in Europe, sold out his interests in the American Fur Company. The trade in beaver soon crashed, and the company was forced to scale back its operations. Astor went on to concentrate his efforts in real estate and became one of the richest men in the country.

See also COMMERCE AND EXPLORATION.

American Geographical Society (AGS)

The American Geographical Society (AGS), founded in 1851, is the oldest geographic society in the United States. Its headquarters are in New York City, and its archive is located at the University of Wisconsin in Milwaukee. Its members have included both professional geographers and nonprofessionals interested in the subject of geography. Unlike many other 19th-century organizations, such as the ROYAL GEOGRAPHICAL SOCIETY, it has been open to women as well as men from its inception.

AGS activities include scientific research relating to geography; the sponsoring of expeditions, lectures, and conferences; the awarding of honors to scholars and explorers; cartography; and magazine and book publishing. Present-day publications include *Focus*, a quarterly magazine for the general public; *Geographical Review*, a scholarly journal; *Ubique*, a semiannual newsletter; and a variety of books on geographic topics, among them *Around the World Program*, a book series on countries of the world with a companion guide for teachers. In the course of its history, the AGS has worked under contract with various branches of the U.S. federal government, academic institutions, and corporations.

An impetus for the founding of the AGS, in addition to the great interest in world exploration at the time, was the publicity surrounding the search for Englishman SIR JOHN FRANKLIN, who disappeared in the Canadian Arctic on an 1845 expedition, and the efforts of his wife, JANE FRANKLIN, to encourage rescue efforts. A number of scholars, businessmen, and statesmen created the organization to support exploration, support geographic research, and promote education. One early expedition that the AGS helped underwrite was an early exploration attempt of the NORTH POLE in 1860–61 by American ISAAC ISRAEL HAYES. In 1878–80, American physician and lawyer FREDERICK SCHWATKA, with AGS backing, led a team overland by sledge from HUDSON BAY to King William Island while searching for evidence of the Franklin expedition.

One of various explorers to receive a gold medal from the AGS was CHARLES CHAILLÉ-LONG in recognition of his contributions to geographic knowledge of Africa, such as determining in the 1870s that Lake Kioga was one of the principal sources of the White Nile, a branch of the NILE RIVER.

A number of famous 20th-century American explorers were associated with the AGS as well. ROBERT EDWIN PEARY, who led the first successful expedition to the North Pole in 1909, served as the society's president for a time. In 1951, MATTHEW ALEXANDER HENSON, who traveled to the North Pole with Peary, was honored at the AGS centennial banquet in 1951. LOUISE ARNER BOYD received AGS backing for her 1933 expedition to GREENLAND's east coast. The AGS was also an early promoter of AERIAL PHOTOGRAPHY in mapmaking, as applied in both the Arctic and Antarctic.

See also GEOGRAPHY AND CARTOGRAPHY.

Andes Mountains

The Andes Mountains are the second-highest mountain range in the world, after the HIMALAYAS. The range contains many of the highest peaks in the Western Hemisphere. The Andes probably received their name from the word meaning "high crest" in the Quechuan language of the Inca Indians. The Andes rise abruptly from the Pacific Ocean coast, thrust up by the collision between the Pacific Ocean and South American continental plates during the Cretaceous period, from 65 to 138 million years ago. The tectonic activity along this plate boundary continues to cause volcanic activity and earthquakes throughout the Andes and along the Pacific coast. The mountains run in a narrow band, generally about 200 miles wide, along the west coast of South America, from the Caribbean Sea in the north to the island of Tierra del Fuego in the south, a distance of about 4,500 miles. The Andes can be divided into three regions, generally referred to as northern, central, and southern.

The northern Andes, which rise in present-day Venezuela, Colombia, and Ecuador, are composed of three narrow ranges known as the Western, Central, and Eastern Cordilleras, so called by early Spanish explorers because of the resemblance of their long thin parallel ranges to ropes. The highest mountain of the northern ranges is Cristóbal Colón in Colombia, at a height of 18,947 feet. Many other peaks are higher than 15,000 feet.

The central Andes are made up of two Cordilleras, the range's broadest region, reaching a maximum width of 400 miles, and the highest region, with many peaks over 20,000 feet. The peaks of the central Andes include Pissis, at 22,241 feet; Huascarán, at 22,205 feet; Illampu, at 21,276 feet; Chimborazo, at 20,561 feet; and Cotopaxi, an active volcano at a height of 19,347 feet above sea level. Between the two ranges of the central Andes, in Bolivia and southern Peru, lies an elevated plain called the Altiplano. Rains falling

on the Altiplano flow into Lake Titicaca at 12,500 feet, making it the highest navigable lake in the world, and a lake with no outlet to the ocean.

The Andes are generally smaller to the south. Close to the central Andes is ACONCAGUA, the highest mountain in the Western Hemisphere, at 22,834 feet, but, near the tip of South America the mountains rise to about 10,000 feet above sea level, and Cerro Yogan, the highest peak of Tierra del Fuego, an extension of the Andes, is 8,100 feet. Many of the highest peaks in the southern Andes are volcanic, and a good number of them are active.

Rain falling on the western slopes of the Andes runs into the Pacific Ocean. The heavy rains brought by the trade winds against the eastern slopes form the tributaries of the three major river systems in South America, the AMAZON RIVER, the ORINOCO RIVER, and the Río de la Plata.

The Andes, especially the plateau regions of the central Andes, were inhabited by native peoples for many hundreds of years before the rise of the Inca Empire in the 15th century. The first Inca emperor, Manco Capac, led an attack on the people living in a fertile valley some miles to the north of Lake Titicaca; the Inca settled there and made Cuzco their capital. The Inca spread throughout the Andes, and, in the 15th century, under the rule of Pachacuti Inca Yupanqui and his son, Topa Inca Yupanqui, the Inca Empire came to include an area of 350,000 square miles, with an extensive system of roads and rope bridges.

Early Expeditions

It is thought that the first European to reach the Andes overland was ALEJO GARCÍA, a Portuguese sailor who had been shipwrecked south of Rio de Janeiro, taking part in JUAN DÍAZ DE SOLÍS's 1515 expedition in search of a passage through South America. García and others who had been shipwrecked befriended the natives. García accompanied them, exploring the interior of the continent and reaching the Andes. He heard tales of the Inca Empire and even obtained several bars of silver for himself. The tales and silver came to the attention of Europeans, when a number of sailors were rescued by SEBASTIAN CABOT, an Italian sailing for England, and taken back to Europe in 1530.

The Spanish conquistador FRANCISCO PIZARRO, who had established himself in Panama, became partners with another Spaniard, DIEGO DE ALMAGRO, to find and conquer the Inca kingdom in the Andes. After taking an outlying Inca town, Pizarro sailed to Spain to seek support for a larger expedition. This support was granted to him, and, in 1531, he began his effort to conquer the Inca.

Pizarro led his forces over the Royal Inca Road, eastward through the Andes and the Piura Valley, entirely without Inca resistance. Finally, on November 15, 1532, the Spanish arrived in the deserted city of Cajamarca, where just out of town the Inca emperor Atahualpa encamped, with re-

portedly 50,000 men. The Spanish made a surprise attack on the Inca, charging with horses, which the Inca had never seen, and firing upon them with their cannon. The Spanish suffered few casualties, though they killed thousands of Inca, and took Atahualpa prisoner. Afterward, Pizarro marched through the Andes on the roads created by the Inca, capturing Cuzco, enslaving many of its inhabitants, and seizing its gold.

During their travels in the Andes, the Spaniards found amazing wealth in gold and other precious metals. The Andes Mountains are rich in precious metals and stones and had been mined by the native peoples for centuries. Attempting to obtain his release, Atahualpa offered to fill a room with gold, which Pizarro allowed him to do before killing him.

The Andes continued to be explored by the Spanish CONQUISTADORES searching for remnants of the Inca Empire and for other kingdoms with equivalent wealth. In 1534, SEBASTIÁN DE BENALCÁZAR set out to capture Quito, an Inca provincial capital in the north. Benalcázar gained the support of Canari Indians as he traveled and was met by the forces of Inca chief Ruminahui in present-day Ecuador, near its highest peak, Chimborazo, where he defeated them.

Diego de Almagro quarreled with Pizarro over their respective positions and power, and, in 1535, after appointment as governor of a new Peruvian province called New Toledo, to the south of Cuzco, he set out with 750 Spaniards and thousands of native allies. He embarked in the middle of winter, and his men suffered in the severe cold of the high Andes. After traveling through the central Andes, Almagro turned westward and reached the coastal Copiapo Valley, then followed the coastal plain of modern Chile into the Central Valley. Repeatedly attacked by native peoples and unable to find another civilization like the Inca, Almagro turned back.

The wet, eastern slopes of the Andes in the north were part of the area rumored to contain EL DORADO, and this story along with other tales of legendary wealth, such as a "Land of Cinnamon," inspired Spanish conquistadores to cross the eastern range of the Andes from Quito into present-day Colombia. These expeditions were headed by Sebastián de Benalcázar, out of Quito, in 1536; GONZALO PIZARRO, in 1541; and PEDRO DE URSÚA, who embarked from Lima, the Spanish capitol of Peru, in 1559. A German explorer, NIKOLAUS FEDERMANN, began his search for the land of El Dorado in Venezuela and Colombia. He became the first to cross the Andes from east to west in 1536.

Modern Exploration

The search for El Dorado died out for the most part in the 17th century, but Spaniards continued to scour the mountains for riches. The first modern scientific surveys of the Andes were made by Frenchman CHARLES-MARIE DE LA

CONDAMINE in the first half of the 18th century. La Condamine was part of a French scientific expedition to measure the curvature of the earth at the EQUATOR. La Condamine traveled through the Andes inland to Quito from the South American coast, becoming the first European to see the process of rubber extracted from rubber trees. La Condamine spent several years around Quito making surveys and conducting work on the natural history of the region.

The next important modern explorer of the Andes was German naturalist ALEXANDER VON HUMBOLDT at the turn of the 19th century. Along with the French botanist Aimé Bonpland, he was granted permission by Spanish king Charles IV to explore Spanish possessions in the New World. Humboldt explored the effects of high altitude in the Andes, making observations on the boiling point of water, and, with Bonpland, attempted to climb Mount Chimborazo. The two reached to within 1,400 feet of the summit before having to turn back, establishing a height record for climbing of 19,000 feet not to be broken for 30 years. Humboldt crossed the Andes five times, as he explored the lands from Ecuador to Peru.

Much important exploration of the Andes was carried out in the first half of the 19th century as part of surveys, especially in the northern and central ranges. The southern Andes were explored in 1876 and 1877 by Argentinian Francisco Moreno. Moreno earned a doctorate in natural sciences at the University of Buenos Aires in 1854, before becoming a professor there, concentrating in anthropology. After many years teaching, he embarked on expeditions into areas south and west of Buenos Aires. In 1876, he explored the southern Andes and studied the Patagonian native peoples, visiting several lakes at high elevations and exploring Cerro Chaltel (Mount Fitzroy). He made another expedition to explore the Andes from 1882 to 1883.

With many of the world's highest peaks, the Andes are important in the history of MOUNTAIN CLIMBING. British mountaineer EDWARD WHYMPER summited Chimborazo in 1880. Italian mountaineer MATTHIAS ZURBRIGGEN climbed Aconcagua in 1897. In 1906, a pioneering woman climber, ANNIE SMITH PECK, reached the top of Huascarán. Today, the range remains a big draw to climbers. The Andes also continue to supply valuable minerals and gems to miners. The mountains are also an area of activity for archaeologists. In 1911, American historian HIRAM BINGHAM located the Inca stronghold of Machu Picchu.

See also SOUTH AMERICA, EXPLORATION OF.

Anian, Strait of

The Strait of Anian is the name of a mythical waterway separating Asia and North America, extending from the northeast coast of North America to the west coast. Its name is derived from a reference in the writings of MARCO POLO, a

13th-century Italian traveler to the Far East. The search for the strait was, for a time, one and the same with the search for the NORTHWEST PASSAGE, although, as was discovered in the 19th century, a Northwest Passage does in fact exist in Arctic waters to the north of the North American continent. The hope of a more southerly waterway endured for centuries, not only for the advantages it would offer as a shortened trade route, but because a southerly route would make it accessible year-round in ice-free waters.

East and West Coasts

The search for the Strait of Anian occurred in several stages involving both the east and the west coasts of North America. Mariners of varying nations searched for a Northwest Passage along the northeast coast of North America, the first, in 1497, by Italian JOHN CABOT, sailing for England, in a voyage during which he made the European discovery of Newfoundland and Labrador. Portuguese GASPAR CÔRTE-REAL claimed to have found the outlet to the Strait of Anian in an undocumented voyage two years later. In his subsequent two voyages—in 1500 and 1501—he failed to back up his claim, which he perhaps fabricated to receive backing.

On the west coast, the Spanish carried out a number of expeditions in search of the outlet of such a strait. HERNÁN CORTÉS imagined the benefits of a water route, especially in terms of consolidating the Spanish hold over territories in Mexico. In 1535, he explored the California coast, but, in his haste, failed to recognize that Baja California was a peninsula and that California was not an island, as had been believed. The geography of the region was somewhat clarified by the 1539–40 explorations of FRANCISCO DE ULLOA, who ventured to the end of the Gulf of California (named by him the Sea of Cortés). There, he located the mouths of the Gila River and COLORADO RIVER. These discoveries left open the question of the Strait of Anian, however. In 1542, JUAN RODRIGUEZ CABRILLO explored as far as modern-day San Diego, becoming the first European to venture that far north.

In England, during the mid-1560s, a debate began concerning the relative merits of a Northwest Passage versus a NORTHEAST PASSAGE. The chief promoter of the former was SIR HUMPHREY GILBERT. He was a believer in the Strait of Anian, and, using the best knowledge available at the time, argued that it would start from the north coast of Labrador, and wind gradually to the southwest, where it would reach the Pacific Ocean about where Seattle, Washington, is today. After considerable effort, Gilbert managed to organize financing for an expedition to test his theory. His chief patron was Michael Lok. Their partnership led to the 1576 expedition of SIR MARTIN FROBISHER, which failed to locate any such passage. The English had a presence on the west coast as well at this time in the person

of SIR FRANCIS DRAKE. In addition to raiding Spanish ships and settlements, he searched for the strait, sailing as far north as Vancouver Island. Meanwhile, the Strait of Anian appeared on various maps of the period. On a 1584 map, Flemish cartographer ABRAHAM ORTELIUS placed Japan in the middle of the strait, equidistant from Asia and America.

Hardship and Fraud

The next chapter in the search for the Strait of Anian involved an outright fraud. Spaniard Lorenzo Ferrer Maldonado claimed to have sailed along the north coast of North America, through the Strait of Anian to the Pacific, and back to the Atlantic, all in summer 1588. The story was taken seriously at the time, especially by Michael Lok. In 1596, Lok's hope for finding the strait was again given new impetus when he met an elderly Greek who had taken the name JUAN DE FUCA while in the service of Spain. De Fuca claimed that, in 1592, he had explored an inlet on the northwest coast of North America, where he had sailed for 20 days to a region of icebergs. He believed it to be the Pacific outlet to the fabled strait. Lok's enthusiasm to raise funds for an expedition was great, but he was unable to convince his peers. De Fuca died before the trip could be arranged. A real strait to the south of Vancouver Island bears his name.

Inspired by de Fuca's story and anxious to complete the navigation of the reported strait, JENS ERIKSEN MUNK led a Danish expedition to the Arctic in 1619. His journey is notable more as a tale of the will to live than for discoveries made. With a crew of 63, he sailed into Hudson Strait. After an arduous journey through the ice of HUDSON BAY, the expedition landed on the west shore near present-day Churchill. In winter 1620, an outbreak of trichinosis from eating undercooked polar bear meat took hold, with horrific consequences detailed by Munk in his journals. SCURVY is also assumed to have taken its toll. Munk and two others were the only ones to survive the winter and, with the warm weather, ate new shoots of plants poking through the ice, regaining strength enough to sail back to Europe.

Another interesting tale in the search for the strait involved a rivalry between two English cities and their commercial interests. LUKE FOXE sailed for London and THOMAS JAMES headed Bristol's expedition. Both set out in May 1631, and both managed to reach Hudson Bay. Foxe had no desire to test his will against the winter and returned to England in the fall of the same year. James and crew spent a dreadful winter trapped in the ice, with scurvy becoming a major problem, yet he and his crew made it back to England in October 1632. They brought back with them the understanding that Hudson Bay was enclosed and not a gateway to the long-sought strait.

While expeditions were making little headway in the search for the strait, news came of an incredible voyage. It was another fraud, this time claimed on behalf of one Admiral Bartholomew de Fonte. The account of his voyage, *Memoirs for the Curious*, published in London in 1708, relates a 1640 trip in the Pacific from Peru to the north in search of a Northwest Passage. He claimed that, by navigating a maze of inland rivers in North America, he came upon a trading ship from Boston. Such was the art of the tale that it was accepted by no less than American statesman Benjamin Franklin.

End of the Myth

The man responsible for helping lay the myth to rest was Englishman SAMUEL HEARNE of the HUDSON'S BAY COMPANY. In 1770, with the help of Chipewyan Indian MATON-ABBEE, he worked his way northward, looking for gold and copper. By July 1771, he and his party had reached the Coppermine River, which they followed northward to its mouth in the Arctic Ocean. The return trip was arduous, and it took another year to make it back to Fort Prince of Wales. By cutting across the land and failing to find a waterway of sufficient size for oceangoing trading vessels, Hearne had determined the fallacy that was the Strait of Anian. Yet search for a passage would continue well into the 19th century in the Arctic waters to the north.

See also LEGENDS AND EXPLORATION.

animals and exploration

Animals have a special place in the history of exploration as a means of transportation, as economic incentive, as an area of study in natural science, and as sustenance.

The Horse and the Donkey

The horse, domesticated in Eurasia about 6,000 years ago, is part of the story of movement over all the continents. Some of its use was for the purpose of conquest. The Mongols, under GENGHIS KHAN and other leaders, became known as masterly cavalrymen as they swept throughout much of Asia (see MONGOL EXPLORATION). The Spanish CONQUISTADORES reintroduced the horse to the Americas—early species having been extinct since the end of the Pleistocene. By the end of the 18th century, the *sunka wakan*, or “mystery dog,” as it was known to some Sioux (Dakota, Lakota, Nakota) bands, had altered the way of life of many Native Americans, especially in the American West, and would affect subsequent expeditions of nonnative peoples, who used horses for travel and at times did battle with mounted Plains Indians.

Donkeys, classified with horses in the family Equidae, played a major role as pack animals, especially the small variety known as the burro and especially in the American

West. Mules, hybrids of jackasses (male donkeys) and mares (female horses), were also utilized.

The Dog

Another animal central to exploration was the dog, especially the breeds best suited to frigid lands, such as the Siberian husky, the Alaskan malamute, and the Eskimo dog. Ponies and dogs actually competed with one another on the final continent explored, Antarctica (see ANTARCTIC, EXPLORATION OF THE). For his attempt on the SOUTH POLE in 1910–12, the Englishman ROBERT FALCON SCOTT chose to use Manchurian ponies along with sled dogs and motorized sledges. His rival, the Norwegian ROALD ENGELBREGT GRAVNING AMUNDSEN, who had studied Inuit (Eskimo) travel methods, used only sled dogs and was willing to eat them if they gave out, not as a last resort, but as part of the plan. Amundsen won the race to the Pole. Until mechanized equipment became the norm, the sled dog made long-distance travel possible over the frozen deserts of the Arctic (see ARCTIC, EXPLORATION OF THE) and Antarctic.



Robert Falcon Scott took the sled dog Chris with him to the Antarctic in his expedition of 1910–12. (Library of Congress, Prints and Photographs Division [LC-USZ62-101001])

The Camel

The camel, especially the Arabian, or dromedary, camel, which has one hump, and the Bactrian camel, which has two humps, also played a small part in the annals of exploration, particularly in the Near East, North Africa, and central Asia among Arabs and other Muslims (see MUSLIM EXPLORATION), as well as Europeans in those regions, such as Englishman THOMAS EDWARD LAWRENCE (Lawrence of Arabia). Camels were also used on other continents. In 1857–58, American EDWARD FITZGERALD BEALE headed a U.S. wagon road-building project from western Texas to California, using camels as draft animals. Also, they were regularly used by Englishmen in the deserts of Australia, on such expeditions as those of ROBERT O'HARA BURKE and WILLIAM JOHN WILLS in 1860–61; PETER EGERTON WARBURTON in 1873; and ERNEST GILES in 1875–76.

Hunting

The pursuit of animals for meat and pelts led to travel to uncharted lands. An American, DANIEL BOONE, who traveled across the APPALACHIAN MOUNTAINS into what is now Kentucky, was a “longhunter” in search of deer, sale of the hides of which supplemented his income. The beaver helped shape North America beyond its own altering of waterways, because of all the expeditions for the purpose of the FUR TRADE. Its pelts became favored for felt in the making of hats with brims, a fashion style that began in Europe in the late 16th century and endured nearly to the mid-19th century. Other animals, such as muskrat, mink, marten, and fox, were also sought, bringing humans to their domain. Sea mammals—seals, sea otters, and whales—also spurred on many expeditions to extreme northern and southern waters (see WHALING AND SEALING). In the early 19th century, for example, a whaler father from England, WILLIAM SCORESBY, SR., and his scientist son WILLIAM SCORESBY, JR., explored the Arctic regions of GREENLAND and pioneered new methods of Arctic navigation.

Sealers—American NATHANIEL BROWN PALMER, Scot JAMES WEDDELL, and Englishman JOHN BISCOE—were among those men who first viewed the Antarctic continent in 1820s–1830s.

Natural Science

Animals also prompted exploration as subjects of natural science studies. Naturalists wrote about them and sketched and painted images of them (see NATURAL SCIENCE AND EXPLORATION). In the first half of the 19th century, for example, American JOHN JAMES AUDUBON undertook numerous expeditions in order to record images of North American wildlife. Other naturalists—such as Americans CARL ETHAN AKELEY, DELIA JULIA DENNING AKELEY, and MARY LEONORE KOBE AKELEY—collected specimens for museums in the early 20th century. Carl Akeley also helped found

Africa's first wild game preserve, now known as the Virunga National Park, as a sanctuary for mountain gorillas and other animals.

Legendary Animals

Legendary animals also are part of the history of exploration. Sea serpents, supposedly giant snakelike creatures, and other sea monsters were part of the culture of early mariners, a believed threat of unknown waters for destroying wooden ships. Some of the reported stories served to scare off mariners from competing countries. KUPE, a 10th-century Polynesian, as legend has it, pursued the Squid King in the South Pacific Ocean, leading to the discovery and settlement of NEW ZEALAND and the resulting Maori descendants (see LEGENDS AND EXPLORATION).

Animals and Space Exploration

Animals were directly involved in the act of exploration as experimental passengers in early SPACE EXPLORATION. On November 3, 1957, the Union of Soviet Socialist Republics (USSR; Soviet Union) launched the SATELLITE Sputnik 2, carrying the first animal—a female dog named Laika—into space. Laika survived for several days, eventually dying from heat exhaustion due to high temperatures within the capsule. The Soviets continued launching dogs as part of the Sputnik program. The United States later launched monkeys to test the effects of zero-gravity conditions on life.

Antarctic, exploration of the

The Antarctic continent, or Antarctica, the world's fifth-largest continent, is centered on the SOUTH POLE, the southernmost place on Earth, and is largely contained within the ANTARCTIC CIRCLE, the point at which the Sun neither sets on the day of summer solstice, nor rises on the day of winter solstice. The southern limits of three oceans—the Atlantic, Pacific, and Indian Oceans—meet at Antarctica. The term *Antarctic*—for “opposite the Arctic,” Earth's northernmost region—applies both to the surrounding waters and to the continent.

Up to 7 million square miles of the Antarctic Convergence, or the “Southern Ocean” (waters of all three oceans with lower temperatures and greater concentrations of salt), turns to PACK ICE in wintertime. An ice sheet—which, in certain areas, is as much as three miles thick—covers about 99 percent of the Antarctic continent. Ice accumulation and the force of gravity and pressure leads to glacial flows from higher elevations to lower. The flows, on reaching the sea, form floating ice shelves, which fringe about half of Antarctica's coastline, and parts of which sometimes break off into massive icebergs. The Antarctic continent is divided into two main regions: West Antarctica, which is the smaller region, contains the Antarctic Peninsula, Ellsworth Land, and

Marie Byrd Land; East Antarctica faces the Indian Ocean and contains Queen Maud Land, American Highland, Wilkes Land, and Victoria Land.

Antarctica was not always in its present location on the globe. Fossils of plants, insects, fish, and other animals date from the Triassic and Jurassic periods (during the Mesozoic era, the Age of Reptiles) and indicate that Antarctica broke away from the ancient landmass known as Gondwanaland (consisting of the present continents of South America, Africa, and Australia as well) about 65 million years ago. Antarctica is rich in mineral deposits and coal; these resources, however, have not been commercially exploited due to the difficulty of extracting them.

Antarctica is the coldest place on Earth, surrounded year-round by stormy seas and pack ice. In fact, parts of the coast are free of ice only several weeks at the end of summer. Average winter temperature is minus 70 degrees Fahrenheit. The lowest temperature ever recorded on the planet—minus 126.9 degrees Fahrenheit—was recorded in East Antarctica. In addition to extremely low temperatures, Antarctica's climate is characterized by rapid changeability, strong winds, and blizzards. There were no human inhabitants of Antarctica until modern times. Plant life on the continent is limited to moss, lichen, and only two kinds of flowering plants. Small insects live among the plants. Larger animals in the region, such as the emperor penguin and seals, spend only some of their time on land in Antarctica.

Early Exploration of Southern Waters

Antarctica was the last continent of Earth's seven continents to be explored and, without a native population, it can be said to have actually been "discovered." Long before humans first sighted Antarctica, Greek geographers of the fifth century B.C. hypothesized the existence of a frigid southern continent containing the southernmost place on earth, the South Pole. They later expanded this theory into the idea of the GREAT SOUTHERN CONTINENT, or Terra Australis, which was thought to occupy more temperate latitudes. It was not until the early 18th century, however, that physical evidence of Antarctica was indicated, when sealing and whaling voyages reached the edge of the pack ice surrounding the continent. In fact, the early story of the exploration of Antarctica is more about its margins—people seeing ice around it, touching on islands near it, seeing evidence that it exists, but not actually setting foot on the continent for many more years.

In the 18th century, several French expeditions to southern latitudes were undertaken in search of the fabled Great Southern Continent, including one in 1738–39 by JEAN-BAPTISTE-CHARLES BOUVET DE LOZIER, who discovered Bouvet Island. In 1772–73, YVES-JOSEPH DE KERGUELEN-TRÉMAREC led two expeditions to southern waters; in the course of the first, he located the Kerguelen Islands

in the southern Indian Ocean, close to the parallel of latitude referred to as the Antarctic Circle. The credit for determining Antarctica's boundaries falls to JAMES COOK, who circumnavigated the southern region of the globe on his second Pacific expedition of 1772–75. He attempted to sail as far south as possible but was blocked by pack ice on three different occasions. He did manage to cross the Antarctic Circle three times, however, reaching as far south as 71 degrees, 11 minutes. He also discovered the South Sandwich Islands. Somewhat ironically, Cook, the man who determined Antarctica's boundaries, never saw the land of the continent itself.

Early Sightings

Following Cook's probes, European interest in Antarctica languished for nearly 50 years. In 1819, inclement weather drove British sailor William Smith 480 miles southeast of CAPE HORN, where he discovered the South Shetland Islands. British naval officer EDWARD BRANSFIELD charted this island group, landing on King George Island. On January 30, 1820, farther to the south, he spotted snow-covered mountains on an expanse of land, which later explorers would chart as the northwest coast of the Antarctic Peninsula. The following November, American sealer NATHANIEL BROWN PALMER—who, for a time, was credited with the first sighting of the mainland before Bransfield's journey came to world attention—also sighted the Antarctic Peninsula.

Another early trip to the region was made by Baron FABIAN GOTTLIEB BENJAMIN VON BELLINGSHAUSEN, a German-born Russian naval officer in search of Terra Australis. He crossed the Antarctic Circle in early 1820. On January 28, he came within 20 miles of Princess Martha Coast of Greater (East) Antarctica and sighted the edge of the ice sheet (which some claim constitutes the first sighting of the continent). After backtracking to Australia, he made another foray south at 41 degrees east longitude, where threatening icebergs and blowing snow turned him back. In December 1820, he entered waters now known as the Bellingshausen Sea. He reached his farthest point south at 69 degrees on January 21, 1821, and discovered Peter I Island the following day. He also saw the peaks of the mountains on Alexander I Land, an island near the Antarctic Peninsula.

Another sealer, JAMES WEDDELL, was also seeking new hunting grounds in the Antarctic waters at this time. A Scot sailing for the English, he discovered the South Orkney Islands in 1822. In February 1823, benefiting from mild weather, Weddell was able to go beyond 74 degrees south latitude, but contrary winds forced him to return north shortly afterward. The southernmost point he reached in the Weddell Sea was not surpassed until the next century.

In the 1830s, the Enderby brothers, who had a business in whaling ships operating out of England since the

18th century, became interested in scientific exploration. Charles Enderby became a member of the ROYAL GEOGRAPHICAL SOCIETY in 1830, the year of its founding. Also that year, the society commissioned Englishman JOHN BISCOE to look for land south of the Indian Ocean. He achieved a latitude of 69 degrees south on January 28, 1831, off Queen Maud Land, but did not sight land until February 24, when he saw sheer ice cliffs, which he correctly guessed to be covering the land of the continent. He named the region Enderby Land after his employers. Biscoe carried out some of the first extensive mapping of Antarctica.

In 1837, JULES-SÉBASTIEN CÉSAR DUMONT D'URVILLE embarked on an exploration of the Antarctic for France and King Louis Philippe. The king suggested that Weddell's record of exploring farthest south should be bested. Dumont d'Urville's ships, the *Astrolabe* and the *Zélée*, were small and poorly equipped for polar exploration, but he managed to discover Joinville Island and to chart the channels and islands along Graham Land on the Antarctic Peninsula. After a rest and meetings with SIR JOHN FRANKLIN and John Biscoe in TASMANIA, he returned to the southern latitudes to look for the SOUTH MAGNETIC POLE, a location determined by terrestrial magnetism and in a different location from the South Pole. On January 20, 1840, Dumont d'Urville sighted ice cliffs on the shore, and, behind them, a mountain of snow and ice that rose thousands of feet into the sky. He named the new territory Adélie Land (also known as Adélie Coast), after his wife. He also determined that the South Magnetic Pole was nearby. An explorer with a strong scientific orientation, Dumont d'Urville painstakingly illustrated the 49-volume set of his explorations in the Pacific and Antarctica with drawings and maps, all of which added greatly to current knowledge of the regions. His was the first French expedition inside the Antarctic Circle as well as the last French one in the 19th century.

After much planning, the U.S. government launched the United States South Sea Surveying and Exploring Expedition in the 1830s. Naval officer CHARLES WILKES commanded the expedition of six ships, which left Norfolk, Virginia, in August 1838. After establishing a base camp at Cape Horn, he headed southward. Unfortunately, Wilkes's ships were ill-suited for their task. After surveying the Strait of Magellan (see MAGELLAN, STRAIT OF) on their return to Valparaíso, one of the ships and all her crew were lost. Later, in January 1840, another was badly damaged by pack ice off the Antarctic coast. That same month Wilkes navigated the icebergs of Piner's Bay and came within a half mile of the shore. Shortly thereafter, he encountered Dumont d'Urville's expedition, and controversy ensued as to who had seen the mainland first. It was later calculated that both had seen land on January 19. Wilkes went on to explore the edge of the Shackleton Ice Shelf. The expedition eventually circumnavigated the world, the first American expedition to do so.

Upon returning to the United States in 1842, Wilkes faced a court martial for endangering his men, but was cleared of all charges except for that of illegal punishment of some of his crew. Later explorers questioned the accuracy of Wilkes's maps upon finding an ocean where he had plotted land. Despite this controversy, Wilkes had accomplished much in biological, geological, and meteorological data collection.

SIR JAMES CLARK ROSS, who had made four journeys to the frigid waters of the north, ventured to the south in 1839. The British naval expedition's main interest was in the South Magnetic Pole. In contrast to other explorers at the time, Ross used ships that were well designed for navigating through pack ice: the *Erebus* and the *Terror*. On January 5, 1841, he entered the ice of the Ross Sea but was blocked from reaching the South Magnetic Pole by the sheet of ice that came to be called the Ross Ice Shelf. He mapped the region extensively, however, discovering Victoria Land, Mount Erebus, and Mount Terror at the base of the Transantarctic Mountain chain. He also set a new record for reaching the farthest point south, at 78 degrees, 4 minutes. The following year, he explored the Weddell Sea on the other side of West Antarctica and discovered the Ross Islands.

During the 1800s, numerous other ships made voyages to Antarctic waters, many of them for whaling purposes. In 1873, for example, EDUARD DALLMAN led a German whaling expedition to Antarctica, considered the first voyage that far south by that country.

On the Mainland

For all the trips that had been made to Antarctica, and the understanding that land existed under the ice, no known landing occurred until January 23, 1895. While on a commercial venture, Norwegian whaling captain CARSTEN EGE-BERG BORCHGREVINK and members of his crew were the first to set foot on Victoria Land. On a subsequent expedition in 1899, sponsored by the British newspaperman GEORGE NEWNES, Borchgrevink took a ship called the *Southern Cross*, which had been specially retrofitted for polar exploration, and a crew of scientists to explore the land. Traveling on land by dog sled, they investigated the Newnes and Murray Glaciers. They then sailed to Mount Erebus and Mount Terror. They found the Ross Ice Shelf had retreated 30 miles since its discovery by Ross some 60 years prior. Borchgrevink and his crew suffered both physical and psychological hardships on the trip, including anemia, malnutrition, and depression. The creaking of the boat in pack ice also reportedly disturbed the crew. Perhaps the greatest accomplishment of Borchgrevink's exploratory expedition was proving that it was possible to spend the Southern Hemisphere's winter on Antarctica, thus setting the stage for a push inland to the South Pole.

The Belgians reached Antarctica in 1897. The leader of their expedition was ADRIEN-VICTOR-JOSEPH DE GERLACHE



This photograph of the midnight sun in the Antarctic was taken during Robert Falcon Scott's expedition of 1910–12. (Library of Congress, Prints and Photographs Division [LC-USZ62-88392])

DE GOMERY, aided by first mate ROALD ENGLEBREGT GRAVNING AMUNDSEN, a Norwegian. They explored the outer coast of the Antarctic Peninsula for three months until the *Belgica*, their ship, was trapped in pack ice. They drifted with the ice for over a year into the Bellingshausen Sea. The Belgians suffered from SCURVY but managed to catch several seals as sustenance. In spring 1899, they managed to free themselves of the ice by dynamiting a canal, and eventually returned to Belgium.

In the early 20th century, many nations launched expeditions to Antarctica. In 1901, ERICH DAGOBERT VON DRYGALSKI led a German expedition to the Indian Ocean coast of Antarctica, locating and naming Kaiser Wilhelm II Land and Mount Gauss. NILS OTTO NORDENSKJÖLD explored the South Shetland Islands, Graham Land, and Mount Haddington on Weddell Sea for Sweden. Between 1901 and 1904, ROBERT FALCON SCOTT explored Victoria Land and the Ross Ice Shelf, and he located Edward VII Land in the British National Antarctic Expedition, setting a southernmost record. Beginning in 1902, WILLIAM SPIERS BRUCE, on the Scottish National Antarctic Expedition, made the first

systematic oceanographic exploration of the Weddell Sea and charted Coats Land. And, between 1903 and 1905, JEAN-BAPTISTE-ÉTIENNE-AUGUSTE CHARCOT mapped the Antarctic Peninsula, Loubet Coast, and Adelaide Land for France. Several years later, Charcot surveyed the Palmer Archipelago and located the Fallières Coast.

To the South Pole

In the early 20th century, reaching the North Pole and the South Pole was considered to be the two greatest goals in exploration. SIR ERNEST HENRY SHACKLETON, who had been part of Scott's 1901 expedition, organized an expedition to the South Pole, the British Antarctic Expedition, which set out in July 1907. After locating the Beardmore Glacier and crossing the Polar Plateau, Shackleton missed claiming this prize by only 97 miles, turning back on January 9, 1909. On January 16, a second party, including the Australian scientist SIR DOUGLAS MAWSON, reached a point 190 miles inland from the west shore of the Ross Sea, where it was determined by COMPASS readings that they had reached the South Magnetic Pole.

That spring, on April 6, 1909, at the other side of the world, two Americans—ROBERT EDWIN PEARY and MATTHEW ALEXANDER HENSON—reached the North Pole (or within a couple of miles of it) by sledge from Cape Columbia on the north coast of Ellesmere Island. (Another American FREDERICK ALBERT COOK claimed he had reached the North Pole on April 21, the year before, but this claim is disputed.)

The British organized another attempt on the South Pole, to be led by Antarctic veteran Robert Falcon Scott, who departed England in June 1910. The plan was to set out from McMurdo Sound and follow the route pioneered by Shackleton (across the Beardmore Glacier and Polar Plateau), with preestablished food and fuel depots along the way. Motorized sledges, Manchurian ponies, and dog sleds were to provide transportation. In the interim, the Norwegian Roald Amundsen, who had intended to attempt to reach the North Pole, learned of Peary's success and decided to make an attempt on the South Pole instead. His approach, also supported by food and fuel depots, was to be launched from the Bay of Whales on the edge of the Ross Ice Shelf, 65 miles closer to the Pole, and across the Axel Heiberg Glacier. The Amundsen expedition, in contrast to Scott's expedition, made use of sledges pulled by dogs alone. Amundsen's party of five men, which set out on October 19, 1911, reached the South Pole on December 14. Scott's party, also of five, set out on November 1, 1911, and reached the Pole on January 17. To their great disappointment, upon reaching the Pole, Scott's party found a marker flag and other items left by the Norwegians. Tragically, Scott and his men—one of them physician and zoologist EDWARD ADRIAN WILSON, who had been with Scott on his earlier Antarctic expedition—all perished upon running out of supplies while trapped in a blizzard.

Others mounted expeditions during this period. Between 1910 and 1912, WILHELM FILCHNER led the Second German Antarctic Expedition, during which he located the Filchner Ice Shelf on the Weddell Sea and Luitpold Land. In 1911, Douglas Mawson led an Australian expedition to Antarctica which located George V Land. In 1912, NOBU SHIRASE led a Japanese expedition to Antarctica, which explored the Ross Ice Shelf and King Edward VII Land. And, beginning in 1914, Ernest Henry Shackleton led the British Imperial Trans-Antarctic Expedition in an attempt to make the first crossing of the Antarctic continent, from the Weddell Sea to the Ross Sea. After the expedition's boat was trapped in ice and sunk in the Weddell Sea, the crew managed to take refuge on Elephant Island. In a now-famous incident, Shackleton and five others made a hazardous open boat voyage to South Georgia Island, crossed the island overland to a whaling settlement on the other side, and eventually rescued the rest of the crew, remarkably with no loss of life.

Aerial Exploration

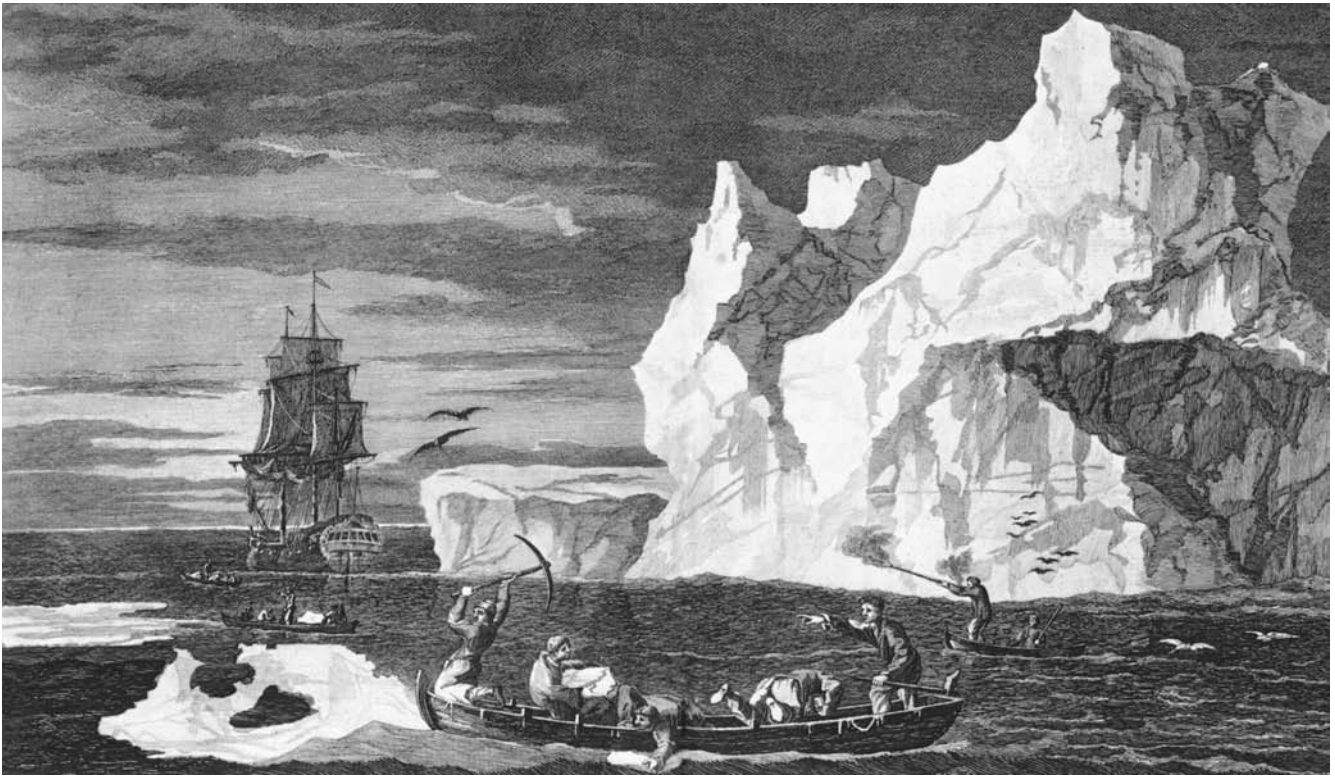
Much of the subsequent Antarctic exploration was by air. In 1929–30, American RICHARD EVELYN BYRD, who had recorded the first flight over the North Pole in 1926, repeated the accomplishment over the South Pole on November 29, 1929, during the First Byrd Antarctic Expedition. Other aviators who contributed to the aerial exploration of Antarctica were Australian Douglas Mawson, who undertook aerial surveys from 1929 to 1931, and American LINCOLN ELLSWORTH, who completed the first flight across the Antarctic continent in 1935.

Byrd's Antarctic career continued into the 1950s. In the Second Byrd Antarctic Expedition of 1933 to 1935, he became the first man to survive a winter alone in Antarctica. Between 1939 and 1941, during the early years of World War II, he established bases to counter German encroachments on territory claimed by Norway. From 1947 to 1948, after the war, Byrd carried out additional aerial reconnaissance for the United States, as part of Operation Highjump, a major fleet exercise; a total of 70,000 aerial-mapping photographs were taken by the fleet's aircraft.

International Cooperation

In 1956, Byrd served as senior adviser to the U.S. Navy's Operation Deep Freeze, conducted in preparation for the INTERNATIONAL GEOPHYSICAL YEAR (IGY) of 1957–58, with Antarctic geography a primary focus. One IGY undertaking was the Commonwealth Trans-Antarctic Expedition, headed by the Englishman SIR VIVIAN ERNEST FUCHS and the New Zealander SIR EDMUND PERCIVAL HILLARY. They accomplished the first successful crossing of Antarctica. The spirit of cooperation generated around IGY led to an Antarctic Treaty, declaring the continent a nonmilitary area to be used only for scientific study; the treaty was drafted in 1959 and has been in effect since 1961. Seven nations have active land claims—Argentina, Australia, Chile, France, Great Britain, NEW ZEALAND, and Norway. The treaty did not resolve these claims, but it did put a moratorium on future claims.

Under the treaty, Antarctic research has been ongoing, with 17 nations maintaining some 40 year-round bases with rotating staffs, on the continent. Today, Antarctica serves as a laboratory of sorts for geological, biological, and environmental research. The study of Antarctica's core samples provides information to scientists and geologists regarding the evolving world climate and the effects of pollution. In 1980, the discovery of the thinning of the ozone layer, the atmospheric gas that shields Earth from harmful ultraviolet radiation, by the British Antarctic Survey has helped make the world aware of the fragility of ecosystems and has led to a reduction in the production of chlorofluorocarbons (CFCs), pollutants linked to ozone depletion. In 1990, an international team with members from



This engraving shows a scene from James Cook's expedition on January 9, 1773, just before the crossing of the Antarctic Circle. It appeared in the explorer's book *A Voyage towards the South Pole*, published in 1777. (Library of Congress, Prints and Photographs Division [LC-USZ62-77398])

six countries, led by American Will Steger and Frenchman Jean-Louis Etienne, used dog sleds to complete the first unmechanized crossing of the Antarctic continent—a journey of about 4,000 miles. A central purpose of the expedition was scientific research, including the measurement of ground-level ozone levels and the pollutants concentrated in Antarctic mosses and lichens.



Although most of Antarctica has now been visited, its harsh environment has preserved it as one of Earth's remaining vast wilderness areas. Despite the conveniences of modern technology, travel, and research there remains a challenge similar to that faced by early explorers.

Antarctic Circle

The Antarctic Circle is a parallel of latitude, a cartographic feature based on natural phenomena, situated at 66 degrees and 33 minutes south of the EQUATOR. The circle, as defined on Earth's surface at the southern end, marks the northern limit of the area in which the Sun does not rise on the summer solstice, on or about June 22, or does not set on the winter solstice, on or about December 22. The pe-

riod of continuous night or day increases from one day along the Antarctic Circle to six months at the SOUTH POLE. The equivalent cartographic feature at the opposite northern end of Earth is the ARCTIC CIRCLE.

The Antarctic Circle was not crossed until late in the history of exploration, despite numerous expeditions in search of the GREAT SOUTHERN CONTINENT. The first recorded crossing was made by Englishman JAMES COOK on January 17, 1773. The regions within the Antarctic Circle were uninhabited until the 20th century, when outposts for scientific research were built.

See also ANTARCTIC, EXPLORATION OF THE; GEOGRAPHY AND CARTOGRAPHY; LATITUDE AND LONGITUDE; MAPS AND CHARTS.

Apollo program (Project Apollo)

The modern concept of human landing on the Moon can be traced to early writers. One such dreamer was Lucian of Samosota, a Greek, who, in A.D. 160, wrote a story of flight to the Moon on artificial wings. Another was French science fiction writer Jules Verne. In 1865, he published *From the Earth to the Moon*, in which a three-man capsule is propelled into space by an aluminum cannon. An early scientist who

began to entertain the notion of space flight was Konstantin Eduardovich Tsiolkovsky (1857–1935), a Russian inventor who was intrigued by the idea of putting an artificial SATELLITE into orbit around Earth. He is credited with understanding that, in order to escape Earth's gravitational pull, a series of booster rockets would be necessary, each stage falling away after its fuel was spent. In the 20th century, many important advances in the ROCKET were made, including American physicist Robert Hutchings Goddard's liquid-fuel rocket of 1926 and the German V2, the direction of which could be controlled, developed during World War II. As the cold war between Russia and the United States came into being, so too did the "space race." The Union of Soviet Socialist Republics (USSR; Soviet Union) scored a major victory with the first successful launch of an artificial satellite in October 1957, when *Sputnik 1* was deployed. The United States launched its first satellite, *Explorer 1*, in January 1958. The following July, the United States established the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) for the purpose of research and to carry out programs in the areas of SPACE EXPLORATION. In April 1961, Russian YURI ALEKSEYEVICH GAGARIN became the first man in space, as part of the VOSTOK PROGRAM.

In 1961, President John F. Kennedy called for the United States to land a man on the Moon and return him safely to Earth before the end of the decade. NASA organized the Apollo program in that year; it would last until 1972. Meanwhile, NASA conducted a number of programs: the MERCURY PROGRAM of 1961–63, during which ALAN BARTLETT SHEPARD, JR., became the first American in space and JOHN HERSHELL GLENN, JR., the first American to orbit the Earth; the GEMINI PROGRAM of 1964–66, which developed techniques for the trip to the Moon; and the unmanned Surveyor Program of 1966–68, which probed the lunar surface.

Among the complex problems to be solved were the acceptable range of acceleration speeds so ASTRONAUTS would not be crushed during liftoff, and the safe return through Earth's atmosphere, since friction created by air molecules would tend to incinerate a spacecraft.

Experiments and missions were carried out continuously by both the United States and Soviet Union. The Soviet Union had several firsts, but American technology slowly gained the advantage. The United States launched its own first successful Lunar Orbiter in August 1966, taking pictures of the Moon with the goal of charting appropriate landing sites for the manned mission. Through November 1968, 12 Lunar Orbiters and Surveyors were launched.

To propel the astronauts into orbit, a three-stage Saturn V rocket was used. The Apollo Spacecraft itself also consisted of three parts: the command module, the service module, and the lunar module. The total apparatus was 363 feet high and weighed 3,000 tons.

Once Moon orbit was achieved, the lunar module disconnected from the command module and service module, descending to the Moon's surface. After exploration, the ascent stage of the lunar module detached from the descent stage, re-docking with the command module. The service module was released just prior to reentry into Earth's atmosphere.

The loss of the three-person crew of *Apollo 1* by fire on the launching pad in 1967 did not lessen the resolve of the United States to be first in placing a human on the Moon. The goal was achieved on July 20, 1969, with the *Apollo 11* mission. NEIL ALDEN ARMSTRONG became the first human to walk on the Moon's surface, followed closely by Edwin "Buzz" Aldrin, Jr., while Michael Collins orbited the Moon in the command module.

There were a total of 17 missions that went under the Apollo name. Of the 12 manned missions, two went into Earth orbit (*Apollo 7* and *Apollo 9*); two went into lunar orbit (*Apollo 8* and *Apollo 10*); six landed on the Moon (*Apollo 11*, *Apollo 12*, *Apollo 14*, *Apollo 15*, *Apollo 16*, and *Apollo 17*), the final three making use of the Lunar Roving Vehicle (LRV) for wide-ranging exploration; one was lost during a test on the launch pad (*Apollo 1*); and one returned to Earth without having made its scheduled lunar landing (*Apollo 13*). Much scientific knowledge was gathered over the course of the Apollo missions, including information on seismic activities, magnetic fields, heat flows, and volcanic history. Close to 900 pounds of rocks and other physical samples were brought back to Earth, as well as 30,000 high-resolution photographs of the Moon from orbit and from the surface. The landing on the Moon and video footage of other Apollo missions has also created historic television moments.

Appalachian Mountains

The Appalachian Mountains, the second-largest mountain system in North America after the ROCKY MOUNTAINS, extend 1,500 miles from the St. Lawrence Valley in Quebec to the Gulf Coast plain in northern Alabama. The range's width varies from 100 to 300 miles. An old mountain range and much eroded, the greatest elevations are found along eastern parts, with plateau formations to the west. Peaks range in height from about 1,500 feet to 6,684 feet above sea level.

The Appalachians are discussed as three subdivisions: northern, central, and southern. The northern division extends from the Notre Dame and Shickshock Mountains of Quebec and includes the Highlands of Maine, the White Mountains of New Hampshire, and the Green Mountains of Vermont. The central division contains the Catskill Mountains of New York; the Blue Ridge Mountains of western Virginia, eastern West Virginia, western North Carolina,

and northern Georgia; the Great Smoky Mountains of western North Carolina and eastern Tennessee; and the Allegheny Mountains of Pennsylvania, Maryland, Virginia, and West Virginia (to the west of the Blue Ridge). The southern division includes the Cumberland Plateau running along the southwestern border of Virginia and southeastern Kentucky, eastern Tennessee, northern Georgia, and northeastern Alabama; and the Cumberland Mountains, the high narrow mountains forming part of the Kentucky state line and separated from the Cumberland Plateau by the Cumberland River Valley. The Black Mountains, a spur of the Blue Ridge in western North Carolina, contain the highest peaks in the Appalachian chain; Mount Mitchell near Asheville, North Carolina, at 6,684 feet, is the tallest.

The Appalachians include a number of valley systems. The Hudson River Valley in New York is one of the largest valleys. The Great Valley extending southward from the Hudson River Valley comprises a number of smaller valleys in Pennsylvania, Maryland, Virginia, Tennessee, and Alabama. What is known as the Ridge-and-Valley Province, with long sharp ridges and narrow valleys, is bordered on the west by the Cumberland and Allegheny Mountains, on the north by the Alleghenies, and on the south by the Blue Ridge and Great Smoky Mountains.

The Appalachians are divided by both water gaps and wind gaps. Water gaps are valleys with rivers running through them; wind gaps are dry valleys. The CUMBERLAND GAP in the Cumberland Plateau is one of the most famous wind gaps because of its role as a natural pass for the westward movement of pioneers.

In terms of watershed, the Appalachians serve as the eastern Great Divide. Rivers on the eastern side empty into the Atlantic Ocean; those on the western side empty into the Gulf of Mexico. Among the largest are the Connecticut, Delaware, Hudson, James, Potomac, Rappahannock, Schuylkill, and Susquehanna Rivers, which flow eastward or southeastward; and the Alleghany, Cumberland, Kanawha, Monongahela, and Tennessee Rivers, which flow westward.

The Appalachians presented an obstacle to western expansion. The earliest European explorers followed narrow Indian trails across them. In the north, rivers and the Great Lakes provided access to the west of the Appalachians. The first European crossing of the Appalachians was accomplished by the Spanish under HERNANDO DE SOTO during their meandering trek through the Southeast in 1539–43. After wintering near the Gulf of Mexico in northern Florida in 1539–40, the CONQUISTADORES headed northward through present-day Georgia and South Carolina into North Carolina. In May and June 1540, they crossed a section of the great range into what is now eastern Tennessee. Their exact route is unknown; they may have journeyed through the Great Smoky Mountains or south of them across the Blue Ridge. From there, they followed the Ten-

nessee River southwestward, crossing through the northwest corner of Georgia into Alabama, and eventually reached the MISSISSIPPI RIVER far to the west.

17th Century

Europeans did not venture into the Appalachians again until the next century. In the far north, starting in 1603, the French established a presence in what is now eastern Canada under SAMUEL DE CHAMPLAIN and explored parts of the northern extent of the mountain chain. In 1615–16, ÉTIENNE BRÛLÉ, working for Champlain, explored the entire length of the Susquehanna River from present-day New York to Chesapeake Bay in Maryland and viewed other sections of the mountain system on his return to Montreal. Over the next decades, French Jesuit missionaries pushed into Indian lands in part of the Appalachian system, such as ISAAC JOGUES, among the Mohawk in the northern Catskills. The French, however, for the most part explored westward from their settlements along the St. Lawrence River to the western Great Lakes, then southward, thus bypassing the Appalachians. In the same period, some Dutch traders also ventured westward into the Catskills, but on a limited basis.

The English, who settled to the south along the Atlantic coast, where the Appalachians are the tallest, had no easy route westward. After the founding of Jamestown, Virginia, in 1607, it took many years for colonists to travel beyond the Piedmont Region between the coast and the mountains. An early expedition was headed by German-born physician JOHN LEDERER in 1669–70; he explored the Piedmont and Blue Ridge of Virginia and North Carolina on behalf of the Virginia colony. In the early 1670s, colonial military officer ABRAHAM WOOD sponsored a number of exploratory expeditions out of Fort Henry near present-day Petersburg, Virginia, to the Appalachian frontier of Virginia and North Carolina. In 1671, THOMAS BATTS and ROBERT FALLAM crossed the Blue Ridge and reached the Kanawha and New River Valleys of present-day West Virginia for him. Two years later, GABRIEL ARTHUR and JAMES NEEDHAM reached Tennessee. Over the next years, it was mostly traders to Indian tribes who traveled into the highlands.

18th Century

Travel into the Appalachians was rare until the 18th century. In 1716, ALEXANDER SPOTSWOOD, lieutenant governor of Virginia, headed an expedition through the James River gap in the Blue Ridge to the Shenandoah Valley of western Virginia. From 1713 until the 1740s, German-born CONRAD WEISER traveled throughout western New York and Pennsylvania as an interpreter, guide, and Indian agent. Traders and frontiersmen such as JAMES ADAIR, DANIEL BOONE, THOMAS CRESAP, GEORGE CROGHAN, JOHN FINLEY, CHRISTOPHER GIST, SIMON KENTON, JAMES ROBERTSON,

and JAMES SMITH explored the Appalachian and trans-Appalachian country starting in the mid-17th century. Hunters sought game to the west of the mountains; with time, settlers sought lands.

As trails and passes were located, land grants were assigned. In the 1750s, Gist and Cresap developed an Indian trail from the Potomac in western Maryland through the Alleghenies to the Monongahela River in western Pennsylvania, which, soon afterward, during the French and Indian War of 1754–63, became known as Braddock's Road when widened to wagon width, after British general Edward Braddock (the first leg would become known as the National Road). In 1758, also during the French and Indian War, British general John Forbes built another road north of Braddock's Road, to advance on Fort Duquesne (present-day Pittsburgh) through the Alleghenies. A postwar extension joined the eastern end of the road with Philadelphia. In 1750, physician THOMAS WALKER led a surveying party through the Cumberland Gap of the Blue Ridge into what is now eastern Kentucky. In 1775, the Transylvania Land Company hired Daniel Boone and 30 others to open the Wilderness Road, from Fort Chiswell in the Shenandoah Valley through the Cumberland Gap, as a route to the Ohio Valley.



These days the Appalachians are widely used for camping and hiking. Modern-day trails give a sense of exploration in prior centuries.

See also NORTH AMERICA, EXPLORATION OF.

Arab exploration See MUSLIM EXPLORATION.

archaeology and exploration

Archaeology, a branch of anthropology involving the study of material remains of human cultures, is a form of exploration in its own right—exploration of the material past. In its search for physical evidence, archaeological studies provide the only source of information for the prehistoric period and supplement the written record for the historic period. Yet, since archaeology potentially looks at every part of the world ever inhabited or traveled by humans and since the discipline requires fieldwork, including surveys of possible sites and excavation of them, it has taken its practitioners to remote places, thereby contributing to world exploration in the broader sense. And, in some instances, archaeological discoveries resulted from exploration for other purposes.

The fields of archaeology include the following: prehistoric archaeology, archaeology of early and classical civilizations, historical archaeology, and underwater archaeology.

Studies are made of a variety of antiquities: human fossils; food remains; ruins of buildings; and artifacts such as tools, pottery, and jewelry. Some archaeologists use skills from other disciplines—chemistry, zoology, botany, geology, and geography—in specialized fields of archaeological studies. Paleoanthropology, the study of ancient human remains, uses archaeological methods. Archaeology began taking shape in the 18th century, became defined as a formal discipline in the 19th century, and was refined in the 20th century with more exacting methods of excavation and statistical sampling.

Most early archaeological studies were conducted in Europe, the Middle East, and the Americas. As early as the 15th century, excavations of Greek sculpture were carried out in Italy. Pioneers of classical archaeology include the German Johann Joachim Winckelmann, who, in the 18th century, laid the foundation for modern scientific archaeology with studies of the ancient Greeks and Romans, and the Italian Ennio Quirino Visconti, who studied Greek and Roman antiquities in the 18th century and into the 19th century. Heinrich Schliemann, the German who located the ruins of Troy in Turkey in the 19th century, and Sir Arthur Evans, the Englishman who uncovered the remains of an Aegean civilization of the Minoans in Crete in the early 20th century, captured the public's imagination with their discoveries. The finding in 1799 of the Rosetta Stone, an inscribed basalt slab giving the key to hieroglyphics of the ancient Egyptians, by troops accompanying Napoléon Bonaparte to North Africa, is considered the beginning of Egyptology, a branch of classical archaeology that centers its studies solely on ancient Egyptian culture.

Another important event in the shaping of archaeology is Danish archaeologist Christian Thomsen's classification in 1836 of three ages of human development in Europe, based on the principal materials used for tools: the Stone Age, the Bronze Age, and the Iron Age.

In the first part of the 19th century, there was a growing awareness of ancient American civilizations. In 1820, Caleb Atwater of Massachusetts published *Description of the Antiquities Discovered in the State of Ohio and Other Western States*, leading to increasing studies of earthworks and, over the next decades, an awareness of the Adena and Hopewell Indian mound-building cultures. In 1849, U.S. Army lieutenant JAMES HERVEY SIMPSON came upon Anasazi Indian ruins at Chaco Canyon in New Mexico and Canyon de Chelly in Arizona while on a military reconnaissance in New Mexico.

In 1911, American historian HIRAM BINGHAM located ruins of the great Inca civilization at Machu Picchu in Peru. The publication, in 1941 and 1943, of John Lloyd Stephens's accounts of his travels to Central America generated interest in the Maya and other pre-Columbian civilizations of the Americas and helped lead to growing archaeological activity.

Beginning in the late 19th century and early 20th century, British archaeologists, such as JAMES THEODORE BENT and GERTRUDE MARGARET BELL, carried out pioneering studies in the Middle East. In 1906–08, SIR MARC AUREL STEIN, an Anglo-Hungarian archaeologist, followed a stretch of the ancient SILK ROAD into western China and discovered the Caves of the Thousand Buddhas, a series of temples built into caves, at Tunhuang. The 1947 discovery of the Dead Sea Scrolls, fragments of the Hebrew Bible written by members of an early Christian sect, gave biblical archaeology new impetus.

The youngest branch of archaeology is underwater archaeology, in which shipwrecks and ruins of buildings lying beneath water are investigated. The development of specialized diving equipment, such as the SUBMERSIBLE, SUBMARINE, and the remotely operated vehicle (ROV), has made such studies possible.

Archaeology is now conducted around the world, with remarkable discoveries and new insights gained on a regular basis. Modern archaeologists, who travel widely and spend time in harsh landscapes on an endless quest, continue the spirit of world exploration.

See also EGYPTIAN EXPLORATION; GREEK EXPLORATION; MINOAN EXPLORATION; ROMAN EXPLORATION.

Arctic, exploration of the

The Arctic, unlike the Antarctic at the opposite end of the Earth, is a region and not a continent. It includes the northernmost of Earth's four oceans—the Arctic Ocean—as well as land areas, including the northern parts of three continents—North America, Europe, and Asia—and numerous islands. Most of the Arctic Ocean and many of the land areas are covered in ice year round, making it resemble the ice-covered landmass of Antarctica.

The term *Arctic*, derived from the Greek word *arktos* for “bear”—because the region is under the constellation known as the Bear—is applied variously. One definition is the area north of the ARCTIC CIRCLE, the parallel of latitude situated at 66 degrees 33 minutes, marking the point at which the Sun neither sets on the day of summer solstice nor rises on the day of winter solstice. Another broader definition is the area north of the summer isotherm, a shifting cartographic line where the average annual temperature is 32 degrees Fahrenheit or less and the mean temperature for the warmest summer month is 50 degrees Fahrenheit. The Arctic is also defined as the area north of the tree line, beyond which trees do not grow. (The tree line corresponds roughly to the summer isotherm.)

Arctic winters are long and severe, with few hours of daylight. Although there is little precipitation, gale-force winds stir up surface snow and create blizzard conditions and enormous drifts. Coastal regions generally have warmer

temperatures and heavier precipitation than colder and drier inland regions.

The ancient continental shields—regions composed mostly of the igneous rock granite and the metamorphic rock gneiss—of North America, Europe, and Asia surround a large basin occupied by the Arctic Ocean, the smallest of the Earth's four oceans. The Arctic Ocean extends south from the NORTH POLE, the northernmost place on Earth, to the north coasts of the three continents. It opens to the Atlantic Ocean between northern Europe and eastern GREENLAND, with ICELAND in the middle; and between northern North America (and its islands) and western Greenland through the Davis Strait. It opens to the Pacific Ocean through the BERING STRAIT between northwestern North America and northeastern Asia. Among the larger rivers emptying into the Arctic Ocean are the Mackenzie and Coppermine Rivers in North America, and the Ob, Yenisey, and Lena Rivers in Asia. The total surface area of the Arctic Ocean is 5.4 million square miles. The following seas are part of the Arctic Ocean: Norwegian, Barents, Kara, Laptev, East Siberian, Chukchi, Beaufort, and Greenland. HUDSON BAY, linked to the Arctic Ocean via the Foxe Channel and the Atlantic Ocean via the Hudson Strait, can be considered an arm of either ocean. The deepest point in the Arctic Ocean is 17,880 feet, but the average depth is a relatively shallow 4,300 feet because of the shallow expanses on the continental shelves. Most of the Arctic Ocean is frozen all year, other than an area north of Scandinavia and northeast of Iceland. During the brief summer, the PACK ICE thaws and open water, containing some DRIFT ICE, appears along much of coastal Alaska, Canada, and SIBERIA.

The islands of the Arctic Ocean lie on the continental shelves extending from the continents. Greenland, to the northeast of North America, is the largest island in the region. Part of Greenland, as well as all of Iceland to its east, lies south of the Arctic Circle. The Canadian Arctic Archipelago—including Victoria Island, Ellesmere Island, Baffin Island, and the Queen Elizabeth Islands—extends north and east along the northern North American mainland. North of Scandinavia lies the archipelago of Svalbard (formerly known as Spitsbergen). North of Russia are Franz Josef Land, Novaya Zemlya, Severnaya Zemlya, the New Siberian Islands, and Wrangel Island.

The treeless coastal plains known as tundra extend throughout much of the Arctic. The subsoil remains frozen all year in a condition known as permafrost. As a result, surface water does not drain, creating numerous lakes, ponds, marshlands, and mud, along with fog. Little vegetation grows other than mosses, lichens, and scrub brush. Mountain ranges and low plateaus rise up from the plains especially in northern Alaska, the Yukon territory, and northeastern Siberia. Of the islands, Ellesmere Island, Baffin Island, Iceland, and Greenland consist predominantly of



Frederick Albert Cook took this photograph during his travels to Arctic regions in the late 19th or early 20th century. (*Library of Congress, Prints and Photographs Division [LC-USZ62-128023]*)

highlands; Greenland in fact is a high plateau covered year round by an ice cap, except along its coasts.

Arctic fauna include many species of fish; aquatic mammals, such as the whale, walrus, and seal; and land mammals, such as moose, caribou, reindeer, musk ox, polar bear, wolf, fox, hare, and squirrel. In springtime, birds migrate to Arctic regions. Insects breed during the short summers, especially in marshlands.

Because of its harsh conditions, the Arctic has been sparsely populated over the centuries. Yet, long before the region came to be mapped, humans survived there for centuries. It is thought that the Arctic's earliest inhabitants, various peoples of Mongolic stock, migrated northward from central Asia and spread westward into Europe and eastward into North America. Major groups include the Sami (Lapps) and Komi (Zyrian) of Europe; the Samoyed (Nentsy) of western Russia; the Yakut, Tungus, Yukaghir, and Chukchi of eastern Russia; and the Inuit (Eskimo) and Aleut of North America.

Earliest Voyages to the Arctic

Greek scholar PYTHEAS of the fourth century B.C. was the first known European traveler to extreme northern latitudes.

His account of his journey six days north of the British Isles, perhaps near or across the Arctic Circle, has not survived, but later geographers, such as Greek STRABO and Roman PLINY THE ELDER of the first century A.D., commented on his observations regarding ULTIMA THULE, supposedly the northernmost lands. Strabo was skeptical in regard to Pytheas's claims.

During the Middle Ages, Irish monks, such as SAINT BRENDAN, ventured out into the Atlantic on sea pilgrimages. Some of them established colonies on the uninhabited Iceland by A.D. 800. Yet, they were not known to have reached the Arctic Circle just to the north of Iceland.

The VIKINGS, accomplished navigators, explored northern waters and very likely crossed into the Arctic waters from their Scandinavian lands. Two early Norsemen known to have reached Iceland are NADDOD and GARDAR SVARSSON in the ninth century. The Norse presence drove away the Irish settlers. In the late 10th century, ERIC THE RED reached Greenland. Both Iceland and Greenland were colonized. His son LEIF ERICSSON is thought to have reached the Arctic regions of North America at the start of the 11th century. He came into contact with a people the Vikings referred to as *Skraelings*, who were very likely Inuit.

At about the same time, Norwegians and Russians reached the Arctic coast of northern Europe and established contacts for purposes of taxation and trade with indigenous peoples.

Passage to the Far East

Arctic exploration during what is known as the EUROPEAN AGE OF EXPLORATION, beginning in the 15th century, revolved primarily around the search for practical trade routes from Europe to the Far East. Some mariners sought an eastward route from the Atlantic to the Pacific north of Europe and Asia by way of the Arctic Ocean—a NORTHEAST PASSAGE. Others sought a westward route through the Americas—a NORTHWEST PASSAGE. All the great European powers of the time—Portugal, Spain, the Netherlands, England, and France—launched expeditions in search of one or both passages. With the geography of much of Europe and Asia well known, expeditions in search of the Northeast Passage traveled directly to northern latitudes. In the decades after the European discovery of the Americas in 1492 by CHRISTOPHER COLUMBUS—an Italian mariner sailing for Spain—many expeditions explored the coasts of both North and South America—exploring bays and rivers—before narrowing down the search for a Northwest Passage to the extreme north.

Early Portuguese Expeditions

Portuguese mariner GASPAR CÔRTE-REAL claimed to have made a voyage in 1499, in the course of which he explored the seas to the west of Greenland. He also claimed he had found the entrance to the Strait of Anian (see ANIAN, STRAIT OF), another name for the Northwest Passage. In 1500, he carried out a documented voyage into Davis Strait along the west coast of Greenland before being forced back by pack ice. On this journey he very likely crossed the Arctic Circle, becoming the first European to do so since the time of the Vikings. Côrte-Real's ship disappeared after heading southward.

Another Portuguese explorer, JOÃO FERNANDES, is thought to have led a Portuguese maritime expedition to North America, also in 1500 and also reaching Greenland. Other Portuguese for a time carried voyages to northeastern North America to reach the fishing grounds off Newfoundland but, having established an eastward water route to Asia around the tip of Africa and having established a foothold in the Americas in Brazil, carried out no more explorations to the Arctic. Spain, Portugal's chief competitor at the time, also concentrated its efforts to the south, fanning out from the Caribbean Sea.

Early British Expeditions

Italian JOHN CABOT, who made the earliest transatlantic voyages for England and reached northeastern North America, also neared Arctic waters. John Cabot possibly explored

southwestern Greenland in his voyage of 1497, and one of his three sons, SEBASTIAN CABOT, possibly entered the Hudson Strait between the North American mainland and Baffin Island, and perhaps even reached eastern Hudson Bay, while in search of the Northwest Passage in 1509, although there is no documentation to determine how far west he actually reached.

Sebastian Cabot was the first governor of the London-based MUSCOVY COMPANY, the primary purpose of which was to locate the Northeast Passage. As such, he sponsored expeditions under HUGH WILLOUGHBY, RICHARD CHANCELLOR, and STEPHEN BOROUGH to the Arctic Ocean north of Europe in the 1550s, during which the two islands of Novaya Zemlya ("New Land" in Russian) north of Russia were reached. Willoughby also became the first Englishman to cross the Arctic Circle. The Muscovy Company continued to back other expeditions over the next years, among them a 1607 expedition headed by HENRY HUDSON. Hudson sailed westward to Greenland, exploring its east coast, then, returning east and north, he came upon Spitsbergen. On a second trip in 1608, he took the more conventional route—directly north and east—and explored Novaya Zemlya but was forced back by ice.

In the meantime, in the latter part of the 16th century, geographer SIR HUMPHREY GILBERT once again promoted the idea of a Northwest Passage. In 1576–78, SIR MARTIN FROBISHER headed three British expeditions to northern Canada, just south of the Arctic Circle, during which he made the European discovery of Frobisher Bay on southeastern Baffin Island. He also entered the Hudson Strait. In 1585–87, JOHN DAVIS also headed three expeditions to some of these same waters, exploring the strait named after him, reaching the northernmost latitude known attained until that time.

British expeditions to the region continued into the 17th century. In 1605–07, JAMES HALL, who had carried out three expeditions to western Greenland for Denmark and drafted charts of Greenland's west coast, also headed one for British merchants in 1612, during which he was killed by an Inuit for having kidnapped other Inuit on an earlier voyage. Henry Hudson sailed all the way through Hudson Strait and made what is considered the European discovery of Hudson Bay in 1610–11. Both are named for him. After wintering on James Bay, the southern extent of Hudson Bay, the crew mutinied; Hudson, his son, and some ailing crew members were set adrift in a small boat and were never seen again. SIR THOMAS BUTTON headed a follow-up expedition to the Hudson Bay in 1612–13, reaching the mouth of the Nelson River and exploring the coast of Southampton Island. WILLIAM BAFFIN, who had sailed with James Hall in 1612, and ROBERT BYLOT carried out two expeditions. The first, in 1615, took them to Hudson Bay's northwest coast and Foxe Basin, leading to a determination that Hudson Bay provided no navigable outlet for a Northwest Passage

(although later explorers would search the region again). The second, in 1616, took them along the west coast of Greenland into Baffin Bay and along the northeastern Baffin Island (both were named for Baffin) as far north as Lancaster Sound between Baffin Island and Devon Island. They found the sound impassable because of ice conditions. Their northernmost record would endure for 200 years. (It would later be determined that Lancaster Sound was in fact the eastern entrance to a water route between the Atlantic and the Pacific.) In 1631, LUKE FOXE, and, in 1631–32, THOMAS JAMES, further explored Hudson Bay.

Danish Expeditions

Denmark launched its own expeditions to the Arctic regions in the early 17th century, sponsored by King Christian IV, known as the Danish Sailor King because of his efforts to make Denmark a maritime power. The Danish monarch hoped to reestablish contact with the Viking colonies after a lapse of two centuries. British mariner James Hall sailed for him in 1605 and again in 1606, reaching the west coast. No Scandinavian colonists were found, but the Danes had contact with the Inuit. An expedition the next year failed to reach Greenland. In 1619–20, Danish mariner JENS ERIKSEN MUNK sailed to Hudson Bay in search of the Northwest Passage and explored the Churchill River region.

Dutch Expeditions

Beginning in the late 16th century, the Dutch launched expeditions to the northern waters for purposes of trade and in the hope of navigating the Northeast Passage. The White Sea Trading Company, founded in 1565, backed a number of attempts. OLIVIER BRUNEL led two of them in 1584–85. Having reached the Ob River overland from Moscow, he hoped to reach its mouth by way of the Kara Sea. His passage was blocked by ice both times around Novaya Zemlya.

The Dutch launched many other expeditions to the region, three of them in the 1590s involving the navigator WILLEM BARENTS. Geographer JAN HUYGHEN VAN LINSCHOTEN, a principal backer, participated in the first two. The waters around Novaya Zemlya proved the westernmost limits of the Dutch expeditions of the period, although, during the first expedition in 1594, Linschoten's ship managed to pass along the southern end of Novaya Zemlya and enter the Kara Sea. On his third expedition in 1596–97, Barents headed north of Norway, charted Bear Island, and reached Spitsbergen, the first European to do so since the Vikings. He proceeded eastward and entered the Kara Sea north of Novaya Zemlya. After a difficult winter, Barents perished from SCURVY.

In 1609, after his earlier expeditions for the Muscovy Company, Englishman Henry Hudson, in the employ of the DUTCH EAST INDIA COMPANY, carried out another attempt to locate the Northeast Passage. He approached Novaya

Zemlya once again, but, because of icy conditions, he headed westward across the Atlantic to the Americas and investigated the coast of Newfoundland and the Hudson River. As these expeditions seemed to prove the Kara Sea un-navigable, both the Dutch and the English turned their attention to the rich fishing and whaling grounds near Spitsbergen.

Russian Expeditions

In the mid-17th century, the Russians—especially Russian Cossacks—began exploring Arctic regions of Siberia overland from the west. In the 1640s–50s, MIKHAIL STADUKHIN, with a party of Cossacks, explored the Arctic coast of Siberia around the Kolyma River and on the Gulf of Anadyr. The earliest recorded sighting of the BERING STRAIT was by Cossacks led by SEMYON IVANOVICH DEZHNEV in 1648.

The following century, Czar Peter the Great sponsored a number of expeditions to northeastern Siberia and both the Arctic and Pacific Oceans, among them the First Kamchatka Expedition of 1725–30, under VITUS JONASSEN BERING, a Danish explorer in service to Russia, and Russian naval officer ALEKSEY ILYICH CHIRIKOV. Bering first charted the Bering Strait in 1728; the strait was subsequently named for him. Starting in 1733, Bering and Chirikov also led the Great Northern Expedition to the Arctic and Pacific coasts of Siberia, during which they explored the Gulf of Anadyr and the Chukchi Sea, crossed the Bering Strait, and, in 1741, made the European discovery of Alaska. Bering, along with 18 of his crew, perished from scurvy in the fall of that year. In 1742–43, SIMEON CHELYUSKIN, also part of the Great Northern Expedition, explored along the Arctic coast from the White Sea to the Leptev Sea, in the course of which he rounded Cape Chelyuskin, the northernmost point of Asia.

The Russians continued explorations of northern Siberia and the Arctic Ocean. In 1760–62, IVAN BAKHOV navigated from the Lena River eastward to the mouth of the Kolyma River. The next year, STEPAN ANDREYEV traveled overland from Fort Anadyr on the Bering Sea to the Arctic coast. While exploring the Bear Islands opposite the mouth of the Kolyma River, he sighted New Siberia Island, part of the island group known as the New Siberian Islands, thus making the European discovery of that group. In the Northeastern Secret Geographical and Astronomical Expedition of 1785–93, searching for the Northeast Passage, Englishman JOSEPH BILLINGS, along with ANTON BATAKOV and GAVRIIL ANDREYEVICH SARYCHEV, explored the Chukchi Peninsula and the Bering Strait.

The Fur Companies

The late 18th century saw renewed activity in the Arctic, especially by fur companies. The establishment of the HUD-

SON'S BAY COMPANY in 1670 to develop the FUR TRADE with Native Americans and the settlement of Hudson Bay led to a number of expeditions; among them were ones led by JAMES KNIGHT and HENRY KELSEY to the Marble Island region off the bay's northwest coast, in 1719–21. All members of Knight's expedition perished, leading to Kelsey's subsequent search expeditions. In 1741, CHRISTOPHER MIDDLETON explored Wager Bay and Repulse Bay on the west coast. And, in 1746–47, WILLIAM MOOR explored Chesterfield Inlet and reexplored Wager Bay.

In the 1760s–70s, SAMUEL HEARNE led a number of overland expeditions from the west coast of Hudson Bay for the Hudson's Bay Company. The company's charter included an obligation to search for the Northwest Passage as a shipping route to the Pacific Ocean. On his third expedition, with the help of Chipewyan Indian guide MATON-ABBEE, Hearne followed the Coppermine River northward, reaching its mouth on the Arctic Ocean in July 1771. On the return journey Hearne made the European discovery of the Great Slave Lake.

The NORTH WEST COMPANY, organized in 1779, also sponsored northern expeditions. In 1789, ALEXANDER MACKENZIE, a fur trader for the North West Company, explored from Great Slave Lake along the Mackenzie River, named after him, to its mouth on the Arctic Ocean.

Also in the late 18th and early 19th centuries, the RUSSIAN-AMERICAN COMPANY sent out expeditions, exploring coastal and interior Alaska.

Renewed British Efforts

Starting in the late 18th century and well into the 19th century, Britain began looking to the Arctic once again, in large part in the hope of navigating the Northwest Passage. The government continued to have a role as a sponsor. The ROYAL SOCIETY, a scientific organization founded in 1670, also played a part as did the Hudson's Bay Company.

The Royal Society was the principal backer of the first scientific attempt on the North Pole. In 1773, naval officer CONSTANTINE JOHN PHIPPS headed an expedition of two ships with reinforced hulls to resist ice. Although passage north was blocked by ice east of Greenland and the expedition fell far short of its goal, Phipps's writings on Arctic navigation proved useful to later explorers. A British whaler and his son, WILLIAM SCORESBY, SR., and WILLIAM SCORESBY, JR., reported to the Royal Society, at the time headed by SIR JOSEPH BANKS, about their findings relating to Arctic navigation and natural science during whaling expeditions in 1806–17.

Beginning in 1818, SIR JOHN BARROW, second secretary of the Admiralty and later one of the founders of the ROYAL GEOGRAPHICAL SOCIETY, organized a number of expeditions for the British government to the Arctic. Among those who sailed for him were SIR JOHN ROSS, DAVID BUCHAN,

SIR WILLIAM EDWARD PARRY, SIR JOHN FRANKLIN, SIR GEORGE BACK, and FREDERICK WILLIAM BEECHEY. In 1818, Ross explored Lancaster Sound in the Canadian Arctic, and Buchan led an attempt on the North Pole by a hoped-for seaward passage due north. Ross mistakenly concluded that the sound was enclosed by a mountain, and Buchan would be repelled by ice. In 1819–27, Parry led four Arctic expeditions, the first three to the Canadian Arctic. He passed through Barrow Strait and reached as far west as Melville Island; explored Hudson Bay and Foxe Basin and the Fury and Hecla Strait between the Melville Peninsula and Baffin Island; explored the Gulf of Boothia and Prince Regent Inlet; and set a northernmost record in an attempt to reach the North Pole by small flat-bottom boats and sledges from Spitsbergen. In 1819–22, Franklin headed a British naval overland expedition eastward along Canada's Arctic coast from the mouth of the Coppermine River, along Coronation Gulf, to Kent Peninsula. Beechey, in his 1825–28 expedition to the Pacific, reached Point Barrow on the north coast of Alaska. And in 1833–35, Back led an overland expedition north and east of the Great Slave Lake, locating what became known as the Back River and exploring the Arctic coastline.

John Ross and his nephew, SIR JAMES CLARK ROSS, headed a privately funded expedition in 1829–33, during which they explored the Boothia Peninsula and determined the location of the NORTH MAGNETIC POLE (the exact northern point of Earth's magnetic polarity). In 1837–39, THOMAS SIMPSON and PETER WARREN DEASE, in the employ of the Hudson's Bay Company, surveyed much of the Arctic coastline of Alaska and Canada.

In Search of Franklin

In 1845, the year of Barrow's retirement from the Admiralty, Sir John Franklin led another British naval expedition to the Canadian Arctic in an attempt to navigate the Northwest Passage from east to west. The *Erebus*, under Franklin's command, along with the *Terror*, under Lieutenant FRANCIS RAWDON MOIRA CROZIER, sailed from England on May 29, 1845; the ships were last seen by a Scottish whaling vessel on July 26, 1845, in upper Baffin Bay, west of Greenland, near the approach to Lancaster Sound. By 1847, without any word from or of the expedition, concern began to mount. Over the next decades, some 50 expeditions, involving approximately 2,000 men, were launched to solve the mystery of what happened to the Franklin expedition (see SEARCHES FOR MISSING EXPLORERS).

In 1847–49, SIR JOHN RICHARDSON, along with JOHN RAE of the Hudson's Bay Company, led a British land-based expedition that reached Canada's Arctic coastline by way of the Mackenzie River, then proceeded eastward to Dolphin and Union Strait. In 1849–50, Rae continued the search on his own, reaching Victoria Island. In 1848–49, Sir James

Clark Ross led a British naval expedition that traveled through Lancaster Sound as far as Barrow Strait and southward from Somerset Island into Peel Strait. In 1850–51, Sir John Ross returned to the Arctic on a privately funded expedition and wintered in Barrow Strait. In 1850–54, SIR ROBERT JOHN LE MESURIER MCCLURE led an expedition that entered Arctic waters from the west by way of the Bering Strait. While proceeding eastward, he located Prince of Wales Strait between Banks Island and Victoria Island; he also reached a point far enough west—Melville Island, which had previously been reached from the east—to prove that the Northwest Passage did in fact exist. At about the same time, in 1850–55, SIR RICHARD COLLINSON, also approaching from the west, explored the Arctic coasts of Alaska and Canada as far east as Victoria Island. Spending the winter of 1852–53 there, he retrieved some pieces of iron from Inuit that had probably come from one of Franklin's ships. Also during this period, in 1852–54, SIR EDWARD BELCHER headed an expedition from the east that navigated west of Lancaster Sound. SIR FRANCIS LEOPOLD MCCLINTOCK located Eglington Island and Prince Patrick Island at the edge of the Beaufort Sea.

Meanwhile, in 1848, Lady JANE FRANKLIN had offered a reward for the rescue of her husband or for information as to his fate. She later gained the support of American shipping magnate Henry Grinnell, who, in 1850–51, sent out an expedition under EDWIN JESSE DE HAVEN, a U.S. naval officer. While trapped in the pack ice north of Baffin Island and Lancaster Sound and drifting with it for some 1,000 miles, De Haven located Grinnell Land on northern Devon Island. Lady Franklin paid for a number of expeditions from her own funds as well. In 1853–55, ELISHA KENT KANE, another naval officer who had sailed with De Haven, led the second U.S. Grinnell expedition in search of John Franklin. On this voyage, expedition members explored Greenland's Humboldt Glacier and Ellesmere Island.

The expedition that located the first irrefutable proof of the missing Franklin expedition was headed by John Rae. In his expedition of 1853–54, during which he explored the Boothia Peninsula and located a strait (Rae Strait), thus proving that King William Island was not connected to the Canadian mainland, he interviewed an Inuit who told him of a story of Europeans marching southward from King William Island toward the estuary of the Back River and eventually perishing. Rae also found relics from the Franklin expedition. Yet, Rae also reported that evidence indicated expedition members had practiced cannibalism in their final days.

In 1857, Lady Franklin sponsored another expedition, headed by Francis McClintock. McClintock approached from the east and Baffin Bay. While in Arctic waters, he erected a monument on Beechey Island commemorating Franklin's Arctic exploits. He also circumnavigated King

William Island, confirming that it was an island. On King William Island, a party under McClintock found a sledge and several skeletons. Another party led by Lieutenant W. R. Hopson crossed Simpson Strait to the Boothia Peninsula and found letters written by Franklin's men indicating that Franklin and other expedition members had died while the ship had been icebound and that the survivors under Lieutenant Crozier had perished while heading for Fort Resolution, a Hudson's Bay Company's post on the Back River. McClintock returned to England with his reports in 1859.

Other expeditions continued to search for more clues. In 1860–62, CHARLES FRANCIS HALL, backed by Henry Grinnell, explored Frobisher Bay, where he found evidence of Frobisher's expedition centuries before. On still another expedition funded by Grinnell in 1864–69, Hall sailed to King William Island and Boothia Peninsula, and, from Inuit in the region, he obtained relics of the Franklin expedition. He also located a skeleton. In 1878–80, FREDERICK SCHWATKA, sponsored by the AMERICAN GEOGRAPHICAL SOCIETY and a whaling company, traveled overland by sledge from Hudson Bay to King William Island, covering more than 3,000 miles. He, too, found artifacts and human remains from the Franklin expedition.

Many Nations

The search for John Franklin was international news and helped inspire Arctic exploration by a number of nations. The major goal now was to reach the North Pole. In 1860–61, during the period he helped underwrite voyages in search of Franklin, Henry Grinnell also sponsored an expedition under American ISAAC ISRAEL HAYES, which explored the Greenland ice cap and attempted to find an open polar sea north of Greenland and Ellesmere Island, Canada's northernmost point, in the hope of reaching the North Pole. In 1868, a Swedish expedition under geologist NILS ADOLF ERIK NORDENSKJÖLD set out from Spitsbergen for the Pole but was turned back by pack ice; he failed again in 1872–73. Meanwhile, in 1871, American Charles Francis Hall, again backed by Grinnell, reached as far as the Lincoln Sea from northern Ellesmere Island, setting a new northernmost record. In 1875–76, SIR GEORGE STRONG NARES sailed beyond northern Ellesmere Island in still another failed attempt but broke the northernmost record.

Germany became active in Arctic explorations with two expeditions to Greenland under KARL CHRISTIAN KOLDEWEY in 1868–70. German geographer AUGUST HEINRICH PETERMANN still promoted the idea of an "open polar sea." His ideas also helped inspire the Austro-Hungarian Arctic Expedition, under Austrian JULIUS VON PAYER and German-born KARL WEYPRECHT, which made the European discovery of Franz Josef Land, an archipelago north of Novaya Zemlya.

In 1878–79, Swedish geologist Adolf Nordenskjöld led the Vega Expedition, which made the first successful navigation of the long-sought Northeast Passage from Norway along Asia's Arctic coast to the Bering Strait. By returning to Europe by way of the Suez Canal in 1880, it also completed the first circumnavigation of Europe and Asia.

An American attempt at reaching the North Pole and making an east-to-west crossing of the Northeast Passage in 1879–81, headed by GEORGE WASHINGTON DE LONG, resulted in the eventual death of De Long and 12 expedition members after the ship had become trapped in ice north of Wrangel Island.

For the International Polar Year of 1882–83, a number of nations dedicated themselves to studying natural phenomena in Arctic regions of the world. Among the expeditions was the U.S. Army's Lady Franklin Bay Expedition headed by ADOLPHUS WASHINGTON GREELY in 1881–84, with the participation of OCTAVE PAVY. This expedition explored the northwest coast of Greenland and Ellesmere Island and set a new northernmost record. Relief vessels were unable to break through the ice of Smith Sound and reach Greely's base, however, and 17 members of the expedition perished from cold and starvation. In 1886–1900, another American explorer, ROBERT EDWIN PEARY, carried out five expeditions to the same regions. It was in 1900 that Peary, on reaching Greenland's northernmost point, Cape Morris Jesup, demonstrated conclusively that it was an island and not a land mass extending to the North Pole. In 1888, Norwegian FRIDTJOF NANSEN made a crossing of southern Greenland. In 1893–96, he headed a Norwegian expedition that attempted to approach the North Pole by purposely having a ship become icebound and drift northward from the New Siberian Islands, then continuing by kayak and sledge. The expedition failed to reach the Pole but set a new northernmost record. A British expedition under FREDERICK GEORGE JACKSON rescued Nansen on Franz Josef Land. In 1892–94, Estonian geologist EDUARD VON TOLL led a Russian expedition to the Siberian Arctic by way of Cape Chelyuskin and explored the deltas of the Yana, Indigirka, and Kolyma Rivers. In 1897, Swede SALOMON AUGUST ANDRÉE tried to reach the Pole from Spitsbergen by air, in a BALLOON, perishing in the attempt. In 1898–1902, Norwegian OTTO SVERDRUP, after exploring the west coast of Ellesmere Island, reached the Sverdrup Islands, which are named after him. At the turn of the last century, in 1899–1900, LUIGI AMEDEO DI SAVOIA D'ABRUZZI led an Italian expedition that attempted to reach the Pole from Franz Josef Land; it failed to do so but set a new northernmost record.

Denmark sent out a number of expeditions to Greenland, to which it had a territorial claim. In 1902–04, LUDWIG MYLIUS-ERICHSEN, accompanied by Danish-Inuit ethnologist KNUD JOHAN VICTOR RASMUSSEN, explored the

northwest coast. In 1906–07, Mylius-Erichsen explored the northeast coast, locating the peninsula known as the Northeast Foreland, losing his life to the extreme conditions. Rasmussen continued his studies in the Arctic into the 1920s.

It was a Norwegian who made the first successful navigation of the Northwest Passage—ROALD ENGELBREGT GRAVNING AMUNDSEN. Departing Norway in June 1903, he sailed past Greenland to Baffin Bay and Lancaster Sound, then down Peel Strait into Franklin Strait. The expedition wintered at a bay on the south coast of King William Island, and he and his crew made measurements in the area until August 1905. In making the passage, he then proceeded through Rae Strait, staying close to the shore in Queen Maud Gulf, through Dease Strait and Coronation Gulf, into what came to be known as Amundsen Gulf. On September 2, the group became trapped in ice near King Point. In July 1906, when the ship was finally freed from the ice, the expedition continued along the northern Canadian border, around Alaska and into the Bering Strait.

The North Pole Attained

Robert Peary's expeditions to Greenland helped prepare him for an assault on the North Pole and convinced him the best route was from northern Ellesmere Island. In 1902, he made an unsuccessful attempt to reach the North Pole by way of Robeson Channel, the northernmost stretch of water between Greenland and Ellesmere Island; and, then again, in 1905–06, from Cape Columbia on Ellesmere Island's north coast. On both expeditions, he set northernmost records.

In July 1808, Robert Peary departed New York for a third attempt, again from Cape Columbia. Peary, his assistant, MATTHEW ALEXANDER HENSON, and four Inuit departed the next spring, on March 1, and, after a month-long trek across the frozen sea with sledges and dogs, reached the North Pole on April 6, 1909. In the meantime, another American, FREDERICK ALBERT COOK, claimed to have reached the North Pole by the Ellesmere Island route on April 21, 1908. The controversy on who actually had been first to the Pole lasted for some time. Peary, with more geographic data to support his claim, received official recognition from the U.S. Congress in 1911. (He may have in fact missed the exact geographic North Pole by a couple of miles; it is now thought that Cook never even came close.)

Ongoing Explorations

Although the Northeast Passage, Northwest Passage, and North Pole had all been conquered, much of the Arctic still remained unexplored. Arctic exploration continued to be an international effort, although nations with Arctic lands became especially active. In 1904–11, Quebecois mariner JOSEPH ELZÉAR BERNIER maintained that any country adjacent to the Arctic had rights to any islands within a triangle

from the north shore of its mainland to its apex at the North Pole and led a number of expeditions to chart northern islands and assert Canadian sovereignty. In 1913–18, Canadian-born anthropologist VILHJALMUR STEFANSSON, of Icelandic ancestry, led an expedition to the Beaufort Sea and located uncharted islands in the Canadian Arctic Archipelago north of Prince Patrick Island. In 1908, Russian mariner and fur trader NIKIFOR ALEKSEYEVICH BEGICHEV determined that Bolshoy Begichev in central Siberia is an island and not part of a peninsula.

A new phase of Arctic exploration began in the 1920s, as a result of progress in aviation (see AVIATION AND EXPLORATION). American RICHARD EVELYN BYRD, after making a series of flights over the Greenland ice cap in 1924–25, carried out the first flight over the North Pole in 1926. Several days later, Norwegian Roald Amundsen, American LINCOLN ELLSWORTH, and Italian UMBERTO NOBILE flew over the Pole in an AIRSHIP. In 1928, eight men died in the course of Nobile's abortive attempt to land at the Pole by airship. Roald Amundsen died on his rescue flight. In 1930, HENRY GEORGE WATKINS led a British expedition that made use of aircraft as well as watercraft to survey the coasts of Greenland. American Arctic explorer LOUISE ARNER BOYD made the first flight by a woman over the North Pole in 1955.

In 1931, Australian SIR GEORGE HUBERT WILKINS attempted unsuccessfully to reach the North Pole from Spitsbergen by SUBMARINE. The U.S. atomic submarine *Nautilus* under Commander William R. Anderson did so in 1958.

Various nations also began establishing permanent scientific bases in Arctic regions. For example, in 1929–30, ALFRED LOTHAR WEGENER of Germany established the first permanent weather stations on the interior of the Greenland ice cap, and, in 1937, OTTO Y. SCHMIDT of the Union of Soviet Socialist Republics (USSR; Soviet Union) set up the first manned scientific post near the North Pole. During the INTERNATIONAL GEOPHYSICAL YEAR of 1957–58, different nations established more than 300 Arctic observation stations, some of them on ice floes. Most of the Arctic has now been surveyed by AERIAL PHOTOGRAPHY and remote sensing by aircraft and artificial SATELLITE.



The exploration of the Arctic, with its harsh climate and ice-choked waters, has been one of the great challenges humankind has faced, with many lives lost. Some remote regions have now been settled, many of them for the development of mining and fishing. Animal husbandry is practiced in some northern lands, especially reindeer herding. Roads provide access to some communities; others are reached only by air. Icebreakers now keep many of the waterways open. The Arctic is also a valuable laboratory for scientists studying Earth's history and monitoring pollution.

Arctic Circle

The Arctic Circle is a parallel of latitude, a cartographic feature based on natural phenomena, situated at 66 degrees and 33 minutes north of the EQUATOR. The location of the Arctic Circle is determined by the fact that Earth is tilted on its axis by 23 degrees and 27 minutes as it revolves around the Sun. Above the Arctic Circle the Earth's relationship to the Sun is different than it is for the rest of the Northern Hemisphere, with a 24-hour period each year when the Sun does not set and a 24-hour period of continuous darkness.

From December 22 to June 22, the amount of daylight within the Arctic Circle is on the increase. On or about June 22, the summer solstice, the entire region experiences 24 hours of daylight, as Earth is tilted toward the Sun for a complete revolution. From June 22 until December 22, the amount of daylight is decreasing, and, on or about December 22, the winter solstice, the area is in darkness for 24 hours, while the region is in Earth's shadow. The situation is more extreme at the NORTH POLE, which sees the sun continuously from March 20 until September 23, with no sunlight from September 23 to March 20. These effects are mitigated by the transmission of light through the atmosphere, and the fact that the North Pole is a single point, and the land surrounding it has less extreme conditions.

The annual pattern of daylight has led to the region of Scandinavia north of the Arctic Circle being dubbed "the land of the midnight sun." Such a name tells only half the story, for there is the equal period of time when the sun is not to be seen. While these solar relationships are taking place in the north, the reverse take place in the ANTARCTIC CIRCLE, with the same net amount of sunlight in the annual cycle.

It is believed that the first European who is thought to have traveled near or north of the Arctic Circle and recorded the event was 4th century B.C. Greek PYTHEAS, during his search for ULTIMA THULE. Pytheas was an astronomer as well as an explorer and remarked on the extended length of days in the region. During the EUROPEAN AGE OF EXPLORATION, the first explorer to venture near the Arctic Circle—and perhaps beyond it—was Portuguese GASPAR CÔRTE-REAL, who, in 1500, explored the west coast of GREENLAND. In 1553–54, SIR HUGH WILLOUGHBY commanded the first English expedition to cross it. The question of the Arctic Circle as a barrier to be crossed by humanity is not important, since the lands within its border were well populated: by the Sami (Laplanders) in Scandinavia; the Samoyed, the Yakut, and the Tungus in SIBERIA; and the Inuit (Eskimo) in North America. It did take time, however, for the rest of the world to be aware of these communities.

See also ARCTIC, EXPLORATION OF THE; GEOGRAPHY AND CARTOGRAPHY; LATITUDE AND LONGITUDE; MAPS AND CHARTS.

Asia, exploration of

Asia, Earth's largest continent, with its outlying islands included, covers some 17,139,000 square miles, almost one-third of the planet's total land area. It is situated in the Eastern Hemisphere and almost entirely in the Northern Hemisphere.

The western limits of Asia are not readily defined since it is not entirely surrounded by water, being the eastern four-fifths of the landmass Eurasia (see EUROPE, EXPLORATION OF). To its north is the Arctic Ocean (the chief subdivisions being the Kara Sea, Laptev Sea, and East Siberian Sea); to its east, the BERING STRAIT and Pacific Ocean (the chief subdivisions being the Bering Sea, Sea of Okhotsk, Sea of Japan, Yellow Sea, East China Sea, and South China Sea); to its south, the Indian Ocean (the chief subdivisions being the Bay of Bengal, Arabian Sea, Persian Gulf, and Gulf of Aden); and to its southwest, the MEDITERRANEAN SEA and the RED SEA (an arm of the Indian Ocean). In the west, in order to distinguish Asia from Europe, most geographers use an imaginary line running from the northern extent of the Ural Mountains on the Kara Sea, then south along the Ural River to the Caspian Sea, then west along the Caucasus Mountains to the Black Sea, then along the Bosphorus Strait (linking the Black Sea and the Sea of Marmara, both forming an arm of the Mediterranean), and the Dardanelles (a strait linking the Sea of Marmara with the Aegean Sea, also part of the Mediterranean). The Isthmus of Suez (including the human-made Suez Canal) separates Asia from Africa. The most northerly point of Asia's continental mainland is Cape Chelyuskin; most southerly, the southern end of the Malay Peninsula; most westerly, Cape Baba in northwestern Turkey; and most easterly, Cape Dezhnyov.

This vast region has varied topography, consisting of plains, plateaus, and mountains. On the Asian mainland are found both the lowest and highest points on Earth's surface: the shore of the Dead Sea, at 1,340 feet below sea level, and Mount Everest (see EVEREST, MOUNT), at 29,035 feet above sea level, part of the HIMALAYAS. Extending from Arctic to equatorial regions, Asia also has a wide variety of climates—from tundra to tropical—and a variety of vegetation and animal life.

Animals found on other continents have adapted to the varying climatic and vegetation zones of Asia, such as reindeer, deer, antelope, gazelles, tigers, elephants, rhinoceroses, wolves, hyenas, monkeys, sables, foxes, marmots, hares, peacocks, and crocodiles. Some animals unique to Asia are the orangutan, the second-largest of the apes after gorillas, found on the islands of Borneo and Sumatra; the giant panda, a type of bear, in southwestern China; the snow leopard, on the plateaus and mountains of central Asia; and the Komodo dragon, the world's largest lizard, in Indonesia.

The exact derivation of the name *Asia* is not known. The Greek form may be derived from the Assyrian word *asu*,

meaning "east" or "sunset," or from a local name for the plains of Ephesus in western Anatolia (Asia Minor), eventually meaning all the lands to the east.

Realms of Asia

Because of its vast size, geographers and historians discuss Asia as comprising various realms, such as East Asia, central Asia, Southeast Asia, South Asia, and Southwest Asia. Other terms that appear in the historical record are *Near East*, originally used for the area occupied by the Ottoman Empire of the Turks, then applied to any parts of Southwest Asia situated close to Europe, from the Mediterranean Sea to the Persian Gulf and even beyond in South Asia, including Afghanistan and Pakistan (and sometimes Egypt, Libya, and other Arabic nations of North Africa, as well as the Sudan); the *Middle East*, originally used for the area extending from the Persian Gulf to India and other countries of the Indian subcontinent, then, in the 20th century, used synonymously with the *Near East*; and the *Far East*, or the *Orient*, generally used for those East Asia and Southeast Asia nations facing the Pacific Ocean (and sometimes for the *Indian subcontinent* as well).

Southwest Asia, or the Middle East (or Near East), consists primarily of arid lands, much of it desert. The most fertile land is situated around the Tigris and Euphrates river valleys in present-day Iraq, part of a region once referred to as the Fertile Crescent. The Anatolian Peninsula, the Asian part of modern-day Turkey, has been referred to as Asia Minor. Other modern-day nations in western Asia are Iraq, Iran (formerly Persia), Syria, Lebanon, Israel, Jordan, Armenia, Azerbaijan, Georgia, and the eastern part of Turkey. Saudi Arabia and a number of smaller countries are situated on the Arabian Peninsula, in the south of which is the desert known as the Rub' al-Khali, or EMPTY QUARTER. Farther to the west in South Asia lie the more mountainous countries of Afghanistan and Pakistan.

The nations of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan (comprising a region once referred to as Turkistan), lying north of Afghanistan, were once part of the Union of Soviet Socialist Republics (USSR; Soviet Union). These, like central Russia, central China, Mongolia, Tibet, Nepal, and Bhutan are often referred to as part of central Asia.

To the east of Afghanistan sits the high Tibetan Plateau (Qing Zang Gaoyuan) of western China. The Himalayas stretch along the southern side, while the Tian Shan mountains extend on the north from the Pamir range of Tajikistan to the border between western China and Mongolia. To the north and east are great deserts, the Takla Makan and the GOBI DESERT. To the northwest are the steppes of central Asia. In northernmost Asia, stretching from the Ural Mountains to the Pacific Ocean, is found the generally flat region of some 5 million square miles known as

SIBERIA, mostly in Russia with a small part in northern Kazakhstan.

To the south of the Himalayas is the Indian subcontinent, with the present-day nations of India, Bangladesh, and Pakistan (Pakistan sometimes is grouped as part of the Middle East). The GANGES RIVER and INDUS RIVER traverse parts of it. The southern part of the subcontinent includes the Deccan Plateau. The island of Sri Lanka (CEYLON) lies in the Indian Ocean to the southeast, and the Maldives, to the southwest.

Crossing from central Asia to the Indian subcontinent is made difficult by the Himalayas and other mountain ranges. The main passes are located in the mountains of northern Pakistan, the most famous of these being the KHYBER PASS through the Safed Koh mountain range, extending from the Hindu Kush range, which connects to Kabul in Afghanistan.

East Asia includes eastern Russia (known as Far East Russia), North Korea, South Korea, eastern China, Japan, and Singapore. Southeast Asia includes Vietnam, Laos, Cambodia, Thailand, and Myanmar, as well as the islands of the Malay Archipelago (historically referred to as the EAST INDIES). The eastern rim of the continent of Asia has a number of plateaus dissected by the YANGTZE RIVER (Chang) and YELLOW RIVER (Huanghe).

Early Contacts between East and West

Before written records, the earliest hints of exploration of Asia come from the myths and folklore of the Babylonians, Egyptians, and Greeks. Recent archaeological finds support the conclusion that many of these stories are mythological versions of early voyages undertaken for conquest and to establish trade routes. The voyage of Jason and the Argonauts to find the Golden Fleece has been represented as the story of initial Greek journeys through the dangerous Bosphorus Strait to establish trade with Black Sea ports. This theory is buttressed by the discovery of ancient Greek shipwrecks along the mythical route. The story of the Trojan War may represent an early Greek attempt to gain full control of this trade route through the Bosphorus. The Babylonian epic of Gilgamesh contains an account of early Sumerian voyages similar to Akkadian voyages in the historical accounts of the region.

Civilization grew and flourished in the fertile regions of the Middle East in the third millennium B.C. Rulers began to dispatch explorers on diplomatic and military missions with the goals of expanding territory, developing commerce, and enhancing their own prestige. In about 2450 B.C., Egyptian HANNU, the first explorer of record, navigated the Red Sea along the coast of the Arabian Peninsula (see EGYPTIAN EXPLORATION). The next known exploratory efforts date to 2340 B.C., when SARGON of Akkad, who had consolidated his rule over Mesopotamia, sent out missions

establishing trade contacts throughout Arabia and as far east as the Indus River. Along the fertile banks of the Indus, the Harrapa culture, the earliest known settled civilization to rise in Asia was flourishing. Harrapa people built cities, with populations of up to 40,000, and dug complex irrigation channels for their agriculture. In addition to Mesopotamia, the Harrapa civilization had trade contacts with lands to the west as far as the southeastern border of Afghanistan.

The greatest extent of the Akkadian Empire lasted only 40 years before it contracted under political pressure and finally collapsed, splitting into smaller states including Babylonia and Assyria. The Hittites who were living in Anatolia gradually expanded their power, most famously through the use of the chariot in warfare. By the 14th century B.C., they had conquered much of the area in modern Turkey and in the northern regions of Mesopotamia. They later developed extensive trade relations with the Greeks, one of the earliest historical instances of the exchange of ideas between East and West. This transfer process continued over the centuries through both trade and military incursions.

The Harrapa civilization disappeared sometime about 1800 B.C. In about 1500 B.C., a group of nomads called Aryans, who were living in central Asia, migrated southward through Afghanistan into northern India and settled in the northern Indus Valley as well as the northwestern part of the Gangetic Plain. By 800 B.C., the Aryans ruled most of northern India. They spread westward to the Iranian plateau, an area almost completely surrounded by high mountains and deficient in navigable rivers. The most significant of these tribes were the Medes in the northwest and the Persians in the south. The Assyrian Empire expanded to the west by the ninth century B.C. and came to include the entire Fertile Crescent region; it flourished until 612 B.C., when the Medes (with the help of the Babylonians) conquered the Assyrian capital of Ninevah. Then, in 550 B.C., Persian Cyrus the Great overthrew the Medes and established the Persian Empire. The Persians spread their conquests eastward, through the mountain passes of Afghanistan into the Indus Valley.

During the sixth century B.C., Greek society, although centered in Greece, was fragmented into small city-states throughout the Mediterranean region and into the Middle East. Among the Greeks were many capable and memorable seafarers (see GREEK EXPLORATION). Many Greek people lived in colonies on the coast of Anatolia. The expanding Persian Empire eased the difficulties of traveling and brought together merchants and mariners from all over the world. In about 548 B.C., Egyptian COSMAS INDICOPLEUSTES, having become a Christian, wrote an account known as *Topographia Christiana* (Christian Topography), based in part on his travels as a merchant to India and Ceylon. In about 520–494 B.C., Greek HECATAEUS OF MILETUS traveled in Asia Minor and Egypt. He later wrote what

is considered the earliest systematic description of the known world, *Tour Round the World*.

The Persians, seeking further economic and military success, hired expert mariners—especially from among the Greeks—to explore the uncharted regions of their empire. In 510 B.C., Persian emperor Darius I sent Greek mariner SCYLAX to determine the course of the Indus River. Greek historian HERODOTUS of the fifth century B.C. reports that Scylax followed the Indus to the Arabian Sea, explored the coasts of present-day southwestern Pakistan and Iran, and then the Gulf of Aden and the Red Sea, finally returning to Persia in 507 B.C. Like many travelers in the mountainous regions of the east and the Arabian coasts, Scylax came back with fantastic descriptions of natives, describing people with giant ears or only one eye.

In the late fifth century B.C., Greek physician CTESIAS OF CNIDUS served as court doctor to Darius II of Persia. During that time, he traveled throughout the Persian Empire and India. Ctesias aimed to discredit much of what Herodotus had reported about the lands of the east. In Herodotus's account, the lands beyond the Indus River were unpopulated, the home of giant animals and birds. By this time, however, Aryans in the Gangetic Plain had established powerful kingdoms, the westernmost of which had common interactions with the Persians. Ctesias may have visited as far east as the Ganges, or relied on reports from the Aryans. Ctesias's account was no less fantastic than that of Herodotus, detailing men with giant feet and others with doglike faces, as well as huge worms in the Ganges that devoured camels and oxen.

Knowledge of this territory was crucial for the maintenance and expansion of the Persian Empire. It was also essential to Macedonian king ALEXANDER THE GREAT. In 334 B.C., he had consolidated his rule over the Greek city-states. Inspired by the writings of Herodotus and other accounts of the East, he made a military assault on the Persian Empire. Alexander advanced onto the Anatolian plateau, conquering all of Asia Minor. He then moved southward and conquered peoples of present-day Lebanon and Israel and, after crossing into Africa, he gained control of Egypt as well. In 331 B.C., Alexander crossed into present-day Syria and pushed on to the Tigris and Euphrates Rivers and defeated Darius III. He continued eastward through present-day Iran and Afghanistan in pursuit of Persian forces. In 329 B.C., he crossed the Hindu Kush into present-day Pakistan and headed northwestward into present-day Uzbekistan. The region at the time was known as Bactria, part of the Persian Empire. Alexander eventually recrossed the Hindu Kush, proceeding to India in 327 B.C.

Earlier, in 329 B.C., Greek NEARCHUS had traveled through Bactria to provide reinforcements for Alexander's campaign. By 325 B.C., Alexander's army had halted in India, unable or unwilling to cross the Jhelum River.

Alexander decided to return to the west but put together a voyage of exploration under Nearchus, consisting of 5,000 men and 150 ships. Alexander hoped that such an expedition would find a route to connect the eastern and western portions of his empire. Nearchus reached the Indus delta and then continued westward along the coast of present-day Pakistan. His ships sailed into the Gulf of Oman and into the Persian Gulf along the coast of present-day Iran. Nearchus reported meeting primitive people he called "hairy men," who used their long fingernails as tools, and other people who lived entirely on fish, building their dwellings from whalebones. The expedition also encountered whales, creatures hitherto unknown to Mediterranean sailors. At the head of the Persian Gulf, Nearchus sailed up the Euphrates to the Tigris, where he rejoined Alexander. Nearchus went on to plan additional voyages around the Arabian Peninsula and even Africa. Alexander's death in Persia in 323 B.C. and the subsequent breakup of the empire put a stop to such ambitious plans of exploration.

By this time, the ancient kingdom in India known as Magadha had expanded, absorbing neighboring kingdoms until it was the most powerful kingdom east of the Indus. In about 321 B.C., Chandragupta Maurya became king of Magadha, establishing the Mauryan dynasty. In 305 B.C., Chandragupta extended his control up to the border of Afghanistan, destroying one of the Hellenistic kingdoms that remained after the collapse of Alexander's empire. The ruler of another Hellenistic kingdom sent a Greek diplomat, MEGASTHENES of Ionia, in about 302 B.C., as ambassador to the Mauryan Empire. Megasthenes traveled throughout northern India, making observations of Hindu culture and the natural history of the region. He was the first Westerner to make accurate observations of the Ganges River and to correctly surmise its source. The Mauryan dynasty extended its control to nearly the entire Indian subcontinent in the third century B.C., except the tip and the lands beyond the Brahmaputra River.

Meanwhile, in the mid-third century B.C., the Greeks established a kingdom in Bactria. By about 150 B.C., this kingdom had encroached on Mauryan territory, expanding to meet the Ganges River in the east. An early Greek visitor to India was EUDOXUS of Cyzicus, who, in about 120 B.C., made one of the earliest known sea voyages from Egypt to India and established coastal trade links.

The Roman Empire, centered in Rome in what is now Italy, became a power in the Middle East during the second century B.C. (see ROMAN EXPLORATION). The Romans conquered territory along the eastern Mediterranean coast to the borders of Persia by 62 B.C. After conquering Egypt, they turned their attention to the southern end of the Arabian Peninsula (present-day Yemen), to an area they dubbed Arabia Felix ("Happy Arabia") because of its wealth. Arabia Felix had been well known to Egyptians as a principal source

of incense and spices, precious commodities valued alongside gold. The incense was taken from the sap of frankincense and myrrh trees, and the spices, such as cinnamon, were imported over sea from India. (The wealth of the kingdoms in Arabia Felix is thought to have inspired the first recorded Egyptian voyager, Hannu.)

In about 25 B.C., a Roman officer in Egypt, GAIUS AELIUS GALLUS, began an expedition in an effort to conquer this region and establish Roman control of the SPICE TRADE. Gallus continued his expedition to the east bank of the Red Sea and then proceeded overland to the Sabaeans city of Marib. Unable to subjugate the Sabaeans, Gallus returned to Roman Egypt, with new geographic knowledge. In A.D. 18, Greek geographer STRABO published his work *Geography* in Rome, based on his own travels in Europe, Africa, and Asia as well as on the work of earlier writers. In A.D. 45, HIPPALUS, a Greek in service to Roman-ruled Egypt, navigated a practical route out of sight of land from the mouth of the Red Sea to India.

The Chinese Empire

The first archaeological evidence for a kingdom among the Chinese is that of the Chang (Shang) dynasty, which arose in about 1570 B.C. In control of the central part of China, the Chang dynasty consisted of a number of smaller states. One of them, Chou, revolted in about 1045 B.C., and the Chang dynasty collapsed. The subsequent Chou (Zhou) dynastic period was marked by contention between the states, with interstate warfare leading to the downfall and annexation of certain states. By the third century B.C., there were only seven states in China. The state of Ch'in conquered the rest of the Chou states and began the Ch'in (Qin) dynasty, from which the name *China* is thought to be derived. Although a short-lived empire, it had a tremendous impact on Chinese civilization. A unified system of weights and measurements and a system of writing were introduced throughout the empire. A revolt in the state of Han led, after a brief interregnum, to the Han dynasty, which lasted more than 400 years, from about 206 B.C. to A.D. 220, during the period the Roman Empire became dominant in the West.

The extension of the Han dynasty through China made travel easier and safer (see CHINESE EXPLORATION). In addition, there became a need for communication throughout all of eastern Asia for military and trading alliances. In 128 B.C., CHANG CH' IEN, an officer in service to the emperor Wu Ti, was sent westward on a diplomatic mission to the Yue-chi (also known as the Scythians), a nomadic people living in present-day Afghanistan. Chang was captured by the Hsiung-nu (Xiongnu, known in the West as the Huns) but escaped 10 years later. In about 118 B.C., Chang resumed his westward journey and finally arrived at Bactria in northern Afghanistan. There, he heard reports of civilizations farther to the west, including Persia, Mesopotamia,

and Rome. He also discovered Chinese bamboo and cloth there, which had been shipped over the SPICE ROUTE, through India, a land of which the Chinese reportedly had no contacts. For some time, the southern end of India had been an important link in the spice trade, with mariners bringing spices and other goods from China, Southeast Asia, and the SPICE ISLANDS (the Moluccas), while overland caravans traveled up the west coast of India and through the Khyber and other passes into Afghanistan. Arab seafarers from the kingdoms of southern Arabia sailed through the Arabian Sea, then bringing Chinese and Indian goods to Alexandria in Egypt and throughout the Mediterranean world. Chang Ch'ien took reports of his findings back to the Han emperor. In 115 B.C., he was again sent out to make an alliance with nomads in western China. Although unsuccessful in this mission, he in turn sent envoys laden with silks and gold from there to Persia and to the eastern Roman provinces. This initial opening of trade links between China and the Hellenized lands of the eastern Mediterranean marked the birth of the trade route known as the SILK ROAD.

KAN YING was another early Chinese explorer, sent out in A.D. 97 on a diplomatic mission to meet with the Romans regarding threats to travel along the Silk Road from central Asian peoples. It is not certain how far east he reached, but his was one of the few voyages made by Chinese through central Asia. For much of Chinese history, the Chinese emperors discouraged travel outside of the empire, relying on nomadic peoples in central Asia and the Persians and others to carry their trade to the West.

What might be considered as early travel writing was recorded by WEN-CHI, a Chinese woman born into a noble family of the Han dynasty in the late second century A.D. As a child of about 12, she was abducted by the Hsiung-nu (Huns) and lived as a nomad on the Mongolian steppes. She wrote about her experiences in *Eighteen Songs of a Nomad Flute*.

The Han empire collapsed into smaller states in A.D. 220. Many of these, especially those in the south, prospered, but the disunity hindered any kind of travel. During this turbulent time, however, Buddhism, which had its origin around the Ganges River in India, slowly grew in influence. Arising as a monastic offshoot of the ancient Hindu religion in the northeastern Gangetic Plain, Buddhism is identified with Siddhartha Gautama, called the Buddha, the son of an Aryan king, generally agreed to have been born in 563 B.C. Buddhism made its greatest gains in India when Ashoka, the king of the Mauryan Empire, after a bloody campaign in 261 B.C., renounced warfare and adopted the religion. Ashoka sent missionaries throughout his kingdom and beyond, even into central Asia.

By the fourth century A.D., Buddhism had taken root in China. But there were many doctrinal disputes among the Chinese Buddhists because of a lack of religious texts. In

A.D. 399, Buddhist monk and scholar FA-HSIEN set out to reach India and obtain Buddhist texts in Sanskrit, which he planned to translate. He traveled with three other monks westward through China and along the Silk Road. He crossed the Takla Makan desert and over the Pamir plateau and into Afghanistan. From there, he followed the Kabul River to the upper Indus Valley, before setting off eastward across the Gangetic Plain. Fa-hsien spent three years copying Buddhist documents and visited many important Buddhist shrines. He also spent two years on Ceylon, which had been among the first lands converted by Ashoka's zeal. He began his homeward journey in about 413 by sea, through the islands of Southeast Asia. Upon his return, he translated the texts he had copied and wrote an account of his journey.

The reunification of China occurred in 581, under the Sui dynasty, during which Buddhist philosophy, rather than the traditional philosophies of Confucianism and Taoism (Daoism) from earlier dynasties, was promoted. The Sui dynasty was short lived and was followed by the T'ang (Tang) dynasty, which lasted hundreds of years, from about 618 to 907.

New political stability and a new religious philosophy inspired new journeys. Buddhist monk HSÜAN-TSANG made his own attempt to resolve further doctrinal problems, convinced of the feasibility of a trip to India by Chang Ch'ien's and Fa-hsien's earlier journeys. But travel outside the empire was forbidden. In 629, Hsüan-tsang embarked in secret from Lanchow, at the western extent of China's Great Wall. He crossed the Gobi Desert, entered the Sinkiang province, crossed the Tian Shan mountains, traveled through the Kirghiz region of central Asia and the lands southeast of the Aral Sea, then crossed the Hindu Kush into Afghanistan. He remained there for two years at a Buddhist monastery. Hsüan-tsang then reached India through the Khyber Pass and crossed plains in the north to the upper Ganges River Valley. He followed the valley until he reached the Nalanda, a Buddhist University in Baragaon. He studied there for five years, collecting Buddhist texts and relics. Hsuan Tsang later followed the Ganges to its mouth. He was deterred from setting out by sea to Ceylon due to political instability, so he then traveled inland to the Deccan Plateau. He followed the Indus River Valley, then joined a trade caravan. When he finally returned to China in 645, though he had defied the emperor's orders, he was warmly welcomed, all recognizing his achievement. His travels in India had been the most extensive in Chinese history.

Another early Chinese traveler to India was I-CHING, in an effort to obtain and translate accurate Buddhist texts to answer lingering metaphysical problems. In 671, he sailed southward along Asia's coast, from Canton to Sumatra, then to eastern India. He ended up spending almost two-and-a-half decades in India and the East Indies.

In the meantime, the West was in a state of collapse. The Roman Empire had converted to Christianity and was

split into two realms, the western part weakened by barbarian invasions, and the eastern part threatened by the Persians and the Turks. While the West decayed into feudalism, and travel became extremely dangerous, if not impossible, the T'ang empire was flourishing. Its two main cities, the capital Chang'an and Louyang, grew to be metropolises, while states in central Asia paid the T'ang empire tribute, and travelers, merchants, and envoys visited from Japan, Korea, and Tibet. The T'ang dynasty was cosmopolitan and had an unparalleled influence throughout the East.

The first European explorer of record who claimed to have reached China—its western frontier—was Rabbi BENJAMIN OF TUDELA, a Spaniard who, in the second half of the 12th century, reached central Asia via Persia. He later visited India and Ceylon.

In the first half of the 15th century, during the Ming dynasty, Admiral CHENG HO led seven Chinese maritime expeditions composed of a JUNK fleet, sailing from China to the Indian Ocean, the Persian Gulf, and the Red Sea, reaching East Africa. His voyages opened up Chinese trade with foreign peoples.

Early Christian Influence in Asia

During his reign of A.D. 98–117, Roman emperor Trajan annexed parts of the Middle East including Assyria and Mesopotamia. Yet Hadrian, who succeeded Trajan in 117, released the eastern conquests. Hadrian also ordered the construction of Hadrian's Wall around the boundaries of the empire. This was also the era that Christianity began its expansion from Jerusalem throughout the Roman Empire. In 330, Roman emperor Constantine I (Constantine the Great) recognized Christianity as the official religion and established a new capital, Constantinople (present-day Istanbul, Turkey). In 395, the Roman Empire was divided into the Western Roman Empire and the Eastern Roman Empire (also known as the Byzantine Empire), the latter influential in the Middle East for centuries.

Adherents of the Christian religion undertook pilgrimages to the Holy Land to fulfill vows. One of the earliest pilgrimages on record dates to 217, when Bishop Alexander traveled from Cappadocia to Jerusalem. The tone of the account of that voyage suggests such pilgrimages were common before then. After Constantine's conversion to Christianity, and especially after his mother, St. Helena, took a trip to the Holy Land and, according to legend, recovered what was claimed to be the true cross of Jesus's crucifixion, pilgrimages to visit holy sites and to recover holy relics grew even more popular.

The most detailed early description of the Holy Land comes from sixth-century Scottish abbot Adamnan, who wrote a detailed account of the journey of Frankish pilgrim ARCULF. His three-volume geography, *De Locis Sanctis* (Concerning Sacred Places), described various biblical

sites, including the Dead Sea, Jordan River, and such cities as Jerusalem, Bethlehem, and Damascus. The work was presented to Aldfrith, the king of Northumbria (in Britain), in 698.

Islamic Expansion

Islam was founded on the Arabian Peninsula by the Prophet Muhammad in A.D. 622. By the time of his death in 632, the entire Arabian peninsula had been united under Islam. Armies of Arab Muslims soon crushed Persia, already weakened by its long conflict with the Eastern Roman Empire, and expanded into neighboring regions, including Jerusalem. By the next century, the Islamic Empire expanded eastward to the edge of the Chinese Empire in central Asia and westward through North Africa. And Islamic learning and trade flourished, with discoveries in mathematics, science, and navigation (see MUSLIM EXPLORATION).

In 711, Mohammed bin Qasim, entering the Indian subcontinent from Afghanistan, much as Alexander had done, conquered Sind, the area of modern-day Pakistan around the Indus River. The Muslims did not press on beyond Pakistan by land at that time. In 758, Muslim seafarers, who were routinely sailing all through the Indian Ocean, ransacked the port of Canton, which led to the closing of the city for 50 years. In 850, Arab trader SOLEYMAN sailed from the Persian Gulf to India, then embarked by Chinese junk through the Bay of Bengal to the Chinese port Khanfu in present-day Canton. Soleyman's extensive observations of India and China were later recorded along with descriptions of other lands in a document known as the *Sequence of Historical Events*.

Muslim rule extended even farther eastward in later centuries. Afghan sultan Mahmud of Ghazni conquered the region of Punjab in India in the early 11th century and made Lahore his capital. Between 1175 and 1186, Turkish Muhammad of Ghur conquered the regions of Sind and Punjab. He was assassinated in 1206. That year, his general, Qutubuddin Aybak, established the Delhi Sultanate, an independent Muslim kingdom in India, which endured until 1526. The sultanate included most of Punjab and Sind during this period.

The emphasis on acts of devotion and on Islamic studies, along with the duty of every Muslim to make at least one pilgrimage to the holy cities of Medina and Mecca, inspired a new emphasis on travel. In 914–34, Arab historian ABU AL-HASAN ALI AL-MASUDI visited every country in the Islamic world, which by then included most of North Africa. In 943–73, ABU AL-QASIM IBN ALI AL-NASIBI IBN HAWQAL made his own similar journeys. In 1017, Arab scholar ABU AR-RAYHAN MUHAMMAD IBN AHMAD AL-BIRUNI traveled to India for the first time. Among his many works was the book *India*. In 1182–1217, ABU AL-HASAN MUHAMMAD

IBN JUBAYR, a Muslim official and scholar, made four pilgrimages from Moorish Spain to Arabia.

In 1325, ABU ABD ALLAH MUHAMMAD IBN BATTUTAH, a Muslim born in Morocco, began his travels throughout the Islamic world, including a pilgrimage to Mecca, where he settled for a time in order to study Islamic law. He eventually traveled eastward, reaching Delhi in India, where he served Islamic sultan Mohammed Tuglaq for seven years. He was then assigned as the sultan's ambassador to the Mongol emperor of China but, on his way to China, was robbed of the gifts he had been given for the emperor. After staying in the Maldives for two years, he returned to India, then sailed to the Malay Peninsula and the island of Sumatra, before reaching China. In 1346, he set out for home, returning to Tangier in 1350. He later traveled southward in Africa. Ibn Battutah's writings about his extensive travels provide vivid details of the lands that Europe would "discover" more than a century later.

In the mid-11th century, as the Turks began to take control of the lands controlled by the Arabs, the conquerors themselves converted to Islam. The Turks were more zealous in some ways than their predecessors: They halted Christian pilgrimages to Jerusalem and began new assaults on Constantinople. Byzantine leader Alexius I Comnenus appealed to the West for help defending against them. In 1095, Pope Urban II gave a speech encouraging aid to Byzantium against Islamic attackers. This instigated what became the first of the European CRUSADES to the Middle East. European nobles mustered armies and advanced beyond Constantinople. They captured Jerusalem and established what were known as Crusader states, Christian nations in Palestine. Crusaders carried home both goods and ideas from the East and helped spur on interest in more trade. Europeans maintained a presence in the Middle East for about 200 years—in the course of which a number of other Crusades were launched—until the region was ultimately retaken by Ottoman Turks. The Turks went on to capture Constantinople in 1453, which resulted in the breakup of the Eastern Roman Empire.

Mongol and European Contacts

In 1206, GENGHIS KHAN consolidated his rule over the nomadic Mongols (see MONGOL EXPLORATION). With his establishment of a capital at Karakorum in the northern Gobi Desert, he began to threaten the domination of the Turks, and embarked on a path that would spur unprecedented contact between the East and West. His armies overran the Ch'in empire of northern China in 1215 and pushed west and south. Like Alexander the Great, Genghis Khan sought geographic information to aid in subjugation of the peoples of Asia. In 1219, CH'ANG-CH'UN, a Chinese Daoist priest and scholar, carried out a mission of reconnaissance for the khan through central Asia. By the time of his death in 1241,

Genghis Khan had established the largest empire ever to exist in human history, from the Caspian Sea in the west to the Pacific coast of China. In fact, the Mongol armies had reached as far west as Hungary.

In 1245, Pope Innocent IV summoned GIOVANNI DEL CARPINI, an Italian born in Perugia and one of the first Franciscans, to undertake a diplomatic mission to Genghis Khan to see if the Mongols might be persuaded to assist the Europeans against the Islamic Turks. Carpini and an interpreter traveled through eastern Europe, across Ukraine, to the Volga River, where they encountered a Mongol party. They were granted safe passage and hardy Tartar horses and crossed the steppes of central Asia, reaching Karakorum in 1246. The new khan, Kuyuk, was no more ill-disposed to the Islamic Turks than he was to Christians, and Carpini left without any alliance or even promise of peace. In 1253, King Louis IX of France sent Flemish WILLIAM OF RUBROUCK on a diplomatic mission to the Mongols at Karakorum. He met with the khan Mangu but achieved no lasting political settlement. Both Carpini and Rubrouck wrote accounts of their journeys, some of the first European reports of the Orient.

The Mongol Empire, although now fragmented after Genghis's death, maintained considerably powerful kingdoms called khanates. After these diplomatic missions from the west to the east, the next travelers were mercantile. MAFFEO POLO and his brother NICCOLÒ POLO were minor noblemen and merchants in Venice. The Polo brothers traded in jewels and precious stones out of Constantinople. In 1260, Maffeo and Niccolò sought a better price for their jewels, traveling to the court of Barka Khan near the mouth of the Volga River. As they prepared to return across the Crimea to the Black Sea, a war between Barka Khan and the khan of Persia erupted, and the Polos were forced to travel eastward in 1263, to Bukhara in present-day Uzbekistan. Bukhara was an important outpost along a main caravan route, and the Polos remained there, unable to travel west until 1266. Then, they encountered a group of Tartar envoys on their way to the court of Kublai Khan, one of the inheritors of the empire of Genghis Khan, who ruled China from Cambaluc (near present-day Beijing). The Polos traveled with the Tartars along the Silk Road. Kublai Khan welcomed the Polos, the first Europeans he had encountered, and expressed interest in Western culture. He hoped to have Western missionaries convert the Mongols, who were without a strong faith, to Christianity, which he thought would have a civilizing and unifying effect on them. After a year, the Polos were allowed to return home, and with the aid of a passport—a large slab of gold—they traveled westward through China.

The Polo brothers returned to Venice in 1269, remaining for only two years before they embarked again, eager to reestablish ties with the Mongol emperor. Niccolò's 17-year-

old son, MARCO POLO, accompanied them as they sailed from Venice to Acre on the east coast of the Mediterranean. Niccolò, Maffeo, and young Marco crossed Mesopotamia through Persia to Hormuz, a port on the Persian Gulf coast, where they hoped to find oversea passage to Cambaluc. They could find no boats on which they were willing to embark, however, and set off overland in 1272. The three crossed southern Persia into Afghanistan, where Marco fell ill. Maffeo and Niccolò remained with Marco for a year in the mountains until he recovered, before following the Oxus River, onto the Pamir plateau. They reached Lop Nor, an important trading city on the far western edge of China, and joined a caravan into Mongolia, where, after three years of travel, they reached the court of Kublai Khan.

The khan was so impressed with Marco, just 21 years old at the time, that he appointed him to a diplomatic post. As part of his official duties, Marco traveled throughout China and Southeast Asia. He visited the Chinese provinces along the Yellow River, Yangtze River, and upper Mekong River. He visited the interior of what is now Myanmar, Thailand, and Vietnam. He also sailed to the islands of Indonesia. In 1292, anxious about their fortunes because of Kublai Khan's advanced years, Marco, Maffeo, and Niccolò sought a way to return to Italy. An opportunity presented itself to escort to Persia a Mongolian princess who was betrothed to the khan of Persia. The three Polos and the princess traveled by sea, the land route being blocked by warfare. They arrived safely back at Hormuz in 1294. Marco Polo's account of the East, known in short as *The Travels of Marco Polo*, became one of the most influential works in European exploration.

Kublai Khan's tentative approval of Christianity and curiosity about the West led to further exploration in the East, this time by Franciscans, dedicated Roman Catholic missionaries. JOHN OF MONTECORVINO was a Franciscan friar from Italy. After serving as an emissary to the pope for the Byzantine emperor in the 1270s, Pope Nicholas IV assigned John to be his representative in the Persian capital at Tabriz. After two years, John sailed by way of the Arabian Sea to the southern tip of India. After founding the first Catholic missions there, he embarked into the South China Sea, following it into the Yellow Sea to Cambaluc, where he met Kublai Khan in 1294. He continued his missionary work in China under the khan's approval, establishing a cathedral and a church school in the Chinese capital, and China's first permanent Christian settlements. In 1307, he became Cambaluc's first archbishop and was named patriarch of the Orient. He reported on his experiences in letters to the Vatican.

In 1280, RABBAN BAR SAUMA, a China-born Christian descendant of Turks who had been aligned with the Mongols, set out on a pilgrimage to Jerusalem. He and a companion followed the Silk Road below the Takla Makan desert and arrived in Mongol-held territories in Persia two

years later. Reports of danger along the route kept Bar Sauma from reaching Jerusalem, but he went on to be appointed to a delegation representing Mongol interests in the West and visited Constantinople and other European cities.

In about 1318, Franciscan missionary ODORIC OF PORDENONE set out overland across Asia Minor and Persia to the port of Hormuz at the mouth of the Persian Gulf. From there, he sailed to India, where he collected the bones of recently martyred Christians. After visiting islands in the Indian Ocean, he sailed to the Chinese port of Hangchow in about 1322. He proceeded along the Great Canal, inland to Cambaluc, where he met and stayed with John of Montecorvino. Odoric interred the bones of the martyrs there, remaining about six years before returning overland to Europe, traveling north from the Great Wall into Mongolia, then south and west. His route took him along the northern slopes of the Himalayas and into Tibet. He later wrote an account of his travels in the Far East, detailing the spice trade in India and Sumatra, as well as the size and marvels of Chinese cities such as Hangchow and Zaiton. His travels provided Europeans with important geographic information, which Spanish geographer ABRAHAM CRESQUES incorporated into his *Catalan Atlas* of 1375.

Another early overland traveler to the Far East was Italian missionary GIOVANNI DE MARIGNOLLI, who traveled to China, India, and Indonesia in 1339–53. Early the next century, in 1403–06, RUY GONZALEZ DE CLAVIJO headed a diplomatic mission for Spain to meet with Mongol emperor Tamerlane in his capital of Samarkand in present-day Uzbekistan in central Asia.

In about 1419, after the Mongols had been expelled from China, NICCOLÒ DI CONTI, a Venetian merchant, traveled to Damascus. He remained there for several years learning Arabic, then traveled to Baghdad and Hormuz at the southern end of the Persian Gulf. Conti learned Persian and studied the peoples living on the Persian coast before continuing his journey eastward. After traveling through India and Southeast Asia, Conti returned by boat to the Arabian Peninsula. He landed in Aden, then traveled up the Red Sea coast to the port city of Jidda in 1444.

Reports of the travels of diplomats, merchants, and missionaries continued building the growing interest in the Far East among Europeans during the RENAISSANCE.

Growing Contacts between East and West

Through much of the 15th century, the first part of the EUROPEAN AGE OF EXPLORATION, the Portuguese, under the influence of HENRY THE NAVIGATOR, prince of Portugal, sought a sea route around Africa. In 1492, Italian mariner CHRISTOPHER COLUMBUS proposed to the king and queen of recently united Spain to sail westward to reach the Orient, a route many thought far too long. Columbus, while wrong

about the distance around the globe to Asia, reached the Americas in 1492 and obtained for Spain trading rights in the Atlantic Ocean. Soon afterward, in 1497–99, Portuguese mariner VASCO DA GAMA sailed around Africa's CAPE OF GOOD HOPE into the Indian Ocean and reached India, gaining access by sea to the lucrative Asian trade.

Their voyages led to a period of extensive maritime activity between Europe and India and the East Indies. In 1503–09, Portuguese admiral FRANCISCO DE ALMEIDA led a number of naval expeditions to the southwest coast of India, where he established Portuguese trade dominance. His son LOURENÇO DE ALMEIDA explored Ceylon and the Maldives.

The islands of the Malay Archipelago and the city of Malacca on the Malay Peninsula occupied an important point in the routes in trade from China, Japan, and the Malay Peninsula to India and countries bordering the Arabian Sea. Some of the islands—such as the Spice Islands—were themselves an important source of spices. The first known European visitor to the Spice Islands is thought to have been an Italian, LUDOVICO DI VARTHEMA, in 1505. He reported finding pepper, mace, cloves, and nutmeg. By this time, people on many of the larger islands had converted to Islam, although they preserved their native cultures on smaller islands.

In 1509, a fleet of Portuguese ships commanded by DIEGO LÓPEZ DE SEQUIRA arrived off the coast of Sumatra. FERDINAND MAGELLAN and FRANCISCO SERRANO sailed under the command of de Sequira. The Portuguese made an unsuccessful attempt to conquer the important port city of Malacca on the southern end of the Malay peninsula. In 1511, AFONSO DE ALBUQUERQUE and Serrano managed to occupy Malacca. An expedition was soon sent out under Antonio de Abreu to find a route to the Spice Islands. While unsuccessful in that purpose Abreu explored the islands of Java, Madura, and Sumbawa. When another Portuguese fleet arrived in 1514, Portuguese control of the region was solidified. In Malacca, the Portuguese encountered Chinese ships, and, that year, Portuguese traders reached Canton on the mainland. Although not permitted to land, they made a heavy profit trading their goods. In 1517, Portuguese envoy TOMÉ PIRES traveled by ship from India to China. He is thought to have stayed in China for about 20 years. The Portuguese also conquered the Persian Gulf port of Hormuz in 1514.

The English meanwhile hoped to develop trading contacts with Persia. ANTHONY JENKINSON, a merchant and member of the MUSCOVY COMPANY, traveled from Russia to Persia in 1562–63. Another English merchant, SIR ANTHONY SHERLEY, traveled to Persia in 1598. Sherley managed to obtain some trade concessions for English merchants and then became employed by Persian shah Abbas the Great. After serving as an ambassador to Moscow and other

countries for the shah, Sherley attempted to garner support for a Persian expedition against the powerful Turks. Later, under the aegis of the Holy Roman Emperor Rudolf II, Sherley unsuccessfully agitated the Arabs to rise against the Turks.

Ferdinand Magellan had returned to Portugal from the East in 1512. He fell out of favor with the Portuguese king despite his military service. When he conceived of a plan to reach the Far East and the Spice Islands by sailing westward, as Christopher Columbus had hoped to do, he sought out support from Charles I of Spain. He proposed that the Spice Islands actually lay in the region allotted to Spanish trade by the 1494 Treaty of Tordesillas, which under the authority of the pope had established spheres of influence to adjudicate rival claims of the Portuguese and the Spanish. Magellan departed Portugal in 1519 with an expedition of five ships. After sailing southward along the coast of South America, he managed to navigate through a strait—which became the Strait of Magellan (see *MAGELLAN, STRAIT OF*). Setting out westward, he expected to sight the Spice Islands after a short time. However, it was not until after more than three months sailing that the expedition sighted land. After landing for a short time on the island of Guam, Magellan sailed 10 more days, reaching the Philippines and claiming the islands for Spain. Magellan was killed by natives in the Philippines on April 27, 1521. Two of the ships finally reached the Spice Islands; one of them under Spaniard JUAN SEBASTIÁN DEL CANO subsequently completed the first *CIRCUMNAVIGATION OF THE WORLD*.

The Spanish route westward broke the Portuguese monopoly on trade with the Far East. Spain sent reinforcements to claim the Spice Islands and to solidify its possession of the Philippines in 1525 and 1528. But, in 1529, Spain relinquished its claim to the Spice Islands to Portugal for a payment of 350,000 gold ducats. The Spanish retained their control of the Philippines despite a longitudinal boundary line that was fixed in the treaty.

At this time, although foreign merchants were not allowed in China, missionaries were given free access. Italian missionary MATTEO RICCI joined the annual fleet of merchant vessels departing from Portugal and bound for India around the Cape of Good Hope, reaching Goa on the west coast of India in late 1578. He engaged in theological studies there for four years. Ricci eventually sailed to the Portuguese island of Macao, where he studied Chinese for a short time. He then sailed to Canton, where he was given permission to establish a Christian mission. With another Jesuit, Father Michele Ruggieri, Ricci remained there for seven years, studying Chinese, and introduced into China Western scientific and geographic knowledge. In 1591, the two Jesuits were eventually driven away by townspeople suspicious of their motives. They traveled northward to the capital at Peking (Beijing) and

met with the Chinese emperor Wan-Li in 1601. Ricci became the court astronomer and mathematician, was granted a mission in Peking, and was allowed to move freely throughout China.

It still was unknown among Europeans whether the land that Marco Polo had called Cathay and reached overland was the same as the lands visited by the Portuguese. In 1603, BENTO DE GÖES, a Portuguese Jesuit at a mission in north-central India, set out to cross Asia overland and attempted to reach Matteo Ricci in Peking, in an attempt to prove that Cathay and China were one and the same. Gões traveled into Afghanistan, passing through Kabul before crossing the Hindu Kush. By 1605, he had reached the western edge of the Takla Makan desert. He joined a trade caravan heading eastward crossing the entire width of northern China in a single year. He reached Suchow, some 200 miles inland from the Yellow Sea, where he was stopped by Chinese authorities. He sent a message to Ricci in Peking, but it was not until April 1607 that he received a reply. He died several days later, after finally having solved an age-old geographic mystery, proving that Cathay and China were indeed the same.

In the East Indies, the English and the Dutch began to encroach on the Spanish and Portuguese spice trade. During the first English circumnavigation of the world, SIR FRANCIS DRAKE, after crossing the Atlantic and Pacific Oceans, arrived in the Spice Islands in 1579. By concluding a trade agreement with the sultan of the Spice Islands, Drake challenged the Spanish and Portuguese monopoly on the East Indies trade.

The first Englishman known to have reached India, the Jesuit missionary THOMAS STEVENS, traveled there on a Portuguese ship and settled at Goa. In 1583, he helped gain the release of RALPH FITCH and JOHN NEWBERRY, part of an English trade and diplomatic expedition to the Mogul (Mughal) Empire, which had been founded by Babur, a central Asian Turk—a Muslim descendant of both Tamerlane and Genghis Khan—in 1526 (and lasted into the 19th century). In the second half of the 16th century, under Akbar, Babur's grandson, the empire was at its height, extending in northern India from Afghanistan to the Bay of Bengal.

In 1600, to develop trade in the region, the BRITISH EAST INDIA COMPANY was founded. In 1601–03, SIR JAMES LANCASTER conducted the company's first maritime trading voyage. Other British East India Company voyages would follow in the ensuing years, including those of JOHN JOURDAIN in 1608–12, CHRISTOPHER NEWPORT in 1613–17, and THOMAS ROE in 1615–19.

In the meantime, the Dutch became active in the East Indies trade. In 1595–97, the brothers CORNELIUS HOUTMAN and FREDERIK HOUTMAN led the first Dutch trade expedition to the East Indies. The DUTCH EAST INDIA COMPANY was chartered in 1602 to follow up on trade

agreements in the region. In 1641, the Dutch captured the important port city of Malacca.

The French, also interested in the region, founded the FRENCH EAST INDIA COMPANY in 1664. Most of its trading activity was carried out from coastal ports in India and from the island of Bourbon (present-day Réunion) in the Indian Ocean.

European colonial powers remained constantly at odds as the power of each expanded, until the Napoleonic Wars in the early 19th century, after which the islands of the Far East were carved up into spheres of influence.

Early European Travel to Japan

In about 1537, Portuguese FERNÃO MENDES PINTO, while traveling with one of Vasco da Gama's sons to India, was captured and sold into slavery by Turks. He escaped in Malaya, and, in 1541, he arrived in Peking with a European trading expedition, entering into diplomatic service with the Chinese government. He accompanied the Chinese to Vietnam and the Mekong Delta, and, sailing across the South China Sea, he became the first known European to reach Japan in 1542. On his return to Portugal in 1558, he wrote an account of his travels, *Periginacoes* ("Peregrinations" or "Wanderings"), which was not published until 1614, 30 years after his death. His stories, many of them too fanciful to be believed, earned him the title "Prince of Lies."

Spanish missionary FRANCIS XAVIER traveled as a missionary to India in 1541, sailing around the Cape of Good Hope with the Portuguese. After spending time in the Portuguese-held Goa, Xavier continued eastward, sailing to the Malay Peninsula and the Spice Islands. In 1549, he embarked on a missionary expedition to Japan and became one of the first Europeans to visit there. He met Fernão Pinto in Kagoshima on Japan's southernmost island, Kyushu.

In 1600, WILLIAM ADAMS, an Englishman in the employ of the Dutch, reached Japan for the purpose of trade. Forced to spend the rest of his life in Japan by the military ruler of Japan, he acted as a consultant on shipbuilding and navigation. He also negotiated with Englishman JOHN SARIS in 1613, granting trading privileges in Japan for the British East India Company.

European Circumnavigators and Scientists in Far Eastern Waters

Ferdinand Magellan and Sir Francis Drake are considered the first circumnavigators of the world with their 16th-century voyages from the Atlantic to the Pacific. OLIVER VAN NOORT, following a similar route taking him through the East Indies, completed the first Dutch voyage around the world at the start of the 17th century. In the 18th century, a number of other British ships made the long journey. ROBERT GRAY carried out the first American voyage

around the world in 1787–90, while on a trading expedition from Boston around South America to British Columbia and then to China and around Africa back to Boston. And, in 1767–69, LOUIS-ANTOINE DE BOUGAINVILLE headed the first French expedition to circle the world, during which he searched for the mythical GREAT SOUTHERN CONTINENT.

In the late 18th and 19th centuries, such long voyages became commonplace—following routes around the world, or to the Pacific, then back over the same waters. They were often undertaken for scientific purposes, with surveyors, cartographers, and naturalists aboard, leading to new geographic information about Far Eastern coastlines. The search for the eastern outlet of a NORTHEAST PASSAGE through Arctic waters north of Europe and Asia, as conducted by Englishman JAMES COOK in his final voyage of 1776–80, also took expeditions to the Asian side of the North Pacific and through the Bering Strait. In 1793–95, Frenchman THOMAS-NICOLAS BAUDIN headed a scientific expedition to China, the East Indies, and India for the Museum of Natural History in Paris, retracing his route on the way back to Europe. In the course of the first Russian circumnavigation of the world, in 1803–06, ADAM IVAN RITTER VON KRUSENSTERN and YURY FYODOROVICH LISIANSKY surveyed parts of Asia's North Pacific coast. In 1825–28, FREDERICK WILLIAM BEECHEY headed a British expedition to the Pacific, during which he explored the Bering Strait, proving beyond any doubt that Asia and North America were not connected by land.

Growing British Activity in the East

The British East India Company became a political as well as an economic force in Asia and directed colonial activity. In the second half of the 18th century, the British government came to play a more direct role in Asian affairs. The Regulating Act of 1773 made the appointment of the governor of the region of Bengal subject to British government approval. The East India Act of 1784 set up a board of control to handle political, military, and financial matters.

The British East India Company's monopoly in Indian trade was taken away by acts of Parliament in 1813 and 1833. The Indian Mutiny (also known as the Sepoy Rebellion) of 1857, in which native soldiers (sepoys) in the Bengal army revolted against the British, led to assumption of full political control over India by the British Crown the next year.

The Turks and Persians maintained both overland control of trade from the East and control of various sea routes from their homelands to India. Until the late 18th century, when European influence in the East, especially that of the British in India, was rekindled, very little European exploration of these regions occurred. That which did occur was undertaken by colonial powers in order to understand and secure their holdings. The British worried that Napoléon

and the French, supported by the Persians and the Russians, would attack India. This concern led them to send SIR HENRY POTTINGER, a British army officer, and CHARLES CHRISTIE, a military surveyor, to explore the interior of present-day Pakistan and Afghanistan and across Persia in 1810. The men developed an accurate understanding of the geography of the region, essential to the British defense of India. Some years later, in 1832, Englishman SIR ALEXANDER BURNES, posing as a native Afghan, explored Afghanistan in more detail. He also traveled into Persia to the Persian Gulf.

In 1802, the British organized the Great Trigonometrical Survey to map the Indian subcontinent and the mountain country to the north. SIR GEORGE EVEREST, after whom Mount Everest was named, played a part, as did native explorers working for the British later in the century. These native explorers were known as the PUNDITS and included NAIN SINGH, KISHEN SINGH, and KINTUP.

Meanwhile, in China at the end of the 18th century, the only port open to foreign traders was Canton. It served as a hub for trade silk, tea, and opium. The British sent emissaries in 1793 and 1816, but both times were unable to obtain the trading concessions they desired. Conditions under which the British traded continued to decline, the principal concern of the Chinese being the spread of opium by British merchants to much of the population. In 1839, after negotiations, the British turned over all the opium then in traders' hands. Yet, opium played a key position in British trading strategy, and, using the excuse that further Chinese demands were untenable, Great Britain went to war with China in the First Opium War of 1839–42, which was settled when the Chinese agreed to pay a large indemnity, and more important, to open four new ports for foreign trade. In 1856, the British again went to war with China—the Second Opium War—this time giving aid to a Chinese aspirant to the throne who had been converted to Christianity. In 1860, the British marched into Peking. The Chinese paid another indemnity, the import of opium was legalized, freedom was granted to preach Christianity, and the interior of China was opened to European travelers.

In 1872–73, Englishman NEY ELIAS, who worked as a civil servant in a foreign office in China took advantage of the new travel freedom and journeyed from China across the Gobi Desert, Altai Mountains, and Siberia to Europe. In 1885–86, he became the first Englishman to cross the Pamir range.

Russian Exploration Eastward and Southward

The exploration of Siberia followed a different course of history than that of the rest of central Asia and the Far East since most of it was carried out by Russians and Russian Cossacks traveling overland from the west. The Cossack YERMAK commanded a military campaign across the Urals

in 1581–82, on behalf of Russian czar Ivan IV Vasilyevich, or Ivan the Terrible, and initiated Russian expansion into Siberia (see COSSACK EXPLORATION).

In 1631–33, PYOTR BEKETOV established Russian dominion to the Yenisey, Lena, Aldan, and Amur Rivers of central Siberia, and, in 1652–60, he expanded Russian interests into southeastern Siberia, south of Lake Baikal. Not long afterward, in 1643–48, VASILY DANILOVICH POYARKO led a military expedition to explore the Amur River, which fed the Sea of Okhotsk, and other rivers of southeastern Siberia.

Meanwhile, in 1641–44, MIKHAIL STADUKHIN explored the Arctic coast of eastern Siberia, reaching the mouth of the Kolyma River. In 1648, SEMYON IVANOVICH DEZHNEV led an expedition in small boats from the mouth of the Kolyma River eastward along the Arctic coast of Siberia and succeeded in rounding the Chukchi Peninsula of northeastern Siberia and making the earliest recorded sighting of the Bering Strait. In 1695–96, LUKA MOROZKO and VLADIMIR VASILYEVICH ATLASOV led expeditions onto the Kamchatka Peninsula.

In 1713–14, fur trader SEMYON ANABARA explored the Shantar Islands in the Sea of Okhotsk. In 1726–33, EMELYAN BASOV led a series of expeditions along Siberia's Lena River in search of a seaward route to the Pacific Ocean.

In 1719–27, German naturalist DANIEL GOTTLIEB MESSERSCHMIDT headed a scientific expedition to central Siberia—from the Lena and Yenisey Rivers in the north to Lake Baikal and the Amur River in the south—on behalf of Russian czar Peter I (Peter the Great). He reported on the geography, peoples, and wildlife of the region.

Starting in 1725, VITUS JONASSEN BERING, a Danish mariner in service to Russia, headed the First Kamchatka Expedition to the Pacific coast of Siberia for Czar Peter. Part of his mission was to determine if there were lands connecting northern Asia and North America. His explorations of the Bering Strait proved tentatively that there was not until conclusive proof in the early 19th century. In 1733–40, Bering and Russian ALEKSEY ILYICH CHIRIKOV commanded the Great Northern Expedition (including the Second Kamchatka Expedition) for the Russian navy to the Arctic and Pacific coasts of Siberia, the Kuril Islands, and inland areas of eastern Siberia; Germans JOHANN GEORG GMELIN and GEORG WILHELM STELLER and Russian STEPAN KRASHENINNIKOV served as naturalists. In 1741, the expedition made the European discovery of Alaska. Russians soon expanded the FUR TRADE from Siberia to North America.

Russians also explored southward to the Caspian Sea, bordered by present-day Russia, Kazakhstan, Azerbaijan, Turkmenistan, and Iran. In 1715–17, ALEKSANDR BEKOVICH-CHEKASSKY and, in 1819–26, GRIGORY GAVRILOVICH BASARGIN led military expeditions to the Caspian Sea, which helped determine the geography and watershed of the

world's largest landlocked body of water (which loses more of its water to evaporation than it receives from rivers, such as the Ural and Volga).

Arctic Asia and the Northeast Passage

The search for the Northeast Passage led to the exploration of Arctic Asia. The earliest voyages in the mid-16th century—many of them sponsored by the London-based Muscovy Company—failed to navigate beyond the island group known as Novaya Zemlya because of icy conditions, thus in effect only exploring the European Arctic. In 1594, geographer JAN HUYGHEN VAN LINSCHOTEN, in one of two ships of a Dutch expedition with WILLEM BARENTS managed to pass along the southern end of the Novaya Zemlya into the Kara Sea, the start of the Asian Arctic. In 1596, Barents himself rounded Novaya Zemlya's northern end.

Russians also explored the Arctic coastline of Siberia from both land and sea. In the 1640s, MIKHAIL STADUKHIN explored the Arctic coast of Siberia around the Kolyma River. And, in the 18th century, Vitus Bering, the Dane exploring for Russia, explored Arctic regions as part of the Great Northern Expedition. Other nations sent expeditions in search of the eastern outlet of the Northeast Passage, such as the British expedition under James Cook in 1776–80.

On a voyage in 1878–79, a Swede, NILS ADOLF ERIK NORDENSKJÖLD, backed by Sweden and Norway, attempted the Northeast Passage using a combination steamship-sailing ship. In August 1878, his expedition sailed past the northernmost point of the Asian Continent at Cape Chelyuskin and, the next month, reached North Cape, where it was icebound through the winter. With the melting of the ice, the expedition continued westward, and, in July 1879, entered the Bering Strait, having completed the passage. It later visited Japan and Ceylon before making use of the Suez Canal to return to Sweden in 1880.

The Mystery of Tibet

Tibet is one of the most isolated regions in the world, surrounded by the Himalayas, with the Karakoram range on the west, and the Kunlun range on the north. Referred to as the “Roof of the World,” it is the highest region in the world, with an average elevation of 16,000 feet. Moreover, for much of its history the last two centuries, it has been under Chinese control and forbidden to foreign travel. Its capital, LHASA, became known as the “Forbidden City.”

The first known European to reach Tibet was Italian missionary ODORIC OF PORDENONE, along the northern edge of the Himalayas, on his return trip from China in the 1320s. He may have reached Lhasa, but documentation is inadequate. The next European visitors to the region, three centuries later, were also missionaries. In 1624–25, Portuguese (or Spanish) Jesuit ANTONIO DE ANDRADE traveled twice across the Himalayas from northern India into Tibet,

where he founded a mission at the Tibetan town of Tsaparang. Soon afterward, in 1626, Portuguese Jesuits JOÃO CABRAL and ESTEVÃO CACELLA also reached Tibet from India and founded a mission at Shigatse. In 1631–35, Portuguese (or Spanish) Jesuit FRANCISCO DE AZEVADO, continued the work Andrade had begun at Tsaparang. Three decades later, in 1661–62, German Jesuit JOHANN GRUEBER and Flemish Jesuit ALBERT D'ORVILLE traveled from Peking across western China to Tibet, becoming the first Europeans known to visit Lhasa for certain; they stayed only a month before proceeding to India. The next century, in 1716, Italian Jesuit IPPOLITO DESIDERI and Portuguese Jesuit Emmanuel Freye reached Lhasa. Desideri remained there five years, studying the Tibetan language.

The next visits by Europeans were diplomatic in nature, by GEORGE BOGLE in 1774 and by SAMUEL TURNER in 1783, both Englishmen in the employ of the British East India Company. The British attempt to establish trade contacts with Tibet and counter the Chinese claim to the region proved largely unsuccessful, as a result of a failed Nepalese invasion of Tibet in the 1790s, encouraged by the British.

European visits to Tibet were also uncommon in the 19th century. In 1811–12, the Englishman THOMAS MANNING was turned down by the British East India Company for a proposed visit to Tibet but traveled there anyway in Asian disguise, reaching Lhasa in 1811 and managing an audience with the seven-year-old Dalai Lama, the spiritual leader of Tibetan Buddhism. In 1812, Englishmen HYDER JUNG HEARSEY and WILLIAM MOORCROFT, in seeking to locate the source of the Ganges River, managed to cross into Tibet, disguised as wandering holy men, and to explore part of the Himalayas.

In 1845–46, French Lazarist missionaries ÉVARISTE-RÉGIS HUC and Joseph Gabet, disguised as Tibetan monks, managed to enter Tibet from China and reach Lhasa, but they were forced to leave by the Chinese ambassador after two months. In the 1850s, German brothers ROBERT VON SCHLAGINTWEIT, ADOLF VON SCHLAGINTWEIT, and HERMANN VON SCHLAGINTWEIT carried out explorations of the Himalayas in India and Tibet. In the second half of the 19th century, the pundits, in their surveying work for the British, traveled inside Tibet in disguise, hiding their measuring tools.

In 1879, a Russian explorer of much of central Asia, NIKOLAY MIKHAILOVICH PRZHEVALSKY, crossed Sinkiang and entered Tibet from the north, reaching within 125 miles of Lhasa before being forced to turn back by Tibetan officials. ANNIE ROYLE TAYLOR, a British missionary in the China Inland Mission and a member of the ROYAL GEOGRAPHICAL SOCIETY, in the course of her travels in central Asia, became the first European woman to enter Tibet in 1892, crossing the border from China. She, too, failed to reach Lhasa, sent back north by officials. She tried again two

years later from India but reached only as far as the Tibetan border city of Yatung. Swedish explorer SVEN ANDERS HEDIN, who traveled throughout Asia, entered Tibet on two different occasions in the late 19th and early 20th centuries, carrying out geographic studies. But he, too, was refused entrance into Lhasa.

In the early 20th century, in 1900, a young Russian student, GOMBOZHAB TSYBIKOV, entered Lhasa disguised as a Buddhist. He remained there a year and visited a number of monasteries. He was soon followed by another Russian, Agran Dorjien. Dorjien became the Dalai Lama's teacher and political adviser. The British, competing with the Russians for economic control of central Asia, sent a military expedition into Tibet under SIR FRANCIS EDWARD YOUNGHUSBAND in 1904, which led to the Treaty of Lhasa with the Tibetans. In 1910, Chinese troops occupied Lhasa, although Tibet again became independent after the Chinese revolution of 1911–12.

Frenchwoman ALEXANDRA DAVID-NÉEL, a student of eastern philosophy and frequent traveler in India and China, moved to India in 1912, and, from there, made several trips into Tibet, never reaching Lhasa. In Japan, she met Ekai Kawaguchi, a Japanese philosopher and monk who had managed to spend 18 months in Lhasa disguised as a Chinese Buddhist monk. In 1924, after more than three years traveling through China and Mongolia, David-Néel, disguised as a beggar at Kawaguchi's side, finally reached Lhasa, becoming the first European woman to do so. She remained there two months, visiting all the holy sites.

In 1951, Tibet again lost its independence with the invasion of Communist China. Travel there has continued to be restricted.

19th-Century French Explorers of Southeast Asia

In 1861, the French navy conquered Cochin China, the area that is now southern Vietnam in Southeast Asia. MARIE-JOSEPH-FRANÇOIS GARNIER accompanied the expedition and was named governor of Saigon (present-day Ho Chi Minh City). Garnier later obtained support from the French government to explore the Mekong River, hoping to find an easy trade route into Southeast China. ERNEST-MARCOLOUIS DE GONZAGUE DOUDART DE LAGRÉE, a French officer who had served as the French ambassador to the king of Cambodia, was appointed to lead the expedition. The expedition of 1866–68 determined that because of rapids and falls along the Mekong it would never make a practical waterway. Doudart de Lagrée later died from illnesses contracted on the expedition. Garnier, for his part, explored the Angkor ruins and the upper Red and Yangtze Rivers.

Another early French explorer in the region was the trader JEAN DUPUIS. In 1871–73, he traveled down the Red River from Yunnan to the northeast coast of Vietnam in search of a practical trade route. His arrest by Vietnamese of-

ficials led to French intervention. In 1891–95, AUGUSTE-JEAN-MARIE PAVIE headed the Pavie Mission with the assigned task of surveying Indochina (present-day Cambodia, Thailand, Laos, and Vietnam). The French would maintain a colonial presence in Southeast Asia through much of the 20th century.

19th- and 20th-Century European Explorers of the Middle East

Beginning in the early 19th century, increasing numbers of Europeans traveled to Arabia and other parts of the Middle East for a variety of purposes. After studying Arabic and the culture and history of the Middle East in Germany, Swiss-born JOHANN LUDWIG BURCKHARDT obtained a commission from England's AFRICAN ASSOCIATION to explore in Africa. In 1809, he traveled to Aleppo in present-day Syria to prepare for the journey. He visited ancient Palmyra and lived with the Bedouin for two years, perfecting his Arabic and arranging to travel across the Sahara with a group of Muslims returning to their homelands after a pilgrimage. In June 1812, he headed southward through the valley of the Jordan River. Along the way, he explored the ancient city of Petra, which had not been seen by Europeans since the Crusades. Unable to obtain caravan passage in Cairo, Burckhardt explored northeastern Africa then crossed back into Arabia via the Red Sea. In 1814, he made a pilgrimage to Mecca and Medina to improve his credentials as a Muslim. On his way back to Cairo, he explored the Sinai Peninsula. In 1817, Burckhardt died of dysentery before he was able to find a caravan to take him south in Africa. His writings were published by the African Association, however, and influenced later European travelers to the region.

A diplomatic mission resulted in the first European east-west crossing of Arabia. In 1819, GEORGE FOSTER SADLIER, a British army officer in India, was sent to negotiate with Ibrahim Pasha, a Turk engaged in consolidating Turkish power over Arabia. Sadlier landed at Qatif, north of Bahrain on the Persian Gulf coast of Arabia, and headed inland to meet with Pasha. In the course of the expedition, he learned Pasha had moved on to Medina. Sadlier continued on across the desert to Medina, and finally met with the leader. Afterward, he continued to the Red Sea coast and returned to India.

The British East India Company, interested in improving travel across the Arabian sea route from Suez to Bombay in India, sought to establish coaling stations on the south coast of the Arabian Peninsula. To that end, in 1834, it sent British officer JAMES WELLSTED to survey the region. Wellsted, landing in what is now Yemen and Oman, undertook excursions into the interior. He made archaeological studies of ancient ruins and became the first European to glimpse the vast interior desert, the Rub' al-Khali (or the Empty Quarter).

British officer, adventurer, and linguist SIR RICHARD FRANCIS BURTON, who would go on to become renowned for his explorations in Africa, also explored in Arabia. In 1842–49, he had spent time in the Sind region of Pakistan as interpreter for his regiment. Intrigued by his encounters with Muslims and bolstered by his growing knowledge of Islam and Arabic, Burton planned his own journey into Arabia. He proposed to undertake a pilgrimage to Muslim holy cities, then continue southwestward to the Empty Quarter, which had been spotted by Wellsted but remained completely unexplored by Europeans. In 1853, he sailed to Suez. Disguised as an Afghan physician, he joined up with a caravan of pilgrims. He reached Mecca in early 1854 and Medina shortly thereafter. After becoming sick, he was forced to abandon his plans and return by steamer to Cairo. His account of his pilgrimage was immensely popular in England.

Hoping to expand French power in the Arabian Peninsula, Napoléon III sponsored a missionary expedition into Arabia by WILLIAM GIFFORD PALGRAVE, a London-born Christian missionary. Palgrave's expedition was also backed by various business interests seeking to increase imports of cotton and pureblood Arabian horse breeding stock. Palgrave left Europe for the Middle East in June 1861. After arriving on the Arabian Peninsula in present-day Jordan, he disguised himself as a Syrian doctor. He then traveled for 13 months over 1,500 miles, heading east over the Nafud desert and finally arriving on the Persian Gulf coast at Qatif, completing the first west-to-east European crossing of Arabia.

In 1893, SIR PERCY MOLESWORTH SYKES traveled to Persia. Sykes, a British diplomat and surveyor, sailed across the Caspian Sea to Asterabad in northeastern Persia. From there he followed the Atrek River eastward to Meshed. He made a north-south crossing of the great central desert in Persia, the Dashi-e-Lut. In 1894, Sykes explored the southern province of Baluchistan and became the first European to climb the extinct volcano Kuh-i-Taftan. He traveled extensively through central Persia as diplomatic counsel from 1894 to 1896. As a participant in a government survey, he explored southeastern Persia on the border of present-day Pakistan. He made visits to Persian Gulf ports and visited the Arabian Peninsula. In 1898, he took part in a surveying expedition, looking for a suitable route to connect a telegraph wire from Kerman (in the interior) to Bandar Abbas (on the Persian Gulf). In 1906, he returned to northeastern Persia as the British consul at Meshed. During World War I, he took part in British survey expeditions throughout southwestern Asia and organized a Persian military unit in support of British forces.

Englishman THOMAS EDWARD LAWRENCE (Lawrence of Arabia) began his travels in Arabia with a walking tour of Syria in 1910. The next year, he took part in an archaeological dig with the British Museum in Mesopotamia and,

two years later, spent a year digging in the northern part of the Sinai Peninsula. Having learned to speak colloquial Arabic and having become acquainted with day-to-day Bedouin life, he joined the British army's intelligence department at Cairo at the outbreak of World War I in 1914. He spent some time assessing the potential for an Arab uprising against the Turks in Arabia, who were aligned with Germany and the Axis powers. In 1915, Lawrence met with the Arab leaders Hussein Ibn Ali and his son Faisal Ibn Hussein. He helped these leaders raise an Arab army, then commanded a force that attacked Turkish rail lines in the Hejaz region of northeastern Arabia. Lawrence made many geological observations and determined the longitudinal locations of important landmarks. After the war, he worked on Arab affairs. Eventually his disappointment with the replacement of Turkish colonial rule by British and French colonial rule drove him to retire from public life. In 1929, he proposed that the Royal Air Force explore the Empty Quarter by AIRSHIP, but that plan was never put into action.

HARRY ST. JOHN BRIDGER PHILBY, a British officer in Baghdad at the outbreak of World War I, who had studied Persian and Arabic, was also involved in supporting the Arab rebellion. In 1917, he traveled to the Arabian Peninsula to meet with local Arab ruler Ibn-Saud to generate support. He ventured on to the ancient ruins at Dariyan, then followed the Muslim pilgrim route toward Mecca, arriving on the Red Sea coast at Jidda. Philby's journey completed the first east-to-west crossing of Arabia by a European in almost a century. He continued to travel through Arabia, exploring the southern provinces of the Nejd region as far as the boundaries of the Empty Quarter. He explored Arabia in the following years and resigned from the British Diplomatic Corps in 1924 in order to become an agent for mining and oil interests in the area.

Another Englishman, BERTRAM SYDNEY THOMAS, was the first known European to cross the Rub' al-Khali. First a British political officer in the Persian Gulf region, Thomas later entered service for the government of Oman as a minister of the Sultan of Muscat. In 1927, he landed at Ras al Hadd on the southeastern tip of the Arabian Peninsula and began making preliminary journeys northward in preparation for his expedition. Accompanied by a party of Bedouin, Thomas and his party headed northward from Salalah in October 1930. In early January 1931, the expedition reached the waterhole at Shana, roughly halfway through the desert. Several weeks later, it arrived at Doha on the Persian Gulf coast of Qatar, Thomas thus becoming the first European to cross the Rub' al-Khali.

About a year later, in January 1932, Harry Philby made his own expedition into the Empty Quarter. In March 1932, he arrived at the mouth of the Wadi Dawasir, near the Arabian oasis settlement at Sulaiyil. Philby's east-to-west expe-

dition is regarded as a more accurate and thorough investigation of the region than that of Thomas.

WILFRED PATRICK THESIGER, who served with the British in North Africa and Syria during World War II, was also known for his photography. After the war, he journeyed to the Arabian Peninsula to investigate locust control measures. Perhaps inspired by his contact with the Bedouin, Thesiger also traveled to Arabia. In 1946, he embarked on his first expedition into the Empty Quarter. With native guides, he traveled in a giant circle, beginning and ending at Salahah in present-day Oman on the Arabian Sea. Thesiger made a second journey across the Rub' al-Khali in 1947–48, again with native guides, traveling from Al Mukalla in present-day Yemen on the Gulf of Aden to the Persian Gulf in present-day United Arab Emirates.

Scholarly Pursuits in the 19th and 20th Centuries

Some expeditions by Europeans in Asia advanced knowledge of the land, its peoples, and wildlife. Among the Europeans who traveled there were renowned 19th-century naturalists (see *NATURAL SCIENCE AND EXPLORATION*). In 1829, late in his career, German ALEXANDER VON HUMBOLDT traveled across Siberia to the Yenisey River and the Chinese frontier on a mineralogical research expedition for the Russian government. In 1847–51, British botanist SIR JOSEPH DALTON HOOKER, who had conducted studies around the world, studied the plant life of Nepal and Bengal, then of the Middle East in 1860. In 1854, ALFRED RUSSEL WALLACE, a British naturalist, after studies in South America, embarked on an expedition to the Malay Archipelago in the Far East. Over the next eight years he traveled more than 14,000 miles through the Malay Archipelago, exploring Timor and the Moluccas and all the way to Malacca on the tip of the Malay Peninsula. He collected more than 127,000 specimens and, from his observations, postulated a boundary line separating Asian and Australian types of animals. He also developed a theory of evolution by natural selection, which spurred CHARLES ROBERT DARWIN to publish his own theory. The two theories were published jointly in 1858, while Wallace was still in Asia.

In 1854–57, German brothers Robert, Adolf, and Hermann von Schlagintweit carried out studies in geology and terrestrial magnetism studies in India, Tibet, and western China. Another German, geologist FERDINAND PAUL WILHELM VON RICHTHOFEN, conducted studies in China—in the eastern, central, and southern regions—in 1868–72.

In 1857–58, Russian geographer and astronomer PYOTR PETROVICH SEMYONOV made the first European crossing of the Tien Shan mountains between Russia and China and explored the Dzungaria region and the Altai Mountains of China. Russian ALEKSEY PAVLOVICH FEDCHENKO, who specialized in anthropology and zoology, and

his Russian botanist wife, OLGA FEDCHENKO, led a series of scientific expeditions into the Pamir region in 1868–71. Another Russian, Nikolay Mikhailovich Przhevalsky, made four scientific expeditions to central Asia in 1870–85, reporting on geography and wildlife.

Europeans carried out linguistic, anthropological, and archaeological studies as well (see *ARCHAEOLOGY AND EXPLORATION*). In 1833, Sir Henry Rawlinson, a British officer in service to the British East India Company, was sent to Persia where he remained until 1839, attempting to reorganize the Persian Army. While there, he began copying ancient inscriptions—a decree of the Persian emperor Darius I—that had been carved into a cliff face at Behistun. These were written in cuneiform, the written language of the ancient Sumerians, later utilized by the Akkadians as well. Although Rawlinson was honored by the Royal Geographical Society for his exploration in Persia, he is best known for the first decipherment of cuneiform inscriptions, which brought to life the history and culture of the ancient civilizations in Mesopotamia.

In 1860, while conducting studies in Southeast Asia, French naturalist HENRI MOUHOT located the ruins of an ancient Hindu temple complex—Angkor Wat—built by the Khmers at Angkor in Cambodia. In 1861–64, Hungarian linguist ARMIN VAMBÉRY traveled in Armenia, Persia, Uzbekistan, and Turkestan, managing to visit the cities of Bukhara and Samarkand, forbidden to non-Muslims. In 1876, Englishman CHARLES MONTAGU DOUGHTY visited the ruins of the ancient city Petra in Arabia, examining inscriptions there, as well as at Mada' in Salih and on an ancient wall at Tayma, where he discovered an inscription corresponding to the biblical tale of Job.

A student of Richthofen, Swedish explorer Sven Anders Hedin, while mapping much of central Asia during the late 19th and early 20th centuries, made archaeological findings along the Silk Road. In 1906–08, Hungarian archaeologist SIR MARC AUREL STEIN followed the Silk Road into western China and located the Caves of the Thousand Buddhas at Tunhuang. Among his other travels was an expedition retracing the route followed by Alexander the Great's army on its return from the Indus Valley to Persia.

Russian painter NICHOLAS KONSTANTINOVICH ROERICH and his wife, writer Elena Blavatsky, carried out studies in both natural science and anthropology, after founding the Urusvati Himalayan Research Institute in northern India in 1928. His some 500 paintings also serve as a record of Asian geography and life.

European Women in Asia

Many European women traveled in Asia in the 18th and 19th centuries, especially in the Middle East, in search of adventure or for intellectual and spiritual pursuits. In 1810, Englishwoman Lady HESTER LUCY STANHOPE made

a pilgrimage to Jerusalem. After traveling in the region disguised in native male attire, she crossed the Syrian Desert to the ruins of the ancient city of Palmyra in 1813. She first lived among a band of Bedouin before building herself a large fortress atop Mount Lebanon, where she practiced a unique system of religion, combining elements of local Christian and Muslim sects, until her death in 1839.

British couple ANNE ISABELLA BLUNT and WILFRED SCAWEN BLUNT traveled in the Arabian Peninsula as undisguised Christians. Wilfred Blunt was first a diplomat and then a poet and anti-imperialist activist; his wife, Lady Anne, was the granddaughter of Lord Byron and an accomplished artist. A breeder of Arabian horses, Blunt traveled deep into the Arabian Peninsula with his wife to purchase purebred stock in 1878. The two continued from Arabia into present-day Iraq, starting from Iskenderun on the southeast coast of Turkey. After following the Euphrates River down to Baghdad, the Blunts followed the Tigris River northward. Befriending an Arab sheik in Damascus, they reentered Arabia, studying the Bedouin in the Nefud region. Outspoken against European colonialism, the Blunts were well received by local peoples. Lady Blunt wrote about her experiences as the first European woman to travel undisguised in Arabia.

Other European women traveled to Asia and shared their experiences with the public through their writings, as the Chinese woman Wen-Chi had done centuries before. Among these was Austrian IDA REYER PFEIFFER, who traveled around the world twice in the mid-19th century, including overland in parts of Asia, and wrote about the lands she visited in two books, *A Woman's Journey Round the World* (1852) and *A Woman's Second Journey Round the World* (1856). Also in the mid-19th century, Englishwoman LUCY ATKINSON and her husband, painter THOMAS WITTLAM ATKINSON, traveled in Siberia, Mongolia, and central Asia. Later 19th-century travel writers were Englishwomen ELIZABETH SARAH MAZUCHELLI and ISABELLA LUCY BIRD BISHOP. Mazuchelli traveled throughout the eastern Himalayas with her husband, Anglican clergyman Francis Mazuchelli. Bishop traveled throughout much of Asia, including Japan, China, the Malay Peninsula, India, the Middle East, and Korea. And Englishwoman Annie Royle Taylor and Frenchwoman Alexandra David-Néel wrote about their experiences in Tibet. American FANNY BULLOCK WORKMAN, after traveling throughout Europe and North Africa and mountaineering in the Alps, toured India, Burma, and Java by bicycle and countries of the Far East. She also climbed in the Himalayas and other mountain ranges in central Asia. With her husband, she wrote a number of books about her travels, including *In the Ice World of the Himalaya* (1900).

After mountaineering expeditions in Europe, Englishwoman GERTRUDE MARGARET BELL began to study the ancient heritage of Persia. In the late 19th century, Bell

traveled extensively there, becoming fluent in Persian. In 1900, she made a trip through present-day Israel, Turkey, Syria, and Iraq. By that time fluent in Arabic, she joined a native trade caravan in Damascus in 1913, intending to travel to Riyadh in present-day Saudi Arabia. Muslim opposition forced her back at Ha'il, and she returned to Damascus through Palmyra. Bell made archaeological excavations throughout the Middle East. She worked for British intelligence during World War I and was instrumental in organizing the modern nation of Iraq.

Russian botanist Olga Fedchenko continued her studies in central Asia in the late 19th and early 20th centuries after the death of her husband, Aleksey Pavlovich Fedchenko. She traveled in the Pamir region, along the Caspian Sea, in the Caucasus Mountains, and in the Ural Mountains.

FREYA MADELINE STARK, an Englishwoman born in France, worked on a newspaper in Iraq. She visited Turkey, Syria, Persia, Kuwait, and Arabia. In 1935, she explored the fertile valley of the Wadi Hadramawt in present-day Yemen, inland from the Gulf of Aden. In 1937, she participated in the first archaeological excavations in Yemen, excavating the Moon Temple of Hureidha. Later in life, Stark traveled to central Asia and the Far East. She was a photographer as well as an author.

Climbing the Himalayas

The Himalayas, with nine of the world's 10 tallest peaks, have attracted mountain climbers from around the world. In 1909, Italian LUIGI AMEDEO DI SAVOIA D'ABRUZZI attempted to climb K2 (formerly known as Mount Godwin-Austen), the world's second highest peak at 28,250 feet, in the Karakoram range of the western Himalayas. Fanny Bullock Workman, for a time, held the altitude record for a woman, which helped set in the Himalayas with the help of Italian mountaineer MATTHIAS ZURBRIGGEN.

Mount Everest, the tallest peak in the world, is considered the greatest prize in MOUNTAIN CLIMBING. In the 1820s, the British, with assistance from Nepalese SHERPAS as guides and porters, made several unsuccessful attempts to reach the summit. During an attempt in 1924, GEORGE HERBERT LEIGH MALLORY and Andrew "Sandy" Irvine lost their lives. Nepalese TENZING NORGAY and Englishman SIR EDMUND PERCIVAL HILLARY summited Mount Everest on May 29, 1953.



In 2000, the continent of Asia had an estimated 3.73 billion inhabitants, three-fifths of the world's population. Many of the themes of ancient times—numerous cross-cultural contacts and political turmoil—still hold true in Asia. Economic development has led to accelerating change. Outside nations, such as the United States and Great Britain, still play a part in Asian affairs.

Association for Promoting the Discovery of the Interior Parts of Africa

See AFRICAN

ASSOCIATION.

astrolabe

The astrolabe is an obsolete tool used for measuring the angle of a celestial body above the horizon. With this measurement, along with knowledge of the day of the year and a table of figures, latitude as well as time of day can be determined.

The astrolabe consists of a disk with graduated markings, a sighting arm that pivots from the center of the disk—an ALIDADE—and a plumb line. By adjusting the sighting arm to view a celestial body and taking a measurement in relation to the plumb line, an angular measurement may be recorded. A table or tables, specific to the celestial body itself, having been compiled from previous measurements throughout the year, yields information on latitude and time of day based on the angular measurement (see EPHEMERIS). For navigation at sea, the astrolabe was modified to improve accuracy. The mariner's astrolabe was made of heavy metal and had a ring on top for a person's thumb or finger so the device could be suspended to keep it plumb. Still, with the constant motion of a ship at sea, multiple readings would be needed for a useful measurement. Properly used, the mariner's astrolabe was accurate to within half a degree. Astrolabes were made in varying sizes and were often ornate, with maps of stars, signs of the zodiac, and other artistic embellishments imprinted on the disk.

The invention of the astrolabe is credited either to Apolonius of Perga, a Greek mathematician of the third century B.C., or to HIPPARCHUS, a Greek astronomer of the second century B.C. It may, however, predate them. Arab Muslims (see MUSLIM EXPLORATION) reinvented or rediscovered the device in about A.D. 700, but used it mostly in the desert where it could be stabilized. Europeans used the device, along with the more recently designed CROSS-STAFF, during the EUROPEAN AGE OF EXPLORATION in the 15th century. In 1484, German cartographer MARTIN BEHAIM was knighted by the king of Portugal for having developed an improved version of the astrolabe. The device remained important until the invention of the SEXTANT in the 1730s.

See also LATITUDE AND LONGITUDE; NAVIGATION AND EXPLORATION.

astronauts (cosmonauts)

The term *astronaut* refers to a crew member on piloted spaceflights. Derived from the Greek words *astron* for “star” and *nautes* for “mariner,” the term is used in the United States and other English-speaking countries. The equivalent Russian term is *cosmonaut*, which has the Greek root word

kosmos for “world.” The French use the term *spationaut*. The term *astronautics* refers to the science and technology of spaceflight.

Although the International Astronomical Federation defines space travel as beginning 62 miles above earth, the U.S. Defense Department applies the rating of pilot-astronaut to those pilots who fly higher than 50 miles. The U.S. agency, the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA), uses the term *nonastronaut* for payload specialists launched into space—as for the SPACE SHUTTLE program—typically scientists conducting experiments, but also physicians, politicians, journalists, and teachers with assigned tasks. In preparation for missions, they receive much of the same training as astronauts.

The earliest human involvement in the conquest of space took place from Earth. But humans in space can adapt to changing situations, repair technology, and perform more experiments than computerized machines, such as spacewalks. Moreover, in addition to demonstrating how humans can function in space, studies of the effects of space on astronauts have led to new medical knowledge relevant to all humans. During the earliest piloted space missions, the spacecraft was completely or mostly controlled from Earth, but the role of astronauts has increased as missions have become more complex. Politicians who have pressed for space programs, scientists and engineers who helped develop the technology, and technicians who have monitored equipment all played and continue to play a part in SPACE EXPLORATION. Yet it is the astronauts and cosmonauts who have put a face on the shared endeavor and are perceived as modern explorers.

The first human in space and to orbit Earth was Russian cosmonaut YURI ALEKSEYEVICH GAGARIN in 1961, as part of the VOSTOK PROGRAM of the former Union of Soviet Socialist Republics (USSR; Soviet Union). The first woman in space, Russian VALENTINA VLADIMIROVNA TERESHKOVA, in 1963, also was a Vostok cosmonaut for the Soviet Union. The United States meanwhile organized the MERCURY PROGRAM to develop its manned spaceflight. In 1961, American ALAN BARTLETT SHEPARD, JR., accomplished the first U.S. suborbital spaceflights. The first American to orbit Earth was JOHN HERSCHELL GLENN, JR., in 1962. Years later, in 1977, he became the oldest man in space on a space shuttle. The first human to walk in space was the cosmonaut ALEXEI ARKHIPOVICH LEONOV, in 1965, as part of the VOSKHOD PROGRAM. That same year, EDWARD HIGGINS WHITE, II, became the first American to walk in space, as part of the GEMINI PROGRAM. As part of the APOLLO PROGRAM, American NEIL ALDEN ARMSTRONG became the first human to walk on the Moon in 1969. Edwin “Buzz” Aldrin, Jr., also walked on the Moon during this mission, while Michael Allen Collins orbited it. In 1983, astronaut SALLY KRISTEN RIDE became the first American woman in space on a space

shuttle. But these names and events only represent the milestones. Many others have participated in space exploration, and some have given their lives. In 1967, three astronauts died in a fire during a prelaunch checkout of their Apollo spacecraft. In 1971, four cosmonauts died in two SOYUZ PROGRAM missions. In 1986, seven astronauts and nonastronauts perished during the launch of the *Challenger* space shuttle. And another seven crew members died in February 2003 when the *Columbia* space shuttle broke up on reentry.

The first U.S. astronauts were all male and selected from military test pilots, seven in 1959. The first astronauts had to be younger than 40, no taller than 5 feet 11 inches, and physically fit. They also had to have a Bachelor of Science degree in engineering, to have graduated from a test-pilot school as a qualified jet pilot, and have a minimum of 1,500 hours of flying time. In 1965, NASA established a new category, the scientist-astronaut who was required to have a doctorate in medicine, engineering, or science. Women also came to be included as astronaut candidates. The roles of pilots and of mission specialists now have separate requirements. In addition to rigorous physical training equal to that of top athletes, astronaut and cosmonaut training includes studies in physics, astronomy, meteorology, computer science, and guidance and navigation. Every aspect of the mission, from liftoff to recovery, is covered; space conditions, such as restrictive spacesuits, cramped quarters, and weightlessness, are simulated; and responses to possible malfunctions and difficulties are practiced.

The Soviet Union also chose its first cosmonauts from the air force, choosing 21 men in 1960. The first cosmonauts had to be younger than 30, no taller than 5 feet 7 inches, and physically fit. They also had to be military officers who had graduated from the Soviet air force. With time, age and fitness requirements were relaxed, but education requirements were stiffened. The Soviet Union chose its first female cosmonauts in 1962 and first civilian cosmonauts in 1963. The Soviet Space Agency has evolved into the much smaller Russian Space Agency.

Other countries have contributed to the pool of astronauts and cosmonauts and payload specialists for U.S. and Soviet/Russian spaceflights. In the 1970s, the Soviet Union trained individuals from other countries as cosmonauts. In the 1980s, European scientists first flew aboard the space shuttle as part of the Spacelab SPACE STATION program. Canada, France, Germany, Italy, and Japan all have developed astronaut programs. In 1991, the EUROPEAN SPACE AGENCY created a pool of astronauts, mostly scientists, from 11 member nations and Canada.

Atlantic Ocean, exploration of the

The Atlantic Ocean is the second-largest of Earth's four oceans, after the Pacific, covering more than 32 million square miles. If adjoining seas are included—the North Sea,

Baltic Sea, MEDITERRANEAN SEA, Black Sea, Gulf of Mexico-Caribbean Sea, and HUDSON BAY—the total area is more than 35 million square miles. (Hudson Bay, linked to the Atlantic Ocean via the Hudson Strait and to the Arctic Ocean via the Foxe Channel, is discussed as an arm of both oceans.) The Atlantic has an average depth of about 12,000 feet. Forming an S shape, it is bounded by North America and South America on the west and Europe and Africa on the east. It extends in the north to the Arctic Ocean and in the south to the Antarctic continent, the Weddell Sea being a part of it. (Sometimes the waters surrounding the Antarctic Ocean—the southern limits of the Atlantic, Pacific, and Indian Oceans—are referred to as the Southern Ocean.) It is connected with the Arctic Ocean by the Greenland Sea and Smith Sound; and with the Pacific Ocean by Drake Passage, the Strait of Magellan (see MAGELLAN, STRAIT OF), and, in modern times, the Panama Canal. The Atlantic and Indian Oceans merge in the expanse between the tip of Africa and Antarctica. In modern times, the Suez Canal provides a water route between the Mediterranean Sea and the RED SEA, a branch of the Indian Ocean. The name *Atlantic* is derived from Atlas, a deity from Greek mythology who supposedly bore the heavens and Earth on his shoulders.

The portion north of the EQUATOR is known as the North Atlantic; the portion south of the equator, the South Atlantic. Each has distinct OCEAN CURRENTS. The North Atlantic generally has currents flowing clockwise, one of them known as the GULF STREAM; South Atlantic currents generally flow counterclockwise.

The Atlantic has relatively few islands, many of them in the Caribbean Sea (see WEST INDIES). Many of the world's largest rivers drain into the Atlantic, including the AMAZON RIVER and ORINOCO RIVER of South America; the MISSISSIPPI RIVER and St. Lawrence River of North America; and the CONGO RIVER (Zaire River), NIGER RIVER, and NILE RIVER (which drains into the Mediterranean) of Africa. The Atlantic has the highest salinity of the world's oceans, in large part as a result of the salty undercurrent from the Mediterranean. The Atlantic Ocean also offers some of the world's most productive fishing grounds, in particular off northeastern North America, the British Isles, and ICELAND.

The Ancients and the Atlantic

The oceans served as the highways of world exploration between continents and islands. Yet, understanding them and charting them is a story unto itself. People living along the Atlantic coasts of Europe, Africa, and the Americas knew of the great body of water from one perspective, but they were not known to have navigated the waters in primitive craft any great distance from the shorelines. What becomes noteworthy regarding ancient times is extended journeys. The Mediterranean Sea, an arm of the Atlantic, was navigated by ancient peoples long before it is known they ventured into

the Atlantic. Yet, some of those same ancient peoples are known as the first navigators of the Atlantic, by GALLEY ship. The writings of fifth-century B.C. Greek historian HERODOTUS indicate that, sailing for the Egyptian pharaoh NECHO II in about 600–597 B.C., Phoenicians followed the Red Sea southward from the Gulf of ‘Aqaba to the Indian Ocean and possibly rounded Africa, returning to the Mediterranean by way of the Atlantic and Strait of Gibraltar (see GIBRALTAR, STRAIT OF). It is also possible that the Phoenicians, or even the Minoans of the island of Crete before them, ventured westward through the Strait of Gibraltar long before the historical record indicates. It is in fact recorded by Greek and Roman writers that Carthaginians—HANNO and HIMILCO of Phoenician descent—passed through the Strait of Gibraltar into the Atlantic in the fifth century B.C. and explored along parts of the coasts of Africa and Europe respectively and established trade routes. The Carthaginians may have even reached the AZORES, an island group 900 miles west of Portugal. The Greeks were among the early mariners to explore Atlantic waters. In a fourth-century B.C. voyage, probably to establish trading contacts, a scholar PYTHEAS traveled from the Mediterranean into the North Atlantic and may have even reached the ARCTIC CIRCLE. The Romans, who rose to power in the Mediterranean region after the Greeks, also dispatched ships into the Atlantic, at first for purposes of conquest. In the first century B.C., GAIUS JULIUS CAESAR led a Roman military expedition to the British Isles, as did SUETONIUS PAULINUS and GNAEUS JULIUS AGRICOLA in the first century A.D. (see CARTHAGINIAN EXPLORATION; GREEK EXPLORATION; MINOAN EXPLORATION; PHOENICIAN EXPLORATION; ROMAN EXPLORATION).

Northern European peoples are also part of the story of the Atlantic navigation. According to legend, in the sixth century A.D., Irish monk SAINT BRENDAN sailed westward from Ireland into the Atlantic in a type of small craft known as a CURRAGH, reaching ST. BRENDAN’S ISLE, which has been theorized as a number of different islands in the North Atlantic, among them Iceland, the Azores, the CANARY ISLANDS, and even the Bahamas off North America. It is thought that there were Irish colonies in Iceland by the early seventh century. The Vikings also explored Atlantic waters throughout northern Europe (see VIKING EXPLORATION). By the ninth century, two different Norse mariners, NADDOD and GARDAR SVARSSON, had reached Iceland. By the late 10th century, ERIC THE RED had reached GREENLAND. And, by the early 11th century, LEIF ERICSSON had reached northeastern North America.

European and African Waters

The sources describing early Atlantic voyages are vague. Much concerning another voyage of the late Middle Ages—that of Italian UGOLINO VIVALDI at the end of the 13th century—is also uncertain. He hoped to reach India by way of

the Atlantic, but it is not known whether he hoped to circumnavigate Africa or travel westward across open waters. It is known that he disappeared near the Canary Islands. That island group, only 70 miles off the coast of Africa, was definitely known to mariners as early as the first century B.C., as reported by Roman historian PLINY THE ELDER. The recorded exploration of the Azores, 900 miles west of Portugal, dates from the 14th century, when seafarers from Genoa in Italy and the Spanish Island of Majorca ventured into the Atlantic.

In the 15th century, with the many maritime voyages sponsored by HENRY THE NAVIGATOR, prince of Portugal—the start of what has become known as the EUROPEAN AGE OF EXPLORATION—the Azores came to be thoroughly charted by GONÇALO VELHO CABRAL. Both the Canaries and Azores became important stopover points for European voyages in the Atlantic over the next centuries.

Prince Henry also sent out voyages of exploration along the African coast in the type of ship designed by his shipbuilders, the CARAVEL. Soon after his death in 1460, his mariners reached Cape Palmas, where the African coast turns eastward. By the end of the century, with the Portuguese voyages of BARTOLOMEU DIAS and VASCO DA GAMA, the extent of Africa was known to Europeans.

Transatlantic Voyages

Spain also began sponsoring Atlantic expeditions at this time. By the 1480s, Italian mariner CHRISTOPHER COLUMBUS had conceived of a plan to sail westward across the Atlantic to the Orient. Portugal turned down his request for backing, but King Ferdinand II and Queen Isabella I of Spain provided support. In August 1492, Columbus set sail, reaching the West Indies in October. Columbus carried out three more transatlantic voyages; in the course of the third, he reached the coast of South America. Other Spanish expeditions, many of them led by men who had originally sailed with Columbus, explored waters of the Caribbean Sea and the Gulf of Mexico, which came to be known as the SPANISH MAIN.

Other European nations began sponsoring transatlantic voyages, and Atlantic crossings along both northern and southern sea-lanes became commonplace over the next decades. In 1497, Italian mariner JOHN CABOT, sailing for England, reached Newfoundland and the east coast of Labrador in northeastern North America. In 1501, Portuguese GASPAR CÔRTE-REAL, after reaching the west coast of Greenland the year before, made the second documented voyage to North America, exploring coastal Labrador and Newfoundland in the hope of finding the NORTHWEST PASSAGE to the Pacific Ocean. In 1524, Italian mariner GIOVANNI DA VERRAZANO, exploring for France, while also seeking the Northwest Passage, explored North America’s east coast from South Carolina to Newfoundland. Meanwhile, in 1513, Spaniard VASCO NÚÑEZ DE BALBOA became the first

European to see the Pacific from the west coast of the Americas, and, in the course of the first CIRCUMNAVIGATION OF THE WORLD in 1519–22, headed by Portuguese mariner FERDINAND MAGELLAN sailing for Spain, the extent of South America was determined.

The North Atlantic came to be well charted in the 16th century. The continuing search for the Northwest Passage took mariners, such as SIR MARTIN FROBISHER and JOHN DAVIS, both sailing for England, to its northern extent at the Arctic Circle in the 1570s and 1580s. (Davis also probably was the first European to reach the Falkland Islands off South America in an expedition in the early 1590s.) Early in the 17th century, in 1610–11, HENRY HUDSON, also sailing for England, explored the Hudson Bay, an arm of the Atlantic.

Southern Latitudes

Much of the South Atlantic was still unknown, however. The search for the GREAT SOUTHERN CONTINENT, also known as Terra Australis—a continent theorized by the ancients to exist in the Southern Hemisphere balancing out landmasses of the Northern Hemisphere—took expeditions mostly to the South Pacific, but also to the South Atlantic far from the coasts of Africa and South America. In 1739, Frenchman JEAN-BAPTISTE-CHARLES BOUVET DE LOZIER came upon Bouvet Island in the South Atlantic Ocean near the ANTARCTIC CIRCLE while looking for Terra Australis. The 1772–75 expedition of Englishman JAMES COOK, during which he circumnavigated Antarctica, proved that the fabled land did not exist in southern waters. While encircling Antarctica, he crossed the Antarctic Circle three times. He also charted South Georgia Island and the South Sandwich Islands east of South America.

An English mariner by the name of William Smith first reached the South Shetland Islands between CAPE HORN at the tip of South America and the Antarctic Peninsula. Early sightings of the Antarctic mainland were made by British naval officer EDWARD BRANSFIELD and American sealer NATHANIEL BROWN PALMER in 1820—on the Antarctic Peninsula near where the Atlantic and Pacific waters meet. That same year, German-born Russian naval officer FABIAN GOTTLIEB BENJAMIN VON BELLINGSHAUSEN sighted the edge of the Antarctic ice sheet from Atlantic waters. In 1821–23, Scottish sealer JAMES WEDDELL located the South Orkney Islands and reached the Weddell Sea east of the Antarctic Peninsula. The southernmost point he reached in the South Atlantic was not surpassed until the next century.

Oceanography

The study of the world's oceans—oceanography, a branch of geography—is a part of the saga of world exploration. By the mid-19th century, the discipline had evolved from the largely speculative to the scientific. The British voyage of the *Chal-*

lenger under SIR GEORGE STRONG NARES and SIR CHARLES WYVILLE THOMSON in 1872–76, the first of such oceanographic voyages, brought back a great deal of information, including the observation that the Atlantic was generally shallower than the Pacific, and led to other such research voyages, including that of the *Challenger II* in 1948. During the INTERNATIONAL GEOPHYSICAL YEAR (IGY) of 1957–58, 37 nations contributed the use of 80 ships to study the world's oceans (see OCEANOGRAPHY AND EXPLORATION).



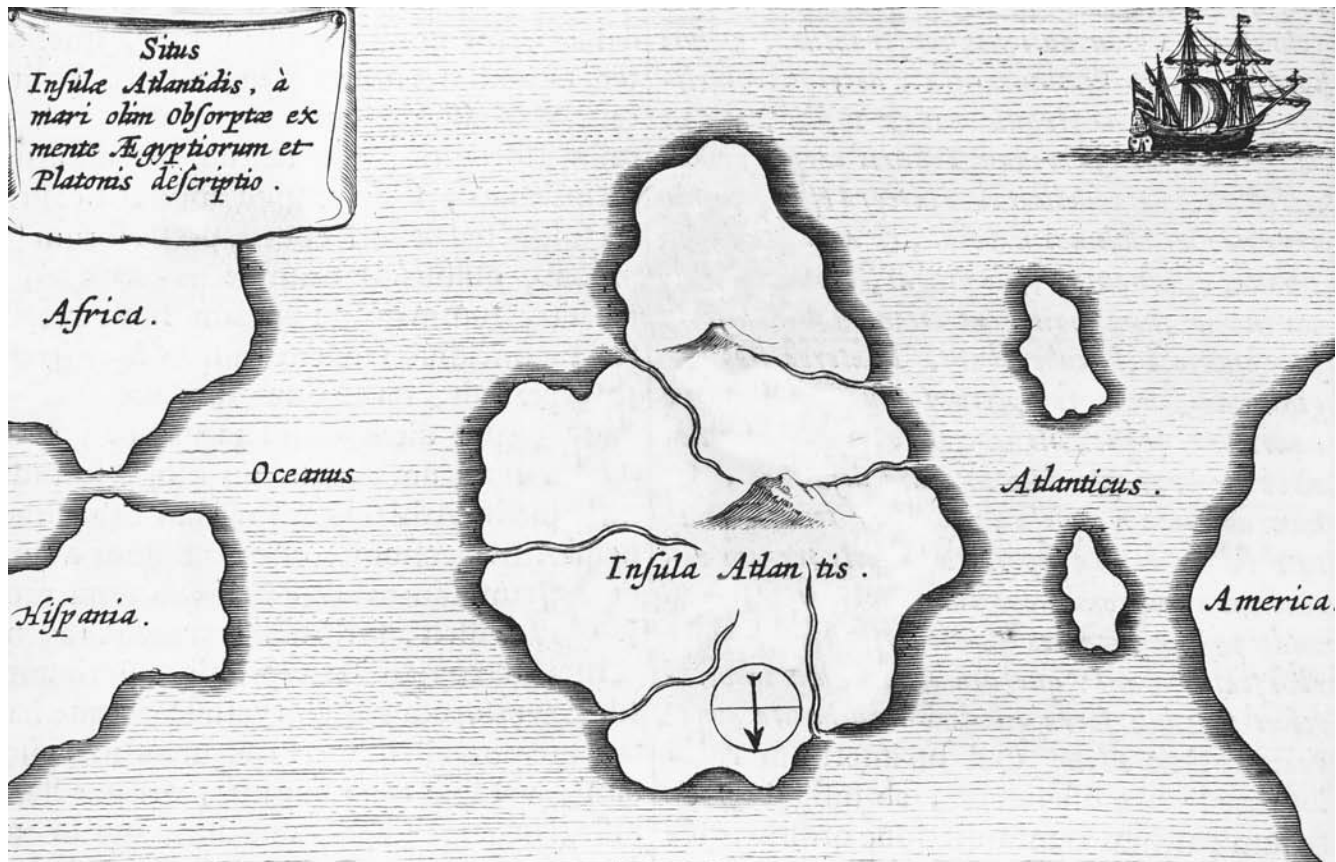
The Atlantic Ocean holds a special place in the history of exploration because ancient expeditions into it and early crossings of it changed humankind's view of the world. It became the link between what was defined as the New World and the Old World.

Atlantis

Atlantis is the name of a mythical island or continent, believed to have been sunk beneath the ocean by an earthquake. An account of Atlantis was written by Greek philosopher Plato in about 350 B.C. in his dialogues *Timaeus* and the *Critias*. The name Atlantis is derived from “Island of Atlas,” Atlas being the Titan condemned to hold the sky on his shoulders after defeat by the Olympian gods. Athenian statesman Solon, an ancestor of Plato, reportedly heard the story from an Egyptian priest and named the land. Plato may have also drawn on Greek folktales.

According to Plato, Atlantis existed in the 10th millennium B.C. He described it as a large island in the Western Ocean, a body of water beyond the known world, west of the Pillars of Hercules (see GIBRALTAR, STRAIT OF). With powerful kings, the Atlanteans supposedly extended their domain deep into Europe and Africa and amassed great wealth. They succumbed to greed, however, and attempted to enlarge their empire to the east. When their armies reached Athens, they met with defeat. The Athenians then liberated Atlantis. In a night of divine judgment, however, storms and earthquakes caused Atlantis to be swallowed up by the sea. The occupying Athenians were also drowned, leaving only a remnant from which Greek civilization was to be rebuilt.

Atlantis is sometimes associated with the island of Crete to the southeast of the Greek mainland in the MEDITERRANEAN SEA and the Minoans. Minoan civilization had been the center of culture and military power from about 3000 to 1000 B.C., before the ascension of the Greeks, and an earthquake or earthquakes may have contributed to its decline. Plato may have heard stories of this earlier civilization, and used an account of it to demonstrate the superiority of a republican form of government over a monarchy.



This map, showing the hypothetical continent of Atlantis, appeared in Athanasius Kircher's 1665 book, *Mundus Subterraneus*. (Library of Congress, Prints and Photographs Division [LC-USZ62-76292])

Proclus, a philosopher who was a follower of Plato, appeared to believe in the literal existence of Atlantis. He wrote in the fifth century A.D. of three great islands and seven lesser islands, which could arguably be the Greater and Lesser Antilles of the Caribbean Sea. His writings may be evidence of knowledge of this area by ancient seafarers. Another ancient writer who wrote about Atlantis was Roman PLINY THE ELDER of the first century A.D.

The story of Atlantis has parallels to the story of the Garden of Eden, a utopia gone wrong. Sir Francis Bacon, the English philosopher of the 16th and 17th centuries, wrote *The New Atlantis*, in which he uses the name of the mythical land for an ideal state founded on scientific principles.

The legend of Atlantis has continued to resonate with the human imagination, and societies still exist committed to proving its existence. In addition to Crete, Thera (Thíra) in the Aegean Sea, which is thought to have experienced a massive volcanic eruption in about 1640 B.C., has been cited as the origin of the legend. Other theories associate Atlantis with the CANARY ISLANDS, the Scandinavian Peninsula, and the Americas.

See also GREEK EXPLORATION; LEGENDS AND EXPLORATION; MINOAN EXPLORATION.

Australia, exploration of

The continent of Australia is located southeast of Asia, entirely in the Southern Hemisphere, between the Indian Ocean and Pacific Ocean. It is almost 3 million square miles, the smallest landmass classified as a continent. It is also one of the flattest landmasses, with an average elevation of about 1,000 feet descending to coastal plains. The GREAT DIVIDING RANGE, running north to south in the east, separates an eastern coastal plain from a series of low plateaus to the west. The most fertile regions are along the east and southeast coasts. Much of Australia's interior—or outback—is arid and sandy, but the river systems flowing from the highlands create some swamplands as well. The north's climate is tropical, and the south's temperate. The flora and fauna of Australia evolved in relative isolation over the course of thousands of years, giving rise to such unique animals as the kangaroo, the platypus, and the emu. Australia was the last inhabited continent explored by Europeans.

The Aborigines

Australian native peoples are known as Aborigines, a term that has its origin in Latin meaning “from the beginning.” As long as 40,000 years ago, the ancestors of the Australian Aborigines traveled from the island of Java to Australia, perhaps by a LAND BRIDGE. They were equipped with small boats, they could swim, and they were nomads, wandering from place to place in search of food and water. Historians are uncertain if their migration was precipitated by a traumatic event, by curiosity, or by a gradual change in conditions.

The Aborigines lived in isolation on Australia, and their culture changed little. They took shelter where they could find it. They gathered or hunted food and did not cultivate crops or raise animals. They made tools of wood and stone. Their most famous tool was the boomerang, a curved piece of wood crafted to return to its thrower if it missed its target. Aboriginal clothing was minimal to nonexistent. Yet, their culture was complex. Europeans discovered more than 500 distinct Aboriginal languages. Their animist religion had a strong connection to the world of dreams, and their cave paintings demonstrated abstraction.

Ancient Exploration

Some artifacts suggest Australia had received foreign visitors before its indisputable discovery by Europeans in the 16th century. In 1909, a coin from the second-century B.C. era of Egyptian pharaoh Ptolemy was discovered near Cairns on the continent’s northeast coast. In 1879, a statuette of a Daoist god believed to date from seventh-century-China was found in northern Australia. In 1948, a fragment of china from the 15th-century Chinese Ming dynasty was discovered on the ocean floor in the Gulf of Carpentaria. These finds—and the proximity of Australia’s north coast to New Guinea and other islands—suggest that the ancient Chinese (see CHINESE EXPLORATION), who explored and traded in that area, traveled to Australia after the aboriginal migrations and before the modern European trade took hold.

Portuguese Exploration

There is some confusion about precisely when Europeans discovered Australia. Since the time of the ancient Greeks (see GREEK EXPLORATION), Westerners had believed that a GREAT SOUTHERN CONTINENT balanced the rotation of the earth. Terra Australis (Latin for southern land) was envisioned as a lush land, rich in resources and densely populated, and it fired the European imagination for centuries. But it was participants in the SPICE TRADE who made the first European sightings of a continent in the Southern Hemisphere. The Portuguese, who had established an eastward maritime route around Africa to the SPICE ISLANDS (the Moluccas of present-day Indonesia), controlled shipping from the Malay Archipelago, and they were probably

the first to see the coast of Australia. Between 1510 and 1530, the Portuguese explored the region to see what goods of value could be found in their colonial domain. They were highly secretive, with severe penalties for anyone who revealed the charts of their profitable routes. The best evidence of a Portuguese discovery of Australia comes from the Dieppe Maps, a collection of French-made maps, the earliest dating from 1541, which accurately describe a portion of Australia’s north coast and which feature many Portuguese names.

Dutch Exploration

The European credited for the earliest definitive sighting of Australia is Dutchman WILLEM JANSZ. In 1605, he sailed for the DUTCH EAST INDIA COMPANY with two goals: to look for gold in New Guinea and to search for Terra Australis. After exploring the south coast of New Guinea and discovering it dry and uninviting, Jansz turned southward. He entered the Torres Strait, came upon Cape York Peninsula in Australia’s northeastern corner. He followed the shoreline for some 150 miles, not convinced the landmass was distinct from New Guinea. Jansz and his crew eventually landed, and several sailors were killed by Aborigines. Jansz claimed the territory for his country and named it New Holland. (Soon afterward, LUIS VÁEZ DE TORRES, sailing for Spain, charted the strait, now known as Torres Strait, separating New Guinea from Australia.)

The Dutch were soon making regular visits to the various shores of Australia, particularly once they mastered the “Roaring Forties,” the strong and constant winds which blow between 40 and 50 degrees latitude. In 1616, DIRK HARTOG located Dirk Hartog’s Island and reached the west coast of the mainland. (The pewter plate he left behind to claim the island was retrieved in 1801 by French naval officer LOUIS-CLAUDE DE SAULCES DE FREYCINET and is presently on display in the States Museum in Amsterdam.) In 1619, FREDERICK HOUTMAN also sighted the west coast, and a Dutchman named Edel landed near Perth in southwest Australia. Three years later, in 1622, another Dutch expedition continued the coastline exploration even farther southward. After being blown off course in 1623, Jan Carstensz saw the coast of Arnhem Land, which he named after his ship. In 1627, FRANÇOIS THYSSEN located the south coast, also by accident. He followed it for some 1,000 miles, but saw only desert lands, and turned back to the west just before vegetation increased to the southeast.

The first Europeans to make their home in Australia did so involuntarily. In June 1629, the Dutch East India ship the *Batavia* was wrecked on the rocky islets of the Houtman Abrolhos off the west coast. Captain François Pelsaert moved as many of the passengers and crew as he could to two islands, then sailed for help in a small boat. While he was away, seaman Jerome Cornelis attempted to seize con-

trol. Several battles ensued between the people on the two islands, with much loss of life. When Pelsaert returned with help, the mutineers were interrogated, leading to executions. Two men, whose lives were spared, were put ashore on the mainland, never to be seen again.

Dutch navigator ABEL JANSZON TASMANTASMAN opened the next chapter in the exploration of Australia and its related territories. In 1642, he was sent by the Dutch East India Company to find Terra Australis. He took a more southerly course than was usual, but soon found himself directed by the winds to a latitude of 42 degrees. On November 24, 1642, he sighted the shores of what he named Van Diemen's Land, after the governor-general of the Dutch East Indies. (It was later renamed TASMANTASMANIA by the English in honor of Tasman.) On the same journey, Tasman made the European discovery of NEW ZEALAND.

In 1644, Tasman returned to southern waters to explore the coasts of New Guinea and Australia. After sailing through the Moluccas and past New Guinea, he came to the western side of Cape York Peninsula and explored the Gulf of Carpentaria. He proceeded westward along the north coast, traveling as far as the Northwest Cape, establishing the continuity of the coastline and proving that Australia and New Guinea were distinct places. His findings were of great importance to geographers, but the desolate nature of the land he described did not inspire Dutch commerce.

English and French Coastal Exploration

The first known Englishman to set foot on Australia was WILLIAM DAMPIER. His first landing was by chance. In 1688, his ship of PRIVATEERS was forced to the barren north shore by a typhoon. The crew went ashore and spent five weeks investigating the land and its people. Dampier's account, published in 1697 as *A New Voyage Round the World*, was read by King William III, who commissioned Dampier to make a second journey to New Holland, this time supported by the Royal Navy. On July 31, 1699, Dampier and his crew of the *Roebuck* sighted Dirk Hartog's Island. The expedition sailed some 900 miles northward along the west coast, looking for river outlets along the way. Both water and food were in short supply, and his men suffered from SCURVY. The sailors also had unfriendly encounters with the Aborigines. On the return voyage, the ship fell apart at Ascension Island, forcing a return to England in a British naval vessel. Dampier reported that Australia was a collection of large islands separated by straits. His information about the dry climate and poor soil discouraged further British exploration for some time to come.

Many questions remained about the coastal outline of Australia. When the French and British returned in search of new colonial territories in the last decades of the 18th century, the best land on the east shores had not yet been reached.

In 1768, LOUIS-ANTOINE DE BOUGAINVILLE, exploring the Pacific for France, saw the endless breakers of the Great Barrier Reef off the east shore of Australia. Recognizing the danger, he proceeded to the calmer waters of New Guinea.

That same year, the British ROYAL SOCIETY prepared a voyage to Tahiti under the command of JAMES COOK. He was charged with studying the transit of Venus, information which permitted scientists to measure the distance between Earth and the Sun. After making his astronomical observations, Cook unsealed his orders for the remainder of the expedition and learned he was to search for Terra Australis. He sailed in the southern latitudes and first came upon New Zealand before reaching Cape Howe on the southeast coast of Australia. He then proceeded northward, charting the coastline and taking note of accessible harbors. When he came to the Great Barrier Reef, he attempted to navigate its shoals, a decision with nearly disastrous consequences. After safely passing through nearly 1,000 miles of the reef, the *Endeavour* (Cook's ship) ran aground on sharp coral in four feet of water. Although Cook jettisoned 50 tons of ballast, cannon, and supplies, the ship would not move and began to leak badly. Eventually, the crew managed to beach the *Endeavour* and, over a six-week period, made repairs to it. Continuing northward, Cook again hugged the shore, rounding Cape York Peninsula before heading northwest to England. During the three-year expedition, Cook's scientific staff, including SIR JOSEPH BANKS, collected much information and many specimens. In his report he foresaw better prospects for settlement than had earlier explorers. He also reported favorably about the way of life and friendliness of Aborigines.

A French expedition embarking in 1785 under JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, to the Pacific Ocean, one of its assignments to chart the north coast of Australia, went missing in 1788 on leaving Botany Bay on Australia's west coast. A 1791–94 expedition under ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux, while searching for de Galaup, explored the coast of Van Diemen's Land and the Great Australian Bight along the south coast.

Colonization

The loss of its colonies in America, along with an ever-growing population of convicts, inspired Great Britain to turn its attention to Australia for development and as a disposal site for its unwanted subjects. In 1788, Captain ARTHUR PHILLIP arrived at Botany Bay with more than 1,000 British settlers. Finding the anchorage unsuitable and the land uninviting, he sailed northward to Port Jackson and founded Australia's first permanent settlement at the location of present-day Sydney. Life was difficult for the nearly 800 convicts, 200 soldiers, and handful of wives and children who made up the colony. The lack of rain and poor soil

meant poor farming conditions, and the settlers suffered from persistent scurvy. As a result, during the first years of the New South Wales colony's existence, the British settlers mounted few exploratory expeditions.

Continuing Coastal Exploration

The seemingly insurmountable barrier of the BLUE MOUNTAINS, part of the Great Dividing Range flanking Sydney, discouraged overland expeditions, but some exploration of the coastline continued. In 1795, GEORGE BASS, a young surgeon, and naval officer MATTHEW FLINDERS sailed the eight-foot boat *Tom Thumb* south to Botany Bay and Georges River. The following year, Governor John Hunte gave them a slightly larger boat—which they also named *Tom Thumb*—and they traveled on it to Port Hacking. The shores of Van Diemen's Land were not known fully, and, in 1798, Bass and Flinders carried out another expedition, circumnavigating that island and discovering the Bass Strait, which separates Van Diemen's Land from the mainland, cutting the travel time for ships from the south by a week.

In 1801, Flinders was commissioned by the British Admiralty to make a detailed survey of the uncharted coastline of the continent. He began his expedition on the south coast and slowly proceeded westward from Cape Leeuwin to King George Sound. It was still not known if Australia consisted of one large landmass or smaller islands separated by ocean. Flinders was also on the lookout for rivers draining the land west of the Great Dividing Range. In spring 1802, he entered Spencer Gulf and, for a time, mistakenly thought he had found a gap between islands. In early April, he encountered a French ship sailing from the opposite direction and joined the captain, THOMAS-NICOLAS BAUDIN, on board for dinner. The two men exchanged findings, and Flinders went on to make a complete circumnavigation of Australia. The map he produced had only a small stretch of coastline left blank to the south of Cape York Peninsula, where the reef kept him from shore. In later years, 1826–29, a French expedition under JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE surveyed the entire south coast.

Beyond the Great Dividing Range

The crossing of the Blue Mountains was spurred on by a desperate need for more grazing lands. An 1810 drought in Sydney increased pressure on the settlers. Three years later, with the drought still on, farmer and landowner GREGORY BLAXLAND sought help from Governor Lachlan Macquarie. Together with William Lawson and WILLIAM CHARLES WENTWORTH, Blaxland headed into the Blue Mountains with the strategy of keeping to the ridge tops instead of going up and down the mountains as previous explorers had done. This approach worked, and they eventually reached a peak affording a view of grasslands to the west ideal for pasture. Governor Macquarie quickly followed up on Blaxland's

work by sending surveyor George Evans to the region and, in 1815, Evans located the Lachlan River. That same year, Macquarie had a road built through the mountains to an area he named Bathurst, after the British Secretary for the colonies. In 1817, surveyor general JOHN JOSEPH WILLIAM OLESWORTH OXLEY began his own investigations into Australia's interior, intending to travel on the Lachlan River. When swampland halted his party, he headed northwestward along the Macquarie River, only to be confronted again by swamp. Turning eastward, he then located the Liverpool Plains.

British botanist ALLAN CUNNINGHAM sought not only grazing lands for sheep and cattle, but also routes for moving livestock to market. In 1823, Cunningham made the European discovery of Pandora's Pass, between the Liverpool Plains and the Hunter River Valley, north of Sydney. Cunningham's most celebrated accomplishment was the European discovery of the agricultural tablelands, which became known as the Darling Downs in 1827. New lands were settled almost as quickly as they were located, as people migrated from Great Britain and as the European market for fine wool expanded.

In 1828, HAMILTON HUME and WILLIAM HOVELL traveled through the Great Dividing Range to explore the land ranging from beyond the mountains to the south coast. The trip was marred by fighting between Hume, who was experienced in the bush, and Hovell, who was accustomed to giving orders. Mosquitoes, ticks, and leeches added to their discomfort. Nonetheless, while on a southwestern course, Hume and Howell made the European discovery of the Murrumbidgee and Murray Rivers and eventually reached the coast at Geelong, the site of present-day Melbourne.

The desire for new land continued. Ralph Darling, new governor of the New South Wales colony, turned his attention to the rivers and swampland Oxley had reached earlier. In 1828, Darling charged CHARLES STURT with seeking the secret to the drainage of the Lachlan and Macquarie Rivers. Once again, the swamplands were difficult to cross. At times, Aborigines attempted to halt the Europeans' progress by torching the reeds in front of them. In February 1829, Sturt and his group, which included Hamilton Hume, came to the broad, slow, salty Murrumbidgee River. The following November, Sturt returned and followed the Murrumbidgee to its junction with the Murray. The expedition traveled another 400 miles along the Murray before reaching Lake Alexandrina, the river's outlet. By this time, the challenging climate and insects had taken their toll. Provisions were scarce. Exhaustion set in, and crossing the mountains was beyond the explorers' strength. Sturt decided they should return the way they had come. Fighting the current proved difficult, but, by April 1830, the group had come close enough to the settlement of Wantabadgery to send for relief. The explorers were rescued the same day they consumed

the last of their food. The major accomplishment of the expedition was discovering fertile land in the Murray River Valley, and, within a few years, that region was settled.

River Systems

Perhaps the most determined—and eventually, most successful—explorer of Australia's rivers was SIR THOMAS LIVINGSTONE MITCHELL. In 1831, Mitchell and a crew of 15 convicts headed northward from the Liverpool Plains to explore new territory. The expedition located the MacIntyre River, one of the tributaries of the Upper Darling. On the return trip, however, supplies ran low, and several men were killed by Aborigines. In 1835, Mitchell explored the lowlands northwest of Bathurst. He followed the Bogan River for 100 miles and then turned westward, traveling overland to the Darling River. Mitchell's group remained on the Darling River for some 150 miles until it joined with the Murray. The expedition had several hostile encounters with Aborigines, killing several of them.

Europeans had yet to understand the relationship of the various rivers. In 1836, Mitchell set off from the upper reaches of the Lachlan River, followed the Lachlan to where it joined the Murrumbidgee, then proceeded along the Murrumbidgee to its junction with the Murray. Mitchell's historic journey debunked many misconceptions and established the connections between the Murray and its tributaries, Australia's only major river system.

Looking Westward

Once the various tracts of grassland had been found in New South Wales, and trails between them and the Adelaide and Melbourne settlements were established, officials began to look westward. British army officers SIR GEORGE GREY (then a captain) and Lieutenant Lushington made the first journey in this next phase in Australian exploration. In 1837, they left Brunswick Bay, intending to travel overland to Perth (a journey of some 1,200 miles). They explored the Prince Regent River and the King Leopold Range. In a mountain cave east of the Glenelg River, they made their most famous discovery—a series of colorful paintings of 10-foot-high people, aboriginal works now known as the Wondjina figures. After four months, because of intense heat and dwindling supplies, Grey and Lushington returned to their starting point. The following year, they departed from Perth and explored the Swan River.

Sheep rancher EDWARD JOHN EYRE carried on the exploration of the interior of the continent. His first trip, in 1839, took him to Lake Torrens, a salt lake north of Adelaide. The next year, he traveled beyond that lake and made the European discovery of the largest lake in Australia, a body of water that would later be named Lake Eyre. In late February 1841, together with his assistant John Baxter, three Aboriginal guides, and nine horses, Eyre began a westward

journey from Fowler's Bay across the Nullarbor Plain. The expedition suffered in the blowing sand. Water was in short supply. At the end of April, two of the Aborigines killed Baxter and made off with some of the expedition's provisions. Eyre and Wylie, his remaining companion, continued their trek. Just over a week later, they reached land where water was plentiful and kangaroos could be found. In early July, more than four months after they had begun, the two men arrived in what is now Albany, completing the first east-to-west crossing of southern Australia.

Eyre's discovery of the lakes north of Adelaide inspired Charles Sturt to search for an inland sea on a south-to-north crossing of the continent. Sturt's belief in such a sea influenced him to take a boat with him when he left Adelaide in August 1844. He and his crew of 16, including JOHN MCDOUALL STUART, followed first the Murray and then the Darling River before heading northward. Drought conditions forced the party to spend six months at Depot Glen, where there was a waterhole. The punishing heat undermined the men's health and spirits. After a rain, the group finally pushed on to the northwest for another 450 miles until conditions again deteriorated. After retreating and setting up camp, Sturt and Stuart once more attempted to reach the center of the continent. This time they were stymied by the difficult terrain of the Simpson Desert. The party turned back and, suffering from scurvy, reached Adelaide in January 1846. Sturt himself had come close to total blindness and never fully recovered.

In order to connect New South Wales with the shipping lane to India, the settlers needed to find a land route to Port Essington in northwestern Australia. Two explorers competed for the glory of first mapping this route: Sir Thomas Livingstone Mitchell, who had previously explored the Darling and Murray Rivers, and FRIEDRICH WILHELM LUDWIG LEICHHARDT, who, in 1843, had walked 500 miles along the east coast from the Sydney area to Moreton Bay. Leichhardt had intended to join Mitchell's party, but that expedition was delayed by problems with government funds. In August 1844, Leichhardt got the jump on his rival by sailing first to Moreton Bay, then proceeding northward through the Great Dividing Range. Leichhardt had not planned wisely, and his party ran low on food. At Cape York Peninsula, after much difficulty and demonstrating more courage than sense, his expedition pressed on to the west. In the end, he and his party succeeded in being the first to reach Port Essington. On their return to Sydney, they were greeted as heroes and Leichhardt was given a large cash award. In 1848, Leichhardt set out from McPherson Station with seven others on an expedition to cross Australia from east to west but was never heard from again, prompting a number of searches over the next decades.

Mitchell, who had learned of Leichhardt's triumph after commencing his own journey, decided upon a different

route through the Great Dividing Range. Exploring previously uncharted territory, he located the Barcoo River and fertile grazing lands in the interior of Queensland.

EDMUND KENNEDY, who had been a member of Mitchell's expedition, led an expedition back to the Barcoo in 1847. He studied that intermittent river before heading northward with the goal of reaching Cape York at the Torres Strait. Once again, scarce food and hostile Aborigines made for a difficult journey. In fact, Kennedy was killed by Aborigines after he broke away from his group on the expedition's final leg. Of the 13 original explorers, only three survived. Cape York Peninsula was not fully explored until 1865, when Frank and Alexander Jardine forged through the territory.

Exploring from the West

SIR AUGUSTUS CHARLES GREGORY, an employee of the Western Australia Survey Department, opened new lands for sheep and cattle grazing on the west coast. In 1846, accompanied by his brother FRANCIS THOMAS GREGORY, Augustus Gregory attempted unsuccessfully a west-to-east crossing from Perth. On this trip he found coal in the Irwin River Valley and located pasturelands in the Champion Bay region. In 1848, traveling eastward from Shark Bay, he discovered mineral deposits and more grasslands in the Murchison Basin. In 1855, Augustus Gregory explored northern Australia from Pierce Point in Arnhem Land. He had two goals: to search for remains of Leichhardt's ill-fated 1848 expedition and to find additional grazing lands. This lengthy journey over varied terrain yielded the European discovery of Sturt's Creek and Gregory Lake and an exploration of the northern border of the Great Sandy Desert. Gregory then proceeded eastward and crossed the rivers that empty into the Gulf of Carpentaria. On the last section of his journey, he traversed the Great Dividing Range and the Belyando River before finally reaching Australia's Pacific coast near the modern-day city of Rockhampton, thus completing the first west-to-east crossing of northern Australia.

Gregory conducted another noteworthy expedition in 1858, during which he explored central Australia along the Barcoo River, Cooper's Creek, and Flinders Range. In addition to discovering more useful land, this trip also discredited the myth of a great horseshoe lake, which made the center of Australia impassable. Gregory's findings were confirmed by PETER EGERTON WARBURTON's travels in 1857–58. Warburton mapped the lakes north of Adelaide and found much open country.

In the meantime, in April 1851, the discovery of gold at Summer Hill Creek in New South Wales led to an accelerated settlement of that region. Other gold strikes occurred in Victoria and Queensland, leading to additional migrations of people from coastal settlements.

South-to-North Crossing

The government of South Australia, intent on establishing a telegraph line, offered a £2,000 prize to the first person to make a south-to-north crossing. Two teams vied for the honor: the Great Northern Exploration Expedition, commissioned by officials in Victoria and led by ROBERT O'HARA BURKE and WILLIAM JOHN WILLS, and a private expedition led by John McDouall Stuart, who headed out first from his sheep ranch north of Adelaide. In August 1860, Burke and Wills left Melbourne with the most well-equipped group Australian exploration had ever seen. Unfortunately, the two lacked experience, and their journey was plagued with trouble from the start. When they reached Menindee in late September, squabbling broke out, and party leader Burke decided to press on before the rear guard arrived with additional supplies. He took seven men with him and they arrived at Cooper's Creek on November 11. After establishing a base camp there, Burke, Wills, and surveyor assistant John King made a dash for the north coast on December 16. They arrived near the Gulf of Carpentaria on February 9, 1861, but swampland prevented them from actually sighting it. On April 21, when Burke, Wills, and King returned to Cooper's Creek with very little food left, they discovered that the camp had been recently abandoned. The situation went from bad to worse: They headed southward, only to circle back to camp a month later; once again, they had narrowly missed a relief party. Burke and King went on for help, leaving Wills behind. He died of starvation. Burke also soon died, but King was given food by Aborigines. He was reached in September by Alfred William Howitt. The four expeditions sent out to rescue Burke and Wills were responsible for many of the discoveries made along the route.

The trail that became the route for the Central Overland Telegraph Line was blazed by John McDouall Stuart, although it took that experienced explorer four tries. On his first attempt in 1859, he explored west of Lake Eyre and made the European discovery of the Neales River. On his second attempt, the next year, he made the European discovery of the Macdonnell Ranges, north of the Great Victoria Desert, and he also reached the geographic center of the continent. He turned back at Attack Creek because of the harshness of the land and a lack of food and water. In late November 1860, Stuart embarked on his third attempt to cross the continent. By the following summer, he had pressed farther north to Newcastle Waters, but the scrub was too brutal to penetrate, and he turned back, less than 300 miles from the north shore. He began his fourth effort in October 1861. This time, he succeeded in finding a route through the scrublands, and he also found relief when he reached the Roper River. His journey ended at Van Diemen Gulf in July 1862. The government of South Australia paid him the £2,000 prize and also awarded him a land grant. But his years in punishing conditions and his bouts of

scurvy had left him partially paralyzed and blind. In 1864, he returned to England, where he died two years later at age 51. The telegraph line that followed his trail took another 10 years to build.

The Western Deserts

The explorers who investigated the center of the continent found useful ranch lands, but they also found great and uninhabitable deserts, which presented a final frontier. JOHN FORREST and his brother ALEXANDER FORREST took up the challenge of exploring the western deserts. In 1869, John Forrest trekked eastward from Perth to look for evidence of the last Leichhardt expedition, which had vanished 20 years earlier. This trip led him to the periphery of the Great Victoria Desert. In 1871, Alexander Forrest explored the Swan River, from which he made a loop through the southwestern portion of the Great Victoria Desert.

The Forrest brothers, exploring from the west, soon had a rival in ERNEST GILES, who made his approach from the east. In 1872, Giles made his first westward trip from Charlotte Waters to Lake Amadeus, south of the MacDonnell Ranges, where the desert country forced him back. In 1873, Giles attempted another crossing and came upon the Gibson Desert, which he named for his assistant who perished within its limits. John and Alexander Forrest mounted another expedition in 1874, which succeeded in crossing the southern portion of the Gibson Desert. After proceeding to Lake Eyre and south to Adelaide, they became the first Europeans to make a west-to-east crossing of the western half of the continent. But Giles was not to be outdone, and, in 1875, using camels, he made a daring east-to-west crossing of the Great Victoria Desert from Adelaide to Perth.

Another explorer of Australia's final frontier was WILLIAM CHRISTIE GOSSE. Gosse explored central Australia in 1873 and reached the giant sandstone formation known as Ayer's Rock.

The last region of Australia to be reached by Europeans was the Kimberley Plateau and its mountains, first traversed by Alexander Forrest in 1879. Shortly thereafter, gold was discovered in Western Australia, and adventurers quickly learned techniques for traveling and surviving in the desert.

There was still much work yet to be done in surveying the continent, but, by the late 19th century, the usable grazing lands had been mapped. In 1896, two south-to-north crossings of the western deserts were made independently by Lawrence Wells and David Carnegie. The Simpson Desert, which had been declared too dangerous to cross, was finally conquered in 1936 by C. T. Madigan. He waited seven years to travel, until heavy rains brought the desert to life and provided food for his camels. Today, there are still vast expanses of unpopulated desert in Australia. Every year, motorists who run out of gas and leave their vehicles lose their lives in the heat.



The Australian continent is unique in that it is home to just one nation, the Commonwealth of Australia, which includes the island of Tasmania. Established in 1901, Australia is a self-governing member of the Commonwealth of Nations. The sixth-largest nation in the world, it consists of six states—New South Wales, Queensland, South Australia, Tasmania, Victoria, and Western Australia—and two territories—the Australian Capital Territory and the Northern Territory. Australia also has a number of island dependencies.

aviation and exploration

The term *aviation* applies to the science and operation of heavier-than-air craft, such as gliders, airplanes, and helicopters. Lighter-than-air craft, such as the BALLOON or AIRSHIP (dirigible), are generally classified separately. Both types of aircraft—heavier-than-air and lighter-than-air—have been used in aerial exploration. Lighter-than-air craft offered a new means of viewing unknown areas of Earth, starting in the 19th century. Airplanes revolutionized exploration and cartography in the 20th century, especially in conjunction with AERIAL PHOTOGRAPHY. Spacecraft, such as the SPACE SHUTTLE, that have been developed using techniques of aviation have made SPACE EXPLORATION possible as well. The science and practice of all types of flight are classified under the general term *aeronautics*.

The Dream of Flight

The concept of human flight is part of the mythology of many ancient peoples. Its practical application can be traced back to at least the fifth century and the first known experiments with kites, a rudimentary airfoil. In the 13th century, English monk Roger Bacon theorized about the properties of air, which he believed could support a craft as water does boats. Another early visionary who explored the concept of human flight was Italian artist and inventor Leonardo da Vinci, who, in the 16th century, studied the flight of birds and drafted designs of various types of human-bearing craft involving the use of muscular power.

First Human Flight

Theories and designs of heavier-than-air craft were put into effect in the 19th century. British inventor Sir George Cayley is considered the founder of aerodynamics, the science of air flow. Many other scientists and engineers of different nationalities experimented with models of aircraft and muscle-powered craft. German inventor and aeronautical engineer Otto Lilienthal made some 2,000 glider flights, starting in 1891, before crashing to his death in 1896. On December 17, 1903, American Orville Wright flew the first airplane, that is a heavier-than-air craft under power and

control, off the beach near Kitty Hawk, North Carolina, in a flight that lasted 12 seconds. He flew a second time that day. His brother, Wilbur Wright, also made two flights that day, including one lasting 59 seconds and carrying him 852 feet. With more practical designs and more powerful engines, subsequent airplanes managed to stay aloft for more than just short distances. On July 25, 1909, Frenchman Louis Blériot flew from France to England.

Early Challenges

Aviation research and development accelerated during World War I (1914–18), and airplanes played a role in surveillance and in attacking targets. After the war, on June 14–15, 1919, British aviators John William Alcock and Arthur Whitten Brown made the first nonstop transatlantic flight, from St. John's, Newfoundland, to Clifden, Ireland. On May 20–21, 1927, American aviator Charles A. Lindbergh made the first nonstop solo crossing of the Atlantic Ocean, from New York City to Paris. In May 1928, exactly one year after the Lindbergh flight, American aviator Amelia Earhart became the first woman to fly solo across the Atlantic Ocean. In 1937, she disappeared while attempting a flight around the world. In the mid-1920s, airmail service was initiated. The transportation of passengers began in 1937.

Aerial Exploration

While many flew to test the capabilities of aircraft and to set distance records, or for commercial purposes, others saw the potential of aircraft in the exploration of remote parts of the Earth, especially the Arctic and Antarctic regions. In 1924–25, American RICHARD EVELYN BYRD, with pilot Floyd Bennett, made a series of flights over the GREENLAND ice cap. In 1925, Norwegian ROALD ENGELBREGT GRAVNING AMUNDSEN and American LINCOLN ELLSWORTH failed in an attempt to fly over the NORTH POLE in two seaplanes. The next year, on May 12, accompanied by Italian UMBERTO NOBILE, they managed to do so in an airship. However, Byrd, again with Bennett piloting, had passed over the Pole three days earlier in an airplane (if his calculations were correct). Other of Byrd's accomplishments include the first flight over the SOUTH POLE in 1929–30, and a general aerial reconnaissance of Antarctica in 1947–48.

Australian photographer and aviator SIR GEORGE HUBERT WILKINS also contributed to polar aerial exploration. In 1928, he made an airplane flight over the Arctic from North America to Europe, and, in 1933–34, he joined Lincoln Ellsworth in flights over Antarctica. In 1929–31, Australian SIR DOUGLAS MAWSON conducted aerial surveys of Antarctica. In 1930, HENRY GEORGE WATKINS (Gino Watkins) led a British expedition, which made use of aircraft as well as watercraft to survey the coasts of Greenland.

American Arctic explorer LOUISE ARNER BOYD made the first flight by a woman over the North Pole in 1955.

Yet, it was not just the polar regions that were explored and mapped from the air. In 1924–25, American ALEXANDER HAMILTON RICE made the first use of aircraft to explore South America. The world's tallest waterfall, Angel Falls, located in the rain forest of southeastern Venezuela, was first mapped in 1935 by American aviator and adventurer James C. Angel. Flights have also been used to increase knowledge of mountains and mountain ranges, such as Mount Everest (see EVEREST, MOUNT) in the HIMALAYAS in 1933. Aerial photography has been central to aerial exploration and modern cartography.

Azores

The Azores are a group of nine (main) islands about 900 miles to the west of Portugal in the Atlantic Ocean. Along with the CANARY ISLANDS and the Madeira Islands to their southeast, their presence encouraged early maritime explorations. In ancient times, sailing out of the sight of land in unknown waters was a new and frightful undertaking. The discovery and mapping of the Azores coevolved with basic techniques of navigation and led to determining the wind systems of the Atlantic.

The earliest knowledge of the Azores is highly speculative. In an account of Carthaginian HAMILCO's journey in about 480 B.C., there is mention of islands that could be the Azores. Some have postulated that the seafaring Irish clerics of the fifth and sixth centuries A.D., such as SAINT BRENDAN, visited the Azores.

The recorded exploration of the Azores dates from the 14th century, when seafarers from Genoa in Italy and the Spanish island of Majorca ventured into the Atlantic. The sailors who made these trips remain nameless for the most part, yet their findings have been passed down through maps that have been reliably dated. After the Canary and Madeira Islands off the northwest coast of Africa were located in the 1330s, travels in the area expanded greatly. Portugal and Spain joined in the exploration of the region. The earliest map showing one island from the group dates from 1351, while maps from the 1380s show greater knowledge, omitting only the two westernmost islands.

Portugal, the closest European nation, came to show the greatest interest in the Azores. When HENRY THE NAVIGATOR, prince of Portugal, was beginning to encourage the exploration of the African coastline, he sent GONÇALO VELHO CABRAL westward to chart the Azores. Cabral's first journey of 1431 ended 25 miles short of the island group at the Formigas Rocks. In 1432, he was sent out again and located Santa Maria. He charted the rest of the islands on subsequent trips. These journeys entailed some of the earliest European applications of the magnetic COMPASS for ocean

navigation. The Azores were named Ilhas dos Acores, or Isles of Hawks, by Prince Henry. Cabral was made master of the islands, which he began to colonize with people from Portugal and Belgium in 1445. In 1486 a Flemish community was organized on the island Fayal by German cartographer

MARTIN BEHAIM, in service to Portugal. In subsequent years, during the continuing EUROPEAN AGE OF EXPLORATION, the Azores served as a convenient stopover point for transatlantic voyages.

See also ATLANTIC OCEAN, EXPLORATION OF THE.

B



backstaff See CROSS-STAFF; QUADRANT.

balloon

A balloon is an aircraft that consists of one or more large spherical, fabric bags, containing air heated by a small gas burner or a lighter-than-air gas to provide lift. Some balloons have gondolas suspended below the bag to carry people; other balloons carry scientific equipment. Hydrogen or helium serve as the lighter-than-air gases. Altitude is gained by discarding ballast, typically bags of sand, or lost by releasing some of the hot air or gas. Unlike an AIRSHIP (also known as a dirigible or dirigible balloon), a balloon has no propulsion system or steering mechanism. A “captive balloon” is fastened to a mooring cable to prevent free flight, as opposed to a “free balloon.” The term *aviation* is generally not used in reference to balloons, but to heavier-than-aircraft, such as airplanes.

A number of men began experimenting with balloons in the late 18th century, many of them Frenchmen who conducted their first ascents in 1783. Two brothers, Jacques Étienne Montgolfier and Joseph Michel Montgolfier, papermakers from the village of Annonay, sent up a linen balloon lined with paper and filled with heated air to 6,000 feet; Jean-François Pilatre de Rozier and Marquis d’Arlandes made the first ascents by humans in Montgolfier hot-air balloons, first in a captive balloon and later in a free balloon; and Jacques Alexandre César Charles, a physicist and chemist, used hydrogen instead of hot air to travel with as-

sociates 27 miles in a two-hour flight. The next year, aeronaut Jean Pierre Blanchard, with John Jeffries, an American physician, successfully crossed the English Channel from Dover to Calais, the first sea voyage. Also in 1784, James Tytler, a Scottish writer, made the first balloon ascent in England. In 1793, Blanchard made the first ascent in America at Philadelphia.

Balloon technology kept improving, and ballooning was undertaken for practical purposes. In 1804, physicist Joseph Louis Gay-Lussac ascended on a number of occasions to study magnetic forces and to observe the air composition and temperature at varying altitudes. Also in the 19th century, photographers first took pictures with cameras suspended in balloons, the beginnings of AERIAL PHOTOGRAPHY. Balloons, especially captive balloons, were used in warfare for observation, starting in the American Civil War of 1861–65, and, in the 20th century, were also used as obstacles against low-flying aircraft.

In 1893, Swedish engineer SALOMON AUGUST ANDRÉE began developing ballooning for the purpose of polar exploration. He developed a steering mechanism that enabled him to follow a course not entirely limited by wind direction. In 1897, accompanied by Nils Strindberg and Knut Fraenkel, he attempted to reach the NORTH POLE in a balloon, the *Ornen* (the Eagle), with hydrogen providing lift. When the steering device failed on takeoff, the balloon drifted uncontrollably. Ice buildup eventually forced it down after about 400 miles, far from the Pole. Andrée and his companions, after a three-month trek across the



Published in 1884, these illustrations celebrated the first centenary of ballooning. (Library of Congress, Prints and Photographs Division [LC-USZ62-12734])

ice, perished, their bodies not being found for another 33 years.

Swiss physicist AUGUSTE PICCARD pioneered the use of the airtight gondola for high-altitude ascents. In 1931, he and Paul Kipler, using hydrogen for lift, set a new world balloon record of 51,793 feet, becoming the first humans to penetrate the stratosphere. In 1932, Piccard reached 55,577 feet. His twin brother, Jean-Félix Piccard, ascended with his wife to an altitude of 57,564 feet in 1934. Manned balloons have since reached an altitude of 100,000 feet; unmanned balloons have reached as high as 140,000 feet.

In 1978, Americans Ben Abruzzo, Maxie Anderson, and Larry Newman accomplished the first successful transatlantic balloon flight, from Presque Isle, Maine, to Miserey, France, also setting a distance record of 3,000 miles and an endurance record of 137 hours 6 minutes, using helium. The first nonstop circumnavigation of the earth by balloon, from Switzerland to Egypt, was achieved in 1999 by Bertrand Piccard, Auguste Piccard's grandson, and Brian Jones, a British pilot, in a hybrid gas and hot-air balloon.

Most scientific ballooning now involves unmanned ascents, for meteorological purposes. Manned sport balloon-

ing has enjoyed a resurgence in recent years. In Europe, hydrogen is favored for buoyancy; in the United States, hot-air ballooning is more common.

See also AVIATION AND EXPLORATION.

balsa raft See RAFT.

Barbary Coast

The term *Barbary Coast* was once used to describe the coastal areas of northwestern Africa, from Ceuta at the Strait of Gibraltar (see GIBRALTAR, STRAIT OF) to Egypt. What became known as the Barbary states—independent states controlled by Muslims (see MUSLIM EXPLORATION)—were Morocco, Algeria, Tunisia, and Tripolis, also known as Tripolitania (Oea, a city in Tripolis, also became known as Tripoli, the name of a specific city in present-day Libya). Barbary was named for Khayr ad-Din Barbarossa, a Turkish pirate. In 1518, Barbarossa captured the port city of Algiers from Spain and turned it over to Turkish control. He regularly plundered the shores of Greece, Spain, and

Italy. In 1533–44, he was appointed an admiral in the Turkish navy.

In 1541, when Charles I of Spain (Holy Roman Emperor Charles V) failed in his final attempt to rout the Turks from North Africa, the era of the Barbary pirates, or corsairs, had begun (see PRIVATEERS). They would sail from their protected harbors into the Atlantic Ocean and take gold, silver, slaves, and other plunder from the Spanish treasure ships—mostly of the GALLEON type—as well as goods from European ships trading in the MEDITERRANEAN SEA. Their thievery was so costly that most countries found it less expensive to pay them tribute than to suffer a complete loss of their cargoes. The tribute and the goods of the pirate industry became the basis of the economy in North Africa.

After the British and the French enlarged their navies, they occasionally engaged the centers of piracy with blockades and bombardments. These tactics proved ineffective. In 1800, the tribute system between the Barbary states and the United States broke down, and the United States entered into a war with them. The United States eventually triumphed and, after 1815, no longer paid tribute. In 1830, France successfully completed a three-year blockade of Algiers and began the domination of Algeria. In 1835, Turkey asserted control of Tripolitania and, because of international pressure, ended pirate activities. At the same time, France, England, and Austria clamped down on Morocco's support of corsairs. Thus ended the larcenous careers of the Barbary pirates.

The name *Barbary Coast* also has been used to refer to the old waterfront neighborhood of San Francisco, known for its saloons, brothels, and gambling dens; it was destroyed in the earthquake of 1906.

bathyscaph

The bathyscaph (also spelled *bathyscaphe*) was the first successful deepwater diving vessel, an early SUBMERSIBLE with its own pressurized oxygen supply and not tethered to a ship on the water's surface. The name is derived from Greek and means "deep boat." The fourth-generation bathyscaph, *Trieste II*, was the first manned vehicle to explore the MARIANAS TRENCH, the deepest place in the ocean, nearly seven miles down.

In 1947, the bathyscaph was invented by Swiss physicist and high-altitude balloonist AUGUSTE PICCARD, improving on the design of the BATHYSPHERE, designed by Americans CHARLES WILLIAM BEEBE and Otis Barton. Piccard's first bathyscaph was named the *FNRS-2*, after the Fonds National de la Recherche Scientifique, the Belgian National Scientific Fund, which sponsored the project (the first *FNRS* was a BALLOON). The *FNRS-2* was an unmanned vessel with a limited mission. It was designed simply to descend to a great depth (4,500 feet), to unballast via a timed opera-

tion, then resurface. This it accomplished successfully in November 1948, validating Piccard's engineering and testing the strength of materials used. The *FNRS-2* was bought by the French navy, which reconstructed it for additional projects and rechristened it the *FNRS-3*.

After his work on the *FNRS-2*, Auguste Piccard designed a manned vehicle for much deeper diving. His son, JACQUES ERNEST-JEAN PICCARD, oversaw the construction of this bathyscaph, which would come to be named *Trieste*, after the town in Italy where it was assembled. The *Trieste* had the primary design consideration of being able to resist the enormous water pressure that occurs at great depths. To accomplish this with maximum efficiency and minimum weight, only the capsule that the operators occupied would be required to withstand the force. The manned capsule was made in the shape of a sphere as had been earlier submersibles, since this shape causes pressure to be distributed evenly on its surface. Holes were drilled into the sphere for Plexiglas windows and wires used to control the vessel. The rest of the craft was designed to be open to the ocean; in other words, it would not be required to resist water pressure. Such was the case with the gasoline flotation tanks and the holds for iron shot, which served as ballast. The ship could be maneuvered at approximately one knot per hour via small propellers driven by electric motors.

The mechanisms for controlled submersion and resurfacing were unique and ingenious. For buoyancy previous to diving, a combination of gasoline and air was used. When diving, the air tanks were flooded with seawater, and gasoline was discharged in limited quantities. The process of drifting to the ocean floor is an intrinsically unstable operation, and so the careful release of gasoline, which is lighter than seawater, was a revolutionary aspect in the design of the bathyscaph. Resurfacing was accomplished through the jettisoning of ballast in the form of iron shot, about the size of BBs. There were two compartments where the shot was kept, both in a funnel-type arrangement. The release of shot was controlled by an electromagnet at the funnel's neck. While the magnet was charged, the shot was held in place like a plug. This design had a built-in safety feature, in that, if power failed to the magnets, the shot would be dumped automatically and the vessel would return to the surface.

The first test dive of the *Trieste* took place on August 11, 1953, at the Harbor of Castellammare and was manned by both Piccards, father and son. The first deep-water dive took place two weeks later off the Island of Capri to a depth of 3,540 feet. On September 30 of that year, they reached a depth of 10,300 feet south of Ponza Island. The *Trieste* performed exceptionally well, with only minor problems. The holes in the sphere where wires ran to the rest of the vessel leaked slightly, but these leaks corrected themselves with increased depth. The Plexiglas portholes for viewing never let so much as a drop of water into the capsule. In 1954, the

bathyscaph accomplished a descent to a depth of 13,125 feet.

After 22 dives, the U.S. Navy eventually purchased the craft and contracted Jacques Piccard as adviser and pilot. More dives were conducted in the MEDITERRANEAN SEA in 1957–58, after which the *Trieste* was brought to San Diego Harbor for exploration in the Pacific Ocean.

In 1958, the navy undertook Project Nekton, with the goal of reaching the greatest depth in the ocean. This involved the retrofitting of the *Trieste*. Designed for a depth of 10 miles, the *Trieste II*, as it was renamed, weighed 13 tons. It had a thicker personnel capsule and larger flotation tank. The new sphere was five inches thick, except around the portholes, where it was seven inches thick. The gasoline float was increased from a capacity of 28,000 gallons to 34,200 gallons. The first test dive for Project Nekton took place November 4, 1959, off Guam. On January 8, 1960, the *Trieste* attained a new record of 23,000 feet at a location called Nero Deep.

The attempt at Challenger Deep, the name given to the deepest place in the Marianas Trench, was made on January 23, 1960, by Jacques Piccard and navy lieutenant Don Walsh. Despite instruments damaged from the tow to the location, Piccard made the decision to go ahead with the dive. Timing was important because of limited oxygen for the dive and for retrieval of the crew. Poor weather delayed the trip by one hour. At eight in the morning, Piccard and Walsh began their descent. They encountered several thermoclines, places where one layer of water meets another of differing density, causing the ship to be repelled. These were penetrated, and, by 1:06 P.M., they had settled to the bottom at 35,800 feet. They had navigated the narrow chasm that formed the trench and found the bottom, a brown mud consisting largely of the remains of diatoms, a type of algae. A lone flatfish was sighted, proving that chordates (animals with a spinal chord) were able to survive in such an environment.

Although there is a curiosity and motivation regarding exploration of the most extreme depths of the globe, most of the ocean presents more moderate depths. For this reason, and because of the limited tasks that the bathyscaph was able to perform, it has been replaced by the SUBMARINE, which is designed for a wide variety of applications.

See also OCEANOGRAPHY AND EXPLORATION.

bathysphere

The bathysphere is a container constructed of steel, designed for deep-sea observation and study, at depths not able to be reached by a DIVING BELL. In 1926, American CHARLES WILLIAM BEEBE made the claim of having designed a craft that could descend one mile below the ocean's surface, a SUBMERSIBLE with its own pressurized oxygen supply.

Beebe was a zoologist and bird expert who had bought a copper diving helmet and accompanying apparatus prior to a trip to the Galapagos Islands to study fish (see DIVING SUIT). The helmet worked well and inspired him to design a craft to hold humans. He and the engineer Otis Barton decided on the shape of a sphere rather than a cylinder, which had been Beebe's original idea. A sphere would be able to resist water pressure evenly, whereas any other shape would have weak points. Their vessel weighed 5,400 pounds and measured four feet nine inches in diameter. It was tethered by a steel cable to a winch aboard a ship, but had its own supply of oxygen in tanks inside the sphere.

The bathysphere's first dives were conducted in 1930 off the coast of Bermuda. Beebe and Barton encountered problems that needed fixing, but, by 1932, they were confident enough to make a live radio broadcast as they attempted their deepest dive ever, which exceeded 2,000 feet. On a subsequent dive, they reached the limit of their length of steel cable, 3,028 feet, five times deeper than ever before accomplished. Barton continued to work with the invention and to make underwater films. In 1949, Barton attained a depth of 4,500 feet, the ultimate depth for the bathysphere. A more advanced type of bathysphere was the BATHYSCAPH, designed by Swiss AUGUSTE PICCARD and first used in 1947.

See also OCEANOGRAPHY AND EXPLORATION.

Bering Strait

The Bering Strait is the waterway between the northeastern end of the continent of Asia, that part of Russia known as SIBERIA, and the northwestern end of the continent of North America, present-day Alaska. It is located at a latitude of 65 degrees and 30 minutes north and a longitude of 169 degrees west. The strait connects the Bering Sea, a northern arm of the Pacific Ocean, with the Arctic Ocean. The narrowest part of the strait—51 miles wide—is between Cape Dezhnev in Russia and Cape Prince of Wales in Alaska. The Diomed Islands lie between the capes. Part of the strait is normally frozen over from October to June.

The Bering Strait forms the western outlet of the NORTHWEST PASSAGE and the eastern outlet of the NORTHEAST PASSAGE, water routes sought by European nations for centuries. There were reports of such a strait—the western outlet of the fabled Strait of Anian (see ANIAN, STRAIT OF)—in the mid-16th century, with representations of it on early maps. The earliest recorded sighting of the strait was by a party of Cossacks under SEMYON IVANOVICH DEZHNEV in 1648; they are thought to have passed through it as well. VITUS JONASSEN BERING, a Danish explorer in service to Russia, first charted the strait in 1728; the strait was subsequently named for him. It was further explored by Englishmen JAMES COOK in 1778 and FREDERICK WILLIAM BEECHY in 1826.

It is theorized that at times during Earth's last ice age in the millennia before 8000 B.C., when more of Earth's water was frozen in glaciers and now-submerged land was exposed, there was a LAND BRIDGE where the Bering Strait is today. Archaeological evidence indicates that Paleo-Indians, tracking big game, migrated to the Americas across the Bering Strait land bridge and are ancestral to the Native American population.

See also ARCTIC, EXPLORATION OF THE; PACIFIC OCEAN, EXPLORATION OF THE.

Blanc, Mont

Mont Blanc is a mountain in the Alps of Europe, located in southwestern France in the Haute-Savoie Department, formerly the Duchy of Savoy. The name is also applied to the massif or range of which the mountain is a part, along the border between France and Italy. The French *Mont Blanc*, or Italian *Monte Bianco*, translates as "white mountain." At 15,771 feet above sea level, Mont Blanc is the highest mountain in the Alpine system. From the summit to about 8,000 feet high, an ice cap, 75 feet thick, covers the mountain. The Mont Blanc massif is considered part of the Savoy Alps of the Western Alps (the Western and Eastern Alps being delineated by a furrow that leads from the Rhine Valley in northern Switzerland to Lake Como in northern Italy).

Mont Blanc is important in the history of exploration since concerted attempts to climb it laid the foundations of modern MOUNTAIN CLIMBING, from 1760, when Swiss naturalist Horace Bénédict de Saussure offered a reward to reach the top, until 1786 when Savoy natives JACQUES BALMAT and Michel Paccard did so.

Blue Mountains

The Blue Mountains of Australia are a collection of high sandstone mountains, 40 miles to the west of Sydney. Named for a blue haze produced by the oils of abundant eucalyptus trees, they are part of the GREAT DIVIDING RANGE, a continuous chain of mountains forming a crescent along the eastern edge of the continent. They rise up more than 3,000 feet above the lowlands. On the eastern side, canyons and ravines end in dead ends, some in the form of waterfalls cascading from high above. Past the easternmost wall of ridges, there is a succession of peaks and valleys, covered with scrub brush. The Blue Mountains present a formidable barrier and hemmed in the settlement of Sydney for 25 years before explorers were able find routes through them to usable land in the interior.

The first explorers of the Blue Mountains were escaped convicts and their pursuers. Legend held that non-Aborigine communities lay beyond the mountains in lands with boun-

tiful food sources. Another myth held that it was but a short distance to China over the mountains. To debunk this latter myth, New South Wales colony governor John Hunter (the second governor after ARTHUR PHILLIP) sent out a party of convicts and soldiers under John Wilson, an ex-convict who had become an experienced bushman, in January 1798. Many of the expedition members were quickly discouraged and returned to base, but Wilson and his guides pushed on and came upon a large but slow river, probably the Lachlan. Ensign Barrallier led another early expedition in 1802. A skilled surveyor, he made a map of his route into the mountains. Yet, since he failed to locate suitable land for development, his accomplishments were disregarded.

In 1813, after a drought of nearly three years, the settlers' need for farm and grazing lands became acute. GREGORY BLAXLAND, a farmer, became determined to cross the mountains in search of arable land. On May 11, 1813, he left South Creek with a fellow farmer, WILLIAM CHARLES WENTWORTH; surveyor William Lawson; an Aboriginal guide named James Burnes; and several convict servants. They decided on a novel strategy. Instead of setting a straight course up and down the mountains, they followed the high ridges. On May 28, they came to Mount York, from which they could see pastureland dotted with trees. Blaxland estimated that these lands would be sufficient to absorb settlers for the next 30 years.

With these encouraging findings, Lachlan Macquarie, now governor, commissioned surveyor George William Evans to investigate later in 1813. Evans proceeded to Mount Blaxland, from where he proceeded to the Fish River, past the Great Dividing Range. He followed the Fish River to the Campbell River, which joins the Macquarie River, named after Governor Macquarie. Evans's explorations inspired Macquarie to build a road to the fertile new lands. It was built in only six months and enabled the town of Bathurst to be established in the Blue Mountains' western foothills. With Bathurst as a staging area, Surveyor General JOHN JOSEPH WILLIAM MOLESWORTH OXLEY charted the Lachlan River in 1817 and the Macquarie River in 1818.

Although developed, especially for vacation use, the Blue Mountains include a number of designated wilderness areas.

See also AUSTRALIA, EXPLORATION OF.

British East India Company (East India Company)

The British East India Company (known in Great Britain simply as the East India Company), founded in 1600 and active until 1874, was the largest and longest-lasting of the joint-stock East India Companies of various nations, formed to conduct trade between Europe and the East. With a charter from the British Crown, the British East India

Company enjoyed monopoly privileges in the Eastern Hemisphere. It also came to act as the government of India, prosecuting crime, dispensing punishment, and seizing land. Members of the British government encouraged these activities because of their many benefits: a favorable balance of trade, cash payments, loans to finance warfare, and aid in the conquest of the Indian subcontinent.

Early Conflicts

Queen Elizabeth I granted the charter under the title “The Governor and Company of Merchants of London Trading into the East Indies” in 1600, with a monopoly on trade in the region (see EAST INDIES). A governor and 24 directors chosen from its stockholders managed the company. Merchants RALPH FITCH and JOHN NEWBERRY had established the original diplomatic contacts between England and India in the 1580s. After the founding of the company, the queen sent her envoy, John Mildenhall, to India to negotiate trading privileges, but he was rebuffed by the Mogul (Mughal) ruler, who had a prior trade relationship with the Portuguese. In the meantime, a fleet of three ships, laden with goods to trade, was sent to the ports of Achin on Sumatra and Bantam on Java. The fleet returned in 1603, carrying a cargo of pepper and other spices. That same year, the English fought the Portuguese at the port of Surat in northwestern India and gained the right to trade there as well. In 1610–11, it established its first factories—that is, trading posts—in India in the Indian provinces of Madras and Bombay.

At that time, trade in India, Malaysia, Indonesia, and the SPICE ISLANDS (the Moluccas) was dominated by the Portuguese. The Portuguese did not have sufficient military power to keep out challengers, however, and the Dutch, French, and English were all active in the region, forming alliances with native kings at various trading centers. In 1612, Thomas Best was sent with letters from English king James I, asking the ruler of India to cooperate with England against Portugal. In a legendary naval battle, Best, with two small ships, outmaneuvered a Portuguese fleet of 29. In 1615, the British government sent another emissary to firm up relations between India and England. SIR THOMAS ROE arrived in Surat in September of that year, and, from there, made a difficult overland journey to Ajmer, where the Mogul capital was located at the time. Roe spent three years at the court of King Jahangir; his diplomatic efforts set the stage for future advances in English-Indian trade.

With its long tradition of trade with the Middle East, India had developed a wide variety of finished products to export and expected to receive high-quality products in exchange. England exported velvets, satins, fine tableware, saddles, spyglasses, and enamel work, among other fine goods. In return, India traded silks (both raw and finished), diamonds, medicines, and brass and bronze work. India used

some of these items, in particular the silk cloth, to barter for spices with nations farther to the east.

In 1620, the Raja of Golconda agreed to allow the East India Company to build an outpost near the Dutch settlement of Pulicat on the Coromandel Coast. Originally called Fort St. George, this became the bustling city of Madras and a major hub of activity for the East India Company. As profits began to swell for the company, discontent grew among merchants who were shut out of the Indian trade, and they petitioned Parliament for their fair share. In 1623, to strengthen the East India Company’s position, King James granted it the power of law enforcement on both land and sea. Conflict with the Dutch came to a head that same year with the Amboina Massacre. The British and the Dutch had shared trading rights with the tiny island of Amboina, just off the coast of New Guinea. To consolidate their hold on the Spice Islands, the Dutch fabricated charges of conspiracy against the English stationed there, convicting and executing 10 of them, along with nine Japanese. Henceforth, the British concentrated on its trade with India.

With the ascension of Charles I to the throne, the British East India Company encountered more difficulties. The new king was sympathetic to those merchants who made trips to India and back without official sanction. In 1635, Charles went so far as to create his own company to challenge the exclusive privileges of the older concern. His venture was a disaster, however, and the East India Company responded by continuing to refine its operations. Skirmishes with the Dutch remained a vexing problem for the company until the 1654 English peace treaty with Holland. The company was also sustaining increasing losses from piracy. It was widely understood that complicity between pirates and local sultans enabled this thievery to exist, and, in 1657, Oliver Cromwell, the Puritan leader who ruled England in 1653–58 under the title of Lord Protector, restored trading powers to the company that Charles had eroded. In 1661, a completely rewritten charter expanded the trading company’s rights even further.

Issues at Home

As the company entered the latter half of the 17th century, trouble in the Pacific diminished and dissent at home increased. The silk weavers of London complained that their position was being undercut by the importation of finished cloth, and British merchants continued to voice their arguments against monopoly protections. Events came to a head in 1694, when it was revealed that the East India Company had paid £80,000 for “secret services,” including the renewal of their charter with favorable terms. In 1698, Parliament authorized the establishment of a new trading company, and this event brought chaos to the India trade. The businessmen of both concerns suffered, and, in 1702, the two com-

panies were merged into the “United Company of Merchants of England trading to the East Indies” but still were popularly known as the East India Company. At the time of its final consolidation, the new company lent £1,200,000 to the British government in 1708, and, as a result, for a time, disagreements were quieted.

The 18th century saw the rise of the importance of tea for the East India Company. Introduced by the Dutch in Europe the previous century, tea had become an essential commodity in many British households. Great Britain had gone so far as to pass a law in 1745 requiring the company either to supply tea at reasonable prices or to face sanctions.

Great Britain was at war with France during much of the 18th century, and the conflict extended to the Far East. In mid-century, Robert Clive led British forces on victories over the French and Dutch. In 1761, the British gained control of the French trading port of Pondicherry, thus circumscribing the ambitions of the FRENCH EAST INDIA COMPANY in India. The 1763 Treaty of Paris gave some trading privileges back to the French, but the British would no longer be defied by other European powers in India.

In the waning years of the 18th century, with outside conflict quashed, the power and profits of the British East India Company increased steadily. Seeing their enormous trading profits disappearing into private hands, the British government levied an annual payment of £400,000 on the company and limited its dividends to 12.5 percent.

The incident that motivated the British government to begin to assert legal control in India came to be known as the Tanjore question. The raja of Tanjore had been deposed by his rival, the nabob of Arcot, Muhammad Ali. Without the consent of his superiors, the president of Madras was complicit in this coup. The raja was subsequently reinstated,

but, in the meantime, the nabob had mortgaged the assets of Tanjore, leading to financial repercussions in England.

The Regulating Act of 1773 made the appointment of the governor of Bengal subject to British government approval. The first to hold the post was Warren Hastings, who had a great influence in the future organization of the country. The East India Act of 1784 made the British government even more responsible for activities in India by setting up a board of control to handle political, military, and financial matters. The East India Company’s monopoly in Indian trade was taken away by acts of Parliament in 1813 and 1833. The Indian Mutiny (also known as the Sepoy Rebellion) of 1857, in which native soldiers (sepoys) in the Bengal army revolted against the British, led to assumption of full political control over India by the British Crown under the terms of the Act for the Better Government of India the next year. The assets of the company were finally dispersed in 1874 with the East India Stock Dividend Redemption Act.



The activities of the British East India Company contributed to the spread of geographic knowledge about Asia to Europeans. It also actively promoted the exploration of lands. The Great Trigonometrical Survey of India, headed for a time by British officer and surveyor SIR GEORGE EVEREST, was initiated by the British East India Company.

See also COMMERCE AND EXPLORATION.

bullboat See CORACLE.

bulrush boat See CANOE.



Canary Islands

The Canary Islands are a group of seven volcanic islands 70 miles off the coast of Africa in the Atlantic Ocean near the border of present-day Morocco and Western Sahara, about 600 miles to the southwest of the Iberian Peninsula. They mark the beginning of the Canary Current, part of the circular system of currents in the Northern Hemisphere that are generated by the northeast TRADE WINDS.

The record of the discovery of the Canaries predates the EUROPEAN AGE OF EXPLORATION of the 15th through the 17th centuries; consequently, the islands served as a point of reference in the unknown seas to the west of Africa, along with the Madeira Islands, and later the AZORES. These islands became a testing ground as explorers learned to navigate the open seas. The Canaries also became a way station for longer voyages.

PLINY THE ELDER, a Roman historian, demonstrated definite knowledge of the Canary Islands in 40 B.C., and subsequent writers, such as Plutarch, referred to the “Fortunate Islands,” probably the Canaries, although they were possibly confused with the Madeiras and Azores. In the early first century A.D., King Juba of Morocco sent explorers to the islands. They brought back a detailed record of their flora and fauna. It was also noted that there were signs of previous human habitation, although no living people were found at the time. It has been theorized that Irish monk SAINT BRENDAN reached the Canaries in the sixth century.

In the late Middle Ages, merchant ships began to pass routinely beyond the Strait of Gibraltar (see GIBRALTAR,

STRAIT OF)—from the MEDITERRANEAN SEA into the Atlantic Ocean—and the Canary Islands were rediscovered. Arab Muslims reached the Canaries in the 12th century. There were a number of voyages in the early 14th century, including one by French mariners in 1334 and one, about the same time, by an Italian, Lanzarotto Malocello, who gave his name to the Island Lanzarote; a map indicating his findings dates to 1339. In *Teseida*, published in about 1341, Italian storyteller Giovanni Boccaccio relates trips by Spanish, Italian, and Portuguese seamen. Some of the visitors attempted to seize power but failed to maintain control for long. In the second half of the century, the islands were regularly visited by Franciscan missionaries, yet attacks on them by the inhabitants halted missionizing attempts for a time.

The peoples who lived on the Canary Islands at the time of the European rediscovery were the Guanches. Like the Berbers of North Africa, they were an ethnically mixed population of varying height, hair, and skin color. Their exact place of origin is unknown; cultural and linguistic evidence traces their origins to the Middle East. Through isolation over time, the society of the Guanches had come to a state that the Europeans deemed as savage. Their extermination was carried out by 1496.

In the early 15th century, the Canaries became the object of closer scrutiny, as various European nations sought exploitable resources. In 1402, the Gadifer de la Salle and Jean de Béthencourt, both Normans, explored the islands in search of gold. No gold was found, but Béthencourt made himself king with the backing of Spain. From 1427 until

mid-century, Portugal was most active in exploring the Canaries. They also used them to aid in sailing westward, which led to the charting of the Azores. In 1479, after a war between Spain and Portugal, the Treaty of Alcacovas established Spanish dominion over the islands. Portugal managed to keep its possessions on the coast of West Africa, the more profitable side of the bargain.

As Europe entered the era of transoceanic travel, the Canary Islands became an important point of launch for numerous voyages of exploration. In 1492, an Italian, CHRISTOPHER COLUMBUS, exploring for Spain, made a stop at the islands to resupply his ships and to make repairs. Since they are located at a latitude where the weather is pleasing, it was his intention to sail due westward from the Canaries to Asia. Another voyage of note that gained assistance from the islands was Portuguese FERDINAND MAGELLAN's first CIRCUMNAVIGATION OF THE WORLD, also for Spain, which was begun in 1519.

See also ATLANTIC OCEAN, EXPLORATION OF THE; MUSLIM EXPLORATION.

canoe

A canoe is a type of small, light boat, with a watertight hull shaped for speed and navigability, typically propelled by at

least one paddle. Predating the historical record, it evolved from the RAFT, which does not have a watertight hull or a streamlined shape. The canoe has many variations around the world. The term *canoe*, from an Arawak (Taino) Indian word, is most often applied to narrow boats with identically shaped bows and sterns and curved sides and that are propelled by a paddle. But, the term encompasses boats with varying shapes as well, some of them with sails. In the broader classification of the term can be included such craft as the kayak, umiak, baidarka, CORACLE (bullboat), OUTRIGGER, and reed-bundle boat.

Canoes are made from a variety of materials, depending upon what is available in the local environment. In the South Pacific islands and the Americas, where wood is plentiful, the craft began as the simple dugout canoe (also called "dugouts"), fashioned from a log with the inner core hollowed out. On the west coast of North America, where cedar trees grow very large, early Native American dugouts were sometimes 100 feet long and were propelled by numerous paddlers. The Haida and Tlingit Indians would fell a tree near the ocean's shore, where they would build seaworthy vessels for use along the coast. The PIROGUE, used in the 19th-century FUR TRADE in North America, was a dugout.

Also in North America, light birch-bark canoes of varying designs were developed among Algonquian-speaking



Shown here, in a photograph from about 1900, is a Native American dugout canoe on the Columbia River. (*Library of Congress, Prints and Photographs Division [LC-USZ62-101283]*)

peoples and other tribes. Pieces of birch bark were stretched over a framework of saplings, then sewn together with root fibers and sealed with pitch or tar. These remarkably light canoes were practical for portages, that is, the carrying of the craft between waterways. The Iroquois (Haudenosaunee) Indians used elm bark as a covering.

For the kayak, Inuit (Eskimo) traditionally covered a frame of bone (often whalebone) or driftwood with sea mammal skins; the deck was also covered, except for a cockpit; the paddler typically used a double paddle. The umiak is a larger, open variation. The Aleut variation of the kayak is known as the baidarka. Another hide boat found in North America among some tribes of the northern plains is the bullboat, made from buffalo hides stretched over a circular frame. The similarly made coracle of parts of Europe and Asia were also round or oval in shape.

Pacific Islanders invented the double canoe—two canoes placed parallel and lashed together with rods. This made the resulting boat more stable and was related to the OUTRIGGER, which had a float parallel to the main body of the craft, also for stability. Sails were typically added. In the shape of a crab claw, they were woven from palm fronds and other fibrous material. The Englishman JAMES COOK observed double canoes with crab-claw sails in Hawaii. There is evidence that the peoples of the Pacific islands conducted much inter-island travel with these highly evolved craft.

Another variation is what is known as the reed-bundle canoe or reed-bundle boat, made from plants of the sedge family. Those found in Africa on the NILE RIVER and made from papyrus are also called papyrus boats; those on lakes in the ANDES MOUNTAINS of South America and made from tule, a type of bulrush, are known as bulrush boats. To make these craft, reeds are tied together into bundles; the bundles are then stacked on one another. The reed bundles become waterlogged after use, but dry out in the sun. Reed boats have two main variations in their appearance. Some are double-ended, with two raised ends like a typical canoe, while others have a single raised prow and a broad stern, like a modern rowboat. Reed canoes were probably first propelled with poles, then later with paddles or oars. Sails were also sometimes used.

Canoes, in general, are used for navigating the lakes and rivers in the interior of continents or along coastlines rather than for transoceanic voyages. They played a part in countless expeditions—especially in Africa, South America, and North America. In North America, they were central to the FUR TRADE, used by Indians and non-Indians alike.

Modern canoes are made from molded plastic or fiberglass, aluminum and magnesium alloys, rubber, canvas, and other materials as well as wood. The catamaran, a refinement of the double canoe, is one of the fastest small sailboats.

See also SHIPBUILDING AND EXPLORATION.

Cape Horn

Cape Horn is the southernmost point of land off the coast of South America. Its importance in the history of exploration is that it marked the gateway between the Atlantic Ocean and Pacific Ocean in the west, similar to the CAPE OF GOOD HOPE at the southern end of Africa between the Atlantic Ocean and the Indian Ocean. The European discovery of Cape Horn took place in three stages. The first to cross from the Atlantic into the Pacific was Portuguese FERDINAND MAGELLAN, in service to Spain, in 1520. The passageway he used, which came to be known as the Strait of Magellan (see MAGELLAN, STRAIT OF), was actually north of Cape Horn, between the main continent and a large island. Magellan observed fires burning on this island, maintained by the Native Americans, and named it Tierra del Fuego, meaning “Land of Fire.” There had been speculation for centuries that the South American continent was connected to a southern landmass referred to as the GREAT SOUTHERN CONTINENT, or Terra Australis, with Atlantic and Pacific waters separated. Magellan’s passage from the Atlantic to the Pacific solved a crucial question of the geography of the region.

The second stage of discovery took place much later and by chance. In 1578, after he had sailed through the Strait of Magellan, Englishman SIR FRANCIS DRAKE was blown south and east by strong westerly winds and found open sea. After returning to his intended course, he found time to check his logbooks and chart his location. It was then he realized that he had found a whole new expanse of ocean. The sea between Cape Horn and Antarctica is now known as Drake Passage.

The final stage of finding and describing Cape Horn did not come until 1616. It was then that Dutch merchant JAKOB LE MAIRE and mariner WILLEM CORNELIS SCHOUTEN found South America’s southernmost point of land. They named it Cape Horn, not because the area resembled a horn, but after their home port of Hoorn in the Netherlands.

There is some confusion concerning the place names of Cape Horn and Tierra del Fuego. The area referred to by these names contains many islands. The largest, originally named Tierra del Fuego, is now called Isla Grande de Tierra del Fuego, part of the Tierra del Fuego Archipelago. The island occupying the most southern latitude—known as Horn Island—is about 45 miles from the largest island. The southernmost point on Horn Island is Cape Horn.

Cape Horn/Tierra del Fuego has the distinction of being the most southerly location of regular human habitation. The latitude where it is located (56 degrees) is mirrored in the north by the coast of Labrador. With the winds that circulate, unimpeded by land, and the frigid currents from Antarctica, the region has some of the worst weather on the planet.

See also SOUTH AMERICA, EXPLORATION OF.

Cape of Good Hope

The Cape of Good Hope is a formation of land along the south coast of Africa. Rounding it by ship has come to represent the transition from the Atlantic Ocean to the Indian Ocean in the east, as CAPE HORN at the southern end of South America does so between the Atlantic Ocean and Pacific Ocean in the west.

There is some confusion as to the identity of the first nonnative peoples to round the Cape of Good Hope. A fifth-century B.C. Greek historian, HERODOTUS, made the claim of an expedition by the Phoenicians, sponsored by NECHO II of Egypt, in about 600–597 B.C. A 15th-century cartographer, Fra Mauro, gave credit to the Chinese for accomplishing the feat in 1420.

The first European known to have sailed around the southern extent of Africa is Portuguese BARTOLOMEU DIAS. Hoping to find a sea-lane around Africa to the SPICE ISLANDS (Moluccas) in the Indian Ocean, he embarked on his voyage in 1487. After encountering unfavorable winds along Africa's south coast, he sailed southward and, when the winds shifted, continued eastward. He made landfall at Mossel Bay. By checking his navigational measurements, he realized that he had passed the southern tip of the continent. He continued up the coast as far as the Great Fish River. On the return trip to Portugal, in the summer of 1488, he set up a *PADRÃO* (pillar) at the place that is now known as the Cape of Good Hope. Sources vary as to whether he gave it that name, or named it Cabo Tormentoso, for "Cape of Storms," after the weather he encountered there, and that King John II of Portugal renamed it Cabo da Bõa Esperança, or "Cape of Good Hope." In 1497, VASCO DA GAMA, also sailing for Portugal, rounded the Cape of Good Hope and continued on to India, establishing a new trade route between Europe and Asia. From that time, such journeys became routine.

The Cape of Good Hope is referred to in general usage as the southern tip of Africa. Yet, the southernmost point on the African continent is actually located at Cape Agulhas, 34 degrees and 52 minutes south latitude, some 40 miles southeast of the Cape of Good Hope. Moreover, on the projection of land referred to as the Cape of Good Hope, there are actually two points equally to the south, about a mile apart with a stretch of water between them.

Although the Cape of Good Hope is located in the most temperate zone of the African continent, it is not easy to navigate its waters. The winds in the region circulate fiercely from the west, much like the winds around Cape Horn, and the weather is unpredictable and the seas often rough. The surrounding land is inhospitable. It was not until the mid-16th century that settlements were established to reprovision ships sailing past on their way to other destinations. The modern city of Cape Town, South Africa, is situated to the north of the Cape of Good Hope.

See also AFRICA, EXPLORATION OF; CHINESE EXPLORATION.

caravel

The term *caravel*, originally derived from *karabos* for a kind of light boat, has been applied in a variety of spellings to small boats from different countries. In the history of exploration, it has come to be used for European boats extensively used in the 15th and 16th centuries.

Caravels were light and maneuverable ships with two or, more commonly, three masts. They typically had a LATEEN RIG, but their front two masts could be square-rigged to take advantage of the prevailing winds in open seas. They were most often carvel-built, a type of construction in which planks are shaped to be flush edge to edge, with caulked seams, rather than overlapping planks as in clinker-built technology. This design feature reduced friction between hull and water. Caravels had flat sterns and center rudders like other European ships. Their sizes varied, the smallest about 60 tons and the largest exceeding 200 tons.

The caravel was developed by the shipbuilders of HENRY THE NAVIGATOR, prince of Portugal. It combined elements of the European ships of the day, such as the COG and the ROUNDSHIP, with those of the Arab DHOW. Other European ships, although sturdy, were clumsy in navigating shorelines and ports. Dhows had maneuverability, yet were vulnerable in high seas. The caravel's hull could resist the pounding of waves; its shallow draught allowed for coastal navigation; and its triangular sails could take advantage of a variety of winds. While the caravel was easy to control and dependable in rough weather, it was not the most comfortable of ships. Crews slept on deck or with the supplies in the hold. Captains had small cabins on the rear deck. Lack of space also made the caravel less suitable for trading voyages.

The invention of the caravel proved a great help to the Portuguese in the 15th-century exploration of the African coast. Italian CHRISTOPHER COLUMBUS, exploring for Spain, used two caravels, the *Niña* and the *Pinta*, for his first transatlantic journey. In the 16th century, Spanish explorers VASCO NÚÑEZ DE BALBOA and HERNANDO PIZARRO built caravels in the Americas to sail the Pacific Ocean. The Monument of the Discoveries in the Portuguese city of Lisbon contains a parade of explorers on an artistic representation of a caravel.

See also SHIPBUILDING AND EXPLORATION.

carrack

The *carrack*, as it was called in northern Europe, or *nao* as it was known in Spain and Portugal, was a large oceangoing ship, descended from the COG of the Middle Ages. It evolved from ships that were clinker-built, a design feature



The 42-foot *Niña II* is a replica of one of Christopher Columbus's caravels that crossed the Atlantic Ocean in 1492. (*Library of Congress, Prints and Photographs Division [LC-USZ62-99661]*)



Roman soldiers scale the walls of Carthage in 146 B.C., as shown in a 1539 engraving by George Pencz. (Library of Congress, Prints and Photographs Division [LC-USZ62-88804])



utilizing overlapping planks, to those that were carvel-built, with flush planks. As its size increased, it came to accommodate three or more masts. The foremasts were typically square-rigged, while the mizzenmast (rear mast) had a LATTEEN RIG. Because of its size and square mainsails, the carrack was at its best on the open seas running with the wind.

A distinctive characteristic of the carrack was its high decks at bow and stern, on which structures known as castles were constructed. They provided quarters for the captain, offered points of observation, strengthened the ship against wind and wave, and gave shelter and comfort to officers and crew.

Carracks were merchant vessels, designed to maximize cargo capacity (see MERCHANT SHIP). Their roomy holds made them attractive for long voyages of exploration as well. They ranged from about 80 tons to more than 1,000 tons displacement.

The carrack ascended in importance over the smaller CARAVEL during the EUROPEAN AGE OF EXPLORATION. With the increasing number of transoceanic voyages of exploration and trade, the storage capacity of the carrack became a crucial factor, as did its durability in stormy seas in a range of latitudes. The carrack was the prototype for the massive GALLEON.

See also SHIPBUILDING AND EXPLORATION.

Carthaginian exploration

Carthaginians were inhabitants of the ancient city of Carthage, situated on a peninsula in the Bay of Tunis in what is now Tunisia on the north coast of Africa. Legend holds that a queen by the name of Dido founded the city, but it is thought to have been established by Phoenicians from Tyre (Sur) as a trading post in the late ninth century B.C. The city had two harbors, connected by a canal; a walled fortress overlooked the harbors from a hill. The name *Carthage* is from the Latin *Carthago* or *Cartago*, derived from a Phoenician word for “new city.”

The colony of Carthage evolved into a city-state under an aristocracy of nobles and wealthy merchants. Through conquest and trade, it came to be influential throughout the MEDITERRANEAN SEA region and competed first with the Greeks, then the Romans. By the sixth century B.C., Carthaginians had subjugated the Libyan tribes and earlier Phoenician colonies and controlled the coast of North Africa from the western extent of Egypt to the Atlantic Ocean, as well as various islands. The Carthaginians failed in their attempt to conquer all the Greek city-states in Sicily, however.

Rome challenged Carthage’s control of the western Mediterranean in the third century B.C., in a series of three wars known as the Punic Wars, after the Roman name for the Phoenicians, *Poeni*. In the First Punic War (264–241

B.C.), Rome sought to gain control of Carthaginian trading posts in Corsica, Sardinia, and Sicily. The Carthaginian general Hamilcar Barca was forced to make peace with the Romans after a naval defeat by the Roman consul Gaius Lutatius Catullus and to give up holdings in Sicily. Deprived of revenue, the Carthaginians developed their trading interests on the southern Iberian Peninsula, which they had inherited in the fifth century B.C. from their kinspeople the Phoenicians after the collapse of the Phoenician cities of Tyre and Sidon in the eastern Mediterranean. In 237–228, the Carthaginians, under Hamilcar Barca, campaigned in southern Spain against indigenous Iberians and Celtiberians (Celtic tribes who had settled among the Iberians). In 227, Carthage founded the city of Cathago Nova (present-day Cartagena) on the southeast coast. It served as the major Carthaginian supply base on the Iberian Peninsula for northward expansion through Roman contacts. Rome and Carthage negotiated a treaty in 226 in which Carthaginian influence extended as far as the Ebro River, with Roman interests to the north of the river. One exception was the seaport of the Roman-allied Saguntum (modern-day Sagunto), 100 miles south of the Ebro.

In 219, the Carthaginian general Hannibal laid siege to and captured Saguntum. In 218, the Roman senate declared Spain a Roman province, marking the official start of the Second Punic War (218–201). Two Roman legions sent to engage Hannibal's forces failed to intercept the Carthaginians, who in a remarkable journey with a full baggage train and elephants, proceeded to cross the Pyrenees, march along the Mediterranean's north coast, and cross the Alps into Italy. The struggle continued on two fronts, with the Romans in Spain tying up the Carthaginian forces that might have reinforced Hannibal's force in Italy. Hannibal had early successes, such as the Battle of Cannae in 216, one of the worst defeats in Roman history, but Rome itself held against his forces. Roman victories elsewhere, such as at Cathago Nova in 209, led to Hannibal's recall to Africa in 203. In 202, Publius Cornelius Scipio defeated Hannibal at Zama in North Africa, after which he was known as Scipio Africanus. With the end of the Second Punic War, in 201, the Carthaginians gave up any claim to lands on the Iberian Peninsula.

The Third Punic War (149–146) evolved out of the ambitions of Rome's growing mercantile community and designs on Carthaginian commercial enterprises, which led to military action and treaty violations. In 146 B.C., Roman legions under Scipio Aemilianus Africanus Numantinus, the adopted grandson of Scipio Africanus, captured and sacked Carthage.

A new city, also named Carthage and founded by the Romans in 29 B.C., became an important center of Roman administration. In A.D. 439–533, Carthage was the capital of the Vandals, a Germanic tribe, who overran Rome in 455.

In 533, it became part of the Byzantine Empire. It was again sacked, this time in 698. But the site continued to be inhabited and is presently a suburb of Tunis.

Carthage, although originally a Phoenician colony, was a melting pot, and the role of Carthaginians in the history of exploration is typically discussed on its own as distinct from that of the Phoenicians. Their most famous exploratory expeditions took place in the fifth century B.C., by which time Carthage was a maritime power. In about 470 B.C., statesman and admiral HANNO led as many as 60 GALLEY ships from Carthage westward along Africa's north coast, through the Strait of Gibraltar (see GIBRALTAR, STRAIT OF) into open Atlantic waters, then southward along Africa's west coast, establishing colonies along the way. He founded one settlement at the mouth of the Senegal River and perhaps explored as far as Cape Verde and the Gambia River, or even beyond to the Gulf of Guinea. In about 450 B.C., another Carthaginian, HIMILCO, perhaps Hanno's brother, also explored Atlantic coastal areas, including the Iberian Peninsula and northward along what is now France's coast and possibly as far north as the British Isles, considered the first such voyage beyond dispute. He may have explored the AZORES as well. In any case, it is known that Carthaginians came to maintain a trade monopoly in the Atlantic Ocean beyond the Strait of Gibraltar and continued the Phoenician tradition of maritime commerce and the resulting exploration and colonization.

See also GREEK EXPLORATION; PHOENICIAN EXPLORATION; ROMAN EXPLORATION.

cartography See GEOGRAPHY AND CARTOGRAPHY.

Cathay Company

The Cathay Company, or Company of Cathay, was a short-lived venture established for the purpose of mining gold from the shores of Frobisher Bay on Baffin Island in the North Atlantic Ocean, part of what is now northern Canada. The beginnings of the Cathay Company stem from the English expedition by SIR MARTIN FROBISHER in search of the NORTHWEST PASSAGE that set out in spring 1576, in which he secured a small quantity of ore that he believed contained gold. He arrived back in England that October. His rock was initially analyzed by two scientists, who reported it to be nothing more than worthless pyrites, or FOOL'S GOLD, but an Italian alchemist by the name of Aque- llo claimed he had found a speck of gold in the samples.

With this meager evidence, Michael Lok, who had been involved with a joint-stock company known as the MUSCOVY COMPANY, and other investors formed the Cathay Company to extract the riches from this newly visited land (Cathay was the medieval name for China). Queen Eliza-

both I also invested and, by refusing a royal charter and appointing a royal commission to oversee additional voyages, kept greater control. A contingent of three ships was funded, which sailed in spring 1577. On this trip they mined about 200 tons of the ore, which was then analyzed by a pair of German chemists who found that it contained some quantities of gold and silver. The calculation was made that a profit of five pounds per ton could be made from the retrieval of the ore, and a much larger expedition was planned.

In spring 1578, without waiting for the conclusive results of the smelting of the initial shipment of ore, Frobisher left Harwich with 15 ships and a staff of professional miners. Their trip was fraught with difficulties. Frobisher still had an interest in finding the Northwest Passage, but the onset of winter compelled him to return to England with his cargo, which had been laboriously acquired while he had been exploring.

Frobisher arrived back in England with 1,350 tons of ore. Upon his arrival it was learned that the previous shipment had proved worthless, and all that was to be done was to dump the new load. The Cathay Company had lost £20,000 of investors' money. Without a royal charter as legal protection, Michael Lok became the principal target for lawsuits and ended up in debtor's prison. Martin Frobisher, however, remained a favorite of Queen Elizabeth I, who subsequently knighted him for his efforts against the Spanish Armada in 1588. He died from a wound received while fighting against the French in 1594.

See also COMMERCE AND EXPLORATION.

caving See SPELEOLOGY.

Central America, exploration of

Central America is the narrow stretch of land, in effect a LAND BRIDGE—some 201,300 square miles—connecting North America to South America and separating the Caribbean Sea from the Pacific Ocean. It extends from the southern boundary of Mexico to northwestern Colombia at the northern extent of South America and includes the nations of Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama. (Based on varying rock formations, Central America is sometimes defined as beginning at the Isthmus of Tehuantepec in southern Mexico, extending to the Atrato River Valley in Colombia.) Geographers consider Central America to be part of North America (see NORTH AMERICA, EXPLORATION OF). The history of its exploration and colonizing is more closely tied to that of South America, however (see SOUTH AMERICA, EXPLORATION OF). The term *Middle America* refers to Mexico and Central America, and sometimes the WEST INDIES as well.

Much of Central America is mountainous. The forested highlands in the north are part of the mountain system of western North America; those in the south are an extension of South America's ANDES MOUNTAINS. Active volcanoes can be found between those two ranges. Tajumulco, a volcano in Guatemala, is Central America's highest peak, at 13,846 feet above sea level. Earthquakes are common in Central America. The Nicaragua Depression is centrally situated; the region's two largest lakes, Lake Nicaragua and Lake Managua, can be found there. Numerous rivers and streams flow down from the mountains, the longest rivers draining into the Caribbean, and mostly smaller streams draining into the Pacific. The coastal plain on the Caribbean side is generally broader than on the Pacific side. Central America's climate is tropical, except in higher altitudes. The Pacific coast and western mountain slopes receive about half the rainfall of the rain forest of the Caribbean side because of conditions of cold stable air created by the cold California Current as opposed to relatively warm ocean waters to the east. The land bridge of Central America connects two previously isolated ecosystems and has flora and fauna typical of both.

Native Peoples

In pre-Columbian times, Central America was a densely populated area. Native peoples of a variety of different language families, with infusions from both the north and the south, lived in autonomous bands united politically and religiously under chieftains. For subsistence, they farmed as well as hunted and fished, living a life similar to peoples of the West Indies. The Maya developed the most complex civilization in the region with autonomous city-states, located around ceremonial centers, situated on the Yucatán Peninsula in present-day Mexico, as well as in present-day Belize, Guatemala, and western Honduras and El Salvador. Its civilization consolidated before A.D. 300 and flourished from A.D. 300 to 900, a cultural phase sometimes referred to as the Classic period and involving the Lowland Maya of Belize, central Guatemala, and southeastern Mexico. The Highland Maya of southern Guatemala flourished in post-Classic times, as did the Maya to the north on the Yucatán Peninsula, who experienced a new flowering of culture after invasion by the Toltec from the west after about 1000. More than 100 Maya sites are known, consisting of magnificent stone structures: temple pyramids, astronomical observatories, palaces, monasteries, baths, plazas, bridges, aqueducts, reservoirs, and ball-courts.

Conquistadores

The first Europeans to reach Central America were Spanish, part of an expedition under RODRIGO DE BASTIDAS in 1501. He explored South America's northeast coast along present-day Venezuela and Colombia and reached the

Gulf of Darién, the eastern extent of Panama. Italian mariner CHRISTOPHER COLUMBUS more thoroughly explored the Central American coastline the next year from the other direction, during his fourth voyage to the Americas for Spain. He first reached the Islas de la Bahía (Bay Islands) in the Gulf of Honduras. He landed near present-day Trujillo, Honduras, where he encountered Maya from the Yucatán. He explored southward along the coast of Nicaragua, Costa Rica, and the Isthmus of Panama, making contact with other indigenous peoples at various landfalls.

In 1508, DIEGO DE NICUESA was granted a license by the Spanish king to found a colony west of the Gulf of Urabá (with ALONSO DE OJEDA granted the rights to a colony east of the gulf in Colombia). The next year, Nicuesa launched an expedition from Hispaniola (present-day Haiti and the Dominican Republic). He was unable to reach his proposed site at the mouth of the Darién River and landed at Nombre de Dios to the west. In the meantime, VASCO NÚÑEZ DE BALBOA, who had been part of Bastidas's expedition, founded a colony at Santa María la Antigua del Darién, the original site. Nicuesa eventually traveled there to claim his governorship, but Balboa and his followers refused to cede power and sent Nicuesa and 17 others out to sea in an unworthy vessel, never to be heard from again. In 1513, Balboa set out to the west with an expedition of nearly 200 Spaniards and 1,000 natives and slaves. Crossing through the rugged mountains and thick jungle of the Isthmus of Panama, the expedition came to a hill that seemed to offer an unobstructed view to the south and west. Balboa and his dog ascended the hill, and he became the first European to sight the Pacific Ocean on September 25. Four days later, Balboa and his men reached the shore of the Pacific Ocean.

In 1514, PEDRO ARIAS DE ÁVILA traveled to Darién to assume governorship of the colony. In 1519, the same year he had Balboa executed, he founded Panama City on the Pacific coast, making it the colony's principal settlement. (Since Nombre de Dios and Darién were abandoned for part of their history, Panama City is considered the oldest permanent European settlement on the mainland of the Americas.) Arias de Ávila sponsored expeditions to surrounding regions. Among them were those of FRANCISCO PIZARRO and DIEGO DE ALMAGRO along the west coast of South America.

In the meantime, in 1522, ANDRÉS NIÑO led the seaward part of an expedition northward—with Gil González de Ávila leading an overland contingent. Niño, with four ships constructed on the Bay of San Miguel in the Pacific, explored along the Pacific coast of Panama, Costa Rica, Nicaragua, and Honduras as far north as Mexico. On rejoining González de Ávila, he helped him fight off an attack by Indians, then explored coastal regions of Costa Rica and

Honduras as well as interior parts of Nicaragua, including Lake Nicaragua. Soon afterward, in 1522–24, the region they had explored was colonized by FRANCISCO FERNÁNDEZ DE CÓRDOBA, under the command of Pedro Arias de Ávila. He founded León near Lake Managua and Granada on Lake Nicaragua. Fernández renounced his allegiance to Arias de Ávila and tried to establish his own colonial domain. Arias de Ávila, who had recently been replaced as governor in Panama, led forces against him and installed himself as governor of the region, maintaining control until his death in 1521.

Other CONQUISTADORES invaded Central America from the north. In 1523–26, PEDRO DE ALVARADO, who had fought under HERNÁN CORTÉS against the Aztec in Mexico, led an expedition southeastward to Guatemala and El Salvador and established Spanish dominion over that region. The European conquest of Central America, as that of other parts of the Americas, was aided by the rapid spread of European diseases, including smallpox, dysentery and influenza (see DISEASE AND EXPLORATION). Those who survived disease and warfare were forced into serfdom as farmers.

Modern Nations and Peoples

The opening of the Panama Canal across the Isthmus of Panama in 1914 provided a practical passage between the Atlantic and Pacific Oceans. Central American nations achieved independence from Spain in the 19th century, although Panama was considered part of Colombia until the early 20th century. Belize was the exception, colonized in 1638 by English logwood cutters out of Jamaica, as well as by Spanish settler. The British defeated the Spanish in 1798. Formerly known as British Honduras, Belize achieved independence in 1981.

The present inhabitants of Central America are an ethnic mix, including European, especially Spanish; Native American; mestizo (people of mixed heritage, chiefly of Spanish and Native American ancestry); African; and mulatto (people of mixed European and African backgrounds). Agriculture is still central to the various economies, although they are becoming increasingly diversified.

Ceylon (Sri Lanka)

Ceylon (or Sri Lanka, as it has been known since 1972), is an island nation of 25,332 square miles just to the east of the southern tip of India. The climate is subtropical and humid, especially during the monsoon season. The island exports a variety of agricultural products, such as tea, rubber, and coconut. A number of spices are grown there as well, including cinnamon, pepper, cloves, nutmeg, and cardamom. Ceylon has also been the source of numerous precious stones and minerals over the centuries. The fertility of its soil and its

abundance of natural resources led to Ceylon acquiring the label “Pearl of the Orient.”

The earliest known inhabitants of Ceylon descended from the Veddas, an aboriginal group of which several thousand still exist. Today they make their home in the isolated mountainous regions. The Veddas were conquered in the sixth century B.C. by the Sinhalese of northern India. The introduction of Buddhism in the third century B.C. led to a cultural renaissance in Ceylon, and the island became a center for the religion. With its proximity to the mainland, Ceylon has been vulnerable to invasion from India, and Hindu Tamils have made regular incursions since the 12th century, a conflict which continues to this day. The population of Ceylon is about two-thirds Sinhalese and one-third Tamil.

Trade between Ceylon and the Coromandel coast (the east coast) of India took place for many centuries. A favorite commodity of India was the betel nut, which grew in large quantities and helped make the island prosperous. In the 12th and 13th centuries, Arab Muslims established a strong presence on the island as they developed the SPICE TRADE. Ceylon was particularly important as the source of cinnamon, found there exclusively at the time.

Ceylon was important not only for spices but also because of its strategic location. Situated in the center of the shipping lanes of the Indian Ocean, the island offered many advantages to those who could maintain forces at her ports. The first Europeans to come were the Portuguese in 1505. Because of rivalry from Arabs, they made a pact with the reluctant Sinhalese ruler to provide military protection in exchange for cinnamon. In 1557, King Dharmapala converted to Christianity and fell further under the control of the Portuguese. This sparked rebellion among the Sinhalese, who were led most effectively by Raja Sinha. Sinha laid siege to the port city of Colombo for six years, until he was eventually defeated by Portuguese naval power. In 1597, Dharmapala died and his crown was surrendered to Portugal. This inspired another uprising, led by Wimala Dharma Suriya.

The Portuguese did not only have to contend with rebellion from the inhabitants of the land. The Dutch, who had grown in their sea power, began casting a jealous eye toward Ceylon and first arrived in 1602 in an expedition headed by Jons Van Spillbergen. Hoping to replace the Portuguese, who were hated, a Dutchman by the name of Sebald de Weert made friendly contact with Wimala Dharma Suriya at the port of Batticaloa the next year. His agreement to aid the people of Ceylon in expelling the Portuguese in exchange for cinnamon turned violent, however. He butchered several cows to feed his crew, in defiance of the taboo against killing these animals, and Wimala had him killed. The Portuguese continued their profitable trade. In 1614, from their base in Goa, they managed to monopolize the cinnamon trade. The tide turned again, though, in 1628 with the ascension of Raja Sinha II to the throne. He formed

an alliance with the Dutch in 1636, who proceeded to move on the most important ports. In 1639, the port of Trincomalee was handed over to them. With help from native allies, they captured the ports of Negombo and Galle in 1640. The most difficult prize was Columbo, which fell to them in 1656.

The Dutch controlled Ceylon and its lucrative spice trade through the DUTCH EAST INDIA COMPANY until 1795, when the British took over their possessions. The British established plantations to grow tea, rubber, and coffee. They also brought unity to the government of the island and established schools. During World War I (1914–18), there arose a movement for independence among the island’s inhabitants, which was finally achieved on February 4, 1948.

See also ASIA, EXPLORATION OF; MUSLIM EXPLORATION.

chart See GEOGRAPHY AND CARTOGRAPHY; MAPS AND CHARTS.

Chinese exploration

The political center of China throughout its history has been the basins of the YELLOW RIVER (Huanghe) and YANGTZE RIVER (Chang). From this agricultural region, a uniform culture spread to the south and west, throughout much of eastern Asia, consisting of various peoples with diverse languages. The name *China*, applied by foreigners, is thought to be a corruption of Ch’in (Q’in or Qin), the name of a dynasty in the third century B.C.; the modern Chinese refer to their nation as Zhongguo, for “Middle Kingdom” or “Central Country.”

The history of China is traced through a succession of dynasties. Little is known of the most ancient of them, information being semilegendary—relating to the culture hero Huang Ti—with some archaeological evidence confirming emerging Bronze Age civilizations. Evidence of the use of writing and the historical record begins with the Chang (Shang) dynasty, from about 1570 to 1045 B.C. During the subsequent Chou (Zhou) dynasty, from about 1045 to 256 B.C., the use of iron and the activities of merchants are documented. The Chou dynasty also saw the flowering of Chinese literature and philosophy. Confucius and Lao Tzu (Laozi) developed philosophies that would influence the Chinese for generations to follow, known as Confucianism and Taoism (Daoism). During the later Ch’in (Qin) dynasty, from about 221 to 206 B.C., a centralized government was organized and the Great Wall, a fortification protecting China from northern invaders, was started. The subsequent Han dynasty, from about 206 B.C. to A.D. 220, was an expansionist period, with foreign trade flourishing and Chinese power and influence in the East rivaling that of the

Romans in the West. Buddhism was introduced into China during the Han dynasty.

A pattern in the long procession of these early and later dynasties was a period of outward expansion from the heart of the country and then an eventual period of withdrawing because of internal corruption and stagnation or military pressure, as from the militaristic Hsiung-nu (Xiongnu; Huns) from the north. Native dynasties were at times supplanted by outsiders. The Mongols, starting under GENGHIS KHAN, ruled China in the 13th and 14th centuries A.D. (see MONGOL EXPLORATION).

China, especially during the periods of expansion, has a rich history of travelers who ventured across and beyond China's varied terrain. In about 138–109 B.C., during the Han dynasty mentioned above, CHANG CH' IEN undertook two Chinese diplomatic missions to western lands. His travels took him to the Altai Mountains of central Asia and Afghanistan and to Sinkiang in western China. On two different occasions, he was captured and held by the Hsiung-nu. In A.D. 97, also during the Han Dynasty, another diplomat, KAN YING, was sent on a mission to Rome in an effort to secure the SILK ROAD for Chinese interests. He reached the Middle East, not Rome, yet probably had contact with Europeans. In about A.D. 190, a Chinese woman, WEN-CHI, was abducted by the Hsiung-nu and lived as a nomad on the Mongolian steppes. She later wrote *Eighteen Songs of a Nomad Flute* about her experiences.

In later years, a number of Buddhist monks traveled south from China to India, to see the founding place of Buddhism along with its sacred sites. One such pilgrim was FA-HSIEN, who, in A.D. 399–414, during the T'sin (Jin) dynasty of 265–420, a period of fragmented political control, headed west and south across China, crossing the Takla Makan Desert, Pamir Plateau, and HIMALAYAS into Afghanistan and northern India. From there, he sailed to CEYLON (present-day Sri Lanka).

In 629–645, during the more centralized T'ang (Tang) dynasty of 618–907 (which followed the Sui Dynasty of 581–618, a period of reunification), HSÜAN-TSANG explored much of central Asia and the Indian subcontinent. I-CHING also traveled to India during the T'ang dynasty, in 671–695. He traveled by sea, however, in the type of boat known as a JUNK. His writings include information on the islands of the EAST INDIES and the Malay Peninsula.

Centuries later, in 1221–22, another Chinese scholar embarked on a different kind of mission: CH'ANG-CH'UN traveled from China to Afghanistan to report about the lands and peoples of central Asia to Genghis Khan, then camped in Afghanistan. During the rule of Genghis's grandson Kublai Khan, founder of the Yuan dynasty of 1279–1368, Italian merchant MARCO POLO visited China and, in 1275–92, served as a diplomat to the Mongol emperor, traveling throughout the Mongol Empire, exploring

China, Tibet, Southeast Asia, Indonesia, Mongolia, and possibly SIBERIA. (Reports of contacts between Chinese and Romans date from 100 B.C. The first European who claimed to have reached China—its western part—was the Spanish rabbi BENJAMIN OF TUDELA in the 12th century.)

The geographic information gathered in the course of these travels and those of other diplomats, merchants, and scholars was recorded by cartographers. In 1311–20, CHU SSU-PEN, during the Yuan dynasty, produced a world map with accurate information on China and surrounding lands, including the continent of Africa.

Perhaps the most famous Chinese explorer of all was CHENG HO, who, in 1405–34, during the Ming dynasty of 1368–1644, carried out seven Chinese maritime expeditions, exploring the Indian Ocean, the Persian Gulf, and the RED SEA, as well as coastal East Africa. By the early 16th century, contacts between East and West, especially by sea, became a more routine occurrence.

chronometer

The term *chronometer* has been applied to a variety of instruments that keep relatively accurate time. The motivation to invent a dependable chronometer had its origins in a need to determine longitude for purposes of navigation.

Since longitude is an angular measurement between a fixed location (the meridian) and a variable location on Earth, and since Earth rotates every 24 hours through the entire 360 degree range of longitude, a time difference of one hour between the fixed and variable location is equivalent to 15 degrees of longitude (360 divided by 24). The time of a chronometer is set to that of a fixed location; the time at the location to be measured is calculated (typically using the Sun for such a calculation); the two times are then compared for a reading of longitude. Of course the accuracy of a longitude measurement would be dependent on the accuracy of the chronometer set to the time at the fixed location.

Sailors had used numerous means over the centuries to keep time. Water clocks (clepsydra) were especially vulnerable to the motion of a ship at sea, and, while the hourglass was less so, both required constant human supervision. The first spring-driven clocks of the 16th century were an obvious improvement, yet variations in temperature and humidity compromised their readings.

The first accurate chronometer was invented by John Harrison, a carpenter in Yorkshire, England. In 1735, he completed his first model, then refined it over the next years. The breakthrough he made was the use of several different metals to compensate for changes in temperature. The first extended voyage using his mechanism was made by Englishman JAMES COOK in 1772, who used a duplicate of Harrison's fourth version, completed in 1760.

The Washington Meridian Conference, held in 1884, established Greenwich, England, as the location of the PRIME MERIDIAN, the reference point from which angles of longitude were to be measured. Previously, most countries favored their own capital city as the reference point for navigators. Advances in chronometers have also been made since the 18th century. Inexpensive devices that keep time using the vibration of a quartz crystal are highly reliable.

See also LATITUDE AND LONGITUDE; NAVIGATION AND EXPLORATION.

Cibola (Seven Cities of Antillia, Seven Cities of Cibola)

The legend of the Seven Cities of Cibola originated in Europe in about 1150 as the Seven Cities of Antillia (also Antilia or Antilla). According to the legend, during the eighth century when the Moors were invading Spain, there were seven Portuguese bishops who fled their oppressors, sailing to the west with their parishioners. On encountering new lands, they established seven cities, each of which became fabulously wealthy.

The discovery of American Indian civilizations with precious metals by the Spanish CONQUISTADORES furthered the legend. In 1519–21, HERNÁN CORTÉS conquered the Aztec and appropriated their gold and other wealth; in 1531–32, FRANCISCO PIZARRO did the same among the Inca. Neither of these peoples' homelands or cities fit the description of Antillia, but the possibility of finding the proof for the Antillia legend grew in the Spanish imagination. The name *Cibola*, originally referring to the land of the Zuni Indians, came to be associated with Antillia; the legend evolved into the "Seven Cities of Cibola," where the streets were supposedly paved with gold and houses were set with precious stones.

The first reports of Cibola came from Spaniard ÁLVAR NÚÑEZ CABEZA DE VACA during his wanderings in North America starting in 1528. After being stranded in Texas during a voyage of exploration, he made his way westward through the American Southwest. In the course of his travels, he came in contact with Native Americans who told him of settlements in the region with great wealth. Cabeza de Vaca reported these rumors to ANTONIO DE MENDOZA, the viceroy of New Spain, upon his arrival in Mexico City in 1536.

Mendoza sent a small reconnaissance expedition to investigate these reports. In spring 1539, Friar MARCOS DE NIZA and the North African ESTEVANICO (who had accompanied Cabeza de Vaca on his previous trek) made their way to the north in search of the Seven Cities of Cibola. At one point, Niza sent Estevanico ahead, with instructions to send him back a cross, the size of which would indicate the wealth to be found in the city. Estevanico reached a Zuni Indian

pueblo, probably Hawikuh, and, possibly because of the turquoise he saw there (assuming such turquoise was indicative of great wealth), sent back a large cross. Estevanico was killed by the Zuni before reuniting with Niza. Niza approached himself and, from a distance, saw Hawikuh. It is thought that its glistening in the Sun with decorative stones led Niza to make an overly optimistic assessment of the prospects for plunder.

In early 1540, FRANCISCO VÁSQUEZ DE CORONADO set out from Mexico with a formidable army and entourage to conquer the newly discovered kingdom. On July 7, they reached Hawikuh and overcame the inhabitants with little difficulty. There were no gold, silver, or precious stones to speak of, yet Coronado maintained his hope that other locations would prove more profitable. To this end, he sent out PEDRO DE TOVAR with the missionary JUAN DE PADILLA—an advocate of the Antillia legend of the seven bishops. Heading northwestward, Friar Padilla encountered the Hopi Indians, the homeland of which indicated no great riches. Another excursion was made by GARCÍA LÓPEZ DE CÁRDENAS, who reached the Grand Canyon. HERNANDO DE ALVARADO, while scouting to the east for Coronado, met two captive Plains Indians, the TURK and Ysopete, at the Cicuye Pueblo (Pecos Pueblo) on the Pecos River. The Turk spoke of QUIVIRA, a wealthy Indian land to the northeast, which prompted Coronado's subsequent explorations of the southern plains. Yet, again, no wealthy cities were found.

Such legends persisted among the Spanish explorers of North America. Similar legends in South America, that of EL DORADO and LOS CÉSARES, spurred on explorations of that continent. As the lands of more and more native peoples were reached without ever producing wealth comparable to that of the Aztec and Inca civilizations, the legends faded.

See also LEGENDS AND EXPLORATION; TREASURE AND EXPLORATION.

City of los Césares See LOS CÉSARES.

Cipangu (Cipango)

The name *Cipangu*, also spelled *Cipango*, refers to an island east of Asia described by Venetian merchant MARCO POLO in his work *The Book of Ser Marco Polo, the Venetian, Concerning the Kingdoms and Marvels of the East* (which came to be known as the *The Travels of Marco Polo* and various other titles), published at the end of the 13th century after his return from extensive travels in the Far East over two decades.

Marco Polo described Cipangu as an island containing palaces with roofs of gold and streets paved in marble, one of more than 7,000 islands in an archipelago in the Sea of China, off the Pacific coast of Asia. Later explorers studied

the work as a source of geographic information. In the 1490s, Italians CHRISTOPHER COLUMBUS, who sailed for Spain, and JOHN CABOT, who sailed for England, hoped to reach Cathay (the name for China at the time) and Cipangu by way of the Atlantic Ocean. They believed the island a major source of spices. Columbus calculated that Cipangu must be about 1,500 miles off Asia. On reaching the WEST INDIES in the Americas in 1492, believing the islands to be off the Asian mainland, Columbus associated them with Cipangu. Cabot, after reaching North America in an expedition in 1497, raised money for a second voyage the next year, promoting Cipangu as the goal for the sake of the SPICE TRADE. The outcome of that expedition is uncertain: Some reports describe it as lost at sea off North America; others maintain Cabot returned to Europe after exploring northeastern North America as far south as Chesapeake Bay, dying soon afterward.

The fabled island of Cipangu has been most often associated with Japan, which contains the largest islands east of China. Japan has three main islands and more than 3,000 smaller islands. At the closest point to Asia, off present-day South Korea, Japan is only 120 miles distant from the mainland. The widest point of the Sea of Japan between Asia and Japan is just over 600 miles. It is not known what Marco Polo meant by the Sea of China. What is now known as the China Sea (which includes the East China Sea and the South China Sea) extends from southern Japan to the southern end of the Malay Peninsula. There are many islands east of Asia in this region, including those of the EAST INDIES and OCEANIA. In the East Indies are the Moluccas, now part of the Republic of Indonesia, which were once known as the SPICE ISLANDS because of the number of spices produced there. In his account, Marco Polo's geographic descriptions are at best inexact, leaving much room for speculation.

See also LEGENDS AND EXPLORATION.

circumnavigation of the world

It is not known when humans first dreamed of circling the world. The ancient Greeks made the case that the Earth was a sphere as early as the fifth century B.C. (see GREEK EXPLORATION). The first known GLOBE, a spherical representation of the Earth, dates from the second century B.C. in Greece. In the second century A.D., hellenized Egyptian PTOLEMY presented his ideas on a curved Earth in his influential work *Geographia*. Yet, although various scholars and mariners, especially among the Muslims (see MUSLIM EXPLORATION), maintained the idea of a curved Earth in the Middle Ages, it did not become a fully accepted concept among Europeans until a route was established south and east around Africa in the 15th century during the RENAISSANCE. Believing in the Earth's curvature, European mariners, such as Ital-

ian mariner CHRISTOPHER COLUMBUS, promoted the idea of reaching the Orient westward from Europe rather than the earlier established eastward route. Columbus, in his expeditions for Spain in the late 15th century, of course never did reach the Orient, making the European discovery of the Americas instead. But a Spanish expedition under Portuguese mariner Fernão de Magalhães, known in Spain as FERDINAND MAGELLAN, did so some years later, and, continuing westward, completed the first circumnavigation of the world.

The First Circumnavigator

After Columbus's voyages, a water route beyond the Americas remained illusive with all inland waterways proving to be bays or rivers, and not the hoped-for NORTHWEST PASSAGE or Strait of Anian (see ANIAN, STRAIT OF) to the Pacific Ocean. Magellan, who had participated in Portuguese expeditions to India and the EAST INDIES early in his career, sought to enter the SPICE TRADE with an expedition to the SPICE ISLANDS (Moluccas). On falling out of favor with Portuguese king Manuel I and failing to receive backing for an expedition, he renounced his Portuguese citizenship and moved to Spain in 1517. Knowing that Portugal controlled the route around Africa to the Far East and that the coast of South America appeared to curve southwestward, he sought support from Spanish king Charles I (Holy Roman Emperor Charles V) for an expedition westward around South America. Magellan reportedly used a copy of the globe designed in 1492 by German cartographer MARTIN BEHAIM to present his case. Magellan received backing, and an expedition of five ships was launched from Sanlúcar de Barrameda, south of Seville, on September 20, 1519.

After crossing the Atlantic, Magellan and his men explored the coasts of present-day Brazil, Uruguay, and Argentina. After the destruction of one ship, the remaining four continued around South America, attempting the passage through what came to be known as the Strait of Magellan (see MAGELLAN, STRAIT OF), north of CAPE HORN. The crew of one ship mutinied and turned back. The remaining three continued westward and, in November 1520, reached the Pacific Ocean, which Magellan named for its apparent calmness. He and his men sailed along the west coast of South America for a time, then, without any awareness of the vastness of the Pacific, began the westward crossing of that ocean as well. After being out of sight of land for more than three months, and with SCURVY affecting a number of the crew, the expedition finally made landfall in the Mariana Islands, part of Micronesia (see OCEANIA), in March 1521. Magellan and his men went on to make the European discovery of the Philippines. There, on April 27, Magellan was fatally wounded in a skirmish with native peoples on the island. The first two commanders to replace him were also killed by natives, and command of

Sechster Theil/

Kurze / Warhafftige

Relation vnnnd Beschreibung der Wun-
derbarsten vier Schiffahrten/ so jemals ver-
richt worden. Als nemlich :

Ferdinandi Magellani Portugalesers/ mit Sebastiano de Cano,
Francisci Draconis Engelländers.
Thomæ Candisch Engelländers.
Oliuarii von Noort, Niderländers.

So alle vier vmb den ganken Erdkreis gefegelt / auß vnterschiede-
nen Authoribus vnd Sprachen zusammen getragen/ vnd mit nöthi-
gen Landt Charten/ feinen Figuren vnd nützlichen Erklärungen gezei-
ret/ vnd verfertiget. Durch

LEVINUM HULSIUM.



Getruckt zu Franckfurt / bey Hartmanno Paltzenio / in Ver-
legung der Hulsischen / Im Jahr / 1626.

the expedition eventually fell to JUAN SEBASTIÁN DEL CANO, a Spaniard of Basque ancestry. After burning one of the ships because of crew shortages due to death and desertion, the two remaining ships proceeded westward, finally reaching the intended destination, the Spice Islands, in November 1521. The Spanish obtained a cargo of cloves and set sail in January 1522. One under del Cano continued westward into the Indian Ocean. The other, not considered seaworthy enough to make the passage around Africa, turned back eastward in the hope of reaching a Spanish port in present-day Panama in Central America. Del Cano's ship, the *Victoria*, successfully crossed the Indian Ocean, journeyed around the CAPE OF GOOD HOPE back into the Atlantic Ocean, not making a landfall until reaching the Portuguese-held Cape Verde Islands off the coast of West Africa. After detention for a time by the Portuguese, the *Victoria*, carrying 18 survivors, reached Sanlúcar de Barrameda on September 6, 1522.

Although Magellan himself did not complete the voyage, as its initiator, he is honored as the first circumnavigator of the world. That he had traveled from Europe around Africa to the East Indies and back on earlier expeditions in addition to organizing the historic westward voyage means that he, too, in effect traveled around the world. FRANCESCO ANTONIO PIGAFETTA, Magellan's private secretary, kept a record of the westward circumnavigation, published as *Primo Viaggio Intorno al Mondo* (First journey around the terrestrial globe).

Other 16th-Century Circumnavigators

The second circumnavigation of the world occurred nearly a half-century later, led by Englishman SIR FRANCIS DRAKE. Its purpose was to locate the GREAT SOUTHERN CONTINENT, or Terra Australis, believed to exist in southern waters, as well as a water route through the Americas. Drake also had a secret military commission from Queen Elizabeth I to conduct raids against Spanish colonies and ships along the Pacific coast of the Americas. Drake set sail from Plymouth, England, on December 13, 1577, with five ships and 166 men. Unlike Magellan, Drake passed south of Cape Horn in what became known as Drake Passage and headed along the west coast of South America. By then, two of the ships had been abandoned, one had sunk, and one had turned back, leaving only Drake's flagship, originally called the *Pelican*, now known as the *Golden Hind*. After managing to capture a Spanish treasure ship off Callao, Peru, Drake proceeded along the coast of North America, seeking the western outlet of the Northwest Passage as far north as Vancouver Island near the present United States–Canada border. In July 1578, almost a year after entering the Pacific Ocean, Drake headed westward across the Pacific. In the Philippines, he again made successful attacks on Spanish ships. It is not known whether Drake purposely continued westward or intended to return to England by the route he had come

and was forced westward by the pursuit of Spanish ships. In any case, he headed for and reached the Spice Islands in October 1579, where he traded for spices, then sailed across the Indian Ocean and around the Cape of Good Hope into the Atlantic. The *Golden Hind* returned triumphantly with a cargo of Spanish treasure and spice to England on September 26, 1580, whereupon Drake was knighted by his queen. Francis Fletcher, the chaplain on the expedition, wrote an account of the expedition in *The World Encompass'd*.

The first expedition with the express purpose of circumnavigating the world was by another Englishman, navigator Thomas Cavendish, who sought to retrace Drake's exploits. He did so in 1586–88, although his passage around South America was by way of the Strait of Magellan. Afterward, he plundered Spanish settlements and ships as far north as California, then continued westward by way of the Philippines, East Indies, and Cape of Good Hope. His second attempt at a circumnavigation led to his death at sea in 1592.

The Dutch, another maritime power of the EUROPEAN AGE OF EXPLORATION, launched a commercial venture around the world soon afterward. In September 1598, two fleets under OLIVER VAN NOORT departed Rotterdam and followed the routes traveled by earlier circumnavigators. Noort's return to the Netherlands in August 1601, despite a perilous journey, was the first Dutch circumnavigation of the world.

17th-Century Circumnavigators

Sailing around the world was still a rare accomplishment in the 17th century. Englishman WILLIAM DAMPIER did so while conducting privateering raids and explorations in 1683–91 (see PRIVATEERS). His book *A New Voyage Round the World* helped him gain sponsorship for a 1699 expedition to the Pacific, during which he and crew members became the first Englishmen to land on Australia, before returning to England in 1701.

18th-Century Circumnavigators

The British continued to use the route established in earlier centuries in their actions against Spain. In 1740–44, GEORGE ANSON commanded a military fleet in a voyage around the world. Some of the ships were lost in stormy weather off Cape Horn, and many of his men were lost to scurvy, but Anson managed to explore islands along the coast of Chile and raid Spanish ships off Peru and the Philippines. JOHN BYRON, who was part of Anson's expedition and was shipwrecked off Patagonia and imprisoned by Indians who turned him over to Spanish authorities, headed a subsequent naval expedition in search of the Great Southern Continent, circumnavigating the world in 1764–66, during which he made the British claim to the Falkland Islands in the South Atlantic and explored South Pacific island groups.

Meanwhile, JAKOB ROGGEVEEN completed a voyage around the world in 1721–22. He also set out westward from the Netherlands in search of the Great Southern Continent on an expedition sponsored by the DUTCH WEST INDIA COMPANY. His ships were confiscated by officials of the DUTCH EAST INDIA COMPANY in the Dutch port of Batavia (present-day Jakarta, Indonesia) for trespassing, and he was sent home via the Indian Ocean and the Cape of Good Hope.

In 1766–69, LOUIS-ANTOINE DE BOUGAINVILLE commanded the first French expedition around the world. The purpose of the government-sponsored scientific expedition was to locate the Great Southern Continent as well as chart islands in the Pacific. In the western Pacific, Bougainville explored the Solomons and other island groups. His account of the expedition was published as *A Voyage Around the World*.

About the same time, in 1766–68, a British expedition under SAMUEL WALLIS and PHILIP CARTERET, again searching for the Great Southern Continent, sailed around the world, in the course of which Wallis made the European discovery of Tahiti, and Carteret located Pitcairn Island. In his first Pacific expedition of 1768–71, Englishman JAMES COOK returned home by way of a westward route, thus encircling the globe. It was also Cook who ended speculation about the existence of a Great Southern Continent. In the course of his second voyage, in 1772–75, he made a circumnavigation of Antarctica—traveling from the Atlantic into the Indian Ocean, then into the Pacific and back into the Atlantic—demonstrating that no other continent existed in southern waters. In doing so, he again circumnavigated the globe, albeit by a shortened route in southern latitudes. In 1791–95, another British expedition, headed by GEORGE VANCOUVER, with the participation of WILLIAM ROBERT BROUGHTON, made an eastward circumnavigation of the world. He traveled around the Cape of Good Hope to Australia, then to NEW ZEALAND, the HAWAIIAN ISLANDS, and the Pacific coast of North America. Charting the Gulf of Alaska to southern California, Vancouver proved that no outlet to the Northwest Passage existed in that region. He returned to the Atlantic by way of Cape Horn. His account was published as *A Voyage of Discovery to the North Pacific and Round the World*.

The first circumnavigation of the world by a U.S. flagship occurred in 1787–90, when ROBERT GRAY, an American captain on a trading expedition, sailed from Boston to British Columbia and then to China and back to Boston.

19th-Century Circumnavigators

The first official U.S. circumnavigation did not take place until 1838–42. Headed by CHARLES WILKES, with the participation of GEORGE FOSTER EMMONS, the United States South Sea Surveying and Exploring Expedition explored coastal regions of South America, Antarctica, Pa-

cific Ocean island groups, and North America's Pacific Northwest.

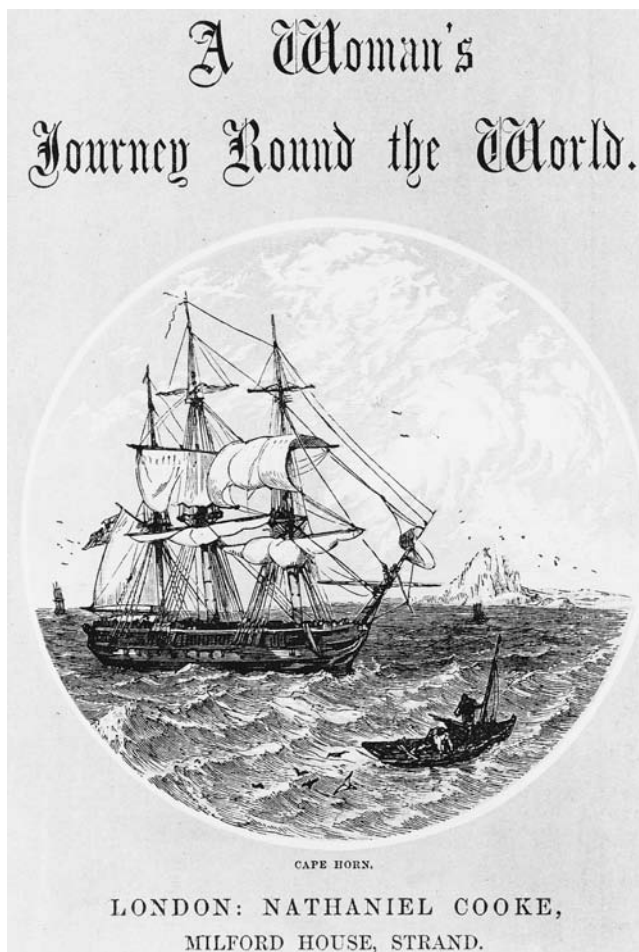
Earlier in the 19th century, in 1803–06, ADAM IVAN RITTER VON KRUSENSTERN and YURY FYODOROVICH LISIANSKY completed the first Russian circumnavigation of the world. Sailing from Kronstadt in the Baltic Sea, the expedition took the westward route, as related in Krusenstern's account *Voyage Around the World in the Years 1803, 1804, 1805, and 1806*. OTTO VON KOTZEBUE, who participated on this voyage as a 15-year-old, led a Russian expedition of his own in 1815–18, in which he searched for outlets of the NORTHEAST PASSAGE and Northwest Passage off Asia and North America in the North Pacific. Other Russian expeditions around the world soon followed, headed by MIKHAIL PETROVICH LAZAREV in 1813–16 and 1822–25; VASILY MIKHAILOVICH GOLOVNIN in 1817–19; and FYODOR PETROVICH LITKE in 1826–29. In 1819–21, German-born FABIAN GOTTLIEB BENJAMIN VON BELLINGSHAUSEN, who had sailed around the world with Krusenstern, circumnavigated Antarctica for Russia.

The French also carried out a number of expeditions circumnavigating the world in the first half of the 19th century, for both military and scientific purposes: LOUIS-CLAUDE DE SAULCES FREYCINET in 1817–20, LOUIS-ISADORE DUPERREY in 1822–25, HYACINTHE-YVES-PHILIPPE POTENTIEN DE BOUGAINVILLE in 1824–26, and ABEL-AUBERT DUPETIT-THOUARS in 1836–39. All these French explorers wrote about their journeys.

By Sea, Land, and Air

By the mid-19th century, such maritime voyages were commonplace, and the fact that they circumnavigated the globe was not the primary goal. Another kind of voyage, some of it by land, gained attention at this period of history. In 1847–48 Austrian travel writer IDA REYER PFEIFFER accomplished a westward journey around the world, most of it by sea, but some by land. She wrote about her experiences in *A Woman's Journey Round the World*. In another work, *A Woman's Second Journey Round the World, from London to the Cape of Good Hope, Borneo, Java, Sumatra, Celebes, Ceram, the Moluccas etc., California, Panama, Ecuador, and the United States*, she wrote about her world travels of 1851–55.

There have been other firsts relating to the circumnavigation of the world in the 20th century. From April 6 to September 28, 1924, four American aviators in two Liberty-engined Douglas Cruiser airplanes flew around the world; Seattle, Washington, was the point of departure and arrival. In 1964, American Jerrie Mock became the first woman to pilot a plane, a Cessna 180, around the world. (American Amelia Earhart's attempt in 1937 ended in her disappearance.) In 1967, Sir Francis Charles Chichester, a British aviator and yachtsman, completed the first solo maritime journey around the world in his yacht *Gipsy Moth*



This title page of an 1854 book by Ida Pfeiffer about her trip around the world shows Cape Horn. (*Library of Congress, Prints and Photographs Division (LC-USZ62-108115)*)

IV; in 1999, Bertrand Piccard, AUGUSTE PICCARD's grandson, and Brian Jones, a British pilot, completed the first nonstop circumnavigation of the earth by BALLOON in the *Breitling Orbiter 3* after many other unsuccessful attempts by other aviators.

cog (coque, kogge)

The cog (or coque or kogge) was a ship developed along the north coast of Europe in about 1200 for the purpose of trade. It was stout in its shape, like the ROUNDSHIP, in order to hold a maximum amount of cargo. It had elevated decks at the bow and stern—the forecastle and the sterncastle. In its standard form, it had a single mast holding a single square sail. Wind power was supplemented by a modest number of oars. The original form of the cog was double-ended with a side rudder, like the LONGSHIP of the VIKINGS, from which it was descended. Also, like the longship, it was clinker-built, meaning that the planks forming its hull over-

lapped, with caulking added to make a watertight seal. The cog was of modest size in comparison with the largest ships of the day. Its length was probably no more than 80 feet, and its width (beam), no more than 30 feet. This was due to a combination of the bulky shape of the vessel and the limitations imposed by the clinker construction.

A number of embellishments of the cog and roundship as they coevolved would become important features in later vessels. Just as in the roundship, the side rudder of the cog was replaced by a center-mounted rudder for better control. Primarily a trading ship without great agility, the cog was not practical in warfare. Yet, with its high hull and sturdy construction, it could withstand attacks from smaller, lower, more maneuverable boats. The castles at bow and stern could be used as platforms for fighting, as well as shelter.

The dependability of the cog helped make trading profitable for the HANSEATIC LEAGUE, an association of commercial interests rising from Germany and active especially in the region of the Baltic Sea. When Hanseatic League merchants traveled to the MEDITERRANEAN SEA, the efficiency of their ships was recognized by the merchants of the region, and cogs came into wide use there as well. The hulk—a ship reportedly developed in the Mediterranean—may have been in fact a version of the cog.

During its period of common use, from 1200 to 1450, the cog offered shipbuilders the opportunity to experiment with numerous features of design and construction. These included the keel, the hull, the rigging, and the previously mentioned castles and rudder. The lessons learned with the cog and the roundship gave shipbuilders the knowledge necessary to shape seaworthy ships with larger storage capacity and maneuverability in a variety of conditions, such as the CARRACK and the CARAVEL, used in transoceanic voyages of exploration.

See also SHIPBUILDING AND EXPLORATION.

colonization and exploration

The term *colonization* refers to the act of establishing a colony, that is, a group of people settling in a new region and forming a community fully or partly subject to their original homeland. In some instances, colonization evolves slowly through the actions of individuals or small groups of people and evolves over a long period of time. In other instances, colonizing expeditions are sponsored by the mother country—or an agency, typically a commercial entity working in conjunction with the government—with an organized plan of settlement. Conquest is often the first stage of colonization, yet not necessarily on a large scale (see CONQUEST AND EXPLORATION).

In addition to domination, *colonization* implies exploitation, with countries developing and controlling provinces to promote their own economic, political, mili-

tary, cultural, and religious interests, typically over indigenous peoples but also in competition with other nations. The related terms *colonialism* and *imperialism* imply a philosophy and policy of colonization by the parent nation. *Colonialism* is sometimes used to indicate a policy of strictly regulated political and economic control, and *imperialism*, to indicate a less formal policy, although some scholars associate imperialism with the economic expansion of capitalist states, or for European expansion after 1870. Treaties and alliances were often shaped—sometimes against the will of local inhabitants—to “legalize” whatever the relationship between colonizer and the colonized.

The two main types of colonies are those of settlement and those of exploitation. The concept of migration is implicit in colonies of settlement, with people making new homes and starting new lives (see MIGRATION AND EXPLORATION). Typically native peoples were excluded from such colonies (see NATIVE PEOPLES AND EXPLORATION). In colonies of exploitation, sometimes also called dependencies, the primary purpose of maintaining the colony was economic, with citizens of the parent nation traveling there as administrators and/or military officers along with merchants, workers, and very likely missionaries (see COMMERCE AND EXPLORATION). In these colonies, native peoples typically were considered a labor resource, either through hiring or by force. Sometimes a newly established colony had been part of a preexisting empire—either the controlling nation or the subject people—with a new nation seizing control. Sometimes one political or ethnic group of a region came to exert control over another group or other groups in that same region, sometimes referred to as an “internal colony.” And, elements of all the above colonial variations might exist to some degree in a sphere of influence as held by one nation over another region rather than as a defined colony. A people might be forced to pay tribute or taxes to another people, for example.

Colonization and exploration are related in a number of ways: Colonization served as an incentive to exploratory expeditions to uncharted lands, with governmental and commercial sponsors devising plans to develop new regions; as a result of explorations, with emigrants deciding to travel to distant lands based on the reports of explorers; or as a natural outgrowth of the establishment of colonies, with colonists themselves traveling beyond original settlements.

Ancient Colonizers

Most of the ancient peoples of the MEDITERRANEAN SEA discussed in this book as especially important to the history of exploration in opening up contacts with regions beyond their homeland—Egyptians, Phoenicians, Greeks, and Romans—founded colonies (See EGYPTIAN EXPLORATION;

GREEK EXPLORATION; PHOENICIAN EXPLORATION; ROMAN EXPLORATION). That they were either merchants who established commercial centers far from home or empire builders seizing territory relates to both exploration and to colonization.

From their homeland along the NILE RIVER, the Egyptians pushed into other parts of Africa, and, during the 18th century B.C., under the pharaoh Thutmose III, conquered territory in Asia as far east as the Euphrates River, including some Phoenician cities and all of what is now Syria. They themselves were colonized for parts of their history, by Libyans, Nubians, Assyrians, Persians, Greeks, and Romans.

Spreading out from present-day Lebanon, the Phoenicians founded trading posts throughout the Mediterranean area and came to control surrounding regions politically. One such center was Carthage in North Africa, founded in the late ninth century B.C.; the Carthaginians also established dominion over other regions.

The Greeks came to control most of the islands in the eastern Mediterranean and also founded settlements in coastal regions of present-day Italy and France, the Iberian Peninsula, parts of Asia Minor and other coastal regions of the Black Sea, and present-day coastal Libya in North Africa. By 500 B.C., they had some 700 settlements under their control. Macedonian ruler ALEXANDER THE GREAT of the fourth century B.C. united the Greek city-states under him and led Greco-Macedonian forces beyond the Mediterranean into Asia as far as India. In the course of his short reign, he founded more than 70 cities in foreign lands.

By A.D. 117, at its greatest extent, the Roman Empire included territory from Italy eastward to Constantinople (present-day Istanbul, in Turkey) and Palestine, southward to North Africa, and northward to Gaul (France) and Britain. At their military posts in foreign lands, the Romans devised a system of colonization in which Roman women were sent along to grow crops and for handiwork and to bear children, so that the post would be self-sufficient and grow.

In addition to these Mediterranean peoples, the ancient Chinese were known as both explorers and colonizers, ever seeking to expand their interests beyond the heart of their territory, the YELLOW RIVER (Huanghe) in eastern Asia. The period of the Han dynasty, from about 206 B.C. to A.D. 220, was an expansionist period, with foreign trade flourishing and Chinese power and influence in the East rivaling that of the Romans in the West.

Medieval Colonizers

The creation of the new religion, Islam, on the Arabian Peninsula in the 620s–630s led to the ascendancy of Arab Muslims in the region. Over the next years, Muslim forces conquered much of the Near East, parts of central Asia, and all of North Africa (see MUSLIM EXPLORATION). In 711, they invaded the Iberian Peninsula, where the Moors—a

Muslim people out of North Africa—maintained a colonial presence until 1492. Travel throughout Muslim lands and beyond became commonplace. For example, the most famous Arab traveler, ABU ABD ALLAH MUHAMMAD IBN BATTUTA, traveled throughout Egypt, Arabia, central Asia, North Africa, and Spain in the 15th century.

From about 800 to 1100, the Vikings out of Scandinavia were active in Europe as traders, raiders, and settlers (see VIKING EXPLORATION). They came to have settlements in the British Isles and neighboring islands in the North Atlantic, western and eastern Europe, ICELAND, GREENLAND, and northeastern North America. The successful large-scale colonizing expedition of ERIC THE RED to Greenland in 985 or 987 led to explorations farther westward to northeastern North America by his son, LEIF ERICSSON, and eventual attempts at colonies in what is referred to in Viking texts as VINLAND, thought to be in Newfoundland. Later descendants of the Vikings—generally referred to in texts as Normans—also established colonies, such as Roger I, who captured Sicily from the Arabs in 1061–91.

In the case of both the Muslims and Vikings, the colonies were not politically regulated by rulers in the original homelands but came to be ruled locally yet maintaining cultural and commercial ties.

With the CRUSADES—the series of religion-inspired incursions into the Near East of the late 11th century to the late 13th century—to counter the expansion of the Seljuk Turks (Muslim people in the Near East), Europeans from a number of different nations established colonies. Yet, they did so without necessarily a political center at home—rather a religious one, the seat of the Catholic Church in Rome. During those centuries the Venetians and Genoese established commercial colonies along trade routes to the East and regulated them for the task at hand—the free flow of goods.

It was the rise of the Mongols, who created a vast empire throughout most of Asia and into eastern Europe in the 13th century under GENGHIS KHAN—with numerous ethnic groups as tribute peoples—that enabled new trade contacts between East and West (see MONGOL EXPLORATION). Merchants, such as Venetian MARCO POLO in the 1270s, could travel the SILK ROAD, parts of which had been controlled by Muslims in earlier centuries.

The European Age of Exploration

Starting in the 15th century, at the beginning of what is referred to as the EUROPEAN AGE OF EXPLORATION, a number of European nations developed oceangoing ships and began seeking new trade routes to the East. There resulted from their wide-ranging maritime voyages a new understanding of world geography, including the extent of Africa and the existence of the Americas between Europe and Asia. Numerous colonies were founded in the years to come, many as

trading posts but others evolving into or founded as permanent settlements: by the Portuguese in Africa, Asia, and South America in the 15th century and 16th century; by the Spanish in South America, Central America, and North America in the 16th century; and by the Spanish, English, French, and Dutch in North America in the 17th century (after some failed attempts by the French and English in the 16th century, including what is known as the LOST COLONY). In fact, much of the exploratory activity of this period of history directly relates to the claiming of territory and the founding of colonies—from Italian CHRISTOPHER COLUMBUS's founding of Santo Domingo on Hispaniola in the present-day Dominican Republic in the WEST INDIES in 1496, the oldest permanent settlement in the Americas, to the founding of Plymouth colony by the PILGRIMS in present-day Massachusetts in 1620.

The various European powers enacted laws to manage their foreign holdings. The Spanish in particular developed a complex system of governance relating to the CONQUISTADORES and the native population in the early 15th century. A royal decree known as the *requerimiento* was read by conquistadores to Indian tribes informing them of their duty to the Catholic Church and the Spanish Crown and their right to freedom if they submitted, along with the threat of war and enslavement if they did not. To achieve anything resembling freedom, however, the Indians had to prove themselves “civilized” in terms of religion, language, shelter, and dress. Because of reports by missionaries of the widespread abuses of the system (even if Indians managed to work out a translation of the decree and reacted peacefully, they were still often brutalized and taken as slaves for personal use or profit), the pope and the Crown further structured Indian policy. In 1512, the Laws of Burgos established the *encomienda* system, which required male Indians to work nine months out of each year in return for entry into Spanish society. In 1542, the *repartimiento* replaced the *encomienda*; this was a system of land grants, giving the grantee the right to exploit the native population with an annual levy for labor and produce. These various laws enabled the creation of a *hacienda*—a large estate typically used for farming and ranching.

The Colonial Age

Out of the exploration and colonization of the 15th and 16th centuries there developed the trade empires of the major European powers—Portugal, Spain, the Netherlands, England, and France—and the beginning of modern colonialism. The overseas colonies served as a source of raw materials and as markets for manufactured goods, leading to the rapid growth of maritime traffic between parent companies and their colonies. In the late 16th and early 17th centuries, chartered companies, such as the BRITISH EAST INDIA COMPANY, DUTCH EAST INDIA COMPANY, and FRENCH EAST INDIA



Jacques Le Moyne depicted the French arrival at Port Royal in South Carolina in 1562 in this map. It was published by the Flemish engraver Théodore de Bry in 1591. (*Library of Congress, Prints and Photographs Division [LC-USZ62-380]*)

COMPANY, working in conjunction with governments, became a primary instrument of colonization. Through them, the English and Dutch came to dominate the trade of the EAST INDIES, wresting control of it away from the Portuguese and founding numerous colonies. The French also came to establish a colonial presence there.

Economic growth was promoted by the policy of mercantilism, a trade policy of state intervention in economic matters, especially to maximize exports and increase a nation's store of gold and silver. Thus, in a mercantile system, colonial possessions did not compete economically with the controlling countries but were regulated in order to provide wealth to them.

Great Britain grew into the largest colonial power through naval power. In the mid-18th century, the British had gained control of the Indian subcontinent, most of which had been part of the Mogul (Mughal) Empire, centered in northern India. Soon afterward, however, it lost control of many of its colonies in North America during the American Revolution of 1775–83, prompted in part

because of legislation known as the mercantilist Navigation Acts, passed in 1651, which restricted shipping to and from colonies to British companies, ships, and crews.

Yet, Great Britain continued to establish colonies in other parts of the world, such as Australia. The first permanent British settlement there, a penal colony for prisoners from the British Isles, was founded in 1788 under ARTHUR PHILLIP. Over the next decades, the growth of Australia as a colony led to expeditions. About the same time, European interests began moving inland from Africa's coastal regions and settling new lands. In 1752, for example, AUGUST BEUTLER led a group of Dutch colonists from the Cape Town colony into the Transkei region. Colonial ambitions in Africa led to numerous expeditions well into the 18th century, and the continent would come to be carved up among European nations. In what is called the "Scramble for Africa," European nations partitioned Africa at the Berlin West Africa Conference (1884–85).

The colonial, or imperial, age lasted until the mid-20th century. National liberation movements arose especially

after World War II of 1941–45, when subject peoples demanded self-determination and were granted or won independence from the imperial powers through negotiations and violence. Remnants of the centuries of colonization still exist, but as self-governing dependencies.



Many explorers who had expeditions financed to further colonization and/or helped bring about colonization themselves did not regard themselves as colonizers. Some responded to exploration as a calling unto itself, or traveled to foreign lands for other ideals, such as missionaries who sought to protect native peoples from the effects of colonization even as they converted them and thus facilitated additional settlement by outsiders. Yet colonization has been a historical current since ancient times and, as such, has to be studied at the very least as context to exploration in general.

Colorado River

At 1,450 miles long, the Colorado River is the longest river west of the ROCKY MOUNTAINS in North America, and one of the major rivers of the United States. Originating just west of the Continental Divide in the Rockies of northern Colorado, it follows a southwesterly course across Colorado and southeastern Utah. After the Green River, its chief tributary, joins the Colorado in southeast Utah, the river then flows westward through the Grand Canyon, and then southward, where it functions as the lower section of the border between Arizona and Nevada and the entire border between Arizona and California. It then flows approximately 90 miles across northwestern Mexico, where the border lies between the states of Sonora and Baja California, and empties into the Gulf of California.

In addition to the Green River, the Colorado River receives a number of other sizable tributaries, including the Gunnison, Yampa, Dolores, San Juan, Virgin, Little Colorado, Salt, and Gila Rivers. The entire system drains about 245,000 square miles in seven states (Colorado, Wyoming, Utah, New Mexico, Nevada, Arizona, and California) and an additional 2,000 square miles in Mexico.

The Colorado's powerful current has carved a series of deep canyons and gorges through its first 1,000 miles. The best known example is the Grand Canyon, where the river cut through consecutive layers of rock and gradually enlarged and deepened its own course. The effects of the current, in combination with the wind and weather, created a canyon 277 miles long, 18 miles wide, and up to a mile deep. Its course there is marked by a series of rapids and waterfalls. The large amounts of sediment carried by the Colorado have created an extensive delta in Mexico. Along its lower course, because of the great amount of sediment, the

water seems reddish in color, leading to the name given by the Spanish, *colorado* for “reddish.”

Spanish Exploration

It is thought that the first European to see the Colorado was Spaniard FRANCISCO DE ULLOA in 1539–40. He headed an expedition sent out from Mexico by HERNÁN CORTÉS, which explored the Pacific coast of Mexico, the Gulf of California, and the mouth of the Colorado. Using one of his ship's boats, he traveled far enough north to see mountain peaks in the distance, situated in present-day California. In 1540, a Spanish overland expedition under FRANCISCO VÁSQUEZ DE CORONADO out of Mexico entered what is now the American Southwest and set up headquarters at the Zuni Indian pueblo of Hawikuh in present-day western New Mexico. One of his lieutenants, PEDRO DE TOVAR, exploring to the northwest, reached the Hopi pueblo of Awatovi in present-day northeastern Arizona. There he learned of a great river to the west. Based on this information, Coronado sent out another expedition under GARCÍA LÓPEZ DE CÁRDENAS, who with his contingent became the first known Europeans to see the Grand Canyon. Meanwhile, HERNANDO DE ALARCÓN, with the seaward portion of Vásquez de Coronado's expedition, sailed northward with supplies. After exploring the Gulf of California, he traveled a good distance up the Colorado—about 200 miles to the vicinity of its confluence with the Gila River, near present-day Yuma, Arizona, where he left a marker. MELCHIO DÍAZ, another one of Vásquez de Coronado's lieutenants, later found the marker.

In 1582–83, a Spanish merchant by the name of ANTONIO ESTEVAN DE ESPEJO financed his own expedition to western New Mexico and eastern Arizona in search of missing missionaries, during which he reached the Little Colorado River in Arizona. Two decades later, in 1604–05, JUAN DE OÑATE, who had founded the first permanent Spanish settlement in New Mexico in 1698, explored westward and explored the lower Colorado, reaching the Gulf of California. The man who charted much of the region of the lower Colorado, as well as the Gila River, was Italian Jesuit missionary EUSEBIO FRANCISCO KINO, trained in astronomy and mathematics, who led some 50 exploratory expeditions in northern Mexico and southern Arizona out of a mission in what is now Sonora, Mexico, in the late 17th and early 18th centuries. He dispelled the myth once and for all that the California Peninsula was an island. Later in the 18th century, in 1774–76, JUAN BAUTISTA DE ANZA followed the Gila River to the lower Colorado on two expeditions to California. Franciscan missionary FRANCISCO TOMAS HERMENEGILDO GARCÉS accompanied him on the first expedition and part way on the second. In 1776, Garcés, seeking native converts, reached the Grand Canyon. In 1776–77, Franciscan missionaries FRANCISCO ATANASIO

DOMÍNGUEZ and FRANCISCO SILVESTRE VÉLEZ DE ESCALANTE, in an unsuccessful effort to create a route between the Spanish settlements of Santa Fe, New Mexico, and Monterey, California, explored parts of the Colorado itself, as well as the Dolores River in western Colorado and the Green River in Utah.

U.S. Exploration

In the mid-19th century, after the United States assumed control of the Southwest from Mexico with the Mexican Cession of 1848, following the U.S.-Mexican War, U.S. Army Corps of Topographical Engineers launched a number of surveying expeditions to the West, among them one under JOSEPH CHRISTMAS IVES in 1857 to determine the navigable limits of the Colorado. Geologist JOHN STRONG NEWBERRY was part of this expedition as was Mojave Indian IRATEBA as a guide. From the river's mouth, Ives and his party reached as far north as the Black Canyon along the border between Arizona and Nevada. In another military expedition, in 1859, JOHN N. MACOMB, also of the Corps of Topographical Engineers, again joined by Newberry, located the junction of the Grand and Green Rivers in eastern Utah, which they determined as the source of the Colorado. The Grand River is now considered part of the Colorado, and its name has been dropped. Grand Lake far to the northeast in northern Colorado is now considered the Colorado River's source.

In 1869, geologist JOHN WESLEY POWELL made the first detailed scientific exploration of the Colorado River, the Green River, and surrounding territory. During that expedition, Powell and his party navigated through the Grand Canyon in wooden boats. In 1871, Powell embarked on another descent of the Colorado. He wrote a report of his journey for the government in which he suggested that the land could support only a limited amount of irrigated agriculture.



The Colorado River and its tributaries are the primary source of water for much of the American West, especially the Southwest, and a part of northern Mexico as well. About two-thirds of the system's water is used for irrigation; much of the rest of it supplies urban areas. Numerous dams have been built along the system, which serve to generate hydroelectric power, store water, and control floods. Along the border of Arizona and Nevada, where the Colorado runs through Black Canyon, the construction of Hoover Dam has created the reservoir known as Lake Mead. The lakes formed by dams also provide recreational activities, as do sections of the rivers for fishing and whitewater rafting. Yet population increases in the vast Colorado River region have already begun to strain the water supply.

See also NORTH AMERICA, EXPLORATION OF.

Columbia River

About a third of the course of the Columbia River, one of the longest rivers in western North America, is in Canada, the rest in the United States. From its source at Columbia Lake in southeastern British Columbia, it travels 1,214 miles before it empties into the Pacific Ocean at Astoria, Oregon. In British Columbia, the river flows northwesterly for about 200 miles between the ROCKY MOUNTAINS to its east and the Selkirk Mountains to its west. This section is also known as the Rocky Mountain Trench. After flowing along the northern edge of the Selkirk Mountains, it turns southward and widens into the Upper and Lower Arrow Lakes. It is joined by the Kootenai (spelled Kootenay in Canada) and Pend d'Oreille Rivers. Continuing southward, it flows into the state of Washington in the United States.

The Columbia continues its southerly course across Washington for about 100 miles until its juncture with the Spokane River. From there, it curves westward in an arc known as the Big Bend, then follows a generally southerly route until its juncture with the Snake River, at which point it turns westward again and forms the border between the states of Washington and Oregon. It crosses the Cascade Range through the Columbia River Gorge. Along its route, it passes through several canyons and deep valleys of both the Cascades and the Coastal Range as well. Numerous rivers feed the lower Columbia, among them the Deschutes and Willamette flowing from the south, and the Cowlitz from the north. The lower Columbia angles to the northwest on its final stretch and eventually opens up to a broad estuary and Gray's Bay, 20 miles from open ocean, the Pacific. Including its tributaries, the Columbia River drains nearly 260,000 square miles.

The upland country between the Rockies and the Cascades is known as the Columbia Plateau after the river. Native Americans of this region, who depended on the Columbia and its tributaries for sustenance—especially for the salmon spawning runs upriver—are sometimes grouped together as Plateau Indians.

From the Sea

Early explorations along the Pacific coast of North America were motivated in large part by the hope of finding the outlet to the NORTHWEST PASSAGE. Spanish naval officer BRUNO HECETA was the first European to discern the Columbia River from the sea. While exploring the Pacific coast in August 1775, he entered a bay, where he noticed strong currents, making him believe a river fed it. He named the river Río San Roque. The currents drove his ship out to sea before he could explore upriver, and he returned to Mexico.

In April 1792, an American sea captain named ROBERT GRAY, who had earlier completed the first CIRCUMNAVIGATION OF THE WORLD by a U.S. flagship, the *Columbia*, was off the Pacific Northwest coast on a second trading expedition

out of Boston. His goal, as in the earlier expedition, was to exchange trade goods for furs from Indian tribes, then sail to China and barter the furs for tea. While sailing southward along the coastline, he located a point where the current and waves seemed to indicate a river emptying into the Pacific, which he thought might be the large river reported by Indians—the Oregon, as it was known (a Native American word, the derivation of which is unknown). A sandbar made passage dangerous. After exploring to the north—during which time he met up with a British ship and conferred with its captain, GEORGE VANCOUVER—he returned south and crossed a sandbar into what was known as Deception Bay, now known as Gray’s Bay. After trading with Indians along the bay, he entered the river—which he renamed the Columbia after his ship—sailing about 36 miles into it. The United States made a claim to the region based on his findings. England also claimed the region. Later that year, British naval officer WILLIAM ROBERT BROUGHTON, sailing a second ship under Vancouver’s overall command, navigated 119 miles upriver and made the first accurate charts of the area over a period of three weeks.

Lewis and Clark

The Columbia River also was an important route of transportation for the Lewis and Clark Expedition of 1804–06, sent out by U.S. President Thomas Jefferson, which departed St. Louis on May 14, 1804. One of Jefferson’s hopes was that the expedition would find a water route all the way to the Pacific. While MERIWETHER LEWIS and WILLIAM CLARK and their Corps of Discovery were forced to travel much of the way overland, after crossing the Rockies and the Continental Divide, they reached the Clearwater River, and, under the guidance of Nez Perce Indians, they carved dugout CANOES. The Clearwater took them to the Snake River, which took them to the Columbia on October 16, 1805. They continued by canoe, navigating through rapids and around waterfalls. On November 7, the explorers reached the mouth of the Columbia in Gray’s Bay on the Pacific. They built Fort Clatsop on the south shore, where they spent the winter, exploring the region and setting out back eastward on March 23, 1806, arriving in St. Louis on September 23.

Trade and Settlement

In 1810, JOHN JACOB ASTOR of the AMERICAN FUR COMPANY, and its subsidiary the Pacific Fur Company, sponsored a maritime expedition to the mouth of the Columbia, where the settlement of Astoria was built the next year, also on the south shore. An overland party, known as the Astorians, under WILSON PRICE HUNT, departed St. Louis soon afterward in 1811, traveling the Columbia on the last leg, arriving at Astoria early in 1812. In 1810–11, DAVID THOMPSON, a British-born fur trader of the NORTH WEST COMPANY, who had already mapped large areas of Canada,

became the first known non-Indian to follow the Columbia River from its source to its mouth and visited Astoria. In 1813, during the War of 1812, the Astorians sold the post to the North West Company rather than make a stand against a British warship.

Following the war, by the terms of the Treaty of Ghent—based on the activities in the region of Robert Gray, Lewis and Clark, and Astor—the British returned Astoria to American possession. In 1818, the United States and Great Britain signed a treaty, agreeing that for 10 years their subjects and citizens of both nations could jointly occupy the Oregon Country (which comprised much of the Pacific Northwest at the time, from the Continental Divide to the Pacific Ocean and from the present border between California and Oregon to Russian Alaska).

Other traders worked the region over the next years. In the 1820s–30s, JOHN MCLOUGHLIN of the HUDSON’S BAY COMPANY was based at Fort Vancouver (present-day Vancouver, Washington, opposite Portland, Oregon) on the Columbia for operations throughout the Pacific Northwest, including expeditions under PETER SKENE OGDEN and JOHN WORK. In 1827, American traders JEDEDIAH STRONG SMITH and JOSHUA PILCHER visited the post. In the 1830s, Boston merchant NATHANIEL JARVIS WYETH led two fur-trading expeditions to the region; Methodist missionary Jason Lee, who later founded schools in Oregon, accompanied him on the first. The establishment of the Oregon Trail brought more settlers to the Columbia River region, including Presbyterian missionaries MARCUS WHITMAN and HENRY HARMON SPALDING. In 1843, Kentucky-born JESSE APPLGATE helped lead a wagon train with about 1,000 emigrants, known as the “Great Migration of 1843.” Many of them settled in the Willamette Valley.



In 1846, Britain ceded Oregon Country to the United States, paving the way for the establishment, over the years, of the present international, state, and provincial boundaries of Columbia River country.

See also NORTH AMERICA, EXPLORATION OF.

commerce and exploration

The term *commerce* refers to the exchange of goods or services between peoples. It is used interchangeably with the term *trade*, although the former in some usage indicates the exchange of goods on a large scale, such as commercial dealings between nations, as well as traffic in goods that have to be transported over a distance.

The theme of commerce runs through the history of exploration. A desire for commerce helped spur on voyages to distant lands, and new forms of commerce resulted from voyages. Exploration was often a moneymaking endeavor.

Many SPONSORS OF EXPLORATION, whether merchants or rulers of nations, hoped to profit from their investments in expeditions, as did the explorers themselves.

Ancient Peoples and Commerce

The ancient peoples most studied with regard to exploration were in many cases known as merchants, in particular the Minoans, Phoenicians, and Greeks, who developed markets along the coasts of the MEDITERRANEAN SEA and beyond through maritime exploration (see GREEK EXPLORATION; MINOAN EXPLORATION; PHOENICIAN EXPLORATION). Yet commerce is a part of the story of some of the other ancients, such as the Egyptians (see EGYPTIAN EXPLORATION). When Queen HATSHEPSUT sent out an expedition to the southern land of PUNT by way of the RED SEA in about 1492 B.C., it was in the hope of locating sources of goods, such as gold and spices.

The Egyptians also hired proven mariners—the Phoenicians and Greeks—to seek out sources of goods on their behalf, as did the Romans (see ROMAN EXPLORATION). A Greek, HIPPALUS, for example, sailed to India in the first century A.D. on behalf of Egypt, then under Roman domination.

The Chinese also sent out expeditions for purposes relating to commerce (see CHINESE EXPLORATION). That which first established what became known as the SILK ROAD, the route over which silk was transported from the Far East to Europe, was carried out by the diplomat CHANG CH'EN in 115 B.C., during which his envoys made trade arrangements with peoples of the eastern Mediterranean. In A.D. 97, another diplomat, KAN YING, was sent on a mission to Rome in an effort to secure the Silk Road. And the seven journeys of the admiral CHENG HO in the early 15th century, although they may have been initiated for political and military purposes, had the effect of opening up coastal regions of the Indian Ocean to Chinese trade.

Medieval Commerce

After the breakup of the Roman Empire in the fifth century A.D., new trade relations developed between Europe, Africa, and Asia in the Middle Ages. A people who became active in trade during this period were the Arabs, who traveled the Indian Ocean between the Near East, East Africa, and Southeast Asia. After the rise of Islam in the seventh century A.D., Arab Muslims ranged even farther for purpose of trade. In many instances, they acted as middlemen between Asian and European interests. Much of the commercial activity surrounded the SPICE TRADE, with the West's demand for spices that were produced in the East. Arabs also controlled the African SLAVE TRADE, capturing or trading for slaves and selling them in European and Asian markets. Salt was another valued commodity produced in Africa. A 10th-century merchant ABU AL-QASIM IBN ALI AL-NASIBI IBN

HAWQAL wrote about the trade routes of the SAHARA DESERT. Another Arab merchant, ABU ALI AHMAD IBN RUSTA, wrote about his travels in Europe.

Commerce between Asia and Europe slowed down in the mid-11th century, however, when the Turks, who also came to adopt the Islamic religion, conquered many Arab lands and threatened Constantinople (present-day Istanbul), the seat of the Eastern Roman Empire (Byzantine Empire). The resulting CRUSADES—military actions by Europeans against the Muslims of the Near East from the late 11th century to the late 13th century—thus had a commercial purpose of reopening trade routes as well as the religious one of spreading Christianity. The Crusades in turn had the effect of sparking new commerce because returning Crusaders had a new interest in Eastern goods.

During the Crusades, Italian port cities took on a central role in East-West commerce. Venice and Genoa, port cities in northern Italy, became primary launching points for trade. It was from Venice that Venetian merchants NICCOLÒ POLO, his brother MAFFEO POLO, and Niccolò's son MARCO POLO set out for the East in the late 13th century, in order to develop trade contacts with the Mongols, who then controlled China and much of central Asia. Marco Polo's writings about his extensive travels led to even greater interests in Eastern products.

In the meantime, trade with foreign interests had become safer because merchants began to form associations for the protection of travelers abroad. The HANSEATIC LEAGUE, a commercial union of German cities and towns and their merchants, was active by the mid-12th century. The Baltic Sea became a hub of trade to other parts of Europe and the eastern Mediterranean. Europe was known as a source of raw materials, such as tar, timber, tin, furs, and wool; some manufactured goods, such as woolen garments and linens; and prepared foods, such as salted fish, wine, oil, and fruit. Asia was known as a source of luxury items, especially spices, tea, textiles, and jewelry.

Commerce during the European Age of Exploration

Because of Muslim domination of overland trade routes and the expense of overland expeditions, European powers hoped to develop water routes. The fall of Constantinople to the Turks in 1453 made it even more economically imperative that European nations bypass Muslim strongholds. HENRY THE NAVIGATOR, prince of Portugal, had earlier begun the process of a maritime solution when he had founded a naval depot, an observatory, and a school of navigation at Sagres near Cape St. Vincent in Portugal, and had assembled together astronomers, mapmakers, and mariners. One of his main goals was to make a seaworthy vessel, combining sturdiness and maneuverability, the result of which was the CARAVEL (see SHIPBUILDING AND EXPLORATION).

Navigational instruments were also refined (see NAVIGATION AND EXPLORATION). Before long, Henry was sponsoring expeditions along the coast of Africa, and, by the turn of the century, the Portuguese were sailing in the Indian Ocean. In 1498, VASCO DA GAMA reached India, where he traded a load of European goods for a cargo of pepper.

In the meantime, in 1492, Italian mariner CHRISTOPHER COLUMBUS, funded by and sailing for Spain, had reached the Americas by making a westward crossing of the Atlantic Ocean. Although he was disappointed in his hope of finding spices and gold, his four voyages back and forth between Europe and the Americas started the process of creating a desire for new products, such as tobacco, unknown in the rest of the world at the time, and creating new markets and trade relationships.

Subsequent Spanish expeditions—in particular those of HERNÁN CORTÉS among the Aztec Indians of Mexico in the 1520s and FRANCISCO PIZARRO among the Inca Indians of Peru in the 1530s—revolutionized the economy of Europe in that they led to an infusion of great amounts of plundered gold to Spain and prompted other expeditions for the purpose of colonization (see TREASURE AND EXPLORATION). The mining of silver by American Indians for the Spanish also contributed to the Spanish economic ascendancy. There was a demand for the commodity of precious metals in Asia as well as in Europe. In addition to the Portuguese and Spanish, the English, French, and Dutch began sailing the Atlantic for the Americas, with investors hoping for a return from these ventures in the form of wealth appropriated from native peoples or in the FUR TRADE.

Out of the explorations along the African coast and the colonization of the Americas, there also expanded the commerce in human lives. In 1562–63, Englishman SIR JOHN HAWKINS completed the first voyage in what became known as the “triangular trade” between Europe, Africa, and the Americas. European ships would transport manufactured goods to Africa’s west coast, where they would be bartered for slaves. The slaves would then be taken to the North and South American colonies, where they would be exchanged for mostly agricultural goods, especially cotton, tobacco, sugar, and molasses, as well as rum, which would then be transported back to Europe.

The Merchant Companies

Starting in the 15th century, many exploratory expeditions were launched by merchants, organized in syndicates and legal partnerships. For example, a number of merchants of Bristol in England, who had been active in commerce since the Middle Ages, organized a syndicate to back the expedition of Italian mariner JOHN CABOT—who had earlier participated in the spice trade in the Mediterranean—across the Atlantic in 1497, in the hope of reaching the spice markets of the Far East. Cabot headed a second such expedition the next year, again with Bristol backing, and searched for a

water route through North America from the Atlantic Ocean to the Pacific Ocean—the NORTHWEST PASSAGE.

In the 16th century, a number of merchant companies were formed to back expeditions, often with shareholders. These companies would purchase their own ships and hire captains and crews to man them. Governments went into the business of chartering these privately owned and managed companies and sometimes investing in particular expeditions. The royal charters granted the merchant companies a monopoly over trade with certain regions.

One of the earliest of the merchant companies was the London-based MUSCOVY COMPANY, founded in 1551, with SEBASTIAN CABOT, John Cabot’s son, as the first director, which became involved in the search for a route eastward north of Europe, the NORTHEAST PASSAGE. Although it was unsuccessful in that purpose, with expeditions encountering ice conditions time and again, the Muscovy Company’s activities led to the charting of northern coastal regions and islands and opened up new markets in Russia.

The CATHAY COMPANY was a short-lived company, created in the winter of 1576–77 as result of an expedition headed by SIR MARTIN FROBISHER that had been launched the prior spring to find the Northwest Passage. On southeastern Baffin Island off the North American mainland near the ARCTIC CIRCLE, Frobisher had discovered what he believed to be gold, but which turned out to be FOOL’S GOLD, or pyrite, a worthless mineral.

The LEVANT COMPANY, which was granted a royal charter in 1581, then reorganized in 1607 as a joint-stock company, was created to develop trade between the British Isles and the countries of the LEVANT, the eastern Mediterranean, in order to circumvent the Venetians, who had had a monopoly on the traffic between Europe and that region.

At the beginning of the 17th century, both the English, in 1600, and the Dutch, in 1602, founded an East India Company—differentiated now as the BRITISH EAST INDIA COMPANY and DUTCH EAST INDIA COMPANY—to develop trade with India and the SPICE ISLANDS (the Moluccas), as well as other islands in the EAST INDIES and other lands in the Far East. In 1621, the Dutch founded the DUTCH WEST INDIA COMPANY for trade in the Americas. The French set about developing the Asian trade with the founding of the FRENCH EAST INDIA COMPANY later in the century, in 1664.

Among the other companies formed to develop foreign trade in the 17th century was the COMPANY OF MERCHANTS OF LONDON DISCOVERERS OF THE NORTHWEST PASSAGE in 1612, which sponsored a number of unsuccessful expeditions to find the passage, and the HUDSON’S BAY COMPANY in 1670, organized to develop the fur trade around North America’s HUDSON BAY.

The VIRGINIA COMPANY is a name used for both the Virginia Company of London and the Virginia Company of Plymouth. They were granted royal charters at the same

time in 1606, leading to the founding of Jamestown in present-day Virginia in 1607 by CHRISTOPHER NEWPORT and JOHN SMITH and the founding of Plymouth Colony by the PILGRIMS in present-day Massachusetts. Although the purpose of these companies was to colonize North America, it was hoped that discoveries of precious metals or the development of new agricultural products would make the ventures profitable. At Jamestown, the colonists grew tobacco, which was shipped back to Europe and other parts of the world over the years. The Pilgrims participated in the fur trade with Indians.

In addition to supplying raw materials, the establishment and subsequent growth of colonies—in Africa and Australia as well as the Americas—also meant the creation of new markets for manufactured goods (see COLONIZATION AND EXPLORATION).

The North American Fur Trade

The fur trade led to the early exploration of North America more than any other activity. Much of it was in the direct form of trade with Native Americans, but non-Indians also came to hunt and trap animals for their furs. Some of the most famous names in the history of North American exploration were fur traders. French fur traders included JACQUES CARTIER, who explored along the St. Lawrence River in the early to mid-16th century; SAMUEL DE CHAMPLAIN, who explored parts of the Northeast in the early 17th century; RENÉ-ROBERT CAVELIER DE LA SALLE, who explored along the Great Lakes and MISSISSIPPI RIVER; and MÉDARD CHOUART DES GROSEILLIERS and PIERRE-ESPRIT RADISSON, involved with the founding of the already mentioned Hudson's Bay Company in 1670 to develop the fur trade in the Hudson Bay region. French-Canadian fur traders included LOUIS-JOSEPH GAULTIER DE LA VÉRENDRYE and his brother François, and PIERRE-ANTOINE MALLET and his brother Paul, among the first non-Indians to reach the Great Plains in the 1730s–1740s.

Fur traders of English and Scottish ancestry for the Hudson's Bay Company included HENRY KELSEY, who explored the Canadian plains in 1690–92; ANTHONY HENDAY, who traveled even farther west on the Canadian plains in 1754–55; SAMUEL HEARNE, who reached the Arctic Ocean in 1770–72; and DAVID THOMPSON, who explored the ROCKY MOUNTAINS in 1793. Thompson went on to chart COLUMBIA RIVER country for the NORTH WEST COMPANY, first organized in 1779, which was responsible for many expeditions in the Canadian and American West. SIR ALEXANDER MACKENZIE, the first known non-Indian to travel across North America north of the Rio Grande in the 1780s–1790s, was also a trader for the North West Company.

American entrepreneurs also became the first non-Indians to travel widely in the American West. In the years after the expedition under MERIWETHER LEWIS and WILLIAM

CLARK from St. Louis to the Pacific Ocean and back in 1804–06, a number of traders developed the MISSOURI RIVER and Rocky Mountain fur trade. JOHN JACOB ASTOR founded the AMERICAN FUR COMPANY in 1808; MANUEL LISA and a number of partners founded the ST. LOUIS FUR COMPANY in 1809; and WILLIAM HENRY ASHLEY and ANDREW HENRY founded the ROCKY MOUNTAIN FUR COMPANY in 1822. Many of the men who worked in Ashley's fur brigades as trappers—such as JEDEDIAH STRONG SMITH and THOMAS FITZPATRICK—became known as MOUNTAIN MEN and had much to do with pioneering the routes in the American West, all the way to California.

Other traders worked the region to the south. In 1822, WILLIAM BECKNELL pioneered a wagon route from present-day Missouri via the Cimarron Cutoff of the Santa Fe Trail to Santa Fe, New Mexico. In 1833, CHARLES BENT and WILLIAM BENT established Bent's Fort as a trade center on the Arkansas River in what is now southeastern Colorado.

In the meantime, traders for the RUSSIAN-AMERICAN COMPANY, founded in 1799 and headed by ALEKSANDR ANDREYEVICH BARANOV, explored parts of Alaska.



The activities mentioned above are some of the obvious connections between commerce and exploration. Yet, the profit motive has played a part in exploration in other, less apparent ways. For example, those creating the technologies surrounding exploration, such as shipbuilders and the makers of navigational equipment, expanded their commercial activities because of it. Writings about exploration and travel have been a solid area of publishing over the centuries. Images from expeditions—paintings and photographs—have also been marketed. Mapmaking firms grew with new geographic findings. The findings of natural scientists who traveled into wilderness areas led to new medicines that could be sold worldwide. Churches sponsoring missionaries in distant lands increased their followings and their coffers. In recent times, the exploration of the ocean depths and space has also led to the development of new technologies.

Company of Merchant Adventurers See MUSCOVY COMPANY.

Company of Merchants of London Discoverers of the Northwest Passage (Company of Merchants of London, Discoverers of the North-West Passage; North-West Company; Northwest Company)

The Company of Merchants of London Discoverers of the Northwest Passage, a joint-stock company, was given a royal charter in England in 1612. Its name also appears as the

Company of the Merchants of London, Discoverers of the North-West Passage, or simply the North-West Company, also spelled as Northwest Company (but not to be confused with the NORTH WEST COMPANY, founded in Canada for the FUR TRADE).

Investors, some of whom had been part of the MUSCOVY COMPANY, formed the company because they believed HENRY HUDSON's expedition of 1610–11 had located the hoped-for NORTHWEST PASSAGE from the Atlantic Ocean to the Pacific Ocean, based on information brought back by ROBERT BYLOT after a mutiny and Hudson's death. Such a water route would give access to the commerce of the Orient. Bylot became a member of the company as did the reputable geographer RICHARD HAKLUYT.

The company sponsored subsequent expeditions under SIR THOMAS BUTTON in 1612–13, William Gibbons in 1614, and WILLIAM BAFFIN in 1615 and 1616. Bylot participated in all four voyages. The failure to locate a western outlet from HUDSON BAY caused the eventual disbanding of the company.

See also COMMERCE AND EXPLORATION.

compass

The compass is an instrument to determine direction, taking advantage of the Earth's magnetic polarity. It consists of a small bar magnet—a magnetized needle—allowed to spin freely so as to point in the direction of magnetic north. A disc under the needle or around the edge of the device displays markings for north, south, east, and west. When the marking for north is aligned with the needle, a direction may be read.

In addition to revolutionizing navigation, the magnetic compass—variations of which came to be known as the mariner's compass—made surveying and cartography more accurate, being the first tool used to make charts from direct observation. While drawing a coastline, a mapmaker could take multiple readings from a compass to determine its direction. This did not represent ultimate accuracy, but it was an improvement over freehand methods.

The origins of the compass are lost to history. It probably was by accident that the Chinese, sometime before A.D. 1040, discovered that an iron needle rubbed on a lodestone (a variety of magnetite with natural magnetism), if allowed to float freely on water on a piece of straw, would always point to the same direction (the Chinese aligned their compasses to the south). The Chinese themselves did not use the compass for navigation but for feng shui, a practice that assigns spiritual properties to the four different directions; compasses were used to align buildings in the most propitious direction. The Chinese may have introduced the compass to Arabs and other Muslims, who made use of it before Europeans.

One of the earliest accounts of European contact with the compass comes from Petrus Peregrinus de Maricourt, a French Crusader, who wrote of it in the mid-13th century. For the ancient seafarer it was more important to understand the winds than to make abstract calculations, so early mariner's compasses were marked with the 12 primary winds instead of the four directions. It was in Amalfi, Italy, between 1295 and 1302, that the compass as we know it was developed. Yet, when first introduced, its functioning was so mysterious that many Europeans thought it a work of the devil or of evil spirits, and captains sometimes had to keep the presence of a compass on board ships secret from crews.

As use of the compass became more advanced, navigators came to understand the difference between true north and magnetic north, and to recognize regional variations in Earth's magnetic field. A variation on the compass, the GYROCOMPASS, an electronic device using a gyroscope, can determine true north as opposed to magnetic north. Compasses are sometimes mounted in other instruments, such as the transit used in surveying.

See also CHINESE EXPLORATION; GEOGRAPHY AND CARTOGRAPHY; MUSLIM EXPLORATION; NAVIGATION AND EXPLORATION; NORTH MAGNETIC POLE; SOUTH MAGNETIC POLE; SURVEYING AND EXPLORATION.

Congo River (Zaire River)

With a length of 2,720 miles, the Congo River, also known as the Zaire River, a modification of the local word *mzadi*, which means "great water," is the second-longest river in Africa, after the NILE RIVER. (The name of the river was changed from Congo to Zaire in 1971 at the same time the nation known as the Congo became Zaire. In 1997, when the nation of Zaire became the Democratic Republic of the Congo, the Congo name once again was applied to the river.) Its major tributary, the Lualaba, is considered the Upper Congo. Together, the Congo and the Lualaba Rivers drain 1,425,000 square miles of land in central Africa, largely in the country of the Democratic Republic of the Congo, but also including parts of the Republic of the Congo, Cameroon, Burundi, Tanzania, Zambia, and Angola. The river is navigable for 1,000 miles along its center, where it has a width of between four and 10 miles. With its tributaries included, this section forms a navigable system of 8,000 miles. The river is unusual in that it crosses the EQUATOR twice, which led to some confusion over its course, since early geographers thought this impossible. The Congo discharges 1.5 million cubic feet of water per second into the Atlantic Ocean. This massive outflow helped create speculation that the Congo was connected to the NIGER RIVER. It was also theorized for a time that the Congo was part of the Nile River or the ZAMBEZI RIVER. The Congo's relative

navigability and size played an important part in early European contact with the interior of Africa and subsequent African exploration. The former name of the river, the *Congo*, is also applied to the region in general.

Portuguese Exploration

DIOGO CÃO made the European discovery of the Congo (Zaire) River in 1482. He sailed for King John II of Portugal, who sought a water route around Africa for the SPICE TRADE of the EAST INDIES. When Cão came upon the mouth of the river, he placed a PADRÃO, a limestone pillar, to claim the land for his sovereign. (For a time, the Congo River would be known to Europeans as the Rio de Padrão or "Pillar River.") The native peoples were friendly and participated in simple trade. Cão learned that upriver there existed a center of power, the kingdom of the Kongo, ruled by Mani Kongo from his city of Mbanza. Cão had been instructed to search for a legendary Christian king PRESTER JOHN, sought by Europeans for centuries, and the Kongo offered a starting point. Cão deployed four Africans among the crew, who had been educated for just such a mission, then continued on his primary task of exploring the African coast. After traveling some 500 miles to the south, Cão headed back northward, stopping at the river on the return trip. Failing to meet up with his emissaries, he continued on to Portugal with four local potentates as hostages. In 1485, Cão made a second journey to the Congo. Since he returned the four African princes to their homeland, the native peoples once again greeted him with hospitality. On this expedition Cão sailed upriver in his CARAVEL. He made it 100 miles inland, where he was prevented from further exploration by the last of the Livingstone Falls, also known as "The Cauldron of Hell." A delegation was dispatched to Mbanza, bearing gifts from King John along with a request for representatives of the kingdom to visit Portugal.

The next record of Portuguese contact with the kingdom of the Kongo at Mbanza comes from the 1491 expedition of Gonçalo de Sousa. He was dispatched with three ships and a complement of soldiers, builders, and farmers to establish a settlement and trading post in the region. The result of this undertaking was disastrous, with many, including de Sousa, dying of disease. The survivors straggled into Mbanza under the command of Gonçalo de Sousa's nephew, Rui de Sousa. The Mani Kongo along with a large throng of fascinated people welcomed them. The king very quickly embraced Christianity, although he may have done so to form a political alliance with the Portuguese against his enemies rather than through sincere religious devotion. Whatever his motivation, a church was constructed, and the king was baptized as were the members of his court. Not all the local population were willing to go along with the new order, however, and conflicts later arose.

The kingdom of the Kongo was perhaps the largest highly developed civilization in Africa at the time, eclipsing Mali, which had gone into decline. The political structure of the Kongo was advanced, with a system of local rulers, governors, and the king, who was able to obtain cooperation among the various tribes in the realm. There were several types of cloth produced by these peoples; it was of such a high quality that the Portuguese mistook it for satin and taffeta of European origin. Native artisans were able to smelt iron thus enabling them to fashion weapons, tools, and musical instruments. They used copper for jewelry, statuettes, and other ornaments. Although the concept of a "cash crop" had not been formulated, the agricultural system was advanced. Trade was a local affair and not an industry carried out with surplus goods.

The prehistory of the peoples of the Congo Basin is intertwined with the Bantu migrations, which probably began early in the first century A.D. The Bantu came from the Upper Nile Valley, where they grew sorghum and millet using a form of slash-and-burn agriculture. As a result of their successes, there came rapid population growth. The combination of increased population and decreased fertility of their lands created pressure to seek new homelands. Over the course of centuries, the Bantu migrated to the south, interbreeding with and displacing other tribes. They found new sources of food, such as the banana and the yam, which had been transplanted from the Pacific Islands to Africa's east coast. Bantu power was consolidated in about A.D. 1000 through new techniques in warfare, which helped them stay in power. Over time, a mythology developed concerning the origins of the Bantu people.

The death of the christianized Mani Kongo resulted in a war of succession between two of his sons, one pagan and the other Christian. The Christian son, Affonso (his Portuguese name), proved victorious. Innocent of the potential motives of Portugal, he encouraged their missionaries, soldiers, and traders. The Portuguese goods were so irresistible that the people of his kingdom were willing to trade slaves for them.

From 1511, there survives a letter Affonso wrote to King Manuel of Portugal appealing for help in curbing the abuses of the slave traders on the island of São Tomé. His appeals were ignored, and the situation in Mbanza and the entire kingdom degenerated rapidly under the pressures of the SLAVE TRADE. With little oversight from the Portuguese, the soldiers of fortune and profiteers plundered the Kongolese culture. Even the priests who had come to "civilize" these people sought profits through the commerce in human life. Affonso continued to trust his Christian brethren overseas. He asked for ships to wage his campaigns against neighboring tribes, and, when these were not forthcoming, he asked for shipbuilders. Assistance was withheld,

however, and, when Affonso died in 1542, his country was in turmoil.

Various Nations

The latter half of the 16th century saw increased conflict in the region of the Congo Basin. The Portuguese installed puppet governments, and a fierce tribe called the Yakas staged raids against them. The factional violence of other European peoples active in the region—British, French, and Dutch—also increased. The Dutch conquered the Congo region for a short time. In 1641, they took the port of Mpinda at the mouth of the river. The reigning Mani Kongo at the time sought to drive a wedge between the Protestant Dutch and the Catholic Portuguese. This Dutch possession was fleeting, however, and the Congo reverted back to Portugal in 1648. As Europeans capitalized on the slave trade for the colonies in the Americas, they relied on native peoples to provide captives, trading for the most part in coastal ports, and the interior regions of the river remained largely a mystery to them for almost three centuries.

England became interested in Africa from a scientific point of view during the Age of Enlightenment. The idea of the “noble savage” caught on, and government-sponsored expeditions to the continent were mounted. James Kingston Tuckey headed the first of these to the Congo in 1816. Tuckey’s was one of two expeditions to trace the course of the Niger River. His instructions were to investigate the tributaries he found as he sailed up the Congo River to the Niger. His expedition was beset by malaria and dysentery. Tuckey was able to map 150 uncharted miles of the river before he died in the effort. Fewer than half of his men made their way back to England.

In 1868, after studying the sources of the White Nile in the southern Sudan, German naturalist GEORG AUGUST SCHWEINFURTH made his way to the Congo Basin. He made the European discovery of the Uele River, part of the Congo system. His drawings of wildlife along with his scientific observations added much to the early understanding of the region. He was the first European to come in contact with Mubuti, who dwelt in the forests to the north of the river.

The expeditions of DAVID LIVINGSTONE and HENRY MORTON STANLEY finally led to the charting of the entire river. In 1871, with sponsorship from his newspaper, the *New York Herald*, Stanley went to Africa in search of Dr. David Livingstone, who had been incommunicado for some time. Livingstone was investigating possible connections of the Nile and the Congo Rivers to lakes in modern-day Tanzania. When Livingstone died in May 1873, Stanley took up the work that his mentor had failed to complete. Among the goals on his subsequent 1874 expedition was to find the Congo River’s source, then follow the river all the way to the Atlantic Ocean. In 1876, after successfully circumnavi-

gating Lakes Victoria and Tanganyika, he turned his attention to the Congo River.

Stanley had a rival in his exploration of the Congo. VERNEY LOVETT CAMERON, a British naval officer, had been sent by the ROYAL GEOGRAPHICAL SOCIETY to relieve Livingstone. In 1873, Cameron began his journey from Bangamoyo in Tanzania. By the time Cameron had retraced Livingstone’s route, Livingstone had already died. Rather than head home, Cameron struck out to the west to make new discoveries. After exploring and mapping Lake Tanganyika in 1874, he reached Nyangwe, a center of the slave trade on the Lualaba River. Cameron guessed that the Lualaba was a Congo River tributary, so following its flow downstream by CANOE would have been a productive plan. Yet, the people of Nyangwe were hostile and would not sell him the necessary boats. When he realized the futility of the plan, Cameron accepted the offer of the half-Arab, half-black slave trader Tippoo Tib to join his caravan on its way to the west coast. The expedition left Nyangwe in August 1874 and arrived at the Angola coast more than a year later. Cameron had beaten out Stanley in being the first European to make an east-to-west crossing of the southern part of the continent, but since he had been compelled to travel overland, the Congo River remained largely unexplored.

In 1876, Stanley also landed in Nyangwe, but knowing where Cameron had failed, he did not depend on the city’s inhabitants for canoes. Instead, it was Stanley’s strategy to follow the Lualaba by land until he came to a place where he could obtain transport. Since the plan was still quite hazardous because of the warring tribes along the route, Stanley convinced the same Tippoo Tib to provide the services of his small army. On November 5, 1876, the group set off from Nyangwe on this untested path. Making headway was very difficult as they hacked their way through the jungle. Many died from disease. On Christmas Day, Stanley and Tippoo Tib spent their last day together. They had only progressed 200 miles along the river but, by this time, Stanley had acquired more than 20 canoes, mostly by theft. Stanley and his men traveled down the river and, on January 4, 1877, came to Stanley Falls. These cataracts took them three weeks to portage. Although the next 1,000-mile stretch of river was easy to navigate, passage was fraught with danger because the banks of the river were lined with warriors. Stanley fought 24 battles with tribes along the river and many more brief skirmishes. In the village of Rubunga, he had a short rest but was soon ambushed. On the Bateke Plateau the river once again turned difficult, but the tribes of the region were more hospitable. In March, Stanley reached a 200-mile stretch of cataracts, which would end at Livingstone Falls and “The Cauldron of Hell.” Bypassing the rapids was extremely difficult, and, in doing so, Frank Pocock, the last of Stanley’s European companions, was killed. On August 1, 1877, Stanley and his guides came to

the furthest point that Captain Tuckey had reached approaching from the opposite direction 60 years earlier. Stanley soon straggled back into the settlement of Boma, where he was treated grandly by Portuguese inhabitants. After a journey of more than 7,000 miles, he had proven the Nile's independence of the Congo River as well as the Lualaba's connection, and had followed the great river to its outlet.

Stanley had witnessed many of the horrors of the slave trade while on his travels. Livingstone had worked on replacing it with a more benign commerce. Indeed, by the late 19th century, the eradication of slavery was a cause in England at the time. It was understandable then that Stanley felt some frustration when, returning to England in 1878, his plans to develop the Congo fell on deaf ears. King Leopold II of Belgium saw the region's potential for profit, however. In 1876, he had sponsored a conference concerning the region, portraying himself as having only the highest humanitarian motives. He actually hoped to create his own African country. For assistance in this endeavor, he hired Stanley.

Possession of the Congo was not to go uncontested. The colonial scramble for Africa was beginning. France, which was wary of King Leopold, sponsored an expedition by PIERRE-PAUL-FRANÇOIS-CAMILLE SAVORGNON DE BRAZZA, a 26-year-old naval officer. Exploring along the Ogoewe River to the north of the Congo, de Brazza came near its source, then set out across the land to find the larger river. In early 1878, de Brazza made it to the Bateke Plateau. He then reached the Alima River, which turned out to be a Congo River tributary. Using these rivers, he returned to the coast.

By the end of 1878, Stanley was planning his expedition for Leopold, and de Brazza was organizing on behalf of France. In August 1879, Stanley arrived at the Congo River with his crew and supplies, with the intention of building a road past Livingstone Falls. De Brazza followed the same route as on his previous journey, but now with the goal of reaching Stanley Pool above the rapids. In September 1880, de Brazza arrived in the village of Mbe (which would become Brazzaville) on the banks of the Congo and negotiated a treaty with the tribal leader Makoko. While he was there, he encountered Stanley.

From 1879 to 1884, Stanley worked for Leopold and established the Congo Free State. Leopold became the personal sovereign of the land. In 1891–92, he issued a number of decrees, which allowed him to extract the wealth of the country. The carnage that followed stands as one of the darkest periods of colonial history. Mercenaries were recruited to compel the population to harvest latex from rubber trees. Those who failed to meet their quota were enslaved on plantations or had their right hands cut off. In fact, hands became a form of currency the soldiers used for payment from the king. Leopold became extraordinarily rich, buying mansions throughout Europe and living in lux-

ury. There were investigations into his abuses, and, in 1908, he was forced to turn control of the Congo over to Belgium.

It is worth noting that Stanley made another journey through the Congo region in 1887–89 on a mission to rescue German official MEHMED EMIN PASHA. Another explorer of the Congo region who bears mentioning is OSKAR LENZ, a German geologist who, in the 1870s–80s, explored both the Saharan and sub-Saharan regions of the continent.



Today, the Congo region produces copper, palm oil, cotton, sugar, and coffee. There is steamer traffic between Kinshasa and Kisangani, the main river ports, and interest in the hydroelectric potential of the river has been increasing.

conquest and exploration

Since prehistory humans have been creating and expanding territory and political power through conquest, and one people conquering another people is part of the history of exploration. Sometimes expeditions were launched with conquest in mind; in other cases, military expeditions were primarily exploratory, but were the only safe ways to travel because of possible armed responses or banditry, and often preceded the travels of others. Conquest thus helped expand geographic knowledge and led to opening routes and enabling further travels. The aftermath of conquest was often colonization, although colonization sometimes occurred in lands where no military action was necessary (see COLONIZATION AND EXPLORATION). The imperatives of conquest were not just territorial and political, but also sometimes economic (see COMMERCE AND EXPLORATION) and sometimes religious (see RELIGION AND EXPLORATION).

Much of history is about empire building, and, in order to understand the context of all exploration, one has to understand the ebb and flow of civilizations and their evolving territorial holdings. Yet, some peoples and certain individuals are especially studied as explorers because their military efforts took them to lands not yet mapped and led to a dramatic increase in geographic knowledge.

Because exploration on all the continents except Antarctica involved travel through native lands, native peoples have been butchered and enslaved, and their homes and lands have been laid to waste (see NATIVE PEOPLES AND EXPLORATION). The spread of diseases against which indigenous peoples had little resistance proved more deadly than military action in the history of conquest (see DISEASE AND EXPLORATION). Many of the outbreaks of violence between explorers and aboriginal peoples were on a small scale and did not involve armies or navies. Yet, they too can be viewed as a form of conquest in that lands were appropriated and

peoples displaced. The SLAVE TRADE, since it involved the commerce in human life, can also be viewed as another form of conquest associated with exploration.

Alexander the Great

One historical figure recognized as an explorer as well as a conqueror is ALEXANDER THE GREAT, or Alexander III, of Macedonia. He succeeded his father, Phillip II, to the throne at the age of 20, whereupon he outmaneuvered his rivals and consolidated his power over the Greeks. In 334 B.C., he embarked upon his Persian expedition, conquering much of Asia Minor. In 332 B.C., his Greco-Macedonian forces defeated the Phoenicians at Tyre on the eastern MEDITERRANEAN SEA and subjugated the Egyptians. That same year, he founded the city of Alexandria in North Africa. In the next years, he pushed eastward into Asia, reaching as far as India by 327 B.C., eventually crossing the INDUS RIVER. His troops had traversed much of the Middle East and Central Asia, overcoming resisting peoples and founding new cities. His purpose was to expand his empire, but, in doing so, he sought knowledge of conquered lands. Surveyors traveled with his troops, recording information as they went, as did scientists, who sent specimens of flora and fauna back to Greece. He also sent out exploratory expeditions to neighboring regions, such as that under NEARCHUS in 325–324 B.C., which explored along the coasts of Pakistan and Iran from the Indus Delta to the head of the Persian Gulf.

Genghis Khan

Another conqueror/explorer was GENGHIS KHAN of the Mongols (see MONGOL EXPLORATION). After uniting the Mongol tribes and defeating the Chinese, he pushed westward and southward bringing much of central Asia, including southern Russia, and the Near East under Mongol domination. He sought geographic information as well as cultural and sent out emissaries on exploratory expeditions to learn about geography and peoples. Among them was the Taoist sage CH'ANG-CH'UN in 1221, who traveled from eastern China through central Asia to Afghanistan. His conquests had the added effect of breaking the monopoly held on the SILK ROAD through Asia held at the time by Muslims and started a period of contact between East and West by diplomats and merchants, including Venetian merchant MARCO POLO, who reached the court of Genghis's grandson Kublai Khan in 1275.

Roman Generals

The Romans, in the expansion of their empire, provided geographic knowledge that came to be disseminated through the writings of geographers (see ROMAN EXPLORATION). One Roman geographer, PLINY THE ELDER, had even served as a Roman cavalry officer in both Europe and Africa, before writing *Historia Naturalis*, published in A.D.

77. Another geographer, PTOLEMY, a hellenized Egyptian living in Alexandria while it was under Roman rule, published *Geographia*, a description of world geography, in A.D. 127–147, drawing on information brought back from expeditions of conquest.

Roman generals whose expeditions are discussed as part of the history of exploration include GAIUS JULIUS CAESAR, who, in 58 B.C., led troops into Gaul (present-day France) and, in 55–54 B.C., to Britain; GAIUS AELIUS GALLUS, who, in 25 B.C., invaded the Arabian Peninsula; SUETONIUS PAULINUS, who, in A.D. 42, led a military expedition from the coast of North Africa southward across the Atlas Mountains to the northern edge of the SAHARA DESERT; JULIUS MATERNUS, who, in A.D. 50, led troops across the Sahara, possibly reaching Lake Chad; and GNAEUS JULIUS AGRICOLA, who, in A.D. 80, led a military exploration into Scotland.

Vikings

The Scandinavian peoples known as Vikings or Norsemen—Danes, Norwegians, and Swedes of the Middle Ages—traveled widely and were known as raiders by the people of Europe because of their numerous attacks (see VIKING EXPLORATION). In the ninth, 10th, and 11th centuries, they spread southward and carried out raids on other Europeans, especially those in coastal areas in western Europe, but also inland in eastern Europe. They also traveled to ICELAND, GREENLAND, and northeastern North America. They did not have organized armies and generals but were leaders of small groups of warriors. Warfare was carried out and plunder taken for individual prestige, but it also enabled settlement in new homelands. Many of those Viking explorers traveled beyond Europe—ERIC THE RED in Greenland or his son, LEIF ERICSSON, in VINLAND in North America—and are known primarily as colonizers rather than as conquerors.

Conquistadores

Much of the Spanish exploration of the Americas involved individuals known as CONQUISTADORES, the Spanish word for “conqueror.” The name is applied to them because of their actions against native peoples—for their territory, wealth, or labor. The two most famous conquistadores are HERNÁN CORTÉS, who conquered the Aztec Indians in Mexico in the 1520s, and FRANCISCO PIZARRO, who conquered the Inca Indians in Ecuador and Peru in the 1530s.

The Great Navies

Exploration, conquest, colonization, and commerce throughout history have been dominated by those peoples with the best ships (see SHIPBUILDING AND EXPLORATION). The LONGSHIP of the Vikings gave them an advantage in medieval Europe, as the JUNK gave the Chinese an advan-

tage in the Far East in the 15th century, and as the CARAVEL, CARRACK, and GALLEON facilitated the exploration and empire building of the Portuguese, Spanish, English, and Dutch during the EUROPEAN AGE OF EXPLORATION, from the 15th into the 17th century, and afterward. Warships enabled conquest and merchant ships enabled the building and maintaining of trade empires.

Rival Powers

Military actions were carried out against other colonial powers as well as against native peoples. For example, PRIVATEERS—such as Englishman SIR FRANCIS DRAKE, commissioned by England in the 16th century to raid Spanish ships and ports in the Americas while undertaking explorations—relate to the subject of conquest. And, on a larger scale, the history of exploration over the centuries has played out against a backdrop of competition of rival nations, with warfare often resulting from lands explored and colonized far from home, such as in the French and Indian Wars of the 17th and 18th centuries in North America.



Not all expeditions by organized militaries were for the purpose of conquest. For example, the navies of many nations sponsored or played a part in expeditions strictly exploratory in nature, such as the first French CIRCUMNAVIGATION OF THE WORLD under the naval officer LOUIS-ANTOINE DE BOUGAINVILLE in the 1760s. And armies had surveying units, such as the U.S. Army's Corps of Topographical Engineers, which helped map the American West, and the British army's Bengal Engineers, who directed the work of the PUNDITS—native Indian explorers—in the Great Trigonometrical Survey of India, both in the 19th century.

conquistadores (conquistadors)

The term *conquistador* (plural form, *conquistadores* or *conquistadors*) is Spanish for “conqueror,” from the Spanish verb *conquistar*, “to conquer.” It has come to be applied historically to any one of the Spanish conquerors of the Americas, especially of Mexico and Peru in the 16th century. It refers both to the leaders and to the men who served under them. Because of association with brutality toward native peoples, as well as against Spanish rivals, the term has also come to be used in reference to any ruthless adventurer.

Some of the conquistadores had served against the Moors—Muslims (see MUSLIM EXPLORATION) out of North Africa who had invaded the Iberian Peninsula in A.D. 711 and occupied parts of it until final defeat in 1492—or in other European campaigns. Many came from the Estremadura region of the kingdom of Castile and had originally served under Spanish monarchs Ferdinand II

and Isabella I, who helped unify Spain and sponsored the 1492 voyage to the Americas by Italian mariner CHRISTOPHER COLUMBUS. Many of the most famous conquistadores were active in the Americas during the reign of Charles I (Holy Roman Emperor Charles V). Many of the men filling out the ranks were not professional soldiers, however.

There was no standing Spanish army or navy in the Americas. The exploratory expeditions and military actions were often planned by and paid for by the conquistadores themselves. Or the conquistadores sought backing from commercial companies who might provide ships, horses, weapons, and clothing against possible profits from plunder. The leader and main investor typically held the title of “captain” and was often a man of high position, such as an appointed government official or nobleman (*hidalgo*) or any *encomendero*, that is someone holding an *encomienda*, a royal land grant. Participants came from a variety of backgrounds and social classes. Freed slaves sometimes joined the force. Priests often traveled with the expedition so that the Catholic Church was also represented (see RELIGION AND EXPLORATION). The conquistadores were armed with swords, lances, crossbows, and at least a few small cannons. They wore armor that could repel native arrows. They utilized horses in battle when the landscape permitted. They often sought the support of native peoples against rival peoples. They also regularly used the strategy of capturing an indigenous leader and holding him hostage in order to pacify his followers. The attainment of gold and silver from native peoples became the primary objective and, when successful, led to royal approval and the granting of huge tracts of land (see TREASURE AND EXPLORATION).

Hernán Cortés

HERNÁN CORTÉS is one of the most famous conquistadores. His father, a noble of modest means, served in the military. The young Cortés had studied law before entering the army himself. He served in campaigns in Italy before traveling to the Americas in 1504, becoming a minor official in the WEST INDIES. He served in the conquest of Cuba under conquistador DIEGO VELÁSQUEZ, a veteran of Moorish campaigns, in 1511. Seven years later, Cortés received a commission from Velásquez for an expedition to the Yucatán Peninsula. Following a dispute, Velásquez dismissed Cortés, but Cortés proceeded on the expedition anyway. Velásquez sent professional soldier PÁNFILO DE NÁRVAEZ—cited as one of the cruelest of conquistadores by Spanish missionary Bartolomé de las Casas, based on his actions against the Arawak (Taino) Indians of Cuba—to arrest Cortés, but Cortés defeated Nárvaez on the Mexican mainland. Nárvaez was imprisoned, and most of his men joined Cortés in the conquest of the Aztec,

which he accomplished in 1521. In the course of his conquest, he took Aztec ruler Montezuma hostage. The great riches obtained from the Aztec and shipped to Spain led to Cortés's being named Captain General of New Spain (the original Spanish name for Mexico). BERNAL DÍAZ DEL CASTILLO, who served under Cortés, went on to write an account of the conquest of the Aztec, entitled *Crónica de la conquista de Nueva España* (*The True History of the Conquest of New Spain*), which is an essential source of information about conquistadores.

Francisco Pizarro

Another famous conquistador, FRANCISCO PIZARRO, was born out of wedlock and raised outside his father's aristocratic family, and he may have served in the military under his father in Italy. In 1502, he traveled to the West Indies in the service of Nicolas de Ovando, the appointed governor of Hispaniola (present-day Haiti and the Dominican Republic) after Christopher Columbus. In 1509, Pizarro later traveled to the South American mainland as part of ALONZO DE OJEDA's expedition to what is now Colombia and was left in charge of a colony at San Sebastián. He moved the colony to present-day Panama, where he participated in explorations of the region as the lieutenant under VASCO NÚÑEZ DE BALBOA. In 1519, Pizarro arrested Núñez de Balboa on behalf of Panama's governor, PEDRO ARIAS DE ÁVILA. Pizarro eventually was appointed mayor of Panama City and received grants of land. Reports of a wealthy Indian civilization to the south led to Pizarro's expeditions to present-day Ecuador and Peru and the conquest of the Inca in the 1530s. In the course of his actions, he held Inca leader Atahualpa captive as part of his strategy.

De Soto and Coronado

Two famous conquistadores in North America were HERNANDO DE SOTO, who had served under Pizarro and traveled through much of the American southeast in 1540–42, and FRANCISCO VÁSQUEZ DE CORONADO, who explored much of the American Southwest and southern plains, also in 1540–42. They too sought wealthy Indian civilizations and, although they failed to locate great riches as Cortés and Pizarro did among the Aztec and Inca, their expeditions led to Spanish colonization and development of native lands.

Lope de Aguirre

One of the most brutal of all the conquistadores was LOPE DE AGUIRRE, who turned his violence against fellow Spaniards as well as against indigenous peoples. He had first worked in the Americas as a horse trainer but later served as a soldier under other conquistadores. In 1560, while part of an expedition on the AMAZON RIVER in search of the fabled wealthy kingdom of EL DORADO, he led a mutiny

against PEDRO DE URSÚA and had him killed along with his mistress Doña Inez de Atienza. The expedition went on to lay waste to native villages. Aguirre later killed his own daughter rather than have her be captured by rival Spanish forces.



It was not just the weaponry of the Spaniards and political rivalries of indigenous peoples themselves that enabled relatively small Spanish forces to defeat Native Americans. The Spaniards were helped in their conquest by the destructive force of European diseases, especially smallpox, against which native peoples had no resistance (see DISEASE AND EXPLORATION).

coracle

A coracle is a small, round or oval boat, typically made with a frame of wood—typically wicker—covered with either animal hide or canvas. It is designed to carry a single person and a small amount of cargo. The use of the coracle certainly predates the historical record. One of the earliest existing models of a boat is a clay sculpture—in the shape of a coracle—from the fourth millennium B.C., found in Eridu in Mesopotamia. Later versions of round boats appear in relief carvings from Assyria.

The coracle has had a long history in the British Isles as well. It was used for fishing, as well as interisland transportation and trading trips. The coracle is thought to be the prototype of the larger CURRAGH, which SAINT BRENDAN used to travel the Atlantic Ocean to the north and west of Ireland. The coracle continues to be used today in England and Ireland for fishing and river travel.

The Arikara, Hidatsa, and Mandan Indians of the upper MISSOURI RIVER shaped similar circular craft out of buffalo hide stretched over a willow frame and sealed with animal fat and ashes. Their version is known as the bullboat.

See also SHIPBUILDING AND EXPLORATION.

cosmonauts See ASTRONAUTS.

Cossack exploration

The Cossacks are a peasant people of mixed descent, who have inhabited, over the course of their history, parts of the Russian czarist empire, the Union of Soviet Socialist Republics (USSR, Soviet Union), and presently Russia and other former Soviet republics. The name is associated with those peoples inhabiting steppe country, extending from the region north of the Black Sea and the Caucasus Mountains eastward to the Altai Mountains in SIBERIA. Some Cossacks were descended from Ukrainians and Poles in addition to

Russians; many Cossack ancestors were runaway serfs. They became known for military prowess and horsemanship. The name *Cossack* is derived from the Turkish word *kazak*, for “free person.”

The formation of Cossacks is traced back to the 14th and 15th centuries. By the early 16th century, Cossack villages were situated along the Dnieper River and eventually the Don and Ural Rivers as well. The villagers, who owned land in common, were governed by assemblies, presided over by elected elders with one elder overseeing several communities, especially in times of war. Starting in the 16th century, the Russian czarist government extended its control to frontier regions and subjugated the Cossacks, who had earlier helped conquer the Tartars (peoples of Turkic origin who had invaded parts of Asia and Europe under the Mongols in the 13th century). The Cossacks came to be organized for the most part as cavalry units and carried out numerous expeditions into Siberia. By the late 18th century, following their participation in failed peasant revolts against czarist rule, the Cossacks had lost most of their political autonomy, yet they had become a privileged military class. In the 19th and early 20th centuries, they were used by the czarist government to quell uprisings but refused to do so in the Bolshevik Revolution of 1917. In the subsequent civil war of 1918–20, they opposed the Red Army. Under the Soviet system, the Cossacks lost their special status in the military. They also lost much of their wealth and were forced to relocate and farm collectively. In World War II (1941–45), a number of Cossack cavalry divisions were formed to fight the invading Germans. Since the dissolution of the Soviet Union, they have experienced a cultural revival as well as newfound unity and influence.

Because of their location on the edge of the frontier, their mobility, and their skill in warfare, the Cossacks played a significant role in the history of Russian exploration. It was YERMAK (also known as Yermak Timofeyevich or Yermak Timofeiev), who, in 1581–82, led a force across the Ural Mountains and conquered the Tartars at Sibir (from which the name *Siberia* is derived). His activity marked the beginning of Russian expansion eastward. By 1610, Russian fur traders had reached the Yenisey River, and, by 1638, the Sea of Okhotsk, opening up on the Pacific Ocean. But it was often Cossack forces that gained control of a region and established permanent settlements, which led to further exploration.

In 1631–33, PYOTR BEKETOV established Russian dominion to the Yenisey, Lena, Aldan, and Amur Rivers of central Siberia, and, in 1652–60, he expanded Russian interests into southeastern Siberia, south of Lake Baikal. In 1643–48, VASILY DANILOVICH POYARKOV led a military expedition and explored the Amur River, feeding the Sea of Okhotsk, and other rivers of southeastern Siberia.

Meanwhile, in 1641–44, MIKHAIL STADUKHIN explored the Arctic coast of eastern Siberia, reaching the mouth of the Kolyma River. In 1648, SEMYON IVANOVICH DEZHNEV led an expedition of Cossacks in small boats from the mouth of the Kolyma River eastward along the Arctic coast of Siberia and succeeded in rounding the Chukchi Peninsula of northeastern Siberia and entering the BERING STRAIT. In 1695–96, LUKA MOROZKO and VLADIMIR VASILYEVICH ATLASOV led expeditions onto the Kamchatka Peninsula.

Cossack activity eastward continued in the 18th century. In 1713–14, fur trader SEMYON ANABARA explored the Shantar Islands in the Sea of Okhotsk. In 1726–33, EMELYAN BASOV led a series of expeditions along Siberia’s Lena River in search of a seaward route to the Pacific Ocean.

The exploration of Siberia was carried out by non-Cossacks as well, but the Cossack role as pioneers, soldiers, and fur traders pushing eastward was critical to the region’s history.

See also MONGOL EXPLORATION.

coureur de bois

The French term *coureur de bois*, which translates into English as “runner of the woods,” was originally applied to unlicensed entrepreneurs, mostly in the FUR TRADE in northeastern North America during the 17th century. In order to control trade with Native Americans, the colonial government of New France issued a limited number of licenses. As a result, many men defied the regulations and went into business on their own as trappers or traders in the wilderness. Their number is not known, but it has been estimated that one-third of adult able-bodied men in New France by the end of the century were *coureurs de bois*, leaving many of the eastern settlements deprived of male support. Efforts by royal representatives and the Roman Catholic Church failed to curtail them, and they played an intrinsic part in the history of the fur trade and in the exploration of North America, much like the later MOUNTAIN MEN, who worked the ROCKY MOUNTAINS in the 19th century.

The French term VOYAGEURS, for “travelers,” was applied to those men who worked for licensed traders and who traveled by CANOE Indian-style—paddling and portaging—on trade routes. Many voyageurs went into business for themselves—thus becoming *coureurs de bois*—or in conjunction with other unlicensed traders. The *coureurs de bois* adopted many Indian customs. Some settled among and intermarried with Indians. Their descendants—typically of French and Cree ancestry as well as Scottish and other tribal ancestry, such as Chippewa (Ojibway) and Assiniboine—became known as Métis, or “mixed-blood.” The trade in liquor and firearms developed by some *coureurs de bois* led

to outbreaks of violence between non-Indians and some native peoples, however.

The *coureurs de bois* were wide-ranging. Much of their activity was in the region of the western Great Lakes, but some ventured down the MISSISSIPPI RIVER into French Louisiana and farther westward onto the Canadian and American plains. Frenchmen MÉDARD CHOUART DES GROSEILLIERS and his brother-in-law PIERRE-ESPRIT RADISSON, who developed the fur trade around Green Bay in the 1650s and explored much of the country around Lake Michigan and Lake Superior, were *coureurs de bois*. On their return to Montreal in 1660, their furs were confiscated for unlicensed trading, leading to their work for the English and the founding of the HUDSON'S BAY COMPANY in 1670. The large fur-trading companies dominated the western fur trade in subsequent years.

cross-staff (balestila, Jack's staff, Jacob's staff)

The cross-staff, also known as Jacob's staff, Jack's staff, or balestila, like the earlier invented ASTROLABE, is an obsolete navigational instrument used for measuring the angle of a celestial body above the horizon. With this measurement, along with information about the celestial body based on earlier measurements, the user can determine latitude and time of day. The device was probably invented in one of the Low Countries (the region of present-day Belgium, Luxembourg, and the Netherlands) and probably in the early 15th century.

A cross-staff consists of two pieces of wood, the staff about three feet long with a sliding crossbar attached to it. On the staff is mounted a sight, and on each end of the crossbar, a hole. To measure the altitude of the celestial body, a navigator looks along the staff with the crossbar aligned vertically, then slides the crossbar to the point at which the celestial body appears through the upper hole and the horizon through the lower. The intersection of the crossbar and a scale written on the staff indicates altitude. A reading of the NORTH STAR, for example, would gauge its height in the sky; the lower it is, the farther south a ship was.

The cross-staff came into favor over the astrolabe with some mariners in the 15th century. CHRISTOPHER COLUMBUS, the Italian navigating for Spain, possibly carried as navigating equipment a magnetic COMPASS, a primitive triangular QUADRANT, an astrolabe, and perhaps one cross-staff. He also had a table of figures to give meaning to the readings from these early navigational tools (see EPHEMERIS).

English navigator JOHN DAVIS modified the design of the cross-staff in the late 16th century by adding a reflector so that the user would not have to look directly into the Sun but could take readings with his back to it. This became known as the backstaff, the antecedent of a type of quadrant known as the Davis Quadrant. The SEXTANT, invented

in the 1730s, became the favored tool of celestial navigation, but people went on making cross-staffs until the end of the century.

See also LATITUDE AND LONGITUDE; NAVIGATION AND EXPLORATION.

Crusades

The Crusades were any of the military expeditions undertaken by European Christian powers, from the late 11th century through the late 13th century, to recover the Holy Land in the Near East from the Muslims. The first Crusades are relevant to the history of exploration since they marked the first attempt at expansionism and colonialism by Christian nations beyond Europe. They also led to increased contacts among differing cultures and growing geographic awareness.

Background

Palestine, the historic region on the east coast of the MEDITERRANEAN SEA (presently controlled by Israel), was at the center of trade routes linking three continents—Asia, Europe, and Africa. Adherents of the Jewish, Christian, and Islamic religions consider it a Holy Land; the city of Jerusalem in particular has sacred sites central to the belief systems of all three religions. In addition to the ancient local peoples—such as the Canaanites (related to the Phoenicians), Philistines, and Israelites—Palestine had been occupied at times by Hittites, Egyptians, Assyrians, Babylonians, Persians, Greeks, and Romans. It fell to the Arab Muslims in A.D. 638. Yet the region remained relatively open—a center of commerce and religious and intellectual activity until the late 11th century when the Seljuk Turks became the dominant Islamic people in Asia Minor (the Anatolian Peninsula) and took control of Jerusalem. Their harassment of Christian pilgrims to Jerusalem and their aggressive stance toward Constantinople (present-day Istanbul), the seat of the Eastern Roman Empire (Byzantine Empire), became a concern to Christian leaders. Alexius I Comnenus, the Byzantine emperor, appealed to the West for help defending against invaders. Soon afterward, in 1095, Pope Urban II gave a speech at the Council of Clermont in France encouraging aid to Byzantium against the Islamic threat.

Wandering preachers, such as Peter the Hermit (Peter of Amiens), helped spread the message of a “holy war.” Some of those who would become involved over the next years did so for the sake of territorial and economic interests in addition to religious ideals. The prosperity and growing populations in Europe at that time prompted a looking outward to distant lands with curiosity, ambition, and dreams of adventure: Religious leaders wanted to make inroads into Muslim lands and unite the Latin and Orthodox branches of Catholicism; nobles saw the potential for territorial expansion; merchants recognized trade possibilities; knights saw the

opportunity of using their skill in battle; and peasants saw the opportunity for a new life in *Outremer*, a French term for “beyond the seas.” In any case, for varying reasons, the call to conquest was heard by people of many different social backgrounds and callings over the subsequent centuries.

Different numbering systems have been applied to the numerous Crusades. In addition to the nine Crusades sanctioned by the Catholic Church, there are a number of other endeavors, some of them with names, such as the “Peasants’ Crusade” and the “Children’s Crusade.”

Peasants’ Crusade

In the so-called Peasants’ Crusade of 1095–96, not an officially sanctioned endeavor, several thousand French and German peasants gathered and headed to Jerusalem by way of Constantinople. Peter the Hermit was one of several leaders. On the way, some of them sacked Belgrade; others attacked Jewish communities. Soon after their arrival in Constantinople, Alexius I provided them with boats to Jerusalem, where they were easily defeated by the Turks. Some managed to escape, returning to Europe; others, such as Peter the Hermit, joined the gathering Crusader forces.

First Crusade

What is known as the First Crusade consisted of organized armies under a number of nobles. Other people joined them en route or traveled to port towns, then sailed to Constantinople on their own to meet up with the Crusaders, creating a force of an estimated 25,000 to 30,000 in late 1096 and early 1097. The majority were Franks, descended from those peoples united in France under Charlemagne in the eighth and ninth centuries. From Constantinople, the Crusaders crossed to Asia Minor and traveled southward overland through Muslim states and principalities in present-day Turkey, Syria, Lebanon, and Israel. Major victories in the First Crusade included the capture of Nicea (present-day Iznik, Turkey) in 1097; the capture of Antioch (a site in present-day Turkey) in 1098; and, in a bloody massacre in which the Crusaders massacred most of the Arab and Jewish inhabitants, the capture of Jerusalem in 1099. Godfrey of Bouillon became the first ruler—known as defender of the Holy Sepulcher—of the Latin Kingdom of Jerusalem. Other Crusader states founded at this time were the County of Edessa (in northern Syria and southern Turkey); the Principality of Antioch (in Syria); and the County of Tripoli (in Lebanon). Some Crusaders thus maintained a presence in the region, in particular members of the military orders, the Knights Hospitallers and the Knights Templars; others returned home.

Second, Third, and Fourth Crusades

The later Crusades were intended to offer support to the Crusader states and expand Christian-held territory. After the fall of Edessa to the Turks in 1144, Bernard of Clair-

vaux called for another crusade. In the Second Crusade of 1147–49, armies under Holy Roman Emperor Conrad III and then king of France Louis VII failed to take Damascus in Syria.

The Third Crusade was declared in 1187 by Pope Gregory VIII and was carried out in 1189–92. Leaders included King Richard I Lionheart of England, King Philip II Augustus of France, and Holy Roman Emperor Frederick I Barbarossa. In battle with Muslim forces under the renowned commander Saladin, a Kurd serving as vizier of Egypt, the Crusaders managed to fight to a truce. They retained Acre (Akko) in Syria and Jaffa, 35 miles northwest of Jerusalem in Palestine, and a narrow strip of coast and the right of free access to Jerusalem. Meanwhile, Tripoli and Antioch were controlled by Christians.

A number of expeditions to the Holy Land in subsequent years are not all listed as major Crusades. That known as the Fourth Crusade, in 1202–04, never reached the Holy Land. Its Frankish leaders joined the Venetians in retaking Zara (Zadar) on the Adriatic coast of present-day Croatia, then part of the Kingdom of Hungary. The Franks then joined in a dynastic struggle for Constantinople itself. After seizing and looting the city, they deposed the Byzantine leaders and established the Latin Empire of Constantinople, with Venice now controlling the sea route between the two cities. Even though Pope Innocent III condemned their acts of violence against fellow Christians, the Fourth Crusade led to increased distancing between the Roman Catholic and Greek Orthodox churches.

Children’s Crusade

In the so-called Children’s Crusade of 1212, a visionary French shepherd teenager, Stephen of Cloyes, inspired other children to try to liberate the Holy Land, a cause that their elders had betrayed in the Fourth Crusade. A group traveled to Paris to seek the support of French king Philip II. On his refusal to help, some of the youth returned to their homes, but others remained devoted to the cause. A youth from Cologne named Nicholas similarly inspired German children. Some of them reached Italy and others, Marseilles. It is thought that some of the youth perished from hunger and disease, and that others set out from Marseilles and other ports by ship, only to be sold into slavery by the crews.

Final Crusades

Soon afterward, in 1217–21, the Fifth Crusade, the final one sponsored by the papacy, was launched against Muslim forces in Egypt. Christian forces captured Damiatta (Dumyāt), at the mouth of the NILE RIVER, but evacuated it two years later after failing to capture Cairo.

In the Sixth Crusade of 1228–29, Holy Roman Emperor Frederick II moved on Jerusalem with the support of the Teutonic Knights, a military order, and, through negotiations, reached a truce with Muslim leaders granting the

Franks control of Jerusalem, except for Islamic holy places. Feuding between the Knights Hospitalers and Knights Templars led to a weakening of the Crusader states, and the Turks retook Jerusalem in 1244.

In the Seventh Crusade of 1248–50, King Louis IX of France attacked Cairo but was captured. Freed by ransom, he stayed in the Near East to rebuild Jaffa and Acre. After his return to France, Jaffa and Antioch fell to Muslim forces. Louis organized the Eighth Crusade of 1270, but he died in northern Africa after invading Tunis. Prince Edward (later King Edward I of England) launched the Ninth Crusade of 1271–72, reaching Acre, where he negotiated an 11-year truce. Yet, in 1271, Tripoli fell to the Muslims. And in 1291, so did Acre, the last Christian stronghold in the Near East. In the meantime, the Byzantines retook Constantinople in 1261, ending the Latin Empire of Constantinople as well.

Economic Outcome

The Crusades had no lasting territorial effect after the fall of the Crusader states to the Muslims. Yet, they did have a lasting economic effect. During the Crusades, Italy became the primary route for travel from Europe to the Near East and North Africa. As a result, Italian cities prospered, and Italian merchants replaced Byzantines and Muslims as the dominant traders in the Mediterranean. Italian port cities remained the commercial center of activity in the region—and the link between East and West—for years to come. And a growing number of Italian merchants, such as MARCO POLO, would travel from Europe to the Far East in the late 13th and 14th centuries. Italian commercial power and expanding worldview helped bring about the start of the period of history known as the RENAISSANCE. Italian control of trade routes helped set the stage for the EUROPEAN AGE OF EXPLORATION, starting in the 15th century, when other European nations began seeking Atlantic Ocean and Pacific Ocean routes to the Far East.



In the years after the Crusades to the Holy Land, other military expeditions against non-Christians were promoted as “Crusades,” such as in eastern Europe. Some of the Crusader military orders even participated. But the term, used historically—and certainly in the context of world exploration—generally refers to the expeditions mentioned above.

See also RELIGION AND EXPLORATION

Cumberland Gap

The Cumberland Gap is a pass through the Cumberland Mountains, a range of the APPALACHIAN MOUNTAINS, in

northeastern Tennessee near its juncture with Virginia and Kentucky. The walls flanking it are more than 500 feet high; its altitude is 1,640 feet; along some stretches it is only wide enough for a small road. Formed naturally, the Cumberland Gap is a wind gap—that is, a dry valley—one of the gaps that separate the Blue Ridge Mountains into smaller sections.

In 1750, Virginia-born THOMAS WALKER, a physician appointed chief agent of the Loyal Land Company, led a surveying party westward from Staunton, Virginia, and crossed the Blue Ridge into the Holston River Valley, then over Powell’s Mountain into Powell’s Valley. It was there he located the mountain pass that he named the Cumberland Gap after the Duke of Cumberland, a British general.

In 1769, DANIEL BOONE, sponsored by the Transylvania Company, who hoped to develop lands to the west, traveled through the Cumberland Gap with JOHN FINLEY and a number of other frontiersmen on a hunting expedition to Kentucky, which lasted until 1771. In 1773, Boone led a colonizing expedition into the pass but was turned back by Indians. In 1775, the Transylvania Company hired Boone to establish a road from Fort Chiswells in the Shenandoah Valley through the Cumberland Gap into Kentucky; Boone and a party of about 30 axmen cleared and marked the route. This became known as the Wilderness Road or Boone’s Trace. Most of the early immigrants to Tennessee and Kentucky journeyed over this road.

curragh (curach, currach, skin-boat)

The curragh (also *currach* or *curach*) is a type of boat constructed from oiled animal hides covering a light wooden frame. It is also called a skin-boat. Pointed at both ends, it resembles a large CANOE. Although normally propelled by oars, it can be rigged with a sail. The curragh, used especially in waters off Ireland, is thought to have evolved from the British CORACLE.

Used for ocean fishing to this day in Ireland, the curragh is a vessel more seaworthy than its appearance would indicate. The experienced sailor is able to handle rough seas in this vessel due to its maneuverability and stability, thus making transoceanic voyages possible, although perilous.

Curraghs were in common use in the fourth century A.D. They were larger than today’s versions and could carry 70 persons or more. It would have been in one of these curraghs that Irish monk SAINT BRENDAN and other monks traveled westward into the Atlantic Ocean in the sixth century A.D.

See also SHIPBUILDING AND EXPLORATION.

D



Davis Quadrant See QUADRANT.

dead reckoning

The navigation term *dead reckoning* refers to the act of determining the position of a watercraft or aircraft from the following data: a known starting point; records of the courses sailed or flown; distance made (which may or may not be estimated from velocity); and the drift (the velocity of the current, either known or estimated). By definition, dead reckoning does not include celestial observations. Yet the principles of dead reckoning are part of virtually every navigation system.

There is a mistaken belief that *dead* in the term *dead reckoning* derives from the word *deductive* rather than from *dead* having the meaning of “directly” or “exactly,” as in “dead ahead” or “dead center.” Yet it can be said that information “deduced” from dead reckoning often is combined with information determined from fixing a position through celestial navigation in order to more accurately ascertain the position of a craft. Celestial navigation names the process of using observed positions of heavenly bodies to determine the position of a craft. It is more useful with north-south latitudinal mapping because the elevation of the NORTH STAR is always equal to the observer’s latitude (given an average error of less than half a degree, or 35 miles); thus, a navigator may determine the craft’s north-south position by the apparent height of the North Star. Dead reckoning, however, requires precise calculations.

In order to navigate by dead reckoning, early mariners used a COMPASS to determine the ship’s direction. They then measured speed with a chip log—a wooden float attached to a long rope with knots in it. As the float entered the water, they overturned a sandglass, and they then counted the number of knots the rope pulled off a reel behind the ship during the time in which the sand passed from the top to the bottom of the glass. (The term *knot*, or one nautical mile per hour, originated with the chip log: if the first knot appeared as the sand ran out, speed was determined to be one nautical mile per hour, or one knot.) Time, distance, and direction were measured each time the ship tacked because of wind direction. A TRAVERSE BOARD was used to keep track of the zigzag course. Dead reckoning took other information into account, such as wave patterns and directions, floating debris, cloud formations, and birds.

Careful and consistent record keeping can result in an accuracy rate of 90 percent for dead reckoning. Although it is not considered especially useful over large distances, an Italian mariner of the late 15th century, CHRISTOPHER COLUMBUS, is believed to have used dead reckoning throughout his travels.

Dead reckoning contrasts not only with celestial navigation but also with pilotage (navigation by visible landmarks or by radar). Navigating by such modern pilotage methods as the SATELLITE-based Global Positioning System is highly precise, but dead reckoning navigation remains a useful low-technology fallback.

See also NAVIGATION AND EXPLORATION.

dhow (baggala, boom, sambuk)

Dhow is a traditional term, used by Europeans, referring to a ship of Arab design with a LATEEN RIG. In places where the dhow is still in use, it is called variously the *sambuk*, the *baggala*, and the *boom*, each distinguished by the shape of its hull.

The dhow is constructed with planking set edge to edge. In the past, the planks were held together with cordage; in modern practice, nails are used. The bow has a long overhang, and the poop is raised. Sails were originally made of palm or date leaves; cotton was later introduced. The lateen rig allowed the boats to point up close to the wind and move at a relatively fast pace. Dhows are typically single-masted, but larger versions might have three or more masts with sails shaped to maximize use of the wind.

The earliest dhows were used for local fishing, transportation, and trade. Records exist of their movement between the RED SEA and India as early as the first century B.C. As Arab trade grew in the Middle Ages, larger and larger dhows could be found from the Middle East to East Africa and China. According to accounts from the ninth century A.D., the dhow grew to a size capable of transporting 800 people. Modern versions of the dhow range from a small handful of crew and passengers to a maximum of about 200.

See also SHIPBUILDING AND EXPLORATION.



William Henry Jackson took this photograph of an Arab dhow in 1894. (Library of Congress, Prints and Photographs Division [LC-D4271-146])

dirigible See AIRSHIP.

disease and exploration

Disease has been a significant factor in the history of exploration; it has both impeded the efforts of explorers and been spread by them. Diseases suffered by explorers at sea or in the field slowed and sometimes halted their journeys. The meeting of hitherto isolated groups of humans engendered and intensified disease. And, in the case of the epidemic known as the Black Death, it created economic conditions that affected the course of exploration.

The Black Death

Expansion of human groups into new lands goes hand in hand with the expansion of diseases; explorers carry their diseases with them and suffer diseases in the lands they explore or conquer. One of the most devastating pandemics in European history probably resulted from this process of contacts between peoples of distant lands, that of the bacterial infection resulting in the bubonic plague or the Black Death, known at the time as the “Pestilence” or “Great Mortality.” The bubonic plague was carried by a number of mammals, especially rats, and passed to humans by fleas. It is thought to have originated in China and spread as a result of expansion by the Mongols in the 13th century (see MONGOL EXPLORATION), when trade routes were opened between East and West. The first known European outbreak occurred in southern Russia. Then, probably first in 1347, Italian merchant ships from the Black Sea carried it to the Mediterranean region. It spread widely throughout Europe until 1351, with recurrences well into the 18th century. The plague devastated Europe’s population; it is estimated that a quarter to a third perished. Cities were particularly hard hit because of the concentration of people. In Italy, for example, almost two-thirds of the population of Venice died, and three-quarters of that of Florence.

Ecclesiastics, whose vocation to go among the sick giving comfort and last rites, were at great risk of infection; university scholars were also decimated. For a time, living standards for the survivors rose considerably as they benefited from the economic wealth built up for a population that had been cut by a third. Laborers leaving the land, which was growing increasingly unproductive because of a long-term climate change called the Little Ice Age, moved to the cities where, because of work shortages, wages rose. Food prices fell, even with the crop losses, because of low population levels. Many laborers were thus able to accumulate some wealth and enter the middle class. With more capital available to invest in ships and trading ventures, the economic importance of trade increased, while at the same time the decrease in the value of much agricultural land diminished the wealth of the landed nobility. The laboring and

merchant classes to some extent began to fill the political vacuum once dominated by clerics and nobles.

Despite these gains, the recurrence of the plague for centuries caused continuing economic and social instability, and population levels did not begin to recover until the 18th century. The plague originally slowed down the development of foreign trade and exploration. However, the new opportunities that had opened up in an economic, social, and political fabric, which had existed for centuries, resulted, by the 15th century, in an energized European society. Ironically, this energy helped lead to European expansion, which was to cause the spread of European diseases to the Americas.

European Diseases in the Americas

Native Americans of every region suffered decimating outbreaks of European diseases. Loss of life ranged from 25 to 50 percent and caused the near extinction of some peoples. They suffered far more even from diseases such as measles, which in Europe were seldom fatal. It has been theorized that the difference was caused by the greater number of domesticated animals, the progenitors of many diseases in humans, in Eurasia than in the Americas, in combination with continental isolation and lack of the necessary antibodies to fight off infection.

Smallpox was the most destructive of the European diseases. It aided HERNÁN CORTÉS in his conquest of the Aztec Indians in present-day Mexico in the 1520s. When FRANCISCO PIZARRO arrived in the Inca city of Tumbes in present-day Ecuador in 1530, only 11 years after Cortés had arrived in Mexico, he saw that smallpox had been there before him. It had killed Emperor Huayna Capac along with his heir apparent, leading to a bitter civil war between adherents of two of his sons for possession of the empire. It was this conflict, decimating the population and crippling the Inca armies, along with smallpox, that primarily enabled Pizarro to conquer the Inca with an army of 180 men. The Mandan of the upper MISSOURI RIVER in North America are said to have declined from 1,600 to 131 during the smallpox epidemic of 1837. Smallpox ravaged neighboring people in repeated outbreaks; from 1837 to 1870, at least four different epidemics struck other Plains Indians of North America.

Other diseases of Europe, such as dysentery, measles, scarlet fever, typhoid, typhus, influenza, tuberculosis, cholera, diphtheria, chicken pox, and venereal infections, swept through the Americas with incredible speed, far in the vanguard of Europeans themselves. It is possible that the great Temple Mound Culture of the Mississippi Valley and Southeast died out as a result of a pandemic that started with the contact of a few Indians with the earliest European explorers of the late 15th or early 16th century. Settlers in New England, as they moved through the forests prospecting for land, often found signs of wholesale depopulation in nu-

merous deserted villages and ceremonial sites, prepared fields, and even stored food.

European Diseases in Other Lands

The pattern of indigenous peoples succumbing to European illnesses continued with the exploration and colonization of Australia and NEW ZEALAND. Illnesses such as smallpox, venereal disease, measles, and influenza—some of which were not life-threatening to the British—devastated the Aborigines in Australia. The Maori population of New Zealand declined rapidly, from about 120,000 in 1769 to 42,000 in 1896, as a result of European diseases, such as influenza, measles, and whooping cough.

From America Back to Europe

Contacts among Europeans and Native Americans led to new forms of disease being carried back to Europe, in particular syphilis. Based on evidence from skeletons, it had been known in Europe from prehistory. Yet it appeared in a far more virulent form immediately after the European discovery of the Americas. An outbreak occurred in Barcelona in 1493 soon after the celebrations of Columbus's return and quickly became an epidemic throughout Europe, differing from the hitherto common form of syphilis in rapidly causing mortality. The most probable theory for this occurrence is that it resulted from sexual relations between Native Americans and the European explorers. Perhaps the syphilis bacterium assumed a new form as a result of its success among the native peoples with their lack of resistance.

Cholera was a severe infectious disease endemic in India and some other tropical countries. Characterized in severe cases by violent diarrhea, vomiting, thirst, muscle cramps, and sometimes circulatory collapse leading to death, cholera caused severe epidemics in Europe in the late 18th century as a result of British colonization of India, and later in the Americas. The horror of cholera lay in the speed with which death often followed its first onset, sometimes within hours.

Diseases among Explorers

SCURVY was a scourge of explorers for centuries and is a recurring theme in the saga of world exploration. This deficiency disease results from the failure to supply the body with the required amount of vitamin C. A weakening of the capillaries results in hemorrhaging, leading to a multitude of symptoms and eventually death. Scurvy is thought to have caused more loss of life during the EUROPEAN AGE OF EXPLORATION than shipwrecks. It took its toll on numerous crews on open-sea voyages. Even after it came to be understood in the 18th century, it caused death on expeditions when food supplies ran low.

Malaria, a debilitating infectious disease caused by single-celled parasites, characterized by chills, shaking, and

periodic bouts of intense fever, which had been known in Europe from Roman times, reached the Americas soon after the first European explorers arrived. It affected native peoples and colonists alike, such as the first settlers of Jamestown in Virginia. Spanish Jesuits in South America discovered a treatment for malaria in cinchona bark, the ingredient of quinine, which they brought back to Europe in 1638. Nevertheless, it continued to be a problem for centuries. Englishman SIR GEORGE EVEREST, for example, who, in the early 19th century, laid the groundwork for topographic mapping of northern India and the HIMALAYAS (and for whom Mount Everest [see EVEREST, MOUNT] is named), was hampered in his work by malaria. Englishmen SIR RICHARD FRANCIS BURTON and JOHN HANNING SPEKE had bouts of malaria and other ailments in Africa in the 1850s. Scottish missionary DAVID LIVINGSTONE died in Africa in 1873 from dysentery, an acute or chronic disease of the large intestine of humans, characterized by severe diarrhea and abdominal cramps.

Dysentery was common on ships, especially slavers, where unsanitary conditions prevailed. Many Africans transported to the Americas for the SLAVE TRADE died in transit, chiefly because of dysentery. It has been theorized that a large proportion of Africans who survived their horrific journey had a genetic condition called “salt-sensitivity,” perhaps the result of ancestors who survived droughts in Africa, which made them able to withstand the loss of salts accompanying the diarrhea of dysentery. Two-thirds of the English population of Jamestown was wiped out by dysentery. SIR FRANCIS DRAKE and SIR JOHN HAWKINS, 16th-century English maritime explorers, suffered from dysentery and also malaria. JOHANN LUDWIG BURCKHARDT, a 19th-century Swiss explorer in the Middle East, died in Cairo of dysentery.

Yellow fever, a noncontagious, infectious disease caused by a virus, and characterized in severe cases by high fever and jaundice, originated in Africa and came to the Americas and Europe via the slave trade. It delayed the exploration and colonization of Africa by Europeans until the latter part of the 19th century, when it was realized that it spread by mosquito bites; thereafter improved methods of sanitation, including draining of swamps and quarantine of ships, helped to bring it under control.



In global terms, the increasing contact between population groups resulted in a more uniform level of contact and exchange of diseases and immunity. Moreover, knowledge and treatment of the diseases that attacked explorers in the field, both infectious and dietary, grew with time. Great plagues like the Black Death became less common by the end of the 18th century, although pandemic diseases still have the ability to decimate populations.

diving bell

A diving bell is a device used to supply air to and convey a diver or group of divers to a desired location. The evolution of this device charts humankind's problems of exploring the ocean's depths, namely regarding air supply and water pressure. The technical challenges of these factors and how slowly they were solved demonstrates humankind's coming to terms with the physical world.

Mention of such a device is found in Greek philosopher Aristotle's *Problematum* from about 360 B.C. In this work, he describes a “kettle,” which is lowered into the sea to supply air to sponge divers. The detail he furnishes makes clear that the device was a workable model of the diving bell. The only other indication of such a contraption in ancient history comes from ALEXANDER THE GREAT's attack on Tyre in 322 B.C., as reported in medieval texts about his campaigns. The Phoenicians had placed obstacles in the water to defend the port city in the eastern MEDITERRANEAN SEA. Alexander ordered them removed so the campaign could commence. To observe the progress of the work, he was reportedly lowered into the sea in some sort of device. From an Arab historian in the seventh century A.D., there exists a detailed description of this device as a wooden box sealed with wax, having glass windows, and weighted with stone. It was tied to a cable and attached to a pole placed between two ships, then lowered and raised according to a message given by a signal rope controlled by the occupants of the box. A 13th-century illustration depicts the same incident with Alexander using a giant glass jar. The actual truth of the matter will never be known of course, but these varied conceptions of the diving bell give some sense of the longstanding interest in the device.

The next record of a diving bell-like invention is from 1531. Italian physicist Guglielmo de Lorena constructed a large barrel that could be used to walk along the bottom of a body of water. It was assisted by people with ropes on the surface and could provide enough air to maintain the diver underwater for about an hour. The motivation for this invention was the exploration of Lake Nemi, which was thought to have the remains of ships and treasure belonging to Roman emperor Caligula. A diver using Lorena's creation was successful in locating these ships where others had failed. A short time later, a larger diving bell was produced by a pair of Greek inventors. In 1538, they demonstrated it to Charles I of Spain (Holy Roman Emperor Charles V) and a large crowd of spectators in Toledo. Their bell carried both inventors to the bottom of the river and back with a burning candle remaining lit.

The sensation caused by the demonstration in Toledo gave rise to interest in such devices throughout Europe. A number of people made versions, and their use in salvaging treasure became more widespread. In 1616, a German named Franz Kessler tested a model that was unencumbered

by ropes. He sunk to the bottom with weights and resurfaced by detaching them. Yet the task proved too cumbersome for his design to gain widespread use.

A breakthrough in the design of the diving bell was made by French physicist Denis Papin in 1689. He thought to supply his apparatus with fresh air from the surface pumped through a tube. The diver would not be limited by the quantity of air in the bell or the compression of air that took place as the bell descended. At a depth of 33 feet, the weight of water is twice that of the weight of atmospheric pressure. Since gas is compressible, this causes the air inside the bell to be reduced by half in volume. This holds true for each additional 33 feet of descent. As a result, in practical operation, the volume of air a diver has access to becomes significantly reduced. The theory of Dr. Papin's device was sound, but he was limited by the power of the pumps of the day, which were unable to generate a pressure of more than three atmospheres, and his diving bell did not break records for depth beyond 70 feet. Still, his contribution was important.

Edmund Halley, an English astronomer and mathematician and a contemporary of Papin, was responsible for another advance in the diving bell. He used lead casks filled with air and regulated by the diver with a valve. This solution to the problem of air supply proved practical and was in use until 1788, when stronger pumps were invented, thus reviving the ideas of Papin.

John Smeaton, an English engineer who invented a pump powerful enough to supply a Papin-type bell, is also responsible for the last great chapter in the history of the diving bell. His device, known as a caisson, was considerably larger than anything that had come before. Designed for underwater construction and capable of holding 12 men, the caisson ushered in a new era in underwater exploration, salvage, and construction. It also revealed new problems caused by working at great depths. Divers using the caissons would be subject to a mysterious cause of death, which was only later diagnosed as the bends, a painful release of nitrogen gas into the bloodstream. This problem was initially solved by slowing the time of ascent to the surface.

The diving bell had limited use in direct exploration. The scientific discoveries to which it contributed were tangential to its practical uses, such as salvaging operations, due to the capital-intensive nature of its operation. With a boat, its crew, and experienced divers required, it was expensive to use. It could also be dangerous. Because of invisible currents and numerous underwater entanglements, there were still many ways for divers to lose their lives.

Diving bell technology, with an attached supply of air, led to that of the SUBMERSIBLE, such as the BATHYSPHERE, BATHYSCAPH, and the SUBMARINE, which maintain surface air pressure inside while descending deep into the ocean, allowing for extensive exploration. Remotely operated vehicles (ROVs) are now also utilized. Yet diving bells, of improved

design and material and with better lighting, heating, and communication systems than earlier models, are still in use, especially in construction, such as on submerged portions of bridges, piers, and jetties, and in transporting divers to underwater work stations. As the diving bell has evolved so has the DIVING SUIT.

See also OCEANOGRAPHY AND EXPLORATION.

diving suit

A diving suit, equipment for underwater diving, is a water-proof outfit, including a helmet and breathing apparatus allowing air to be supplied from the surface pumped through a tube. Early references to diving are found in writings of the ancient Greeks and Romans. In the *Iliad*, the epic poem probably of the eighth century B.C. and attributed to the Greek poet Homer, divers are described as playing a part in the Trojan Wars. Ancient divers used stones as weight and ropes as guides. The invention of the diving suit and other diving gear enabled divers to spend more time underwater for a variety of tasks: gathering sponges, coral, and pearls; examining and repairing the underwater parts of ships; working on underwater supports for structures such as bridges and docks; salvaging sunken ships and their contents; military operations, in particular reconnaissance and sabotage; and scientific studies.

The development of the diving suit paralleled that of the DIVING BELL, as inventors sought means to supply air below the surface. Various attempts were made at watertight suits in the 17th century with piped air. In 1819, German inventor Augustus Siebe developed the first efficient diving suit, consisting of a copper helmet attached to a watertight canvas and leather jacket with weights attached around the chest. A surface pump pushed air to the diver through hoses attached to the helmet. The pressure of the pumped air kept the water level below the diver's chin, and the air could escape through vents at the bottom of the jacket. The fact that a diver had to remain vertical to prevent water from entering the vents led to refinements—a full closed suit with valves that let air exit without letting water enter. The suit proved more practical than the diving bell in that divers could walk along the bottom and could look in all directions rather than just through fixed windows.

Siebe's basic design for helmet diving suits has endured to this day. Improvements include the use of rubber for the suit. Leaded boots keep the diver on the bottom and leaded weights around the chest help to maintain equilibrium. Additional valves help regulate buoyancy. The attached lifeline to the surface in addition to the air pipe also includes a line of communication. Armored steel suits are also used for deeper dives along with a special mixture of gases added to oxygen to help prevent decompression sickness on surfacing.



A deep-sea sponge diver climbs back into a boat in his diving suit, as shown in this 1940s photograph. (Library of Congress, Prints and Photographs Division [LC-USW3-043126-C])

Helmet diving, despite modern improvements, restricts lateral movement because of the necessary connection to the surface, and inventors sought an alternative, leading to the development of the scuba (for “self-contained underwater breathing apparatus”), in which the diver carried an air supply. In 1865, French inventors Benoît Rouquayrol and Auguste Denayrouze developed a combined system. In addition to surface-supported hoses, it included cylinders worn by the diver containing compressed air. Yet a helmet and suit were still required, and the cylinders functioned poorly. Modern scuba diving began with the invention of the Aqua-Lung (or aqualung) by Frenchmen JACQUES-YVES COUSTEAU and Émil Gagnon, first successfully used in 1943, consisting of a cylinder of compressed air connected through a pressure-regulating valve to a face mask. Scuba divers, although they have reached depths of about 300 feet, usually do not descend below 130 feet because of the effects of nitrogen narcosis (popularly known as “raptures of the deep”), caused by the narcotic effects of nitrogen in the air at high pressure. The condition is marked by a loss of judg-

ment that often causes the diver to discard equipment or engage in other dangerously foolish behavior. Helmet divers can avoid nitrogen narcosis until a depth of about 200 feet.

Scuba diving, which replaced helmet diving in many practical applications much as the SUBMERSIBLE replaced the diving bell, also has become a recreational activity. A recent invention granting even greater freedom to the scuba diver is the rebreather, a device that recycles air exhaled by the diver. Moreover, the rebreather does not emit noisy bubbles the way open-circuit scuba does, enabling a greater interaction with marine life.

See also OCEANOGRAPHY AND EXPLORATION.

doldrums

The term *doldrums* refers to ocean regions slightly north of the EQUATOR where there is no regular system of cross-oceanic winds. These regions are also known as the “equatorial belt of calms.” Because of the relative intensity of the sunlight in the doldrums, a continuous updraft of air is created. Evaporation occurs simultaneously, and the air is especially humid, leading to squalls. Since the doldrums are an area of low pressure, weather systems from the Northern Hemisphere and Southern Hemisphere are able to converge, and hurricanes form with regularity.

For centuries, fear of the doldrums gripped the crews of sailing ships that might drift for days, weeks, and even months. Among the earliest observations of the phenomenon of the doldrums came from Portuguese expeditions along the west coast of Africa, such as those sponsored by HENRY THE NAVIGATOR, prince of Portugal, in the 15th century. His expeditions experienced the doldrums at about the latitude of Cape Verde.

One example of a voyage affected by the doldrums was the first CIRCUMNAVIGATION OF THE WORLD headed by Portuguese FERDINAND MAGELLAN, exploring for Spain, in 1519–22. While crossing the Atlantic Ocean westward, the expedition’s progress was slowed significantly. On the second leg of the voyage in the Pacific Ocean, his ships drifted for 96 days.

drift ice (drifting ice)

The term *drift ice*, or *drifting ice*, refers to any floating and moving ice in a body of water. It is generally used, however, as distinct from an extensive, fixed ice field, or to the annually created PACK ICE, which also drifts but at much slower rates.

Different names are applied to different kinds of drift ice. Relatively small fragments of ice, less than seven feet in diameter, typically found near pack ice, are known as *brash ice*, or *brash*. The term *growler* is applied to larger pieces of ice floating low in the water that make a growling noise

when waves wash over them. *Bergy bits* refers to pieces of ice between seven and 16 feet in diameter. *Pan* refers to a fragment of the uniformly chunk of flat ice at the surface of water. *Ice floe*, or *floe*, refers to a relatively flat and low expanse of ice detached from an ice field. *Iceberg*, or *berg*, refers to a larger mass, tabular, rounded, or irregular in shape, which has calved, or broken off, from an ice shelf (a huge slab of permanent ice that floats on water near the edges of Arctic and Antarctic landmasses) or from the face of a glacier (a formation of ice on land where snowfall exceeds melting and the resulting mass moves downward from above the snowline under the force of gravity and pressure). Thousands of icebergs are calved each year. They can be huge; the largest one on record, sighted in the Ross Sea off Antarctica in 1956, was 208 miles long and 60 miles wide. Only a small percentage of these various kinds of drift ice are underwater, about one-fifth.

Drift ice occurs in the relatively short summer thaws in Arctic and Antarctic waters. When the water freezes over

again in wintertime, drift ice from the previous season or seasons becomes trapped in it, giving the pack ice irregular shapes. Some drift ice travels great distances before melting. Icebergs last on average about four years. Arctic icebergs, many of them from GREENLAND, have been sighted as far south as 30 degrees latitude north; Antarctic icebergs have been sighted as far north as 27 degrees latitude south.

Because of the range of icebergs, they have proven a hazard to navigators over the centuries. Between 1870 and 1890, for instance, more than 50 ships collided with icebergs, 14 of them sinking. After the sinking of the British ocean liner *Titanic* in 1912 due to a collision with an iceberg, an International Ice Patrol, consisting of ships and aircraft from a number of countries, have monitored northern waters. Yet drift ice, like pack ice, can offer refuge to stranded explorers. For instance, during the British expedition to Antarctica in 1914–17 led by SIR ERNEST HENRY SHACKLETON, his men survived part of the time on ice floes after their ship was crushed in the pack ice. And, starting in



This photograph of drift ice at the edge of the Ross Ice Shelf in the Antarctic was taken during Richard E. Byrd's 1947 expedition. (Library of Congress, Prints and Photographs Division [LC-USZ62-101004])

the 20th century, scientific stations have been located temporarily on ice floes and icebergs.

drift voyage

The term *drift voyage* refers to a transoceanic journey between continents by primitive boat or RAFT, propelled by OCEAN CURRENTS. With the extensive sea travel carried out over the centuries along coastlines for fishing and trading—plus the westward current in the South Atlantic Ocean, the westward current north of the EQUATOR in the Pacific Ocean, and the eastward current in the North Pacific—it is theorized that some unintentional drift voyages occurred, or perhaps even intentional ones. Norwegian anthropologist THOR HEYERDAHL, in his *Kon-Tiki* voyage across the Pacific from Peru to the Tuamotu Islands in 1947, and his *Ra* voyage across the Atlantic from Morocco to Barbados in 1970, demonstrated that small wooden or reed crafts could make such ocean crossings.

Scholars have used cultural similarities of artifacts on different continents to make the case for prehistoric drift voyages—from Europe, Africa, and Asia to the Americas. Yet there is no conclusive archaeological evidence of such early transoceanic contacts. Some ancient transoceanic voyages, such as the legendary sixth-century voyage of SAINT BRENDAN and the archaeologically proven 11th-century journeys of the Vikings (see VIKING EXPLORATION), are not considered drift voyages because the mariners controlled their courses.

The term *drift voyage* has also been applied to the motion of ships in the Arctic and Antarctic while trapped in PACK ICE.

Dutch East India Company

The Dutch East India Company, one of the various European East India Companies, chartered in 1602, was the premier joint-stock trading company of the Netherlands during the 17th and 18th centuries. The company routed the Portuguese from their possessions in the SPICE ISLANDS (the Moluccas) and, with monopoly protection from the Dutch government, made enormous profits in the SPICE TRADE and other commerce. In search of even greater riches, the company sponsored explorations throughout the Pacific Ocean.

What is now the Netherlands had been inherited by Charles I, who became king of Spain in 1516 and Holy Roman Emperor in 1519. Over the years, the Dutch had gained more autonomy from Spain, and Charles's son King Phillip II had continued to try to assert control over the region. Holland, which had been a territory of Spain, declared its independence in 1581. In 1588, the Spanish Armada was defeated by the English. The Dutch, who had

a tradition of seamanship, worked hard to build a fleet of ships to strengthen their position of independence. The greatest navies soon belonged to the British and the Dutch. The Dutch East India Company was formed in 1602 to reap profits from the Indian Ocean and Pacific trade. It was also allowed to engage the Spanish and Portuguese on the high seas and at their trading posts. In 1594, Phillip had closed the Portuguese port of Lisbon, part of his domain, to Dutch merchant vessels. This had acted as an incentive to the Dutch to develop other markets. They had sent a trading mission to the EAST INDIES the following year under CORNELIUS HOUTMAN. Houtman had succeeded in forming relations at Bantam, Bali, and Sumatra.

Competing Nations

The East Indian trade became very competitive very quickly, and with various European companies bringing about a lowering of prices, the various Dutch interests decided to merge. In 1602, the General United East India Company was granted a charter by the government of the Netherlands, which gave broad powers, including the exclusive right to trade between the CAPE OF GOOD HOPE and the Strait of Magellan (see MAGELLAN, STRAIT OF), the right to make war on other European countries, to form alliances with the princes of the east, and to perform various administrative and judicial functions. The government reserved the right to revoke privileges if necessary and to share in the profits.

The Dutch were aided in their trading endeavors by extensive experience as merchants and bankers, and they had become accomplished shipbuilders and mariners. They also had goods that could be exchanged for the spices and textiles of the East. These goods included high-ticket items such as porcelain, velvets, and marble work, along with more mundane items such as soaps, oils, and cured herring. Convoys were sent from the Netherlands three times a year, accompanied by heavily armed naval ships.

The ascendancy of the Dutch in the Spice Islands, and in Malaysia, Sumatra, and Java to the west, did not come without military action. The Portuguese had spread themselves thin militarily in the East Indies. In 1615, the Dutch drove the Portuguese from Amboina. In 1619, Jan Pieterszoon Coen conquered Jacatra and founded the city of Batavia in Java (present-day Jakarta, Indonesia) as the headquarters of the company. From Batavia, the Dutch East India Company conducted business throughout the East Indies to parts of China, Japan, India, and Iran in Asia, as well as the Cape of Good Hope in Africa, where they founded the first European settlement in South Africa. In the 1650s–1660s, the Dutch captured Malacca, CEYLON (present-day Sri Lanka), and Celebes. (In the meantime, in 1648, the Dutch had achieved independence from

Spain, as the United Provinces.) The English and the BRITISH EAST INDIA COMPANY also were making inroads in the region. It was eventually resolved that the Dutch would control the Spice Islands, and the English would dominate India. Despite the expenses of waging war, the Dutch East India Company's stock rose to six times its original capitalization and paid annual dividends of between 12 and 75 percent.

Exploratory Expeditions

The Dutch East India Company had launched exploratory expeditions from its inception. In 1605, WILLEM JANSZ, sailing for the company, had made the first recorded sighting of Australia by a European. Having become established in the East Indies, the company launched a number of expeditions to locate the GREAT SOUTHERN CONTINENT, the fabled Terra Australis. In 1642, ABEL JANSZON TASMAN sailed from Batavia to the South Pacific and made the European discovery of an island south of Australia, naming it Van Diemen's Land, after the governor general of the Dutch East Indies (it has since been renamed TASMANIA). Later that year, Tasman made the European discovery of NEW ZEALAND, Fiji, and other islands. Another important explorer in the employ of the Dutch East India Company was JAKOB ROGGEVEEN, who made the European discovery of Easter Island in 1722.

18th Century

In the 18th century, Dutch strength in the East Indies began to decline. The English had solidified their position in world trade by putting more efforts into colonization. The French and the FRENCH EAST INDIA COMPANY had also developed trade in the region. Rampant corruption overtook the Dutch East India Company, and, by 1724, it was unable to pay dividends to investors and survived by taxing the native population. The British successfully attacked Dutch possessions in the Far East in 1780. As of 1795, the French were in control of the United Provinces—known as the Batavian Republic (until 1806 when the Kingdom of Holland was established)—and dissolved the Dutch East India Company in 1798.

See also COMMERCE AND EXPLORATION.

Dutch West India Company (West India Company)

The Dutch West India Company, or the West India Company, a joint-stock trading and colonizing company, was chartered by the States-General of the Dutch republic in 1621 to develop new commercial interests in the Americas and Africa. It began its commercial activity two years later. The DUTCH EAST INDIA COMPANY had been active in Asia since 1602.

By the terms of the charter, the company regulated all Dutch trade along the African coast from the TROPIC OF CANCER to the CAPE OF GOOD HOPE and along the American coast from Newfoundland to the Strait of Magellan (see MAGELLAN, STRAIT OF). Within these regions, the company had administrative and judicial independence, but it needed approval from the States-General for declarations of war.

North America

In North America, following the explorations of the Englishman HENRY HUDSON in New York Bay and the Hudson River, Dutch fur traders (*swanneken*) had begun to trade for fur with Native Americans of the region. The United New Netherland Company held a charter to develop the region in 1614–17, then lost it, leading to a period of activity by independent traders from 1617 to 1624. The next years, the Dutch West India Company occupied Fort Orange on the site of Albany, Fort Nassau on the Delaware River, Fort Good Hope on the site of Hartford on the Connecticut River, and Fort Amsterdam on the southern tip of Manhattan Island. The region taking in all of Manhattan Island became known as New Amsterdam.

During the early years of Dutch colonization, traders negotiated with Native Americans for small tracts of land to build isolated trading posts and village sites. Starting in the 1630s, with the depletion of fur resources in coastal areas and the threat of British expansion out of New England, the Dutch embarked on a course of agricultural colonization requiring more lands. The patroon system was devised to expedite development. Like seigneurs in New France and proprietors in the British colonies, patroons were colonial landlords who collected rent from tenant farmers. In return for purchasing available tracts of land from American Indians and settling at least 50 Europeans on each, patroons received deeded title from the Dutch West India Company. During this period, the company lost its trade monopoly. Independent traders, whose activity on the frontier was more difficult to regulate, began taking greater advantage of native peoples, leading to violence, with repeated outbreaks until England wrested control of New Netherland from the Dutch in 1664.

South America

The Dutch West India Company, in competition with Spanish and Portuguese interests, hoped to develop regions of northern and eastern South America. In 1623, the company established a presence in east Brazil—in Bahia and Pernambuco—but, by 1661, had been driven out from the last of its posts. It also was active in Suriname (also called Surinam, Dutch Guiana, Netherlands Guiana) starting in the 1620s, and in the Netherlands Antilles, part of the WEST INDIES, starting in the 1630s. The Dutch maintained colonies in this part of the world for centuries.

Reorganization

With lands lost and profits dwindling, the Dutch West India Company was reorganized in 1674 under a new charter. Much of its subsequent activity was in the African SLAVE TRADE. The charter expired in 1791, and, largely because

of warfare with France, it was not renewed. Another West India Company, organized in 1828, lost investors money and never had an impact on world trade.

See also COMMERCE AND EXPLORATION.

E



East India Company See BRITISH EAST INDIA COMPANY; DUTCH EAST INDIA COMPANY; FRENCH EAST INDIA COMPANY.

East Indies

The term *East Indies* has changed in meaning over the centuries. During the EUROPEAN AGE OF EXPLORATION, starting in the 15th century, the phrase had its broadest meaning, referring to the lands from coastal India, CEYLON (Sri Lanka), the Malay Peninsula, and other coastal regions of Southeast Asia, plus all the islands in the region as far east as New Guinea and as far north as the Philippines. It later came to be used specifically for the islands of the Malay Archipelago, the largest island group in the world at 1.1 million square miles—that is, the Sunda Islands, which include Sumatra, Java, Sulawesi (Celebes), Borneo, Bali, and Timor; the Moluccas (once known as the SPICE ISLANDS); New Guinea; the Philippine Islands (including Mindanao and Luzon); plus thousands of smaller islands. The term *Indonesia* has also been used historically as synonymous with *East Indies*. Nowadays, the term *East Indies* is most often used to mean specifically the islands of the nation known as the Republic of Indonesia. Geographically speaking, the East Indies form a natural barrier between the Indian Ocean and the Pacific Ocean. Most of the larger islands have central volcanic mountains with surrounding coastal plains. The climate is tropical.

As home to the Harrapa civilization along the INDUS RIVER, India gave rise to one of the earliest organized societies on Earth, starting in about 2500 B.C. The islands to the southeast were settled many millennia before then. As the source of spices and other unique goods, the region was a draw for merchants from China and Arabia long before the Christian era. In about the first century A.D., the movement of Hindu and Buddhist monks from India into the East Indies had a profound cultural impact on the region. The Chinese developed commerce in the region, especially in the early 15th century. The Arab Muslims, who had always traded there, made their most successful efforts at religious conversion in the 15th century, with the result that the majority of Indonesians are Muslim. The peoples who live in Indonesia are of two basic groups—the Malayan and the Papuan. There are many subgroups and people of mixed ancestry.

Of the historical journeys to the East Indies from other places, one of the earliest is that of Italian MARCO POLO, who visited the islands of Indonesia in the course of his 1275–92 adventure. Chinese CHENG HO traveled among the islands during his “Seven Voyages” and mapped coastlines from China to the Red Sea and Africa between 1405 and 1433. Portuguese VASCO DA GAMA made the first contact with the East Indies from Europe by sea when he arrived in the Indian port of Calicut in 1498. In subsequent years, ships of numerous other European nations—the Netherlands, England, Spain, and France—developed commerce

with the peoples of the East Indies, especially the SPICE TRADE. Trading companies—such as the DUTCH EAST INDIA COMPANY, BRITISH EAST INDIA COMPANY, and FRENCH EAST INDIA COMPANY—became economically and politically important in the region. The Moluccas, central to trade, even became known as the Spice Islands. The islands of the East Indies also served as a convenient stopover point for European ships sailing on a CIRCUMNAVIGATION OF THE WORLD.

See also SPICE ROUTE; SPICE TRADE.

Egyptian exploration (ancient Egyptian exploration)

Ancient Egypt was a civilization that flourished along the valley and delta of the NILE RIVER in northeastern Africa for more than three millennia, from before 3300 B.C. until 30 B.C. Many of the themes associated with ancient Egyptians are familiar: the great pyramids and their burial chambers; sphinxes and other statues combining human and animal forms; large temple complexes; and hieroglyphics. Their place in the history of exploration is not so widely known, however.

Egyptian history is divided into periods for purposes of study. In prehistoric times, the people who became the ancient Egyptians migrated from western Asia to the Nile and settled among indigenous Africans. By about 3500 B.C., in predynastic Egypt, two kingdoms competed with each other, referred to as Lower Egypt of the Nile's northern delta area, and Upper Egypt to the south. Their unification in about 3000 B.C. led to a succession of 30 dynasties of native pharaohs (or monarchs) and an expanding empire.

For purposes of study, the dynasties are grouped into the Old Kingdom (or Old Empire), the First Intermediate Period, the Middle Kingdom (or Middle Empire), the Second Intermediate Period, the New Kingdom (or New Empire), the Third Intermediate Period, and the Late Period. In the Second Intermediate Period, the Hyksos, a Semitic people from Syria, ruled Egypt; and, in the last two stages, after a long-term war with the Hittites of Asia Minor, which weakened the Egyptian Empire despite a treaty in about 1290 B.C., other peoples held power for a time—the Libyans, Nubians, Assyrians, and Persians—but native leaders did manage to come to power once again. The conquest of the region by Macedonian ALEXANDER THE GREAT in 332 B.C. led to a hellenized culture in Egypt (that is, a culture influenced by the Greeks). A succession of Greek rulers known as the Ptolemies—Ptolemy I to Ptolemy XIV—ruled through 30 B.C., when the Romans annexed the region.

In the course of their history, the Egyptians developed their maritime skills on the Nile River and eventually ventured into the MEDITERRANEAN SEA and the RED SEA as well, although their GALLEY ships were not as seaworthy as those of other ancient exploring peoples in the region, and

they did not apparently venture as far west as did the Minoans and Phoenicians. The Egyptians sought raw materials and products from ancient kingdoms to the east into Asia and to the south and west into Africa, such as lumber, precious metals, and spices, as well as slaves and exotic animals. They also engaged in conquest and, under Thutmose III during the 18th dynasty (during the New Kingdom) in the mid-15th century B.C., controlled territory eastward into Asia as far as the Euphrates River, including some Phoenician cities and all of what is now Syria.

The earliest recorded sea voyage (although there had no doubt been countless beforehand) involves the Egyptians of the Old Kingdom. In about 2780 B.C., according to their picture writing known as hieroglyphics, Snefru, the first pharaoh of the fourth dynasty (during the Old Kingdom), sent a trading expedition—probably across the eastern Mediterranean to the Phoenician city of Byblos near present-day Beirut, Lebanon—to trade for cedar logs. Moreover, the earliest actual explorer on record was an Egyptian, HANNU, who in about 2450 B.C., during the fifth dynasty (during the Old Kingdom), journeyed southward for the pharaoh Sahure via the Nile to the land of PUNT—the exact location of which is unknown—for precious metals and spices. Another early explorer was HERKUF, an Egyptian governor of a southern province, who, in about 2270 B.C., during the sixth dynasty (of the Old Kingdom), led a trading expedition for the pharaoh Menera from the upper Nile River southward to the interior of central East Africa. In about 1492 B.C., during the 18th dynasty (during the New Kingdom), Egyptian queen HATSHEPSUT (Thutmose III's stepmother), who had assumed the power of pharaoh after the death of her husband, sent a trading expedition under her lieutenant Nehsi down the Red Sea to what is again identified as the land of Punt. And, in about 600–597 B.C., during the 26th dynasty (during the Late Period), the pharaoh NECHO II commissioned a Phoenician maritime expedition into the Red Sea and Indian Ocean, which perhaps circumnavigated Africa.

During the reign of the Ptolemies, there were other expeditions as well that helped unite the ancient world. In 120–115 B.C., EUDOXUS, a Greek navigator in service to Egypt, made two trips across the Arabian Sea to India. On the second journey, he made a landing on the coast of East Africa. Eudoxus also attempted a circumnavigation of Africa. And, in A.D. 45, HIPHALUS, another Greek in service in Egypt, located a more direct route from across the Arabian Sea out of sight of land to India.

See also GREEK EXPLORATION; MINOAN EXPLORATION; PHOENICIAN EXPLORATION; ROMAN EXPLORATION.

El Dorado

El Dorado means “the gilded man” in Spanish and refers to a legendary place of great wealth in South America. The

term *El Dorado* is credited to Spaniard SEBASTIÁN DE BENALCÁZAR, who, in 1535, reportedly heard tales of the land from a captured Native American of present-day Colombia. The idea of the land predated de Benalcázar's information by several years, however. Germans, who had settled the coastal region that is now Venezuela, had also heard from the inhabitants of lands or cities of treasure.

The earlier explorations of Spaniard ALEJO GARCÍA were driven by the stories of a "White King," who possessed a large quantity of silver. Traveling through the mountains of Colombia to the site of present-day Bogotá, with a contingent of Indian conscripts sometime between 1522 and 1526, he managed to secure a small quantity of silver—from an unknown people—spurring on Italian SEBASTIAN CABOT in his 1526–30 explorations of the Río de la Plata and its drainage for England, as did a similar legend of a city in the south known as LOS CÉSARES. Spaniard DIEGO DE ORDAZ, who explored the ORINOCO RIVER, heard stories of a people, the "Guiana," who lived in a fabulously wealthy land, supposedly with a capital city called Manoa, paved with gold and which glittered with jewels.

The riches of the Inca Indians, which probably formed the basis of these stories, would elude the Spanish for seven more years. The origin of the El Dorado myth is thought to have come from an annual ceremony of the Chibcha Indians—living on the upper Magdalena River near present-day Bogotá—who reportedly applied their king with a resin, then sprinkled him with gold dust. He floated out on a lake, where the gold was washed off while people threw offerings of emeralds and other precious items around him. As this story became embellished and fictionalized, people claimed this ceremony took place weekly, and then daily. In actuality the practice had died out long before Europeans arrived in the area.

In the North

An early official search for El Dorado was conducted by AMBROSIUS ALFINGER in 1531–33. The German head of a colonizing expedition to Venezuela for Charles I, king of Spain (Holy Roman Emperor Charles V), he explored the lowlands surrounding the Magdalena River in northern Colombia. He died in 1533, but the search was taken up by his fellow countrymen. GEORG HOHERMUTH VON SPEYER traveled through the same area and farther southward to the plains of Colombia and Venezuela in 1535–38. The German with the most extensive journeys in the area, from 1530 to 1539, was NIKOLAUS FEDERMANN. Spanish conquistador GONZALO JIMÉNEZ DE QUESADA, also seeking El Dorado, explored the region in 1536, which led to some disagreements over boundaries between the Spanish, Federmann, and his sponsor, the Welser family.

The explorations continued, conducted mainly by the Spanish. FRANCISCO PIZARRO had had great success with the subjugation of the Inca Empire in the 1530s, and this

naturally whetted Spain's appetite for gold and precious stones. The brother of Jiménez de Quesada, Hernán Pérez de Quesada, traveled in the plains of the Orinoco River in Venezuela in 1541. Years later, in 1569–72, Jiménez de Quesada himself led a second expedition in search of El Dorado in eastern Colombia as far as the confluence of the Orinoco and Guaviare Rivers.

South and East

Without results in the north, the search area was expanded. ALVAR NÚÑEZ CABEZA DE VACA, another Spanish military officer, explored the regions of the upper Paraguay River with 400 soldiers in 1543–44. His efforts were impeded by thick jungle. In 1541, GONZALO PIZARRO, brother of Francisco Pizarro, set out eastward from present-day Quito to find the land of cinnamon, which was also purported to have a wealth of gold. It was on this journey that his lieutenant, FRANCISCO ORELLANA, separated from the expedition with a group of men and traveled down the AMAZON RIVER to its mouth. Along the way, he heard tales of a land with great riches to the north. The 1560 expedition of PEDRO DE URSÚA was inspired by such reports, which resulted in the exploration of the Huallaga, Marañón, and Ucayali Rivers. This was the expedition on which Ursúa was murdered by LOPE DE AGUIRRE and his coconspirators. The quest for El Dorado was also conducted in the region of Guiana, east of Venezuela. DIEGO DE ORDAZ had heard rumors of great wealth in the region in 1532. Decades later, in 1584, ANTONIO DE BERRÍO traveled on the Orinoco looking for El Dorado and, failing to find it, moved across to Guiana and other places to the east.

The last great chapter in the search for El Dorado involved Englishman SIR WALTER RALEIGH in 1595. In his zeal for treasure and with his country in competition with Spain, he led a royal expedition of five ships to find the elusive land. Landing in Trinidad, he attacked the Spanish settlement there and interrogated Antonio de Berrío concerning what he knew of El Dorado. Raleigh proceeded to the mainland, where he, too, explored the Orinoco River and Guiana. After his return to England, he became involved in political intrigues, which resulted in a death sentence. In a desperate attempt to save his life, he proposed a second expedition to find El Dorado, which was undertaken in 1617. In Trinidad, Raleigh became sick with fever while his son ventured into Spanish territory. He and his men engaged the Spanish army at San Thomé, where Raleigh's son was killed. Consistent with his previous sentence, for disobeying orders not to attack the Spanish, and for failure to find El Dorado, Raleigh was executed soon after his return to England.

An Enduring Legacy

The stories that grew around the legend of El Dorado have had an enduring character. British poet John Milton made reference to it in *Paradise Lost*, French writer Voltaire used

the concept in *Candide*, and American writer Edgar Allan Poe made it the subject of a poem. To this day, the phrase is synonymous with a place of luxury and ease. The lure of El Dorado for Europeans was based in reality, given the treasures of the Inca Empire. It is likely that the indigenous peoples who told the wondrous tales of the golden kingdom were anxious to have their foreign conquerors move along to other territories. Yet evidence indicates that the myth of El Dorado was believed to some degree by these peoples, who traded precious objects made with gold and jewels from region to region.

See also LEGENDS AND EXPLORATION; TREASURE AND EXPLORATION.

Empty Quarter (Rub' al-Khali, Arabian Desert, Great Sandy Desert)

The Empty Quarter (Rub' al-Khali in Arabic), also called the Arabian Desert and the Great Sandy Desert, is one of the largest sand deserts in the world. It occupies the southern regions of the interior of the Arabian Peninsula, stretching over an area of about 225,000 square miles. The desert accounts for about one-quarter of the land area of present-day Saudi Arabia, from highlands in Nejd to the north to the plateaus of Hadhramaut in the south. Its western edge rises to an altitude of more than 660 feet and slopes nearly to sea level in the east. The Rub' al-Khali receives hardly any precipitation, making it one of the driest places on Earth. During the summer, daytime temperatures regularly exceed 100 degrees Fahrenheit; during the winter, they fall into the 50s. Today, the Rub' al-Khali is a major source of oil deposits, including the world's largest oil field. Yet the vast desert remained largely unknown and untraversed by Westerners until the mid-20th century.

Ancient Exploration

As early as about 2450 B.C., Egyptian explorer HANNU sailed in the RED SEA along the Arabian coast, looking to improve trade with the kingdoms to the south in the land of PUNT. His exact place of landing is not known, but it is assumed that he visited lands of the Arabian Peninsula, possibly including the fringes of the Empty Quarter.

The Romans (see ROMAN EXPLORATION) perceived Arabia as three geographic parts: Arabia Petrea (or "Stone Arabia") to the west, including Egypt; Arabia Felix (or "Happy Arabia") to the south; and Arabia Deserta ("Desert Arabia"), the vast desert region of the Arabian Peninsula, including the Empty Quarter. On gaining control of Arabia Petrea in the first century B.C., they turned their attention to Arabia Felix, a cluster of prosperous kingdoms situated at the far southern extreme of the peninsula at the edges of Arabia Deserta. These kingdoms were intermediaries in the

important and lucrative SPICE TRADE between India and Egypt. In addition, the highly valued incenses frankincense and myrrh were obtained from trees growing in remote desert mountains.

In about 25 B.C., GAIUS AELIUS GALLUS, a Roman officer in Egypt, set off with an expedition into the southern kingdom of Saba and its principal city, Marib. Saba was one of the primary kingdoms involved with trade in incense and spices. Gallus hoped to conquer the Sabaeans and open direct trade contacts with India and the rest of the Orient. He returned to Egypt unsuccessful, but with a wealth of geographic knowledge about the areas south and east of the Red Sea. For nearly the next two millennia, the interior region of the peninsula and the overland trade routes that brought incense and spices from Arabia Felix remained unexplored and unknown to outsiders.

The desert regions of Arabia, including the Empty Quarter, have been inhabited since ancient times by nomadic people called Aribi by the Akkadians. Probably in the 10th century, these nomads domesticated the camel, which allowed them to cover the long desert stretches between oases. The desert regions are known to Arabs as el-Badieh ("Great Wilderness" in Arabic), and the nomadic inhabitants as Bedouin. Traversed with impunity by the Bedouin, the Rub' al-Khali remained mysterious even to other inhabitants of the Arabian Peninsula. With the rise of Islam in the sixth century A.D., the Rub' al-Khali was known as the location of mythical cities destroyed by fire from heaven or buried in sands for excess and sin (see MUSLIM EXPLORATION).

19th Century

As European power and influence grew, travel into Arabia for various reasons increased. Some went fulfilling quests for knowledge, both geographic and cultural, such as JOHANN LUDWIG BURCKHARDT of Switzerland, who lived with the Bedouin and took a pilgrimage to the Islamic holy cities of Mecca and Medina in present-day Saudi Arabia as a Muslim in 1814–15. Eventually, with military and political influence in the Orient growing, countries such as Great Britain sent diplomatic missions tracking across largely uncrossed territory to meet with native leaders.

GEORGE FOSTER SADLIER, a British army officer in India, was sent in 1819 on a diplomatic mission to Ibrahim Pasha, a Turk who was engaged in consolidating Turkish power over Arabia. Sadlier landed at Qatif on the Persian Gulf coast of present-day Saudi Arabia, then headed inland. By the time he had crossed much of the Arabian Peninsula, he learned that Pasha had moved on to Medina. Sadlier continued on to that city. From there, he headed to the Red Sea port of Yenbo, north of Jidda, becoming the first European to cross the Arabian Peninsula, although to the north of the Empty Quarter.



A Bedouin caravan travels the desert country of Arabia in this late 19th- or early 20th-century photograph. (*Library of Congress, Prints and Photographs Division [LC-USZ62-76262]*)

The BRITISH EAST INDIA COMPANY, interested in improving travel across the Arabian sea route from the Isthmus of Suez to Bombay, India, sought to establish coaling stations on the south coast of the Arabian Peninsula and, in 1834, sent British army officer JAMES WELLSTED to survey the region. Wellsted undertook excursions into the interior from present-day Yemen and Oman and became the first European to glimpse the vast interior of the Empty Quarter.

WILLIAM GIFFORD PALGRAVE, an Englishman who had done missionary work in India and Lebanon, conceived a plan to make a missionary expedition into the heart of the Arabian Peninsula. Hoping to expand French power over the region, which would become vitally important with the building of the Suez Canal, Napoléon III of France supported Palgrave's expedition, as did various business interests looking to increase imports of cotton and pure-blood Arabian horse-breeding stock. Palgrave left Europe for the Near East in the summer of 1861. Arriving in present-day Jordan, he traveled eastward over some 1,500 miles into present-day Saudi Arabia. Crossing the Nafud Desert, he reached the Persian Gulf coast at Qatif, becoming the first European to cross Arabia from west to east.

Despite these northern crossings of the Arabian Peninsula, the Empty Quarter to the south remained for Europeans what SIR RICHARD FRANCIS BURTON called a "huge white blot on our maps." A British officer and adventurer

and a talented linguist, Burton obtained a year's leave of absence in 1853. He proposed to undertake a journey to the Muslim holy cities of Medina and Mecca, then continue into the southwest to explore the Empty Quarter. Disguised as an Afghan physician, Burton traveled with Muslim pilgrims to the Islamic holy sites. Before he could embark into the Empty Quarter, however, he was struck ill and had to return by steamer to Egypt.

20th Century

HARRY ST. JOHN BRIDGER PHILBY, more than a half-century later in 1914, was a British officer sent from India to Baghdad at the outbreak of World War I. He journeyed for the first time through Arabia in 1917 to meet with Ibn-Saud to generate support for an Arab rebellion against the Turks. He ventured on to explore ancient ruins at Dariyan, then followed the Muslim pilgrim route toward Mecca, arriving on the coast of the Red Sea at Jidda. With that, Philby completed the first east-to-west crossing of Arabia by a European in almost a century. Philby continued to travel through Saudi Arabia, exploring the southern provinces of the Nejd region as far as the boundaries of the Empty Quarter. He continued to explore Arabia in the following years, resigning from the British diplomatic corps in 1924 to become an agent for mining and oil interests in the area. Philby became a political adviser to Ibn Saud, pressing for permission to

lead an expedition into the Empty Quarter. He received approval in 1931 to search for the ruins of the legendary city of Wabar, which according to Muslim tradition was destroyed by God for its wickedness. However, another Englishman, BERTRAM SYDNEY THOMAS, would become the first European to cross the Empty Quarter.

Thomas, first a British political officer in the Persian Gulf region, later entered service for the government of Oman as a minister of the Sultan of Muscat. In the mid-1920s, he journeyed by camel to and along the east coast of Oman from Muscat. In 1927, he landed at Ras al Hadd on the southeastern tip of the Arabian Peninsula and began making preliminary journeys northward to prepare to cross the Empty Quarter. Accompanied by Sheikh Salih Bin Yakut and a party of Rashidi Bedouin, Thomas headed northward from Salalah in October 1930. In early January 1931, the expedition reached the water hole at Shana, roughly halfway through the forbidding desert. Several weeks later, they arrived at Doha on the Persian Gulf coast of Qatar, completing the crossing.

About a year later, in January 1932, Harry St. John Philby set out from the wells at Dulaiqiya, west of Qatar near Hofuf in Saudi Arabia, to travel southward into the Empty Quarter. His expedition located several large craters near a site in the middle of the wastes known as Al-Hadida. At the craters, he discovered quantities of iron, which he later determined were fragments of a giant meteor. Some Muslim authorities judged them to be remnants of the fabled Wabar. From this site, Philby headed westward over the sands. In March, he arrived at the mouth of the Wadi Dawasir, near the Arabian oasis settlement at Sulaiyil, completing the crossing. Philby's expedition, while not the first to cross the Empty Quarter, is regarded as the most thorough scientific exploration of the region up to that time. Spending more time in the desert, he brought back many samples of the scarce plant and animal life of the region and made accurate meteorological and geological observations.

WILFRED PATRICK THESIGER, another Englishman, worked as a British civil servant in the Sudan in the 1930s. During World War II, he served in North Africa and Syria. After the war, he journeyed to the Arabian Peninsula to investigate locust control measures. Inspired perhaps by his contact with the Bedouin, Thesiger made subsequent trips in Arabia, taking pictures and writing. In 1946, he embarked on his first expedition into the Empty Quarter. With Rashid native guides, Thesiger made a giant circle from Salalah in Oman on the Arabian Sea. He made a second journey across the Empty Quarter in 1947–48, also with Rashid tribespeople, from Al Mukalla in Yemen on the Gulf of Aden to the Persian Gulf in United Arab Emirates. His first book, *Arabian Sands*, was hailed and continues to remain as haunting and accurate a portrait of the peoples and lands of the Arabian Desert as the photographs he took. Thesiger's

two journeys were the last European expeditions to use camels and Bedouin guides.



With improved technology and the discovery of oil in the Empty Quarter, the area was mapped by SATELLITE and explored thoroughly in the latter half of the 20th century.

See also ASIA, EXPLORATION OF.

ephemeris

The word *ephemeris* (plural form, *ephemerides*) is both Greek and Latin for “diary.” The Greek root word from which *ephemeris* derives, *ephemeros*, means “daily.” For a time, the English term *ephemeris* was used to refer to a diary, or, more generally, to that which exists only for a day or a short time, the concept associated with the adjective *ephemeral*. But the term came to be used specifically for a list of tables, or for a compilation of such tables in an almanac or publication relating to astronomical data. The information in an ephemeris might include the position of celestial bodies—the Sun, Moon, planets, stars, comets, and asteroids—for each day of the year, or for other regular intervals, along with related facts, such as time of sunrise, sunset, moonrise, and moonset. As such, an ephemeris is a tool of astronomy and navigation.

Ephemerides have been standardized and published in different countries. The oldest such publication is the *Connaissance de Temps* of France, first published in 1679. In England, the British Royal Observatory at Greenwich began publishing the *Nautical Almanac and Astronomical Ephemeris* (or the *Nautical Almanac*) in 1767. Its original purpose was to provide astronomical data necessary to determine longitude at sea. In 1852, the U.S. Naval Observatory began publishing *American Ephemeris and Nautical Almanac*, adjusted for the meridian at Washington, D.C., rather than the PRIME MERIDIAN at Greenwich.

The term *ephemeris time* (ET), formerly applied to astronomical time, is defined by orbital motions of celestial bodies to correct inaccuracies caused by the fact that Earth does not rotate at uniform speed, making the solar day an imprecise unit of time. Ephemeris time is now known as dynamical time, from terrestrial dynamical time (TDT or TT) or barycentric dynamical time (TDB), two different systems of measurement.

See also LATITUDE AND LONGITUDE; NAVIGATION AND EXPLORATION.

equator

Equator is a geographic and cartographic term for an imaginary east-west circle on Earth's surface, everywhere equidistant from the NORTH POLE and the SOUTH POLE, and

dividing Earth into regions defined as the Northern Hemisphere and the Southern Hemisphere. The largest of all such imaginary east-west lines, it is that from which terrestrial latitudes are measured and is thus considered the prime parallel or zero latitude. The equator, as it appears on a map or a GLOBE, intersects northern South America, central Africa, Indonesia, and stretches of the Pacific, Atlantic, and Indian Oceans.

Celestial equator (also *equinoctial circle* or *equinoctial line*) is an astronomical term for the circle on the celestial sphere, lying midway between the celestial poles in the same plane as the geographic equator. (*The celestial sphere* is the imaginary sphere of infinite radius used for defining the positions of celestial bodies, with Earth considered the center of the sphere.) When the Sun's path intersects the celestial equator, twice a year, on March 21, the vernal equinox, and September 23, the autumnal equinox, day and night are of equal length. The equatorial coordinate system is the most commonly used astronomical coordinate system for indicating the positions of celestial bodies, thus relating to navigation.

The equator, the TROPIC OF CANCER, the northern limit of the Sun's apparent annual path across the sky, and the TROPIC OF CAPRICORN, the southern limit of the Sun's apparent path, were the first three reference lines on maps. Ancient cartographers had conceived of this system, based on the Sun's motion, some time before the third century B.C. Greek astronomer and geographer ERATOSTHENES used it to help determine Earth's circumference and tilt with a high degree of accuracy.

See also GEOGRAPHY AND CARTOGRAPHY; LATITUDE AND LONGITUDE; MAPS AND CHARTS; NAVIGATION AND EXPLORATION.

Europe, exploration of

At about 4 million square miles, Europe, including adjacent islands, is the sixth largest continent. It is actually the western fifth of Eurasia (see ASIA, EXPLORATION OF). To distinguish Europe from Asia, most geographers use an imaginary line running from the northern extent of the Ural Mountains on the Kara Sea, then south along the Ural River to the Caspian Sea, then west along the Caucasus Mountains to the Black Sea, then along the Bosphorus Strait (linking the Black Sea and the Sea of Marmara, both forming an arm of the MEDITERRANEAN SEA), and the Dardanelles (a strait linking the Sea of Marmara with the Aegean Sea, also part of the Mediterranean). The Mediterranean Sea and the Strait of Gibraltar (see GIBRALTAR, STRAIT OF) separate Europe from Africa.

To the west of Europe is the Atlantic Ocean (with the North Sea and Baltic Sea as subdivisions) and to the north is the Arctic Ocean (with the Norwegian Sea, Barents Sea, and

White Sea as subdivisions). The British Isles are part of Europe. Mediterranean islands include the Balearics, Corsica, Sardinia, Sicily, Crete, Malta, and Cyprus (which is actually closer to Asia). The archipelago of Novaya Zemlya and the Faeroe Islands are also defined as part of Europe, as are ICELAND, about 600 miles west of northern Europe in the North Atlantic, and the archipelago of Svalbard (Spitsbergen), about 400 miles north in the Arctic Ocean. The AZORES, about 900 miles west of southern Europe in the Atlantic, although politically tied to Europe, are typically discussed as a separate entity.

Much of Europe, which can be viewed as a large peninsula of Eurasia itself, consists of peninsulas, the largest being the Scandinavian, Iberian, Italian, Balkan, Kola, and Jutland Peninsulas. The northernmost point of the European mainland is Cape Nordkinn (North Cape) in Norway; the southernmost is Punta de Tarifa in southern Spain near the Strait of Gibraltar; the westernmost is Cabo da Roca in Portugal; and the easternmost is the Ural Mountains in Russia.

A west-east mountain chain—the Alpine—traverses Europe; the Pyrenees, the Alps, the Carpathians, the Balkans, and the Caucasus are all part of it. The highest point in Europe is Mount Elbrus in the Caucasus, at 18,481 feet above sea level. The lowest point is located along the Caspian Sea's north shore, at 92 feet below sea level. Between the mountainous Scandinavian Peninsula in the north and the Alpine chain in the south, and extending from the Atlantic Ocean to the Urals, lies the Great European Plain. The Central European Uplands, consisting of a number of ranges, break up the plain. In the east is some steppe country. The largest rivers in Europe, from west to east are the Tagus, Garonne, Loire, Rhône, Rhine, Elbe, Oder, Vistula, Danube, Dnieper, Don, and Volga.

The prevailing westerly winds from the Atlantic Ocean that pass over the North Atlantic Drift lead to a moderating effect and significant rainfall, especially in the west, with cooler and drier weather to the east. Part of the continent lies above the ARCTIC CIRCLE. Mediterranean regions have hot and dry summers and rainfall generally only in winter. Most of Europe, except the tundra regions in the extreme north and the grasslands of the Great European Plain, was originally forested.

Large mammals including bears, wolves, bison, boars, deer, and elk were native to Europe, along with the smaller mammals still found there. Europe has a wide variety of birds, among them the eagle, falcon, finch, nightingale, owl, pigeon, and sparrow. European waters have a wide variety of fish, such as cod, mackerel, herring, and tuna; sturgeon are found in the Black Sea and Caspian Sea.

Europe is commonly discussed as seven geographic regions: Scandinavia (present-day Denmark, Finland, Norway, Sweden, and Iceland); the British Isles (present-day United Kingdom and Ireland); western Europe (present-day

Belgium, France, Luxembourg, Monaco, and the Netherlands); southern Europe (present-day Andorra, Italy, Malta, Portugal, San Marino, Spain, and Vatican City); central Europe (present-day Austria, the Czech Republic, Germany, Hungary, Liechtenstein, Poland, Slovakia, and Switzerland); southeastern Europe (present-day Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Macedonia, Romania, Slovenia, Yugoslavia, and the western part of Turkey); and eastern Europe (present-day Belarus, Estonia, Latvia, Lithuania, Moldova, Ukraine, and the western part of Russia). An eighth region, Transcaucasia (Armenia, Azerbaijan, and Georgia), is sometimes included as part of Europe (and sometimes as part of Asia).

The etymology of the name *Europe* has been variously explained. Europa is a figure of Greek mythology, seduced by Zeus in Phoenicia and taken to Crete where she gave birth to Minos, the supposed ancestor of the Minoans. The name has also been associated with the Phoenician word *Ereb*, “sunset” or “west” in contrast to the word *Asia*, possibly meaning “sunrise” or “east.” The Hellenes—people of ancient Greece—used *Europe* to describe their lands west of the Aegean Sea. In its root form, *Europe* might simply have meant “mainland.”

The Flow of Peoples

Because so much of world exploration, as the saga is generally presented, involves the travels of Europeans and their descendants to and on other continents, far fewer of those individuals defined as “explorers” in this and other works are known for exploration of Europe than of elsewhere. One has to expand the definition of “exploration” to include migration to tell the entire story of how Europe was “discovered” by outsiders (see MIGRATION AND EXPLORATION). Since there are no written records regarding many of these migrations, and geographic knowledge was not necessarily disseminated as a result of them, these movements of peoples are not exploration in the strict sense—that of mapping the world. But to understand how Europe came to be perceived as a geographic entity distinct from the rest of Eurasia, it is necessary to touch upon the flow of at least some of the larger groupings on the continent in prehistoric as well as historic times.

Early Migrations and Civilizations

By the sixth millennium B.C., farming was established in Europe; Neolithic (New Stone Age) cultures were replacing earlier Paleolithic (Old Stone Age) hunting and gathering cultures. It is thought that it was peoples from western Asia who brought agricultural knowledge with them to the new lands. By about 2200 B.C., during the Bronze Age, Indo-European-speaking peoples arrived in the Balkans—probably originally from the Black Sea region of eastern Europe or western Asia—and spread from there to the rest of Europe,

displacing or merging with native descendants of earlier Neolithic peoples.

Three highly developed Bronze Age cultures emerged in the region, known collectively as Aegean: the Mycenaean culture on the mainland; the Cycladic culture on the Cyclades island group; and the Minoan culture on the island of Crete. Based on the dispersion of artifacts, archaeologists have determined that the Minoans, who flourished from about 3000 to 1000 B.C., were active mariners and traders throughout much of the Mediterranean region, reaching as far west as the east coast of present-day Spain (see MINOAN EXPLORATION). They also had contacts with ancient Egyptians of North Africa, who became knowledgeable about Mediterranean navigation as well, although more along the African and Asian coasts than European coasts.

About the same time Indo-Europeans were spreading westward, in about 2340–2305 B.C., SARGON, the ruler of Akkad in Mesopotamia, established trade contacts with peoples of both the east and west, including of the eastern Mediterranean Sea; he may have even launched naval campaigns in the Mediterranean, which, if true, would make his men among the earliest known Asian visitors in European waters and along European shores.

Another ancient people who are regarded as explorers of the Mediterranean region are the Phoenicians of present-day Lebanon in Asia, who, by the mid-13th century B.C., had begun displacing the Minoans as the most wide-ranging Mediterranean maritime traders (see PHOENICIAN EXPLORATION). They established a number of trading centers far from their home in coastal Europe—present-day Italy, France, and Spain—as well as in North Africa. They also developed an alphabet and a standardized system of weights and measures.

By the early Iron Age, beginning about 1000 B.C., the European population was growing, with Indo-European and other peoples migrating to new homelands along major river routes. Among the peoples who would move about Europe over the ages were Indo-Europeans speaking Baltic, Celtic, Germanic, Hellenic, Illyrian, Italic, Phrygian, and Slavic languages, as well as non-Indo-European-speaking Bulgaric, Caucasian, Finnic, Mongolic, Ugric, and Turkic peoples. Some of them migrated there from the Asian steppes. Other groups, such as the Basques and Etruscans, spoke languages not seemingly related to any of the above.

Carthaginian Explorers

Among the outposts founded by the Phoenicians was Carthage in present-day Tunisia in North Africa, probably in the late ninth century B.C. It became a thriving city over the next centuries. Its people are discussed historically as Carthaginians, even though most were presumably of Phoenician ancestry. Two generals out of Carthage are the first individuals of record to have crossed through the Strait

of Gibraltar into the Atlantic Ocean (see CARTHAGINIAN EXPLORATION). In about 470 B.C., HANNO headed an expedition from the strait southward along Africa's west coast; and, in about 450 B.C., HIMILCO headed an expedition northward along Europe's coast. It is not known how far north Himilco reached in his journey of four months—possibly only the northern extent of the Iberian Peninsula, but even possibly the British Isles. Other ancient mariners venturing out of the Mediterranean—accounts of whom did not survive—may have explored Europe's Atlantic coast even earlier.

The Hellenistic Period

Over the centuries, starting sometime after 2200 B.C., various peoples speaking related Greek (or Hellenic) dialects reached the Balkan Peninsula from the north and competed with indigenous peoples. One group, the Achaeans, are thought to have been ancestral to the Mycenaeans who replaced the Minoans as dominant in the region. Other Greek-speaking peoples followed, sometimes classified as Aeolians, Dorians, and Ionians. Their descendants came to be known collectively as Hellenes or Greeks. The Mycenaean civilization broke up after 1200 B.C. From about 1000 to 750 B.C., after the Mycenaean collapse, the region suffered what is sometimes referred to as the Greek Dark Age. During what is known as the Archaic Age, from about 750 to 480 B.C., independent city-states formed and eventually united against the threat from Persia (present-day Iran). The period from about 480 to 323 B.C., in which Greek influence spread throughout the region, is known as the Greek Classical Age. Like the Minoans and Phoenicians, the Greeks developed a trade network throughout the Mediterranean and into the Black Sea as well, founding hundreds of coastal settlements (see GREEK EXPLORATION). Having adopted the Phoenician alphabet, they too spread a uniform culture.

During both the Archaic and Classical Periods, a number of individual Greeks began gathering geographic information. In the early fifth century, in the 490s B.C., an Ionian Greek HECATEUS OF MILETUS published an account of his travels known as *Tour Round the World*, in which he described his travels throughout the Mediterranean region. It was used as a source by Greek historian HERODOTUS, who, later in the fifth century B.C., also traveled extensively to parts of Europe, Asia, and Africa and published a work known as *History*.

A people living to the north of Greece, the Macedonians, rose to power in the mid-fourth century B.C. under Phillip II and his son ALEXANDER THE GREAT. Although not Greek-speaking, the Macedonian rulers came to think of themselves as part of the Greek tradition and furthered Greek culture through Alexander's conquests in North Africa and Asia. During this period, in about 325 B.C.,

Greek scholar PYTHEAS headed a maritime expedition through the Strait of Gibraltar and northward along Europe's Atlantic coast, reaching the British Isles and exploring parts of the North Sea and Baltic Sea.

The Roman Period

A number of different Indo-European peoples meanwhile had occupied the Italian Peninsula, among them the Italics and Villanovans. One of the Italic group—the Latins—founded Rome on the Tiber River in the eighth century B.C. They absorbed cultural elements from the Greek colonies to the south, including their alphabet, which they altered to fit their Latin language. In its early stages, until the end of the sixth century B.C., Rome was occupied by the Etruscans out of the north. In the fourth century B.C., they defended their city against invading Gauls, a subgroup of the Celts who had settled in France. By the second century B.C., the Romans had conquered the Carthaginians, Macedonians, and Greeks and had become the dominant power in the Mediterranean, eventually expanding their empire into northern Africa, southwestern Asia, and northern Europe. In the late second century B.C., the Romans defeated the Teutons and Cimbi, Germanic peoples from the Jutland Peninsula who had migrated southward.

A number of Roman generals are discussed as explorers because of their expeditions to unmapped regions of Europe (see ROMAN EXPLORATION). In the first century B.C., GAIUS JULIUS CAESAR invaded Gaul (present-day France) and Britain. His reports, along with those of other military leaders, helped Greek geographer STRABO publish *Geography*, a description of lands of the Roman Empire, in A.D. 18. In the decades to come, other Roman military leaders, such as Suetonius Paulinus and Gnaeus Julius Agricola, further explored the British Isles.

At the end of the fourth century A.D., the Roman Empire was divided into the Western Roman Empire and the Eastern Roman Empire (or Byzantine Empire), with its capital at Constantinople (present-day Istanbul). The Western Roman Empire gradually broke up by the fifth century because of economic decline, internal political unrest, and the continuing pressure of the Huns as well as Germanic peoples from the north. The Franks came to control much of Gaul, with the Alemanni in Switzerland their subjects; the Ostrogoths controlled most of Italy; the Visigoths had reached Spain; the Angles, Frisians, Jutes, and Saxons had invaded the British Isles; and the Vandals had occupied the Roman provinces of North Africa. These peoples came to adopt many Roman customs. In the sixth century, many of these lands were retaken by the Byzantine emperor Justinian. Yet other waves of peoples would come to power for a time, such as the Lombards, a Germanic people in Italy; and the Avars, a Mongolian-Turkic people, and the Slavs in the Balkans.

Muslims in Europe

Muslims, the followers of Islam, a religion founded by the Prophet Muhammad (or Mohammed) on the Arabian Peninsula in the seventh century A.D., played a part in the exploration of Europe as migrating peoples and as individual travelers, many of them Arabs but not all (see MUSLIM EXPLORATION). Moving westward from Asia, Muslims conquered peoples of North Africa, including the Berbers, and from there, in 711, crossed the Strait of Gibraltar in an invasion of Spain, eventually gaining control of most of the Iberian Peninsula and even land across the Pyrenees in southern France. Those Muslims occupying parts of Europe were a mixture of Arab and Berber peoples, known as Moors. The Moors, although unable to push farther into Europe because of a Frankish kingdom united under Charlemagne, who defeated them in northern Spain in 778, maintained a presence on the Iberian Peninsula until 1492.

The Muslim world, although not a political entity like the Roman Empire, manifested religious and cultural unity, and, over the centuries of the late Middle Ages and early RENAISSANCE, individuals traveled widely for religious, commercial, and scientific reasons. Among those who visited parts of Europe and helped disseminate geographic and cultural information concerning it were merchant ABU ALI AHMAD IBN RUSTA, historian ABU AL-HASAN ALI IBN AL-HUSAYN AL-MASUDI, religious scholar AHMAD IBN FADLAN, and merchant and geographer ABU AL-QASIM IBN ALI AL-NASIBI IBN-HAWQAL in the 10th century; cartographer ABU ABD ALLAH MUHAMMAD ASH-SHARIF AL-IDRISI and official and religious scholar ABU AL-HASAN MUHAMMAD IBN JUBAYR in the 12th century; and religious scholar and geographer ABU ABD ALLAH MUHAMMAD IBN BATTUTAH in the 14th century.

Most of the Turkish population also converted to Islam. The Ottoman Turks became the dominant people in the Middle East and captured Constantinople in 1453, bringing the Eastern Roman Empire to an end. The Ottoman Empire, although weakening over time, endured until 1923, when the republic of Turkey was established.

Vikings out of the North

The Vikings, or Norsemen, of Scandinavia traveled widely as traders, raiders, and settlers from about 800 to 1100 (see VIKING EXPLORATION). Some groups settled the east coast of the Baltic Sea and, from there, traveled inland into eastern Europe as early as the eighth century. Some groups followed the Neva River, which took them to Lake Ladoga. Some eventually reached the south-flowing Dnieper River, along which they had access to the Black Sea and Constantinople, which they raided in 860, and into the Mediterranean. Vikings also followed the Volga River to the Caspian Sea. The Vikings invaded coastal settlements in the British Isles by the end of the eighth century and established a num-

ber of settlements. They also came to control surrounding islands, such as the Hebrides, Orkneys, Shetlands, and Faeroes. In the early ninth century, Vikings also gained control of parts of coastal France and traveled up rivers on raids. A group attacked Paris in 845. Those Vikings who settled in the region became known as Normans, a derivation of "Northmen," and the region they controlled became known as Normandy.

Vikings from these settlements launched expeditions to the south. In 858, one expedition passed through the Strait of Gibraltar into the Mediterranean. Normans came to expand their holdings; in the second half of the 11th century, William I the Conqueror invaded England, and Roger I, Sicily.

The Vikings reached Iceland in the ninth century. The Irish had already settled the island by 800 and possibly earlier. According to one Norse saga, in about 860, NADDOD, a Norwegian Viking, was blown off course while traveling from Norway to the Faeroes and reached the east coast of Iceland. Another Norse saga holds that, about the same time, GARDAR SVARSSON circumnavigated Iceland and built the first Viking house on its north coast.

From Iceland, the Vikings ventured even farther to the west. Norwegian Viking ERIC THE RED is considered the European discoverer of GREENLAND (geographically defined as part of North America) in about A.D. 982. His son LEIF ERICSSON and other Viking explorers reached VINLAND on the North American mainland soon afterward.

Mongol Inroads

During the Middle Ages, in the 13th and 14th centuries, the Mongols, a people out of eastern Asia, in the expansion of their vast empire, penetrated as far west as Germany and Hungary, leading to a growing knowledge of European geography among Asian peoples (see MONGOL EXPLORATION). A number of European nations established diplomatic relations with the Mongols, and east-west travel increased along the SILK ROAD.

In 1280, soon after Venetian merchants MAFFEO POLO, NICCOLÒ POLO, and MARCO POLO arrived in China, a Turk by the name of RABBAN BAR SAUMA, raised as a Nestorian Christian, traveled throughout the Middle East and Europe. (The Nestorians were a sect of Eastern Christians who followed the teachings of Nestorius, patriarch of Constantinople, condemned as a heretic in 431 for believing in two distinct natures, God as a divine being and Jesus as a man.) He visited Armenia and Georgia as well as Constantinople and a number of cities in Italy and France as part of a Mongol delegation.

Arctic Europe

During what is known as the EUROPEAN AGE OF EXPLORATION, from the 15th century into the 17th century, when

European nations developed water routes around the world, Arctic Europe came to be explored in the course of the search for the **NORTHEAST PASSAGE**—a sea route between the Atlantic Ocean and Pacific Ocean, from along the north coast of Norway to the eastern edge of **SIBERIA** at the **BERING STRAIT** (see **ARCTIC, EXPLORATION OF THE**). Many of the important expeditions to northern waters in the 16th century were those sponsored by the London-based **MUSCOVY COMPANY**, in the hope of establishing trading contacts with the Far East.

In 1553–54, **HUGH WILLOUGHBY**, **RICHARD CHANCELLOR**, and **STEPHEN BOROUGH** headed an expedition that rounded Cape Nordkinn and entered the White Sea. Chancellor and Borough traveled overland to Moscow; Willoughby, continuing westward, sighted the archipelago of Novaya Zemlya. In 1556–57, Willoughby led another expedition, which sailed even farther east, reaching the entrance to the Kara Sea south of Novaya Zemlya. In 1557–64, another representative of the Muscovy Company, **ANTHONY JENKINSON**, undertook two expeditions to Russia, using the White Sea route, from where he continued overland, exploring parts of eastern Europe and central Asia. In 1584–85, Dutch mariner **OLIVIER BRUNEL** headed two expeditions in search of the Northeast Passage, also reaching Novaya Zemlya. Later expeditions would sail past Novaya Zemlya, reaching Arctic Asia.

In 1607, during a Muscovy Company expedition to find the **NORTHWEST PASSAGE**, Englishman **HENRY HUDSON**, after sailing westward and exploring Greenland's east coast, returned east and north, and came upon Svalbard, or Spitsbergen, the archipelago in the Arctic waters north of Norway.

The Northeast Passage would not be navigated in its entirety for three centuries. In 1878–79, Swede **NILS ADOLF ERIK NORDENSKJÖLD**, with the backing of both Sweden and Norway, crossed from the Atlantic to the Pacific through Arctic waters.

Travel Writing and Natural Science

The tradition of traveling and writing about it—as both ancient Greeks and medieval Muslims had done—continued in later centuries and is part of the story of the exploration of Europe. In the mid-17th century, a Turkish writer by the name of **ÇELEBI EVLIYA** traveled throughout the Ottoman Empire, including lands in eastern Europe and the Balkans as well as in western Asia and northern Africa. He described geography and customs of diverse peoples in a 10-volume work known as *Seyahatname* (Travel Book). Another early travel writer was Englishwoman **CELIA FIENNES**, who, in the late 17th and early 18th centuries, traveled throughout England, writing about her experiences in a journal, which was published as *Through England on a Side-Saddle*.

Other individuals traveled in parts of Europe to advance scientific knowledge. Among these were the 19th-century Scotsman **EDWARD FORBES**, who studied the fauna and flora of the waters around the British Isles and in the Mediterranean, and 19th-century Russian **PETER KROPOTKIN**, who studied the geography, wildlife, and native culture of northern Finland in addition to parts of Asia.

Mountain Climbing in Europe

MOUNTAIN CLIMBING came of age in the Alps in southern central Europe, where many modern techniques developed. In the late 18th century, Frenchmen **JACQUES BALMAT** and Michel Paccard made the first ascent of Mont Blanc (see **BLANC, MONT**), the highest peak in the Alps, and the second-highest in Europe, at 15,771 feet. Englishman **EDWARD WHYMPER** climbed the Matterhorn in 1865, the last high alpine peak to be conquered. Later renowned climbers undertook climbs in the Alps in the late 19th and early 20th centuries, among them Italian **MATTHIAS ZURBRIGGEN**, who became a guide in expeditions around the world, and American **ANNIE SMITH PECK**, one of the women pioneers of mountaineering.

Because of their geographic remoteness as well as political isolation, the other high ranges in Europe—the Caucasus and Urals—are not central to the early history of mountain climbing as an international activity. In the 20th century, the Urals became a training ground for climbers of the Union of Soviet Socialist Republics (**USSR**; Soviet Union). And, in more recent times, the high peaks in both ranges have served as challenges to climbers.



With the flow of so many diverse peoples to and in Europe, the continent has been a melting pot over the centuries, and its political map has been redrawn time and again. Peoples from other continents—in particular Africa and Asia—continue to migrate there. Europe presently has the second-highest overall population density of the continents, after Asia. Peoples of many nations with varying languages and traditions live in close proximity to one another. The founding of the European Union in 1993, a confederation of 15 nations formerly known as the European Economic Community, most of which now use the same euro currency, has led to greater economic unity.

European age of exploration

Starting in the 15th century and into the 17th century, various European nations launched many important maritime voyages, among the most famous in history, which led to a new understanding of world geography. These explorations are associated with the **RENAISSANCE**, the cultural phase between medieval and modern times in Europe. Many texts on

the subject of exploration speak of an “Age of Discovery” in reference to this period of great activity. The concept of “discovery” as it relates to exploration is problematic, however, in that it marginalizes the historic role of indigenous peoples. The Renaissance was indeed a time of intellectual discovery—in geography as well as other cultural pursuits—but it is misleading when applied to Europeans visiting already inhabited lands. Other texts cite an “Age of Exploration.” Yet this phrase ignores the periods of great exploring activity among other cultures. One might, for example, be referring to a Muslim age of exploration, from the ninth to the 14th century, when Muslims from a number of different nations ventured beyond the lands along the MEDITERRANEAN SEA into other parts of Europe, Africa, and Asia (see MUSLIM EXPLORATION). Or one might be referring to a Chinese age of exploration, such as during the Han dynasty, from about 206 B.C. to A.D. 220, an expansionist time with new contacts established by the ancient Chinese in distant lands, or during the Ming dynasty of 1368–1644, when their mariners explored coastal East Africa (see CHINESE EXPLORATION).

Other texts speak of a “European Age of Exploration.” This is the most accurate phrase in that it distinguishes itself from the cultural contributions of other peoples, making it the least Eurocentric in implication. There were other great periods of exploration among European civilizations, in particular the ancient Greeks and Romans (see GREEK EXPLORATION; ROMAN EXPLORATION). But they were specific to these peoples and their patterns of expansion and might better be called the “Greek Age of Exploration” and the “Roman Age of Exploration.” The European age of exploration was just that. It involved many European nations—Portugal, Spain, Holland, England, and France—and many individuals of different nations, often sailing for countries other than their place of birth. And it was a momentous time in Europe, where it led to an understanding of the true extent of the Earth and extensive contacts among peoples of the Eastern and Western Hemispheres.

Foundations

Many developments led up to and contributed to the European Age of Exploration. First, there was a movement away from feudalism, the system based on obligation, toward the centralized nation-state. Exploration thus became a national purpose. The related decline of seigniorialism, the system of political, economic, and social relations between seigneurs, or lords, and their dependent farm laborers, also was in decline as merchant capitalism took hold. There were new incentives to obtain products and expand markets.

Since the time of the CRUSADES of the late 11th to late 13th centuries, Italians controlled trade routes in the eastern Mediterranean Sea and trade with the Far East, leading other European nations to seek out new routes. These early stirrings of European expansion in the 13th and early 14th

centuries came to an end when the “Black Death,” the bubonic plague, arrived in Europe in the mid-14th century, probably brought by Italian merchant ships from the Black Sea (see DISEASE AND EXPLORATION). The economic and social dislocation caused by the loss of as much as a third of Europe’s population, many of them city dwellers, ecclesiastics, intellectuals, and merchants, who had been in the forefront of commercial and political efforts outside of Europe, made such ventures far more difficult to mount. As living conditions for survivors of the plague rose as a result of rising wages and falling food prices, the need and desire for expansion beyond Europe diminished. During this hiatus, however, the seeds of future expansion were being sowed; many of the laborers attracted to the depopulated cities were able to save enough money to enter the middle class and to invest in overseas trading ventures; they also created a market for spices and other foreign goods. At the same time the decrease in the value of much agricultural land caused by a dramatic climate change called the “Little Ice Age,” which began after 1300, steadily diminished the wealth of the landed nobility. The laboring and merchant classes to some extent began to fill the political vacuum once dominated by clerics and nobles.

The growing Muslim power in the Near East, culminating in the fall of Constantinople (present-day Istanbul) to the Ottoman Turks in 1453—which, in effect, was the end of the East Roman Empire (or Byzantine Empire) centered there—along with the earlier breakup of the empire of the Mongols to the east, meant that established overland trade routes to the Orient, critical to the SPICE TRADE, were no longer secure, and a sea route to Asia became a necessity for merchants. Moreover, the economic system of mercantilism or bullionism, in which a nation’s wealth and power are determined by its quantities of gold and silver, became dominant. Europeans hoped to divert the Muslim trade in African gold and ivory to their homelands, or to find new sources of gold. New sources of furs were also sought. And there was a new crusading spirit among the Christian nations of Europe—as there had been during the Crusades to the Mediterranean region in previous centuries—to conquer Muslim-held territory and spread the Christian doctrine. The Reformation and resulting establishment of Protestant churches, with governments eventually adopting official religions, led to growing competition to convert native populations.

The fall of Constantinople to the Ottoman Turks had intellectual ramifications as well, some of which are also discussed as leading up to and defining the encompassing concept of the Renaissance. It had the effect of driving Byzantine scholars to western Europe and leading to greater awareness of Greek and Roman classical studies such as that of hellenized Egyptian PTOLEMY of the second century A.D., as well as of Muslim studies and technologies. The Spanish

reconquest of territory controlled by the Moors in the course of the 15th century also made scholarly texts available to Europeans. The development of printing by the German goldsmith and printer Johannes Gutenberg about the same time also contributed to the dissemination of knowledge. Shipbuilding was being revolutionized, with the development of the CARAVEL, which combined the sturdiness and roominess of European ships with the maneuverability of Arab vessels (see SHIPBUILDING AND EXPLORATION). Methods of navigation became more modernized with the growing use of the ASTROLABE, which the ancient Greeks had invented and Arab Muslims had used, as well as the recently invented CROSS-STAFF (see NAVIGATION AND EXPLORATION).

Along the West Coast of Africa

The date 1492, when CHRISTOPHER COLUMBUS first reached the Americas, is sometimes cited as the start of the European age of exploration. Yet it can be more accurately said that the Portuguese initiated this cultural period, and that HENRY THE NAVIGATOR, prince of Portugal, more than any other individual, inspired it. In 1416, he decided to make his home at Sagres near Cape St. Vincent, the southwesternmost point in Portugal, and there founded a naval depot. He also soon founded an observatory and a school of navigation, bringing together astronomers, mapmakers, and mariners. Among the projects was developing the caravel and studying navigational equipment. One of the scholars was MARTIN BEHAIM, who would contribute to technology, working on the astrolabe and cartography, and making the oldest extant GLOBE.

In 1418 and 1419, Henry, who would become known as “the Navigator,” even though he never made a voyage of exploration himself, sent out his first two expeditions, which explored the Atlantic islands of Porto Santo and Madeira. Many more expeditions would follow, reaching farther and farther southward along the Atlantic coast of Africa. The AZORES, about 900 miles out to sea, were located and colonized by GONÇALO VELHO CABRAL in the early 1430s. GIL EANNES’s rounding of Cape Bojador (the “Bulging Cape,” which, as far as Europeans knew, was the southernmost limit of the African coast) in 1434, dispelled many superstitions and misconceptions about sailing into southern waters. Two years later, AFONSO GONÇALVES BALDAYA reached the TROPIC OF CANCER. In 1444–45, DINÍS DIAS reached Cape Verde, Africa’s westernmost point. The Portuguese soon established a presence along the African coast and began developing the SLAVE TRADE. In 1455, Italian ALVISE DA CADAMOSTO, sailing for Portugal, became the first known European to observe the constellation known as the Southern Cross. The next year, he reached an island group directly to the west of Cape Verde, which was called by the same name—the Cape Verde Islands. Soon after Henry’s death in

1460, his mariners reached Cape Palmas, where the African coast turns eastward.

John II, who became king of Portugal in 1481, sponsored a new round of expeditions southward. In 1482–84, DIOGO CÃO headed an expedition in which he reached the CONGO RIVER (Zaire River). In a subsequent expedition of 1485–86, he traveled as far southward as present-day Namibia, almost reaching the TROPIC OF CAPRICORN. In 1487–88, BARTOLOMEU DIAS finally determined the southern extent of Africa, sailing around the tip of the continent and locating the CAPE OF GOOD HOPE.

Early Transoceanic Voyages

By the 1480s, Italian mariner and map dealer Christopher Columbus had devised a plan to sail westward across the Atlantic Ocean to the Orient. He presented the idea to King John, whose geographers proclaimed it unfeasible. King Ferdinand II and Queen Isabella I of Spain, however, were eventually convinced to give backing to such an expedition, and, in August 1492, Columbus set sail, reaching the Americas the following October. Between 1493 and 1502, Columbus led three more transatlantic expeditions, insisting until his death in 1506 that he had reached Asia. Others, some of whom had sailed with Columbus, also explored the Americas for Spain in the late 15th century and early 16th century, with most of their activity in the Caribbean Sea. These included AMERIGO VESPUCCI (an Italian), VICENTE YÁÑEZ PINZÓN, FRANCISCO MARTÍN PINZÓN, ARIAS MARTÍN PINZÓN, PÁNFILO DE NARVÁEZ, ALONSO DE OJEDA, JUAN DE LA COSA, and RODRIGO DE BASTIDAS. Spain was now fully engaged in world exploration as well as colonization. In 1493, Pope Alexander VI established a Line of Demarcation, defining the spheres of Spanish and Portuguese claims in the Americas; it was modified the next year in the Treaty of Tordesillas. It ran due north and south about 1,110 miles west of the Cape Verde Islands. All lands lying east of this line were to belong to Portugal, which verified their claim on Brazil; all those to the west were considered Spanish possessions.

England also soon dispatched ships, which reached the Americas. Italian mariner JOHN CABOT, who had unsuccessfully sought backing from Spain for an Atlantic crossing in the 1480s, presented his plan to King Henry VII of England, who, in defiance of the Line of Demarcation, offered his support. In 1497, Cabot reached Newfoundland and the east coast of Labrador in northeastern North America, the first documented European voyage to North America since the Vikings crossed the North Atlantic centuries before (Amerigo Vespucci may have explored northward from the WEST INDIES that same year). On a second expedition in 1498, Cabot may have traveled southward along the coast as far as the Chesapeake Bay before being lost at sea.

Meanwhile, the Portuguese had continued seeking a water route to the Orient. In 1497–98, VASCO DA GAMA proved the practicality of an eastward route by rounding the Cape of Good Hope, entering the Indian Ocean and reaching India. Other voyages along this route would soon follow, establishing a Portuguese presence along coastal East Africa as well as in the EAST INDIES. Moreover, the international spice trade now became a maritime enterprise. And, in 1501, Portuguese GASPAR CÔRTE-REAL, after reaching the west coast of GREENLAND the year before, made the second documented voyage to North America, exploring coastal Labrador and Newfoundland in the hope of finding a NORTHWEST PASSAGE to the Pacific Ocean.

It was an exciting time in Europe, with ships setting on new quests and others returning with information of exotic lands, along with proof of landings in the form of people, wildlife, and plants. And cartographers culled information from the returning mariners to create new representations of the world. In 1507, German MARTIN WALDSEEMÜLLER published the first world map depicting South America as a distinct continent; he chose the name America after a Latinized version of Vespucci's first name, based on the Italian mariner's accounts of his voyages.

In the meantime, Spanish colonization of the Americas was under way, leading to more sea traffic and more explorations. In 1513, JUAN PONCE DE LEÓN, who had been the governor of Puerto Rico, explored northward to Florida, and VASCO NÚÑEZ DE BALBOA, who had founded Santa María de la Antigua del Darién on the Isthmus of Panama, the first permanent European settlement on the mainland of the Americas, became the first European to see the Pacific Ocean from the west coast of the Americas.

Another defining moment in European consciousness and in world history—similar in impact to Columbus's and Vasco da Gama's expeditions—was the first CIRCUMNAVIGATION OF THE WORLD completed in 1522 by one of a fleet of five ships that had set out three years earlier under FERDINAND MAGELLAN, a Portuguese mariner sailing for Spain.

The French soon began pursuing maritime exploration. In 1524, Italian mariner GIOVANNI DA VERRAZANO, while looking for a Northwest Passage to the Orient, explored North America's east coast from present-day South Carolina to Newfoundland. In the 1530s–40s, JACQUES CARTIER, also seeking a Northwest Passage, explored the St. Lawrence River system and surrounding areas in what is now eastern Canada.

Inland Expeditions

More and more inland expeditions were launched as well in the first half of the 16th century, especially by Spain in the Americas. In 1519–20, HERNÁN CORTÉS explored parts of what is now Mexico for Spain and conquered the Aztec Indians. In 1531–33, FRANCISCO PIZARRO led a Spanish expedition to Ecuador and Peru and conquered the Inca. The

resulting riches obtained, along with the development of mining, made Spain the richest nation for years to come and helped create the Spanish Empire, the largest empire since the fall of the Roman Empire centuries earlier. In 1540–41, FRANCISCO DE ORELLANA traveled down South America's AMAZON RIVER, from the Napo River to the Atlantic coast. Also in the early 1540s, HERNANDO DE SOTO led the first extensive expedition in the American Southeast, and FRANCISCO VÁSQUEZ DE CORONADO explored much of the American Southwest and southern plains. Some of these expeditions were spurred on by legends of wealthy lands, such as EL DORADO in South America and the Seven Cities of CIBOLA in North America (see TREASURE AND EXPLORATION).

European and Canadian Arctic

Private companies, typically with government support, were formed to develop trading and colonization. The express purpose of one of these, the MUSCOVY COMPANY, founded in 1551, was to locate a NORTHEAST PASSAGE, a shorter eastward water route to Asia than around Africa. The first expedition outfitted by the company was that of SIR HUGH WILLOUGHBY; in 1553–54, it explored the waters of the European Arctic.

The Dutch also became active in maritime exploration. In 1584–85, OLIVIER BRUNEL made two voyages in search of the Northeast Passage, reaching Novaya Zemlya. In 1596–97, WILLEM BARENTS, also searching for the Northeast Passage, reached Bear Island and Spitsbergen (present-day Svalbard).

Continuing expeditions by the English led to new European knowledge of the Canadian Arctic. In 1576–78, MARTIN FROBISHER led three expeditions to the Arctic in search of the Northwest Passage, locating Frobisher Bay on southeastern Baffin Island. In 1585–87, JOHN DAVIS, who designed the Davis Quadrant, also led three English expeditions to the Arctic seeking the Northwest Passage and locating the eastern entrance of Hudson Strait.

Pacific Coast of the Americas

Another region reached by Europeans in the 16th century was the Pacific coast of the Americas, the European exploration of which had started with Magellan's journey around the world. In 1542–43, JUAN RODRÍGUEZ CABRILLO and BARTOLOMÉ FERRELO reached the present Oregon-California border of North America. SIR FRANCIS DRAKE, during the first English circumnavigation of world in 1577–80, reached as far north as Vancouver Island in present-day Canada.

West and South Pacific

This period of activity saw the increasing exploration of the West and South Pacific as well. In 1564–65, MIGUEL LÓPEZ DE LEGAZPI founded the first permanent Spanish settlement in the Philippines. In an expedition of 1567–69, ALVARO DE

MENDAÑA and PEDRO SARMIENTO DE GAMBOA made the European discovery of the Solomon Islands.

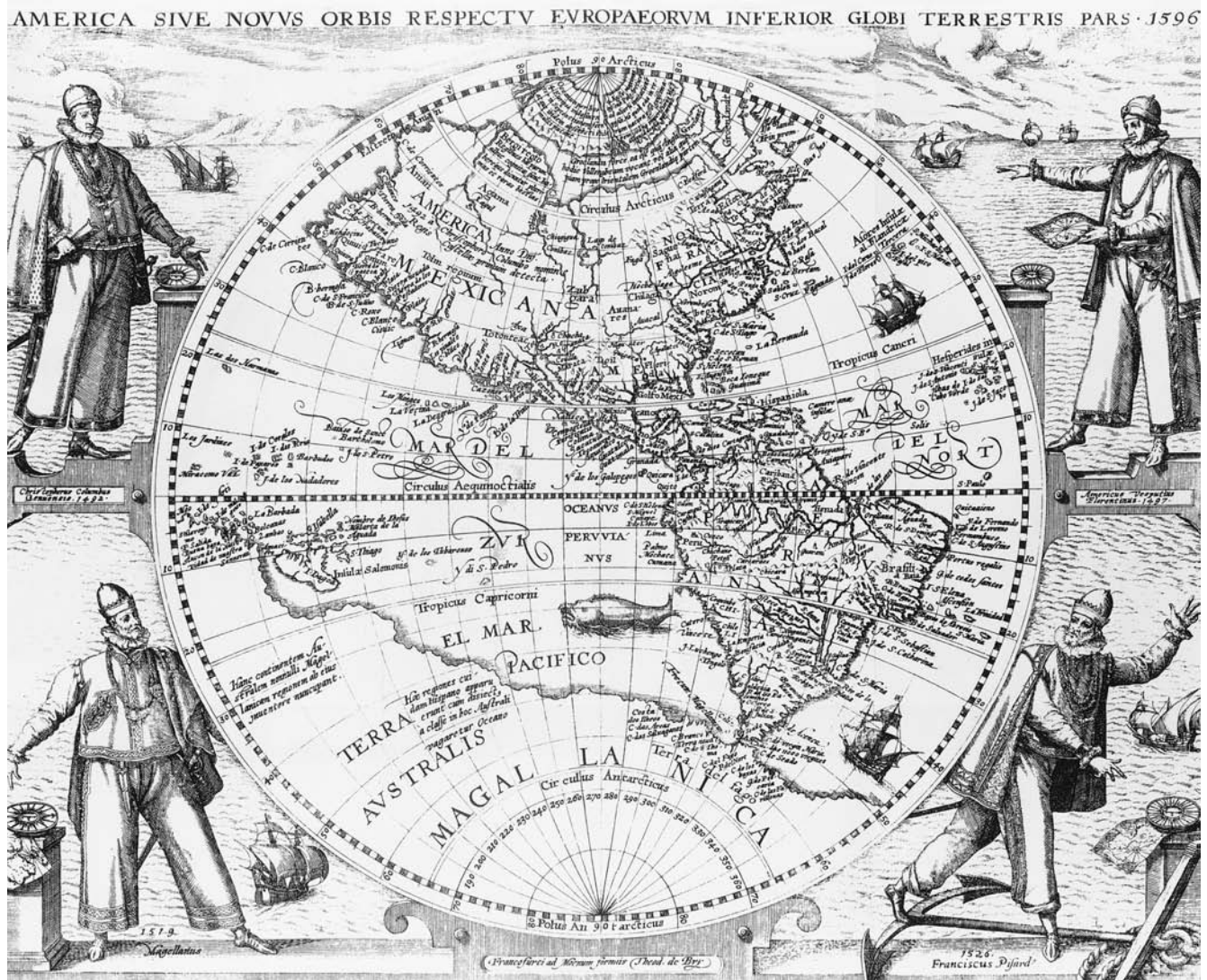
Cartography

As exploration flourished in the latter part of the 16th century, so did cartography. Spanish cartographer DIEGO GUTIERREZ produced the first map detailing the inland river systems of South America. Flemish cartographers GERARDUS MERCATOR and ABRAHAM ORTELIUS produced world atlases. Englishmen SIR HUMPHREY GILBERT and RICHARD HAKLUYT wrote about geography, and MARTIN LLEWELLYN published the first English atlas of the Far East.

17th Century

It is even harder to fix a date for the end of the European age of exploration than for the beginning. The end of the 16th

century is sometimes given, probably because of convenience. But perhaps the subsequent half-century mark, 1650, is a better date. There had been a belief in a GREAT SOUTHERN CONTINENT, known in Latin as Terra Australis, since the time of the ancient Greeks. The existence of Terra Australis proved to be a fable. Yet Dutch mariners in the first half of the 17th century did make the European discovery of Australia in the Southern Hemisphere and chart many of its coastlines. Early coastal explorations were carried out by Dutch mariners, including WILLIAM JANSZ in 1605, DIRK HARTOG in 1616, FREDERICK HOUTMAN in 1619, FRANÇOIS THYSSSEN in 1627, and ABEL JANSZON TASMAN in 1644. The Dutch were active in North America as well in the early 17th century. Englishman HENRY HUDSON, sailing for the Netherlands in 1609, explored New York Bay and the Hudson River in search of the Northwest Passage. In



The Americas are flanked by images of Christopher Columbus, Amerigo Vesputius, Ferdinand Magellan, and Francisco Pizarro in this replica of a 1596 map. (Library of Congress, Prints and Photographs Division [LC-USZ62-89908])

1610–11, on an expedition for his native country of England, he made the European discovery of HUDSON BAY.

It was Hudson's expedition to the Hudson River region that led to a Dutch claim and the eventual founding of New Netherland. By that time, SAMUEL DE CHAMPLAIN was already colonizing New France in present-day Quebec. In 1607, the English under JOHN SMITH had founded the colony of Jamestown in Virginia; in 1620, the PILGRIMS, among them EDWARD WINSLOW, founded the Plymouth colony in Massachusetts. There had been earlier attempts at colonies in the 16th century by both French interests under JEAN RIBAUT in present-day South Carolina and British interests sponsored by SIR WALTER RALEIGH in present-day North Carolina, but they had failed. By the mid-17th century, however, all the European nations that had sent maritime expeditions around the world were developing colonies. The slave trade was well under way as well. Millions of Africans would be transported across the Atlantic to the Americas.

A Continuum of Exploration

Perhaps a way to think of the subsequent European period of exploratory activity is an age of European COLONIZATION AND EXPLORATION. Many of the ensuing important European expeditions around the world were land based; parts of Asia, the Americas, Africa, and Australia would not be charted until the 19th century. Yet European mariners continued to contribute to world knowledge as well. In the 18th century, another European country, Russia, launched maritime expeditions. One of them, in 1740–41, under Danish mariner VITUS JONASSEN BERING would lead to a Russian claim on and a colonial presence in Alaska. A good number of the expeditions sent out by the British later in the 18th century—such as those headed by England's JAMES COOK—were scientific in nature, many of them to the Pacific Ocean and part of the mission to find the Great Southern Continent. In the course of his voyage of 1772–75, Cook made a circumnavigation of Antarctica, demonstrating that no other continent existed in southern waters. Cook did not sight Antarctica himself. The discovery of the last known continent on Earth occurred in the early 19th century, the first sightings in 1820–21, by British naval officer EDWARD BRANSFIELD, American sealer NATHANIEL BROWN PALMER, and Russian naval officer FABIAN GOTTLIEB BENJAMIN VON BELLINGSHAUSEN. Arctic regions also were further charted in maritime expeditions of the 19th century.



The European age of exploration changed the world in terms of geographic knowledge, commerce, and colonization. It led to the diffusion of technologies and agricultural products as peoples of different continents learned from one another. It resulted in the development of European empires

and the exploitation of native peoples and their resulting depopulation and cultural dispossession from disease, warfare, and slavery.

See also COMMERCE AND EXPLORATION; CONQUEST AND EXPLORATION; GEOGRAPHY AND CARTOGRAPHY; LEGENDS AND EXPLORATION; NATIVE PEOPLES AND EXPLORATION; RELIGION AND EXPLORATION.

European Space Agency (ESA)

The European Space Agency (ESA) is an organization of European nations dedicated to the development of space research and technology for peaceful purposes. ESA was formed in 1975 from the merger of the European Space Research Organization (active since 1962) and the European Launcher Development Organization (active since 1964) and presently has 15 members: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. Canada participates as an observer. ESA promotes programs for launchers, science, telecommunications, Earth observation, and piloted spaceflight. Member nations are obliged to invite ESA's participation in any space project. And a nation's financial contribution is determined by the extent of involvement in various projects.

ESA headquarters are in Paris, France. The European Astronaut Center, located in Cologne, Germany, is responsible for the selection and training of ASTRONAUTS. The European Space Research and Technology Center, in Noordwijk, the Netherlands, conducts research and directs artificial SATELLITE projects. The European Space Operations Center, in Darmstadt, Germany, controls, monitors, and retrieves data from satellites. The European Space Research Institute, in Frascati, Italy, documents information and manages data obtained from remote sensing satellites. There is also a meteorological office in Toulon, France. Launching facilities are found in Norway, Sweden, and French Guiana, and tracking stations are located in Belgium, Germany, Italy, and Spain.

ESA has contributed greatly to SPACE EXPLORATION since its founding. The Ariane ROCKET, developed in the 1970s–80s, has been a mainstay in satellite launching. Arianespace, a division of ESA, is the first commercial space transportation company and launches a large portion of commercial satellites. ESA developed *Spacelab*, a module for scientific and medical studies, which first flew on the SPACE SHUTTLE in 1983. ESA ASTRONAUTS (the French call them *spationauts*) spent time on the *Mir* SPACE STATION of the Union of Soviet Socialist Republics (USSR; Soviet Union), since its first module was put into orbit in 1986. In 1986, ESA launched the *Giotto* SPACE PROBE, which studied Halley's Comet, and, in 1990, participated with the United States in the *Ulysses* probe, which flew over the poles of the

Sun. In 1995, ESA placed the Solar and Heliospheric Observatory and Infrared Space Observatory into orbit. The joint U.S.-ESA space probe *Cassini*, launched in 1997, is intended to explore Saturn, its rings, and some of its moons on arrival in 2004. The probe *Mars Express*, launched in 2003, will study the planet Mars into 2005. ESA is also involved in the ongoing construction of the International Space Station.

ESA has proven itself as a model of international cooperation while furthering knowledge of space and creating a successful commercial venture in the launching of satellites. It has also helped promote the idea of developing space programs around the world.

Everest, Mount

Mount Everest is a mountain peak in the central HIMALAYAS of Asia, located on the border between Nepal and the Tibet region of China. According to a survey by SATELLITE, Mount Everest's summit is 29,035 feet above sea level. (An earlier survey by the Indian government had determined 29,028 feet.) The Tibetans call the peak *Chomo-Lungma*, for "mother goddess of the land"; the Chinese (see CHINESE EXPLORATION), who claim it as part of China, use *Qomolangma Feng*, for "sacred mother of waters." The English name, *Everest*, was given in 1856 by Englishman Andrew

Waugh in honor of fellow Englishman SIR GEORGE EVEREST, under whom he had worked as a surveyor in India. As the highest elevation in the world, summitting Mount Everest came to symbolize a long sought-after goal in the history of world exploration and the ultimate challenge in MOUNTAIN CLIMBING.

The British, with assistance from Nepalese SHERPAS, made pioneering attempts on Mount Everest in the 1820s. In a climb via the north side in 1924, GEORGE HERBERT LEIGH MALLORY and Andrew "Sandy" Irvine lost their lives. Attempts continued the following years, falling short. In 1933, two British airplanes flew over the peak for the first time.

The summit was finally reached by Nepalese TENZING NORGAY and Englishman SIR EDMUND PERCIVAL HILLARY via the southeast side on May 29, 1953. Four Swiss mountain climbers repeated the achievement three years later. In 1963, an American team completed an ascent via the west; in 1975, a British team did so via the southwest; and, in 1980, a Japanese team did so via the north.

More than 600 climbers of many nations have now climbed Mount Everest. Nearly a third of that number have lost their lives on the mountain. As recently as 1996, eight climbers died in a blizzard on the descent after having reached the top. Many bodies have remained on the mountain. Mallory's remains were not located until 1999.

F



fool's gold (pyrite, iron pyrite)

Fool's gold, a mineral composed of iron sulfide, FeS_2 , is known by the technical name pyrite, or iron pyrites. Brassy yellow in color with a metallic luster, it often occurs in cube-shaped crystals. Its resemblance to gold led to its playing a part in the history of exploration.

In 1542, JACQUES CARTIER, exploring northeastern North America for France, in his search for the mythical Native American land of SAGUENAY, found what he believed to be gold and precious stones near the St. Lawrence River of present-day Canada. When tested in France, the minerals turned out to be pyrite and quartz.

In 1576, SIR MARTIN FROBISHER, exploring for England, brought a sample of pyrite back from Baffin Island in Frobisher Bay in what is now northern Canada, believing it to be gold. His rock was initially analyzed by two scientists, who reported it to be nothing more than worthless pyrite, but an Italian alchemist by the name of Aquello claimed he had found a speck of gold in the samples.

The CATHAY COMPANY was founded to develop mining interests, with London merchant Michael Lok a principal investor. Frobisher carried out two other expeditions, with mining operations the financial incentive, in 1577 and 1578, and returned with some 200 tons and 1,350 tons of ore respectively, which yielded nothing of value to the investors.

Fountain of Youth

The first known mention of a Fountain of Youth, the water of which would supposedly give the drinker eternal youth, relates to the legend of PRESTER JOHN, a fabled Christian monarch who was believed to rule territory in either Asia or Africa in the 12th century or afterward. Yet, the search for such a fountain is most associated with the explorations of the Spanish conquistador, JUAN PONCE DE LEÓN, as reported by Spanish historians Gonzalo Fernández de Oviedo and Antonio de Herrera.

By 1509, Ponce de León had been given the right by King Ferdinand of Spain to subjugate the native population of Puerto Rico and to take four-fifths of the spoils for himself, turning over the remaining fifth to the king. He had quelled Native American resistance and, over the next three years, ruled Puerto Rico as its governor, becoming wealthy from gold on the island. From the Carib Indians, Ponce de León heard reports of a land to the north, known as "Bimini" or "Boyuca," where there was supposedly gold in abundance and where a spring gushed with a magic water that gave perpetual youth to those who drank it or bathed in it. On losing his position as governor for political reasons in 1512, he was granted, as partial compensation, the commission to search for Bimini and colonize it.

In March 1513, Ponce de León left Puerto Rico in search of his new territory and the so-called Fountain of Youth. He sailed among the islands of the Bahamas and

briefly explored the coastlines. On April 2, he landed on the coast of Florida, near present-day St. Augustine. The next day was Easter, and he named his discovery *Pascua Florida*, after the Spanish tradition of celebrating Easter with flowers. Ponce de León believed this new land to be an island and spent seven weeks exploring its coast. He was frustrated in his search for gold and the restorative waters by Indian resistance. In September, after resupplying his ships in Puerto Rico, Ponce de León returned to the Bahamas, where he spent six weeks looking for the fabled fountain without results.

The search for the Fountain of Youth was delayed while Ponce de León fulfilled military obligations for the king. In 1521, at his own expense, he departed for the west coast of Florida with two ships and 200 men and landed near modern-day Tampa. It was his intention to establish a base from which to bring the land under control and to find the mythical fountain. Once again, the Indians were not welcoming, and they killed many of his party and wounded Ponce de León himself. The expedition sailed back to Cuba, where he died at age 61.

The legend of the Fountain of Youth faded with time. Two of the islands of the Bahamas became known as the Bimini Islands after the fabled land.

See also LEGENDS AND EXPLORATION.

French East India Company

In 1664, Jean-Baptiste Colbert, a statesman in the employ of French king Louis XIV, organized a joint-stock company, known as the French East India Company. The following year, the company established a base of operations on the island of Bourbon (present-day Réunion) in the Indian Ocean, which had been settled by France earlier in the century. In 1675, the company began trading at the port of Surat in northwestern India; the following year, at Pondicherry on the Coromandal coast of India. The latter became the company's most important port.

The company was profitable, trading from the EAST INDIES to Iran and China, but suffered from the extravagances of the French king. Drawing against the company's holdings, Louis XIV not only lavished his court with luxuries, he also engaged his nation in expensive wars. In 1719, facing bankruptcy, the French East India Company merged with several other French trading companies active in North America and Africa, including the Mississippi Company. The new concern was known as the *Compagnie des Indes*. Scottish financier John Law formulated a plan for the colonization and commercial exploitation of the Mississippi Valley and other French holdings in the Louisiana, known as the Mississippi Scheme. The company was heavily promoted, leading to a great inflation in its stock, and many French migrated to Louisiana. In October 1720, however,

due to overexpansion of its activities and the lack of assets, the company's stock crashed. Law fled from France.

The French East India Company regained its independent status in 1723. It suffered continuing losses. In 1730, it gave up participation in the transatlantic SLAVE TRADE. The next year it ceased all trade activities in Louisiana. And in 1736, it ceased the coffee trade in other parts of the Americas. The company henceforth concentrated its efforts on promoting trade with India. It established sugar plantations on Île de France (present-day Mauritius) and imported slaves to work the plantations. The company prospered for a time under the leadership of the governors in India, including Benoît Dumas, who oversaw its interests in 1735–41, and Joseph François Dupleix, who came into increased competition with the BRITISH EAST INDIA COMPANY in 1742–54. In 1751, British military leader Robert Clive captured Arcot in southern India. In 1761, other British forces captured France's premier port, Pondicherry. As a result, the French East India Company went into a rapid decline. By 1769, the company had ceased operations and had turned its possessions over to the French government.

See also COMMERCE AND EXPLORATION.

fur trade

The fur trade, the commerce in animal skins and pelts, has played a significant part in world exploration and development. Trade in furs has taken place since ancient times in all hemispheres and among various peoples. Yet it is most directly tied in with the history of exploration in the Northern Hemisphere, especially in northern parts of North America and in SIBERIA in eastern Asia. Europeans of all the colonial powers, especially in the 16th through 18th centuries—the French, Dutch, English, Russians, and, to a lesser extent, the Spanish—bartered trade goods, such as iron tools and utensils, cloth, glass beads, firearms, and alcoholic beverages, with indigenous peoples in order to fulfill a demand for furs in Europe, especially beaver pelts for felt for the making of hats with brims, a fashion style that first caught on in the 1580s. But the pelts of other animals, such as muskrat, mink, marten, fox, sea otter, and seal, were also sought. After the founding of the United States, Euro-Americans continued working the fur trade. Some became hunters and trappers themselves. And some native peoples acted as middlemen between other tribes and the European or Euro-American traders. The fur trade involved the capture of fur-bearing animals through hunting and trapping, skinning them, then transporting the skins for processing into fur clothing and felt.

French Trade

In early colonial times, the French most thoroughly exploited the fur trade. Whereas mining and the raising of live-

stock had a greater economic bearing on the development of Spanish colonies, and farming dominated the economy and land use of the English colonies, commerce in furs determined French expansion. The French and Indian fur trade began with JACQUES CARTIER in 1534 along the St. Lawrence River. His original intent had been to find a NORTHWEST PASSAGE from the Atlantic Ocean to the Pacific Ocean and gain maritime access to the Orient, but he found instead an untapped source of furs among Native Americans, who were eager to trade for European goods. SAMUEL DE CHAMPLAIN began colonizing New France in 1604, with trade with Native Americans central to the colony's economy. Over the next years, Champlain explored the northern woods and established trade agreements with various tribes to deliver their pelts to French trading posts. Port Royal in Acadia (now Annapolis Royal, Nova Scotia), Quebec City, and Montreal all became thriving centers of commerce.

Eastern Algonquian-speaking tribes, such as the Cree, Algonkin, Montagnais, Naskapi, Abenaki, and Micmac, were all involved in the French fur trade. Yet the Iroquoian-speaking Huron (Wyandot) became the foremost suppliers. From the years 1616 to 1649, the Huron, in conjunction with the Algonquian Ottawa and Nipissing, developed a trading empire among Native Americans from the Great Lakes to the HUDSON BAY to the St. Lawrence. Each of the three main trading partners had its own river and portage route for travel by CANOE, plus a yearly schedule, linking them up with each other and other tribes as well. Acting as middlemen, the Huron traded agricultural products to other tribes for pelts, which they then carried to the French in Quebec city or Montreal, to trade for European wares. In their flotillas of canoes, now laden with goods, they then completed the trade circle, returning to other peoples to exchange some of the European trade goods for still more furs.

This complex trade relationship lasted until the mid-17th century, ending with the military and economic expansion from the south by the five Iroquois (Haudenosaunee) nations—Mohawk, Oneida, Onondaga, Cayuga, and Seneca—who at the time were trading partners of the Dutch working out of Fort Orange (present-day Albany) in New Netherland. The Dutch also carried out some trade for furs with the Algonquian-speaking Lenni Lenape (Delaware) and Wappinger Indians out of New Amsterdam in present-day New York City. In the meantime, many Frenchmen, some of them sponsored by de Champlain and others by the Catholic Church, were venturing along lakes and rivers into the wilderness in search of new sources for furs. Many more would follow. The men who earned a livelihood by paddling large canoes into the wilderness in quest of furs for licensed traders came to be known as VOYAGEURS; the independent, unlicensed entrepreneurs who defied regulations, many of them living among the native popula-

tion, became known as COUREURS DE BOIS. Both voyageurs and coureurs de bois would propagate a group of people associated for years with the fur trade—the Métis—mixed-bloods of predominantly French and native descent, or of Scottish and native descent, especially Cree, Chippewa, and Assiniboine.

The fur market varied in profitability, one crash occurring in 1696. Yet the French fur trade expanded into new regions. Under royal management, New France extended its territory from the Great Lakes across the MISSISSIPPI RIVER into the Louisiana Territory. PIERRE-ANTOINE MALLET and his brother Paul as well as PIERRE GAULTIER DE VARENNES DE LA VÉRENDRYE helped open the trans-Mississippi region in the first half of the 18th century. French traders also expanded their markets in the south, from settlements along the Gulf Coast northwestward along the Mississippi and Red Rivers—parts of present-day Louisiana and Texas. New Orleans, founded in 1718, became a bustling center of commerce. And during the 18th century, the French established a special trade relationship with the Taovaya in the Southwest, the French name for both Wichita and Caddo Indians, who acted as middlemen for them as the Huron had done for the French the century before.

British Trade

England, after the takeover of New Netherland from the Dutch in 1664, inherited a trade relationship with the Iroquois. They also developed trade relations with tribes in the fur-rich untapped Hudson Bay region. Claim to the area was based on the voyage of HENRY HUDSON in 1610. The fur-trading expedition of MÉDARD CHOUART DES GROSEILLIERS and his brother-in-law PIERRE-ESPRIT RADISSON to the region in 1668–69 led to the founding of the HUDSON'S BAY COMPANY in 1670. The English, rather than sending traders inland to collect furs as the French did, established trading posts for barter with the Indians—especially the Cree and Chipewyan—at the mouths of the large rivers that drained into the bay. Ships could come and go in the summertime when the northern waters were free of ice. At this time, England did not know the extent of Rupert's Land, as its northern holdings were called, after Prince Rupert, the Hudson's Bay Company's chief backer and first governor. The French also claimed the Hudson Bay region and sent out various military expeditions against British posts, with some successes, and continued to play a dominant role in the fur trade until England's ultimate victory in the French and Indian Wars and the Treaty of Paris in 1763.

Starting in the 1780s, the Hudson's Bay Company also encountered fierce competition from the NORTH WEST COMPANY, founded by Scottish interests in Montreal. The rivalry spurred a period of extensive exploration in which new Indian contacts were established, especially among the tribes of the Canadian West. A "Nor'wester," SIR ALEXANDER

MACKENZIE, became the first non-Indian to cross the North American continent north of Mexico in the early 1790s. DAVID THOMPSON, who worked for both companies at different times in his career, mapped much of the Canadian West in the late 18th and early 19th centuries. The two companies merged in 1821 under the name of the older company, and the Hudson's Bay Company thrived in the fur trade for years to come.

Russian Trade

During the period of conflict between France and Great Britain, Russia also began developing its fur trade. Russia had been a world source of furs for centuries, especially luxury furs. With fur-bearing animals depleted in western parts, the *promyshlenniki*—Russian fur traders and hunters—pushed eastward into Siberia. Early traders, such as YEROFEY PAVLOVICH KHABAROV, who explored the Amur River in southeastern Siberia in the mid-17th century, conducted some trade in the region. In the mid-18th century, EMELIAN BASOV, one of the Cossacks who explored eastern Russia, developed the fur trade as far as the Kamchatka Peninsula.

In the years after Danish VITUS JONASSEN BERING's and Russian ALEKSEY ILYICH CHIRIKOV's voyage of exploration to Alaska on behalf of Russia in 1741, the *promyshlenniki* extended operations to North America, reaching the Aleutian Islands and the Alaskan mainland, where the sea otter was plentiful. In the early years, the traders formed ad hoc companies, with no rules governing their operations or their exploitative treatment of the Aleut, the native peoples on the Aleutian Islands, and the Inuit (Eskimo), on the mainland. The typical early Russian method of acquiring furs was to enter a native village, take hostages either by means of violence or with the threat of violence, pass out traps to the men, then demand furs in exchange for the lives of the women and children. If the men failed to deliver furs, hostages would be executed. Then, when the furs were collected, the Russians would depart until the next season.

By the 1780s, British and American traders also worked the Pacific coast, especially in Nootka Sound in present-day British Columbia. But they also extended their activity to Alaska in the north and in California in the south. Ships would sail from Boston around South America to fur country, then transport the sea otter skins to China, where there was a great demand.

To protect their territorial claims and economic interest, the Russians, under the impetus of GRIGORY IVANOVICH SHELIKOV, and his employer, Ivana L. Golikov, who had set up a base at Okhotsk in Siberia, began establishing permanent colonies, the first at Three Saints on Kodiak Island in 1784. Because of Shelikov's efforts and those of ALEKSANDR ANDREEVICH BARANOV, in his employ, in 1799, the RUSSIAN-AMERICAN COMPANY was chartered, with a monopoly in all Russian territory in North America. By 1812, that terri-

tory extended to northern California, where Fort Ross was founded near Bodega Bay.

American Trade

During colonial times, U.S. interests participated only minimally in the fur trade. The deerskin trade flourished in the Southeast, however. In 1808, JOHN JACOB ASTOR founded the AMERICAN FUR COMPANY, having various subsidiaries to follow, such as the Pacific Fur Company, with a trading post at Astoria, Oregon, and the South West Company, operating near the Great Lakes. The next year, a group in St. Louis on the Mississippi River founded the ST. LOUIS MISSOURI FUR COMPANY. Among the partners were JEAN PIERRE CHOUTEAU, his son AUGUSTE PIERRE CHOUTEAU, MANUEL LISA, WILLIAM CLARK, ANTOINE PIERRE MENARD, and ANDREW HENRY.

Both enterprises sponsored numerous expeditions into the western wilderness. In 1816, the American Congress enacted a law excluding British traders from the United States. Another American entrepreneur, WILLIAM HENRY ASHLEY, became a powerful force in the fur trade with his ROCKY MOUNTAIN FUR COMPANY, founded by him and Andrew Henry in 1822. Many of the men who worked for and traded with him came to be known as the MOUNTAIN MEN. Among the most famous of them were THOMAS FITZPATRICK, JEDEDIAH STRONG SMITH, and WILLIAM LEWIS SUBLETTE. In the 1820s–1830s, they traveled the Native American trails and passes of the West as hunters, trappers, and traders, and like the voyageurs and the coureurs de bois of French Canada, they learned wilderness survival skills from Native Americans.

During these same years, the U.S. government also played a part in the fur trade, through a system of federal trading houses, called the “factory system.” From 1790 to 1799, the U.S. Congress passed four Trade and Intercourse Acts pertaining to Indian affairs and commerce. Among other regulations, the acts provided for the appointment of Indian agents and licensing of federal traders, who could barter with the Indians for furs. In 1802, a follow-up Trade and Intercourse Act codified the four earlier ones. And, in 1806, an Office of Indian Trade was created within the War Department to administer the federal trading houses. The “factory system” was abolished in 1822, at which time provisions were made for the licensing of independent traders, who were better able to operate in the wilderness.



The international fur market experienced a decline starting in the late 1830s, partly because the beaver hat went out of style in favor of the silk hat. Other factors contributed to the end of the centuries-long fur boom: the depletion of fur-bearing animals and the advance of farming settlements. As for the mountain men and other counterparts, many of



A trapper poses for a photograph in his canoe with his dogs and hides sometime in the early 20th century. (*Library of Congress, Prints and Photographs Division [LC-USZ62-130283]*)

them stayed active in the American West long after the fur decline, as soldiers, scouts, and guides. In 1867, Russia gave up its North American venture and sold Alaska to the United States, and in 1869, the Hudson's Bay Company sold off its vast territorial holdings to the Canadian government. Yet the fur trade had made its mark in the history of exploration; the traders had pioneered routes, mapped vast

regions, and opened up vast areas to non-Indian settlement and other types of commercial development. Nowadays, the fur trade is still carried out in the far north, mostly by indigenous peoples.

See also COMMERCE AND EXPLORATION; NATIVE PEOPLES AND EXPLORATION.



galleon

The term *galleon* refers to a large ship with three to four decks and three square-rigged masts, except typically for the third (mizzen) mast, which had a triangular sail to help control direction. It was developed by the Spanish from the smaller CARRACK starting in the 15th century, with refinements throughout much of the 16th century. While the carrack started at around 80 tons, the galleon ranged from 500 to 1,400 tons displacement.

The galleon, too large for exploring uncharted coastlines, was designed for carrying cargo and for warfare. The Spanish used it to haul treasure and other resources from the Americas, taken from the Aztec and Inca Indians (see TREASURE AND EXPLORATION). They also used it to defend against fighting ships of other nations, notably the English. The size of the galleon not only made it harder to sink, but also allowed it to carry more guns, which were located in batteries on its broadsides.

As the flow of goods from their principalities increased, the Spanish devised a convoy system where 10 or more ships sailed together, guarded by galleons. In order to counter these measures, the English created smaller and faster fighting vessels, able to dodge the galleon's formidable firepower.

See also SHIPBUILDING AND EXPLORATION.

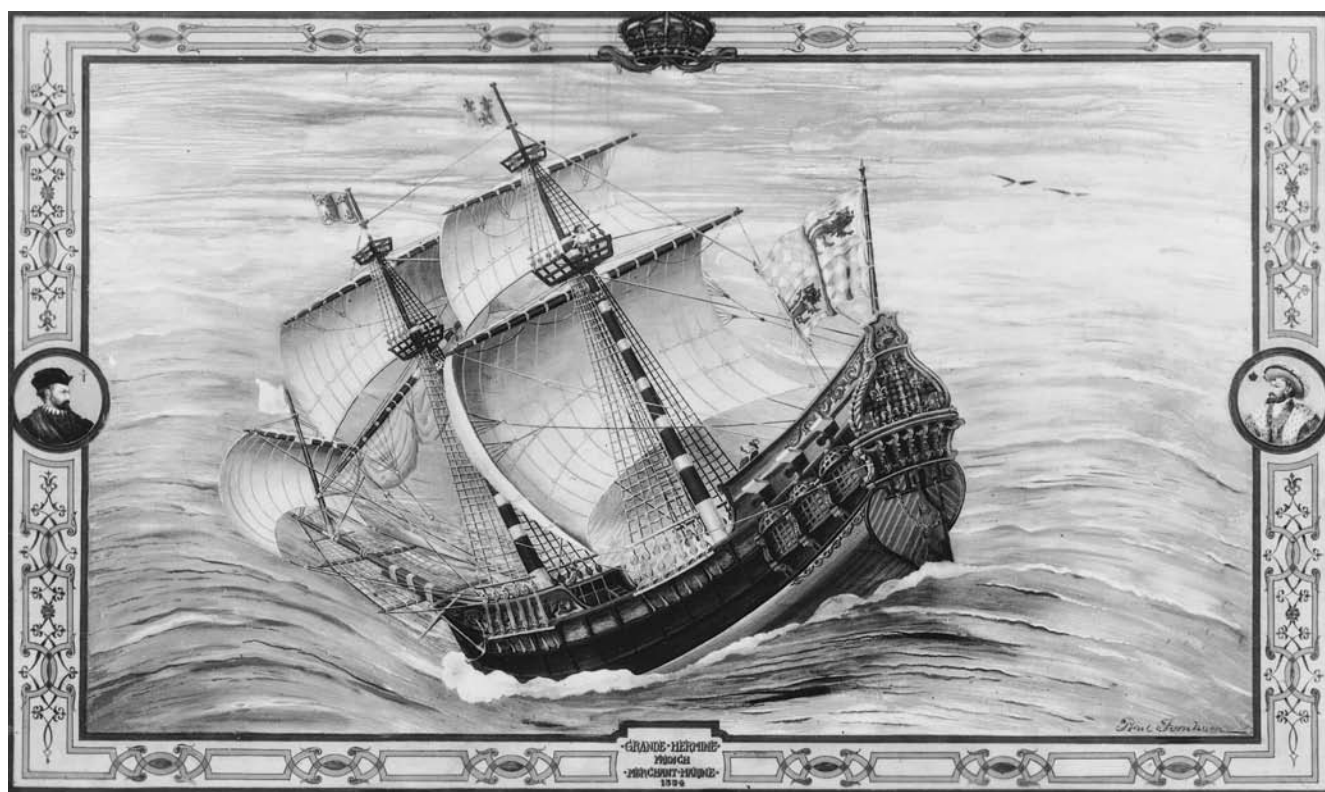
galley

The term *galley* or *galley ship* refers to a variety of vessels that were powered mainly by oar. The term is primarily as-

sociated with the vessels of ancient civilizations surrounding the MEDITERRANEAN SEA. The ancient Egyptians used galleys for transportation and trade on the NILE RIVER, RED SEA, and Mediterranean. By 1500 B.C., Egyptian ships were as large as 130 feet long and 16 feet wide. The Minoans also used galleys. Other ancient mariners, the Phoenicians, invented an early form of the galley, constructing it from cedar planks and using caulk to seal the seams. If the Phoenicians did make the journey around Africa in about 600 B.C., as fifth-century B.C. Greek historian HERODOTUS recorded, it would have been a galley that they used. Other Mediterranean peoples, the Greeks and the Romans, built later versions of the galley.

It is believed that most ships were constructed hull-first. Planks were fashioned and held together end to end with dovetail joints. On the edges, holes were drilled, and dowels of a hardwood were used to connect the planks along their length. The preferred woods for the planks were cedar, cypress, and pine. The ribs, which were inserted later, were made of a hardwood such as oak. Caulking was also necessary and was accomplished with a variety of fibrous materials and additives such as pitch and lime. Later shipbuilders began making the frame of their vessels first, then attaching the planking. Metal nails were used to hold the hull and frame together, copper being favored for its resistance to rust. In addition to caulking, a sheath of lead might also be added to prevent leaking and add to a ship's durability.

Galleys came to be as long as 150 feet with 50 oars, typically one man to an oar. Designers learned to build the



The *Grande Hermine*, a 16th-century French galleon, is flanked by cameos of Jacques Cartier and Francis I, king of France. (Library of Congress, Prints and Photographs Division [LC-USZ62-10525])

ships seven to eight times as long as they were wide for maximum speed. The oarsmen, often slaves, prisoners of war, or convicts, sat on benches to which they were chained. There would be decks built on either end of the ship for officers and passengers. Cargo and supplies would be stored in containers at the open center of the boat. Some galleys had sails, but typically more for decoration than for taking advantage of wind power.

As galleys advanced in design and size, more levels were added. The bireme was a version with two levels of oarsmen; the trireme had three levels. A galley containing five levels of oarsmen, was first recorded as being produced in the Italian city of Syracuse in 398 B.C., and galleys with as many as six levels of rowers have been recorded.

The galley was not suited for long trading voyages on the open ocean. To provision a crew that expended as much energy as the required number of oarsmen would not have been economical. The standard practice was to pull the ship on to shore at the end of the day and make camp. Cooking was done on the beach, not in the ship.

The galley was the primary warship of ancient civilization. The Greeks introduced the ram—a sharp projection on the front of a ship—for the purpose of ramming into and sinking an enemy vessel. The Romans made hooks to pull

enemy vessels to theirs and used planks as bridges to board them. After A.D. 395, when the Roman Empire was divided into the Western Roman Empire and the Eastern Roman Empire (the Byzantine Empire), the Byzantine navy came to use a type of fast galley, known as the dromon, or racer, with one or more banks of oarsmen to accompany and protect the larger cargo galleys.

At the beginning of the 14th century, the development of the galley reached its pinnacle. The *galea grossa*, designed and built for the needs of the traders of Venice, could be as large as 250 tons and complemented rowing with sail power. These ships, launched from the great cities of the eastern Mediterranean, through the Strait of Gibraltar (see GIBRALTAR, STRAIT OF) and north to England, were active into the 17th century. Yet, after Portugal established a trade route around Africa in the 16th century, and sail power was made more efficient, use of galleys dropped off. The design of boats in northern Europe during the Middle Ages came to rely predominantly on wind power, but in order to survive the unpredictable winds, they too would have a bank of oars. By the 15th century, most oceangoing ships were too heavy to row.

The LONGSHIP of the Vikings is a type of galley. In modern usage the term *galley* refers to the kitchen of a ship.

See also EGYPTIAN EXPLORATION; GREEK EXPLORATION; PHOENICIAN EXPLORATION; MINOAN EXPLORATION; ROMAN EXPLORATION; SHIPBUILDING AND EXPLORATION.

Ganges River

The Ganges, the most important river of the Indian subcontinent, flows 1,560 miles from the HIMALAYAS in northern India, over the area called the Gangetic Plain, through Bangladesh to the Indian Ocean. Formed by the confluence of the Bhagirathi and the Alaknanda Rivers, the Ganges River's annual discharge is rivaled only by the AMAZON RIVER in South America and the CONGO RIVER (Zaire River) in Africa. The Bhagirathi River, originating in an ice cave of the Gangotri at a height of 13,000 feet, is considered the source of the Ganges, later met by the Alaknanda River, fed by melting snow and glaciers. The Yamuna River is a main tributary. The Ganges changes names as it passes through India and Bangladesh. The main course of the river flows south and is joined by the Brahmaputra River and then by the Meghna River (the name by which it is known thereafter), as well as numerous other tributaries, before entering the Bay of Bengal. The delta region is referred to as the Ganges Delta or the Ganges-Brahmaputra Delta.

Of significant religious importance to the Hindu population, which composes a majority of India, the river is named after the Hindu goddess Ganga, daughter of Meru, the mountain god Himalaya. Hindus consider drinking from and bathing in the waters of the Ganges a sacred act, and the ashes of deceased persons are scattered in the river. Along the river and in the mountains by its headwaters are many holy sites visited by Hindu pilgrims, for the Lord Vishnu is said to have bathed there. The Ganges, with its snow-fed waters, is economically significant in addition, providing irrigation waters and fertilizing important foodcrops including rice, sugarcane, lentils, oil seeds, potato, and wheat.

Ancient Contacts

After the early Indus Valley civilization disappeared from India, replaced by Aryan tribes migrating from central Asia, the Gangetic Plain became a center of civilization. Starting in the sixth century B.C., the kingdom of Magadha grew in power and was later called the Mauryan Empire as it expanded into central India. By this time, the Persian Empire to the west had conquered as far east as the INDUS RIVER. In the fourth century B.C., Greek historian HERODOTUS wrote his account of the wars between the Greeks (see GREEK EXPLORATION) and the Persians, using his own travels, reports from traders, and earlier accounts to describe the geography of the known world. In Herodotus's account,

the lands east of the Indus River were unpopulated and the home of giant birds and other fantastic animals.

From 420 to 400 B.C., a Greek by the name of CTESIUS OF CNIDUS, in service as court physician to Darius II, emperor of Persia, traveled through Persia and east into India. Ctesius was the first Westerner to report about the Ganges River, and he discredited Herodotus's descriptions of the lands east of the Indus. Ctesius reported things no less fantastic than Herodotus, telling of men with giant feet, or dog-like faces, as well as huge worms in the Ganges that devoured camels and oxen. The latter, however, could be a description of the crocodiles that inhabit the river.

In 334 B.C., after ALEXANDER THE GREAT of Macedonia consolidated his rule over the Greek city-states, inspired by the writings of Herodotus and other accounts of the East, he made a military assault on the Persian Empire. Alexander advanced onto the Anatolian plateau, the Asian part of modern-day Turkey, conquering all of Asia Minor. After consolidating power over the countries on the Mediterranean coast as far west as Egypt, Alexander defeated Darius III of Persia, continued east through Afghanistan, and finally crossed the Hindu Kush range into India. Alexander's goal was to conquer India as far as the Ganges River, but his soldiers mutinied, fearing the strength of the Mauryan kings.

Alexander's empire collapsed into smaller kingdoms after his death in 323 B.C., while the Mauryan Empire continued to flourish around the Ganges. The ruler of a kingdom in ancient Syria sent a Greek diplomat, MEGASTHENES of Ionia, in about 302 B.C., as ambassador to the Mauryan Empire. Megasthenes traveled throughout northern India, making observations of Hindu culture and the natural history of the region. He was the first Westerner to make accurate observations of the Ganges River and to surmise its source correctly. Somewhat later in the middle of the third century B.C., a Hellenistic kingdom was established in Bactria, covering modern-day Afghanistan, Uzbekistan, and Tajikistan, and which, by about 150 B.C., had expanded to meet the Ganges River in the east. This kingdom collapsed under internal and external pressure. By that time, however, the Ganges had ceased to be a place shrouded in mystery for the Western world.

Chinese Buddhists

Contact between India and the lands to its east, including the flourishing Chinese Empire, was made extremely difficult by the high mountains and rugged terrain separating the two regions. But Buddhism, an offshoot of the ancient Hindu religion, spread slowly from the Ganges River Valley to the north and east. In the late fourth century A.D., a Buddhist monk called FA-HSIEN traveled into northern India by way of Afghanistan to retrieve ancient Buddhist texts and to visit Buddhist shrines. It was a long and arduous journey

through deserts and high mountains, and Fa-hsien returned without seeing the Ganges. In the seventh century, another Chinese Buddhist monk, HSÜAN-TSANG, conscious of the continued need for Buddhist texts from India to solve disputes and fill in gaps in religious knowledge, made his own journey into India. Hsüan-tsang eventually reached the valley of the Ganges, followed the river, and reached the Buddhist university in Baragaon.

Another famous Chinese pilgrim, I-CHING, inspired by the journeys of Hsüan-tsang, made his own trip to the Ganges River and the Buddhist holy sites there in A.D. 671. He traveled overland initially, but because of political turmoil in Tibet and the presence of Muslims (see MUSLIM EXPLORATION) in Afghanistan, I-ching boarded a Persian ship. He sailed to the mouth of the Ganges, then trekked overland, visiting holy sites before finally settling to study in Magadha, the ancient birthplace of Buddhism.

Charting the River

Although there had been parties of exploration sent by Indian rulers during periods of stability during the turmoil following the invasion of Islamic Turks in the 11th century, the river remained uncharted. In 1624–25, ANTONIO DE ANDRADE, a Jesuit missionary (either Portuguese or Spanish), who traveled from northern India across the Himalayas into Tibet, reported finding waters feeding the Ganges. Yet it was not until the British gained control of the Indian subcontinent in the 18th century that systematic exploration of the river was made. A British survey team, inspired by the tradition of expanding scientific knowledge of the Age of Enlightenment, as well as more practical political and tactical considerations, determined that the Bhagirathi River issuing from the foothills of the Himalayas was indeed the source of the Ganges, confirming the deduction of Megasthenes more than 2,000 years prior.

See also ASIA, EXPLORATION OF.

Gemini program (Project Gemini)

The Gemini program was one of a series of programs carried out by the United States for the purpose of SPACE EXPLORATION. Following the creation of the APOLLO PROGRAM in 1961 for the purpose of placing humans on the Moon, the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) instituted a number of programs to help accomplish such an undertaking: the manned MERCURY PROGRAM of 1961–63 to launch the first Americans into space; the manned Gemini program of 1964–66 to help develop the necessary techniques for a lunar mission; and the unmanned Surveyor program of 1966–68 to probe the lunar surface. The Gemini program competed with the VOSKHOD PROGRAM of the Union of Soviet Socialist Republics (USSR; Soviet Union).

Gemini missions were designed to keep two ASTRONAUTS in space for extended periods of time, perfect rendezvous and docking techniques, conduct experiments on equipment and human adaptation to conditions in space, and make accurate landings. All the missions were launched from Cape Canaveral (now Cape Kennedy), Florida, with a Titan II intercontinental ballistic missile (ICBM) as the propelling ROCKET. The Mission Control Center (MCC) was based in Houston, Texas.

The Gemini spacecraft had two modules: the adaptor module for orbital and docking operations, and the reentry module to return to Earth. Gemini spacecraft were controlled by the pilot, unlike those of the Mercury program. Landings were by parachute into the Atlantic Ocean or Pacific Ocean.

Twelve Gemini flights were conducted, the final 10 piloted. The most famous of these was *Gemini 4* in June 1965, during which EDWARD HIGGINS WHITE II became the first American to participate in extravehicular activity (EVA), more popularly known as “walking in space.” (ALEXEI ARKHIPOVICH LEONOV was the first human to walk in space, for the Soviet Union, in March of that same year on *Voskhod 2*.) *Gemini 4* set a record of four days in space; *Gemini 5*, seven days; and *Gemini 7*, 14 days. *Gemini 6* and *7* were in orbit at the same time and accomplished a rendezvous of within a few feet. A variety of rendezvous and dockings, with differing target vehicles, were accomplished from *Gemini 6* on. In the entire Gemini program, astronauts logged about 2,000 hours in space and about 12 hours in EVA.

geography and cartography

Geography is the science of Earth’s surface form. The first-known use of the term, literally meaning “earth description,” is by third-century B.C. Greek scholar ERATOSTHENES. Geographic studies encompass both physical and cultural features, that is, both the natural environment and the human environment.

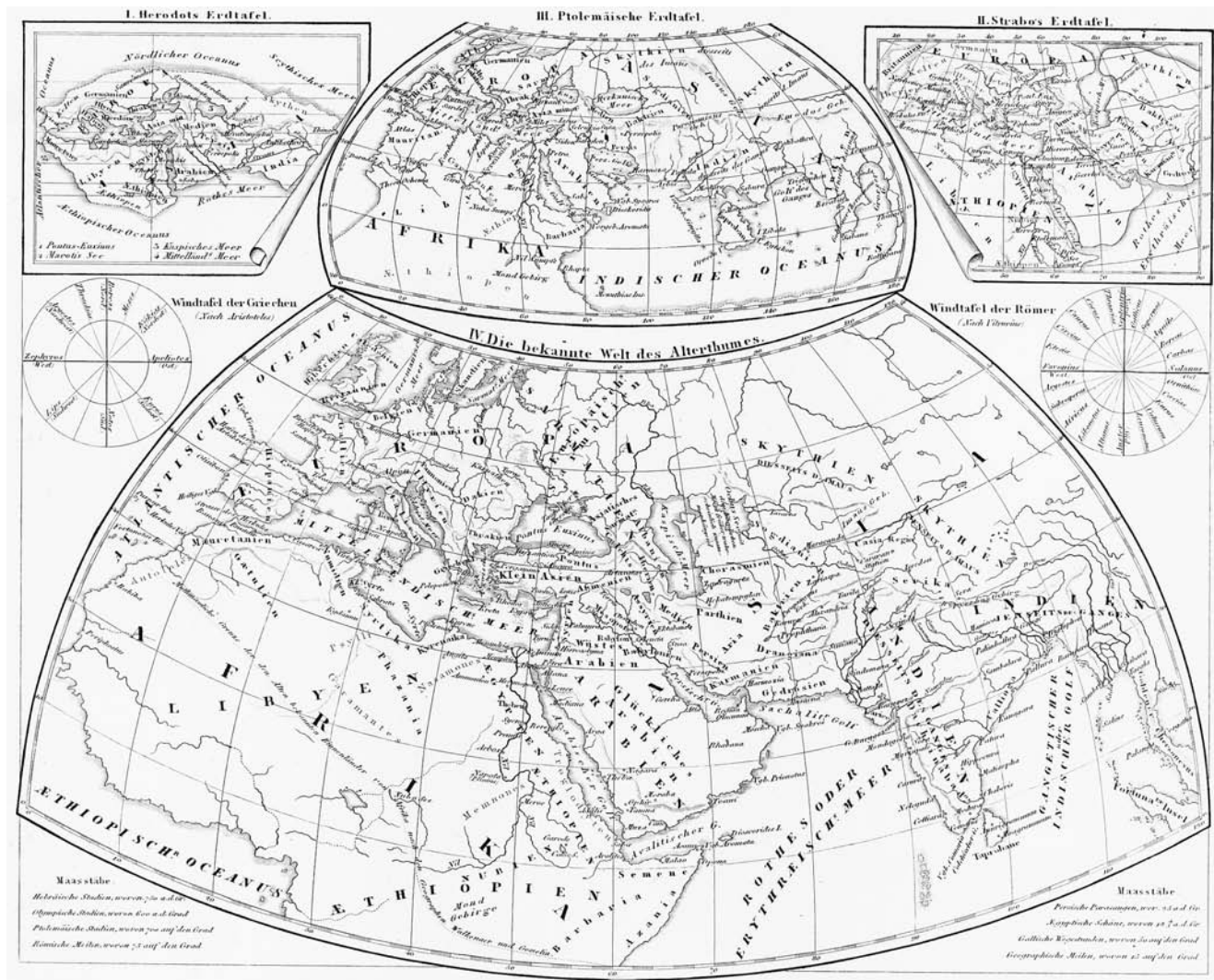
The two broad classifications of geography are physical geography—including geomorphology, climatology, biogeography, soils geography, HYDROGRAPHY, and oceanography (see OCEANOGRAPHY AND EXPLORATION); and cultural geography, also called human geography (and formerly anthropogeography)—including historical geography, political geography, military geography, economic geography, ethnography, historical geography, urban geography, demography, and linguistic geography. Geography is thus an integrating discipline, bridging earth sciences and social sciences. There are two general approaches to geographic studies: “systematic geography,” focusing on an individual feature; and “regional geography,” focusing on relationships among differing features or regions.

Geographic studies necessitate the collection of data through a variety of means in the field, such as surveys, photography, or geological investigations; through a quantitative study of collected data using mathematical and statistical analysis; or by studying historical sources (see PHOTOGRAPHY AND EXPLORATION; SURVEYING AND EXPLORATION). The results of such studies can be presented in various ways, the most practical being a combination of words and images in maps and charts. (Those two terms—*map* and *chart*—have been used interchangeably for any representation of the surface of Earth or of the heavens; yet the latter term, when used with regard to exploration, most often refers to a navigator's map relating to the marine environment or an aviator's chart for flying—see MAPS AND CHARTS.) Cartography is the art and science of making maps and charts. The history of the gaining of geographic information and representing that information cartographi-

cally by geographers/cartographers is parallel to the history of exploration.

Ancient European Geographers

The first geographers were those ancient travelers or scribes who recorded information about lands. The earliest existing maps, clay tablets inscribed by Akkadians of ancient Mesopotamia—showing settlements, cultivated plots of lands, streams, and hills—dates to about 2300 B.C., at the time of the ruler SARGON. Other early maps of the region, dating as far back as 2000 B.C., show plans of properties for the purpose of taxation. Another Mesopotamian people, the Babylonians, carved what is considered the earliest extant world map—a clay tablet from the sixth century B.C.—on which the city of Babylon is depicted, flanked by Assyria to the east and Chaldea to the southwest, and surrounded by oceans and what are thought to be islands.



A number of maps by ancient cartographers were re-created in the 1851 *Iconographic Encyclopaedia of Science, Literature, and Art* by Johann G. Heck. (Library of Congress, Prints and Photographs Division [LC-USZ62-115363])

Early mariners, such as Minoans, Egyptians, Phoenicians, and Greeks, who traveled throughout the MEDITERRANEAN SEA, especially for purposes of trade, helped spread and record geographic information. Most of the sea's shorelines were known to the various seagoing peoples by about 1400 B.C., and, in ensuing centuries, ancient mariners explored other waterways. An extant Egyptian map drawn on papyrus, which shows Nubian gold mines between the NILE RIVER and RED SEA, dates to 1300 B.C. By at least the sixth century B.C., Egyptians and Phoenicians were venturing along the Red Sea and into the Indian Ocean (see EGYPTIAN EXPLORATION; PHOENICIAN EXPLORATION). By the fifth century B.C., the Carthaginians—predominantly of Phoenician ancestry—had also navigated past the Strait of Gibraltar (see GIBRALTAR, STRAIT OF) and explored the Atlantic coastlines of Europe and Africa (see CARTHAGINIAN EXPLORATION).

The ancient Greeks made geography a scientific and philosophical study. In the sixth century B.C., Greek philosopher Anaximander drafted the first known map to represent a concept of the world, with the Aegean Sea off Greece represented as the center, encircled by Mediterranean lands and oceans. A form of ancient geographic text thought to have originated about the same time and associated with Greek mariners was the PERIPLUS, an account of a sea voyage, describing landmarks and waterways. Also in the sixth century B.C., HECATAEUS OF MILETUS published a work called *Periegesis* (Tour Around the World) about his travels in Asia Minor and Egypt. In the fifth century B.C., another Greek historian, HERODOTUS, chronicled the history and geography of the Mediterranean world, drawing on the writings of Hecataeus and other ancient travelers. In the fourth century B.C., a scholar, PYTHAEAS, also an accomplished navigator, traveled along the Atlantic coast of Europe and perhaps even reached the ARCTIC CIRCLE.

The Greeks also first made the case that Earth was round, as put forth, in the fifth century B.C., by a philosopher, Parmenides. In the fourth century B.C., Greek philosopher Aristotle recognized that all matter tends to fall toward a common center; that, in traveling from north to south, new constellations become visible while others disappear; and that, during an eclipse, Earth casts a circular shadow on the Moon. A scholar, Eratosthenes, who served as head of the library at Alexandria in North Africa in the third century B.C., is cited as the first systematic geographer. He drew a map of the known world, representing parts of Europe, Asia, and Africa, which was the first to use grid lines, an early version of lines of LATITUDE AND LONGITUDE. He also first accurately calculated the circumference of Earth. A second-century B.C. astronomer and mathematician, HIPPARCHUS, further developed the concept, making the east-west lines parallel and the north-south lines at right angles to them. A

Greek geographer, Crates of Mallus, made the first known GLOBE in the second century B.C.

With the rise to power of the Romans and the expansion of the Roman Empire around and beyond the Mediterranean region, geographic knowledge became even more organized—for military and trade purposes. Early in the first century A.D., Greek STRABO published the 17-volume *Geography* in Rome, summarizing his own travels and accounts of others' travels. Later in the century, PLINY THE ELDER, a Roman, published *Historia Naturalis* with geographic accounts of Europe, Asia, and Africa. The last greatest classical geographer—as well as mathematician and astronomer—was hellenized Egyptian PTOLEMY of the second century A.D. Like Eratosthenes, he worked out of Alexandria. His eight-volume work, *Geographia*, or *Introduction to the History of the Earth*, summarized the geographic and cartographic knowledge of his time—including a compilation of 8,000 places and their coordinates of latitude and longitude. The work influenced Western thought for centuries.

Other Cultures

It is a mistake to ignore the geographic accomplishments of other peoples around the world, such as the Chinese, with regard to geography and cartography (see CHINESE EXPLORATION). Mention is made of the use of maps in ancient China as far back as the seventh century B.C. The earliest extant Chinese maps—drawn on silk—date to the second century B.C., showing highly developed cartographic techniques including representations of topography. The ancient Marshall Islanders (see OCEANIA) made charts from cane sticks lashed together to indicate wind and wave patterns, with shells and corals attached to depict islands. The Polynesians used palm sticks for similar charts. By the time the Spanish arrived in Central and South America in the 16th century, the Inca, Maya, and Aztec Indians were also making maps on calico and other materials. Some Native North Americans drew maps on rawhide. The Inuit of Arctic North America carved coastal maps in ivory.

The Middle Ages

After the collapse of the Roman Empire, among Europeans of the Middle Ages, the Vikings were the most active voyagers (see VIKING EXPLORATION). They were also geographers in that they passed on their geographic discoveries, such as voyages to North America, in written accounts. (The VINLAND MAP, visually depicting these voyages, turned out to be a forgery.)

Most European mapmaking of the medieval period was carried out by Christian monks—such as sixth-century Egyptian-born COSMAS INDICOPLEUSTES and eighth-century Spaniard BEATUS OF VALCAVADO—whose religious beliefs affected content as much as did accurate geographic knowledge. On early world maps, from about the fourth to

the 14th century—known by the Latin term *MAPPA MUNDI*—there is no attempt to represent true scale or latitude and longitude. The PORTOLAN CHART—a navigational chart similar to the periplus of the ancient Greeks—containing accurate geographic information, although without latitude and longitude, was common by at least the beginning of the 14th century.

The greatest geographers and cartographers of the Middle Ages were the Arab Muslims, who maintained the cartographic principles of Ptolemy and the Greeks (see MUSLIM EXPLORATION). In the 11th century, scholar ABU AR-RAYHAN MUHAMMAD IBN AHMAD AL-BIRUNI made observations on Earth's circumference and latitude and longitude. In the 12th century, ABU ABD ALLAH MUHAMMAD ASH-SHARIF AL-IDRISI produced an influential work, *The Book of Roger*, which contained 70 accurate maps making use of a grid system, as well as accounts of his and others' travels in Europe, North Africa, and the Middle East. In the 13th century, SHIHAB AL-DIN ABU ABD ALLAH YAQUT AL-RUMI, a Greek-born Muslim, published a gazetteer-type geographic study. And, in the 14th century, ABU ABD ALLAH MUHAMMAD IBN BATTUTAH traveled more than any other known individual to date, as far as the edge of SIBERIA in Central Asia and across the SAHARA DESERT in Africa, and wrote detailed descriptions of the lands he visited. In the meantime, the Chinese recorded information on distant lands. In 1311–20, cartographer CHU SSU-PEN produced a world map with accurate information on Africa.

By the late Middle Ages, Europeans were again looking eastward. The CRUSADES of the late 11th century to the late 13th century took them to the Near East. Also in the 13th and 14th centuries, a number of diplomats, missionaries, and merchants, such as Venetian merchant MARCO POLO in the 1270s–90s, traveled to regions of the Far East as well. Marco Polo wrote descriptions of places he had visited. Much of this information was incorporated by Spaniard ABRAHAM CRESQUES in his *Catalan Atlas* of 1375, a world map based on geographic information obtained from Marco Polo and other travelers.

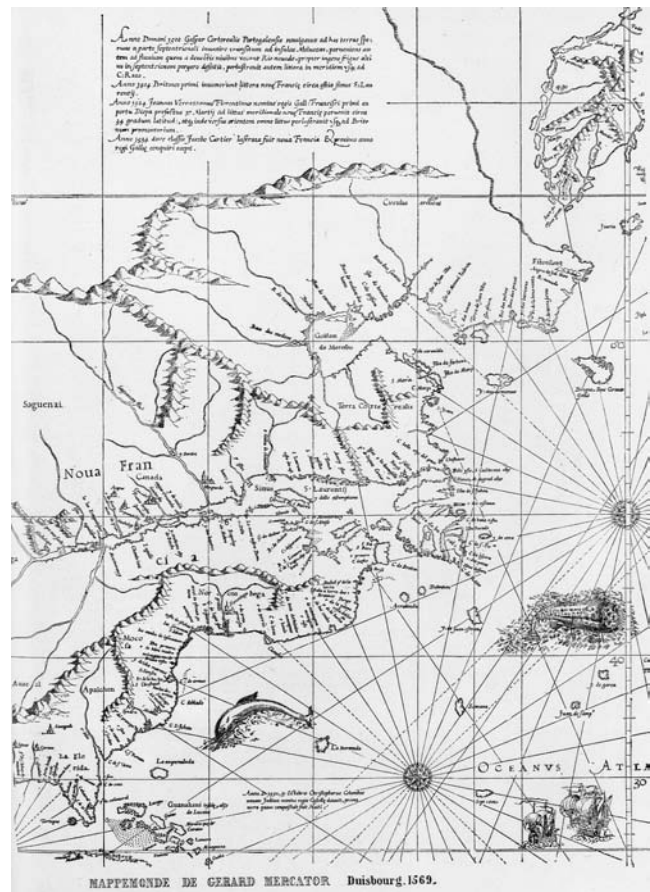
The European Age of Exploration

The 14th century is cited as the beginning of the RENAISSANCE in Europe, a time of an expanding worldview, and the 15th century as the start of the EUROPEAN AGE OF EXPLORATION, initiated by the Portuguese voyages of exploration along the west coast of Africa. In 1492, the same year that CHRISTOPHER COLUMBUS made the post-Viking European discovery of the Americas, German cartographer MARTIN BEHAIM, working for the Portuguese, developed a globe of the world depicting islands in the Atlantic Ocean.

The 16th century experienced a burst of cartographic creativity in Europe, as mapmakers recorded the abundance of new geographic information from the voyages of exploration

to the Americas and beyond. The rediscovery and translation into Latin of Ptolemy's *Geographia* in about 1410 helped set the stage. The development of printing via German Johannes Gutenberg's invention of the movable type printing press, as well as advances in engraving in the mid-15th century, made cartography more practical. (The earliest European printed maps were made from woodcuts.) The printing press also made books on geography available to the general public. And the extent of the Earth came to be understood finally with the first CIRCUMNAVIGATION OF THE WORLD for Spain under FERDINAND MAGELLAN in 1519–22.

Among the many cartographic breakthroughs were the first world map depicting the Americas and showing a coastline from present-day Newfoundland to Argentina by German MARTIN WALDSEEMÜLLER in 1507. Spanish cartographers active in mid-century, such as GONZALO FERNÁNDEZ DE OVIEDO Y VALDEZ and DIEGO GUTIÉRREZ, depicted explorations in the Caribbean and South America. In 1569, Flemish cartographer GERARDUS MERCATOR created the first map accurately depicting latitude and longitude through his mapmaking techniques known as the MERCATOR PROJECTION, one method of representing



Gerardus Mercator published this world map in 1569. (Library of Congress, Prints and Photographs Division [LC-USZ62-92883])

Earth's curve on a flat surface. Because of its accuracy, this cartographic technique revolutionized navigation (see NAVIGATION AND EXPLORATION). The next year, another Flemish cartographer, a friend and associate of Mercator, ABRAHAM ORTELIUS, produced a world atlas. In his annual editions through the end of the century, he stayed abreast of new geographic discoveries.

A number of Englishmen also contributed to the field of geography and cartography during this period. In 1576, SIR HUMPHREY GILBERT published a work furthering the idea of a NORTHWEST PASSAGE across North America. Although some of his ideas were based on fable, the work contributed to the continuing European fascination with world geography. In the 1580s, RICHARD HAKLUYT published three influential books on exploration and geography, including *The Principal Navigations, Voyages, and Discoveries of the English Nation*. In 1598, MARTIN LLEWELLYN published the first English atlas to show sea routes to the Far East.

An Organized Field of Study

Geography and cartography became more organized as a field of study in the 17th and 18th centuries. In 1625, Nathaniel Carpenter advanced geographic methodology by emphasizing spatial relationships among Earth's physical features. In 1634, Dutch cartographer WILLEM JANSZON BLAEU published a comprehensive atlas detailing world explorations up to that time, carrying on the tradition established by Ortelius. A German geographer by the name of Bernhardus Varenius became influential in theoretical geography. He defined three branches of the science in his work *Geographia generalis*, published in 1650: one studying the form and dimension of Earth; another studying variables depending upon the position of Earth, such as climate, seasons, and tides; and a third studying relationships of different regions.

Yet many erroneous geographic concepts persisted, such as that of a GREAT SOUTHERN CONTINENT, the legendary Terra Australis, first conceived in ancient times and still promoted in the mid-18th century by French scholar CHARLES DE BROSSES. English mariner JAMES COOK, who brought an appreciation of the sciences to his seamanship and explorations, finally put that particular notion to rest in his voyage of 1776–80 by circumnavigating Antarctica. By the late 18th century, science was typically an official adjunct to exploration. Many maritime expeditions of that period and the early 19th century, like those of Cook and that of Frenchman ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux, in the 1790s to the South Pacific Ocean, included naturalists and geographers (see NATURAL SCIENCE AND EXPLORATION). Mapping new regions became the incentive for many overland expeditions, such as those of British fur trader and cartographer DAVID THOMPSON, starting in the 1780s, in western Canada.

Modern Geography

German naturalist ALEXANDER VON HUMBOLDT, who traveled widely, especially at the turn of the 19th century, is sometimes cited as the “father of modern geography.” His great contribution was the classification and comparative description of geographic features observed in the field, the approach known as systematic geography, as put forth in his five-volume work *Kosmos*, published in 1845–62.

Another German, Carl Ritter, promoted the comparative study of particular areas, the approach known as regional geography, as presented in his 19-volume work *Geography and Its Relation to Nature and the History of Man*, published in 1822–59. The German geographer, Friedrich Ratzel, helped develop the field of cultural geography—the study of the distribution of people and their cultures in particular regions of Earth—in his work *Anthropogeographie*, published in 1882.

Many other geographers of the 19th and 20th centuries helped shape the discipline as it has come to be practiced today. And a number of geographic societies founded in the 19th century—such as England's ROYAL GEOGRAPHICAL SOCIETY; the United States's AMERICAN GEOGRAPHICAL SOCIETY and National Geographic Society; and France's Société de Géographie—helped further interest in the field and promote the gathering of information through the sponsorship of expeditions.

Expanding Technologies

Modern technology has revolutionized geographic studies and cartographic representations. Photography, including infrared photography and AERIAL PHOTOGRAPHY, some of it by SATELLITE, along with specialized sensors, such as multispectral scanners, has aided in the recording of geographic information and computers in the quantitative analysis of it. Computers are also used in mapping. The Geographic Information System (GIS), a computer system introduced in the 1960s, processes huge amounts of data and can create two- or three-dimensional images of an area. The vast majority of Earth's surface has now been accurately mapped.

Many different processes are utilized in modern mapping, among them photoengraving, wax engraving, lithography, or modeling in clay, plaster of paris, or plastic.

Gibraltar, Strait of (Bab al-Zakak, Gaditan Strait, the Straits, Straits of Gibraltar)

The Strait of Gibraltar (or the Straits of Gibraltar, or simply the Straits) is a narrow passage connecting the MEDITERRANEAN SEA to the east with the Atlantic Ocean to the west, situated between Europe to the north and Africa to the south. About 30 miles long and eight to 24 miles wide, the strait has a continuous current flowing easterly from the Atlantic, and a westerly undercurrent carrying salty outflow

from the Mediterranean. The term *Gibraltar* is derived from the Arabic *jebel* for mountain and *Tariq*, the name of a Moorish general who invaded Spain in 711. Another name is Gaditan Strait from the Latin *Fretum Gaditanum*. The Arab name is Bab al-Zakak.

The eastern entrance to the Strait of Gibraltar is flanked by two promontories, known since ancient times as the Pillars of Hercules (or the Gates of Hercules). The European promontory, the Rock of Gibraltar (also Calpe, a name given by the Romans), a limestone formation, is situated on a British-ruled peninsula connected to the Iberian Peninsula and Spain; the town of Gibraltar lies at the peninsula's northwestern end. The African promontory, known as Jebel Musa (also Abyla), lies to the west of Ceuta, a Spanish town surrounded by the nation of Morocco. A Greek myth holds that Hercules, the son of the god Zeus, wrenched apart a mountain range to join the seas; another is that he left the pillars there during his travels.

The narrow strait served as a barrier to ancient peoples navigating the Mediterranean. It is not known which mariners of the ancient world first ventured through it into the Atlantic. Artifacts crafted by Minoans from the island of Crete in the eastern Mediterranean have been found as far west as the Balearic Islands off the east coast of Spain. The Phoenicians from the Mediterranean east coast also traveled the entire sea in their GALLEY ships. The writings of the fifth-century B.C. Greek historian HERODOTUS indicate that, sailing for the pharaoh NECHO II in about 600–597 B.C., Phoenicians followed the RED SEA southward from the



This late 19th-century photograph shows the Rock of Gibraltar, which flanks the Strait of Gibraltar from the European side. (Library of Congress [LC-USZ62-91741])

Gulf of Aqaba to the Indian Ocean and possibly circum-navigated Africa, returning to the Mediterranean by way of the Atlantic and Strait of Gibraltar. It is known from other Greek and Roman writings that, in the fifth century B.C., Carthaginians—Phoenicians from the city of Carthage in North Africa, in particular HANNO and HIMILCO—navigated past the Strait of Gibraltar and explored the Atlantic coastlines of Europe and Africa. The Carthaginians, in order to control trade with Atlantic coastal regions, guarded the strait and promoted the idea of sea monsters and other hazards beyond. The Greeks eventually managed to pass through it, the mariner and scholar PYTHEAS for one, in the fourth century B.C. It came to offer a regular route for trading ships between lands of the Mediterranean and of the Atlantic coasts of Europe and Africa.

See also CARTHAGINIAN EXPLORATION; GREEK EXPLORATION; MINOAN EXPLORATION; PHOENICIAN EXPLORATION; ROMAN EXPLORATION.

globe

The term *globe* refers to a round body. It also is applied to a spherical map, or model, of Earth or the heavens. A model of Earth, known as a terrestrial globe, represents Earth without the typical distortion of flat maps. A model of the heavens, known as a celestial globe, is a representation of the nighttime sky as seen from Earth. Both types of globes, like flat maps, are tools of navigation.

Globes have been made from wood, metal, plaster, or papier-mâché. The cartographic information is engraved and sometimes drawn on the sphere, or on printed parchment or paper sections with the information—known as gores—glued over it. For modern globes, plastics are also sometimes used. Some terrestrial globes show relief features of Earth. Globes are often attached to a rod running from the NORTH POLE to the SOUTH POLE, which represents the axis around which the Earth rotates, and are tilted at an angle of about 23.5 degrees, indicating the tilt of Earth away from the axis of the Sun.

The primary advantage of a globe is accuracy regarding the shape and curvature of Earth (although most do not show the flattening of Earth at the Poles or the bulge below the EQUATOR). Globes have the added advantage over flat maps of representing long routes, such as by air or sea, as well as natural events that follow the curvature of Earth, such as earthquake shocks and tidal waves. The disadvantages of globes for navigators are their bulkiness and their limitation in showing detail for portions of the Earth.

The ancient Greeks first scientifically made the case that Earth was a sphere. In the fifth century B.C., Greek philosopher Parmenides hypothesized that Earth was round. In the fourth century B.C., Greek philosopher Aristotle recognized that all matter tends to fall toward a common center; that,

in traveling from north to south, new constellations become visible while others disappear; and that, during an eclipse, Earth casts a circular shadow on the Moon. The first known globe dates from about 150 B.C., reported to have been constructed by Greek geographer Crates of Mallus. In the second-century A.D., Greek-Egyptian PTOLEMY wrote about the accuracy of globes as well as their limitation in scale. Yet, the view that Earth was flat persisted among many peoples for centuries to come. In 1230, an English mathematician and astronomer, JOHN HOLYWOOD, published *Treatise on the Sphere*, presenting the idea that Earth might be spherical. It was not until the 14th century and the RENAISSANCE, however, that geographic theories of the ancient Greeks and the Muslims became widely known in Europe and changed long-held views. In any case, by the 15th century, European scholars generally accepted the notion of Earth's roundness.

The oldest extant globe was made in 1492 by German cartographer MARTIN BEHAIM—Behaim's *Erdapfel*, or "earth apple," as it was called. Behaim used a plaster mix over a spherical mold and pasted strips of parchment to the surface; he then mounted it on a wooden tripod. The 15th–16th-century Italian artist and scientist Leonardo da Vinci also made globes. GERARDUS MERCATOR, famous for the MERCATOR PROJECTION, a type of mapmaking with a practical depiction of LATITUDE AND LONGITUDE, constructed a world globe in 1541 and, 10 years later, a celestial globe. The earliest known English globes were made by Emery Molyneux in 1592, much of the geographic information for them provided by English mariner JOHN DAVIS.

See also GEOGRAPHY AND CARTOGRAPHY; GREEK EXPLORATION; MAPS AND CHARTS; MUSLIM EXPLORATION; NAVIGATION AND EXPLORATION.

gnomon

A gnomon is any device used to tell time by the shadow it casts. The term is also applied to the specific part of a sundial that casts the shadow. Gnomons have been made in a variety of forms throughout the ages. The gnomon was possibly the first scientific instrument and one of the earliest devices—along with the sounding pole for measuring water depth—used for the purpose of navigation. From the length of a shadow cast, an approximation of latitude could be made. Gnomons were produced as portable objects, and there is mention of them being taken along on ancient sea voyages. Early mariners would have taken them ashore to determine relative location.

Poles and large stones have been used as gnomons. The ancient Egyptians told time by the shadows cast by pyramids and obelisks. Some gnomons had notches in their side to provide readings. In the Middle Ages, the Vikings made use of a type of sundial known as a sun-measuring disk, or

shadow board, which floated in a tub of water to level it. The gnomon—in this case, an adjustable center pin—could be raised or lowered based on the height of the sun at different times of the year. The shadows cast on concentric circles on the disk on which were marked directional points would help determine latitude.

See also LATITUDE AND LONGITUDE; NAVIGATION AND EXPLORATION.

Gobi Desert

The Gobi Desert, located in present-day Mongolia and northern China, with an area of about 500,000 square miles, is one of the largest deserts in the world. Shaped like a crescent and extending about 1,000 miles from east to west and 600 miles from north to south, it sits on a plateau from 3,000 to 5,000 feet above sea level and is mostly surrounded by steppe land and high mountains. These include the Da Hinggan Ling to the east, the Altun Shan and Nan Shan to the south, and the Altai, Hangayn Nuruu, and Yablonovy to the north. The far western region of the Gobi, from the foot of the Pamir Plateau, through the Tarim River basin to Lop Nor, the dried-up bed of an immense salt lake, is often considered separately and called the Takla Makan.

The name *Gobi* is Mongolian for "waterless place," while the Chinese refer to the desert as Yintai Shamo, meaning "sand desert," and Han-hai for "dry sea." Only the southwestern quarter of the desert, however, is entirely without water; the remainder is covered with sparse vegetation, mostly grass, shrubs, and thorns. Most of the Gobi is covered with a shallow layer of gravel; only a small percentage consists of sand dunes.

Nomadic peoples inhabit the Gobi, their flocks surviving on what vegetation there is. Frequent high winds lead to dangerous sandstorms. Violent late-summer thunderstorms create large shallow lakes, but the only reliable sources of water for inhabitants of the plateau are wells and springs. The temperature in the Gobi varies from the extremes of minus 40 degrees Fahrenheit in the short winter to 113 degrees in the summer.

Mongols and Chinese in the Gobi

The Mongols, who inhabited the Gobi Desert and surrounding steppe country, were a nomadic people who hunted and maintained herds of horses and sheep and lived in tents (see MONGOL EXPLORATION). They were divided into warring tribal groups until GENGHIS KHAN united them in the early 13th century. He founded his capital—Karakorum—in the northern Gobi.

The main east-west trade route, called the SILK ROAD, ran along a narrow band called the Hexi Corridor, skirting the southern edge of the Gobi Desert. But the desert itself contained several important caravan trails, carrying goods

from Partizansk in Russia to Hami in China, and from Zhangjikou in China to Ulaanbaatar, a major city of Mongolia. The Gobi proved a dangerous place for Chinese traveling westward (see CHINESE EXPLORATION). HSÜAN-TSANG, a Chinese Buddhist monk hoping to reach India to obtain original Buddhist texts and visit holy sites, denied passage by the T'ang emperor, set out in secret, in about A.D. 629, from the western end of the Great Wall of China, and entered the Gobi. Abandoned by his guide, Hsüan-tsang wandered through the desert strewn with the bleached bones of animals. He was saved when his horse, smelling water, carried him to an oasis. From there, nomadic tribesmen escorted him out of the Gobi, and he resumed his travel to the west.

Europeans in the Gobi

The earliest European reports of the Gobi Desert come from the travels of MARCO POLO. Polo, a native of Venice, was the son of NICCOLÒ POLO, a merchant who along with Marco's uncle MAFFEO POLO had traveled across Asia to the court of the Great Khan in the East. In 1271, at age 17, Marco accompanied his father and uncle on their second journey to the East. After failing to find acceptable passage by sea, the Polos decided to travel overland. They traveled through Afghanistan, along the edge of the Takla Makan desert, to the city at Lop Nor on the edge of the Gobi. They joined a camel caravan crossing the desert and were met in Inner Mongolia by a representative of Kublai Khan. After 24 years in service to the kahn, the Polos returned to Venice. Marco Polo recorded his voyages, which were met with intense skepticism.

There was relatively little western travel through the Gobi Desert, and, when there was, it followed the pattern of the Polos, staying on traditional caravan trails. As a result, the desert remained mostly uncharted through the 19th century, despite visits by a number of Europeans of varying nationalities. A French Jesuit priest named Jean François Gerbillon traveled across the desert in the 1680s. The first significant exploration of the Gobi was undertaken by NIKOLAY MIKHAILOVICH PRZHEVALSKY, a Russian Cossack and career military officer. Przhevalsky volunteered in 1867 for service along the Russia-China border, writing a report about the region's natural history and the culture of its native peoples. Afterward, he formulated a plan for exploring the interior of Mongolia and China, which was sponsored by the Russian Imperial Geographic Society. In 1870, Przhevalsky and two Russian companions obtained camels and crossed the Gobi Desert to Peking (Beijing) in China. Przhevalsky later explored the Takla Makan desert, and became the first European to visit Lop Nor since Marco Polo.

In 1872–73, Englishman NEY ELIAS traveled from China across the Gobi Desert, the Altai Mountains, SIBERIA, and the Ural Mountains into Europe; he later led a number

of other exploratory expeditions to central Asia. In 1923, during one of his many expeditions to central Asia, Swede SVEN ANDERS HEDIN headed a scientific survey of the Gobi. American paleontologist Roy Chapman Andrews carried out a scientific expedition to the Gobi on behalf of the American Museum of Natural History that year and four others over the next years until the Chinese Civil War ended his travels in 1930. In addition to expanding geological understanding of the Gobi, he found there the first fossilized dinosaur eggs.



A highway now crosses the Gobi Desert. A railroad, the Trans-Mongolian, links the city of Ulan Bator, Mongolia, with Jining, China.

gold rush See TREASURE AND EXPLORATION.

Gonneville's Land

In 1504, a French seafarer named Binot Palmière de Gonneville (also cited as Palmier, Paulmier, or Paulmyer de Gonneville) returned to his hometown, the seaport of Honfleur in northwestern France, and claimed that, in the course of a voyage to the Americas the year before, his ship the *Es-poir* had been driven off course into the southern Atlantic Ocean by a storm, and that he and his men had located a land where the inhabitants lived in peace and contentment and with plentiful resources. Gonneville and his crew claimed to have stayed there six months. As evidence of this paradise—an Eden, as he described it—he displayed furs and feathers from unknown species as well as exotic pigments. He had also brought 24 “savages” back to Europe, one of them the son of a ruler, named Essomeric.

Gonneville's Eden became known as Gonneville's Land, and the story of it endured for centuries. At the time, many Europeans were convinced of the existence of a GREAT SOUTHERN CONTINENT, or Terra Australis, and Gonneville's Land became associated with it. More than two centuries later, maps showed a “Terre de Gonneville” in the South Atlantic as part of Terra Australis. In 1738–39, JEAN-BAPTISTE-CHARLES BOUVET DE LOZIER carried out an expedition in search of the fabled continent, locating what became known as Bouvet Island in the South Atlantic in the process. Moreover, noted French scholar CHARLES DE BROSES, in his work *Histoire de la navigation aux terres australes* (History of Navigation to Southern Lands), published in 1756, cited Gonneville's 16th-century expedition as one of several voyages indicating the existence of Terra Australis.

Given that Gonneville's return to France is documented, and that Essomeric was known to be baptized and to have started a family in Normandy, the fact of

Gonneville's expedition is not disputed. It is likely that Gonneville's Land was actually somewhere in South America, probably Brazil. That would make Essomeric and the other visitors the earliest Native Americans to visit France.

Great Dividing Range

The Great Dividing Range, or Great Divide, is a mountain chain along the eastern edge of Australia, from Cape York Peninsula in the north to TASMANIA, an island off the southeast coast, in the south. The range as a whole is also called the Eastern Highlands. Sections of the range are known by various names, including Atherton Plateau, Australian Alps, BLUE MOUNTAINS, Clarke Range, Drummond Range, Expedition Range, Grampians, Gregory Range, McPherson Range, New England Range, Snowy Mountains, and War-rumbungle Range. The mountains not only divide the fertile east coast from the grasslands to the west, but also separate the rivers that flow into the Pacific Ocean from those that enter the Indian Ocean. The daunting terrain of the Blue Mountains kept early colonists from venturing very far from their coastal settlement at Sydney for several decades. Other parts of the Great Dividing Range proved just as difficult. Some plateau regions became productive grazing lands, however. Mount Kosciusko, Australia's highest peak at 7,310 feet above sea level, is located in the Australian Alps.

Early Expeditions

After GREGORY BLAXLAND, WILLIAM CHARLES WENTWORTH, and William Lawson succeeded in penetrating the Blue Mountains to Mount York in 1813, the exploration of the Great Dividing Range began in earnest. The energetic governor of New South Wales, Lachlan Macquarie, sent George William Evans to survey the new territory later that year. He came across lands that could be developed for grazing. By order of the governor, a road was quickly built using the supply of convict labor. The laborers, many of whom were sent to Australia for petty offenses, earned their freedom for their efforts. Bathurst, a new settlement, became a launching point for many subsequent expeditions.

Hopes for the discovery of more productive lands were high, but finding usable routes for transportation were also a priority. In 1817, Macquarie sent JOHN JOSEPH WILLIAM MOLESWORTH OXLEY from Bathurst to follow the course of the Lachlan River. He was accompanied by Evans and botanist ALLAN CUNNINGHAM, who would go on to make significant discoveries of his own. Oxley was stopped when the Lachlan became marshland, but he then circled around to the Macquarie River and explored new territory in the range. His expedition the following year was more successful, but more difficult. In April 1818, he led a party to the upper Macquarie River, also hoping to find it a useful means of transportation. They encountered heavy rains, and much

of his party stayed behind. Making his way downstream via boat, he came upon thick reeds towering seven feet above the waterline. After slogging through this second stretch of marshland and crossing mountains, which he called the Arbuthnot Range, Oxley came upon the Liverpool Plains, another region ideal for grazing. The problem of transportation had yet to be solved, however. Oxley and company headed east through the mountains, touching the southern border of the New England Range and reaching the east coast at Port Macquarie.

There were finally some results in finding transportation for people and their livestock in 1823. In June of that year, Allan Cunningham started out from the Hunter River Valley to the north of Sydney on an arduous journey of 500 miles. His efforts were rewarded with the European discovery of Pandora's Pass in the Liverpool Range, connecting Bathurst with the Liverpool Plains. The migration of farmers to the mountains took on new dimensions.

The expedition in 1824 of HAMILTON HUME and WILLIAM HILTON HOVELL led to the European discovery of the Australian Alps. From the Lake George region to the south of Bathurst, they trekked along the western side of the Great Dividing Range, first crossing the Murrumbidgee River. Heading on a southwest course, they encountered the beginnings of the Murray River, then crossed the Ovens and Goulburn Rivers as well. They located more farmland before crossing the Alps on their way to Port Phillip Bay at the location of present-day Melbourne, a suitable place for settlement. But Hovell misidentified the geographic coordinates of that site as Western Bay, where the soil is poor. A contingent of colonists who attempted to settle Western Bay by mistake were compelled to abandon the spot, delaying the settlement of what would become the state of Victoria for a number of years.

In 1827, Allan Cunningham carried out his most important expedition farther to the north in the Great Dividing Range than had been attempted before. He set out in May of that year with a guide named Macintyre, six men, and 11 horses across the Liverpool Range. He skirted the western border of the New England Range and located several rivers along his path—the Naomi, Gwydir, Dumaresq, and Macintyre. On June 8, he encountered a vast expanse of grassland from a hill near the Macintyre. He named it Darling Downs after the governor of New South Wales, Sir Ralph Darling. Darling Downs would prove to be the best farmland in the state of Queensland. The following year, he found a route from the Downs to the Pacific coast through the mountains, known as Cunningham's Gap, which made development of the region practical.

Post-Settlement

As the country was preoccupied with the settlement of the new grazing lands, interest in new explorations waned for a

period. In 1840, Polish geographer SIR PAUL EDMUND DE STRZELECKI explored the Australian Alps and climbed the tallest peak in the Great Dividing Range and all of Australia, naming it Mount Kosciusko, after Polish national hero and military leader Tadeusz Kościuszko. The next great explorer of the Great Dividing Range was Prussian naturalist FRIEDRICH WILHELM LUDWIG LEICHHARDT. After traveling by foot along Australia's east coast from Sydney to Moreton Bay in 1843, he found private sponsorship for a larger expedition north through the mountains, much to the consternation of SIR THOMAS LIVINGSTONE MITCHELL, who had intended to lead a party along the same route. In October 1844, Leichhardt led his 10 men—among them two Aborigine guides—from Darling Downs through the mountains to the north, always keeping within 10 miles of a supply of water. The journey was beset with problems, as pack animals escaped and food was consumed at too rapid a rate, but Leichhardt did not lack for courage. On June 25, 1845, the party succeeded in crossing the range to the north and came upon the Mitchell River, where they were attacked by Aborigines. John Gilbert, an ornithologist in the group, was killed; others were injured. On Leichhardt's insistence, the expedition continued westward, arriving at Port Essington, the site of present-day Darwin, on December 17. Leichhardt was given a hero's welcome and received a large cash prize. He would later disappear on his attempt to cross Australia from east to west in 1848, generating one of the great unsolved mysteries of Australian exploration.

Sir Thomas Mitchell organized his own expedition through the Great Dividing Range in 1845. With a large contingent of 28 men, plus 250 sheep, horses, and oxen, he left the interior near Bourke in December. A messenger soon informed him of the successful conclusion of the Leichhardt expedition, but Mitchell continued on his own route. As he and his group curved to the northeast, they explored new territory. Heading westward, they traversed the Chesterton Range and Warrego Range, then came to the start of the Grey Range. Mitchell's quest for new land was satisfied when he reached the productive grazing lands of the Maranoa region.

The exploration of the Great Dividing Range was largely motivated by a need for new pasture to support the herding industry. England had become a lucrative market for the fine wool that Australia produced, and migrations from the British Isles increased as the passage became less expensive. Newly explored lands were settled at a rapid rate.



In the 20th century, some mountain areas themselves have been settled. The Australian Alps are now known for their skiing resorts.

See also AUSTRALIA, EXPLORATION OF.

Great Southern Continent (Terra Australis, Terra Australis Incognita)

The Great Southern Continent, also known as Terra Australis (Latin for “southern land”) or Terra Australis Incognita (“unknown southern land”), was an imaginary land thought to exist in the Southern Hemisphere. The first to conceive of its existence were the ancient Greeks (see GREEK EXPLORATION), who had realized that the Earth was a sphere and devised a geographic theory based on balance and symmetry, including a southern region to mirror the lands of the known world. They maintained that the south must contain a similar ratio of land to sea as the north and must be located in similar temperate zones, thus capable of producing a similar abundance of flora and fauna. In the second century A.D., hellenized Egyptian geographer PTOLEMY proposed that such a continent connected the southern tips of Africa and Asia, which would make the Indian Ocean an inland sea.

An Enduring Legend

The concept of Terra Australis proved to be enduring. The publication in Latin of Ptolemy's writings in about 1410 gave new impetus to it among Europeans. Terra Australis was depicted in numerous ways by the mapmakers of the 15th century and afterward during the EUROPEAN AGE OF EXPLORATION. It was sometimes presented as rather featureless, used to fill space where lands were unknown; or it was presented with rivers and detailed coastlines, offering cartographers a chance to exercise their imagination, as in a map by Flemish ABRAHAM ORTELIUS in 1570, part of the first atlas of modern design. In some instances, the fabled continent was drafted as occupying the entire southernmost portion of the world and contiguous with the southern portions of Africa and South America.

Aside from the ancient idea of balance, there were two other reasons why the belief in Terra Australis persisted in the European mind. One was the failure to grasp the size of the Pacific Ocean. Although astronomical measurements had determined the size of Earth, the integration of this knowledge with knowledge of explored lands was slow to be realized, largely due to the lack of a dependable way to measure longitude (see LATITUDE AND LONGITUDE). Indeed, many earlier geographic discoveries in the Pacific had to be rediscovered during the 17th and 18th centuries since their locations were poorly understood. The other reason Europeans believed in Terra Australis's existence was simply wishful thinking. Terra Australis might yield untold riches to a nation laying claim to it. The dream of such a prize spurred on many expeditions to the South Pacific. One French mariner who perhaps reached southern waters while driven off course in a storm—Binot Palmière de Gonneville—reported locating a paradise in 1504. Although he probably landed in South America, perhaps Brazil, his

reported Eden became known as GONNEVILLE'S LAND and helped drive the myth of an unknown southern continent.

16th Century

The scientific search for Terra Australis began with the first CIRCUMNAVIGATION OF THE WORLD by FERDINAND MAGELLAN, a Portuguese mariner sailing for Spain, in 1519–22. Having traveled through the Strait of Magellan (see MAGELLAN, STRAIT OF) between the continent of South America and Tierra del Fuego, Magellan disproved the notion that Terra Australis was connected to the greater landmass, and, although he believed Tierra del Fuego to be an island, he did not have enough data to convince the mapmakers of the day. The theories of Magellan would not be confirmed until Englishman SIR FRANCIS DRAKE's journey in 1577–80, when he rounded the southern tip of CAPE HORN and navigated through Drake's Passage.

In 1567, ÁLVARO DE MENDAÑA and PEDRO SARMIENTO DE GAMBOA were sent by Spain to discover and claim the Great Southern Continent for their homeland. They found the Solomon Islands of Melanesia in the West Pacific, which they believed to foreshadow the continent itself. On a second journey of colonization in 1595, de Mendaña sailed with four ships. He came upon the Marquesas Islands of Polynesia, but the natives were not welcoming, and he pressed on. De Mendaña died at sea, and his wife, nicknamed "the Governess," succeeded to command and steered the expedition to the Philippines.

17th Century

The Spanish continued to be interested in Terra Australis. In 1605, PEDRO FERNÁNDEZ DE QUIRÓS, a Portuguese mariner sailing for Spain, was outfitted with three ships and sailed westward into the Pacific from Lima on the coast of Peru. He had accompanied de Mendaña on his journey a decade earlier and had persisted in his faith of finding the fabled land. His travels were marked by a lack of leadership, and although he came upon several previously unknown islands, his contributions were overshadowed by those of LUIS VÁEZ DE TORRES, who captained one of the ships in the Spanish fleet. He had been separated from Fernández de Quirós, and, continuing to follow the orders he had received in Peru, sailed on a northwestward course. Following the south coast of New Guinea, he passed through the Torres Strait without seeing the southern tip of modern-day Australia. He had demonstrated, however, that New Guinea was an island, and that, if Terra Australis did exist, its size was smaller than expected.

Unknown to Váez de Torres, the continent he had barely missed had been located some months earlier by a Dutchman. While exploring the same region, WILLEM JANSZ sighted Australia's Cape York Peninsula. Having missed the gap, which would become known as Torres Strait, he believed Australia to be a southern extension of

New Guinea, which he named New Holland nonetheless. The Dutch had extended their claims in the region but were slow to capitalize on their findings. The waters along the west coast of Australia were hazardous, and the prospect of profitable activity seemed remote. Consequently, Europeans failed to appreciate the size of the new land (which, although it was almost 3 million square miles, was significantly smaller than the theorized Terra Australis).

FREDERIK HOUTMAN explored the coast near the present-day city of Perth in 1619. In 1629, a ship sailing for the DUTCH EAST INDIA COMPANY, the *Batavia*, was wrecked on the west coast of Australia, and archaeological evidence shows that survivors had made a settlement there, the first of its kind.

The next major journey of exploration in search of the Great Southern Continent was also sponsored by the Dutch East India Company and was headed by ABEL JANSZON TASMAN in 1642. Sailing from west to east, he came upon Van Diemen's Land (present-day TASMANIA), the large island to the south of Australia. Continuing westward, he also made the European discovery of NEW ZEALAND. Next, he explored the Fiji Islands.

As the century progressed, the English began their explorations in the South Pacific. Initially motivated at the prospect of raiding Dutch and Spanish vessels in the region, WILLIAM DAMPIER became the first Englishman to set foot on New Holland during his CIRCUMNAVIGATION OF THE WORLD in 1679–91. Sir Francis Drake was also active in the region at the time.

18th Century

The failure to find a "Great Southland" that fit the expectations of the European imagination did not stop expeditions from being sponsored. In an expedition financed by the DUTCH WEST INDIA COMPANY, JAKOB ROGGEVEEN sailed from Europe in 1721 to continue the quest. His efforts were rewarded with the European discovery of Easter Island and Samoa in the Pacific. His findings eliminated a number of theories about the location and size of Terra Australis, and, after his travels, the Dutch committed considerably fewer resources to the finding of such a land. In 1739, Frenchman JEAN-BAPTISTE-CHARLES BOUVET DE LOZIER made the European discovery of Bouvet Island in the South Atlantic Ocean near the ANTARCTIC CIRCLE while looking for the fabled southern landmass.

In the latter half of the 18th century, England and France began to take the lead in Pacific exploration. With improved techniques in navigation, a mania for natural science, and a growing hunger for land, these two countries transplanted their historic rivalry to the uncharted regions in the south. French scholar CHARLES DE BROSES, who published *Histoire de la navigation aux terres australes* (History of Navigation to Southern Lands), continued to promote the

equilibrium theory of land in the Southern Hemisphere to counterbalance the Northern Hemisphere.

The 1764–66 expedition of JOHN BYRON is called by some the first scientific voyage of exploration. After claiming the Falkland Islands for Great Britain, he traveled extensively in the South Pacific. In 1766–69, Frenchman LOUIS-ANTOINE DE BOUGAINVILLE, a soldier with an analytical mind, explored the region. He sought Terra Australis along the east coast of New Holland and among the New Hebrides Islands, of which he made the European discovery. Although he did not find Terra Australis, his expedition collected a wealth of plant and animal specimens, giving support to the practice of scientific exploration.

Also in 1766, SAMUEL WALLIS and PHILLIP CARTERET were sent by England to find the Great Southern Continent. In April 1767, they were separated by bad weather. Wallis went on to make the European discovery of Tahiti, where the natives proved to be exceptionally hospitable, while Carteret came upon Pitcairn Island. Carteret also filled in the map with the Santa Cruz Islands, rediscovered since Fernández de Quirós's voyage for Spain, and helped define the geography of the Solomon Islands. In 1772–73, Frenchman YVES-JOSEPH DE KERGUÉLEN-TRÉMAREC continued the search on behalf of France and came upon an archipelago in the southern reaches of the Indian Ocean, which he believed to be the coast of Terra Australis and which he called "La France Australe"; they later became known as the Kerguelen Islands.

James Cook

The man who finally laid to rest the idea of the Great Southern Continent was Englishman JAMES COOK. Cook had acquired superior skills as a surveyor and mapmaker while serving in the Royal Navy during the Seven Years War in Canada. He was meticulous and innovative in his work, producing accurate charts. He also had the advantage of a CHRONOMETER on his second journey, a tool necessary for the accurate determination of longitude. His was one of the first voyages to test the instrument. The purpose of Cook's first journey to the South Pacific in 1768 was ostensibly to time the transit of Venus across the Sun as a means to learning the distance between Earth and the Sun. After this task was accomplished, he opened a letter with additional orders, which sent him on a search for Terra Australis. At this stage of his expedition, he sailed as far south as 40 degrees south latitude, beyond where the continent was thought to exist. He then sailed around the two islands that make up New Zealand, making a high-quality map of it in the process. Next he charted much of the east coast of New Holland. Cook's next expedition in 1772–75 compelled Europe to abandon the dream of the fabled land. His instructions were to circumnavigate the southern polar region as closely as possible. The trip was not easy, with the bitter cold freezing the

rigging of his vessels, dense fog, and dangerous PACK ICE. Nonetheless, he succeeded in his mission. He is given credit for being the first to cross the ANTARCTIC CIRCLE, which he did three times. The southernmost latitude he attained was 71 degrees. He did not sight the mainland of Antarctica on this trip, however, since his ship was blocked by ice.



There was still important knowledge to be gained of southern waters. Since New Holland had not yet been circumnavigated, most assumed it to be a collection of islands rather than a single continent. MATTHEW FLINDERS accomplished its circumnavigation in 1802–03. He is also responsible for lobbying heavily to rename the continent Australia (see AUSTRALIA, EXPLORATION OF). Early sightings of the land that came to be known as Antarctica were made by Englishman EDWARD BRANSFIELD, American NATHANIEL BROWN PALMER, and Russian FABIAN GOTTLIEB BENJAMIN VON BELLINGSHAUSEN, all in 1820. It would take some years to grasp the extent of the Antarctic continent (see ANTARCTIC, EXPLORATION OF THE).

In the course of the search for the Great Southern Continent, two new continents were brought to the world's attention. One of them, Australia, came to bear a name derived from *Terra Australis*.

Great Victoria Desert

The Great Victoria Desert is the vast, arid region located in southwestern Australia to the north of the Nullarbor Plain, which separates it from the Great Australian Bight, an inlet of the Indian Ocean. Some 450 miles long from east to west and with an average altitude of 500 to 1,000 feet, it consists mostly of hilly sand country with some salt lakes and grasslands. It was the last region of Australia to be explored, with the exception of the smaller Simpson Desert in the center of the continent.

This barren area was originally visited by various groups of Aborigines. By the time Europeans turned their attention to it, most of the good grazing land in Australia had been charted. There was a sense among geographers that little of value would be found in the extensive tracts of sand. Still, with the lure of the unknown beckoning, a minor rivalry began among a handful of explorers in the early 1870s. JOHN FORREST had led an expedition in 1869 from Perth on a search for the remains of the FRIEDRICH WILHELM LUDWIG LEICHHARDT expedition, which had vanished 20 years before. On this trip he had gone as far east as Mount Weld on the western edge of the desert, finding some new grasslands suitable for grazing.

On an unsuccessful attempt to make an east-to-west crossing of the continent, WILLIAM CHRISTIE GOSSE traveled deeper into the desert in 1873. He passed through the end

of its northern region, below the Musgrave Ranges to the north. It was on this journey that he came upon Ayer's Rock, one of Australia's most distinctive geological features, a block of sandstone rising 2,845 feet above the surrounding flatlands.

In 1874, John Forrest returned to the western desert regions with his brother ALEXANDER FORREST, hoping to make the first west-to-east crossing of Australia. Traveling across the southern portion of the Gibson Desert, he succeeded in reaching the Peake telegraph station after five and a half months. His success led ERNEST GILES to form his own plan of exploration.

On a journey in 1872–73, Giles had attempted to cross the Great Victoria and the Gibson Deserts, but had failed to do so, losing his companion, Alfred Gibson, in the process, for which he named the region. Giles had gained valuable experience on this trip, however, and proved the worth of camels for traveling through the brutal conditions of the desert. In May 1875, he left Port Augusta with Henry Tietkins, an Afghani camel driver named Saleh, and 24 camels. The land they crossed in the southern portion of the desert was desolate. Relief was found midway through the trip when they crossed a northern projection of the Nullarbor Plain and were able to replenish their water supplies. In November, after traveling 2,500 miles, the party reached Perth, having made the first successful east-to-west crossing of Australia.

Ernest Giles named the region the Great Victoria Desert after Queen Victoria of Great Britain. A subsequent explorer to help map it, David Lindsay, took a different diagonal route in 1891. The Great Victoria Desert became part of the states of South Australia and Western Australia.

Greek exploration (ancient Greek exploration)

The geographic region referred to as ancient Greece was centered on the Balkan Peninsula and the Peloponnesus, a large peninsula connected to the southern end of the Balkan Peninsula, and on Crete and other nearby islands in the western MEDITERRANEAN SEA. But ancient Greeks, or Hellenes, as they called themselves, came to inhabit much of the northern Mediterranean and Black Sea coastal regions, during the first millennium B.C. Greek civilization has been called the cradle of Western civilization because of achievements in science, mathematics, philosophy, literature, and art, as well as the introduction of the political system of democracy. The Greeks also played a significant role in the history of exploration.

Pre-Hellenic Greece is referred to as Aegean civilization, with three highly developed Bronze Age cultures—Minoan, Mycenaean, and Cycladic. The Minoan culture thrived on the island of Crete; the Mycenaean culture on the mainland; and the Cycladic culture on the Cyclades island group. The

Minoans, as wide-ranging traders, were some of the earliest explorers of the Mediterranean until their decline toward the end of the second millennium, at which time the rival Phoenicians of present-day Lebanon became the most active mariners.

Beginning about 1400 B.C., various peoples speaking related Greek dialects reached the Greek peninsula from the north—Achaean, Aolian, Ionian, and Dorian. From about 1000 to 750 B.C., after the Mycenaean collapse, the region was in a political vacuum with warfare and poverty rampant—the Greek Dark Age, as it is sometimes called. During what is known as the Archaic Age, from about 750 to 480 B.C., independent city-states formed and eventually united against the threat from Persia (present-day Iran). The Persian Wars began in 512 B.C., when the revolt of Greek colonies in Asia Minor against their Persian landlords led to an unsuccessful Persian invasion of Greece—with Greek victories at Marathon, Salamis, and Plataea—and lasted until 449 B.C.

During the Classical Age, from about 480 to 323 B.C., Greek civilization reached its pinnacle. From 480 to 359 B.C., Athens was the most powerful city-state and led an alliance of almost 150 city-states in the creation of the Athenian empire surrounding the Aegean Sea. The Peloponnesian War between Athens and the city-state of Sparta, situated to its south in Peloponnesus, in 431–404 B.C., led to the decline of Athens. The Macedonians, a people living to the north of Greece, became a dominant military power first under Phillip II and then under his son, ALEXANDER THE GREAT, leading to their supremacy from 359 to 323 B.C. Although not Greek-speaking, the Macedonian rulers came to think of themselves as part of the Greek tradition and furthered Greek culture through conquest of the Egyptians of northern Africa and eastward into Asia as far as India. After Alexander's death, his generals ruled in what is referred to as the Hellenistic period, which lasted until 31 B.C. and the ascendancy of the Romans.

The Minoan mastery of navigation was passed to the Greeks, who carried out the tradition of trade throughout the Mediterranean region and into the Black Sea, which is connected to the Aegean Sea by the Bosphorus, the Sea of Marmara, and the Dardanelles. By about 500 B.C., the Greeks had colonized parts of Asia Minor, Mediterranean coastal regions of present-day Italy and France, the Iberian Peninsula, and even the present-day coastal Libya in northern Africa. They came to have some 700 settlements, some of which evolved into independent city-states. Transported items in the complex trading network of the Mediterranean and Black Sea regions included silver, copper, tin, amber, obsidian, ivory, timber, dyes, grains, salt, fish, wine, olive oil, pottery, and glass. The Greeks also may have ventured into the Atlantic Ocean as early as the sixth century B.C. Their commercial activity contributed to the diffusion of cultural

traits and geographic knowledge. The Greek invention of the ASTROLABE in the third or second century B.C. helped further maritime exploration.

The names of certain Greek individuals have endured in the historical record as explorers, historians, and cartographers, in some cases in the employ of other peoples. In about 520–494 B.C., historian HECATAEUS OF MILETUS ascended the NILE RIVER. In 510–507 B.C., mariner SCYLAX descended the INDUS RIVER for Persian emperor Darius I and sailed from the Arabian Sea to the RED SEA. In about 440–420 B.C., historian HERODOTUS traveled throughout eastern Mediterranean Sea and Black Sea lands and chronicled much about ancient history and exploration. He also traveled up the Nile. In about 420–400 B.C., physician and writer CTESIAS OF CNIDUS traveled in Persia and India.

One great journey was actually a military retreat. In 401 B.C., soldier and historian XENOPHON led Greek mercenaries on a great retreat from Persia through present-day Iraq, Turkey, Armenia, and Georgia to Greece. Macedonian Alexander the Great's remarkable trek into Africa and Asia in 334–323 B.C., exploration by conquest, brought new awareness of Asia to European cultures. NEARCHUS, a Greek serving under Alexander, explored the coasts of Pakistan and Iran from the Indus Delta to the head of the Persian Gulf in 325–324 B.C. MEGASTHENES, a Greek diplomat, traveled from Syria to northern India in 300–290 B.C., reaching the GANGES RIVER.

In the meantime, the maritime expedition of PYTHEAS in about 325 B.C. along the coasts of Spain, France, and Britain as far as the Baltic Sea brought knowledge of northern Europe to the Mediterranean peoples. The water route between Africa and India was explored in 120–115 B.C. by EUDOXUS, a Greek navigator in service to Egypt, who made two trips across the Arabian Sea to India. On the second, he landed on the coast of East Africa; he later unsuccessfully tried to circumnavigate Africa. In A.D. 45, HIPPALUS, another Greek in service of Egypt, at that time under Roman domination, navigated a direct sea route across the Arabian Sea from Africa to India. And, in A.D. 50, DIOGENES, a Greek merchant, explored inland on Africa's east coast, possibly as far as Lake Victoria and Lake Albert.

Some of the knowledge of these ancient travels was recorded by ERATOSTHENES, a Greek scholar heading the library at Alexandria in northern Africa. In 240–195 B.C., he wrote what is considered the first systematic treatise of geography. STRABO, another Greek scholar, published an important work on geography in Rome in about A.D. 18. The *Periplus of the Erythraean Sea*, written in about A.D. 100 by an anonymous Greek trader who lived in Egypt, provided information about East Africa, including commercial activities in the region (see PERIPLUS). PTOLEMY, a hellenized Egyptian, published a description of world geography in A.D. 127–147.

See also EGYPTIAN EXPLORATION; GEOGRAPHY AND CARTOGRAPHY; MINOAN EXPLORATION; NAVIGATION AND EXPLORATION; PHOENICIAN EXPLORATION; ROMAN EXPLORATION.

Greenland

At about 840,000 square miles, Greenland is the largest island in the world. From northernmost Cape Morris Jesup to southernmost Cape Farewell, it is about 1,650 miles long; its widest point from east to west is about 800 miles. The coastline, deeply indented with fjords, runs an estimated 27,000 miles. Most of Greenland lies north of the ARCTIC CIRCLE. The Arctic Ocean lies to the north; the Greenland Sea to the east; the Nares Strait to the northwest, separating it from Ellesmere Island; the Denmark Strait to the southeast, separating it from ICELAND; the Davis Strait and Baffin Bay to the west, separating it from Baffin Island; and the Atlantic Ocean to the south. Disko Island in Davis Strait is the largest of the many offshore islands. The Danish name is Grønland; the name in Greenlandic (Inuit, with some Danish words) is Kalaallit Nunaat.

More than three-quarters of Greenland, a high plateau, is covered with an ice cap, the maximum thickness of which is 14,000 feet. Coastal regions and islands are mainly ice free, although some smaller ice caps and glaciers can be found locally near the coasts. The east and west coasts are flanked by mountain chains; Mount Gunnbjørn in southeastern Greenland, at 12,139 feet above sea level, is the highest peak. Greenland produces many of the world's icebergs and ice floes, with ice moving outward from the island's center and calving on reaching the sea (see DRIFT ICE), making the Davis Strait to the west and the Greenland Sea to the east especially hazardous to navigation. The south coast has the warmest climate, moderated by the North Atlantic Drift, a continuation of the GULF STREAM. Vegetation, like much of the Canadian Arctic to the west, consists mostly of mosses, lichens, grasses, and sedges. Some dwarf trees can be found in the south. Greenland also has similar fauna to that of the Canadian Arctic, such as reindeer, musk ox, polar bear, wolf, fox, and hare.

Greenland's indigenous peoples are ancestrally related to the Inuit (Eskimo) of Canada and Alaska and are grouped together as Greenland Inuit. A number of bands traditionally lived along the west coast, including a group north of Cape York on the Hayes Peninsula known by non-natives as Polar Eskimo; a band known as the Anmagssalik (now also the name of a town) traditionally lived along the east coast.

The Vikings

ERIC THE RED is considered the European "discoverer" of Greenland. The account of his journey there in about A.D.

982 is preserved in the literature of the Vikings known as *Eiríks saga*, or the *Saga of Eric the Red*. He may not have been the first Viking to reach or see Greenland since a mariner by the name of Bjarni Gunnbjörn supposedly reported lands to the west of Iceland. Eric the Red established a settlement at an inlet he called Ericsfjord, where present-day Julianehaab is located. From Greenland other Vikings—such as his son, LEIF ERICSSON—explored farther westward, eventually reaching the North American mainland in about 1000. The Norse settlement endured until the early 15th century, when the outbreak of the bubonic plague cut off communication with Scandinavia.

Early Arctic Expeditions

The history of further exploration of Greenland is tied in with that of Arctic Canada. Many European ships navigating the Davis Strait in search of the NORTHWEST PASSAGE explored Greenland’s west coast as well as Baffin Island’s east coast. Italian mariner JOHN CABOT possibly explored southwestern Greenland in his voyage for England in 1497. In his voyage of 1500, Portuguese mariner GASPAR CÔRTE-REAL is known to have sailed along the west coast of Greenland before being turned back by PACK ICE. In 1576,

Englishman SIR MARTIN FROBISHER stopped at southern Greenland and claimed the region for England—the first confirmed stopover since the Vikings—calling the land “West England,” although the claim was not maintained. Davis Strait is named after Englishman JOHN DAVIS, who carried out three expeditions to the waters west of Greenland in the 1580s. Englishman HENRY HUDSON navigated along Greenland’s east coast for London’s MUSCOVY COMPANY in 1607. Englishman JAMES HALL carried out three expeditions to western Greenland for Denmark in 1605–07, hoping to locate Scandinavian colonists, and made a number of landings and drafted charts of the region. Contact was made with Inuit, but not colonists. In 1612, Hall also headed an expedition to the region for England. In 1616, Englishmen WILLIAM BAFFIN and ROBERT BYLOT explored along Greenland’s west coast, reaching Baffin Bay.

In 1721, a Norwegian missionary named HANS EGEDE gained Danish support for a colony to Greenland. It was still hoped that descendants of Viking settlers would be found there. Egede, who landed at present-day Nuuk (formerly known as Godthaab), failed to find Scandinavian survivors there but founded the first permanent European settlement



Below an early map of Greenland appear four vignettes of native life. (Library of Congress, Prints and Photographs Division [LC-USZ62-77699])

and preached to the Inuit until 1736. A number of trading posts were soon established. Denmark increased the population by deporting undesirable subjects there, much as Great Britain shipped convicts to Australia.

Mapping Greenland

As of 1800, much of Greenland had yet to be mapped. In 1806–13, a German mineralogist named Karl Ludwig Giesecke studied the southeast coast by umiak, a type of Inuit boat (see CANOE). In 1822, Englishman WILLIAM SCORESBY, JR., explored the east coast in the region of Scoresby Land and Scoresby Sound. Many other explorers of varying nations contributed to growing knowledge of the huge island over the years. In 1853–55, American ELISHA KENT KANE, while leading an expedition in search of SIR JOHN FRANKLIN, explored Greenland's Humboldt Glacier on the northwest coast, one of the largest glaciers in the world. In 1869–70, German KARL CHRISTIAN KOLDEWEY and Austrian JULIUS VON PAYER explored the east coast.

The Danish Committee for the Geographical and Geological Investigation of Greenland was founded in 1876, leading to a methodical program of research. In 1902–04, Danish LUDWIG MYLIUS-ERICHSEN, accompanied by Danish-Inuit ethnologist KNUD JOHAN VICTOR RASMUSSEN, explored the northwest coast. In 1906–07, Mylius-Erichsen explored the northeast coast, locating the peninsula known as the Northeast Foreland. Rasmussen, who continued his studies of the Inuit people into the 1920s, founded the settlement of Thule, named after the legendary land of ULTIMA THULE, on North Star Bay in the northwest, in 1910. In 1900, American ROBERT EDWIN PEARY reached Greenland's northernmost point—Cape Morris Jesup—and demonstrated conclusively that Greenland was an island and not a landmass extending to the NORTH POLE. American LOUISE ARNER BOYD contributed to the growing geographic and scientific knowledge of Greenland with her studies along the east coast in 1931 and 1933.

Into the Interior

In the meantime, expeditions had begun to venture into Greenland's interior. During his attempt to reach the North Pole in 1860–61, American ISAAC ISRAEL HAYES undertook an inland voyage from the northwest coast and measured the Greenland ice cap at a point where it was some 5,000 feet thick. In 1888, Norwegian FRIDTJOF NANSEN and five others, among them OTTO NEUMANN SVERDRUP, made an east-to-west crossing of southern Greenland on snowshoes and skis, reaching a maximum altitude of 9,000 feet on the ice cap. Rasmussen made a west-to-east crossing in 1912. In 1924–25, American aviator RICHARD EVELYN BYRD carried out the first flights over the Greenland ice cap and charted some 30,000 square miles of territory. In 1929–30, the

German Greenland Expedition under German geologist ALFRED LOTHAR WEGENER established the first permanent weather stations on the ice cap. And in 1930–31, Englishman AUGUSTINE COURTAULD spent the winter alone at about the geographic center of the ice cap, collecting meteorological data, as part of the British Arctic Air Route Expedition of 1930–32 under HENRY GEORGE WATKINS (Gino Watkins). The University of Michigan sponsored a similar American expedition simultaneously. After World War II, scientific expeditions were carried out on a larger scale.



Denmark made Greenland a crown colony in 1924. In a 1979 referendum, Greenlanders voted for home rule, and the island, although still considered part of Denmark, is presently self-governed. The capital and largest city is Nuuk.

See also ARCTIC, EXPLORATION OF THE.

Gulf Stream

The Gulf Stream is one of many OCEAN CURRENTS. A warm water current in the Atlantic Ocean, it greatly affects the climate of North America and Europe and has played an important role in routes used by ships. It is created by easterly winds putting pressure on the Atlantic Ocean, a pressure built up in the Gulf of Mexico. Warming caused by proximity to the EQUATOR also contributes to higher pressure. The water seeks an outlet and forms a northward flowing current, past Florida and along the east coast of North America. At Cape Hatteras, as it runs into the southern branch of the cold Labrador Current, the current takes an eastward course. Farther east it splits into two branches, one passing western GREENLAND, the other passing western ICELAND. The current then continues north to Scandinavia and England, circling around to Spain and Portugal, where it cools down and dissipates. The Gulf Stream has been called "the great river within the ocean."

The Gulf Stream may be observed as it crosses the Atlantic. Its water is a dark gray-blue whereas other water surrounding it is gray-green. This results from the relative lack of minerals and plankton. For great stretches, the Gulf Stream is about 100 miles wide and a mile deep. As it leaves the Gulf of Mexico, its temperature is 80 degrees. The average speed of the Gulf Stream is four knots, which decreases as it branches and widens. It makes the climate milder along its course and creates the unique patterns of rainfall in eastern North America.

Italian mariner CHRISTOPHER COLUMBUS, exploring for Spain, was one of the first Europeans to use the Gulf Stream in navigation. The winds and other ocean currents that propelled him to the Caribbean Sea in 1492 presented an obstacle for his return trip to Spain the next year. Rather

than sail back into them, he headed northward and rode the Gulf Stream. In 1513, Spanish conquistador JUAN PONCE DE LEÓN explored the regions where the current originates. In the northeast, the Gulf Stream worked against sailing ships traveling westward from Europe to the northern reaches of North America, delaying extensive exploration of those regions, even as it aided them on their return Atlantic crossings. Whaling captains in colonial New England knew of the Gulf Stream as an area of no whales.

See also ATLANTIC OCEAN, EXPLORATION OF THE.

gyrocompass (gyroscopic compass, gyrostatic compass)

A gyrocompass—or gyroscopic COMPASS or gyrostatic compass—is an electronic device used to determine true north as opposed to magnetic north. The device, if properly maintained, is highly accurate and has a variety of applications

aboard a modern ship, such as providing a reference for the interpretation of celestial observations and directing automatic steering mechanisms.

The basic gyroscope is a balanced mass, usually a disk, which is able to spin in any direction about its axis. Once the rotational element is set in motion, its spin axis maintains its direction. This principle is called gyroscopic inertia. In the gyrocompass the axis of the gyroscope is set to run parallel with Earth's north-south axis, or meridian.

The modern version of the gyroscope was developed by French physicist Jean-Bernard-Léon Foucault by 1852. Its uses were multiplied when electric motors were added. The gyrocompass was invented in the early 20th century by American and European scientists and subsequently refined. SUBMARINE navigation benefits from the gyrocompass because of its immunity from the magnetic effects of the steel hull. The gyrocompass is a key component of navigation in modern commercial ships.

See also NAVIGATION AND EXPLORATION.



Hadley's Quadrant See QUADRANT; SEXTANT.

Hakluyt Society

The Hakluyt Society is a London-based charity organization, founded in 1846, dedicated to the advancement of knowledge and education regarding world history, especially from the point of view of world exploration, geography, and navigation. It is named after RICHARD HAKLUYT, the 16th–17th-century English geographer, who, through his writings, helped chronicle important expeditions and spread geographic knowledge to a wide public.

The Hakluyt Society's main activity, still vital today, has been publishing primary sources on exploration in English, including the writings of explorers of many different nationalities, such as Russian FABIAN GOTTLIEB BENJAMIN VON BELLINGSHAUSEN, Englishman JAMES COOK, Russian Cossack SEMYON IVANOVICH DEZHNEV, Englishman SIR FRANCIS DRAKE, Portuguese VASCO DA GAMA, Arab ABU ABD ALLAH MUHAMMAD IBN BATTUTAH, Frenchman JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, German FRIEDRICH WILHELM LUDWIG LEICHHARDT, and many more. The society's published works—about 200 editions, in about 350 volumes—relate to travels on or around all the continents and oceans and cover the last 2,000 years.

Hanseatic League

The Hanseatic League was a commercial union of German cities and towns and their merchants during the Middle

Ages and the RENAISSANCE. The league was the most successful trade association of its time. It grew out of smaller unions of merchants conducting business in foreign lands, known as Hansas. The date of inception is unknown, but it was active by the mid-12th century, created by merchants to establish favorable trade conditions. By the 13th century, the Hanseatic League had evolved into an alliance of cities and towns, which came to number, by the 15th century, as many as 180. Its legislative assembly was known as the Hansetag.

Sharing resources and developing new markets together, league members were able to generate greater profits. Moreover, without a strong centralized government to offer merchants protection from attacks on land and at sea, they had to defend themselves, which was facilitated by banding together. The city of Lübeck in northern Germany was the first permanent Hanseatic trading center. Activity of the Hanseatic League extended throughout Germany, northward to Scandinavia via the Baltic Sea, and eastward to Russia. Members controlled the trade in copper and iron from Sweden, fur from Russia, and, most important, herring and cod caught in the region. But they conducted trade with interests in western Europe as well, including the British Isles. Members of the Hanseatic League even founded franchises in foreign lands.

The COG, a small dependable ship dating from about 1200, enabled extensive trade by sea, even as far as the MEDITERRANEAN SEA. All the commercial activity increased geographic knowledge among league members, created regular routes of travel, and helped unite distant lands.

The Hanseatic League declined in effectiveness by the mid-17th century, largely because of growing English and Dutch power and political strife and warfare in Germany. The Hansetag met for the final time in 1669, with only six municipalities represented.

See also COMMERCE AND EXPLORATION.

Hawaiian Islands (Hawai'i)

The Hawaiian Islands are a group of eight major islands and a number of small islands in the Pacific Ocean, between 19 and 22 degrees north latitude and 155 and 161 degrees west longitude. The islands are of volcanic origin. The largest of them is Hawaii, while the most developed and populous is Oahu. The other primary islands are Kahoolawe, Kauai, Lanai, Maui, Molokai, and Niihau.

The peoples who lived on the Hawaiian Islands prior to the arrival of Europeans were of Polynesian ancestry. Although darker-skinned than Polynesians to the south in the other parts of OCEANIA, they spoke the same basic language, had many religious and cultural traits in common, and used a similar type of boat, the OUTRIGGER. The best estimate of the time of their migration is about A.D. 750.

Although it was later claimed in Italy that the Hawaiian Islands were visited in 1555 by Italian Juan Gaetano, who had been a chronicler on the 1542 voyage of Ruy López de Villalobos to the SPICE ISLANDS (the Moluccas), the story remains unconfirmed. As a result, the credit for the European discovery of the island group goes to Englishman JAMES COOK. On his third Pacific expedition, after sailing in the South Pacific he was headed northward to find the western outlet of the NORTHWEST PASSAGE. On January 18, 1778, he came upon the western half of the islands, which he named the Sandwich Islands, after the Earl of Sandwich. The inhabitants proved friendly. It was Cook who noticed the similarity in their language with that of other Polynesians and thus defined the wide boundaries that constitute Polynesia. He and his crew stayed for 12 days before continuing northward.

After his explorations to the north, Cook returned to the islands in January 1779. On this second stopover he discovered Maui and the largest island, Hawaii. His reception on these other islands was hospitable, but, on the expedition's departure in February, the chiefs made no secret that they were glad to see him go. When his ship, the *Resolution*, suffered a damaged foremast, and he returned a week later, relations deteriorated. One of his auxiliary boats was stolen and the next day Cook went ashore with 10 marines to take a chief hostage until the boat was returned. A melee broke out after Cook fired his gun, and Cook, along with four marines and several native people, was killed. His dismembered body was returned to the crew by the tribespeople, and CHARLES CLERKE assumed command of the expedition.

The island of Maui was visited for one day by Frenchman JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, in May 1786, as part of his scientific exploration of the Pacific. GEORGE VANCOUVER, who had been a member of Cook's second and third Pacific voyages, returned to the islands on his 1791–95 voyage and charted their location. He also made the first accurate map of the islands.

At the time of Cook's discovery, the tribes of the islands were engaged in warfare. During Vancouver's visit, king Kamehameha I acknowledged rights of the British to settle in the territory. In 1810, the islands were unified, and Kamehameha became the sovereign. Agriculture was developed, and the islands became an important provisioning station for whaling fleets. British, French, and American interests were established, and, by the 1830s, a thriving sugar industry was in operation. In 1893, with the instigation of the American population and with the help of the American companies on the island, Queen Liliuokalani was deposed. The U.S. minister to Hawaii, John L. Stevens, set up a provisional government, which sought annexation of the islands. President Grover Cleveland refused, due to the nature of the change in government, but his policy was reversed under William McKinley, who annexed the territory in 1898. Hawaii became the 50th state of the United States on August 21, 1959.

See also POLYNESIAN EXPLORATION; PACIFIC OCEAN, EXPLORATION OF THE.

Himalayas

The Himalayas are the highest mountain range in the world. Located in a strip between 200 and 250 miles wide on average, they separate the Indian subcontinent from Tibet and China and the rest of central Asia to the north. The Himalayas form a broad arc of 1,600 miles from the INDUS RIVER in the northwest to the Brahmaputra River on the east and are buttressed on the west by the Hindu Kush mountain range, and on the east by the Assam range, rising up from India's flat Gangetic plain. The mountain range leads into the high Tibetan plateau. The Himalayas, whose name means "abode of snow" in Sanskrit, are one of the world's geologically young mountain ranges, which contains nine of the world's 10 highest peaks, including Mount Everest (see EVEREST, MOUNT), K-2, and Mount Kanchenjunga. They developed between 30 and 50 million years ago, as the Indian tectonic plate collided with Asia. There continues to be tectonic activity as the mountains are slowly uplifted, with earthquakes that strike eastern Pakistan and northern India.

Composed of a series of parallel ridges, the Himalayas can be divided into three main regions: Great Himalayas, Middle (or Inner or Lesser) Himalayas, and Outer (or Sub-Himalayas). The Great Himalayas are a snowy range containing the highest peaks, the average height exceeding

20,000 feet. This region runs in a narrow band of about 15 miles the length of the Himalayas, projecting erratically into the Middle Himalayas to the south. The Middle Himalayas, roughly 50 miles wide, are composed of peaks of a regular height of about 6,000 to 10,000 feet. The Outer Himalayas (including the Siwalik range), averaging about 3,000 to 4,000 feet, slope gently into the northern plains of India and Pakistan, beginning at a width of 30 miles in the west, and narrowing to nothing in East India.

The Great and Middle Himalayas are also divided, along with the other mountains around the Tibetan plateau, into a series of mountain chains: the Kunlun, which forms the northern edge of the Tibetan Plateau; the Trans-Himalayan chain of Muztagh, also called Karakoram, which ends at the source of the Indus River; the Ladakh chain, broken into two parts by the Indus River; the Zaskar chain, containing the majority of snowy peaks; and the Middle Himalayan Nag Tibba, Dhaola Dhār, Pir Panjal, and Mahabharat ranges.

The Great Himalayas are mostly snow covered and harsh, containing a few high valleys, where the scattered inhabitants, largely Tibetan Buddhists, remain isolated. Travel is extremely difficult and often impossible. The hidden valleys have inspired countless tales of lost paradises, such as Shangri-La, a mythical land of well-being and long life.

The peaks in the Himalayas, as the tallest in the world, are significant in the history of MOUNTAIN CLIMBING. Inhabitants of the Himalayan regions of Nepal and Sikkim called *SHERPAS*, familiar with the terrain and skilled in mountaineering, are often called upon as mountain guides and climbers. The Middle Himalayas contain fertile valleys and high forested mountains and are modestly populated, along with the Outer Himalayas, with Hindus of Indian ancestry. Travel in the Middle Himalayas is made difficult by frequent gorges and jagged mountains.

Mapping the Himalayas

The first systematic attempt to map the Himalayas was made in 1590 at the command of Akbar, a Mogul (Mughal) emperor of India. In what had been an Islamic state, while expanding his empire, Akbar allowed freedom of religion and accepted Hindus, Buddhists, and even Christian missionaries at his court. In 1590, he sent an expedition into the mountains to the north.

It was not until the British controlled India in the 19th century that the peaks of the Himalayas were mapped and their heights obtained with great accuracy. In 1806, a British officer, Colonel William Lambton, began what would be called the Great Trigonometrical Survey, sponsored at first by the BRITISH EAST INDIA COMPANY, then headed by the British government. He planned to survey a one-degree swath of India along a straight meridian line from the base of the subcontinent through the Himalayas. Lambton

worked until his death in 1823, succeeded in his job by SIR GEORGE EVEREST. In 1841, the peak now known as Mount Everest was recorded. Everest was succeeded as Surveyor General of India by Andrew Waugh, who helped complete much of the later work on the Great Trigonometrical Survey, measured the heights of the highest peaks in the Himalayas, and named Mount Everest for his predecessor. The PUNDITS, trained Indian emissaries for the British government, carried on the survey in the work in the second half of the century. Meanwhile, in 1854–57, German brothers ADOLF VON SCHLAGINTWEIT, HERMANN VON SCHLAGINTWEIT, and ROBERT VON SCHLAGINTWEIT explored and surveyed the Himalayas and adjoining ranges for the British East India Company.

Mountain Climbers

In the late 19th and early 20th centuries, the challenge of the Himalayan peaks drew more and more climbers. American FANNY BULLOCK WORKMAN made a number of climbs; Swiss mountain climber MATTHIAS ZURBRIGGEN served as her guide on some of them. In 1909, LUIGI AMEDEO DI SAVOIA D'ABRUZZI attempted to climb K2; he did not reach the summit but set an altitude record to that date. British climber GEORGE HERBERT LEIGH MALLORY lost his life in 1924 during an attempt on Mount Everest.

By mid-century, May 1953, Nepalese TENZING NORGAY and Englishman SIR EDMUND PERCIVAL HILLARY reached the highest point of the world, the top of Mount Everest. Since that time, the Himalayas have continued to be a focus of international mountain climbing.



In addition to mountain climbers and visitors to Tibet and its city of LHASA, the Himalayas have also attracted painters, such as 20th-century Russian painter NICHOLAS KONSTANTINOVICH ROERICH. Travel through the Himalayas is still difficult, accomplished for the most part by pack animal.

See also ASIA, EXPLORATION OF.

Hudson Bay

Hudson Bay, along with James Bay at its southern end, is an inland sea of North America. Linked to the Atlantic Ocean via Hudson Strait and to the Arctic Ocean via the Foxe Channel, it can be considered an arm of either one. Just south of the ARCTIC CIRCLE, it borders, from east to west, Quebec, Ontario, Manitoba, and Nunavut Territory in Canada. Baffin Island, part of Nunavut, lies to the north. Hudson Bay has an area of some 475,000 square miles, at about 850 miles long and 650 miles wide. The bay's average depth is about 330 feet; its maximum depth, about 2,846 feet. The 15,700-square-mile Southampton Island in the

northwestern corner is the largest island. Other large islands lie off the east coast: Coats Island, Mansel Island, and the Belcher Islands. Akimiski Island is situated in James Bay. Lands to the west of Hudson Bay are generally barren and rocky; to the east are found mostly low-lying marshlands. Many rivers—among them the Rupert, Nottaway, Albany, Nelson, and Churchill—drain into the bay. The bay is covered by ice from October to mid-July, but open to navigation from mid-July to October.

Hudson Bay played an important role in the history of exploration in two ways: first, as the hoped-for eastern entrance to the NORTHWEST PASSAGE across North America from the Atlantic to the Pacific Ocean; and, second, as the base of operations for the HUDSON'S BAY COMPANY and the development of the FUR TRADE throughout much of North America.

Northwest Passage

Native peoples, partners in the fur trade—in particular the Inuit (Eskimo), Cree Indians, and Chipewyan Indians—knew of Hudson Bay since ancient times. It is possible that Englishman SEBASTIAN CABOT entered the Hudson Strait between the North American mainland and Baffin Island and perhaps even reached eastern Hudson Bay, while in search of the Northwest Passage in 1509, not long after the European discovery of the Americas, although there is no definite documentation. Englishman HENRY HUDSON is given credit for being the first European to navigate through the strait in 1610. He lost his life there the next year, after wintering at James Bay; his crew mutinied because he was supposedly hoarding scarce supplies of food and set him adrift with his son and ailing crew members in a small boat. Yet England's claim to the region was based on his voyage, and both the strait and bay were named for him.

In the years after Hudson's voyage, numerous expeditions explored Hudson Bay for England in the continuing search for the Northwest Passage. SIR THOMAS BUTTON reached the mouth of the Nelson River and explored the coast of Southampton Island in 1612–13; WILLIAM BAFFIN and ROBERT BYLOT explored the bay's northwest coast and Foxe Basin in 1615; LUKE FOXE explored western and northern parts of the bay, including Foxe Channel in 1631; and THOMAS JAMES thoroughly explored James Bay in 1631–32. JENS ERIKSEN MUNK, meanwhile, explored Hudson Bay for Denmark, reaching the Churchill River region on the southwest coast in 1619–20.

Fur Trade

Later in the 17th century, in 1668–69, Frenchman MÉDARD CHOUART DES GROSEILLIERS, backed by an English group of merchants, sailed from England to Hudson Bay and founded Charles Fort (Rupert House) on the Rupert River on its east side, from where he traded with Cree Indians for

furs. In 1670, after his return to England with his cargo, the Hudson's Bay Company was granted a royal charter and a trade monopoly over all the lands whose rivers drain into the bay. Later in 1670, PIERRE-ESPRIT RADISSON, *Sieur des Groseilliers's* brother-in-law, led a second trading expedition there and founded a post at the mouth of the Nelson River on the bay's west coast. In 1671–72, French missionary CHARLES ALBANEL, who had traveled with Groseilliers and Radisson on an earlier expedition to the western Great Lakes, traveled overland from the St. Lawrence River to the mouth of the Rupert River on James Bay.

Over the next decades the Hudson's Bay Company sponsored a number of expeditions in the continuing search for the Northwest Passage. In 1719, an expedition under JAMES KNIGHT explored the Marble Island region off the bay's northwest coast. HENRY KELSEY led three other expeditions from York Factory on the Nelson River to the same region in 1719–21. Later expeditions along the west coast included that of CHRISTOPHER MIDDLETON in 1741, during which he explored Wager Bay and Repulse Bay, and that of WILLIAM MOOR, in 1746–47, during which he explored Chesterfield Inlet and more of Wager Bay. The Hudson's Bay Company next turned its attention to overland expeditions west and north, such as those of SAMUEL HEARNE in the 1760s–70s.

Political Claims

During many of these years England and France struggled for possession of Hudson Bay as it did for other Canadian lands. In 1713, France ceded its claim by the Peace of Utrecht. In 1763, in the Treaty of Paris following the French and Indian War, it ceded all its claims to lands in North America. Yet, in 1782, during the American Revolution, French naval officer JEAN-FRANÇOIS DE GALAUP, *comte de La Pérouse*, who went on to explore the Pacific Ocean, commanded a small French fleet that destroyed a number of British trading posts, including Fort Prince of Wales, where he captured Samuel Hearne. Hearne was later released.

See also ARCTIC, EXPLORATION OF THE; NORTH AMERICA, EXPLORATION OF.

Hudson's Bay Company (HBC)

The Hudson's Bay Company was one of two great fur-trading corporations that helped open the West of what is now Canada and northern parts of the United States. It was granted a charter by the English government in 1670, Charles II conferring on his cousin Prince Rupert, count Palatine of the Rhine, and 17 other noblemen a FUR TRADE monopoly as well as near sovereign rights to the region drained by rivers flowing into HUDSON BAY. The vastness of the territory was unknown at the time, but Rupert's Land, as it came to be known, included almost half of present-day

Canada—what is now all of Manitoba, plus large parts of Alberta, Saskatchewan, Ontario, Quebec, Nunavut, and the southeast corner of the Northwest Territories. Moreover, northern portions of present-day North Dakota and Minnesota were also eventually claimed. The Hudson's Bay Company (HBC) is still in existence, but only as a department store retailer.

Groseillers and Radisson

The impetus for starting the Hudson's Bay Company came from two French *COUREURS DE BOIS*, or independent fur traders, *MÉDARD CHOUART DES GROSEILLIERS* and his brother-in-law *PIERRE-ESPRIT RADISSON*. After being arrested for unlicensed trading and having a load of furs confiscated by French authorities in Montreal, the two elicited backing from merchants in London. In 1668–69, on separate ships, they sailed from England to Hudson Bay as part of a fur-trading expedition. Radisson's ship was damaged off Ireland and returned to England. *Sieur des Groseillers* reached Hudson Bay and founded Charles Fort (Rupert House) on the Rupert River on its east side. He successfully traded with Cree Indians for furs. Although that expedition failed to earn a profit because of the damage to Radisson's ship, it proved the feasibility of sailing into Hudson Bay, wintering there, and returning with a cargo of furs, and led to the royal charter for the company and a subsequent expedition by Radisson in 1670. The Gentlemen Adventurers, as the partners were called, also hoped to locate mineral wealth. Still another motivation for investing in such a company was discovering a *NORTHWEST PASSAGE* from the Atlantic Ocean to the Pacific Ocean for access to the Far East, a goal that was included in the company's charter.

The Hudson's Bay Company slowly expanded its operations into the 18th century. Posts were established at the Nelson, Albany, Moose, Severn, Eastmain, and Churchill Rivers. A number of exploratory expeditions by Englishmen were sponsored. In 1690–92, *HENRY KELSEY* explored the Assiniboine and Saskatchewan Rivers, reaching the Canadian prairies and plains. In 1719–21, *JAMES KNIGHT* explored northwestern Hudson Bay in search of the Northwest Passage; after being shipwrecked on Marble Island, Knight and his entire crew perished; Kelsey led a number of expeditions to the region to search for him. In 1754–55, *ANTHONY HENDAY* explored the Canadian plains within 40 miles of the *ROCKY MOUNTAINS*. In the 1760s–70s, *SAMUEL HEARNE* explored inland from southwestern Hudson Bay on three expeditions. He also established the company's first inland trading fort, Cumberland House on the Saskatchewan River. In 1770–72, with the help of Chipewyan Indian guide *MATONABBEE*, Hearne reached the Arctic Ocean and made the European discovery of the Great Slave Lake. In 1772–75, *MATTHEW COCKING* explored from southern Hudson Bay to western Saskatchewan.

During many of these years, France and England vied for control of the region as they did for other parts of North America. The Peace of Utrecht, 1713–14, a series of treaties resolving conflicts in Europe, brought some stability to the fur trade, as did the Treaty of Paris in 1763, which ended the French and Indian Wars and gave England control over formerly French-held territory in North America. Yet, during the American Revolution in 1775–83, French forces were again active in the Hudson Bay area.

Competition with the North West Company

The Hudson's Bay Company faced growing competition in the fur trade in the latter part of the 18th century. Scottish interests organized the *NORTH WEST COMPANY* in the 1780s, and, taking advantage of French expertise in the field, its traders became active over a greater expanse of territory than the Hudson's Bay Company traders. In the 1780s–90s, *DAVID THOMPSON*, a skilled geographer and cartographer of Welsh ancestry, journeyed westward as far as present-day Calgary, Alberta, explored up the Saskatchewan River into the Rocky Mountains, and pioneered a route from Hudson Bay to Lake Athabasca. Without the backing he desired for further surveys, however, he joined the Nor'westers (as the employees of the North West Company were known) in 1797. The *AMERICAN FUR COMPANY*, founded in 1808 by *JOHN JACOB ASTOR*, also proved a formidable competitor to the south. As a result, the Hudson's Bay Company began sending traders farther inland to locate new sources of furs.

After 1808, Thomas Douglas, earl of Selkirk, gained influence within the Hudson's Bay Company, and started a new policy of settling Scottish and Irish farmers on company lands. The founding of the Red River Settlement along the Red River in present-day Manitoba led to violence in 1816 between the colonists and the Métis, the mixed-blood descendants of Native Americans and French and Scottish traders, backed by Nor'westers. That conflict and others led to an amalgamation of the two companies in 1821. Although the North West Company was the more active of the two in the fur trade at that time, the older Hudson's Bay Company controlled many of the favored westward routes, and the name of the latter company was retained. Control of additional lands—all the way to the Pacific and Arctic Oceans—were under the control of the new monopoly. In 1838, the company's license for sole trading rights was renewed for 21 years.


After the Merger

After 1821, Hudson's Bay Company representatives sponsored explorations of a vast region. In the 1820s–30s, *JOHN M'CLOUGHLIN*, based on the *COLUMBIA RIVER* and in charge of operations in the Pacific Northwest, a region subject to joint Canadian and American occupancy at the time, directed traders, such as *PETER SKENE OGDEN* and *JOHN*

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This advertisement for the Hudson's Bay Company appeared in *The Klondike Official Guide*, published by the Department of Interior of Canada in 1898. (*Library of Congress, Prints and Photographs Division [LC-USZ62-104304]*)

WORK, in trading expeditions throughout the region, even as far south as Great Basin in what is now Utah. They thus competed with American MOUNTAIN MEN then working the West. In 1824, ALEXANDER ROSS explored the Snake River from present-day Montana to the mouth of Boise River in present-day Idaho. In the 1830s–40s, SIR GEORGE SIMPSON, head of the vast northern department, sponsored his cousin THOMAS SIMPSON along with PETER WARREN DEASE in surveys of Alaska's and Canada's Arctic coastline; he also sponsored JOHN RAE in a survey of the territory north of Fury and Hecla Strait in the eastern Canadian Arctic. In 1840, ROBERT CAMPBELL located the source of the Pelly River in the Yukon Territory. And, in 1841, JAMES SIN-

CLAIR, leading emigrants westward from the Red River Settlement to the Oregon Country for the company, pioneered a wagon route through the Canadian Rockies.

In 1859, with the expiration of the current license, the Hudson's Bay Company lost its trading monopoly throughout Rupert's Land. After the British North America Act of 1867 and the confederation of the colonies of Nova Scotia, New Brunswick, Quebec, and Ontario into provinces of the Dominion of Canada, property rights were also reevaluated. In 1869, the Dominion of Canada acquired Rupert's Land. The next year, the Red River area became a new province, Manitoba; the rest of Rupert's Land became the Northwest Territories, the southern portions of which became the provinces of Alberta and Saskatchewan. The Hudson's Bay Company retained some lands and its posts.

The Modern Company

In the 20th century, the Hudson's Bay Company diversified into manufacturing and retail, developing a chain of Canadian department stores. During World War I (1914–18), it operated a steamship line, transporting food and munitions for the war effort. In 1930, the company was forced to split up and divest, with Canadian retail interests becoming incorporated as a separate organization, and London interests remaining active in the international fur trade. Many of the remaining lands were eventually sold off. During World War II (1941–45), the Hudson's Bay Company again provided resources in the war effort, including supply vessels for patrols. In 1970, company headquarters were transferred from London to Winnipeg, Manitoba. The Bay, Zellers, Home Outfitters, and hbc.com are the current company divisions.

See also COMMERCE AND EXPLORATION.

hydrography

Hydrography, a branch of geography, is the study of bodies of water and the land that surrounds them. The main purpose of the hydrographer is to survey, chart, and sound bodies of water so that navigation may be conducted with the greatest degree of safety. To this end, the findings of hydrographic surveys are published for those who have practical need of them. Sometimes a distinction is made between hydrography as the study of surface water sources and supplies, and hydrology, the study of underground sources.

In modern practical use, hydrography has come to include the observation of magnetic variations, currents, tides, waves, and weather conditions, although such subjects—at least regarding the world's oceans—are generally considered as part of the discipline of oceanography. Hydrography begins with very precise measurements of locations. These reference points are called origins. From these points, other features are located.

Hydrography became organized as a field of study in England during the reign of Queen Elizabeth I in the second half of the 16th century. An 18th-century Englishman, JAMES COOK, was a noted hydrographer.

See also GEOGRAPHY AND CARTOGRAPHY; OCEANOGRAPHY AND EXPLORATION; SURVEYING AND EXPLORATION.

hypsoneter

A hypsoneter is a device used to measure the altitude of a location (hypsonetry being the measurement of elevation relative to sea level). One of the earliest methods for determining altitude relied on the variation of the boiling point of water with altitude. Since there is less atmospheric pressure the higher one travels, the temperature at which water boils is proportionally lower. A hypsoneter measures the deviation in boiling point from water at sea level (212 degrees Fahrenheit). It consists of a cylindrical vessel in

which water or another liquid is boiled; in the outer partitions of a jacketed column, steam circulates, while in the central one a thermometer gives a reading of the steam's temperature without immersion in the boiling water.

Although comparing boiling times had been used to measure elevation for years, a practical hypsoneter was not designed until 1845. Its inventor was French chemist and physicist Henri-Victor Regnault, who was at that time a professor at the Collège de France.

In addition to the obvious applications in mapping the contours of mountainous regions, the hypsoneter was important to early explorers who sought to understand river systems. By comparing the location and elevation of an unknown river with that which was known about another river in question, a person could trace drainage patterns and thus determine the relationships between a river and its tributaries.

See also GEOGRAPHY AND CARTOGRAPHY.



iceberg See DRIFT ICE.

Iceland

Iceland, or Ísland in the Icelandic language, is an island in the North Atlantic Ocean, just south of the ARCTIC CIRCLE, about 180 miles east of GREENLAND across the Denmark Strait, and about 600 miles west of Norway across the Norwegian Sea. Along with tiny neighboring islands, it constitutes the Republic of Iceland, considered the westernmost nation of Europe.

The island of Iceland is about 300 miles from east to west and about 190 miles from north to south. The coastline, with deep fjords, especially in the north and west, is about 3,730 miles long. The total land area including islands is about 39,800 square miles. Iceland consists of a plateau, averaging about 2,000 feet in height. Some 200 volcanoes, many of them still active, such as Mount Hekla, rise up from the tablelands. Because of the warming effect of the North Atlantic Drift—a continuation of the GULF STREAM—southern and western regions have a milder climate. About one-fourth of the island is habitable, with most settlements situated along the southwestern coastal lowlands. Grasslands predominate with few trees. Almost 15 percent of the island is covered by permanent glaciers and snowfields. Numerous lakes and rivers are located throughout the island.

Iceland may have been the legendary ULTIMA THULE visited by Greek scholar PYTHEAS in about 325 B.C. The ear-

liest people known certainly to have reached Iceland were Irish. During the Middle Ages, Irish monks carried out sea pilgrimages, seeking barren islands to find solitude and enlightenment or inhabited islands where they might missionize native peoples. In the course of such expeditions they founded settlements in the Orkney Islands, the Shetlands, and the Faeroes. It is not known at what point they reached Iceland. The legendary ST. BRENDAN'S ISLE, supposedly reached by monk SAINT BRENDAN in the sixth century A.D., may have been Iceland. In any case, Irish settlements existed there by 800.

The Vikings reached Iceland later in the ninth century. Traditional Norse literature holds that, in about 860, NADDOD was blown off course while traveling from Norway to the Faeroe Islands and reached the east coast of Iceland; he named it Snaeland for "Snowland." Another Norse saga holds that, about the same time, GARDAR SVARSSON circumnavigated Iceland, determining it was an island and naming it Gardarsholm, or "Gardar's Island," then building the first Viking house there, on the north coast. There is a possibility that both the accounts are derived from the same actual voyage. Floki Vilgerdarsson, another early traveler, built a house on the east coast. Ingólfur Arnarson, who established a farm at present-day Reykjavík on the southwest coast in about 874, is considered the first permanent settler of Iceland. By that time, the Irish had abandoned the island. During subsequent decades, other settlers flocked to the island from both the British Isles

and Scandinavian countries. In 930, a general legislature called the Althing was established for all the colonies. Iceland became a home for Vikings as well as a stopover for voyages farther west. ERIC THE RED, who settled in Iceland, sailed from there to Greenland in about 982–85. LEIF ERICSSON, who reportedly reached North America, may have been born in Iceland.

In 1262, Iceland came under the rule of Norway. In 1380, Denmark assumed control. In 1918, Iceland became an independent kingdom in union with Denmark. Reykjavík is the capital. The people of Iceland are predominantly of Scandinavian and Celtic ancestry.

ice pack See PACK ICE.

Indian Ocean, exploration of the

The Indian Ocean is the third-largest ocean in the world, after the Pacific Ocean and the Atlantic Ocean, covering more than 23 million square miles. It is bounded by the Malay Archipelago and Australia in the east, the continent of Asia in the north, Africa in the west, and Antarctica in the south.

In its southern regions, the Indian Ocean has counterclockwise currents similar to those of the Atlantic and Pacific. To the north, the currents are dominated by seasonal monsoon winds. In the winter, the winds north of the EQUATOR blow from the northeast, creating a current in the same direction; south of the equator they curl from the northwest. In the summer, the winds reverse general direction, blowing from the south and west.

Among other smaller rivers, the Indian Ocean is fed by the ZAMBEZI RIVER of Africa, the Tigris and Euphrates Rivers of the Middle East, and the INDUS RIVER and GANGES RIVER of the Indian subcontinent. The waters of the Indian Ocean are generally warm, except near Antarctica, where they contain PACK ICE and DRIFT ICE for most of the year.

The Indian Ocean contains several subdivisions, which are important bodies of water in their own right. The Arabian Sea (or Erythraean Sea as it was known in antiquity) in the northwest connects to the Persian Gulf and the RED SEA. The Bay of Bengal in the northeast is also named separately. These waters formed the basis of trade between Africa and Asia. The regularity of the monsoonal wind system, despite the great number of storms, has facilitated navigation over the centuries.

Ancient Travel

The various principalities along the shores of the Indian Ocean did not always know of one another, and their early history is uncertain. Ancient Egyptians were traveling down

the Red Sea to the land of PUNT as early as 2450 B.C. (see EGYPTIAN EXPLORATION). By that early time, in the land of Ur in southern Mesopotamia, buildings were made of teak imported from the Malabar Coast in western India. To the east the history is even more unclear. It is likely that Indians brought goods from Sumatra and Java several thousand years before Christ, but because of the destruction of the Indus River civilizations in about 1500 B.C. by Aryans from the north, knowledge of this time is limited. Buddhist texts from 1000 to 500 B.C. mention lands to the east of great wealth. A trade connection with the SPICE ISLANDS (the Moluccas) at that time has not been proven.

There is some speculation that Arabs were venturing past Africa's CAPE OF GOOD HOPE by the eighth century B.C. to trade with the peoples of East Africa. Moreover, the question of the source of cinnamon among civilizations in the MEDITERRANEAN SEA at this time is interesting, since the spice probably originated in CEYLON (present-day Sri Lanka), indicating extensive early East-West contacts.

There survives an account of Phoenicians making a journey from the Red Sea, through the Indian Ocean, and around Africa through the Strait of Gibraltar (see GIBRALTAR, STRAIT OF) in about 600 B.C. (see PHOENICIAN EXPLORATION). The story, as told by fifth-century B.C. Greek historian HERODOTUS, though impossible to confirm, has details that give it credibility.

ALEXANDER THE GREAT, who began his military conquest of the east from Macedonia in 334 B.C., arrived in the land that is now Pakistan in 325 B.C. On the Indus River, Alexander's army constructed 150 boats. NEARCHUS, one of his generals, was given command of an expedition to explore the coast of the Erythraean Sea on a return trip to the western end of the Persian Gulf. It was Alexander's intention to unite the lands he had conquered, with trade routes by both land and sea. The report of this journey survives through Greek historian Arrian, who wrote of it in his work *Indica* in the second century A.D. The empire that Alexander created fragmented with his death, as did the hoped-for trade routes.

In about 45 B.C., Greek merchant HIPPALUS, seeking a faster route to India and hoping to avoid the pirates along the coasts of Arabia and Persia (present-day Iran), sailed across the Indian Ocean to the Malabar Coast, finding favorable winds. His route became well traveled by traders bringing back exotic goods for the wealthy Romans (see GREEK EXPLORATION; ROMAN EXPLORATION). Meanwhile, the Indians also extended their influence, colonizing the Malayan Peninsula and other lands of Southeast Asia, which came to be known as "Greater India." India's central location gave it its role as the middleman of Indian Ocean traffic. It was at this time that a connection was made with the Spice Islands at the eastern extent of the Indian Ocean.

The Middle Ages

With the breakup of the Roman Empire in the fifth century A.D., Europe again became isolated from India. This was exacerbated with the founding of Islam in the seventh century. Persia came into ascendancy and traded energetically with India as the West languished. The Chinese also made efforts to obtain goods from their southern neighbors. They sent their own ships to Malaysia and India, but were also serviced by the merchants of these countries. The Chinese preferred to have as much control over their balance of payments as possible, which made them inconsistent in their trade policy and often isolationist. In A.D. 758, Arabs ransacked the port of Canton in southeastern China, which led to the city being closed to outsiders for 50 years. Muslims were also sailing farther down the coast of East Africa, settling on the island of Madagascar by the ninth century. Madagascar became an important center of trade with Africa, for ivory, agricultural products, and slaves. It also had a vital seafaring culture.

During much of the Middle Ages, trade was at a minimum between Europe and Asia. What little contact there was grew out of the port city of Venice, which came to dominate the Mediterranean Sea and eventually trade with the East. Venetian trader MARCO POLO traveled through Asia and into China with his father, NICCOLÒ POLO, and uncle, MAFFEO POLO, in 1271–75. In 1292, he made a journey by ship from the South China Sea through the Strait of Malacca into the Indian Ocean. After several stopovers in India, he continued westward to Ormuz, a center of trade at the mouth of the Persian Gulf. He arrived back in Venice in 1295. The published account of his travels opened up a whole new world to Europeans. Arab traveler ABU ABD ALLAH MUHAMMAD IBN BATTUTAH visited much of the civilized world during his lifetime, including Europe, and the stories of his journeys became known there. In 1349–54, he sailed the Arabian Sea, the open waters of the Indian Ocean, and the Bay of Bengal (see MUSLIM EXPLORATION).

Two other figures are important in the history of the Indian Ocean before the route from Europe around Africa was discovered by the Portuguese. The first was Italian adventurer NICCOLÒ DEI CONTI, who sailed from the Persian Gulf to India, Sumatra, Burma, and Vietnam. His travels, from 1414 to 1437, formed the basis of a book by Poggio Bracciolini dealing with the conflict between Christianity and Islam. It also proved a rich source of information on the culture and geography of the east. The second great traveler at this time was Chinese admiral CHENG HO. Between 1405 and 1434, he mounted seven expeditions to the south under the sponsorship of the Ming dynasty. These voyages were on a grand scale, with 62 main ships and 27,000 soldiers. Cheng Ho's efforts took him as far as the Persian Gulf. He exacted tribute from many different peoples and

brought back many luxuries to his homeland (see CHINESE EXPLORATION).

Around Africa

When HENRY THE NAVIGATOR, prince of Portugal, conquered the Muslim port of Ceuta in North Africa at the Strait of Gibraltar in 1415, a new chapter in European exploration was begun, sometimes referred to as the EUROPEAN AGE OF EXPLORATION. Inspired by the richness and vigor of the Islamic culture, and knowing of the profits that could be made by circumventing their hold on the SPICE TRADE, Henry began a concerted effort to sail around Africa to the source of these goods. The ambition was not realized in his lifetime but was pursued by his fellow countrymen. King John II of Portugal sent BARTOLOMEU DIAS on the first European voyage to round the southern tip of Africa into the Indian Ocean, which he accomplished in 1487–88. VASCO DA GAMA embarked on a journey intending to reach India in 1497. On April 14, 1498, he reached Malindi on the coast of East Africa where Kenya is today, and secured the services of an Arab pilot to take his fleet to India. The uneventful trip was made in 23 days. The Hindu leader he met at Calicut was not overly friendly. The Muslim traders, who were well entrenched, were even more antagonistic, realizing that their way of life was severely threatened. After attacking the city, da Gama sailed southward to Cochin, where he managed to form an alliance with the Hindus. A second Portuguese journey in 1500, led by PEDRO ÁLVARS CABRAL, was even more successful, and the time of European ships sailing the Indian Ocean was well under way. With the first CIRCUMNAVIGATION OF THE WORLD by FERDINAND MAGELLAN's Spanish expedition in 1519–22, Europeans first entered the Indian Ocean from the east. A century later, European ships would also sail Indian Ocean waters along Australia's west coast.

Southern Waters

The northern Indian Ocean continued to be a primary route of transportation between four of the world's seven continents—Africa, Asia, Europe, and Australia—over the next centuries. Yet its southern latitudes remained uncharted until the late 18th century. In 1772, Frenchman YVES-JOSEPH DE KERGUÉLEN-TRÉMAREC led an expedition to southern waters in search of the fabled GREAT SOUTHERN CONTINENT, or Terra Australis, during which he located the Kerguelen Islands in the southern Indian Ocean, close to the parallel of latitude referred to as the ANTARCTIC CIRCLE. At about the same time, in 1772–75, Englishman JAMES COOK circumnavigated Antarctica, proving that the fabled land did not exist in southern waters. While encircling Antarctica, he navigated the Pacific, Atlantic, and Indian Oceans and crossed the Antarctic Circle three times. The Antarctic coast

was not sighted until the 19th century—the Indian Ocean side later than the others—and was not thoroughly charted until the 20th century.



The Indian Ocean holds a special place in the history of exploration as the ancient maritime link between three continents, Europe, Africa, and Asia. The arrival of the Portuguese along the route around Africa renewed its significance as a highway of cross-cultural contact and commerce.

Indus River

The Indus River runs some 1,800 miles from its source, glacial streams in the high HIMALAYAS, to the Arabian Sea. It flows northwestward from western Tibet into India, passing between the far western edge of the Himalayas and the northern extent of the Hindu Kush mountain range. Made navigable by a junction with the Kabul River flowing out from Afghanistan, the Indus, after flowing through the Pakistani province of Sind, finally branches into an infertile delta of some 3,000 square miles. Other major tributaries are the Sutlej, Ravi, and Chenab.

Harrapa Civilization

The Indus Valley was the location of one of the oldest civilizations on record. The Harrapa culture flourished there by about 2500 B.C.—at the same time as the highly developed civilizations of Mesopotamia, Egypt, and Crete—and came to encompass one of the largest geographic areas covered by a single Bronze Age culture. Harrapa people built cities reaching a population of 40,000, dug complex irrigation channels, and even had indoor plumbing. There is evidence that they traded with civilizations as far east as Arabia. By 1500 B.C., however, the Indus Valley civilization had disappeared, to be rediscovered by archaeologists in the 20th century.

In about 2340 B.C., SARGON of Akkad consolidated his power over all of Mesopotamia and began looking outward. He sent out expeditions in all directions for conquest and trade. It is known that Sargon established trade contacts with the Harrapa civilization, and the boundaries of the Akkadian Empire perhaps extended as far as the Indus Valley. After only 40 years, the Akkadian Empire contracted under political pressure and finally collapsed.

The Harrapa civilization collapsed about the time Aryan tribes established themselves in the Indus Valley as well as farther east in Persia (present-day Iran). Several empires flourished in the east until about 550 B.C., when Persians from the southern region of the Iranian plateau, led by Cyrus the Great, gained control of the former Assyrian Empire, which had stretched over much of Anatolia and

Mesopotamia. Before long, the Persians also invaded the Indus River Valley.

Greek Travels and Writings

The Greeks had an early knowledge of the Indus (see GREEK EXPLORATION). Greek geographer HECATAEUS OF MILETUS traveled in the eastern Mediterranean between 520 and 494 B.C. He used his observations and information from merchants and mariners to write the first systematic geographic account of the world. With knowledge gleaned from the Persians, Hecataeus described the newly conquered Indus River Valley and first introduced the terms *Indus* and *India* into a European language.

In 510 B.C., Darius I, the successor to Cyrus of Persia, sent Greek mariner SCYLAX to investigate the course of the Indus River in the hope of improving trade and communication with that part of the Persian Empire, as well as providing tactical military information. Scylax traveled overland throughout the Near East, then is thought to have entered the Kabul River, sailing into the Indus and descending it to the Arabian Sea. CTESIAS OF CNIDUS, another Greek, served as court physician to Darius II and traveled throughout the Persian Empire and India on his behalf in the late fifth century B.C. He wrote two accounts of his journeys, *Indicus* and *Persicus*, attempting to discredit the accounts of his contemporary, Greek historian HERODOTUS, who recounted Scylax's expedition down the Indus.

In 331 B.C., Macedonian ALEXANDER THE GREAT, after consolidation of his rule of the Greek city-states and military victories against the Persians in Asia Minor and the Egyptians in North Africa, he marched across into what is now Afghanistan. Informed by the accounts of Herodotus and Ctesias, he descended into India in 327 B.C. After crossing the Indus River and defeating Indians at the Jhelum River, Alexander's army refused to proceed farther east. In 325 B.C., Alexander and his army sailed from the Jhelum to the Indus, following it to the Arabian Sea.

Alexander's empire collapsed into smaller kingdoms shortly after his death in 323 B.C. In about 300–290 B.C. MEGASTHENES, a Greek, and a servant to the king of Syria, one of these kingdoms, traveled as a diplomat making observations of India. With Megasthenes's account, which exists only in fragments, the story of Western travel into the East and through the Indus River Valley, ended for a time.

Chinese Voyages

With the rise of the kingdom of China farther east in the early centuries A.D., the Indus River Valley again became important (see CHINESE EXPLORATION). Due to the imposing central band of the Himalayan mountain range separating the Indian subcontinent from the rest of central Asia, travelers from the east seeking to enter India, or seeking to leave it,

were best served by traveling through the less-imposing Hindu Kush range farther west and following the Indus River Valley southward into India.

One such traveler was FA-HSIEN, a Buddhist monk and scholar from east-central China. In A.D. 399, he set out to India with three other monks in order to locate Sanskrit originals of Buddhist texts, which he planned to translate. Fa-hsien crossed into present-day Afghanistan after a long journey through the deserts of central Asia. He followed the Kabul River and entered the Indus Valley. He returned to China by boat after three years in India. Another Buddhist monk, HSÜAN-TSANG, made a similar journey in 629 A.D., crossing into India through the KHYBER PASS from Afghanistan. After years of study and pilgrimage through India, Hsüan-tsang returned but this time followed the Indus River into Afghanistan, returning to China in an overland trade caravan.



In ancient times, the Indus River Valley served as the cradle of the Harrapa civilization. Afterward it was a line of demarcation between the near east lands hellenized by Alexander the Great's conquest and the rest of the Indian subcontinent. For centuries, it remained an important route for travel from central Asia, but as Europeans developed and exploited routes to India over the Arabian Sea, its importance waned. It now serves as an artery of local traffic and also provides irrigation for surrounding lands.

See also ASIA, EXPLORATION OF; EGYPTIAN EXPLORATION.

International Date Line

The International Date Line is an imaginary line extending between the NORTH POLE and the SOUTH POLE, which marks off one calendar day from the next, with a time difference of 24 hours on each side. Situated on the opposite side of Earth from the PRIME MERIDIAN, which is designated as zero degrees longitude, the International Date Line as defined on a map, chart, or GLOBE corresponds most of its length to the 180-degree meridian of longitude, bending eastward around the eastern tip of SIBERIA, westward around the Aleutian Islands and eastward again around various island groups in OCEANIA, thereby avoiding a time change in populated areas.

Throughout history, most localities set their time by the rising and setting of the Sun. By the late 1800s, with increased long-distance communication and travel, a standard time system was needed. By international agreement, Earth's 360 degrees were divided into 24 zones, each measuring about 15 degrees in width, based on Earth's rotation of 15 degrees of longitude per hour. Clocks within a given time zone are set to the same time, with local noon corre-

sponding approximately to the time at which the Sun crosses the central longitude of that zone. Each of the 24 zones is generally one hour later than the zone to its west. A hypothetical eastward traveler from the prime meridian would set a clock ahead one hour for each 15 degrees of longitude, the clock thus gaining 12 hours; a westward traveler from the prime meridian would set a clock back one hour for each 15 degrees, the clock losing 12 hours. The two clocks would therefore differ by 24 hours, or one calendar day, which necessitates a date change.

See also GEOGRAPHY AND CARTOGRAPHY; LATITUDE AND LONGITUDE; MAPS AND CHARTS.

International Geophysical Year (IGY)

Geophysics is the study of the structure, composition, and dynamic changes of Earth and its cosmic environment, involving a variety of scientific disciplines. The International Geophysical Year (IGY) was an 18-month period, from July 1957 to December 1958, designated for cooperative study of Earth's geophysics. The time frame was selected because it was a period of intense solar activity. Scientists of 66 nations participated. Studies were conducted on solar activity, cosmic rays, auroras, the ionosphere, the upper atmosphere, geomagnetism, gravity, meteorology, glaciers, oceanography, and LATITUDE AND LONGITUDE. Some of the endeavors relate to the history of exploration.

Among the many accomplishments during IGY were the launching into space of *Sputnik 1*, the first artificial SATELLITE by the Union of Soviet Socialist Republics (USSR; Soviet Union) on October 4, 1957. The Soviet Union launched the much larger *Sputnik 2* on November 3, 1957, which carried a dog, Laika. The first U.S. satellite, *Explorer 1*, launched on January 31, 1958, discovered the Van Allen belts, a zone of trapped radiation surrounding Earth; subsequent satellites performed additional tests. In the field of oceanography, soundings were made of the floor of both the Pacific and Atlantic Oceans. The surveys led to the discovery of seismically active rifts in submarine mountains and furthered knowledge of plate tectonics. More than 300 observation stations were set up in Arctic regions. Knowledge of Antarctic geography was furthered in the Commonwealth Trans-Antarctic Expedition of 1957–58, headed by Englishman SIR VIVIAN ERNEST FUCHS and New Zealander SIR EDMUND PERCIVAL HILLARY. (The U.S. Navy's Operation Deep Freeze to Antarctica, involving aviator RICHARD EVELYN BYRD, was carried out in 1956 in preparation for IGY.) The spirit of cooperation generated around IGY led to the Antarctic Treaty, declaring the continent a nonmilitary area to be used only for scientific study and used to govern Antarctica since 1961.

IGY was followed in 1964–65 by the International Years of the Quiet Sun (IQSY) to obtain data for comparison

of a time of minimum solar activity with that of the earlier studies. IGY has led to continuing research and monitoring of geophysics, partly because of a growing sense of urgency among scientists regarding the effects of human activities on Earth, such as increasing levels of carbon dioxide in the at-

mosphere resulting from the burning of fossil fuels, the so-called greenhouse effect.

See also NATURAL SCIENCE AND EXPLORATION; OCEANOGRAPHY AND EXPLORATION; SPACE EXPLORATION).



junk

The junk, a type of ship designed by the Chinese, has several unique features. Among them are a broad and square bow and a raised poopdeck—a partial deck at the rear of the boat above the main deck—on which is mounted a center long rudder for steerage. The rudder can be lowered in deep water to act as a centerboard, or raised in shallow water where necessary; it is controlled by a long tiller, which enables it to be moved quickly for fast maneuverability. This rudder design was achieved centuries before Europeans also adapted it. The bottom of the boat is flat, sometimes with a small keel. The junk has two or more masts with battened four-cornered sails, known as lugsails. The battens, or bamboo rods dividing the sail into sections, make the sail stiffer than single-section sails and more efficient in using wind. Moreover, the sections can be raised or lowered depending on condition. The junks of today use cotton sails, but in the past they were made with various types of fiber matting. The Chinese compare this type of sail to an ear, which “listens for the wind.”

Chinese have used junks for millennia. The earliest known reference to the boat is from the time of emperor Fu Hsi, in about 2800 B.C. They were used for fishing, transportation, trading, and warfare. Junks would sail the oceans, traveling southward from China to the Malay Peninsula, India, CEYLON (present-day Sri Lanka), and even to the east coast of Africa. The recovery of ancient Chinese coins is ev-

idence of these journeys. In writings by Muslims are found descriptions of junks on the Euphrates River in the seventh century A.D.

The great age of the seafaring junks lasted from the 12th to the 15th century. At this time the Chinese were active in trade with the merchants in the EAST INDIES and India. One of the first known Europeans to see a fleet of junks was Italian MARCO POLO in the 13th century. He described them in some detail, with their watertight compartments, helping to prevent sinking in case of a puncture (and able to carry liquid cargoes), iron nails to secure its planks, and dovetailed joints for strength. He was in awe of their size and related how a junk might have 50 to 60 cabins, each one occupied by a trader and his goods, and supporting him in comfort. By the 15th century, junks had become colossal in size, some of them 400 feet long and 160 feet wide. CHENG HO, a Chinese admiral and explorer of that century, commanded a vast fleet of large junks.

The ease of control and dependability in poor conditions have made the junk useful in the modern coastal waters and in the rivers of the Far East—especially in China, Japan, and Indonesia—for fishing and commerce. Some seen in seaports are 70 feet long, displacing some 100 tons. Some families live on their junks.

See also CHINESE EXPLORATION; MUSLIM EXPLORATION; SHIPBUILDING AND EXPLORATION.



Shown here, in a photograph from the early 20th century, is a Chinese junk in the harbor of Hong Kong. (*North Bennington, Vt.: H.C. White Co., c1907; Library of Congress [LC-USZ62-118818]*)



keelboat

The term *keelboat* refers to a long, slender, shallow boat with a keel and a covering to protect cargo and crew. It was principally powered by poles or oars, although some keelboats had hand-cranked paddle wheels or sails to take advantage of useful winds. The design of the keelboat made it suitable for use on rivers, especially the moving of freight. A large keelboat could carry 80 tons of goods. But they were also used as early passenger vessels, especially on the MISSISSIPPI RIVER and MISSOURI RIVER. Early U.S. expeditions up the Missouri, such as those under MERIWETHER LEWIS and WILLIAM CLARK in 1804 and ZEBULON MONTGOMERY PIKE in 1805, made use of the keelboat. It was also an essential craft in the Missouri River FUR TRADE of the early 1800s.

When steamships came into use (the first one on the Mississippi in 1811), they generally replaced the keelboat (although, in 1825, Colonel HENRY ATKINSON used keelboats for a second military expedition along the Missouri and Yellowstone Rivers after steamships broke down on the first). Two-way traffic on the river, with and against the current, was accomplished more efficiently by steam power. In modern usage, the term *keelboat* refers to a sailing vessel with a ballasted keel giving stability in ocean racing.

See also SHIPBUILDING AND EXPLORATION.

Khyber Pass

The Khyber Pass is the most important mountain pass in western Asia. Connecting modern-day Afghanistan and Pa-

kistan, it runs just more than 30 miles through the Safed Koh mountain range, extending to the south from the Hindu Kush mountain range. Of the five passes that connect Afghanistan to Pakistan through these mountains, the Khyber Pass is favored because it is the shortest route. Winding through the mountains, it varies in width from 450 to 15 feet. Before modern improvements, travelers could touch both walls with outstretched hands while passing the narrowest region of the pass. Near Kabul, Afghanistan, the altitude of the pass is about 1,404 feet; on its opposite end near Peshawar, Pakistan, it reaches a maximum elevation of 3,517 feet. Two streams run through the pass, and on either side rise sheer shale and limestone cliffs between 600 and 1,000 feet high.

Because of the many mountain ranges surrounding the Indian subcontinent, the Khyber Pass, before air travel, provided the best route from central Asia into India, and played an important part in trade along the SILK ROAD, linking the major route between China and the MEDITERRANEAN SEA with India. It also provided easy access to the INDUS RIVER, which merchants could use to sail into the Arabian Sea. Many travelers to India followed the trade routes through the Hindu Kush, including the first Chinese explorers of India. The Khyber Pass was also a convenient route for invasion, and Darius I of Persia (present-day Iran), part of Macedonian ALEXANDER THE GREAT's army, and people of the Islamic Mughal (Mogul) Empire all traversed it, attempting to invade India.

In the 19th century, as Britain and Russia vied for superiority in central Asia, Afghanistan and the Khyber Pass

became a contested area. In the course of shoring up their defense of its Indian possessions and later during the Anglo-Afghan wars, there were many skirmishes between the British and Afghan natives. In January 1842, some 16,000 British and Indian soldiers were killed fighting in the pass. The British made modifications to the pass, constructing a road in 1879, and expanding that road in the 1920s as well as building a railroad.

The importance of the Khyber Pass was greatly diminished with the advent of air travel, but it is still used today. During the Afghan civil war of the 1980s, 3 million refugees fled through the pass into Pakistan.

Kilimanjaro, Mount

Mount Kilimanjaro, part of Africa's Eastern Highlands, is a mountain located in northeastern Tanzania, near its border with Kenya. The highest mountain on the continent, it actually consists of two peaks, seven miles apart and connected by a ridge. Kibo is the higher peak at 19,341 feet above sea level; Mawensi is 16,893 feet.

Greek merchant DIOGENES perhaps viewed Mount Kilimanjaro in the first century A.D. Hellenized Egyptian

PTOLEMY produced a map the next century showing the MOUNTAINS OF THE MOON, most often associated with the Ruwenzori Mountains, but possibly representing Mount Kilimanjaro and the second-highest peak in Africa, Mount Kenya, at 17,057 feet. German missionaries JOHANN REBMANN and JOHANN LUDWIG KRAPF are known to have seen Kilimanjaro in 1848. Krapf also sighted Mount Kenya.

Kibo was first scaled in 1889 by German geographer HANS MEYER and Austrian mountain climber Ludwig Purtscheller. Meyer had made two earlier unsuccessful attempts, in 1887 and 1888. On his 1889 expedition, Meyer explored the ice-covered crater at the top and determined that the mountain is a dormant volcano. Since that time, numerous other expeditions have reached the summit of both peaks. Tourism related to MOUNTAIN CLIMBING, as well as farming along the mountain's lower southern slopes, provide income for inhabitants in the region.

King Solomon's mines See OPHIR.



land bridge

A land bridge is a stretch of land connecting two landmasses, such as islands or continents. In the history of exploration, the term is applied to the land bridge across the **BERING STRAIT**, once connecting Asia and North America. It is theorized that over it came the Paleo-Indians, Stone Age peoples from Asia, the real discoverers of the Americas.

Earth's most recent ice age, referred to as the Wisconsin glaciation with regard to North America and the Wurm glaciation with regard to Europe, lasted from about 90,000 or 75,000 to 8000 B.C. It is theorized that at various times during the Wisconsin glaciation, enough of the planet's water was locked up in ice to lower the oceans and expose what is now submerged land. The narrowest part of the Bering Strait, between Cape Dezhnyov in Russia and Cape Prince of Wales in Alaska, is 51 miles. During the ice age, along with more coastal lands revealed, there would have been a stretch of land, possibly as much as 1,000 miles wide, bridging the two continents. The Bering Strait land bridge, or Beringia, would have consisted of the treeless plains of the tundra; the islands of today in the region, such as the Diomed Islands, would have been mountains.

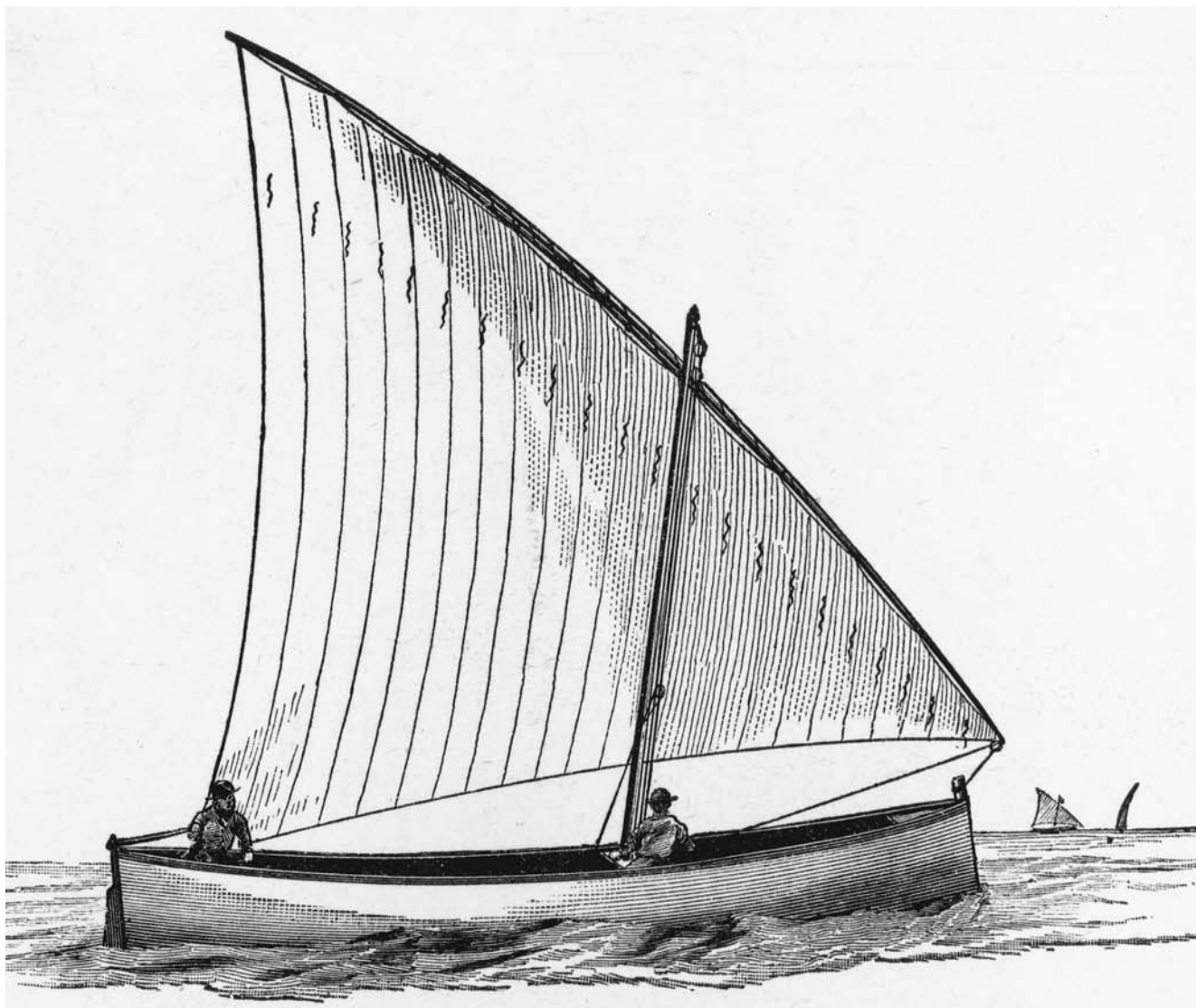
Based on archaeological evidence, it is known that Mongolian peoples of Asia hunted large mammals, such as big game, including woolly mammoths, mastodons, and saber-toothed tigers. The big game of the ice age could have migrated across the land bridge. And the human hunters and their families could have followed them. The time of the

first such travelers is not known. The estimated time frequently cited by scholars has been before 11,200 years ago. More recent archaeological finds have led scholars to an estimated time of before 12,500 years ago. Other archaeological evidence in both North and South America, along with DNA and linguistic evidence, has resulted in an estimated time of before 33,000 years ago. Possibly other Paleo-Indians reached the Americas by boat. Descendants of all these ancient explorers spread throughout the Americas over subsequent generations. Later voyagers, in particular Inuit (Eskimo) and Aleut peoples of the Arctic region, were known to have traveled by boat from **SIBERIA** after the land bridge had been flooded again.

It is thought that Aborigines on the island of **TASMANIA** reached there by way of a land bridge before 35,000 years ago. When waters rose and the land was covered, they became isolated from Australia's Aborigines. The Isthmus of Panama in **CENTRAL AMERICA** is sometimes discussed as a current land bridge.

lateen rig

The term *lateen rig* refers to the triangular sails used by boats and ships that optimize speed and control in adverse winds, in contrast to square-rigged sails. A lateen-rigged ship had sails attached to a long yard and pivoted skyward on a relatively short mast. Although this arrangement was not as sturdy as square rigging in strong, favorable winds, it was



Shown here, in an early 20th-century engraving, is a sailboat with a lateen rig. (Library of Congress, Prints and Photographs Division [LC-USZ62-105524])

ideal for lighter, contrary winds, where sailing close to shore was desired. Lateen-rigged ships would often have two or three masts, and the sails could be turned to catch the best wind. This is also known as a fore-and-aft rig. Another advantage of the lateen-rigged ships was their ability to make the most efficient use of tacking when sailing windward. Large square-rigged vessels came to use a triangular sail on their mizzenmast (mast behind the main mast) for added maneuverability.

The lateen rig was imported from the Arab *DHOW* and employed by shipbuilders, who worked for 15th-century sponsor of expeditions *HENRY THE NAVIGATOR*, prince of Portugal, in the making of the *CARAVEL*. With a small but robust hull, stern-mounted rudder, and lateen rig, the *caravel* proved a major advance in ship design. It was used to

great advantage in navigating the difficult and unpredictable African coastal waters at the beginning of the *EUROPEAN AGE OF EXPLORATION*.

See also *SHIPBUILDING AND EXPLORATION*.

latitude and longitude

The term *latitude*, used geographically, is the angular distance of any point on the surface of Earth north or south of the *EQUATOR*. *Longitude* refers to the angular distance on Earth's surface measured along the equator east or west from its intersection with a designated north-south line known as the *PRIME MERIDIAN*. Latitude and longitude together provide a grid—a system of geometrical coordinates—which can be used in identifying any location on the Earth's surface.

Parallels of latitude, imaginary east-west parallel circles around Earth, enable one to locate a place north or south of the equator. The equator is the longest of the parallels, with the length of the others decreasing the farther north or south they are represented; they are measured in angles from zero degrees at the equator to 90 degrees at the NORTH POLE and the SOUTH POLE. Meridians of longitude, imaginary parallel half-circles running through the North Pole to the South Pole, enable one to locate a place east or west of the prime meridian; they all are the same length. They are measured in angles from zero degrees at the prime meridian to 180 degrees at the INTERNATIONAL DATE LINE. Each degree of latitude and longitude is divided into 60 minutes, and each minute, into 60 seconds, to allow for precise numerical designations.

In most current cartographic representations—either a GLOBE, map, or chart—parallels of latitude are indicated in multiples of five degrees. In addition, most representations show four fractional parallels, which have special meanings, based on the Sun's relation to Earth and climate: They are, north to south, the ARCTIC CIRCLE, TROPIC OF CANCER, TROPIC OF CAPRICORN, and ANTARCTIC CIRCLE. The equator, tropic of Cancer, and tropic of Capricorn were the first three reference lines on maps.

Greek Scholarship

The ancient Greeks determined these lines based on the Sun's movement. The tendency of Greek scholars was to focus more on the abstract and theoretical than on the empirical; they believed that the most important goal of philosophy was to discover the Ideal Forms, of which the forms we perceive with our senses are but imperfect imitations; the study of mathematics was the high road to such knowledge. Thus, it was natural for them to try to discover mathematical principles underlying everything in the universe, including the shape and size of Earth and its relationship with the heavenly bodies. The generally accepted idea about this was that Earth, a perfect sphere, lay in the exact center of a much larger sphere on the surface of which were fixed the heavenly bodies. As noted elsewhere, for the Greeks physical existence was nested, as it were, firmly within metaphysical existence, as the spherical Earth nested within the concentric celestial sphere, beyond which, so Plato believed, lay heaven itself, the abode of the gods.

The celestial sphere rotated around Earth on an axis running through the poles; thus the different heavenly bodies as they moved described imaginary lines around Earth's surface that were parallel to one another, the largest of these being the equator. The best way to define or fix the position of any locality on Earth lay in finding its relationship with the celestial sphere, which was eternal, perfect, and divine. This was done by determining, at any given locality, the angle between a line drawn from the observer through a point on the horizon and a line through the North Pole and South Pole, the

axis of rotation of the celestial sphere. This angle would be exactly the same for all localities along a line parallel to that of the equator, running east and west, and perpendicular to the celestial axis. A system of parallel lines running around Earth, called *klimata*, which means inclination, began to be devised, sometime before third-century B.C. Greek astronomer and geographer ERATOSTHENES himself worked on these matters, adding other lines. A second-century B.C. Greek astronomer and mathematician, HIPPARCHUS, further developed the concept, making the east-west lines parallel and the north-south lines at right angles to them.

By the second century A.D., these lines were referred to as latitude and longitude. Hellenized Egyptian PTOLEMY made the system of coordinates more accurate by choosing lines so that the longest day of the year differed from one to the next by a quarter of an hour. In 1569, the publication of a map accurately depicting latitude and longitude—the technique created by Flemish cartographer GERARDUS MERCATOR known as the MERCATOR PROJECTION—revolutionized mapmaking.

Early Navigational Instruments

For the purposes of navigation, instruments were needed to determine latitude and longitude. Early devices, such as the ASTROLABE, CROSS-STAFF, and Davis QUADRANT, gave readings of latitude. For centuries, finding longitude depended on DEAD RECKONING—a system of collecting information involving the use of a magnetic COMPASS, an hourglass, a measuring line, and a TRAVERSE BOARD for recording the information, in order to estimate distance traveled east or west. The inaccuracy of this method is illustrated by Italian mariner CHRISTOPHER COLUMBUS's famous error in believing, when he made landfall in the Americas on behalf of Spain, after traveling only 66 degrees, that he had arrived in the islands of the China Sea, some 230 degrees from Spain. The solution of the "longitude problem" awaited the invention of an accurate way of keeping time since comparing the time of day at any location with that of the current time at one's point of departure will give the number of degrees traveled east or west from that point. (Since Earth revolves once in 24 hours and each horizontal circle of latitude measures 360 degrees, a difference in time of one hour between two points means they are 15 degrees apart.) This method, in principle, was first proposed in the 17th century by Italian scientist Galileo after he made his discovery of the moons of Jupiter. He realized that they could be used as an extraterrestrial clock by observing and noting the times at which each passed behind Jupiter and then reappeared; using a diary of the timing of their movements compiled at one's home port, observations made on board a ship would give the current time back home. However, it proved impractical to make accurate enough sightings of Jupiter's moons at sea.

The Longitude Problem

During the 18th century, the French and British governments were engaged in an equivalent of the 20th-century space race between the United States and Union of Soviet Socialist Republics (USSR; Soviet Union) as they strove to solve the longitude problem; on the accurate determination of location at sea depended supremacy in trade, naval warfare, and world dominance. For this reason, the two governments built observatories at Greenwich in England and in Paris, since it was assumed that longitude would be able to be determined by celestial observation as latitude was. Isaac Newton, a 17th- to 18th-century English physicist and mathematician, was the principal proponent of this theory; he insisted that no timepiece could be accurate enough to be relied upon. (Newton's strength as a theorist, able to comprehend universal laws of nature, perhaps tended to blind him to practicality.) The idea was to take Galileo's idea a step further and use the whole sky as a clock; if the Moon's movements among the stars were tracked and compared to the "sun time" for any locality, this information could be used to tell the time for that locality from anywhere on Earth. Astronomers of the time realized that current knowledge about star and Moon positions was insufficiently accurate for this purpose; thus the principal reason the British and French observatories were built was to gain more precise astronomical data. In this way the search for better navigational techniques contributed to the advancement of science in general.

However, the ultimate solution to the "longitude problem" turned out to be more humble—the invention of a very accurate timepiece, or CHRONOMETER. John Harrison, a carpenter in Yorkshire, England, became interested in clock design while serving as a bell ringer in his church and watching the pendulumlike swing of the bells. In 1714, the English Parliament in conjunction with the ROYAL SOCIETY had offered a prize of £20,000 to whomever succeeded in making the accurate determination of longitude possible. The Longitude Prize was a result of a naval disaster that took place in 1707, in which a large proportion of the nation's navy was wrecked, killing thousands of sailors, when the fleet crashed into a reef off the Scilly Islands because of uncertainty over their position. Realizing that an accurate timepiece might be the solution, Harrison engaged in extensive experimentation using different materials, beginning with woods, then different metals. He compared his clocks to star movements to assess their accuracy and to each other. In 1735, he completed his first model, which made use of different metals in the mechanism to adjust to temperature differences; it was tested at sea in 1736 on a particularly stormy voyage and proved to be accurate to within five to 10 seconds a day. Only after many years of work, in the 1760s, were his chronometer clocks accurate enough to win the Longitude Prize. Meanwhile, in the early 1730s, various inventors developed the SEXTANT, an im-

provement on earlier instruments used to measure the angular elevation of celestial bodies. English optician John Hadley built a version (based on Newton's notes), and American Thomas Godfrey constructed one in Philadelphia, both of which could determine latitude but not longitude. John Campbell designed a sextant that could measure longitude as well in 1757.



The concept of latitude and longitude, in addition to its terrestrial application, is used in various celestial coordinate systems. One of these is the ecliptic coordinate system, based on an imaginary ecliptic, or great circle of the celestial sphere, with the imaginary plane with coordinates passing through the centers of both Earth and Sun.

See also GEOGRAPHY AND CARTOGRAPHY; GREEK EXPLORATION; MAPS AND CHARTS; NAVIGATION AND EXPLORATION.

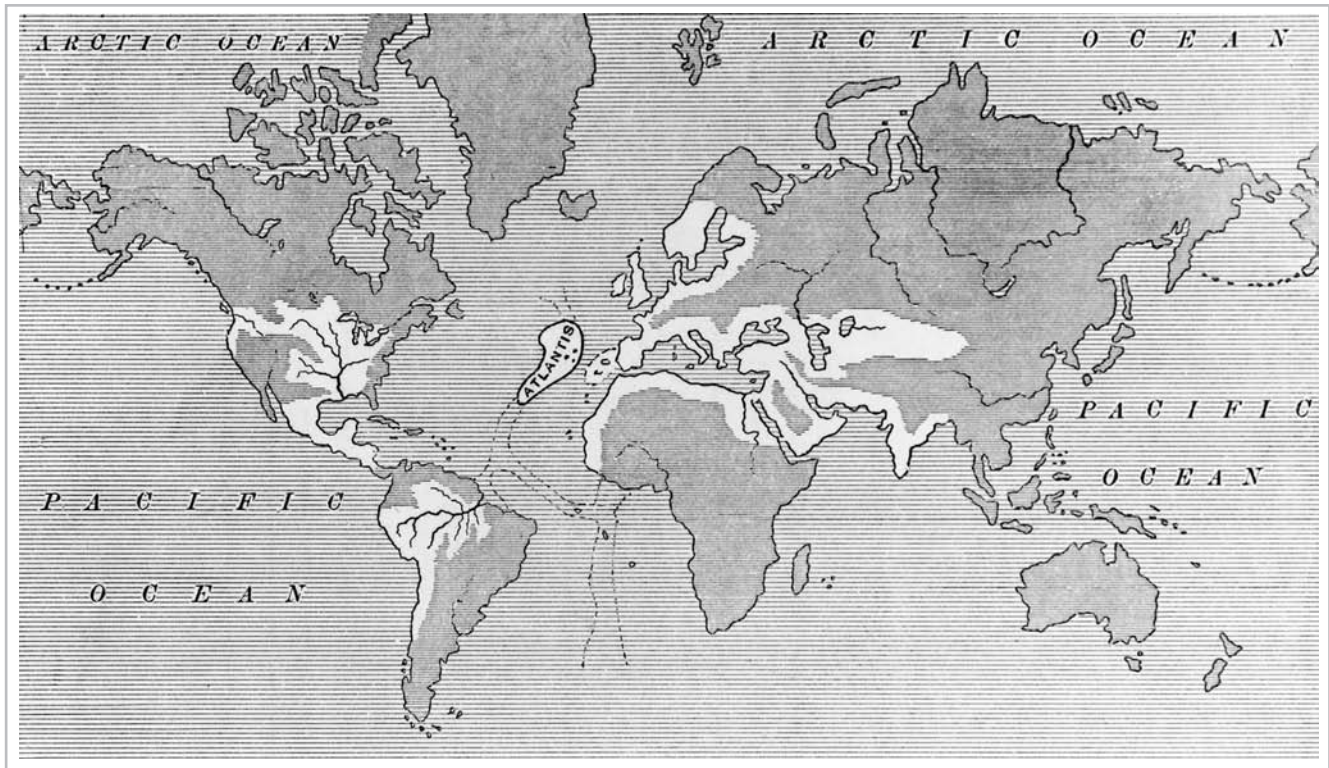
legends and exploration

Mythology has helped inspire world exploration from ancient to modern times. Explorers have set out on numerous expeditions in search of wealthy lands, lost peoples, hoped-for routes, or cures. Geographic misconceptions have endured over the centuries, and exploration can be regarded as an empirical method to confirm or disprove myths. Some of these myths have endured to present times. And some unconfirmed exploratory journeys have also taken on legendary status.

Enduring Myths

An example of a geographic myth that still endures in some circles is the sunken island of ATLANTIS. First mention of Atlantis is found in the fourth-century B.C. writings of Greek philosopher Plato. He spoke of a Western Ocean, where the great civilization of Atlantis had thrived. The location has been identified with various locations in the MEDITERRANEAN SEA and the Atlantic Ocean, and new theories still crop up.

Another Greek myth, this one associated with the voyage of scholar PYTHEAS to the Arctic Sea in the fourth century B.C., is that of ULTIMA THULE, reputed to be the northernmost land, six days travel north of the British Isles. Since Pytheas's writings on the voyage have not survived, details are from later sources, one from Roman scholar PLINY THE ELDER of the first century A.D., who coined the name for the land. Varying theories hold that the northernmost land described by Pytheas was Norway, ICELAND, or Jan Mayen Island in the Arctic Ocean. The question surrounding this myth, unlike the story of Atlantis, is not whether such a place existed, but what the place attached to the myth really is.



This hypothetical world map shows the empire of Atlantis; it appeared in Ignatius Donnelly's book *Atlantis: The Antediluvian World*, published in 1882. (Library of Congress, Prints and Photographs Divisions [LC-USZ62-90566])

Disproved Myths

An example of a geographic myth that has been disproved is that of the GREAT SOUTHERN CONTINENT, also known as Terra Australis or Terra Australis Incognita, a continent supposedly located in the Southern Hemisphere. This myth also originated among the ancient Greeks (see GREEK EXPLORATION), who, on determining that the Earth was a sphere, theorized that, based on a concept of balance and symmetry, the south must contain a similar ratio of land to sea as the north. The story lasted through the Middle Ages and RENAISSANCE, with ships of various nations searching for Terra Australis in the southern oceans. It came to be associated with another fabled land supposedly reached by Frenchman Binot Palmière de Gonville in 1503, GONVILLE'S LAND. It was not until the late 18th century, when Englishman JAMES COOK journeyed far enough south to determine that Terra Australis did not exist. Other continents, not quite fitting the theories, were discovered, however—Australia and Antarctica.

Truth in Legends

Truth often blends with myth, as in the case of the supposed voyages of sixth-century Irish monk SAINT BRENDAN and an island known as ST. BRENDAN'S ISLE. Historical evidence indicates that, in the course of his sea pilgrimages, Brendan

visited Wales on the British Isles, Brittany, in what is now northwestern France, and the Hebrides Islands west of Scotland. But, in some medieval literature, he is also purported to have visited an island somewhere in the Atlantic, hypothesized as Iceland, GREENLAND, the CANARY ISLANDS, the AZORES, the Madeira Islands, or the Bahama Islands. If Saint Brendan did in fact reach the Bahamas, he would have been the European discoverer of the Americas, even before the Vikings, a theory that, without any archaeological evidence, has to remain as myth as do theorized transatlantic voyages—by DRIFT VOYAGE—of other seagoing peoples of the Mediterranean region.

The writings describing Viking journeys at the turn of 11th century—the *Saga of Eric the Red* and the *Saga of the Greenlanders*—regarding the travels of ERIC THE RED, LEIF ERICSSON, and other Norsemen, were long considered largely myth until archaeological evidence in Newfoundland indicated a Viking presence in North America. Both Irish and Viking accounts, mythical or not, reportedly influenced later explorers to look for lands across the Atlantic. A map, supposedly from the mid-15th century and found in 1957—the so-called VINLAND MAP—which cartographically confirmed the Norse voyages to North America, turned out to be a forgery—in effect a legendary map—but, because of the archaeological evidence, did not do anything to

detract from the truth of the Norse discovery of North America.

KUPE, a 10th-century Polynesian, as legend has it, pursued the Squid King in the South Pacific Ocean, leading to the discovery of NEW ZEALAND. It is known that the Polynesians did in fact migrate to New Zealand and became ancestral to the Maori, another case of truth blending with myth.

Venetian merchant MARCO POLO, who traveled extensively in the Far East in the late 13th century, described CIPANGU as an island containing palaces with roofs of gold and streets paved in marble, one of more than 7,000 islands in an archipelago in the Sea of China, off the Pacific coast of Asia. Two centuries later, both CHRISTOPHER COLUMBUS, an Italian sailing for Spain, and JOHN CABOT, an Italian sailing for England, sought this fabled island, thought to be a major source of spices, which has come to be associated most with Japan.

Another example of a legend with some truth is that of the Strait of Anian (see ANIAN, STRAIT OF), a mythical version of a NORTHWEST PASSAGE through North America from the Atlantic Ocean to the Pacific Ocean. Such a strait supposedly extended from the Atlantic coast somewhere north of Labrador to a more southerly latitude on the Pacific coast. Although a concept of the 15th century until late 18th century, its name was gleaned from the writings of Marco Polo, one of the texts that explorers studied in the hope of finding a practical water route from Europe to Asia. No such waterway fitting that description was located, although, in 1903–06, Norwegian ROALD ENGELBREGT GRAVNING AMUNDSEN did navigate a water route in the Arctic Ocean north of North America. Unlike the legendary Strait of Anian, supposedly a year-round route, the real Northwest Passage proved impractical because of annual freezing.

Legends out of History

Theories surrounding the LOST COLONY—part of the story of the first attempt at an English colony as sponsored by SIR WALTER RALEIGH in the late 16th century—demonstrate how legends evolve out of historical fact. The story of the colonists and how they struggled to survive along the coast of what is now northeastern North Carolina is known up to the point that their leader JOHN WHITE departed for England in 1587. When he returned to the region three years later, there was no trace of the colonists—who included his daughter, Eleanor White Dare, and his granddaughter, Virginia Dare—other than the word “CROATOAN” written on a stockade post. Since no evidence has been found to prove or disprove speculation regarding what happened to them, various myths endure, such as that they became ancestral to certain area tribes, some of whom have non-Indian blood. Reports of blue-eyed or bearded Native Americans passed down over the years often were associated with the Lost Colonists. Much folklore and literature surrounds Vir-

ginia Dare, the first English child born in the America, one of the most fantastic fables of which is that she was transformed into a white doe.

Wealthy Kingdoms

Among the most persistent myths are those involving wealthy lands. South America has the legends of the City of LOS CÉSARES and of EL DORADO, which set in motion numerous expeditions by various European nations in the 16th and 17th centuries. North America has the Seven Cities of CIBOLA and the related QUIVIRA, sought by FRANCISCO VÁSQUEZ DE CORONADO in the 16th century. Real encounters with native peoples—in particular the Aztec and Inca—who did possess quantities of gold, silver, and gemstones—helped further legends of such lands. The legend of the Seven Cities of Cibola has its origins in that of the Seven Cities of Antillia from centuries before, more evidence of the endurance of myths. Meanwhile, the French—JACQUES CARTIER in the 16th century and SAMUEL DE CHAMPLAIN in the 17th century—sought the legendary land of SAGUENAY in Quebec. FOOL’S GOLD, another name for iron pyrites, was mistakenly thought to be real gold by a number of explorers, including Jacques Cartier, as he searched for Saguenay.

The location of another wealthy land, OPHIR, referenced in the Bible in connection with the Hebrews—where King Solomon’s mines are supposed to have been located—has been debated over the years: lands in Africa or Asia; or as far away in Asia as India, the Ural Mountains, or Japan; or on other continents altogether, in the Americas, Australia, or New Zealand.

Individuals and Myth

Some legends involve specific people. A “White King” was reported to rule a kingdom somewhere in South America, which was absorbed into the legends of Los Césares and El Dorado. Surrounding a real-life Welsh prince MADOC of the 12th century, there arose a legend that he had made a voyage in the Atlantic Ocean to a faraway land where there were human inhabitants and, after his return to Wales, set out on a colonizing expedition, never to be heard from again. It is not known whether geographer RICHARD HAKLUYT and others who promoted the idea in the late 16th century actually were convinced the story was true or were using it as propaganda on behalf of Queen Elizabeth I of England to make a claim for the discovery of North America more than three centuries before Italian Christopher Columbus’s voyage for Spain. In any case, the legend persisted into the 19th century, when some travelers tried to establish a connection with the Mandan Indians of the upper Missouri and a lost Welsh people. The story resembles that of the 10 Lost Tribes of Israel, who supposedly, on being conquered by the Assyrians, were exiled from their

homeland in the eighth century B.C. Since the ultimate fate of these people is unknown, there has been speculation over the centuries regarding where they settled, leading to theories that they ended up in various places in Asia, Africa, Europe, or the Americas.

PRESTER JOHN is one of the most famous of all legendary individuals. Numerous texts and maps from the 12th to the 17th centuries refer to a Christian ruler and his wealthy kingdom in Asia or Africa. Numerous explorers, such as Italian Marco Polo, who traveled to Asia in the 13th century, and Portuguese PÉRO DA COVILHÃ, who visited East Africa in the 15th century, hoped to find such a person. The start of the legend, which became ever more fantastic over the centuries, may have been based in truth since a community of Nestorian Christians were thought to have migrated from Constantinople (present-day Istanbul) somewhere in Asia east of territory controlled by Muslims. (Nestorianism—the name taken from Nestorius, the fifth-century patriarch of Constantinople—was a theological position maintaining the human nature of Christ was independent from the divine nature.) One of the writers on Prester John is legendary himself. *Travels of Sir John Mandeville*, a work originally written in Norman French and published between 1357 and 1371, with some 300 total translations in English and most European languages, is thought to have been written by a citizen of Liège in present-day Belgium under the pseudonym of SIR JOHN MANDEVILLE. That the work is obviously a compilation of other medieval explorers' travels—such as Marco Polo and Italian missionary ODORIC OF PORDENONE of the 14th century—has led scholars to this interpretation of “Mandeville” as a pseudonym, although some maintain he was a real person who borrowed from other travel accounts.

The FOUNTAIN OF YOUTH, a water source that supposedly gave eternal life, was a concept associated with Prester John, who supposedly drank from it. It later became a primary motivation for JUAN PONCE DE LEÓN—who had heard about such a phenomenon while Spanish governor of Puerto Rico—in his explorations of the Bahamas and Florida in the early 16th century.



The history of cartography demonstrates the evolution of myths and their debunking as voyages of exploration defined the world map. Some of those myths—such as sea or land monsters—although partly based on ignorance, were actually a kind of misinformation purposely passed to prevent other peoples from traveling the same routes.

Levant

The term *Levant*, in its historical usage, referred to the countries along the eastern MEDITERRANEAN SEA, especially in

the Near East, but also Egypt, Turkey, and Greece. The name is derived from the Italian word *levante*, which means “rising,” as with regard to the Sun—the French verb *lever* means to rise. It came to be applied to the concept of east and was originally applied to all of the Orient. People of the Levant have been referred to as Levantines by other Europeans. The Arabic equivalent of *Levant* is *Mashriq*, for “the country where the sun rises.”

Italy was the dominant European power in the Mediterranean during the second half of the Middle Ages and into the RENAISSANCE, acting as the middleman for trade between the Levant and the rest of Europe. In 1581, the LEVANT COMPANY was chartered in England to develop trade with the region. In recent times, Syria and Lebanon have been called the Levant States.

See also ASIA, EXPLORATION OF.

Levant Company

The Levant Company—also known as the Turkey Company—was one of the first of the English-chartered trading companies. It formed a commercial bridge between East and West in a way that had not been previously developed.

In 1579, Queen Elizabeth I sent her ambassador William Harburn to Murad III, the sultan of Turkey, to request permission to trade on terms equal to those then existing between Turkey and other Europeans, such as the Venetians of northern Italy. The request was granted, and in 1581, Elizabeth chartered the Levant Company for a period of seven years, and with limited membership. To accommodate this new opportunity, larger, stronger ships were built (see MERCHANT SHIP). Soon the English were trading wool and tin, abundant in England, with the region of the LEVANT, flanking the eastern MEDITERRANEAN SEA, for dates, figs, hemp, coffee, and medicines. The Venetians, who had previously enjoyed a monopoly on this traffic, objected. The Spanish attacked English vessels, as did the pirates of the BARBARY COAST. The company agreed in short order to pay the tribute demanded by these pirates. Still, the price of Eastern goods decreased substantially in England, and the company was profitable.

In 1605, James I, Elizabeth's successor, revised the Levant Company's charter as a joint-stock venture. Any English person with £25 could buy a share in the concern. Along with those of the investor community, the interests of the government became increasingly entwined with that of the company, with customs duties and payments made for the continuation of its privileges. Profits continued to soar, however, and the Levant Company's rate of return was about 300 percent at this time.

The company's trade was relatively stable for much of the 17th century. In 1680, after an ongoing dispute with the BRITISH EAST INDIA COMPANY over the importation of

raw silk, Parliament agreed to hear the Levantine's grievances. The Levant Company accused the British East India Company of sending weavers to India to teach them their skills, thus attempting to destroy the Lancashire industries. The British East India Company countered by accusing the Levant Company of exporting too much bullion. Without gaining satisfaction from Parliament, the Levant Company responded by sending ships on "the Cape Route" to India, that is around the CAPE OF GOOD HOPE of Africa. They eventually gained the right to trade in India as well.

With increased competition from home and abroad, the Levant Company experienced a steady decline throughout the 18th century. The French, who had established a Levant Company of their own, were more conveniently located and paid more attention to the Eastern market than did the British. They exported lighter and fancier cloth, which was better suited to the climate, and undercut the British company's profits. The Treaty of Paris in 1763 between France and England marked a turning point from which the company never recovered because of growing French competition. In 1780, Parliament earmarked £10,000 to keep the company afloat, a noteworthy change of circumstances. In 1825, the Levant Company closed its doors, as trade in the Mediterranean became increasingly deregulated.

See also COMMERCE AND EXPLORATION.

Lhasa

Lhasa is a city located near the Lhasa River, a tributary of the Brahmaputra, in the southeastern end of the Tibetan HIMALAYAS. Surrounded on three sides by mountains, Lhasa receives little rain and has sparse vegetation. Temperatures vary from 85 degrees Fahrenheit during the day to minus two degrees at night. The city is the capital of Tibet, part of present-day China, as well as the center of Tibetan Buddhism.

Lhasa enters recorded history in the seventh century A.D., when Songtsen Gampo, a Tibetan born about A.D. 608, united Tibet through conquest and made Lhasa his capital. After conquering Nepal in 640, Gampo married a Nepalese princess, and, the following year, in a display of his power, took the daughter of the Tang Emperor in China as his second wife. Under the influence of his two wives, Gampo converted to Buddhism, then established it as the state religion. Gampo built the first palace of Potala and the temple of Jokhang. In 836, the kingdom of Tibet collapsed as Lang Darma captured the throne through fratricide and outlawed Buddhism. With the dissolution of the kingdom, Lhasa dwindled in importance.

Gradually, Buddhism reasserted itself through the influence of missionaries from India and China. In the late

14th century, Tsung-Khapa established the Yellow-Hat sect of Buddhism, which dominated Tibetan Buddhism. The chief abbot or lama of the Yellow-Hat sect was revered by the Mongols, who called him Dalai for his great wisdom. It was during the reign of the fifth Dalai Lama, in 1641, that Lhasa again became the capital of a unified Tibet.

Early European Visitors

The first Europeans to arrive in Lhasa, in 1661, were two Jesuit missionaries, JOHANN GRUEBER of Germany and ALBERT D'ORVILLE of Flanders (although Italian missionary ODORIC OF PORDENONE may have reached it in the 14th century). Grueber and D'Orville remained in Lhasa for a month, reporting that the "common people" ate raw meat and never washed. They were most impressed, however, by the great Potala palace, which had originally been built by Songtsen Gampo. The currently standing Potala palace was built to replace the original palace between 1645 and 1693. The palace contains over a thousand rooms, stands 330 feet, or 13 stories, high, and stretches 1,310 feet east to west and 1,150 feet from north to south.

The next Westerners to visit Lhasa were an Italian Jesuit, IPPOLITO DESIDERI, and a Portuguese Jesuit, Emmanuel Freye. Desideri had spent several months in India studying the Persian language before he set out from Delhi, India, in September 1714. He continued north to Lahore, making his way with a native caravan through the mountains before setting foot in Lhasa in March 1716. Desideri remained in Lhasa for five years, studying the Tibetan language and preaching. He was recalled abruptly from Tibet by Rome, and the account of his travels remained unpublished for 200 years. After Desideri, Capuchin monks of the Franciscan order stayed and preached in Lhasa, the last leaving in 1745. By the end of the 18th century, Tibet had become closely allied with China, and, under Chinese influence, closed its borders to all foreigners with penalty of torture and death. Lhasa became known to Europeans as the "Forbidden City."

In 1811, THOMAS MANNING, a British scholar in the service of the BRITISH EAST INDIA COMPANY, attempted to reach Lhasa but was refused entrance. Manning, however, disguised himself heavily and rode up to the Potala palace. He was recognized as a European but was allowed a five-month stay and an audience with the seven-year-old Dalai Lama.

Two French-Canadian Lazarists, ÉVARISTE-RÉGIS HUC and Joseph Gabet, who had been serving as missionaries in China, joined a Tibetan caravan that was returning to Lhasa from Peking (Beijing). Huc and Gabet traveled 18 months with the caravan and reached Lhasa in January 1846. They remarked on the incredible commercial activity and noise in the streets of the city. After only two months, they were expelled at the urging of the lead Chinese official in Tibet.

Huc and Gabet were the last Europeans to enter Lhasa for more than 50 years.

The Pundits

Throughout the 19th century, the British trained and equipped native Indians to perform survey missions. These Indian surveyors, known as PUNDITS, ventured into the Himalayas and Tibet under disguise for the British and took instrument readings in secret. In this way, the British acquired knowledge of Lhasa and its environment. Meanwhile, a famous Russian explorer, NIKOLAY MIKHAILOVICH PRZHEVALSKY, as he explored central Asia, made four attempts to reach Lhasa. In 1879, Przhevalsky crossed Sinkiang, entering Tibet from the north. He was within 125 miles of Lhasa when Tibetans forced him to turn him back.

20th Century

In 1900, a young Russian student, GOMBOZHAB TSYBIKOV, entered Lhasa disguised as a Buddhist. He remained there two years and visited a number of monasteries. He was soon followed by another Russian, Agran Dorjien. Dorjien became the Dalai Lama's teacher and his political adviser. This worried the British, who, at the time, were vying with Russia for economic control of central Asia; in 1904, they sent SIR FRANCIS EDWARD YOUNGHUSBAND with 1,000 troops into Tibet. Younghusband advanced on Lhasa until the Tibetans relented and agreed to sign the Treaty of Lhasa, which forced them to pay an indemnity to the British and opened up trade between India and Tibet. The British, who had established influence over China, convinced the Chinese to take control of Tibet. In 1910, Chinese troops occupied Lhasa. After the Chinese revolution of 1911–12, Tibet again became independent.

The last famous Western visit to Lhasa was that of the Frenchwoman ALEXANDRA DAVID-NÉEL. A student of Eastern philosophy and frequent traveler in India and China, she learned Sanskrit and Tibetan. In 1912, she moved to Sikkim, a province of India very near to Tibet. David-Néel made several trips into Tibet, never reaching Lhasa. In Japan, she met Ekai Kawaguchi, a Japanese philosopher and monk who had managed to spend 18 months in Lhasa disguised as a Chinese Buddhist monk. In 1924, after more than three years traveling through China and Mongolia, David-Néel, disguised as a beggar at Kawaguchi's side, finally reached Lhasa. She remained two months in Lhasa, visiting all the holy sites.

In 1951, Tibet again lost its independence with the invasion by Communist China. Many temples and Buddhist holy sites were destroyed to make way for a modern city in Lhasa, in order to house the new Chinese officials. The Dalai Lama fled and continues to live in exile. In the early 1980s, China again allowed pilgrims to visit holy sites. The Potala is presently a state museum.

See also ASIA, EXPLORATION OF; MONGOL EXPLORATION.

London Company See VIRGINIA COMPANY.

longitude See LATITUDE AND LONGITUDE.

longship

The longship was a type of GALLEY ship used by the Vikings (see VIKING EXPLORATION) in the fjords of their homeland in Scandinavia and for their travels to other parts of Europe and North America from about A.D. 800 to 1100. Two types of Viking ships have come to be called by that name: the *drakkar* for "dragon ship," or *langskip* for "longship"; and the *knörr*, or *hafskip* for "half-ship," also called a *kautskip* for "merchant ship." The drakkar, or longship proper, was long and sleek, as its name would indicate, and had a shallow keel, with pointed ends, curving upward in the shape of a serpent. The knörr, shorter and broader and with a much higher freeboard (height of a ship's sides that ride above water) and wider keel, was deeper in draught; it two had a pointed bow and stern but without the dragon symbol. It also was sometimes decked at bow and stern, offering some shelter. The longship was the warship of the Vikings; the knörr was the ship used for long voyages and carrying cargo. Both types of Viking ships had a single bank of oars, the primary source of propulsion, although a single square sail, made of *wadmal*, a coarse woolen cloth, was also employed. The knörr sails could be close-hauled so they could beat to windward.

The drakkar were typically about 70 feet in length, but it is believed some reached a length of 100 feet. The knörr was about 50 feet. Withies (lashings) of a variety of materials, such as hide or baleen (the horny substance from the mouths of baleen whales used in feeding), and small iron plates and iron nails were used to secure the rib-style oak frameworks of Viking ships. They were clinker-built, meaning the planks, typically of pine, overlapped, providing multiple places for caulking by twisted animal hair soaked in tar. Such construction, with ribs that were not directly attached to the keel, allowed the ship the flexibility to twist in the waves without leaking. Keels were also typically made of oak. Steering was accomplished with a rudder mounted to the right side of the stern, the steerboard (which gave its name to the term *starboard* for the right side of a boat). A generally three-foot right-angled tiller enabled good control in poor conditions. Riggings and anchor cable were typically made of walrus hide.

The drakkar, long and low with fearsome serpentine heads on the prow and stern, was built for speed and



Shown here, in an 1893 photograph, is a replica of a Viking drakkar, or dragon ship. (*Library of Congress, Prints and Photographs Division [LC-D4-21183]*)

maneuverability in war although its flexibility made it durable in relatively rough seas. With its shallow draught, it could negotiate coastal regions and rivers. Its light weight made it easy to drag upstream and even overland when necessary. It is estimated that it was capable of speeds of 10 or 11 knots and more in short bursts. The drakkar carried crews of 25 to 60 men who were all also free warriors, in contrast to the galley slaves of the Romans; thus, they were able to forgo carrying extra provisions for nonfighters. They sat on benches in the open and hung their shields along the side for extra defense when fighting. An awning in the front offered a measure of shelter, but the drakkar was basically an open shell. Most often it was used for a day trip and beached on shore at night. When a voyage lasted longer without land in sight, the sailors would sleep in leather sleeping bags wherever they could find room. The Vikings used the drakkar in their raids on European coastal settlements and inland wa-

terways. Sea battles between fleets of opposing peoples were rare; the method of fighting in these cases was for ships to rope themselves together and send a barrage of arrows and other missiles against the enemy. After this, individual ships would come together, and each war band attempted to board and take the other's ship; the aim was not to destroy the enemy's ship but to take the precious commodity.

The even more seaworthy knörr was used to carry people and cargo over long distances. Such ships could carry three or four dozen men, livestock, and the timber for building a new farmstead. With its robust construction, some have speculated that it was the knörr that Vikings such as NADDOD, ERIC THE RED, and LEIF ERICSSON used to cross open waters of the Atlantic and colonize the Faeroe Islands, ICELAND, GREENLAND, and North America.

The Vikings' personal attachment to their ships was more than a little mystical. The ship was often highly dec-

orated on the sides, the prow, and especially the sail. Women participated in the decorating. Vikings saw their ships as the means to their worldly achievements, as well as their reward in the afterlife. Young men would be given command of a longship to establish their manhood and prove their viability as leaders. These ships would be well cared for and given lyrical names like “Snake of the Sea.” The stories of these vessels—both drakkars and knörrs—being carried overland by their crews from river to river inside Russia also gives testimony to the value they placed on them. Much is known about the Viking ships, since they were often buried with their captains. Many have been excavated and reconstructed for exhibition in museums around the world.

Both the drakkar and the knörr design elements were incorporated in other European ships, such as the ROUND-SHIP, which evolved during the latter part of the Middle Ages and the RENAISSANCE and facilitated the EUROPEAN AGE OF EXPLORATION.

See also SHIPBUILDING AND EXPLORATION.

Los Césares (City of the Caesars, City of los Césares, Ciudad de los Césares)

Los Césares, or the City of los Césares, also appearing as Ciudad de los Césares and City of the Caesars, was one of the early legends concerning kingdoms in South America wealthy in precious metals and jewels. The name was taken from Francisco Cesar, who explored for Italian SEBASTIAN CABOT in his Spanish expedition of 1526–30 to Río de la Plata and other inland waterways of present-day Brazil, Uruguay, Paraguay, and Argentina, and who probably reached the edge of the ANDES MOUNTAINS. Los Césares eventually was thought to be in the Andes in the present-day Arauco province of Chile.

The discovery and appropriation of Inca Indian gold in the 1530s under FRANCISCO PIZARRO helped create a fervor around the idea of other such civilizations and riches. Any rumors of such places heard from native peoples, or perhaps created by nonnative explorers themselves to justify expeditions, led to new expeditions. Reports of the adventures of ALEJO GARCÍA, a shipwrecked sailor of the 1515–16 expedition of JUAN DÍAZ DE SOLÍS, and of a “White King” who ruled over mountains of silver also spurred on Cabot and his men. Reports of a kingdom to the north that came to be known as EL DORADO led to a similar legend.

The legend of Los Césares endured for decades. It was at least part of the incentive for the 1535–37 expedition of DIEGO DE ALMAGRO and the 1540–41 expedition of PEDRO DE VALDIVIA from Peru southward into Chile, as well as the 1580 expedition of JUAN DE GARAY south from present-day Buenos Aires, Argentina.

See also LEGENDS AND EXPLORATION; TREASURE AND EXPLORATION.

Lost Colony (Roanoke Island)

Lost Colony is the name applied to the first English colony in the Americas in what is now northeastern North Carolina. The people who disappeared are called the “Lost Colonists.”

First Expedition

In July 1584, an English exploratory expedition under captains Philip Amadas and Arthur Barlowe, sponsored by SIR WALTER RALEIGH and with the support of Queen Elizabeth I, reached the Outer Banks, or Barrier Islands, and explored Roanoke Island as well as parts of the neighboring mainland. Amadas and Barlowe and their men had friendly contacts with native peoples. It was decided that two Native Americans would return to England with the expedition—Manteo, a Hatteras Indian of the village of Croatoan on the Outer Banks, and Wanchese, a Roanoke Indian, cousin to the brothers and chiefs Granganimeo and Wingina. They departed the Americas in August, reaching England in mid-September.

First Roanoke Colony

In London, Manteo and Wanchese met Raleigh and Queen Elizabeth I. Their presence helped Raleigh raise funds for a permanent colony, granted as a part of the original Virginia patent. Roanoke Island, sheltered from the ocean by the Barrier Islands, seemed a favorable site to establish a presence in the Americas, from where PRIVATEERS could carry out raids on Spanish ships. In April 1585, Raleigh’s fleet of seven ships, commanded by his cousin SIR RICHARD GRENVILLE, set forth with some 600 men, among them intended colonists. The ships reached Pamlico and Albemarle Sounds by June. The colonists under Governor Ralph Lane built Fort Raleigh on Roanoke Island and explored the region, having contact with many of the area’s Algonquian-speaking tribes.

Scientist THOMAS HARRIOT studied the native peoples and catalogued the wildlife and resources. (His work was published on his return to England as *A Briefe and True Report of the New Found Land of Virginia*.) Also among the colonists was JOHN WHITE, who, in addition to serving as the cartographer, made watercolor drawings of peoples, animals, and plants, which were published in Europe. Meanwhile, the Algonquian showed the English methods of farming and fishing.

Relations between the English and area Native Americans deteriorated over a variety of issues. In one incident, in summer 1585, the English burned a village on the mainland because a Secotan Indian had stolen a silver cup. A

subsequent series of events led to more hostilities. To assure the cooperation of the upriver tribes in offering supplies to his men during their search for gold and pearls, Lane had Skyco, son of the Chowanoc Indian sachem Menatonon, taken hostage in spring 1586. The deaths from European disease of Granganimeo and his father, Ensenore, who headed the pro-English faction of Roanoke Indians, further hurt relations. Wingina, taking a new name, Pemisapan, turned militant and attempted to starve out the English. Wanchese, his cousin, who had traveled to England, turned against the English as well. Manteo, the Hatteras, remained pro-English.

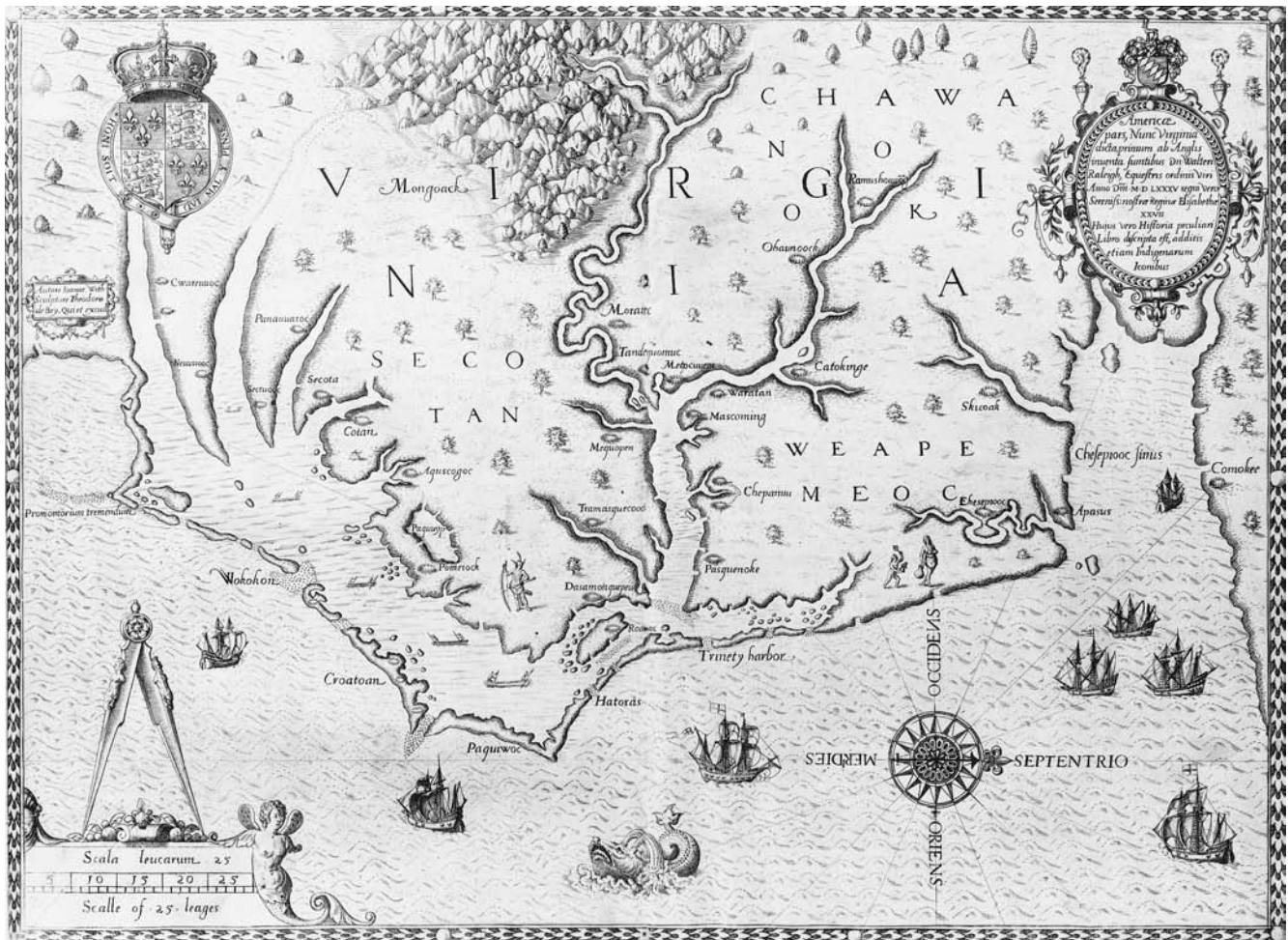
Using rumors of a planned Indian attack as his excuse and pretending to seek council with Wingina, Lane led an attack on a mainland coastal village of the Roanoke on June 1, 1586. Wingina was shot and beheaded. Less than three weeks later, the colonists, no longer receiving any help from local tribes in acquiring food, departed Roanoke Island with the visiting fleet of SIR FRANCIS DRAKE. Manteo again

accompanied them, this time with an Indian by the name of Towaye.

Second Roanoke Colony

In May 1587, another fleet set sail from England for North America. The 150 colonists in Raleigh's second attempt at a colony, with John White as governor, included women and children. Manteo returned with them. (Towaye's fate is not known; he may have died in England.) Although the intended place of settlement was Chesapeake Bay to the north, Simon Fernandes, the pilot of the fleet, on reaching the Roanoke Island region in July, refused to take the colonists any farther. They were forced to rehabilitate the former settlement and reestablish tenuous relations with area tribes. An attack soon followed: Roanoke warriors, now led by Wanchese, killed a colonist while he was fishing away from the fort.

That August, White christened Manteo and made him Lord of Roanoke and Dasamonquepeuk, thus attempting to



John White created this map of the coast of Virginia in 1585. It was published by the Flemish engraver Théodore de Bry five years later. (Library of Congress, Prints and Photographs Division [LC-USZ62-54020])

usurp Wanchese's power. Also that month, the first English child was born in the Americas—Virginia Dare—to John White's daughter Eleanor White Dare and son-in-law Ananias Dare.

At the end of August, with supplies dwindling and winter approaching, the colonists convinced White to return with Fernandes to Europe for supplies. In England, at White's request, Raleigh organized a relief expedition under Grenville for March 1588, but it was ordered not to sail because of warfare with Spain. White lined up two small ships for a crossing, but his ship was intercepted and looted by French pirates. The invasion of the British Isles by the Spanish Armada in July–August 1588 further delayed his return. When White finally reached Roanoke Island in August 1590, the colonists had dis-

appeared. The only clue White found was the word *CROATOAN* carved on the stockade post, probably indicating that at least some among the settlers had relocated to Manteo's village on the Outer Banks. Others may have built a boat in an attempt to reach Chesapeake Bay. It is possible all were killed in attacks by Roanoke, Powhatan, or other area tribes. Some may have intermarried with native peoples. Theories on the fate of the Lost Colonists have led to much speculation over the centuries and an entire literature.

Less than two decades later, in 1607, the English would found their first permanent settlement in the Americas at Jamestown to the north among the Powhatan Indians.

See also LEGENDS AND EXPLORATION.



Madoc

Madoc was a legendary Welsh prince of the 12th century, son of King Owain Gwynedd of North Wales. He reportedly had a love of the sea and some skills as a sailor. Legends indicate that, in order to escape family tensions, he sailed to the south of Ireland in 1170 and, after a long time traveling in the Atlantic Ocean, came upon a land with human inhabitants, from which he returned. Upon his return, he gathered up a group of companions to colonize the land and set out on a second journey, after which he and the emigrants were not heard from again.

In 1583, Sir George Peckham published a pamphlet, which made the case that England had a claim to the Americas because of Madoc's discoveries. In his *Historie of Cambria* of 1584, Dr. David Powell, drawing on earlier work of the geographer Humphrey Llwyd, made the claim that Madoc had reached either Mexico or Florida, giving to England rights over those regions rather than to Spain. In the same period, geographers RICHARD HAKLUYT and John Dee promoted the notion of the English discovery of North America more than three centuries before CHRISTOPHER COLUMBUS, sailing for Spain, had reached the WEST INDIES. Hakluyt divined that Madoc had landed somewhere in the Caribbean Sea. There were obvious nationalistic incentives for the English to expand the exploits of Madoc beyond any solid evidence. England was beginning to explore these regions, and any basis for sovereignty over new territories could have geopolitical consequences.

The legend was promoted in numerous ways, even to the point at which explorers returning from the North American continent would falsely claim to have encountered Welsh-speaking Indians. In 1795, a Welshman named John Evans accompanied a Spanish fur-trading expedition headed by Scotsman James Mackay up the MISSOURI RIVER to the villages of the Mandan Indians in search of evidence to verify the legend of Madoc. None was found. The legend endured, however, continuing to inspire literature and poetry over the centuries, including Robert Southey's poem "Madoc" from 1805. Frontier painter GEORGE CATLIN, who spent time among the Mandan Indians in the 1830s, theorized that the tribal name might be derived from *Madawgwys*, for "followers of Madoc." As late as 1953, the Daughters of the American Revolution placed a plaque at Mobile Bay in Alabama, where Madoc made a supposed landing.

Although it is thought that Prince Madoc was a real person, any claims to his accomplishments in the Americas, as vague as they are, were made by others on his behalf. The phenomenon of his legend is thus of more interest for its political content than as an expansion of geographic knowledge.

Magellan, Strait of (Estrecho de Magallanes)

The Strait of Magellan (or Estrecho de Magallanes in Spanish) is a narrow passage at the southern extremity of South America between the Atlantic Ocean and Pacific Ocean. About 350 miles long and two to 15 miles wide, this

submerged valley follows a winding course between the mainland of South America to the north, and the Tierra del Fuego Archipelago to the south. The southernmost island in the archipelago contains CAPE HORN, beyond which is Drake Passage between South America and the South Shetland Islands off the Antarctic Peninsula of the continent of Antarctica. Dungeness Point on the north and Cape Espiritu Santo on the south mark the entrance of the Strait of Magellan on the Atlantic side; Cape Pilar at the northwestern end of Desolación Island marks the entrance on the Pacific side. Except for a few miles of the modern nation of Argentina on the Atlantic end, the strait passes through lands belonging to Chile. The Chilean city of Punta Arenas is located along the strait on Isla Grande de Tierra del Fuego.

The strait is named after Portuguese mariner FERDINAND MAGELLAN, the first European to navigate it over 38 days in October–November 1520 while sailing for Spain in the first CIRCUMNAVIGATION OF THE WORLD. He also named the large island to the south Tierra del Fuego, Spanish for “Land of fire”; the westernmost cape, Cape Deseado, for “Desired cape” (also known as Cape Pilar); and the Pacific Ocean itself for its apparent calmness. Over the next decades, the Strait of Magellan became the favored route for Spanish ships entering the Pacific. Although often foggy, it offered protection from the frequent ocean storms in Drake Passage.

In 1578, Englishman SIR FRANCIS DRAKE passed through the strait, the first English ship to do so. Blown off course, he ended up in the waters of Drake Passage before sailing west and north again. Along the coasts of Peru and Mexico, he successfully raided Spanish settlements and ships. The next year, Spanish mariner and scientist PEDRO SARMIENTO DE GAMBOA attempted to intercept Drake in the Strait of Magellan, his likely route back to the Atlantic and Europe. Drake sailed westward across the Pacific, however, and eventually completed the second voyage around the world in 1580. In the meantime, Sarmiento de Gamboa conducted a 16-month survey of the strait, returning to Spain in 1580.

With the construction of the Panama Canal in Central America in the early 20th century, the Strait of Magellan no longer served as the main passage between oceans. Yet it still serves as a sea lane for southern commerce.

See also CENTRAL AMERICA, EXPLORATION OF; SOUTH AMERICA, EXPLORATION OF.

magnetic poles See NORTH MAGNETIC POLE; SOUTH MAGNETIC POLE.

Mandeville, Sir John

It is not known whether Sir John Mandeville was a real person or a made-up name, a pseudonym attached to a 14th-

century book. The book attributed to him was originally written in Norman French and translated into Latin and other European languages in some 300 different volumes. Its English title appears as *The Voyages and Travels of Sir John Mandeville, Knight*; as *The Travels of Sir John Mandeville*; or simply as *Mandeville's Travels*. Published between 1357 and 1371, the work consists of a first-person narrative describing travels in Africa and Asia, including Egypt, Jerusalem, Persia (present-day Iran), India, and China, and lands in between. It is obvious from comparative studies of medieval texts that the work is a compilation of other people's travel accounts, including those of Italians MARCO POLO and ODORIC OF PORDENONE.

The author has been variously theorized as being Jean de Bourgogne (also Jean à la Barbe), a physician, or as Jean d'Outremeuse, a historian, both from Liège, in what is now Belgium. Some scholars maintain that Mandeville was in fact a real person from St. Albans in England, who spent much of his life in other parts of Europe, and who drew on other writers to create a travel guide for pilgrims to the Holy Land and beyond. Many of the descriptions in the work are fantastic. One section describes the kingdom of legendary figure PRESTER JOHN. Travel accounts written for entertainment were a popular genre in England. The work is said to have influenced subsequent English writers, such as Geoffrey Chaucer, William Shakespeare, and John Milton. Milton himself proclaimed that Mandeville influenced a generation of explorers, including Italian CHRISTOPHER COLUMBUS.

mappa mundi (mappemonde)

Mappa mundi (plural form, *mappae mundi*) is Latin for “cloth of the world,” as the first world maps were drawn on pieces of cloth. Sometimes the word is written as one. The French version is *mappemonde*. A medieval term, it still appears in discussions of early cartography, referring to early world maps. Almost 600 *mappae mundi* are still in existence, having been produced in Europe from the years 300 to 1300. One map is known specifically by the name Mappa Mundi, or the Hereford map, dating from about 1290 and housed since that time in a cathedral at Hereford, England, and depicting Hereford on it.

Mappae mundi demonstrate the limited geographic knowledge of the Middle Ages. No attempt was made to represent true scale or LATITUDE AND LONGITUDE. They are now considered works of art and religious and philosophical statements as much as cartographic representations. Their most common shape is circular, with a *T* in the center, hence the descriptive name “T-O maps.” Around the *O* is the world's ocean. Within the *O* are the three continents known at the time—Asia, Europe, and Africa. Since east is shown at the top, Asia is depicted above the *T*, with Europe and Africa flanking the base. The top of the *T* represents

the NILE RIVER and the Don (Tanais) River. The bottom of the *T* is the MEDITERRANEAN SEA. The T-O design probably originated among the ancient Greeks and was also used by Arab cartographers. In maps drawn by Christian cartographers, Jerusalem typically appears at the center.

The Hereford map also reveals religious themes and is thought to have served as an altarpiece. Its English cartographer, Richard of Haldingham, reportedly based much of the content on the writings of Orosius, a religious scholar of the fifth century A.D. and a pupil of Saint Augustine. It is drawn within a circle 52 inches in diameter, on a 64-by-54-inch sheet of vellum supported by an oak frame. Most of its writing is black ink, with red and gold leaf used for emphasis, and blue or green for rivers and seas, except red for the RED SEA. Scalloped designs indicate mountain ranges, and walls and towers indicate towns. The map shows Jerusalem at its center, as well as routes there. Other religious images include angels, Jesus Christ, the Apostles, the Garden of Eden, the Tower of Babel, and Noah's Ark. Biblical inscriptions accompany the images. Non-Christian themes, such as a dragon, unicorn, and mermaid, also appear. An inscription cites Roman general JULIUS CAESAR of the first century B.C.: "The measurement of the world was begun by Julius Caesar. All the East was measured by Nicodoxus, the North and West by Theodoxus, the southern parts by Policlitus." Irish monk SAINT BRENDAN of the sixth century A.D. is also mentioned in association with six islands near the CANARY ISLANDS.

Two other types of maps came into use in the Middle Ages. The road map and the sailing chart served practical purposes and were less decorative.

See also GEOGRAPHY AND CARTOGRAPHY; GREEK EXPLORATION; MAPS AND CHARTS.

maps and charts

A map is any graphic representation of Earth's surface, or some part of it, according to some given scale or projection. The related term *chart* is sometimes used interchangeably with *map* but most often refers to a navigator's map, relating to the marine environment, or an aviator's map, for flying. A GLOBE is a spherical map, although the terms *map* and *chart*, with regard to exploration, are generally used for representations drawn on flat surfaces. Cartography is the art and science of making maps and charts. An atlas is a book containing a collection of maps or charts (after mythological Greek deity Atlas, who was often depicted supporting Earth on the title pages of early map collections).

Maps are used for a variety of purposes and show quantitative and qualitative facts, such as physical features, boundaries, sites, patterns, and distribution. The information communicated might relate to geography, geology, physiography, meteorology, politics, economics, or demography. Maps are typically aligned with north at the top and

south at the bottom. Pictures as well as a conventionalized system of symbols are used along with words to convey natural and cultural features.

Among the symbols utilized are a circular compass rose indicating the four primary directions. True north and magnetic north are often both indicated (see NORTH POLE; SOUTH POLE; NORTH MAGNETIC POLE; SOUTH MAGNETIC POLE). Another common map element is a geographic grid for accurate determination of location, the most common being intersecting lines of LATITUDE AND LONGITUDE. A scale shows the ratio of the distance between two points on Earth's surface and the distance between the two corresponding points on a map. Drawings of physical features, contour lines, hachure marks, shading, and coloring are different ways to indicate relief, the varying elevations and depressions on Earth's surface. Dots are typically used to indicate towns and cities. Lines—continuous or broken—indicate boundaries. Specialized maps have an array of other symbols. A key or legend, often set off graphically in a box, gives their meaning.

One of the great challenges in mapmaking is the representation of Earth's curvature on a flat surface, known as projection. Different kinds of map projections have been devised, using geometry and mathematical analysis. An early technique, known as orthographic projection, was conceived by Greek HIPPARCHUS in the second century B.C. Earth is presented as seen from an observer high above it; the center is true to scale, but the scale contracts with greater distance from the center. In the MERCATOR PROJECTION, named after the 16th-century Flemish cartographer GERARDUS MERCATOR, Earth is represented as a rectangle on which lines of latitude and longitude appear as straight lines intersecting at right angles. Many modern maps use azimuthal projections of one kind or another, in which true direction from the center of the map is preserved.

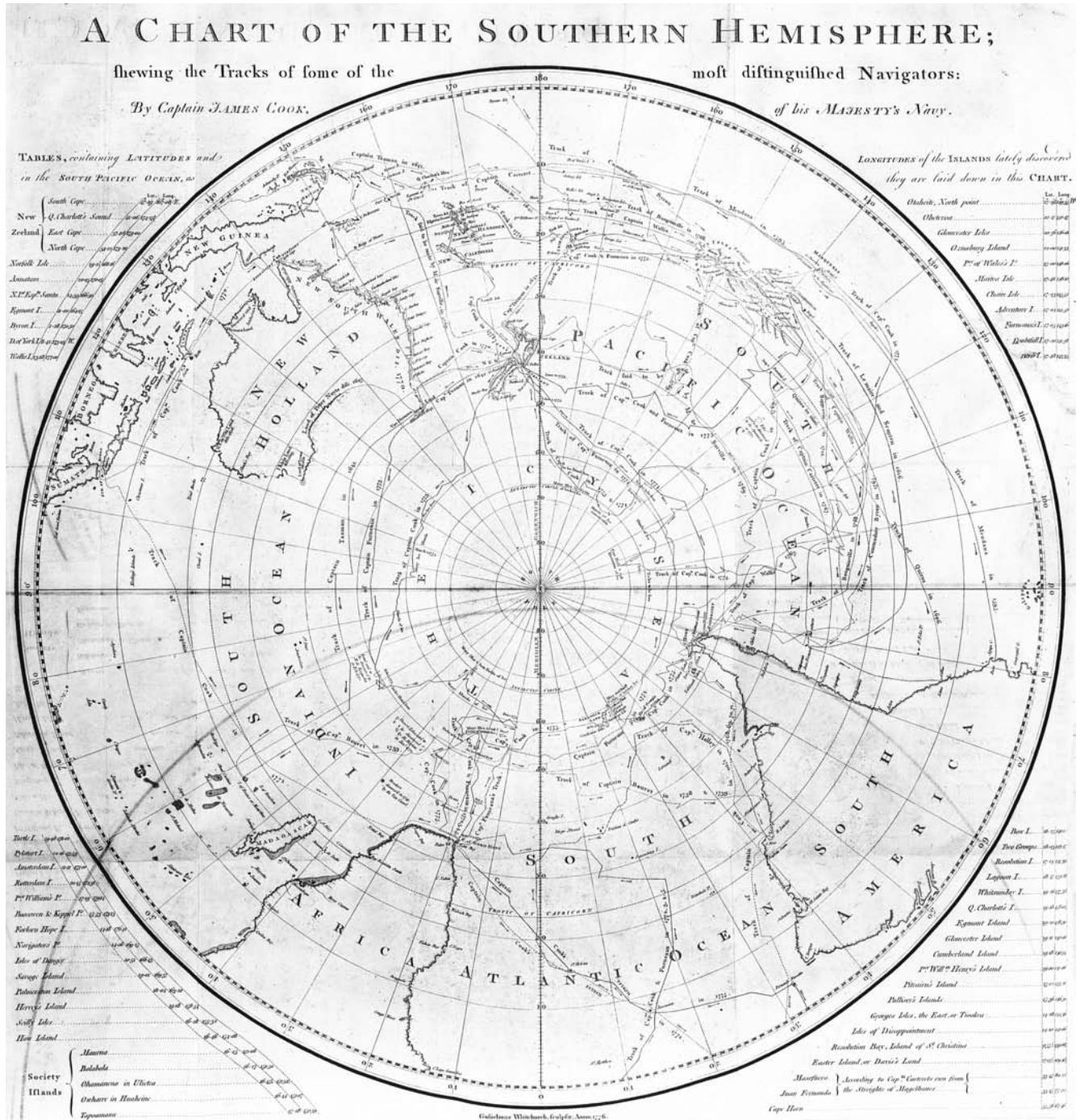
There are many different kinds of maps. The two general categories are topographic maps and thematic maps. Topographic maps show both natural and cultural features, such as lakes, rivers, mountains, and various political entities, including nations, states, and municipalities, along with borders. A thematic map is any map used for special purposes, such as to show an explorer's route. Thematic maps might include some of the same information as topographic maps. A relief map is the three-dimensional model of the terrain of an area. Another type of thematic map is the navigator's chart, also called marine chart or hydrographic chart (see HYDROGRAPHY). Such charts are used for the navigation of ships and show features of bodies of water. Information includes coastlines and harbors (with landmarks, natural and human-made), channels, winds, tides, currents, undercurrents, depth, bottom features (sand, mud, rock), hazards (rocks, bars, reefs, shoals, shipwrecks), and signals (lighthouses, lightships, buoys, beacons). The PERIPLUS and PORTOLAN CHART were early navigation charts. Aeronautical

charts, also called aviation charts, give similar information as topographic maps, along with elevations, flight paths, forbidden fly zones, radio-navigation stations and their areas of coverage, and radio communication channels.

Many different materials were used in early map-making, among them clay, papyrus, silk, calico, rawhide,

ivory, and cane. Many maps were drawn by hand on paper. Early printed maps were made from woodcuts. Photoengraving, wax engraving, lithography, or modeling in clay, plaster of paris, or plastic are some modern processes.

See also GEOGRAPHY AND CARTOGRAPHY.



This chart of the Southern Hemisphere by James Cook appeared in his book *A Voyage towards the South Pole*, published in 1777. (Library of Congress, Prints and Photographs Division [LC-USZ62-77400])

Marianas Trench (Mariana Trench)

The Marianas Trench is a depression in the Pacific Ocean located east of the Mariana Islands, formed by the collision of two tectonic plates. It is also spelled as Mariana, without the s.

The arc-shaped trench or valley extends generally northeast to southwest for 1,580 miles at an average width of 40 miles. Near its southwesternmost point, about 210 miles southwest of Guam, the Marianas Trench has the deepest point in the oceans of the world, at a depth of 36,198 feet, known as the Challenger Deep, named after the ship of its discovery in 1948, the HMS *Challenger II*.

The Marianas Trench and the Challenger Deep were explored by Swiss scientist JACQUES ERNEST-JEAN PICCARD and U.S. Navy lieutenant Donald Walsh in 1960, using the BATHYSCAPH *Trieste*.

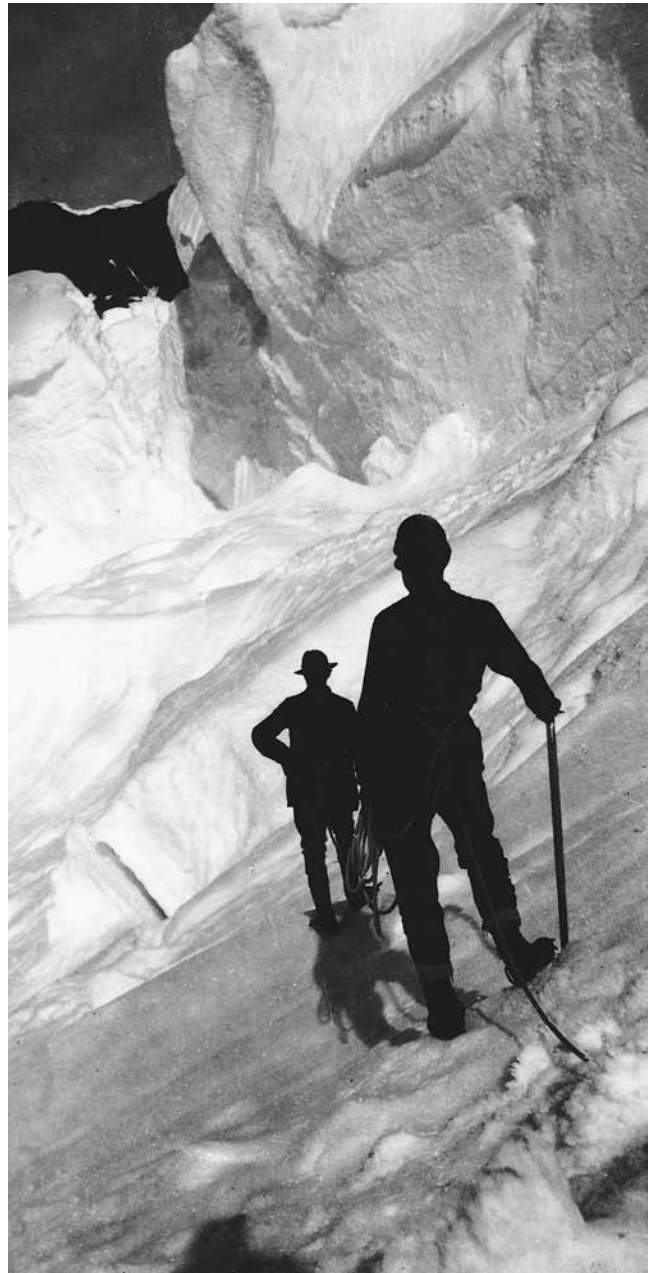
See also PACIFIC OCEAN, EXPLORATION OF THE.

McKinley, Mount (Bulshia, Denali, Doleyka, Dunsmore's Mountain, Gora, Tenada, Traleika)

Mount McKinley is a mountain in the Alaska Range of south-central Alaska. At 20,320 feet above sea level, it is the highest mountain in North America. Its twin peaks rise some 17,000 feet above the timber line. It also has one of the steepest vertical rises in the world. Year-round snowfields cover more than half the nonvolcanic mountain. Although it is not as high as some of the other mountains that challenge explorers around the world, Mount McKinley's harsh weather conditions and difficult terrain make its peaks especially dangerous to summit.

Mount McKinley was named after President William McKinley, the 25th president of the United States, in 1897. It has been known variously as Doleyka, Traleika, Bulshia, Gora, Tenada, and Dunsmore's Mountain. Its Native American name in local Athapascan dialects is Denali, which translates as "The High One" or "The Great One." There have been unsuccessful attempts over the years to make Denali the official name.

The first attempts at scaling Mount McKinley's summit began in 1903. FREDERICK ALBERT COOK claimed to have reached the summit of the north peak in 1906, although his claim (along with that of reaching the NORTH POLE in 1908) was later discredited. Peter Anderson and William Taylor, Alaskan gold prospectors, who, along with Charley McGonagall were known as the Sourdough Party, made the first successful climb of the north peak in 1910, which until that time was considered the higher peak. Anglo-American clergyman HUDSON STUCK, along with Harry Karstens, Robert Tatum, and Walter Harper, accomplished the ascent up the 850-foot taller south peak in 1913. Four years later, Harry Karstens became the first superintendent of Mount McKinley National Park, now known as Denali National Park and Preserve.



Climbers scale Mount McKinley, as shown in an early 20th-century photograph. (Library of Congress, Prints and Photographs Division [LC-USZ62-62301])

Mediterranean Sea

The Mediterranean Sea takes its name from the Latin for "in the middle of the land." Almost entirely landlocked, the Mediterranean is bordered by three continents—Europe, Asia, and Africa—and connected to the Atlantic Ocean by the Strait of Gibraltar (see GIBRALTAR, STRAIT OF). It occupies an area of 969,000 square miles, extending east-west about 2,400 miles and achieving a maximum width of about 990 miles. Due to a shallow coastal shelf stretching from

Spain to Morocco, the circulation through the Strait of Gibraltar is highly restricted. This makes for a small tidal range and, in concert with high rates of evaporation, makes the water saltier than that of the Atlantic. The Mediterranean is divided into smaller seas, including the Aegean and Ionian Seas off Greece, the Adriatic Sea between Italy and the Balkan Peninsula, and the Tyrrhenian Sea off the west coast of Italy. The Black Sea, connected to the Aegean by the Bosphorus Strait, the Sea of Marmara, and the Dardanelles, is also an arm of the Mediterranean. Large islands in the Mediterranean include Malta, Sicily, Sardinia, Corsica, and Cyprus. The world's longest river, the NILE RIVER, drains into it from Africa.

The Mediterranean was formed about 30 million years ago, as tectonic activity, caused by the collision of the continental plates for Eurasia and Africa, shrunk the much larger Sea of Tethys. The Strait of Gibraltar, the only remaining connection to the Atlantic Ocean, at 40 miles long, with a width varying from eight to 24 miles, separates northeastern Africa from the southern tip of Spain. The eastern entrance to the Strait of Gibraltar is bordered by two rocks, called in ancient times Calpe (the modern-day Rock of Gibraltar) and Ceuta, also called the Pillars of Hercules.

The Mediterranean Sea was the barrier and ultimately the link of many ancient civilizations that rose to dominance along its various shores. It offered trade and military routes among them. The Minoans, Egyptians, Phoenicians, and Greeks were early seafaring peoples who explored parts of the Mediterranean, starting in eastern regions. As seafaring technology and knowledge increased, they were able to overcome the limitations of their natural resources, reaping the benefits of shipping and trade. The Phoenicians and Greeks eventually established colonies on islands and coasts throughout the Mediterranean region. Without the SEXTANT and other mechanical means for navigation, early mariners originally depended on the stars. It was thought that ancient mariners hugged the coasts, not crossing open waters for centuries. This conclusion disagreed with reports in ancient myths and legends and accounts by later ancient historians, which were written off as exaggeration. New archaeological evidence, however, is beginning to change scientists' opinions of ancient seafaring skill, and it is probable that the ancients were excellent navigators and had trade routes across open ocean.

Ancient Voyages

The earliest voyages of exploration and trade can be gleaned from myths, such as the voyage of Odysseus (Ulysses), an account of which, the *Odyssey*, is attributed to ca. ninth-century Greek poet Homer. Odysseus's legendary destinations have been equated to islands and coastal regions throughout the Mediterranean. The travels of Odysseus, the voyage of Jason and the Argonauts and other myths show a knowledge of the African coast, Sicily, smaller is-

lands, and even the Strait of Gibraltar and the Pillars of Hercules. By about 1400 B.C., the Mediterranean was fairly well charted by ancient mariners. By about 500 B.C., the Greeks had established colonies not only on the islands in the eastern Mediterranean but throughout southern Italy, while the Phoenician colonies including Carthage were prospering on the North African coast.

The quest for domination of Mediterranean trade sparked the Punic Wars between Republican Rome and Carthage. Carthage originated as a colony of Phoenicia, but grew into an empire controlling nearly all of North Africa from western Libya to the Strait of Gibraltar. Carthage also controlled much of southern Spain and the islands of Sardinia and Corsica. The Carthaginians came to dominate most Mediterranean trade, and some of their mariners, in particular HANNO and HIMILCO, even reached the Atlantic waters in the fifth century B.C. The first of three wars was started in the middle of the third century B.C. The Romans had extended their influence over southern Italy and fought the Carthaginians over control of the island of Sicily. With no decisive winner, Carthage maintained most of its control of Mediterranean trade. As Rome grew in power, however, two more wars were fought, the final war ending in 146 B.C. with the utter destruction of Carthage and Rome in total control of Mediterranean trade.

Muslim Use

After the fall of the Roman Empire, and the rise of the Islamic Arab empire, the Mediterranean became a place of curiosity again. The Arabs invented superior methods of seafaring, using the sextant for navigation. The Mediterranean was a desirable route for Muslims in the western part of the empire, including southern Spain, to aid them in traveling to Egypt then over the RED SEA to take part in the hajj, the required pilgrimage to the Islamic holy cities of Medina and Mecca in Arabia. Many pilgrims, such as ABU AL-HASAN MUHAMMAD IBN JUBAYR of Spain of the 12th century, recounted their voyages across the Mediterranean, including visits to Sicily and Malta, which were at the time Arab possessions.



Even before the digging of the Suez Canal in the mid-19th century, the Mediterranean was the starting point for many expeditions of exploration, allowing explorers from Europe to reach Africa, the Middle East, and the far Eastern coast of the Black Sea from which they could continue their journeys to far-off destinations. Once the canal opened up a passage from the Mediterranean to the Red Sea, ships could sail directly from Europe to Arabia, the east coast of Africa, India, Southeast Asia, and Australia. The Mediterranean continues to provide an important path for global shipping, especially of oil from the Middle East. It is also a popular tourist destination, where tourists cruise through

the islands immortalized in the myths and legends of the ancient Greeks.

See also ATLANTIC OCEAN, EXPLORATION OF THE; CARTHAGINIAN EXPLORATION; EGYPTIAN EXPLORATION; GREEK EXPLORATION; MINOAN EXPLORATION; MUSLIM EXPLORATION; PHOENICIAN EXPLORATION; ROMAN EXPLORATION.

Mercator projection

Mercator projection is a mapmaking technique named after 16th-century Flemish cartographer GERARDUS MERCATOR. Drawing on the work of other mapmakers of his day, he used Mercator projection to create a map of the world, the publication of which in 1569 revolutionized cartography and facilitated navigation.

A GLOBE is the most accurate means of depicting relationships of location, distance, and direction on Earth but is not as convenient as a map. Projection addresses the problem of creating a flat representation of a curved surface, and many different types of projections have been developed mathematically, resulting in varying types of distortion. A cylindrical projection is obtained by projecting the surface of Earth on a cylinder tangent along the EQUATOR and then rolling the cylinder out along the plane around the globe. Meridians of longitude, which on the globe converge at the NORTH POLE and SOUTH POLE, are thus represented as parallel to one another. In a Mercator projection, a variation of a cylindrical projection, parallels of latitude, although equidistant on a globe, are drawn with increasing separation as their distance from the equator increases. As a result, the equatorial regions appear normal, but the high latitudes appear distorted. GREENLAND, for example, is exaggerated in size and appears larger than even South America, which in reality is eight times Greenland's size.

Mercator projection maps are practical for purposes of navigation in that directions are represented accurately. Meridians of longitude and parallels of latitude appear as straight lines intersecting at right angles. Since any line intersecting two or more meridians at the same angle also appears as a straight line, it is possible to plot a course by drawing such a line (known as a rhumb line) between two points and determining its COMPASS direction from the map. Mercator's projection maps were favored by both cartographers and navigators for centuries.

See also GEOGRAPHY AND CARTOGRAPHY; LATITUDE AND LONGITUDE; MAPS AND CHARTS; NAVIGATION AND EXPLORATION.

merchant ship

The term *merchant ship* is used in two distinct ways. In the general usage, a merchant ship is any ship whose main pur-

pose is to carry cargo for trading purposes. The ancient Egyptians, Greeks, and Romans all used various forms of the GALLEY as merchant ships. The trading ship used in the Far East was the JUNK; the Arabs had the DHOW. In Scandinavia around A.D. 1000, the knörr, a variety of the LONGSHIP, was the standard merchant ship, and the COG was the merchant ship of the north coast of Europe during the Middle Ages. For trading in the MEDITERRANEAN SEA, the galley continued to be used as the primary merchant ship by the Venetians through the RENAISSANCE. The giant East Indiamen, the large, armed cargo ships built by the East India companies in the 17th century—the BRITISH EAST INDIA COMPANY, DUTCH EAST INDIA COMPANY, and FRENCH EAST INDIA COMPANY—were a type of merchant ship.

A more specific use of the term is as a synonym for ROUNDSHIP, a tubby vessel awkward to maneuver, but economical for the quantity of freight it could hold. The roundship developed in northern Europe in the latter half of the Middle Ages.

Merchant ships are relevant to the history of exploration in that they are part of the history of international trade (see COMMERCE AND EXPLORATION). But they were also sometimes used specifically for exploration. Rarely was an individual ship built to an explorer's specifications. There are notable exceptions in Arctic exploration, but, for the most part, an explorer had to take the available craft of his day and, in many cases, it turned out to be what had previously functioned as a merchant ship. Moreover, the process of trial and error in the use of merchant ships helped lead to the development of more specialized craft, such as the CARAVEL.

See also EGYPTIAN EXPLORATION; GREEK EXPLORATION; ROMAN EXPLORATION; SHIPBUILDING AND EXPLORATION.

Mercury program (Project Mercury)

The Mercury program of 1961–63, named after the speedy messenger of Greek and Roman mythology, was the first manned space program carried out by the United States. One of a series of programs run by the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA), it worked in conjunction with the APOLLO PROGRAM of 1961–72, the goal of which was to put the first human on the Moon, and was followed by the GEMINI PROGRAM of 1964–66. The goal of the Mercury program, in addition to putting humans into space and developing technologies for future SPACE EXPLORATION, was to investigate their ability to survive and work in space over a period of time.

On May 5, 1961, ALAN BARTLETT SHEPARD, JR., became the first American in space, when the Freedom 7 made a 15-minute suborbital flight. (YURI ALEKSEYEVICH GAGARIN had become the first human in space less than a

month before on April 12, 1961, as part of the VOSTOK PROGRAM of the former Union of Soviet Socialist Republics). There were five other Mercury flights. On July 21, 1961, Virgil I. (Gus) Grissom also made a suborbital flight, only 15 seconds longer than the first Mercury flight. On February 20, 1962, JOHN HERSCHELL GLENN, JR., became the first of the U.S. ASTRONAUTS to orbit Earth, in a flight of three orbits. On May 24, 1962, Malcolm Scott Carpenter orbited Earth in a flight lasting almost five hours. On October 3, 1962, Walter (Wally) M. Schirra, Jr., orbited Earth six times on a flight of more than nine hours. On May 15, 1963, Leroy Gordon Cooper, Jr., circled Earth 22 times over a period of more than 34 hours.

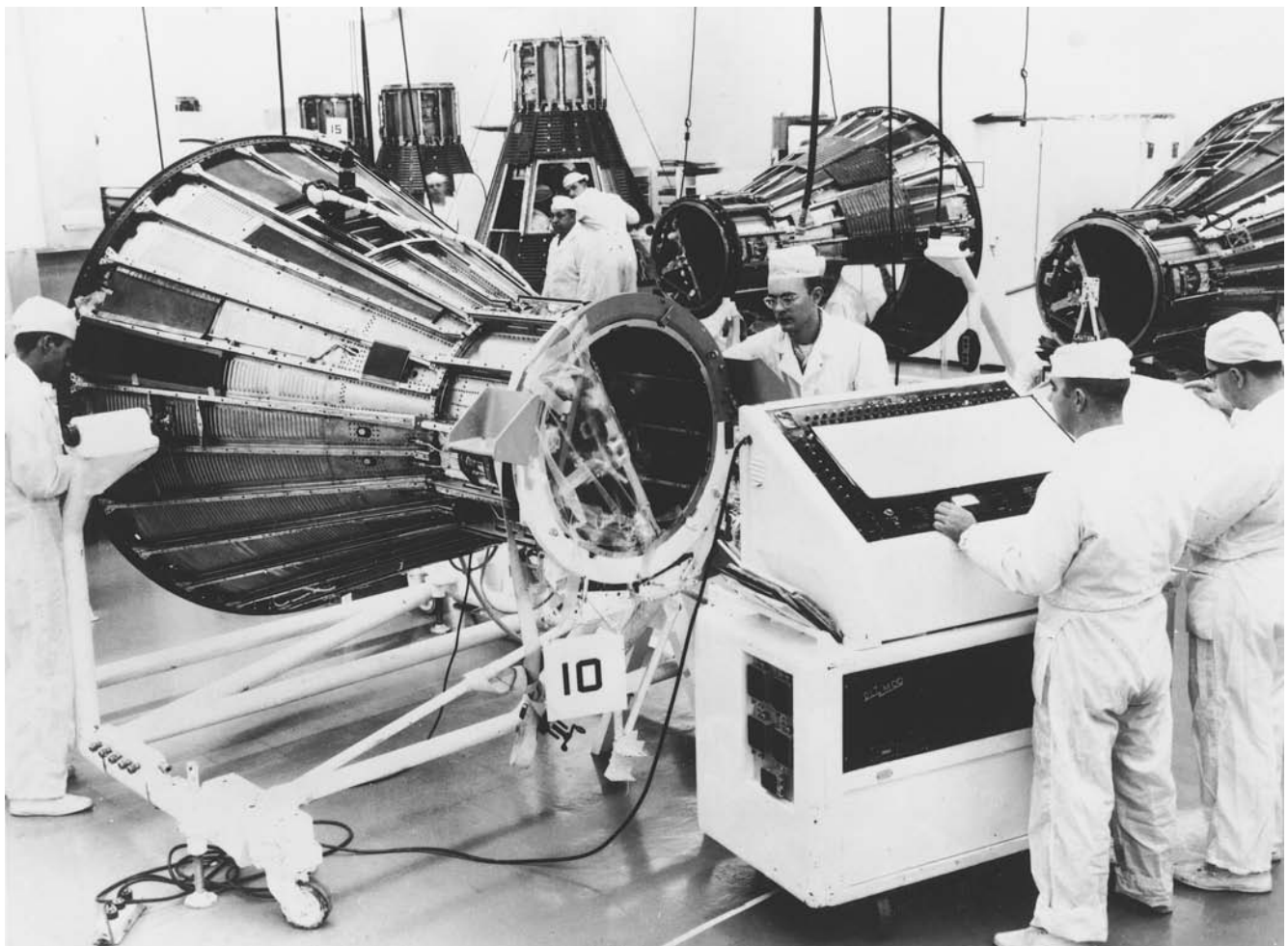
The first two Mercury missions made use of one of the U.S. Army's Redstone ROCKETS to launch capsules beyond Earth's atmosphere in a suborbital flight. In subsequent missions the U.S. Air Force's more powerful Atlas rocket was used to put the capsules in orbit. A retro-rocket system was used to bring the capsules back to space. Parachutes slowed

their descent into the ocean, where they were designed to float until they were recovered by a ship. Although the Mercury flights were controlled from the ground, experiments were carried out to develop the piloting of spacecraft.

meridian See LATITUDE AND LONGITUDE; PRIME MERIDIAN.

migration and exploration

Migration is the movement of groups of people from one region to another, resulting in settlement in a new location. In earliest times, the migrations of peoples were tied in with the hunting and gathering of food. Migrating groups of peoples tracked herds of game or sought new hunting grounds or sought new land to farm. A catastrophic event in one's homeland—change of climate, drought, flood, earthquake, volcanic eruption, fire, soil depletion, invasion—and resulting



In this 1961 photograph, workmen assemble Mercury program space capsules for American astronauts at McDonnell Aircraft Corporation, St. Louis, Missouri. (Library of Congress, Prints and Photographs Division [LC-USZ62-121450])

lack of water, food, shelter, or safety might have precipitated the move. Some people migrated as a way of life—nomads, who wandered with their herds of domesticated animals or who preyed on other peoples. In historical times there were other social causes of migration, such as overpopulation, defeat in war, and ethnic or religious persecution.

The drive toward looking beyond one's homeland plays a part in travel of all kinds, whether exploratory or migratory. Implicit in the notion of exploration as it has come to be studied is that information about the new lands explored is passed back to one's original home—through word of mouth, writings, or charts—which is not necessarily the case in migration. Yet migration in prehistory and early history can be said to be a form of exploration in that migrating people came to experience a new land. The concept of migration in modern times is distinct from exploration in that the lands where migrants traveled are well known.

However they are defined, studies on exploration encounter the theme of migration time and time again. In some cases, it can be said that exploration precedes migration and settlement; in some cases, exploration and migration are simultaneous. Conquest and commerce and searches for riches are often part of migration. Colonization results from and causes more migration. Spreading a religious doctrine and obtaining religious freedom—part of the history of exploration—are also related to both exploration and migration. Moreover, the subject of migration is part of the philosophical debate regarding exploration as in discussing what it means to “discover” a new land. For example, the use of the word *discovery* of North America by Europeans has been questioned since Paleo-Indians arrived to the continent millennia earlier. A subject related to both migration and exploration is geography. Certain geographic features—bodies of water, mountain ranges, deserts, ice formations—slowed exploration and impeded migration. Exploratory routes and migratory routes were often one and the same. The spread of culture is another theme central to both concepts as well: The movement of peoples over the ages, whether by migration, exploration, or conquest, inevitably has been accompanied by the movement of ideas and beliefs, such as agriculture. And since it is now known through archaeological and genetic studies that ancestral humans and early humans moved about considerably in their migrations, it has become apparent that exploration is deeply rooted in human ancestry.

See also COLONIZATION AND EXPLORATION; COMMERCE AND EXPLORATION; CONQUEST AND EXPLORATION; RELIGION AND EXPLORATION; TREASURE AND EXPLORATION.

Minoan exploration

The Minoans, so-named in modern times after the legendary king Minos, were an ancient people of the island of

Crete, in the MEDITERRANEAN SEA, who flourished from about 3000 to 1000 B.C. They are associated with the Greek myth of the Minotaur, a creature with a bull's head, very likely derived from the Minoan sport of bull-leaping. Minoan origins are not known, although it has been theorized that they were related to peoples of what is now mainland Greece (Crete is a part of present-day Greece). Their culture, known as the Minoan civilization, was one of three known highly-developed Bronze Age cultures of pre-Hellenic Greece, the other two being the Mycenaean culture on the mainland and the Cycladic culture on the Cyclades island group. All three are treated as the Aegean civilization, distinct from the civilization of the Greeks.

Minoan civilization is organized into three phases: Early Minoan (ca. 3000 B.C.–2200 B.C.), Middle Minoan (ca. 2200 B.C.–1500 B.C.), and Late Minoan (ca. 1500 B.C.–1000 B.C.). The Minoans were at their most powerful in the Middle Minoan period. From Knossos, where a great palace was built, and other population centers on Crete, they became a maritime power on the Mediterranean Sea and, as such, were among the earliest explorers of the region.

By about 1580 B.C., Minoan civilization is known to have spread northward to neighboring islands in the Aegean Sea and to the mainland of Greece. The dispersion of artifacts, as determined archaeologically, indicates that the Minoans developed extensive trade contacts. They are thought to have traded for grain with farming peoples on the shores of the Black Sea. Minoan artifacts themselves have been found as far west as the Balearic Islands off the east coast of Spain. They traded at least as far south as Egypt and as far east as Mesopotamia.

Tin was central to Minoan trade. The island of Cyprus, east of Crete, became part of the trading network, with copper mined there and alloyed with imported tin to produce bronze. Isotopic analysis of the tin in some Mediterranean bronze objects from the period indicates that it came from as far away as Britain, although, without confirmation that the Minoans traveled there, the tin very likely passed through the hands of many different peoples on its way to the Mediterranean region. In any case, the Minoans crafted objects of bronze that they used to barter for other goods. In addition to bronze ax heads and other metalwork, they traded stone and ivory carvings, pottery and other objects for agricultural products, and raw materials, such as obsidian, copper, gold, and silver.

The Minoan culture is known for its hieroglyphic writing and a complex system of weights and measures, both of which enabled its efficient mercantile bureaucracy. With their wide-ranging travels, it can be assumed the Minoans were proficient mariners, having a mastery of navigational techniques necessary for Mediterranean travel. Images on stone reveal that they traveled in a type of GALLEY ship, with high sterns and forecastles.

It is not known what caused the decline and eventual disappearance of Minoan civilization. Archaeological evidence indicates that earthquakes damaged some of their buildings, as did fire. Another theory maintains that as iron tools became common in the region, the tin trade network ended, leading to a decline in the Minoan economy. The Mycenaeans flourished in the years after the Minoan decline, and it has been theorized that they attacked Minoan centers. The Minoans themselves were remarkable in that they apparently thrived in that time without developing a sizable military. During the Late Minoan phase, the Phoenicians replaced them as the greatest of maritime traders. Over the centuries, some writers have hypothesized that knowledge of Crete and Minoan civilization among later ancients led to the myth of the lost continent of ATLANTIS.

See also EGYPTIAN EXPLORATION; GREEK EXPLORATION; PHOENICIAN EXPLORATION.

missionaries See RELIGION AND EXPLORATION.

Mississippi River (“Old Man River”)

The Mississippi River is the second-longest river in the United States; only the MISSOURI RIVER, which feeds it, is longer. It travels 2,340 miles from Lake Itasca in northern Minnesota to the Gulf of Mexico; from the headwaters of the Missouri River to the Gulf of Mexico, the distance is 3,680 miles, making the combined rivers the fourth-largest river system in the world, after the NILE RIVER, AMAZON RIVER, and YANGTZE RIVER (Chang). The Mississippi has the largest drainage area in North America and the third-largest in the world. It drains some 1,247,300 square miles between the Great Divide of the APPALACHIAN MOUNTAINS and the Continental Divide of the ROCKY MOUNTAINS. It varies in depth from nine to 100 feet. Its name is Native American-derived, an Algonquian term meaning “big water.” A prevalent nickname is “Old Man River.”

From its source in Lake Itasca the Mississippi flows slightly northward before flowing eastward through a series of small lakes to Grand Rapids, Minnesota. From there, it travels southward. Along its route it is joined by the Minnesota and St. Croix Rivers. The Mississippi River forms the lower boundary between the states of Minnesota and Wisconsin. As it travels southward, it forms most of the eastern borders of Iowa, Missouri, Arkansas, and Louisiana, and western borders of Illinois, Kentucky, Tennessee, and Mississippi.

The Illinois River and the Missouri River next join the Mississippi. The muddy Missouri in turn makes the Mississippi River mud-colored. At its confluence with the Ohio River, the geographic point designated as separating the Mississippi into upper and lower sections, it doubles in vol-

ume; south of the juncture with the 975-mile-long Ohio River, its width extends up to 50 miles, and its valley becomes wide and fertile. Through this section the river loops back and forth and is joined along its route by the Red and Arkansas Rivers. In the loops, lakes—known as oxbow lakes—are formed. In Louisiana one quarter of the river follows the Atchafalaya River.

Near the Gulf of Mexico large deposits of sediment have formed the extensive Mississippi Delta—some 13,000 square miles. The river is divided into several channels known as distributaries, which enter the Gulf of Mexico, including Main Pass, South Pass, North Pass, and Southwest Pass, known locally as the Passes.

Spanish Exploration

In the 16th and 17th centuries, the river served as a route for French and Spanish explorers. Later in the 1800s the river became a major transportation and trade route for steamboats. It was already home to many Native American tribes along its course, including bands of Chippewa (Ojibway), Santee Sioux (Dakota), Winnebago (Ho-Chunk), Fox (Mesquaki), Sac, Illinois, Kickapoo, Missouriia, Quapaw, Chickasaw, Choctaw, Tunica, Natchez, and Chitimacha.

The first Europeans known to have seen the Mississippi were the Spanish. In May 1539, HERNANDO DE SOTO and 600 men landed in Florida and headed northward along the Gulf of Mexico. During the four-year expedition, they covered some 350,000 square miles of what is now the southeastern United States. On May 8, 1541, they came upon the Mississippi River—probably south of present-day Memphis, Tennessee. They constructed barges in order to cross it and explored westward into present-day Arkansas and Oklahoma. The expedition eventually returned to the Mississippi. De Soto died there a year later, on May 21, 1542, at its confluence with the Red River. In order to keep secret the knowledge of their leader’s death from the Indians of the region, the CONQUISTADORES weighted his body with rocks so that it would sink in the Mississippi. After traveling southwest into Texas in the hope of reaching Mexico by land, the new leader, LUIS DE MOSCOSO, led the survivors back to the Mississippi, where they spent the winter of 1542–43. The Spanish built seven barges and, when the river flooded on July 2, 1543, they embarked on them, reaching the Gulf of Mexico on July 18, from where they followed the coastline to Mexico, arriving at the settlement of Tampico the following September.

French Exploration

The Mississippi remained the domain of only Native Americans for more than a century. It was the French who next came to frequent it, using it as a highway from the region of the western Great Lakes. In 1654–56, French fur trader MÉDARD CHOUART DES GROSEILLIERS, while developing rela-

tions with the Indian tribes of the region, explored the rivers to the west of Lake Michigan, including the Fox and Wisconsin as well as a stretch of the Mississippi. In 1659–60, he returned to the region with his brother-in-law PIERRE-ESPRIT RADISSON and explored Lake Superior and the upper eastern Mississippi Valley.

Yet the extent of the great river was still not known to Europeans. The French hoped that the Mississippi flowed westward to the Western Sea—the Pacific Ocean—and would thus prove a good trade route to the Far East. In 1673, Governor General Comte de Frontenac of New France sent LOUIS JOLLIET, a fur trader, to trace its course. JACQUES MARQUETTE, a missionary who knew several languages, accompanied him. Jolliet, Marquette, and a party of five Miami Indians and VOYAGEURS traveled by CANOE from Green Bay on the west shore of Lake Michigan, along the Fox River to Lake Winnebago. They then crossed to the Wisconsin River and descended it to the mouth of the Mississippi, which they reached on June 17. The expedition then descended the Mississippi, passing the mouth of the Missouri River, to the junction of the Arkansas River. They soon concluded, however, that the Mississippi flowed southward and probably emptied into the Gulf of Mexico rather than westward to the Pacific. On the return trip they branched off into the Illinois River, which took them near the south shore of Lake Michigan.

Over the next decades, French fur traders continued to be active in the upper Mississippi region. In 1679, RENÉ-ROBERT CAVELIER DE LA SALLE and his lieutenant HENRI DE TONTI founded Fort Crèvecoeur on the Illinois River. In spring 1680, La Salle sent trader MICHEL ACO and Jesuit missionary LOUIS HENNEPIN on a mission northward to explore the Mississippi, Wisconsin, and Minnesota Rivers and perhaps determine the source of the Mississippi. They descended the Illinois to its mouth on the Mississippi, then proceeded northward. At some point, probably along the Mississippi, they were captured by a party of Sioux. In the course of his travels, perhaps while in captivity, Hennepin saw and named the Falls of St. Anthony near present-day St. Paul, Minnesota. They eventually were taken to a Sioux village in central Minnesota. In the meantime, in search of a route to the Western Sea, trader DANIEL GREYSOLON DULUTH, Tonti's cousin, followed the St. Croix River—the upper portion of the present boundary between Wisconsin and Minnesota; he reached its mouth on the Mississippi near present-day Prescott, Wisconsin. On learning of the capture of Aco and Hennepin, he returned north and negotiated their release.

In February 1682, La Salle and Tonti set out from the Illinois River on a journey down the Mississippi and completed the first known European journey from the river's northern regions to its mouth on the Gulf of Mexico on April 9. During this journey, he claimed the entire Missis-

issippi Valley for France, naming the region Louisiana in honor of the French king Louis XIV. On the return journey, he and Tonti founded another post on the Illinois—Fort St. Louis. Tonti was left in charge, while La Salle returned to Montreal. In France La Salle raised backing for a colonizing expedition to the Mississippi Delta in 1684. However, he misjudged the location and ended up at Matagorda Bay on the Texas coast, about 500 miles to the west. Starting in 1685, he led several attempts to reach the Mississippi from the Gulf Coast. During one in 1687, La Salle was killed by one of his own men in a quarrel. HENRI JOUTEL led the survivors to the lower Arkansas River, where they met with Tonti, who had traveled the length of the Mississippi in search of the colony the year before as well.

In 1698, Tonti led Jesuit missionary ALBERT DAVION to the lower Mississippi and helped him found a mission to the Tunica near the confluence of the Yazoo River. Tonti would later join the colonizing efforts along the lower Mississippi of PIERRE LE MOYNE, Sieur d'Iberville and JEAN-BAPTISTE LE MOYNE, Sieur de Bienville's colonizing expedition to the lower Mississippi in 1698–99. Over the next years, Sieur de Bienville founded a number of posts in the region, including Fort Rosalie among the Natchez Indians in 1716, which would become modern-day Natchez, Mississippi, and New Orleans in 1718. In 1700, trader PIERRE-CHARLES LE SUEUR, in the service of Sieur d'Iberville, ascended the Mississippi from the Gulf of Mexico all the way to the Minnesota River, where he established a post, Fort L'Huillier, among the Sioux.

Other important early settlements in the FUR TRADE were Cahokia, to the south of the mouth of the Missouri River, founded by missionaries in 1699, and Kaskaskia to the south near the mouth of the Kaskaskia River, founded in 1703, also by missionaries. Both were named after Illinois Indian subtribes. In 1720, French historian PIERRE-FRANÇOIS-XAVIER DE CHARLEVOIX traveled from the Illinois down the Mississippi to New Orleans, writing about his journey in the *History of New France*, published in 1744.

St. Louis, named after the French medieval king Louis IX, canonized as a saint, was founded in 1764 on the west bank in what is now Missouri, where the river makes a great bend to the east, a short distance downstream from the mouth of the Missouri River and opposite Cahokia, by French fur traders PIERRE LIGUESTE LACLEDE and RENÉ AUGUSTE CHOUTEAU. It further added to the commerce along the river.

U.S. Interests

France ceded its North American holdings to Great Britain and Spain at the end of the French and Indian War in 1763. The United States gained Great Britain's holdings, other than Canada, at the end of the American Revolution two decades later. France again gained control of the western

Mississippi Valley in 1800, but sold it to the United States in the Louisiana Purchase of 1803. The Mississippi became for the United States, as it had been for colonial powers, a primary transportation route. Early trade was by RAFT, flatboat, and KEELBOAT; the first steamboat on the Mississippi was the *New Orleans* in 1811. St. Louis served as a gateway to the West, with many exploratory, trade, and military expeditions organized and launched from there. WILLIAM CLARK, while recruiting the Corps of Discovery for his expedition with MERIWETHER LEWIS, set up camp opposite the settlement in winter 1803–04.

Despite all the activity along the Mississippi in the 17th and 18th centuries, its true source was not known. In 1805, General James Wilkinson of the U.S. Army chose ZEBULON MONTGOMERY PIKE to search for the Mississippi's headwaters. He followed the river northward until he found the Red Cedar Lake (Cass Lake) and Leech Lake in Minnesota. He wrongly believed these to be the headwaters of the Mississippi. In 1823, Italian GIACOMA COSTANTINO BELTRAMI, traveling with a U.S. military surveying expedition under STEPHEN HARRIMAN LONG, traveled up the Minnesota River and located what he mistakenly cited as the source, Lake Julia. In 1832, in an expedition sent out by Michigan territorial governor Lewis Cass, geologist and ethnologist HENRY ROWE SCHOOLCRAFT was led by a Chippewa Indian from Cass Lake to a lake known to the French as Lac la Biche (Elk Lake), which he determined to be the source. He renamed it Lake Itasca, from the Latin words *veritas*, "truth," and *caput*, "head."



A major route of transportation, the Mississippi is presently navigable by ship for 1,800 miles from St. Paul, Minnesota, and the Falls of St. Anthony to the Gulf of Mexico. It is still a principal artery for commerce, with more freight transported on it than any other inland waterway in North America.

See also NORTH AMERICA, EXPLORATION OF.

Missouri Fur Company See ST. LOUIS MISSOURI FUR COMPANY.

Missouri River

The Missouri River is the longest river in the United States. From its source at the confluence of the Gallatin, Jefferson, and Madison Rivers in the mountainous terrain of southwestern Montana, through the grasslands of the northern plains, to its mouth on the MISSISSIPPI RIVER, it extends some 2,540 miles. It first flows northward along the edge of the ROCKY MOUNTAINS, where it passes through the Gates of the Mountains, a gorge. It then turns northeast-

ward past the Great Falls before heading eastward across Montana. It flows first westward and then curves south-eastward in North Dakota, continuing in that direction across South Dakota, forming a section of the border between South Dakota and Nebraska. It then flows southward and forms the border between Nebraska and Kansas on the west and Iowa and Missouri on the east, then heads eastward across Missouri. Its course follows what once was the edge of the ice sheets extending down from the north during the ice ages.

The Missouri can be divided into three sections: the upper where it is clear and swift-moving; the middle where it crosses the plains and begins to live up to its nickname of the "Big Muddy"; and the lower that is slower and muddier still than the midsection. Among its tributaries are the Marias, Musselshell, Milk, and Yellowstone Rivers in Montana; the Knife River in North Dakota; the Grand, Cheyenne, White, and James (Dakota) Rivers in South Dakota; the Niobrara and Platte Rivers in Nebraska; the Kansas River in Kansas; and the Osage River in Missouri. It in turn is the largest tributary of the Mississippi River, turning the Mississippi mud-colored. The river has a drainage basin of 529,000 square miles and drains areas of 10 states and two Canadian provinces.

Before Europeans began to explore the Missouri River, it was home to bands of a number of Indian tribes, including the Missouria (who gave their name, probably meaning "people with dugout canoes," to the river), Omaha, Ponca, Arikara, Mandan, Hidatsa, Nakota Sioux and Gros Ventre. Bands of other tribes, such as the Osage, Kaw (Kansa), Ioway, Otoe, Pawnee, Assiniboine, Lakota Sioux, Northern Cheyenne, Northern Arapaho, Crow, Shoshone, and Blackfeet, were centered on the Missouri's tributaries, yet frequented and camped along the Missouri itself.

French Exploration

French-Canadian explorers LOUIS JOLLIET and JACQUES MARQUETTE were the first known Europeans to reach the mouth of the Missouri River during their descent of the middle stretch of the Mississippi River in 1673. The lower Missouri became an important route for the FUR TRADE with Indians. The earliest traders in the region, such as Frenchman HENRI DE TONTI, a lieutenant of RENÉ-ROBERT CAVELIER DE LA SALLE, who together descended the Mississippi in 1682, passed the mouth of the Missouri numerous times on subsequent expeditions, but did not follow it on its course northwestward. French trader ÉTIENNE-VENIARD BOURGMONT is known to have explored much of the lower portion of the river in 1712–17, possibly exploring as far north as the mouth of the Platte River in eastern Nebraska. In 1738, French-Canadian trader PIERRE GAULTIER DE VARENNES DE LA VÉRENDRYE and his son LOUIS-JOSEPH GAULTIER DE LA VÉRENDRYE reached the Mandan villages,

where the river makes its big bend westward in North Dakota, overland from their post, Fort Rouge, on the Red River of the North near the site of present-day Winnipeg, Manitoba. His sons, Louis-Joseph and François, headed southwestward across the Missouri onto the northern plains possibly into northeastern Wyoming, circling back by way of South Dakota and a stretch of the Missouri.

Out of St. Louis

The founding of St. Louis in 1764 on the Mississippi's west bank, a short distance downstream from the mouth of the Missouri River in what is now Missouri, by French traders PIERRE LIGUESTE LACLEDE and RENÉ AUGUSTE CHOUTEAU led to increased activity in the region. In 1792, a Frenchman named Jacques d'Église made the first known European journey upriver from the Missouri's mouth, reaching the Mandan villages. In 1793, St. Louis merchants formed the Company of Explorers of the Upper Missouri (the Missouri Trading Company). In 1794–95, French-Canadian JEAN-BAPTISTE TRUTEAU traveled up the Missouri River on its behalf as far as the Black Hills in what is now western South Dakota. In 1795, a Welshman named John Evans accompanied a Scottish fur trader, James Mackay—formerly of the NORTH WEST COMPANY, now in the employ of the Spanish—on an expedition up the Missouri River to the Mandan villages. Evans hoped to verify the legend of Welsh prince MADOC, who had supposedly colonized some foreign land, but found no evidence among native peoples. Soon afterward, in 1802, Frenchman FRANÇOIS MARIE PERRIN DU LAC, accompanying a fur trader, traveled up the Missouri as far as the mouth of the White River in south-central South Dakota.

Lewis and Clark

The Missouri River was included as part of the Louisiana Purchase from France by the United States in 1803. The following year, President Thomas Jefferson sent out an expedition under MERIWETHER LEWIS and WILLIAM CLARK to explore the newly acquired lands, and they chose the Missouri as their route westward, organizing their expedition at a camp opposite St. Louis. They hoped to find a manageable water route all the way to the Pacific—the NORTHWEST PASSAGE. The Corps of Discovery set out on May 14, 1804, by KEELBOAT and other small craft, over the stretch of river well known to traders, reaching Mandan country in present-day North Dakota on October 27, where they built a post, Fort Mandan, and wintered. On April 7, 1805, they proceeded to the upper Missouri, now accompanied by Shoshone Indian woman SACAJAWEA. On June 2, they reached the mouth of the Marias in present-day Montana and were unable to determine whether that river was the Missouri, but accurately chose the Missouri. On June 13, they reached the Great Falls, which the Mandan claimed marked the end

of the river. On July 27, however, they reached the true source of the river—the Three Forks of the Missouri, which Lewis named the Gallatin, Jefferson, and Madison. After crossing the Rockies and traveling along the Snake River and the COLUMBIA RIVER, the expedition reached the Pacific Ocean on November 15, 1805, where they built Fort Clatsop in present-day Oregon and spent the winter. In June 1806, on their return journey, the party split up: Clark explored the Yellowstone River, and Lewis, the Marias to the north. They met up at the mouth of the Yellowstone and returned to St. Louis by way of the Missouri, arriving September 23. Some of the men who were part of the Corps of Discovery remained active in the Missouri River region, such as JOHN COLTER.

Traders, Painters, and Writers

The Missouri River remained the primary route west for a number of years, especially for the continuing fur trade up the river and beyond in the Rockies. In 1808, JOHN JACOB ASTOR founded the AMERICAN FUR COMPANY, with various subsidiaries to follow. The next year, a group of traders in St. Louis founded the ST. LOUIS MISSOURI FUR COMPANY. Among the partners were JEAN PIERRE CHOUTEAU, his eldest son AUGUSTE PIERRE CHOUTEAU, MANUEL LISA, WILLIAM CLARK, ANTOINE PIERRE MENARD, and ANDREW HENRY. People and goods were transported by keelboat and later by steamboat, the first voyage by the *Independence* in 1819. That same year, the U.S. army established a presence on the river with the founding of Fort Atkinson by Colonel HENRY ATKINSON at Council Bluffs in northeastern Nebraska (where Lewis and Clark had met with Sioux tribal leaders in 1804). Another American entrepreneur, WILLIAM HENRY ASHLEY, became a powerful force in the fur trade with his ROCKY MOUNTAIN FUR COMPANY, founded by him and Andrew Henry in 1822. Many of the men who worked for and traded with him came to be known as the MOUNTAIN MEN. Among the most famous of them were THOMAS FITZPATRICK, JEDEDIAH STRONG SMITH, and WILLIAM LEWIS SUBLETTE.

Men of other callings used the river to explore westward. In 1811, for example, American writer HENRY MARIE BRACKENRIDGE and Scottish naturalist JOHN BRADBURY traveled up the Missouri River to the Mandan villages with a trading expedition headed by Manuel Lisa. In 1832, American frontier painter GEORGE CATLIN traveled from St. Louis to the mouth of the Yellowstone, seeking out Native American subjects along the way. In 1833–34, German naturalist ALEXANDER PHILIPP MAXIMILIAN and Swiss artist KARL BODMER also traveled upriver to the mouth of the Marias River. By this time, there were a number of army posts along the Missouri.



With the advent of the railroads in 1858, the Missouri saw fewer travelers. Nowadays, for the most part, the lower river is used commercially for shipping, while the upper river is used for recreation. In 1844, with the Missouri River Basin Program, a series of locks, dams, and reservoirs were constructed for the sake of navigation, irrigation, flood control, and hydroelectric power.

See also NORTH AMERICA, EXPLORATION OF.

Moluccas See SPICE ISLANDS.

Mongol exploration

The Mongols are a people of east-central Asia, distributed in the country of Mongolia as well as contiguous parts of Russia to the north and China to the south, east, and west. They originally consisted of nomadic tribes inhabiting steppe and desert country, with an economy based on herds of horses and sheep, and living in tents. The various tribes, who competed for territory, organized at times into loose alliances. In the early 13th century, a chieftain of the Yakka Mongols, GENGHIS KHAN, defeated his rivals and united the various tribes, founding a capital at Karakorum in the northern GOBI DESERT, establishing codes of law and creating a powerful army, masters of the use of cavalry for the swift attack; every adult Mongol male in fact was a mounted warrior.

Under Genghis's leadership and the leadership of subsequent khans—the most powerful after him being his sons Ogadai and Guyuk and his grandsons Mangu and Kublai—the Mongols invaded much of Asia and eastern parts of Europe, penetrating as far as present-day Hungary and Germany. Their armies came to include other peoples, such as Turkic peoples who became known collectively as the Tartars or Tatars (the name *Tartars* has been applied to the Mongols by Europeans as well, who did not distinguish between invading tribes from the East). And the Mongols came to adapt many of the customs of peoples they conquered, in particular the Chinese (see CHINESE EXPLORATION), whose capital Yen-King (present-day Beijing) Genghis occupied in 1215. Genghis's son Ogadai succeeded him as supreme khan, while Ogadai's brother Juchi was granted territory comprising much of present-day Russia. In 1235, Batu Khan, Juchi's son, along with his chief general Subutai, campaigned in the west. In 1238, Batu's warriors—referred to in Russia as the Golden Horde because of Batu's golden tent—captured Moscow (in present-day Russia) and, in 1240, Kiev (in present-day Ukraine). His razing of Kiev, at the time ruled by the Rus—a people of Viking and Slavic descent—led to the rise of Muscovite Russia.

The Mongols proceeded westward and, within two years, had also conquered present-day Hungary and Poland and made military incursions into Germany. Batu laid the

groundwork for the founding of the Kipchak Khanate (also known as the Empire of the Golden Horde) between the Volga and Danube Rivers in 1243, with a capital first at Sarai Batu, near present-day Astrakhan, on the lower Volga and later at Sarai Berke also on the Volga, near present-day Volgograd. This had been territory of a Turkic people known as the Kipchak or Cuman. The death of Ogadai in 1241 led to Batu's recall to Karakorum in 1242, and the Mongols therefore did not proceed into western Europe.

By 1260, the Mongol Empire was subdivided into four khanates, that is, territories ruled by khans, descendants of the royal line founded by Genghis Khan. The subdivisions included the Great Khanate, comprising all of China and most of East Asia; the Jagatai Khanate in Turkistan; Il-Khanid Khanate in Persia (present-day Iran); and the Kipchak Khanate in western Russia.

The geographic extent of the Mongol Empire was the greatest ever known to human history, reaching for part of its existence from the Pacific Ocean west to the Adriatic Sea and from Mongolia to the Indian Ocean in the south. The Mongol age of expansion led to a new age of exploration within Asia and between Asia and Europe. The movement of the armies and subsequent occupation led to the passing of knowledge between cultures. Routes became secure, leading to increased travel. The khans maintained a system of mounted couriers for communication throughout the empire. The SILK ROAD, which had been controlled by the Muslims, now was open to other entrepreneurs. Moreover, the khans encouraged exploration for better understanding of peoples under their domain as well as for military reconnaissance. In 1221–22, for example, Genghis sent out an expedition under Chinese Taoist CH'ANG-CH'UN to explore central Asia, from China to Afghanistan.

With the Golden Horde in eastern Europe, Europeans became more aware of and concerned with Asian issues. Papal and political diplomatic missions were sent out, such as that of Italian GIOVANNI DA PIAN DEL CARPINI in 1245–47 and Flemish WILLIAM OF RUBROUCK in 1253–55. European traders followed. In 1271–75, Italian merchants MAFFEO POLO, NICCOLÒ POLO, and MARCO POLO traveled across central Asia to Cambaluc (present-day Beijing), the new Mongol capital founded by Genghis's successor Kublai Khan. Marco Polo, in 1275–92, explored on behalf of the khan, visiting other parts of China, Tibet, Southeast Asia, Indonesia, Mongolia, and possibly SIBERIA. His book, *The Travels of Marco Polo*, with descriptions of Mongol customs, was influential in Europe over the next two centuries and influenced CHRISTOPHER COLUMBUS in his 1492 attempt to reach the Orient by way of the Atlantic Ocean.

By the 14th century, however, the far-flung Mongol Empire had weakened due to internal conflicts as well as resistance from conquered peoples. By 1382, the Mongols were completely expelled from China back into their origi-

nal homeland. The Mongols of today are still a pastoral people, maintaining sheep, horses, cattle, camels, and goats and living much as their ancestors did. In addition to shamanism, many of them practice Lamaism, a branch of Buddhism.

Mont Blanc See BLANC, MONT.

mountain climbing

Mountain climbing, or mountaineering, is the practice of climbing to Earth's most elevated points for exploration, scientific research, or sport. The three types of mountaineering are trail climbing (also called scrambles or walkups), which involves hiking on trails to the tops of some mountains; rock climbing, the scaling of steep mountain faces using technical climbing gear, like ropes and pitons; and ice

climbing, the ascent on snow and ice of the world's highest mountains, whose peaks soar above the timber line.

Trail climbing requires proper attire and food and water, but no special climbing equipment. For rock climbing, in which the hands are used as well as the feet, climbers use special footwear, ropes, hammers, and steel spikes, known as pitons, driven into the rock for support, or, in more recent times, hardware placed into cracks. In ice climbing (or ice and snow climbing), additional equipment includes ice axes and attachable boot spikes, known as crampons. Mountaineers sometimes carry bottles of oxygen for high-altitude climbing. Naturally, warm clothing, as well as tents and blankets or sleeping bags, are also needed for overnight survival on mountains.

The history of mountain climbing, in particular ice climbing, is closely tied to the history of world exploration. The high peaks were some of the last areas explored on the planet. The first recorded climb of a high-altitude mountain



Climbers ascend Mont Blanc in the Alps, as shown in this late 19th-century photograph. (*Library of Congress, Prints and Photographs Division [LC-USZ62-108854]*)

was in A.D. 633, with the ascent of Mount Fuji (or Fujiyama), the highest peak in Japan at 12,387 feet above sea level.

Alpinism

Modern mountain climbing took its early shape in the European Alps. The ascent to the summit of France's Mont Blanc (see BLANC, MONT), the highest alpine peak, by Frenchman Michel Gabriel Paccard and guide JACQUES BALMAT in 1786 was the crowning moment of early mountaineering attempts. Their accomplishment, without rope or ice axes, but with alpenstocks—long wooden staffs with iron tips to poke for crevasses and cut steps in the ice—was widely publicized. As a result many Europeans, especially the British, began climbing other alpine summits, often with the help of local guides from Savoy (now part of France) and Switzerland. Mountaineering thus became for some climbers a calling and for others a hobby; still other climbers were geologists and topographers. The goal of being the first to “summit” various peaks spurred on many climbers, and the growing elite class of professional guides, like Jacques Balmat, took many of the firsts.

In 1858, the Alpine Club was founded in London; in 1863, the *Alpine Journal* began publication. The mid-1800s are sometimes referred to as the golden age of mountain climbing because of widespread interest in the activity and the number of alpine peaks conquered. The golden age is said to have ended with EDWARD WHYMPER's 1865 ascent of the Matterhorn in Switzerland, the last high alpine peak to be scaled.

During this period of great activity, an approach to mountain climbing known as alpinism (or alpine climbing) was developed. The techniques, equipment, and safety measures of alpinism are still in use today in both ice and rock climbing. In alpinism, climbers work in teams, of typically two to four climbers, who are attached by ropes and who carry all the equipment they need; in addition to ice axes and crampons, food, and water, they haul a camping stove and fuel, sleeping bags, sleeping mats, a tent or bivouac sacks, and first aid gear onto the mountain. If the climbers cannot reach the summit and return in a single day, they bivouac, or spend the night on a mountain ledge, before continuing. Slings and other specialized equipment are used for glacier routes, where crevasses—deep fissures in the ice—are a danger.

Mountain Topography

Much had been learned about mountain topography in other parts of the world by the mid-19th century. Italian poet Petrarch climbed Mont Ventoux in France in the 14th century, and Italian scientist Leonardo da Vinci climbed Monte Bo in Italy in the 15th century; both men passed on their experiences in writings. Some early explorers who

helped gather information about mountain ranges were seeking passes through these ranges; others, such as the MOUNTAIN MEN in North America's ROCKY MOUNTAINS, were working in the mountains, trapping for furs. Some early explorers climbed mountains simply to reach the top, as Spaniard DIEGO DE ORDAZ did in climbing Mexico's Popocatepetl in 1520, and American JOHN CHARLES FRÉMONT did in the climbing of Fremont Peak in Wyoming's Wind River Mountains in 1843. In the 18th and early 19th centuries, naturalists and geologists hiked up mountains and even climbed difficult peaks for purposes of scientific study. In 1740, for example, French naturalist CHARLES-MARIE DE LA CONDAMINE, and, in 1801, German naturalist ALEXANDER VON HUMBOLDT, accompanied by French botanist Aimé Bonpland, attempted to climb Mount Chimborazo in the ANDES MOUNTAINS of Ecuador in South America, but failed to reach the top. In the 1860s–70s, American naturalist JOHN MUIR and American geologist CLARENCE KING hiked and climbed much of the Sierra Nevada of California in North America. The Great Trigonometrical Survey of India of the 19th century, headed for a time by SIR GEORGE EVEREST and carried on by the PUNDITS (trained Indian emissaries), led to the mapping of the HIMALAYAS and a calculation of the heights of the main peaks. In 1854–57, German brothers ADOLF VON SCHLAGINTWEIT, HERMANN VON SCHLAGINTWEIT, and ROBERT VON SCHLAGINTWEIT explored and surveyed the Himalayas, the Karakoram Range, and Kunlun Mountains for the BRITISH EAST INDIA COMPANY.

The Challenge of the High Peaks

Mountain climbing as an end in itself continued to increase in popularity. By the end of the 19th century, many more climbing clubs besides the Alpine Club had been organized in Europe and North America, and many climbers were ascending peaks without guides. With no more firsts to be accomplished in the Alps, many climbers turned their attention to other ranges. In 1868, Englishman Douglas Freshfield and French guide François Devouassoud, along with two other team members, climbed two of the main peaks—Kasbek and Elbrus—of the Caucasus Mountains of Georgia, Armenia, Azerbaijan, and southwest Russia (the Caucasus is considered a boundary between Europe and Asia). Other expeditions followed, in particular from Great Britain, Germany, Italy, and, in the 20th century, the Union of Soviet Socialist Republics (USSR; Soviet Union).

The HIMALAYAS of central Asia, which boast many of the world's highest peaks, lured professional mountain climbers as did the Andes Mountains of South America and the Southern Alps of NEW ZEALAND. Italian guide MATTHIAS ZURBRIGGEN, who had developed his mountaineering skills in the European Alps, participated in expeditions in all three ranges. In 1897, he became the first

person to climb ACONCAGUA, the highest peak in the Andes and the entire Western and Southern hemispheres. Tanzania's Mount Kilimanjaro (see KILIMANJARO, MOUNT), Africa's tallest peak, was first scaled in 1889 by German geographer HANS MEYER and Austrian mountain climber Ludwig Purtscheller. In 1899, Englishman Sir Harold Mackinder climbed Africa's second-highest peak, Mount Kenya, located in Kenya. Anglo-American clergyman HUDSON STUCK, along with Harry Karstens, Robert Tatum, and Walter Harper, climbed North America's highest mountain, Mount McKinley (see MCKINLEY, MOUNT), in 1913.

In the late 19th and early 20th centuries, Italian LUIGI AMEDEO DI SAVOIA D'ABRUZZI (duke of Abruzzi) was an active mountaineer. He made the first ascent of Mount Saint Elias in Alaska and of various peaks of the Ruwenzori Mountains in East Africa—associated with the MOUNTAINS OF THE MOON as described by second-century hellenized Egyptian geographer PTOLEMY. He also attempted the world's second-highest peak, K2 (formerly known as Mount Godwin-Austen after the explorer Henry Haversham Godwin-Austen), at 28,250 feet, in the Karakoram range of the western Himalayas. The duke of Abruzzi began the tradition of mountain climbers putting their skills to work in polar exploration. Also at the turn of the century, Americans FANNY BULLOCK WORKMAN in the Alps and Himalayas, and ANNIE PECK SMITH in the Alps and Andes, competed for altitude records and, in the process, helped develop a tradition of women mountain climbers.

The ascent of Mount Everest (see EVEREST, MOUNT) in the Himalayas, the world's highest peak at 29,035 feet above sea level, remained an elusive prize well into the 20th century. In the 1920s, the British, with assistance from Nepalese SHERPAS as guides and porters, made attempts to climb it. During an attempt in 1924, GEORGE HERBERT LEIGH MALLORY and Andrew "Sandy" Irvine lost their lives. Nepalese TENZING NORGAY and Englishman SIR EDMUND PERCIVAL HILLARY finally reached the summit on May 29, 1953. The next year, Italians Achille Compagnoni and Lino Lacedelli, part of Ardido Desio's expedition, summited K2. Other Himalayan mountains were conquered in the 1950s–60s, including the third-highest peak in the world, Kangchenjunga (or "Kang" or "Kanch"), as well as Annapurna, Nanga Parbat, Cho Oyu, Makalu, Lhotse, Manaslu, Gasherbrum II, Broad Peak, Hidden Peak, Dhaulagiri, and Shisha Pangma (or Gosainthan). With the highest peaks conquered, the challenge of Himalayan mountaineering has evolved into a pursuit of specialized assaults—by especially difficult routes, in wintertime, without oxygen bottles, solo, or in a series of related climbs. For example, in 1978, Italian Reinhold Messner and Austrian Peter Habeler climbed Mount Everest for the first time without bottled oxygen. Two years later, Messner accomplished a solo climb of Everest. In the course of 17 years, ending in 1986, Messner completed his goal of climb-

ing the 14 highest mountains in the world, located in Nepal, Pakistan, China, and Tibet. Climbs in other Asian mountain ranges—Tien Shan, Pamir, Kunlun, and Hindu Kush—as well as other ranges around the world have also been undertaken by climbers of many different nationalities. In 1985, American Dick Bass became the first to climb the "Seven Summits," the highest peak on each of the seven continents. Because of the difficulty of such assaults, mountain climbers continue to lose their lives in falls, storms, and avalanches.

Modern Climbing

In recent times, new technologies have helped refine mountain-climbing clothing for warmth, waterproofing, and evaporation of perspiration. Equipment has also been developed to allow for climbing vertical and overhanging rock faces. Such equipment includes chocks, cams, and nuts to wedge into rock crevices; carabiners to attach ropes to the chocks; and loops of nylon webbing used as ladders. Cellular telephones make communication while mountain climbing easier. Another recent development is a new environmental awareness. Some countries now require climbing permits and even environmental bonds to ensure the removal of waste from expeditions. The placement of pitons and other hardware is also regulated in some locations. Rock climbing, which started as a method of training for ascents of high mountains, has grown as a sport in its own right. Climbers today are able to train in indoor rock-climbing gyms and to compete in rock-climbing tournaments. Many climbing clubs and organizations have formed around the world for both rock and ice climbing.



The history of mountain climbing is a rich saga unto itself, apart from other kinds of exploration. Each high peak has its story, and many other individuals not mentioned above have contributed to their conquest. Mountaineering, despite all the accomplishments from the past and the advancements in its technology, remains one modern-day activity offering the thrill of exploration in some of the most remote places on Earth. As such, mountain climbing represents a continuum of exploration from ancient times to the present.

mountain men

The mountain men were frontiersmen active in the FUR TRADE in the ROCKY MOUNTAINS and surrounding regions of the American West. The term is most often applied to fur hunters, trappers, and traders working the northern and central Rockies in U.S. territory, seeking especially beaver furs and active in the 1820s and 1830s, but is sometimes also used in reference to those active in the southern or Canadian Rockies, and in other decades. Most mountain

men operated at a time when there were no permanent posts in that region and lived off the land, adopting Native American customs, including the wearing of leather and deerskin clothing. Some lived among tribes and married Indian women.

Many of those who became known as mountain men began their careers in the fur trade in the employ of the ROCKY MOUNTAIN FUR COMPANY, founded by WILLIAM HENRY ASHLEY and ANDREW HENRY in 1822. The earlier ST. LOUIS MISSOURI FUR COMPANY, also involving Henry, had been active along the MISSOURI RIVER. The AMERICAN FUR COMPANY, founded by JOHN JACOB ASTOR, had been working the country west of the Rockies. The Canadian HUDSON'S BAY COMPANY, which merged with the NORTH WEST COMPANY in 1821, had built most of its posts in the northern forests. And the RUSSIAN-AMERICAN COMPANY



Frederic Remington, known for his works on the American West, painted these mountain men, probably in 1904. (Library of Congress, Prints and Photographs Division [LC-USZ62-107676])

had developed the fur trade in Alaska. But some of the more difficult mountainous terrain and the routes through them were still virgin territory to non-Indians, and the activities of the mountain men opened much of the West to non-Indians.

Early in his operations, Ashley instituted the “brigade system,” in which trappers were sent out in numbers to defend against Indian attacks, especially by the Blackfeet Indians who were hostile to outsiders crossing their territory. Many of the mountain men developed friendships that would endure over the next decades. JAMES PIERSON BECKWORTH, JAMES BRIDGER, ROBERT CAMPBELL, JAMES CLYMAN, HUGH GLASS, THOMAS FITZPATRICK, HENRY FRAEB, CALEB GREENWOOD, DAVID E. JACKSON, ÉTIENNE PROVOST, EDWARD ROSE, JEDEDIAH STRONG SMITH, WILLIAM LEWIS SUBLETTE, WILLIAM HENRY VANDERBURGH, LOUIS VASQUEZ, and JOHN WEBER all worked for Ashley. The annual rendezvous—the first, in July 1825, organized by Ashley at Henrys Fork of the Green River in what is now northern Utah—was an essential part of the fur-trading economy. There would be 15 more such gatherings. At these meeting places, the mountain men delivered their furs to their employers, received their year’s wages, obtained new supplies, and socialized. Native Americans also brought their catch to barter for supplies.

In 1826, Ashley sold out his fur-trading interests to three of his former employees, David Jackson, Jedediah Smith, and William Sublette. They maintained a loose company over the next years, as did other mountain men. Some came to work for the American Fur Company, which also began working the Rockies. BENJAMIN LOUIS EULALIE DE BONNEVILLE, a U.S. military man on leave who led a number of fur-trading expeditions west of the Rockies in 1832–35, employed mountain men JOSEPH REDDEFORD WALKER, ZENAS LEONARD, and JOSEPH L. MEEK. Not all the mountain men were white. Edward Rose was part Cherokee and part African American. Jim Beckwourth was part African American. Another trapper from the same period who has been referred to as a mountain man is CHRISTOPHER HOUSTON CARSON (Kit Carson).

Following the change in fashion with the beaver hat going out of style in favor of the silk hat and the drop-off in the international demand for furs in the late 1830s, the mountain men put their wilderness skills to work as guides and interpreters, leading many of the early exploratory expeditions of the West, such as those under JOHN CHARLES FRÉMONT, as well as wagon trains, especially along the Oregon Trail and the branching California Trail, which mountain men had pioneered. Others became soldiers and scouts, proving effective against the native peoples from whom they had learned so much. After working as a trapper and a guide for Frémont, Kit Carson went on to become an Indian agent as well as brigadier general against tribes of the Southwest.

Many former mountain men settled in California. A number wrote accounts of their exploits.

Mountains of the Moon

The concept of the Mountains of the Moon, as associated with Africa, originated with **DIOGENES**, a Greek merchant who, in about A.D. 50, traveled inland in East Africa and reportedly sighted a range of snowcapped mountains feeding two large bodies of water. The next century, **PTOLEMY**, a hellenized Egyptian living in the North African city of Alexandria and a renowned geographer, produced an early map of Africa on which a group of mountains south of the EQUATOR were identified as *Lunae Montes*, or “Mountains of the Moon,” and wrote about them as the source of the NILE RIVER.

The source of the Nile was not determined for centuries. In 1613, **PEDRO PÁEZ**, a Spanish missionary sent out by Portugal, reported that the source of the Blue Nile, one of the two branches converging into the great river, was Lake Tana in the mountains of Ethiopia, a discovery corroborated by Scotsman **JAMES BRUCE** in 1770. Then, in 1858, Englishman **JOHN HANNING SPEKE** theorized that the source of the White Nile, the main branch, was Lake Victoria, confirmed by Anglo-American **SIR HENRY MORTON STANLEY** in 1875. A decade later, in 1889, Stanley and **MEHMED EMIN PASHA** explored the Ruwenzori Mountains on the border of present-day Uganda and the Democratic Republic of the Congo. It was determined that the Ruwenzori were at least part of the watershed feeding the Nile, some streams flowing southward through Lake Edward and Lake George to Lake Victoria and to the Nile, and others flowing northward to Lake Albert and to the Nile. The range thus came to be associated with the fabled Mountains of the Moon.

The Ruwenzori Range consists of six mountains, including Mount Stanley, named after the explorer, with Margherita Peak, at 16,762 feet above sea level, the third-highest summit in Africa. Mount Speke is named after John Hanning Speke; Mount Emin, after Mehmed Emin Pasha; Mount Baker, after **SIR SAMUEL WHITE BAKER**; and Mount Gessi, after Italian Romlo Gessi, who explored the Nile to Lake Albert in 1876. In 1906, **LUIGI AMEDEO DI SAVOIA D’ABRUZZI** completed the first ascent of Margherita Peak, naming it for Italy’s queen mother; he climbed five of the six peaks in the range as well. Mount Luigi di Savoia is named after him.

There is no way to prove that the Ruwenzori were in fact Diogenes’s and Ptolemy’s mountains. It is possible that Mount Kilimanjaro (see **KILIMANJARO, MOUNT**), Africa’s highest mountain, and Mount Kenya, the second-highest, both closer to the Indian Ocean, were the mountains viewed

by Diogenes and represented on Ptolemy’s map. Yet the name is widely used for the Ruwenzori.

Mount Everest See **EVEREST, MOUNT**.

Mount Kilimanjaro See **KILIMANJARO, MOUNT**.

Mount McKinley See **MCKINLEY, MOUNT**.

Muscovy Company (Company of Merchant Adventurers; Merchant Adventurers of England for the Discovery of Lands, Territories, Isles, Dominions and Seignories Unknown; Mystery and Company of Merchant Venturers for the Discovery of Regions, Dominions, Islands and Places Unknown; Russia Company)

The Muscovy Company, a joint-stock corporation, was created in England to discover a **NORTHEAST PASSAGE** eastward from Europe to Cathay (present-day China), and to profit from the exclusive trade along such a route. It was referred to at different times by a number of other names, such as the Russia Company; the Company of Merchant Adventurers; the Merchant Adventurers of England for the Discovery of Lands, Territories, Isles, Dominions and Seignories Unknown; and the Mystery and Company of Merchant Venturers for the Discovery of Regions, Dominions, Islands and Places Unknown.

English merchants became interested in alternative trade routes as they saw their fellow European nations grow rich from their arrangements. Robert Thorne, a Bristol merchant in the mid-16th century, was especially enthusiastic about finding a passage to China by sailing past the northern border of Scandinavia, along Russia’s north coast, and around the northeastern edge of the Asian continent. The Company of Merchant Adventurers was founded on December 18, 1551, with Italian-born **SEBASTIAN CABOT** as first governor. The son of the even more renowned explorer **JOHN CABOT**, Sebastian Cabot had had an eminent career in his own right, including a search, in 1509, for an alternative **NORTHWEST PASSAGE** westward through the Americas. Although Cabot was elderly at the time of his appointment, with no plans to accompany an expedition, his knowledge and wisdom were considered vital to the company’s mission.

The waters to the east of Scandinavia and north of Russia were well known to native peoples inhabiting northern European shores at the time. Many made their living by fishing and hunting. Russia had had regular conflicts with their northern native neighbors, but cooperation was poor. In addition, most of the seafarers plying these waters were

illiterate, so reliable records of their knowledge was difficult to attain. Thus, the expeditions of the Muscovy Company took on a diplomatic element, as well as unifying the geographic understanding of the regions.

Trade Links

The first expedition outfitted by the company was to be headed by SIR HUGH WILLOUGHBY, an English soldier; RICHARD CHANCELLOR, an English mariner, was to serve as pilot general; and STEPHEN BOROUGH, another English mariner, was to captain one of the ships. Their task was to sail to China and establish trade links with the rulers of distant lands, and they carried letters from the king for this purpose. Setting out in May 1553, they rounded the northern border of Norway, where the ships were separated by a storm. Willoughby continued eastward, where he sighted Novaya Zemlya, although he was unable to land due to ice. He turned back, coming ashore on the Kola Peninsula, where he and his crew perished during the winter. Meanwhile, Borough had turned back prematurely because of icy conditions. Chancellor had proceeded southward and entered the White Sea. He dropped anchor at the mouth of the Dvina River, where the trading port of Archangel was located—later to become an important point of contact with England—and traveled overland. Learning of his presence, Czar Ivan IV (Ivan the Terrible) invited him to Moscow, where he and his party were well received. The following summer, Chancellor and his men returned to their ship and sailed back to England.

With friendly contact made between Russia and England, the newly christened Muscovy Company was granted a royal charter in 1555 and given a monopoly in trade between the two countries. Chancellor made a second journey that same year to clarify agreements with the Russian government, but lost his own life on the return trip.

Another voyage in search of the Northeast Passage sponsored by the company was made in 1556 by Stephen Borough, who had captained a ship in the Willoughby expedition. With a crew of only eight and a small vessel named the *Searchthrift*, they made their way along Norway's coast to the Barents Sea. Along the way, they discovered Vaigach Island, and then came upon Novaya Zemlya. Here they encountered the Samoyed (now known as the Nentsi), a nomadic people. Turned back by ice from entering the Kara Sea, his descriptions of the unfavorable conditions that lay ahead discouraged the English from further exploration for several decades.

The Muscovy Company then turned its attention to capitalizing on trade links, exchanging English textiles for Russian furs. In 1561, Englishman ANTHONY JENKINSON was given the task of pushing farther south to open up relations with Persia (present-day Iran). Passing through Russia, he took a boat down the Volga River to Astrakhan. From there, he managed to navigate the rough conditions on the Caspian

Sea, eventually reaching the court of the shah in the capital of Kazvin. He was rebuffed, but did manage to reach an agreement with the ruler at Shirvan. On another British expedition in 1564, Thomas Alcock, the leader, was killed. Four more trips, taking place from 1565 to 1580, were unsuccessful.

New Attempt at a Northeast Passage

The next English expedition in search of the Northeast Passage sponsored by the company was headed by Arthur Pet and Charles Jackman. They set sail in separate ships in June 1580: a 40-ton vessel, *George*, was commanded by Pet, and the 20-ton ship, *William*, was under Jackman's command. These were small boats, but their captains had experience from earlier expeditions—Pet with Chancellor, and Jackman under SIR MARTIN FROBISHER in the western Arctic. They found the strait between Vaigach Island and the mainland (currently called the Yugor Strait) but were stopped by the ice on the Kara Sea, having penetrated only a few more miles than Borough's expedition.

In 1607, the Muscovy Company hired Englishman HENRY HUDSON to find the Northeast Passage. He sailed westward to GREENLAND, then returning east and north, he came upon Spitsbergen (present-day Svalbard), a collection of islands situated to the north of Norway, visited in 1696 by a Dutch expedition under WILLEM BARENTS. Hudson's progress farther eastward impeded by ice, he returned to England. His reports of whales in northern waters led to the development of the English whaling industry, with some participation of the Muscovy Company. On a second trip in 1608, he took the more conventional route used by his predecessors and explored Novaya Zemlya, but was again forced back by ice.

Enduring Legacy

Despite their failure to accomplish their original objective of a Northeast Passage to China, the Muscovy Company left an enduring legacy. They were the first major joint-stock trading company in England, paving the way for numerous monopoly ventures to follow. Their trade with Russia was lucrative and continued for centuries, being interrupted only from 1646 to 1660, when English merchants were banned from Russia. Their monopoly privileges were long a subject of controversy, but these they were able to maintain until 1698, when the political pressure became too strong for the English monarchy to resist. The company remained active over the next centuries, however, finally closing its books in 1917.

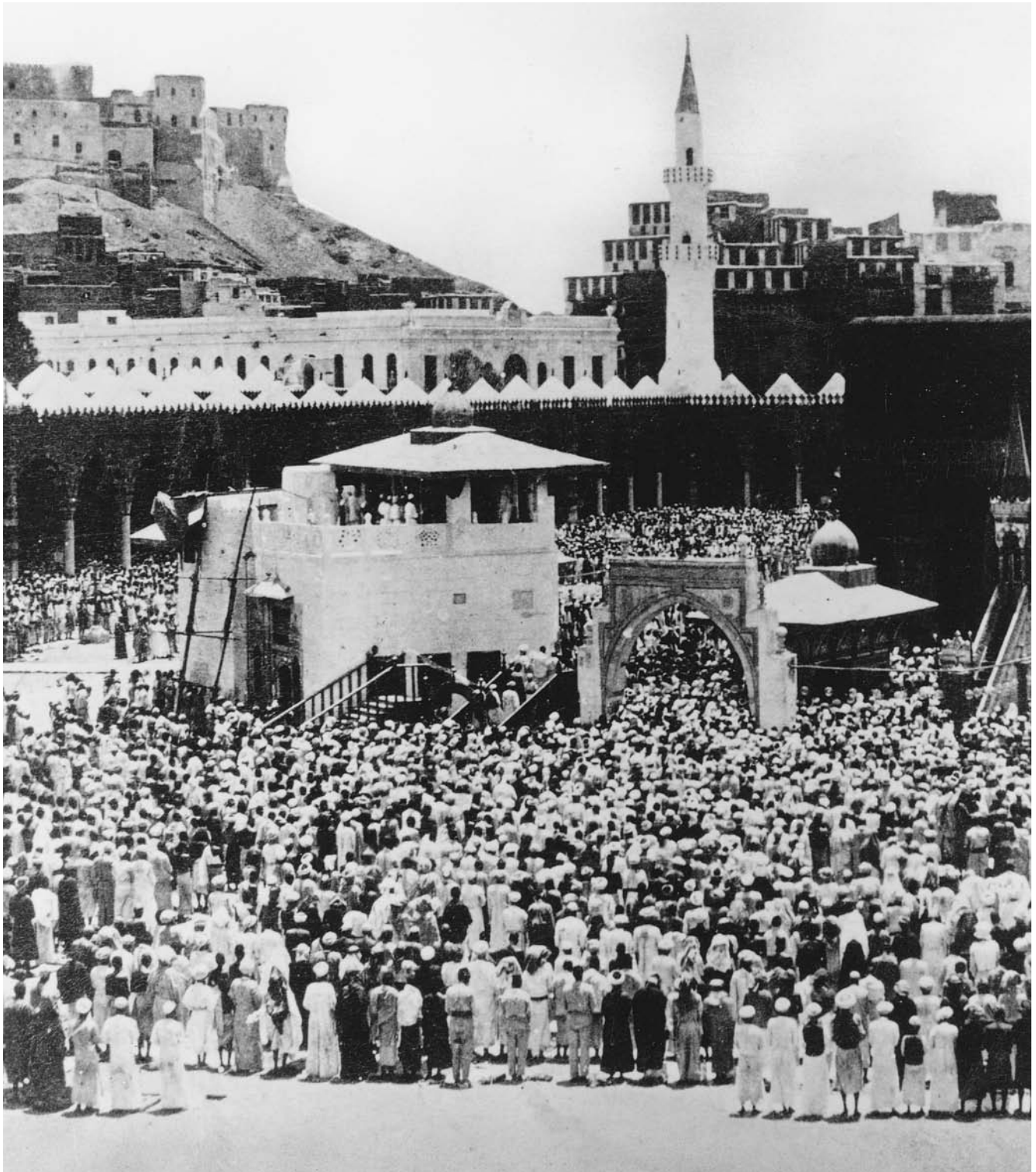
See also COMMERCE AND EXPLORATION.

Muslim exploration

The term *Muslim*, also written *Moslem*, is Arabic and translates as "one who submits," referring to a believer in the religion of Islam. Islam, the youngest of the three monothe-

istic world religions after Judaism and Christianity and evolving out of them, was founded by the Prophet Muhammad (or Mohammed) in the seventh century A.D. Muhammad was born in about 570, a native of Mecca in what is

now western Saudi Arabia. After experiencing a vision at age 40, he began preaching his revelations about the one god, known as Allah in Arabic, to the polytheistic Meccans. He eventually recorded his beliefs in the Qur'an (Koran). In



This photograph from the 1880s shows Muslims gathered at a sacred shrine in Mecca during the hajj. (*Library of Congress, Prints and Photographs Division [LC-USZ62-99278]*)

622, on alienating that city's political and religious rulers, he fled with his followers in a migration known as the *hegira*, the event from which the Islamic calendar is dated, and settled in Yathrib (later known as Medina) to the north. His influence and power grew as more and more Arab tribes declared their allegiance to him. In 630, he and his followers conquered Mecca.

At the time of Muhammad's death two years later, the new religion was spreading rapidly, largely through military conquest, as directed by the first three caliphs, Abu Bakr, Omar, and Othman. In 637, Jerusalem fell to Arab armies. Muslims also conquered Mesopotamia, Persia, and Syria. Under later rulers, Muslims came to control lands in central Asia to the edge of the Chinese Empire, all of North Africa, as well as territory in Spain, which they first invaded in 711 under Moorish leader Tariq. They were active traders even beyond these regions and came to dominate commerce along the SILK ROAD among other trade routes.

In later years, other Islamic peoples besides the Arabs came to dominate extensive regions. At the beginning of the 11th century, the Seljuk Turks under Togul began consolidating their power, conquering much of Asia Minor and surrounding areas. It was their ascendancy and harassment of Christian pilgrims to Jerusalem and their threatening Constantinople (present-day Istanbul, Turkey), the seat of the Eastern Roman Empire (Byzantine Empire) that helped prompt the CRUSADES, the military expeditions by European Christians to the Near East through the late 13th century. After proclaiming their independence from the Seljuks in 1290 under Osman I, the Ottoman Turks rose to power in the region and established the Ottoman Empire, which at the height of its power in the mid-16th century under Suleiman the Magnificent included much of southeastern Europe, western Asia, and northern Africa.

The Middle Ages, from the ninth to the 14th century, was a time of inquiry in the Muslim world, and comparisons can be made between this period of Muslim intellectual activity and the earlier Classical Age of the Greeks, and with the later RENAISSANCE in Europe (and the related EUROPEAN AGE OF EXPLORATION). There was a new mobility among its population. People traveled for religious purposes, with pilgrimages to Mecca, the holiest city of the Islamic faith as the birthplace of Muhammad (travel to which became regarded as an essential act of faith, known as the *hajj*). Religious research was part of devotion, and Islamic scholars journey throughout Muslim lands to research the *hādith*, oral teachings attributed to Muhammad and his followers. People also traveled for economic reasons, with Muslim merchants developing new markets. And people traveled for scientific reasons, even beyond the Muslim world, seeking knowledge of foreign lands. There resulted a wealth of Muslim literature: cosmographies, world geographies, regional geographies, geographies of

particular routes, chronologies of nations, and astronomical studies. The Arabs designed the DHOW, a craft with a LATEEN RIG, which became a common sight in the MEDITERRANEAN SEA, RED SEA, Arabian Sea, Persian Gulf, and Indian Ocean. The Muslims became proficient in navigation in oceans. They used the sundial, QUADRANT, ASTROLABE, and magnetic COMPASS. As early as the 10th century, they recorded nautical data in texts known as *rahmānī*, similar to the periplus of the Greeks and Romans (see PERIPLUS).

Many of the Muslim travelers were Arab, but not all, some descended from other peoples and venturing forth from other homelands. In some instances their exact nationality is not known. One of the most renowned early travelers was Arab merchant SOLEYMAN, also known as Sulaimen el Tagir, who, in about 850–51, traveled from the Persian Gulf by sea to India and China, visiting en route the Maldiv Islands and Laccadive Islands, CEYLON (present-day Sri Lanka), and the Andaman Islands. He wrote a book that came to be known as *Sequence of Historical Events*, with geographic as well as cultural information about the places he visited. In the early part of the 10th century, another Arab merchant, ABU ALI AHMAD IBN RUSTA, traveled throughout the lower Volga region of eastern Europe as well as to Malay in Asia. In his writings he describes both European and Asian peoples.

Two scholars traveled in the early 10th century as well, ABU AL-HASAN ALI AL-MASUDI, an Arab historian who reportedly visited every country in the Islamic world, and AHMAD IBN FADLAN, a non-Arab scholar who traveled from Baghdad into the Volga region of European Russia. Another individual who traveled throughout the Islamic world was merchant and scholar ABU AL-QASIM IBN ALI AL-NASIBI IBN HAWQAL. He also reportedly traveled across the SAHARA DESERT. His travels, beginning in 943, lasted about three decades. The next century, in about 1017, Arab scholar ABU AR-RAYHAN MUHAMMAD IBN AHMAD AL-BIRUNI traveled to India from Afghanistan; he later wrote a book on Indian customs and geography.

In 1145–54, after extensive travels in northwestern Europe, Arab ABU ABD ALLAH MUHAMMAD ASH-SHARIF AL-IDRISI, working for Roger II, the Norman king of Sicily, revolutionized cartography in *The Book of Roger*, which contains accurate geographic information based on his travels and the use of a grid system. In 1182–85, a son of a prominent Muslim family of Spain, ABU AL-HASAN MUHAMMAD IBN JUBAYR, explored the lands of the Mediterranean on pilgrimage from Spain to Arabia. His writings in a travel account known as a *Rihla* for "Journey" include a description of the holy places in Mecca. Another cartographer, SHIHAB AL-DIN ABU ABD ALLAH YAQUT AL-RUMI, was a Greek-born Muslim who traveled throughout the Middle East for a Baghdad merchant. In 1228–29, he published *Mu'jam al*

Buldan (Dictionary of Countries), a gazetteer-type geographic study.

The most famous of all the Muslim travelers was ABU ABD ALLAH MUHAMMAD IBN BATTUTAH, an Arab born in Tangier, Morocco. In 1325–50, as a pilgrim and scholar, he traveled throughout Egypt, Arabia, central Asia, Africa, and Spain. In Africa, he reached the city of TIMBUKTU in the kingdom of Mali, south of the Sahara. He, too, recorded his experiences in a *Rihla* travel account, published in 1357. At the time of his death in 1378, he was considered the most widely traveled person in history.

There are many other Muslim individuals who contributed to the growing body of knowledge of the medieval period and afterward and who are a part of the history of exploration.

The Muslim tradition of wide-ranging travel—both for religious purposes and for commerce—continued after the Middle Ages, and Islam continued to spread to new peoples, especially in Africa and Asia. Moreover, Muslim individuals continued to play a part in world exploration, even as part of other traditions, their religious affiliation not necessarily the motivation for travel. CHENG HO, who carried out seven maritime expeditions to the Indian Ocean on behalf of the Ming rulers of China in the early 15th century, was the son of Chinese Muslims. Muslims were hired for their expertise as navigators during the EUROPEAN AGE OF EXPLORATION of the 15th, 16th, and 17th centuries. It is widely

believed that Italian mariner CHRISTOPHER COLUMBUS used Muslim navigators in crossing the Atlantic Ocean for Spain in 1492. At the very least, he made use of Arabic navigational techniques and charts. (Based on ancient documents which, for example, tell of Muslims of African origin sailing from Spain across an ocean of “darkness and fog” and returning with evidence of a “strange and curious land,” it is theorized by some that Muslim mariners even reached the Americas before Columbus, as early as the ninth and 10th centuries.) ESTEVANICO, a slave out of North Africa who participated in Spanish explorations of the American Southeast and Southwest in the first half of the 16th century, is assumed to have been Islamic. Many other Muslims were taken to the Americas as slaves and contributed to European expansion into new territory. The fact that they were Islamic has rarely been documented. (One exception is Omar Ibn Sayyid, a West African slave in North Carolina, known to be Muslim from a letter he wrote in 1831.) There is also a legacy of a Muslim presence in Australia predating European settlement: It is thought fishermen and traders from the Indonesian archipelago reached Australia’s north shore as early as the 16th century. Afghan Muslims are known to have traveled to Australia in the 19th century to help with the exploration of the interior as camel drivers. Yet Muslim exploration as a subject of study generally relates to the Middle Ages, which might be called the Age of Muslim Exploration (as well as the Golden Age of Muslim Travel Writing).



nao See CARRACK.

NASA See NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.

National Aeronautics and Space Administration (NASA)

The National Aeronautics and Space Administration, better known as NASA, is an agency of the U.S. government, established by the National Aeronautics and Space Act of July 1958, for the purpose of SPACE EXPLORATION. In managing the U.S. space program, NASA conducts research in aviation and in ROCKET design, as well as related communications. It also directs scientific experiments in space. Moreover, it works in organizational aspects of space exploration, including the selection and training of ASTRONAUTS and the development of alliances between nations and partnerships between government and business or academia.

NASA was founded in response to the early success of the Union of Soviet Socialist Republics (USSR; Soviet Union) in its space program. In October 1957, the Soviets put the first artificial SATELLITE, *Sputnik 1*, into space, the start of the “space race.” To coordinate all space-related activities in one agency, NASA replaced the National Advisory Committee for Aeronautics (NACA), which had been founded in 1915 and had been geared toward research, and

absorbed some of the responsibilities of other government agencies as well.

NASA is based in Washington, D.C., and is overseen by the U.S. president, who helps plan policy and determine budget. Moreover, the administrator of NASA, a civilian, is appointed by the president, with the advice and consent of the Senate; under him is a staff of thousands of scientists, engineers, and technicians. The five NASA branches are the Office of Aero-Space Technology; the Office of Earth Science; the Office of Space Flight; the Office of Life and Microgravity Sciences and Applications; and the Office of Space Science. Facilities include the John F. Kennedy Space Center at Merritt Island, Florida; the Lyndon B. Johnson Space Center in Houston, Texas; the Goddard Space Flight Center in Greenbelt, Maryland; the George C. Marshall Space Flight Center in Huntsville, Alabama; and the Jet Propulsion Laboratory, operated under contract by the California Institute of Technology, in Pasadena.

NASA directed the MERCURY PROGRAM of 1961–63 to launch the first Americans into space; the manned GEMINI PROGRAM of 1964–66 to help develop the necessary techniques for a lunar mission; the unmanned Surveyor Program of 1966–68 to probe the lunar surface; and the APOLLO PROGRAM of 1961–72 to land a human on the Moon. Other projects include the unmanned exploratory flights to Mars. Since 1981, NASA has been directing flights of the reusable space vehicle, the SPACE SHUTTLE. Although originally conceived as a civilian agency, NASA has been

increasingly involved in aiding military research, carried out through space shuttle flights. NASA teamed up with the EUROPEAN SPACE AGENCY (ESA) to launch and maintain the *Hubble Space Telescope*. NASA has also been involved with the development of an international SPACE STATION.

native peoples and exploration

The history of exploration from ancient to modern times is not just about travel in uncharted lands, but also about contacts among peoples. The exploration of any continent, except Antarctica, cannot be discussed without relating the role of and impact on indigenous peoples. Since studies on exploration and explorers involve the stories and viewpoints of individuals who traveled from their homelands to foreign lands and helped diffuse knowledge, the related stories of indigenous peoples are sometimes neglected. The long-term use of the word *discover* as applied to already inhabited lands is an obvious example of how native peoples have been historically minimized in accounts on exploration. Moreover, there has been until recent years a tendency to glorify “discoveries” without offering a balancing account of the negative impact contacts with outsiders had on aboriginal populations—through disease, conquest, slavery, displacement from lands, and dispossession of culture. There also has been a minimizing of the role many indigenous individuals had in the success of specific expeditions as guides, interpreters, canoeists, and carriers, as well as the fact that some were explorers in their own right, opening up regions for their own people.

Conquest and Colonization

Some expeditions were launched with conquest and colonization of native peoples as the express purpose. The explorations of Macedonian ruler ALEXANDER THE GREAT in the fourth century B.C. in Africa and Asia, of Roman general GAIUS JULIUS CAESAR in the first century A.D. in Europe, and of Mongol leader GENGHIS KHAN in the 13th century A.D. in Asia involved the conquest and colonization of peoples. So did the early 16th-century Spanish expeditions of HERNÁN CORTÉS and FRANCISCO PIZARRO in the Americas. The very name applied to such Spanish explorers—CONQUISTADORES—implies conquest of indigenous peoples. Such military ventures had a direct impact on the history of peoples, and, in some cases, entire civilizations. The highly organized civilizations of the Aztec and Inca collapsed under the Spanish invasion.

Varying Contacts

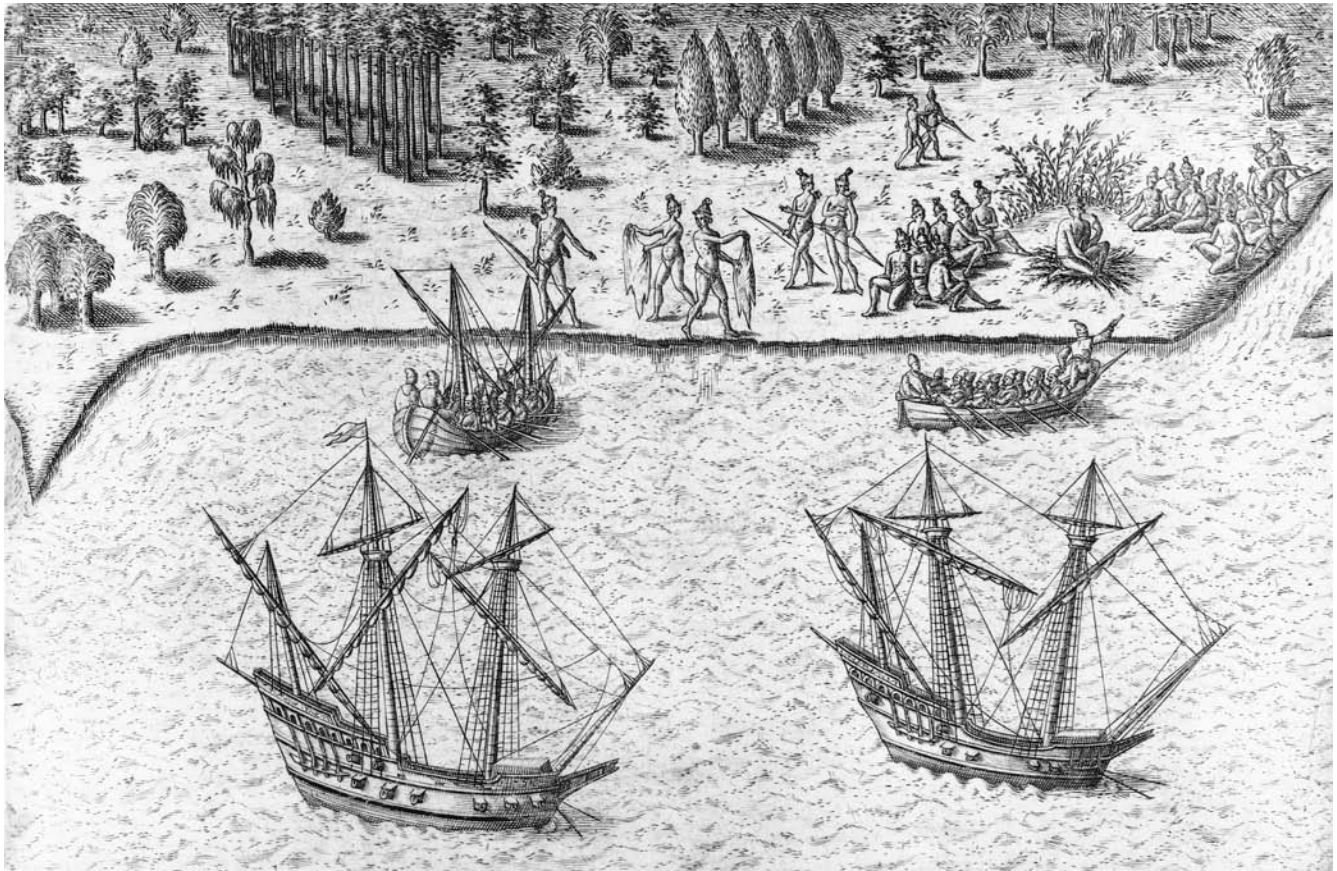
Other expeditions were initiated having peaceful contacts with native peoples in mind. Italian mariner CHRISTOPHER COLUMBUS, exploring for Spain, hoped to find a new trade route to the Orient with the SPICE TRADE in

mind when he set out westward across the Atlantic Ocean in the late 15th century. Russian fur traders journeyed to Alaska in the mid-18th century to develop the FUR TRADE with native peoples. The religious conversion of native peoples provided incentive for many voyages into the wilderness, such as those of Frenchman CLAUDE-JEAN ALLOUEZ in the western Great Lakes country of North America in the mid-17th century. Knowledge of native peoples, as well as knowledge of geography, was a motivating factor in other expeditions, such as the U.S. government-sponsored expedition headed by MERIWETHER LEWIS and WILLIAM CLARK to the Pacific Northwest of North America in the early 19th century.

Part of the story of these expeditions, however, like those undertaken in the name of conquest, is the negative impact on peoples. When Columbus failed to reach the wealthy civilizations of Asia, he sought to obtain enough gold from Native Americans of the WEST INDIES to satisfy his sponsors. When that endeavor failed, he turned to the SLAVE TRADE as a means of profit. Colonization of the region followed, as did the eventual extermination of local tribes. The exploitation of native labor became central to the operations of the early Russian fur traders, who took Aleut hostages to force the delivery of furs. Allouez’s work among a reported 22 tribes—as that of other missionaries throughout the world—altered traditional ways of life. And the Lewis and Clark Expedition, despite peaceful contacts with more than 50 Native American tribes, can be seen as the start of the similar pattern for those tribes of nonnatives entering the native domain and beginning the process of destructive change.

The outcome of some expeditions involving native peoples as the primary motivation can be viewed in a positive light. For example, American GEORGE CATLIN, who traveled in North, South, and Central America in the mid-19th century, helped preserve knowledge of native peoples. In the early 20th century, American historian HIRAM BINGHAM helped preserve the Inca legacy in his studies of their ruins in Peru.

In the case of many other expeditions, the interaction with native peoples is incidental to the undertaking, but central to the story. Most accounts of expeditions to uncharted lands include mention of encounters with native peoples, both friendly and hostile. The explorations along the coast of Australia, such as those carried out by Englishman WILLIAM DAMPIER in the late 17th century, and in the interior by Scotsman SIR THOMAS LIVINGSTONE MITCHELL in the first half of the 19th century, resulted in engagements with Aborigines, some of them violent. In many instances, native peoples determined the outcome. Some of the most famous explorers were killed in confrontations, such as Spanish JUAN PONCE DE LEÓN, who made the European discovery of Florida in North America in the early 16th



Jacques Le Moynes painted a watercolor of the French, led by René de Laudonnière, encountering Native Americans in 1562 at St. Johns River in Florida. It was published by the Flemish engraver Théodore de Bry in 1591. (*Library of Congress, Prints and Photographs Division [LC-USZ62-380]*)

century, and Portuguese FERDINAND MAGELLAN in the course of the first CIRCUMNAVIGATION OF THE WORLD soon afterward.

Benefactors, Guides, Interpreters, and Porters

In other instances, native peoples were essential to the success of expeditions. In the Americas, Arawak (Taino) Indian chief GUANCANAGARI helped Columbus in the West Indies as a protector, guide, and interpreter. Aztec Indian woman MALINCHE helped Cortés in the same role. Huron (Wyan-dot) Indian DONNACONNA aided Frenchman JACQUES CARTIER in his 16th-century explorations along the Gulf of St. Lawrence and the St. Lawrence River in what is now northeastern Canada. Native American TURK and Ysopete served as guides, also in the 16th century, to Spanish FRANCISCO VÁSQUEZ DE CORONADO in the American Southwest. The PILGRIMS, who sought a new life in northeastern North America in the early 17th century, would not have survived without help from Native Americans—a course of events leading to the American holiday of Thanksgiving. The Wampanoag Indian SQUANTO was invaluable to them

as both a diplomat and interpreter, as well as a guide on their later coastal explorations. The Chipewyan MATONABEE was central to the survival and success of Englishman SAMUEL HEARNE's 18th-century voyages west of HUDSON BAY in Canada. Shoshone Indian woman SACAJAWEA (Sacagawea) deserves as much credit for the success of the early 19th-century Lewis and Clark Expedition as anyone, as a guide and interpreter, as well as a diplomat since the presence of a Native American woman provided safe passage through tribal lands. Ioway Indian woman MARIE DORION played a similar role for the Astorians, who traveled to the Pacific Northwest under WILSON PRICE HUNT several years later. In the mid-19th century, Mojave Indian IRATEBA served as a guide for several U.S. military topographic expeditions. At about the same time on South Island in NEW ZEALAND, a Maori named Ekuhu proved essential as a guide in the explorations of Englishman THOMAS BRUNNER.

An example of an Asian native offering assistance is NIKOLAY DAURKIN of the Chukchi tribe of northeastern SIBERIA. He served as an interpreter under Russia's Northeastern Secret Geographical and Astronomical Expedition of

the late 18th century, headed by Englishman JOSEPH BILLINGS.

The history of African exploration is also filled with the stories of native participants. HUGH CLAPPERTON and RICHARD LEMON LANDER, explorers of West Africa in the early 19th century, traveled with WILLIAM PASCOE, a Hausa tribesman and freed slave who acted as a servant and cook as well as a guide and interpreter. European explorers of Africa would not have been able to venture into the interior of Africa without the help of African porters—the *pagazi*—to carry their supplies. The porters' leader—the *kirangozi*—helped organize day-to-day life of an expedition. The Yao tribal member SIDI BOMBAY was critical to the success of a number of 19th-century British expeditions, including those of SIR RICHARD FRANCIS BURTON, JOHN HANNING SPEKE, SIR HENRY MORTON STANLEY, and VERNEY LOVETT CAMERON, as a caravan leader, guide, and interpreter.

In the 20th century, SHERPAS have been essential to the success of numerous MOUNTAIN CLIMBING expeditions in the HIMALAYAS as guides and porters. One of them, TENZING NORGAY, who accompanied Englishman SIR EDMUND PERCIVAL HILLARY in an assault on Mount Everest (see EVEREST, MOUNT) in 1953, became the first human to summit the world's highest mountain. There are numerous other native individuals known to have led foreigners through their lands and beyond. The names of many others, however, have been lost to history.

Native Explorers

Native peoples carried out their own travels to new lands. Most books about exploration do not discuss ancient migrations as exploratory expeditions, however. If the history of world exploration is perceived as the record of diffusion of geographic and cultural knowledge—with the mapping of the world, as a result of particular expeditions, at the heart of the saga—then ancient migrations determined through archaeological investigation are not part of the story. Yet, in the case of the Americas, so much is made as to their discovery, with 1492 as one of the best-known dates in history and Christopher Columbus as the most famous explorer, that it becomes necessary to discuss the migrations of Paleo-Indians across the LAND BRIDGE formed in the BERING STRAIT during the last ice age and attribute to them the true discovery of the Americas by humankind.

Accounts of some native explorers have been passed down orally. For example, the tradition of the Maori people holds that KUPE, a chieftain of the Polynesians, reached New Zealand in the mid-10th century. The legendary story contains some fantastic elements—such as the pursuit of a Squid King—yet the fact of a Polynesian migration to New Zealand is considered fact.

The PUNDITS, native peoples of India or neighboring countries working for the British in the 19th century, are

central to the story of the mapping of the Himalayas. Men such as NAIN SINGH, KISHEN SINGH, and KINTUP were able to disguise themselves as Buddhist merchants and pilgrims to travel in Tibet, a land forbidden to Europeans.

Some explorers were part native, their ancestry playing a part in the success of their accomplishments. EDWARD ROSE, who worked as a guide for a number of fur-trading expeditions, as well as interpreter and negotiator among Native American tribes along the MISSOURI RIVER and to the west in the early 19th century, had Cherokee ancestry along with European and African. Another part-Cherokee, JESSE CHISHOLM, similarly worked as a guide and interpreter in the American West; in 1865, he blazed the Chisholm Trail from Texas to Kansas, which soon became a major cattle drive route. Anthropologist KNUD JOHAN VICTOR RASMUSSEN—who studied GREENLAND and its Inuit (Eskimo) peoples in the early 20th century—had an Inuit mother and a Danish father.



One other point should be made regarding indigenous peoples and exploration. From the native point of view, some among them “discovered” lands foreign to them just as Europeans are said to have “discovered” other places. For example, when Squanto was taken to Europe as a slave in the early 17th century, then managed to return to North America, in relating his experiences to his people, he no doubt was perceived as an explorer who had lived a remarkable adventure. Omai, the Tahitian man who returned to Europe with TOBIAS FURNEAUX in 1774, and who, as a guest of SIR JOSEPH BANKS, made a splash in London society, can be said, as the first South Pacific native to visit England, to have “discovered” Europe for his people.

See also COLONIZATION AND EXPLORATION; COMMERCE AND EXPLORATION; CONQUEST AND EXPLORATION; DISEASE AND EXPLORATION; POLYNESIAN EXPLORATION; RELIGION AND EXPLORATION.

natural science and exploration

The precursor of a wide range of sciences—from the study of life-forms, such as biology, zoology, botany, paleontology, and anthropology, to the earth sciences, such as geology, geography, and oceanography—was the discipline of natural science. Also referred to as natural history, the discipline was practiced over the centuries by naturalists who studied “nature,” the natural world both animate and inanimate. In ancient times, such studies related to other scientific studies as well: mathematics, physics, and astronomy. Even in the golden age of natural history, the 17th to 19th centuries, European naturalists as part of others' expeditions or on their own, would conduct studies in a wide range of subjects: animal and plant species, native peoples, rock formations,

Earth's magnetic fields, OCEAN CURRENTS, and so on. The scope of their study must be hard to imagine for scientists today who have become increasingly specialized.

Foundations of Natural Science

It is difficult to separate out natural history from a general quest for knowledge in ancient times. The ancient Egyptians, for example, sent out expeditions—such as that of Queen HATSHEPSUT in about 1492 B.C., to the land of PUNT to the south—in order to collect among other things exotic plants and animals (see EGYPTIAN EXPLORATION). Many different peoples around the world, such as the ancient Chinese and Native Americans, also developed a remarkable body of knowledge about herbs for healing (see CHINESE EXPLORATION).

It can be said, however, that the philosophical foundation of modern science, empiricism and the objective observation of phenomena without reference to the observer, was developed by the ancient Greeks (see GREEK EXPLORATION). Thales of Miletus, who was active in the seventh to sixth century B.C., established some of the earliest principles of natural science, in astronomy, geography, and hydrology. In 585 B.C., he accurately predicted an eclipse of the Sun. Aristotle of the fourth century B.C. considered him the father of Greek philosophy. The philosophers of the ancient world thought in terms of a metaphysical “first cause,” which created the world and set it in motion toward an appointed end or “final cause,” and tended to denigrate the material world perceivable to our senses in favor of abstract ideas and theories. The fifth- to fourth-century B.C. Greek philosopher Plato, for example, maintained that the forms we see are but shadows of ideal forms. Yet the ancient Greeks placed much more emphasis on empirical observation and experimentation than did philosophers of the Middle Ages, and the Greeks traveled the known world observing and describing what they had observed.

CTESIAS OF CNIDUS was drawn to the fantastic, however. A Greek physician who traveled in Persia and India from 420 to 400 B.C., he later wrote accounts of his experiences, which, he claimed, discredited earlier accounts by fifth-century B.C. Greek historian HERODOTUS. Yet most of his information was based on hearsay from Persian courtiers; he wrote down everything he was told, no matter how incredible. Ctesias serves as an example of the importance to the Greeks of factual reporting, for as soon as Macedonian ALEXANDER THE GREAT traveled the same regions in the fourth century B.C., Ctesias's work was superseded by eyewitness accounts, some of them by scientists and surveyors traveling with Alexander's army. His scientists even sent back specimens of wildlife to Greece. The difference in worldview of the ancient Greeks from that of medieval Europeans is clearly shown by the latter's credulous acceptance of everything Ctesias wrote. For example, his account of a race of

men with a single huge foot, which may have originated from tales of Indian holy men who would spend hours meditating while standing on one foot, resulted in medieval depictions of big-footed men.

Ctesias's importance may derive more from the effect his writings had on others; his books were read by many educated Greeks including Aristotle, a fourth-century B.C. Greek philosopher, as well as Alexander, who studied under Aristotle. It is likely that, during his travels in Persia and India, Alexander sought confirmation of Ctesias's information. Moreover, Alexander sent back to Aristotle multitudes of natural specimens and reports on the natural phenomena. Aristotle was thus a naturalist-explorer by proxy; one of his assistants may actually have accompanied Alexander's army and worked to systematize their findings before sending them home. Aristotle differed from Plato by insisting that ideal form, the ultimate object of study for philosophers, was inherent in concrete individual things, resulting in his preoccupation with observable nature.

Natural Science during the Middle Ages

For all the profound influence Aristotle's writings had on European beliefs about the natural world, Plato's philosophy became the essential framework for medieval Christian theology and philosophy, with a belief in the dualism of matter versus spirit or soul and a profound mistrust of the physical. It is ironic that the basic beliefs of scholars of the Middle Ages led them to study Aristotle's works rather than studying nature for themselves as he had done.

Science in the Middle Ages combined the physical with the metaphysical; the precursor of chemistry was alchemy, that of astronomy was astrology. The aim was to discover evidence of a preconceived order in the world; thus, early maps showed landmasses arrayed in the perfect symmetry that God must have bestowed on them, with Jerusalem at the center of Earth (see GEOGRAPHY AND CARTOGRAPHY). Also, during the Middle Ages, animals were studied not by direct observation but as they appeared in bestiaries, books with depictions and descriptions that used animal lore to teach Christian values. The core material of most medieval bestiaries came from *Physiologus*, a text written by an anonymous author, possibly a contemporary of Saint Augustine, the bishop of Hippo in north Africa, who lived in the fourth to fifth centuries A.D. This writer took the assertions of earlier authors as undeniable fact without making any attempt at independent verification. Stories such as that of the mythical bird known as the phoenix, which burns itself to death and rises on the third day from the ashes, had symbolic value, this particular one representing Christ's resurrection.

Stirrings of a new way of regarding nature began to be discernable in the 13th century. Italian friar Saint Francis of Assisi deposed man from the dominion over all nature given him in the Bible; this dominion had long been reinforced by

the belief that man with his soul and his reasoning mind was highest of all creatures on Earth in the hierarchy from matter to spirit. To Saint Francis, however, nature consisted of a harmonious democracy of all creatures.

Saint Francis's contemporary, Friederich I of Hohenstaufen, king of Germany and Holy Roman Emperor, an avid falconer, wrote *De Arte Venandi cum Avibus* (The art of hunting with birds), using his own careful observations, and displayed a different attitude toward textbook natural history than had predominated for so long. "No certainty comes by hearsay," he declared, and carefully tested as many of Aristotle's facts as he could, writing only about what he had observed himself; he refuted many of the tales of the bestiaries. German scholar Albertus Magnus, the patron saint of natural scientists, translated into German Aristotle's *Historia animalium*, making it more accessible for confirmation or refutation. During his travels, Venetian MARCO POLO, who traveled to the Far East in the latter part of the century, was able to refute many bestiary "facts," such as that of the rhinoceros, which he described were not very likely "to be taken by maidens" (a reference to scholars' confusion of the rhinoceros with the unicorn, which in legend could be captured only by a virgin). Italian monk Rufinus of Naples wrote a treatise on plants in 1287, which presented them as a subject worthy of study on their own, aside from any moral lessons they might tell and without reference to their medicinal uses.

Natural Science during the Renaissance

With the humanists of the Italian RENAISSANCE of the 16th century came a more widespread return of interest in the classical approach to science, instead of simple acceptance of the facts of the ancients. An example is English naturalist William Turner, who, in 1544, printed a small book devoted entirely to birds; he included the descriptions of Aristotle and Roman writer PLINY THE ELDER of the first century A.D., but added many accurate descriptions based on his own extensive studies.

Artists at this time of the great flowering of Italian Renaissance painting were as devoted to the ideal of close observation and exact depiction of nature as many naturalists; the science of perspective drawing allowed for a realism never seen before. Italian artist, architect, and poet Michelangelo risked criminal prosecution to dissect corpses in an effort to study the muscular structure of the body. Italian artist and architect Leonardo da Vinci, also a talented scientist and inventor, dissected cadavers as well and studied other aspects of natural history, such as the flight of birds. German painter Albrecht Dürer, who made woodcuts for Konrad Gesner's enormously influential encyclopedia, *Historia Animalium* (1551–58), brought scientific drawing to new heights of accuracy.

By the end of the century 16th century, the struggle between the old and new attitudes was in full swing. The latter found its major champion in Italian mathematician, astronomer, and physicist Galileo, an early practitioner of modern science. He, too, explored the physical aspects of the natural world to better understand the theoretical world.

A contemporary of Galileo's was Englishman THOMAS HARRIOT, a geographer, surveyor, and naturalist for the expedition of SIR WALTER RALEIGH to North America in 1585. Harriot helped locate the site for the Roanoke colony and designed its fort. He identified more than 86 species of birds and many trees and shrubs unknown to Europe; in 1588, he wrote the first critical study of the flora and fauna of North America. Harriot was also an astronomer and independently discovered some of the same sunspots as Galileo. He even preceded Galileo (by a few months) in making the first telescope-based drawing of the Moon in 1609; he made the first drawing of sunspots in 1610.

Naturalistic study of lands discovered in the first wave of exploration in the 16th century was mostly carried out by clerics, especially Jesuits such as JOSÉ DE ACOSTA, a Spaniard who traveled to Peru and Mexico in the 1570s–80s. Yet the Protestant Reformation caused the Catholic Church to retreat into an increasingly defensive posture on all fronts, especially intellectual. Heresy was suspected and found everywhere, and in this atmosphere of suspicion Galileo ran afoul of Church authority. His affair had a chilling affect on intellectual endeavor within the church, and, by the 18th century, it had become more common for lay naturalists to accompany exploratory expeditions.

From Descartes to Darwin

A modern approach to science fully came into play only in the 17th century, largely as a result of the work of French mathematician and philosopher René Descartes, who promoted the rigorous separation of the realm of the mind, *res cogitans*, from that of material phenomena, *res extensa*. In 1660, the ROYAL SOCIETY was founded in England by a number of intelligentsia. Its full title—Royal Society of London for Improving Natural Knowledge—indicates how natural science had become an impassioned cause.

In the 18th century—culturally defined in Europe as the Age of Enlightenment, when for many human reason displaced religion as the source of truth and the primary force for good in the world—the stream of discoveries of new species of plants and animals became a flood. Naturalists now were traveling to many areas of North and South America, Africa, Asia, and the Indian and Pacific Oceans, and the lands they found, vastly different from those of Europe, were profoundly changing Europeans' worldview, enlarging their sense of the scope and variety of the life-forms of Earth. There was a pressing need for a truly universal system of classification of species. Carl Linnaeus, a Swedish

physician and botanist, was one of those in the forefront of carrying out and promoting expeditions of naturalistic study. In 1731, he mounted a solo botanical and ethnographic expedition to Lapland. He became a professor at the University of Upsalla in 1741; during his tenure there, he arranged for many of his students to accompany voyages of discovery. Perhaps his most famous student, fellow Swede DANIEL CARL SOLANDER, was assistant to British naturalist SIR JOSEPH BANKS on Captain JAMES COOK's CIRCUMNAVIGATION OF THE WORLD in 1768–71. The expedition, backed by the Royal Society, brought back the first plant collections from Australia and the South Pacific to Europe. Solander introduced the Linnaean system into Britain and was a pioneer in its use to classify new species. Banks and Solander recognized that the kangaroos, wallabies, and other marsupial mammals were fundamentally different from and more primitive than placental mammals. JOSEPH-PHILIBERT COMMERSON, a French physician, studied for many years with Linnaeus; he later accompanied LOUIS-ANTOINE DE BOUGAINVILLE on the first French circumnavigation of the world in 1766–69 and sent back to France more than 5,000 specimens of plants and animals, most of them hitherto unknown to science.

Early on, Linnaeus had seen the need for an improved system of classification and, in 1735, he had published the first slim volume of his *Systema Naturae*, which later would grow to many volumes. Paradoxically, since his system would ultimately facilitate 19th-century British naturalist CHARLES ROBERT DARWIN in his development of the theory of natural as opposed to divine selection, Linnaeus's basic conception of the study of nature was that it furnished a natural theology whereby one could learn about God's wisdom by studying His creations. But his system of classification was based not on moralistic judgments about species but on their physical characters; beginning with plants, he used the number and arrangement of their reproductive organs to classify them. In the end, this approach proved unworkable, and his lasting contribution was to group organisms not only as species sharing common characteristics, which Aristotle had done, then species into genera, but also into higher groupings: genera were grouped into orders, orders into classes, and classes into kingdoms. Formerly, species had been grouped as, for example, those which lived in water, or domesticated species; thus, fish and whales had been considered to occupy the same grouping. The use of common physical characteristics to organize species on all taxonomic levels shifted the focus to familial relationships and inheritance. Based on this concept, Darwin—in the mid-19th century, after his trip around the world on the *Beagle* captained by ROBERT FITZROY—would make his controversial identification of humans, apes, and monkeys as belonging to the same order, Primates, all sharing a single common ancestor. British naturalist ALFRED RUSSEL WALLACE, who had

traveled to South America with fellow naturalist HENRY WALTER BATES and later to Southeast Asia, developed a theory of natural selection independently of Darwin. In the meantime, Darwin's cousin SIR FRANCIS GALTON traveled to Africa and carried out studies in a variety of fields relating to natural science.

An Expanding Field

A listing of some other early observations of phenomena that are now common knowledge—and some of the names of other naturalists involved in making them—gives an idea of the Europeans' enlargement of vision and the shift in sense of their place in the world.

During the same period in which Linnaeus created a new classification system, British naturalist MARK CATESBY studied wildlife in Virginia, the Carolinas, Bermuda, and Bahamas and wrote a two-volume study beginning the practice of interpretative ornithology, published serially in 1731–43. German physician and naturalist DANIEL GOTTLIEB MESSERSCHMIDT, on a 1719 expedition to SIBERIA, found a complete mammoth skeleton, evidence of an extinct species that challenged the creation story of Genesis, which told that all species had been created at one time; for a long time theologians had explained such finds as remnants of creatures destroyed during Noah's Flood. In the 1730s–40s, during Danish VITUS JONASSEN BERING's explorations of Siberia, the Kamchatka Peninsula, the Aleutians, and Alaska on behalf of Russia, Germans JOHANN GEORG GMELIN and GEORG WILHELM STELLER and Russian STEPAN PETROVICH KRASHENINNIKOV participated as naturalists and conducted organized studies of the wildlife and indigenous peoples of those regions for the first time. In 1735, French scientist and cartographer CHARLES-MARIE DE LA CONDAMINE went to South America as near to the EQUATOR as possible to make measurements that would help ascertain whether Earth was flattened there or at the NORTH POLE and SOUTH POLE, as adherents of 17th- to 18th-century British mathematician and physicist Sir Isaac Newton insisted; a simultaneous expedition to Lapland proved the latter. La Condamine also became one of the first Europeans to encounter the material now known as rubber. German naturalist JOHANN REINHOLD FORSTER, who accompanied James Cook on his second voyage to the Pacific in 1772–75, pioneered the study of comparative anthropology in studying South Pacific islanders. He also collected specimens of king and emperor penguins, a type of bird utterly unknown in Europe and worthy of inclusion in the medieval bestiaries for their strangeness, and carried out some of the earliest oceanographic studies, measuring differences in surface and subsurface temperatures (see OCEANOGRAPHY AND EXPLORATION).

In the 19th century, before Darwin's great accomplishments, German naturalist GEORG HEINRICH RITTER VON

LANGSDORFF, during a Russian expedition to the Pacific headed by ADAM IVAN RITTER VON KRUSENSTERN in 1803–08, discovered that ocean phosphorescence was caused by tiny microorganisms. German botanist CARL FRIEDRICH PHILLIPP VON MARTIUS was the first European to see the giant rain forest trees of the upper AMAZON RIVER in his South American expedition of 1817–20. French naturalist ALCIDE-CHARLES-VICTOR DESSALINES D'ORBIGNY's study of micro-fossils in South America in the 1820s–30s laid the foundations for stratigraphic paleontology. German naturalist and geographer ALEXANDER VON HUMBOLDT, active at the same time, was notable for going beyond simply collecting and observing natural phenomena, applying his knowledge of physical processes to interpret what he found. He was among the first to use isotherms, lines on a map connecting locations with the same temperature at a given time, comparable to lines on a topographic map, to get a larger picture of climate patterns and their relationship with altitude. He made important studies of ocean currents and of magnetic intensity in relation to proximity to the equator.

A number of painters contributed to natural history and exploration both (see PAINTING AND EXPLORATION). Some of them were part of expeditions, assigned the task of creating visual representations of native peoples, flora, and fauna; British painter JOHN WEBBER, for example, sailed with James Cook in 1776–80. Others, such as American GEORGE CATLIN, who painted Native Americans in North America and South America in the mid-19th century, traveled alone.



With explorations of the most remote regions of Earth—such as the interior of the Antarctic continent starting in the early 20th century, and the ocean depths in the mid-20th century—new natural science studies were undertaken using ever more sophisticated instruments and techniques. Moreover, in the 20th century, natural science became a cooperative venture. During the INTERNATIONAL GEOPHYSICAL YEAR, for example, an 18-month period from July 1957 to December 1958, designated for cooperative study of Earth's geophysics, scientists from 66 nations participated. Part of the effort was in SPACE EXPLORATION, humankind's latest exploratory endeavor, which also combines physical and scientific exploration.

navigation and exploration

Navigation is the art, science, and technology of finding the position of a craft and charting a course for that craft from one point to the other. The term originally referred to directing the course of watercraft, but it has come to be applied to maneuvering aircraft as well. The history of navigation reflects the history of science and technology from ancient times to the age of SPACE EXPLORATION.

Early Navigational Techniques

Much of ancient navigation was in sight of land, that is, “coastal navigation.” Ancient seafarers in oceans, seas, and lakes around the world used coastlines and their landmarks—mountain peaks, rocks, trees, or waterways—to determine location. They gave these landmarks colorful names to help remember them. Yet they used other methods as well. When out of sight of land, they could use the position of the Sun in the daytime and the stars at night to help steer a course, an early form of “celestial navigation.” They measured the depth of water with sounding poles, perhaps the earliest navigational tool. They also used “adventitious aids,” as they are called, based on knowledge passed from generation to generation of seafarers: knowledge of winds, water depth, tidal streams, currents, reefs, shoals, and the habits of birds, fish, and sea mammals. The kind of waves, long and rolling or short and sharp, could give them an idea of direction based on knowledge of how, for example, westerly or northerly winds in a given region affect the sea as a result of the water depth and the positions of surrounding landmasses. The color of water could indicate to them when they were in a current or particular sea channel or over a fishing bank.

Navigators of the Mediterranean

Peoples of varying civilizations became skillful navigators of the MEDITERRANEAN SEA and adjoining waterways, the NILE RIVER, the RED SEA, and the Black Sea. Some among them reached the Indian Ocean and Atlantic Ocean as well. The Minoans and Egyptians and later the Phoenicians, Greeks, and Romans all developed a seagoing tradition and made use of the type of oar-propelled boat known as the GALLEY (see EGYPTIAN EXPLORATION; MINOAN EXPLORATION). They followed coastlines when convenient but also came to venture into open waters. The Phoenicians and their offshoot, the Carthaginians, were the most wide-ranging of the ancient travelers and were even hired by other peoples for their services at sea (see CARTHAGINIAN EXPLORATION; PHOENICIAN EXPLORATION). They traveled into the Red Sea and may have even circumnavigated Africa. Historical record indicates that the Carthaginians passed through the Strait of Gibraltar (see GIBRALTAR, STRAIT OF) into the Atlantic Ocean. It is known that they navigated by the NORTH STAR, the most basic technique of celestial navigation. But there are references to constellations as aids to navigation in ancient writings. As early as about the ninth century B.C., according to Greek poet Homer, who may have lived then, in his epic poem the *Odyssey*, Odysseus was instructed by the gods to “keep the Great Bear on his left” when sailing from Calypso's Island.

The Greeks created the PERIPLUS as early as the sixth century B.C., and the Romans continued to use it (see GREEK EXPLORATION; ROMAN EXPLORATION). Periplus began as accounts of voyages, then evolved into sailing guides, describing

landmarks, harbors, anchorages, watering places, winds, and currents of waterways. Through them, knowledge could be passed among mariners from generation to generation.

The Greeks are also credited with founding the science of geometry, the principles of which came to be applied to navigation, and inventing the *ASTROLABE*—a device for determining the angle of celestial bodies and latitude—possibly in the third or second century B.C. *HIPPARCHUS* of the second century B.C., who cataloged about 1,000 stars, may have been the inventor. It used a sighting arm to point toward a given celestial body and a plumb line to determine the horizon plane, which would be perpendicular to the plumb line. However, it was used more for theoretical studies and did not become widespread as a navigational tool for centuries, after being reinvented by the Arabs.

Navigation During the Irish Age of Saints

The earliest transoceanic voyages of exploration by Europeans were carried out by Irish monks beginning in the sixth century A.D. Written accounts of *SAINT BRENDAN* perhaps attribute to him collective sea experiences of a number of Irish mariners, and the actual location of *SAINT BRENDAN'S ISLE* is not known. There is more reliable information about the travels of Saint Columba, the founder of Iona, and the monks of the many monasteries he and his followers founded. Abbot Adamnan of Iona, writing in the next century, documents some of these journeys, including four ocean pilgrimages. One of these was led by a monk named Cormac, who was searching for a deserted island on which to settle; Cormac sailed in his *CURRAGH* for 14 days and nights straight out to sea with a south wind until, it seemed to him, he had traveled “beyond the limit of human wanderings.” Another monk, Baitan, reportedly traveled a great distance in stormy seas. It may have been during such a voyage as these that the Faeroe Islands were reached, perhaps in the seventh century. The Faeroe Islands were the first overseas landmass unknown to the Greco-Roman world reached by Europeans. Irish monks eventually traveled even farther into the Atlantic and reached *ICELAND*, possibly as early as A.D. 795. Once these islands were colonized, traffic was carried on between them and the British Isles, which obviously required considerable navigational skills. The fact that the monks were out of sight of land for two weeks implies that they steered by Sun and stars. According to Faeroese tradition, the monks avoided sailing during the months with “luminous nights”—that is, during summer when at high latitudes the stars are invisible in the nightlong twilight.

According to some accounts, Irish seamen listened for the roar of breakers to tell them of land nearby or watched for land birds such as falcons; they may have guessed at the existence of Iceland by observing migratory land birds flying out to sea beyond the Faeroes. Certain peaks could serve as landmarks for the starting point of a voyage, with traditional

sea lore to tell them what to expect when sailing in a given direction from that point.

Vikings

The techniques practiced by the Irish were also practiced by the Vikings, who began raiding the coasts of Europe toward the end of the eighth century in a type of galley ship known as the *LONGSHIP* (see *VIKING EXPLORATION*). In later centuries, they navigated westward, eventually reaching North America. It is possible that the Vikings learned much about the waters to the west from the Irish whom they displaced. Accounts of the earliest Viking voyages to the Faeroes and Iceland say nothing about their discovery, indicating that they were already known to mariners.

Vikings used the shorelines of Scandinavia as an approximate north-south reference for bearing, with east-west determined by sunrise and sunset. They referred to lands to the east as “Land-North” or “Land-South,” corresponding to northeast and southeast; and seas to the west as “Out-North” and “Out-West,” corresponding to northwest and southwest. They also used a type of sundial known as a Sun-measuring disk or shadow board, which floated in a tub of water to keep it level. It was marked with concentric circles and had an adjustable center pin—a *GNOMON*—which would be raised or lowered based on the height of the Sun at different times of the year. The shadows cast on the circles on which were marked the above directional points helped determine latitude.

Adventitious aids included patterns of fog in relation to landmasses. Moreover, a luminous white sky could indicate the presence of snow-covered land or *DRIFT ICE* below. Another phenomenon of Arctic regions that may have shown them lands far out to sea is the Arctic mirage, which occurs when an air mass rests on an ocean surface of colder temperature, causing the image of objects viewed through it to be displaced optically upward, so that distant lands or ships normally below the horizon can be seen. They also released ravens to determine distance. Whether a bird flew back in the direction of the starting point, or to the ship, or in the direction where they were heading helped determined distances to landmasses.

Polynesians

The Polynesians, inhabitants of the islands of Polynesia in the South Pacific, are thought to have originated in the Malay Peninsula of Southeast Asia. Sometime after the second century B.C., invasion of the peninsula by Malays drove the proto-Polynesians out to sea. Over a period of many centuries until about A.D. 1000, they settled on many Pacific islands, including the *HAWAIIAN ISLANDS* and *NEW ZEALAND* (see *POLYNESIAN EXPLORATION*).

Polynesians utilized celestial navigation and adventitious aids. Their techniques, which they referred to as

“wayfinding,” made use of the horizon, using the rising points of the stars and terrestrial markers, supplemented by observations of the Sun, Moon, and ocean swells. They had knowledge of the “houses of the stars” (some 220 known and named). Certain stars were “on-top” stars to them, in that they were directly above certain landmasses, such as Sirius over Tahiti or Arcturus over Hawaii. They had sidereal compasses, devices with a pointer that could be aligned to a particular star to set a course. They also judged direction by the Sun’s rising and setting, using the color of the Sun’s path on the water to gauge how long it was after sunrise—as the Sun rose its usefulness as a direction finder diminished. At sunrise the direction of waves would be noted and used to determine bearing after the Sun had risen too high. Even when it was too dark to see and clouds hid the stars, skilled navigators could tell the run of the seas by feeling the impact of waves on their vessels (a CANOE, or a canoe with a float or double canoe known as an OUTRIGGER). Like the Vikings, the Polynesians used a known point of departure with information about their subsequent course, which they had memorized. They stayed aware of their speed and took into account each change of course. The Polynesians also made charts from palm sticks tied together with coconut fiber, with shells threaded on the sticks to represent islands.

Arabs

During the Middle Ages, Arabs sailed the waters of the Mediterranean Sea, the Red Sea, and the Indian Ocean in a type of LATEEN RIG craft known as the DHOW (see MUSLIM EXPLORATION). They used the age-tested techniques of mariners before them. Yet they developed new methods of determining location, some of it for navigating desert regions. They gathered significant knowledge in the science of astronomy. In about A.D. 700, Arab Muslims reinvented the astrolabe to measure the angle of celestial bodies and thereby determine latitude. But since it had to be stabilized, they used it primarily on land.

At sea, Arabs were more likely to use a device they called the *al-kemal*, for “the consummation,” also known as a “guiding line.” A rectangular piece of horn was held at arm’s length with its bottom lined up to the horizon. It was then moved toward the user until the North Star was aligned with the top. A cord from the center of the rectangle was then placed on the user’s nose. The knots, which represented points of latitude, were then counted.

Chinese

Since ancient times, the Chinese also practiced coastal and celestial navigation in their boats of the JUNK design and came to know the waterways of Asia’s coastlines, along both the Pacific and Indian Oceans (see CHINESE EXPLORATION). The Chinese are credited with inventing the magnetic COMPASS. Sometime before A.D. 1040, they discovered that an iron needle rubbed on a lodestone (a variety of magnetite

with natural magnetism), if allowed to float freely on water on a piece of straw, would always point to the same direction (the Chinese aligned their compasses to the south). But the Chinese themselves did not use the compass for navigation but for feng shui, a practice which assigns spiritual properties to the four different directions; the compass was used to align buildings in the most propitious direction. It is thought that they first introduced the compass to Arabs, who in turn passed it to Europeans, who developed it in the 13th and 14th centuries.

Application of Mathematics to Navigation

The crucial and fundamental difference between the navigational methods of European explorers and those of their predecessors lies in the use of mathematics and, in particular, geometry to describe Earth and the movements of celestial bodies. The word *geometry* means the measurement of Earth; the study of geometry began with the ancient Greeks. The tendency of Greek philosophers and later European navigators trying to fix their position, rather than amassing large amounts of particular data on winds, currents, and landmarks of a given region, as the Irish, Viking, and Polynesian navigators had done, was to resort more to general principles. The concepts of geometry freed European navigators from the limitations experienced by early practitioners of celestial navigation, that is, of only being able to use the Sun’s position at sunrise and sunset (since the angle in relation to the horizon that the Sun travels through on its daily cycle is different at each latitude and in each season). The principle that its course describes a circle parallel to that of the EQUATOR allowed Europeans to calculate their position in terms of latitude at any time of day. The concept of LATITUDE AND LONGITUDE, in effect, allowed navigators to view Earth from a vantage point above the celestial sphere and predict with precision the flight of Sun and stars as they revolved around Earth.

The European Age of Exploration

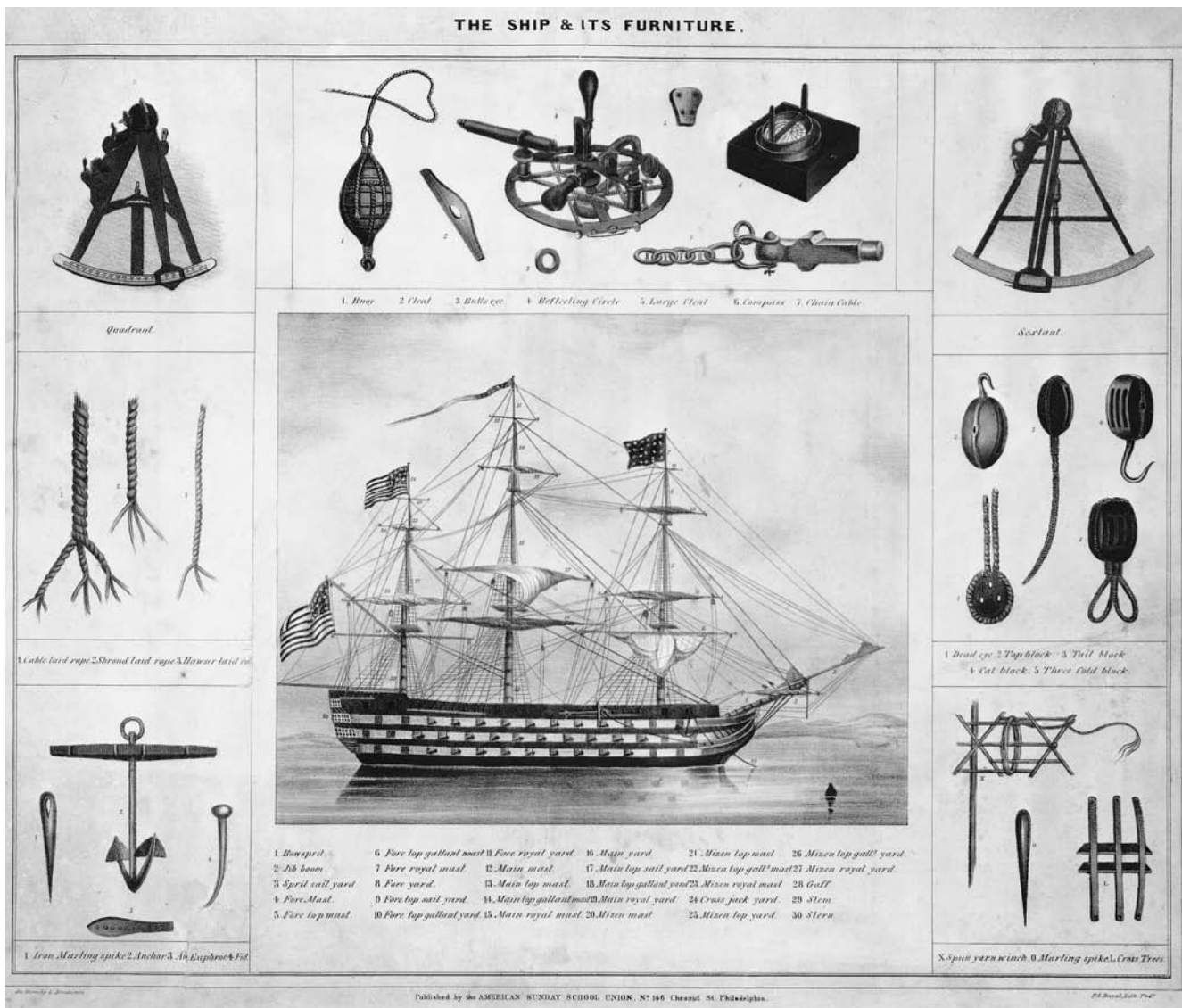
The RENAISSANCE—the cultural period beginning in the 14th century and marking the end of the Middle Ages—in Europe saw great advances in navigational methods and technology and helped inspire the EUROPEAN AGE OF EXPLORATION from the 15th century to 17th century. In the early 1400s, HENRY THE NAVIGATOR founded an observatory and a school of navigation at Sagres near Cape St. Vincent in southwestern Portugal, bringing together astronomers, mapmakers, and mariners. Among the projects was the development of the type of ship known as the CARAVEL—which combined elements of European and Arab ships—studying navigational equipment and making maps and charts, improvements on the PORTOLAN CHART first made in the Middle Ages. During the reign of Queen Elizabeth in England in the second half of the 16th century, navigation as practice became organized. New laws of navigation were

established. Trinity House, a guild that had been created in 1514 for the piloting of ships and the regulation of English navigation, was given more powers. HYDROGRAPHY, the studies and charting of bodies of water, received governmental support. Mariners came to have a good understanding of TRADE WINDS and OCEAN CURRENTS.

Meanwhile, navigational instruments were making long-distance sea travel a possibility. The introduction of the compass enabled mariners to determine direction accurately. They used a method of navigation known as DEAD RECKONING, a system of collecting information involving the use of a compass, a sandglass, a measuring line (a chip log—a float with a knotted line attached to it), and a TRAVERSE BOARD (for recording the information), in order to estimate distance traveled east or west. Regarding celestial navigation,

the first instrument used to measure celestial bodies and to determine latitude according to Greek principles was the astrolabe, which was reinvented by Arabs and passed back to Europeans, who further developed it for use on ships. In the early 15th century, the CROSS-STAFF—a staff of wood with a sliding crossbar—was invented in Europe. In the late 16th century, English mariner JOHN DAVIS created a version known as the backstaff—with a reflector enabling the user to take readings of the Sun. He also developed the DAVIS QUADRANT, which incorporated elements of both the astrolabe and the cross-staff.

Developments in geography and cartography, with more and more accurate maps and charts being drafted, also facilitated transoceanic voyages. In the mid-16th century, Flemish cartographer GERARDUS MERCATOR used a new



This lithograph, published by the American Sunday School Union in the mid-19th century, shows a ship and nautical equipment of that era. (Library of Congress, Prints and Photographs Division [LC-USZC4-1942])

cartographic technique to facilitate navigation—the MERCATOR PROJECTION—with directions represented accurately, with lines of latitude and longitude appearing as straight lines intersecting at right angles. By the end of the 16th century, charts showed compass variation and ocean currents.

18th and 19th Centuries

During the 18th century, sometimes defined as the Age of Enlightenment, a growing scientific approach to navigation developed. In the 1730s, the invention of the SEXTANT, a complex device with a mounted telescope and mirror system, made readings of latitude more precise. Its refinement, along with the invention of an accurate timepiece—the CHRONOMETER—also enabled mariners to take readings of longitude, solving the last great challenge of navigation. The 1767 publication of a *Nautical Almanac and Astronomical Ephemeris* (or the *Nautical Almanac*) by the British Royal Observatory at Greenwich, providing astronomical data to aid in navigation also aided mariners (see EPHEMERIS). Englishman JAMES COOK, who traveled in all the world's oceans in the second half of the 18th century, exemplifies the skilled navigator and hydrographer of the period. His expeditions were scientific as well as geographic endeavors, with scientists participating and conducting a variety of experiments.

In the 19th century, existing navigational methods and equipment became more and more refined. An example of a technological improvement was the patent log—a small rotor towed behind the ship's stern, the revolutions of which were counted—to replace the chip log. Also, in the 19th century, the discipline of oceanography, which, like techniques of navigation, had been developed over centuries, was coming into its own as a scientific and organized field of study (see OCEANOGRAPHY AND EXPLORATION).

Electronic Navigation

In the 20th century, new navigational systems were developed making use of electronic technologies. Radio direction finding—determining location by sending out radio beacons—was the first form of electronic navigation, for ships in 1911 and for airplanes in 1924. Another major breakthrough was radar (for *radio detecting and ranging*), developed simultaneously in several countries in 1935–40. Radar detects the position, motion, and nature of a distant object by means of radio waves reflected from its surface. In addition to navigation, radar has been used in geographic, astronomical, and meteorological studies, as well as in military applications. Sonar (for *sound navigation ranging*), a form of electronic depth sounding, is based on the reflection of underwater sound waves. Loran (for *long-range navigation*) is a specific radio navigational system used to guide ships and aircraft to their destinations. It measures the time-of-arrival difference between two electronic pulses broadcast from two different ground stations. The system became

widespread in the 1960s–1970s. The more recently developed inertial guidance systems allow navigation without contact with a ground station by means of an inertial navigator device consisting of a GYROCOMPASS (to measure direction), an accelerometer (to measure changes in speed and direction), and a computer. Such systems are often used in a SUBMARINE, aircraft, or spacecraft. Another development has been computerized electronic charts and electronic plotting tools.

SATELLITE technology has further revolutionized navigation. The U.S. Department of Defense initiated what was originally known as the Navstar Global Positioning System (GPS) in 1973 and still manages it. But GPS—and similar systems, such as GLONASS (the Global Orbiting Navigation Satellite System), developed by the former Union of Soviet Socialist Republics (USSR; Soviet Union)—has been used for many applications besides military and, in fact, has become the primary system of navigation. As 24 satellites orbit 10,000 miles overhead, their atomic clocks are monitored for almost perfect accuracy. With a GPS receiver, it is possible to determine one's exact position anywhere on Earth, at any time and in any weather. The ancient Greeks' metaphorical view of Earth from beyond the celestial sphere, which enabled them to devise their latitude and longitude system, has thus become a reality.

New Zealand

New Zealand is a country in the South Pacific Ocean to the southeast of Australia, part of the region referred to as OCEANIA. It is composed of two main islands—North Island and South Island—as well as numerous smaller islands in surrounding waters, including Great Barrier Island in the north and Stewart Island to the south. The total land area is 104,454 square miles. The Chatham Islands, 536 miles to the east, are also New Zealand territory. Both North Island and South Island are mountainous, with some active volcanoes and hot springs. The Southern Alps on South Island extend nearly the entire length of the island. Seventeen peaks in that range exceed 10,000 feet; Mount Cook is the highest at 12,316 feet above sea level. North Island contains New Zealand's largest lake, Lake Taupo, 234 square miles, from which flows the country's longest river, the Waikato. Much of New Zealand's coastline is irregular, especially that of North Island; South Island has deep fjords in the southwest, however. With its temperate climate, New Zealand is hospitable to a variety of plant and animal species, some of which are unique to the island due to prolonged isolation from other landmasses.

The Maori

The oldest human inhabitants of New Zealand are the Maori, a subgroup of the Polynesians (see POLYNESIAN EX-

PLORATION). They call their homeland Aotearoa. According to Maori legend, their original ancestors arrived by *OUTRIGGER*, a type of *CANOE*, in New Zealand in around A.D. 950, led by a mariner, *KUPE*. Legend also holds that, several generations later, Maori arrived in a fleet of outriggers and colonized Aotearoa. The legends are impossible to authenticate, but it has been proven archaeologically that Maori reached New Zealand by about 1200. The majority settled on the coasts and rivers of North Island, but spread to South Island as well. A second wave of migration, probably from Tahiti, occurred in the 1300s.

Early European Explorers

Dutchman *ABEL TASMAN* is credited with the European discovery of New Zealand, sighting the west shore of South Island on December 13, 1642. He named the land *Staten Landt*, believing he had reached the coast of South America explored by fellow Dutchman *WILLEM CORNELIS SCHOUTEN* several decades earlier. The Dutch were attacked by Maori tribesmen, who rammed their scouting boats with war canoes. Four crew members were killed. Unable to obtain fresh water, Tasman continued his journey, locating the Fiji Islands to the north.

The next European visitor to the islands was *JAMES COOK*. In October 1769, on his first expedition to the Pacific for England, he came upon North Island and spent some time exploring its coastline. Sailing from the east to the west shore, he conducted the first mapping of the island. In January, after entering what became known as Cook Strait, he realized that New Zealand was made up of two large islands, a fact unknown to Tasman. Cook then circumnavigated South Island, but came to some false conclusions of his own. He believed Banks Peninsula to be an island and Stewart Island to be a peninsula. The Maori were hostile to him as well, and expedition members spent little time on shore. Cook would make three more visits to the islands between 1769 and 1777.

The coastlines were charted by various British mariners in the early 19th century. Owen Folger Smith charted the Foveaux Strait, between South Island and Stewart Island, in an expedition of 1803–04. Then, in 1809, William Stewart charted Stewart Island's coasts. A Captain Chase of the *Pegasus* corrected Cook's error concerning Banks Peninsula on trying to sail around the supposed island.

As Australia came to be settled, interactions between that continent and New Zealand increased. The Maori recognized the advantages of European technology, trading food, water, and labor for guns and powder from whaling vessels, which would stop for repairs and provisions at the Bay of Islands on the northeast coast of North Island. Their relations with Europeans continued to be volatile, however. In 1809, a British ship named the *Boyd* arrived in Whangaroa Harbor to collect timber. A Maori boy reported to

tribal members that he had been treated harshly while visiting the ship. In retaliation, the Maori lured the captain and crew of the vessel to their *pa* (a fortified village) to share in a harvest and attacked and killed 70 men in all. The crew of a British whaling ship exacted revenge, destroying the *pa* and killing all the villagers.

Other nations launched scientific expeditions to the Pacific, stopping at New Zealand, such as a Spanish expedition under *ALESSANDRO MALASPINA* in 1789–94. During his expedition of 1826–29, Frenchman *JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE* made a study of New Zealand wildlife along Cook Strait, becoming the first known European to see the kiwi bird in its native habitat. D'Urville Island to the north of South Island is named for him. Frenchman *ANTOINE-RAYMOND-JOSEPH DE BRUNI*, chevalier d'Entrecasteaux, during his expedition of 1791–93, also sailed along New Zealand's west coast. A British expedition to southern waters in 1839–43 under *SIR JAMES CLARK ROSS* stopped over at the Bay of Islands, where naturalist *SIR JOSEPH DALTON HOOKER* collected more than 1,700 plant specimens.

Missionaries

The exploration of much of New Zealand's interior, especially on North Island, was undertaken by British missionaries. In December 1814, *SAMUEL MARSDEN*, the chaplain of New South Wales in Australia, arrived at the Bay of Islands with a handful of followers and two Maori chiefs. Marsden explored the interior of North Island on foot, traveling between Bay of Islands and Waitemata Harbor, covering some 400 miles and preaching to the Maori. Duties in Australia interrupted his mission work, but he had a great impact on the Maori with the force of his personality. He also inspired other missionaries, such as *WILLIAM COLENSO*, Thomas Chapman, and Henry Williams, who braved the rugged terrain and treacherous rivers to reach remote villages. *WILLIAM WILLIAMS*, the brother of Henry Williams, made the first south-to-north crossing of the North Island. On this journey, he located the hot springs near Lake Taupo.

Colonists

After a number of unsuccessful attempts to establish permanent colonies in New Zealand, a new effort was undertaken by Edward Gibbon Wakefield. He had founded the New Zealand Company in order to apply the principles of "scientific colonization," which had been useful in the settlement of southern Australia. Purchasing large tracts of land from the Maori in the southern part of North Island in 1840, he founded the town of Wellington on Cook Strait, which would prove to be New Zealand's first permanent settlement. Also in 1840, Wakefield signed the Treaty of Waitangi with 50 Maori chieftains, agreeing that they could keep possession of their lands if they acknowledged the colonial

sovereignty of Great Britain. Wakefield was dedicated to exploration as well as profits and sponsored expeditions by Ernst Dieffenbach, a professional naturalist. Among Dieffenbach's achievements was the scaling of the 8,260-foot-high Mount Egmont (*Taranaki* to the Maori) on the western end of North Island, a feat he accomplished without Maori guides, who considered the peak sacred.

The search for the best farmlands had begun. Working for the New Zealand Company, Charles Kettle and Alfred Wills found an ideal expanse of grazing land around Lake Wairarapa northeast of Wellington in 1842. Colonists soon established large sheep ranges in the area. On South Island, that same year, the settlement of Nelson was founded. The best land was located along the Wairau River flowing into Cook Strait. As more and more British colonists arrived and violated Maori land rights, the Maori offered resistance. In 1843, after their protests were ignored, they attacked the colonists of South Island, killing 22 of them and suffering the loss of five of their own, beginning the First Maori War, which lasted until 1848. The Second Maori War took place in 1860–70.

Thomas Brunner

The best-known explorer of South Island was THOMAS BRUNNER, also in the employ of the New Zealand Company. In 1843, he carried out the first European explorations of the island's interior, heading southward from Tasman Bay to the Richmond Range. In 1845, Brunner, Charles Heaphy, and William Fox were sent to find arable land to the south of Cape Foulwind. With the help of Maori guide Ekuhu, they pushed through dense forest and negotiated steep mountains to reach Lake Rotoroa. Brunner began his most arduous trek in 1846. This time, with Ekuhu and another Maori and their wives, he set off to follow the Buller River to its mouth, to continue southward along the west coast of the island, and then to return by another route. The expedition began at a promising pace, but then, heavy rains, fog, and a paucity of game brought great hardship. After reaching the end of the Buller, Brunner explored the little-known coastline to the Grey River. He followed the Grey upstream, then crossed the Southern Alps. Brunner suffered a twisted ankle, blindness, and paralysis, causing the party to stop for rest on several occasions. The explorer rallied his forces, however, and returned to the west coast, where he continued southward to Tititira Head. The trip, which came to be known as "The Great Journey," took 550 days. Soon afterward, the region was colonized and became productive farm country.

Late 19th Century

In the latter part of the 19th century, sheep raising and gold mining provided income for most colonists. During the 1890s, after many of the farmlands had been settled, the

most intimidating regions of South Island were explored by Charles Douglas. In the province of Westland, to the west of the Southern Alps, is an area of New Zealand's highest mountains and glaciers. Douglas, who had been born in Scotland, spent 40 years of his life exploring these mountains and sometimes doing surveying work for the government.



New Zealand's colonial status was formally terminated in 1907. Like its neighbor, Australia, it is now a self-governing member of the Commonwealth of Nations. Its capital, Wellington, is located on the southern end of North Island. Auckland, also on North Island, is New Zealand's largest city. Christchurch is South Island's largest city. Most New Zealanders live in coastal cities.

Niger River

The Niger River is the great river of West Africa, 2,600 miles in length, the third-largest river in all of Africa. From a plateau in the Republic of Guinea, it flows northeastward into Mali, where it forms an inland delta of channels, lakes, and swamps. Just past the city of TIMBUKTU, the Niger bends to the east, and then to the southeast in the Republic of Niger. It meanders on its course through Nigeria, where it forms the largest coastal delta in Africa, spanning almost 120 miles, emptying into the Atlantic Ocean at the Gulf of Guinea. The Niger's drainage basin is about 808,000 square miles.

Due to its length and the nature of its course, the Niger held long-term mysteries for explorers of Africa. Not only was its source unknown, its direction and even its delta were obscure. Answering these questions involved many, largely English, expeditions, and the untangling of much misinformation. These expeditions were undertaken from the late 1700s to the mid-1800s. The exploration of the Niger was largely a matter of geographic curiosity, for trade had been carried out in the surrounding regions by other means for centuries.

Riddle of the Niger

The Niger was known to Europeans as early as the fifth century B.C. Relating the stories of travelers in North Africa who saw a river flowing to the east, Greek historian HERODOTUS speculated that this was the source of the NILE RIVER. The name Niger can be traced to the writings of PLINY THE ELDER, a Roman of the first century A.D., and hellenized Egyptian PTOLEMY of the second century, who called it the *Nigris*, Latin for "black river." During the Middle Ages, Arab geographers described the river as forming the southern border of the SAHARA DESERT. They, too, confused the Niger with the Nile. They also helped to create the confusion concerning its direction. ABU AL-QASIM IBN ALI

AL-NASIBI IBN-HAWQAL had correctly stated the general direction from west to east in the 10th century, but ABU ABD ALLAH MUHAMMAD ASH-SHARIF AL-IDRISI contradicted him several hundred years later. LEO AFRICANUS, who actually visited the Niger in the early 1500s, perpetuated the error in his book, *Description of Africa* (see MUSLIM EXPLORATION).

As information on the Niger filtered into Europe, so too did descriptions of the places surrounding the river. In 1352, Arab traveler ABU ABD ALLAH MUHAMMAD IBN BATTUTAHA ventured from Fez in North Africa, across the Sahara, to visit the kingdom of Mali when it was at its peak. His writings included information on gold as well as educational systems. Leo Africanus, during his visit to the region, made a trip to Timbuktu and described in enthusiastic terms the variety of trade goods, the bustle of activity, and the high value placed on books in the city. Europeans had known of the gold trade, conducted by the camel caravans of the Sahara, but the origin of the gold was a carefully guarded secret. News from the Niger Basin focused attention on such riches. Still, Europe could not hope to challenge the entrenched Muslims of the western Sudan. If they were to take a share of the gold trade, another approach would be necessary. The Portuguese, who began exploring the West African coast in the 15th century, with expeditions sponsored by HENRY THE NAVIGATOR, prince of Portugal, did succeed in gaining access to gold through the Gambia and Senegal Rivers, and on the Gold and Ivory Coasts. Other countries, such as England, Spain, France, and the Netherlands would soon launch expeditions to the region.

18th Century

Geographic theories concerning the Niger abounded in England in the late 18th century during the Age of Enlightenment. English geographer James Rennell postulated that the river must empty into a large inland lake. Others continued to support the idea that it was the western tributary of the Nile, including the high-ranking British navy officer SIR JOHN BARROW. Another popular theory of the day, held by Scotsman MUNGO PARK among others, was that the Niger formed an estuary that emptied into the CONGO RIVER (Zaire River). Park theorized a series of lakes along the Niger's route, based on the massive quantity of water flowing in the Congo.

Active measures to solve the puzzle of the Niger began with the founding of the AFRICAN ASSOCIATION in London in 1788. The association's first expedition of significance was led by DANIEL HOUGHTON in 1790. He ascended the Gambia River, working westward through hostile territory. In 1791, he sent word of his progress back to England but was never heard from again. Subsequent investigations revealed he had reached a point 160 miles from the Niger, the far-

thest-known European journey into the interior of Africa at that time.

The first European to see the Niger and return to tell about it was Mungo Park. In another African Association expedition, carried out in 1795–97, he set out along the same route and encountered the same intertribal rivalries that Houghton had described. On July 21, 1796, Park came upon the Niger at Segou. Observing its flow from west to east, he settled the question of its course. After a lengthy journey home, during which he was given up for dead, he became an instant celebrity for his findings.

German FRIEDRICH CONRAD HORNEMANN developed a plan to approach the Niger from the Arab enclaves in North Africa and succeeded in also gaining the sponsorship of the African Association. Disguised as a Muslim, he arrived in Cairo in 1797, traveled westward to the oasis at Murzuk, and later southward to Lake Chad. He died of dysentery while on his way to the Niger, having underestimated the size of Africa's interior and misjudging the location of the river.

19th Century

In 1805, Mungo Park returned to Africa to test his theory that the Niger was connected to the Congo. With a group of soldiers, carpenters, and companions, he sailed up the Gambia and trekked overland to Mali. Disease proved devastating to the company, and by the time he had reached the Niger, most of his contingent had died. With the few survivors, he followed the flow of the river. It was later learned that, after much struggle with hostile tribes along the river, his remaining party was finally overwhelmed at the Bussa Rapids.

Because of the regular loss of life on their journeys, the African Association became discouraged and more conservative in backing expeditions. In 1815, the British government sent out two expeditions with the hope of tracing the Niger. The first, under the command of Captain James Kingston Tuckey, was to sail up the Congo, mapping the river and locating its confluence with the Niger. The second, directed by Major John Peddie, was to follow Park's route, taking the Niger to its end. Both expeditions were disasters, with many men dying and little information gathered.

One of the triumphs of this period of exploration was accomplished by RENÉ-AUGUSTE CAILLIÉ. He was a working-class Frenchman with a long-held fascination with Africa. He had traveled there previously with a British expedition in search of Mungo Park. In 1825, he heard that the Geographical Society of Paris was offering 10,000 francs to the person who visited Timbuktu, then returned to report on his findings. Determined to win the prize, Caillié set off eastward from Freetown in Sierra Leone on his quest in March 1827. Arriving at the Niger, he took a CANOE to a point near Timbuktu and reached the city. After spending

two weeks there, he returned to France via a caravan heading northward and was awarded the prize.

There were still many unanswered questions about the Niger. In 1818, the British began a series of expeditions out of Tripoli. The first was led by JOSEPH RITCHIE and GEORGE FRANCIS LYON. After completing the first leg of the journey, from Tripoli to Murzuk, Ritchie died. Lyon gathered information from the area and learned falsely that the Niger emptied into Lake Chad before joining the Nile. The Bornu Mission of 1820–25 failed to accomplish its goal of tracing the Niger but did visit a large section of previously unexplored territory. In 1824, as part of the Bornu Mission, Englishman DIXON DENHAM debunked the notion that Lake Chad was connected to the Niger. In 1826, Scotsman ALEXANDER GORDON LAING reached Timbuktu but was murdered as he returned to the north.

Among the more renowned Englishmen to seek the Niger was HUGH CLAPPERTON. As part of the Bornu Mission, he had been among the first to make a north-south crossing of West Africa and to see Lake Chad. In 1825, he made a novel approach to the river from the Bight of Benin in the Gulf of Guinea. Traveling northward, he found the Niger at Bussa within two months. Continuing to Sokoto, to the northwest of Bussa, Clapperton had the intention of reaching Timbuktu and tracing the course of the Niger to its mouth. This plan was cut short when he died of dysentery in 1827. His cause was taken up by a member of his expedition. In 1830, RICHARD LEMON LANDER returned to the Niger at Bussa and, with his brother John Lander and Hausa guide WILLIAM PASCOE, followed its course southward. They discovered the Niger's major tributary from the east, the Benue, where they were held for a time by natives. On being released, they continued downriver, eventually reaching the Bight of Benin and solving the riddle of the mouth of the Niger.

There were to be many more British expeditions to and along the Niger, for scientific purposes, to promote commerce, and to discourage the SLAVE TRADE, among them one headed by Macgregor Laird in 1832, and one headed by Henry Dundas Trotter in 1841. Both teams traveled up the lower Niger by ship and both suffered a great number of casualties. In a British expedition in 1850–51, headed by JAMES RICHARDSON and ADOLF OVERWEG, only one man survived, HEINRICH BARTH. He explored along much of the Niger's course and studied the tribal societies in the region. In a journey in 1854 to find Barth, WILLIAM BALFOUR BAIKIE explored the Benue River 150 miles beyond the point charted by other explorers.



Today, the Niger River offers a supply of fish and regional transportation to peoples of varying nations.

Through irrigation projects, it also provides water for farmlands.

See also AFRICA, EXPLORATION OF.

Nile River

At 4,160 miles in length, the Nile River of northeastern Africa is the world's longest river. It has two main branches, the Blue Nile and the White Nile. The source of the Blue Nile, the shorter branch to the east, is Lake Tana in the mountains of Ethiopia. The White Nile, the longer branch, originates in Lake Victoria, which sits on the EQUATOR and is bordered by Kenya, Tanzania, and Uganda. The two Niles meet at the city of Khartoum in the center of the country of Sudan, some 1,857 miles from the sea. From there, the Nile winds its way into Egypt, where it forms Lake Nasser, with the help of the Aswan Dam. From the former rapids at Aswan, the river is navigable for 550 miles to the sea. The Nile's outlet to the MEDITERRANEAN SEA is a delta 100 miles long and more than 100 miles wide. This delta represents the majority of the cultivated land in Egypt, the location of one of Earth's oldest civilizations. Carvings dating to between 6000 and 5000 B.C. depict boats on the Nile River, but, until less than two centuries ago, the source of the Nile waters remained a mystery. The search for the source of the Nile is one of the most famous stories in the annals of exploration.

Riddle of the Nile

The Nile was the starting point for the first voyage of exploration in recorded history. In about 2450 B.C., HANNU traveled up the Nile on a trading mission for Egyptian pharaoh Sahure. Near where the Nile becomes impassable, he left the river and traveled overland, eventually coming to the land known as PUNT, where many of Egypt's luxury goods were produced. Trade between the nations was already well established, and Hannu was able to obtain gold, silver, ebony, and incense, and to have boats built to convey these goods back to Egypt via the RED SEA. It is believed the Egyptians used the Nile extensively for internal trade and communication and to learn the art of seamanship (see EGYPTIAN EXPLORATION).

The Greeks would have known of the Nile through their trade with the Egyptians (see GREEK EXPLORATION). When the Romans replaced the Greeks as the preeminent world power, they used Greek middlemen in their trade with the region (see ROMAN EXPLORATION). In 30 B.C., the Romans conquered Egypt and made it part of their empire and, before long, visited parts of the upper Nile in Ethiopia and Sudan while on military campaigns. Also in the first century A.D., Nero commissioned an expedition to find the source of the Nile. His party is believed to have reached the swamplands of the White Nile, the Sudd, where pa-

pyrus grows thick and decaying vegetation makes passage difficult.

Nero's men were the last known Europeans to visit the region until the 1800s. The accounts of both these expeditions and those of Greek merchant DIOGENES, who explored overland into East Africa from the Indian Ocean, are thought to have influenced hellenized Egyptian PTOLEMY. In the second century A.D., the astronomer and geographer described the source of the Nile as the MOUNTAINS OF THE MOON, possibly the Ruwenzori Mountains.

During the Middle Ages, the lands of Ethiopia contained a black Christian community which became isolated from the Arab Muslims to the north (see MUSLIM EXPLORATION). This isolation effectively obscured the origin of the Blue Nile. To the west, the White Nile went on for such a length and disappeared into the equatorial jungle that Arab traders had little inducement to track its source. The next mention of the Nile's sources comes from the 17th-century Portuguese. They came to establish friendly relations with Christians in Ethiopia, whom they associated with the legend of PRESTER JOHN. Spanish Jesuit PEDRO PÁEZ, who was working for the Portuguese, made the European discovery of Lake Tana in the mountains of Ethiopia in 1613. He correctly determined Lake Tana to be the source of the Blue Nile, although the Portuguese policy of secrecy meant his findings were not disclosed.

Growing Knowledge

For much of modern history, credit for the discovery of Lake Tana went to 18th-century explorer JAMES BRUCE, although even he had a hard time convincing skeptical Europeans. He began his search for the source of the Nile by first taking the river to Aswan, then crossing the desert to the east and sailing down the Red Sea to Ethiopia. He reached Gondar, the capital city, in February 1770. It took some time for Bruce to receive permission to travel farther, but, after helping to save the royal family from a smallpox epidemic, it was granted. In November 1770, he located the Springs of Geesh emanating from Lake Tana and named them the "Fountain of the Nile." The following year, he followed the Blue Nile to its convergence with the White Nile, then continued to Cairo. On his return to England, he published his adventures in a five-volume work, *Travels to Discover the Source of the Nile*, but not until after his death in 1794 were his achievements properly recognized.

The first half of the 19th century saw regular explorations along the Nile, but no great breakthroughs. The approach was always the same: Follow the river upstream. Such a strategy became a test of stamina, and the traders and missionaries who made these journeys either lost interest or ran out of supplies. The most successful expedition was conducted by Mehemet Ali, the viceroy of Egypt. Seeking to develop commercial interests in the southern Sudan, Mehemet

Ali led trips in 1839 and 1841, along the Nile, reaching as far as Gondokoro, the last navigable point between the river and its source.

Burton and Speke

The most famous names associated with the search for the Nile's source are SIR RICHARD FRANCIS BURTON and JOHN HANNING SPEKE, both British army officers. After collecting and studying the information from previous expeditions, Burton devised a unique plan to approach the source of the Nile from the east coast of Africa. He surmised that the large inland lakes (supposed to be located over the mountains from the coast of Tanzania), might hold the key to the age-old mystery of the source of the Nile. After recruiting porters and outfitting the expedition in Zanzibar, a small island off the coast of Tanzania, Burton and Speke began their journey in June 1857. SIDI BOMBAY accompanied them as guide and interpreter. Following slave-trading routes, they crossed the mountains and reached the commercial hub of Ujiji on the shores of Lake Tanganyika in February 1858. They were the first Europeans to visit that region. But both men had come down with malaria. Speke recovered sufficiently to explore the lake, but his results were inconclusive. They decided to return to the coast in the summer and agreed to rest in Tabora. Weary from his illness and fed up with Speke's company (the two never did get along), Burton agreed that Speke should search for the other great lake in the region. When Speke reached Lake Victoria in August 1858, he believed he had found the source of the Nile. Because of Lake Victoria's immense size, Speke decided to return to Burton rather than try to bolster his theory with geographic evidence. Speke and Burton reunited in Tabora and then continued on to the coast. According to Burton, Speke promised to keep his findings secret until they both returned to England; nonetheless, Speke, on reaching England several weeks before his leader, announced his theory.

In England, Speke had both champions and skeptics. In 1860, in an effort to resolve the issue of the source of the Nile once and for all, the ROYAL GEOGRAPHICAL SOCIETY sent Speke and JAMES AUGUSTUS GRANT to explore Lake Victoria. In 1860–63, the two men traveled along the western side of the lake to its outlet at Ripon Falls and into Lake Kyoga. From Lake Kyoga, they continued northward overland, crossing the Nile only once on their way to the cities of Juba and Gondokoro. His failure to keep the Nile in sight meant that once again, Speke did not come up with conclusive proof.

Burton and Speke were scheduled to debate the source of the Nile, but a day before their encounter was to take place, in September 1864, Speke was killed in a hunting accident. He left behind a legacy as a careless scientist, yet history proved him correct: Lake Victoria is the true source of the Nile.

Continuing Exploration

While on their own journey of exploration, SIR SAMUEL WHITE BAKER and his wife, FLORENCE BAKER, had come across Speke and Grant. Disappointed that others had already found Lake Victoria's outlet, the Bakers continued on their travels. In March 1864, they came upon Lake Albert and discovered it was fed by Lake Victoria, which in turn fed the Albert Nile section of the White Nile. Returning to England in 1866, Baker was given the ROYAL GEOGRAPHICAL SOCIETY's gold medal and was knighted by Queen Victoria.

Although the major discoveries of the source of the Nile had been made, there was still enough uncertainty to warrant further explorations. German GEORG AUGUST SCHWEINFURTH explored the separation of the Nile and CONGO RIVER (Zaire River) watersheds on his 1868–71 journeys. Scotsman DAVID LIVINGSTONE was convinced that the Lualaba River was part of the Nile River system, and was working on the problem when he died in 1873. (It was later discovered that the Lualaba is actually a tributary of the Congo River.) Anglo-American SIR HENRY MORTON STANLEY tied up many of the loose ends of the Nile watershed during the first half of his 1874–77 expedition. During this trip, he circumnavigated both Lake Tanganyika and Lake Victoria, discovered Lake Tanganyika joined the Congo, and confirmed Speke's assertion that Lake Victoria was the primary source of the Nile. On his mission to relieve the MEHMED EMIN PASHA in 1887–89, Stanley explored Lake Albert and corroborated the discoveries of the Bakers. He also explored the Ruwenzori Mountains, part of the Nile's watershed, which came to be associated with the Mountains of the Moon.



With its great length, variety of terrain it traverses, and long history, the Nile has inspired the human imagination for millennia. As in the past, when seasonal flooding replenished the soil of its banks in Egypt, the Nile continues to sustain life. Today, irrigation systems increase the Nile's productive capacity, and hydroelectric dams generate power for African nations.

See also AFRICA, EXPLORATION OF.

Norsemen See VIKING EXPLORATION.

North America, exploration of

North America is the world's third-largest continent. Situated entirely in the Western Hemisphere and Northern Hemisphere, it is linked to South America by a region referred to as Central America, which is defined by geographers as being part of North America. The Arctic Ocean and HUDSON BAY (which can be considered either an inlet of the

Arctic Ocean or the Atlantic Ocean) lie to its north; the Atlantic Ocean (including the Gulf of St. Lawrence, Gulf of Mexico, and Caribbean Sea, arms of the Atlantic) to its east; and the Pacific Ocean (including its inlet, the Gulf of California) and Bering Sea to its west. The largest of the many offshore islands or island groupings are GREENLAND, the Canadian Arctic Archipelago, the Aleutian Islands, the Alexander Archipelago, Vancouver Island, Newfoundland, and the WEST INDIES. Three modern-day nations occupy North America: the United States, Canada, and Mexico. Mexico and Central America are sometimes discussed as Middle America with regard to their history, and sometimes the West Indies are grouped with them as well.

North America, extending from near the NORTH POLE to near the EQUATOR, embraces every climate zone. Much of the continent has temperate climates suited to human settlement and agriculture. Yet there are extreme desert regions as well, where mountain ranges block rain-bearing westerly winds, such as Death Valley in the western Great Basin in California, the lowest point in North America, at 262 feet below sea level. Mount McKinley (see MCKINLEY, MOUNT) in the Alaska Range of Alaska is the highest point, at 20,320 feet above sea level. The APPALACHIAN MOUNTAINS and Laurentian Highlands of eastern North America are old and eroded ranges; the ROCKY MOUNTAINS extending along much of the western part of the continent are younger and taller. Much of the central part of the continent is prairie country, with the Great Plains sloping up to the Rocky Mountains. Lake Superior is the largest lake in North America, part of the five Great Lakes, which include Lake Michigan, Lake Huron, Lake Erie, and Lake Ontario. The longest river is the MISSOURI RIVER; the MISSISSIPPI RIVER, which it feeds, is the third longest; their waters drain into the Gulf of Mexico. Other major North American rivers include the Rio Grande, which also drains into the Gulf of Mexico; the COLORADO RIVER, which drains into the Gulf of California; the COLUMBIA RIVER and Snake River, which drain into the Pacific Ocean; the Delaware River, Hudson River, and Susquehanna River, which drain into the Atlantic Ocean; the St. Lawrence River, which drains into the Gulf of St. Lawrence; the Mackenzie River—the second-longest river in North America, if the Slave, Peace, and Finlay Rivers are considered part of it—which drains into the Arctic Ocean; and the Yukon River, which drains into the Bering Sea. The wide variety of landscape and climate leads to a wide variety of flora, from tundra to rain forest, with evergreen trees growing on much of the continent, and a wide variety of fauna.

Native Peoples

As is the case with all the continents—except Antarctica, uninhabited until modern-day expeditions—both North America and South America were inhabited by indigenous

peoples in ancient times long before 1492, when they became part of documented world exploration. The migrations of Mongolian peoples out of Asia across a LAND BRIDGE between Asia and Alaska at the BERING STRAIT during the last ice age are sometimes discussed as the first explorations of the Americas. Based on archaeological evidence, it is theorized that Mongolian peoples tracked big game across the land exposed because of lower oceans. The latest estimated time based on archaeological evidence in America, along with DNA and linguistic evidence, is between 15,000 and 18,000 years ago. Possibly other Asian peoples reached the Americas by boat. Descendants of all these travelers—Paleo-Indians—spread throughout the Americas over subsequent generations and became known to peoples of other continents as Indians, or Native Americans, and by their native names or adaptations of native names. Later voyagers, in particular Inuit (Eskimo) and Aleut peoples of the Arctic region, arrived in North America by boat after the land bridge had been flooded.

What is known about Native Americans before the arrival of Europeans in their homelands is based primarily on archaeological and linguistic evidence, with some information gleaned from legends passed down through oral traditions. Regarding population levels in pre-Columbian times, estimates vary considerably, from an approximation of 15 million for the entire continent of North America to as much as 60 million, with Middle America having the majority. The population for the region north of Mexico is estimated at a native population of one to 1.5 million to 10 to 12 million. Aboriginal populations were generally densest where agriculture was highly developed or along coastal areas with marine resources. And rivers and lakes also supported denser populations, in particular the St. Lawrence, the Great Lakes, the lower Mississippi, the upper Missouri, the upper Rio Grande, and the Little Colorado. Conversely, population densities were lowest in extreme environments, such as the Arctic, Subarctic, and Great Basin.

It is also impossible to determine the number of tribes, even for the early post-contact period. The fact that different social groupings are under discussion as “tribes” (i.e., tribe, band, village, city-state, confederacy, and culture) makes such a determination inexact to begin with. Moreover, some peoples perhaps died out before Europeans even reached them, since the first tribes having contact with Europeans may have carried European diseases to them—coastal tribes, for instance, trading with inland tribes (see DISEASE AND EXPLORATION). In any case, native peoples in thousands of different political groupings lived a variety of lifestyles, determined by environment. Subsistence patterns, dwellings, clothing, belief systems, rituals, and social organization all varied significantly. Each group had worked out stable adaptations to their local environments and available resources. Language varied significantly as well. It has been

estimated that there were as many as 2,200 distinct native languages in all the Americas, with as many as 650 in North America, about 350 of those in Middle America.

Scholars have devised a system of culture areas to group the various peoples and tribes together for purposes of study. One such system speaks of the Northeast, Southeast, Southwest, Great Basin, California, Plateau, Northwest Coast, Subarctic, Arctic, Great Plains, Mesoamerica (Mexico), and Circum-Caribbean (West Indies and Central America).

Algonquian-speaking woodland peoples, many of whom were the first Indians to have contact with explorers along the coasts, and Iroquoian-speaking peoples, such as the tribes of the Iroquois (Haudenosaunee) League of Six Nations, lived in the Northeast. In the Southeast, Muskegean-speaking peoples—such as the Chickasaw, Choctaw, and Creek—made up the largest group; the Cherokee, an Iroquoian-speaking people, as well as Siouan-speaking and Timucuan-speaking tribes, also lived in this region. Peoples of both these woodland regions were farmers as well as hunter-gatherers.

What is defined as the Southwest Culture had Athapascan-speaking nomads—the Apache and Navajo (Dineh)—as well as the village-dwelling and farming Pueblo Indians, who spoke a number of different languages. The Great Basin Indians, such as the Ute, Paiute, and Shoshone, were primarily Uto-Aztecan-speaking hunter-gatherers, eking out a living in the harsh, arid landscape.

The densely populated California, Northwest Coast, and, to a lesser degree, Plateau regions had tribes of many different language families and peoples; they were hunter-gatherers, many of who depended heavily on fishing. Northwest Coast peoples were also known for hunting sea mammals. Plateau Indian subsistence involved fishing salmon along the Columbia River.

In the sparsely populated Subarctic region were found Algonquians in the east—the Cree, for example—and Athapascans—the Chipewyan, for example—in the west. The Arctic culture area was the home of the Aleut on the Aleutian Islands, and the Inuit in Alaska, northern Canada, and Greenland; they spoke related languages grouped together as Eskimaleut.

The Great Plains culture area is different from the others in that the typical nomadic way of life of its tribes developed in the 18th and 19th centuries, long after Europeans had reached North America and brought horses with them. Peoples from other regions, speaking many different languages—such as the Siouan-speaking Sioux (Dakota, Lakota, Nakota); the Algonquian-speaking Blackfeet, Cheyenne, and Arapaho; and the Uto-Aztecan-speaking Comanche—took to the use of the horse and, living in portable hide tipis, tracked the buffalo herds. Some tribes classified as part of the Great Plains culture area were a semisedentary people, living in villages for much of the year, but leaving

them to track buffalo; the Arikara, Hidatsa, and Mandan, for example, had villages along the Missouri River with permanent earth lodges as dwellings.

The most powerful people in the densely populated Mesoamerica culture area when Europeans first arrived were the Nahuatl-speaking Aztec. They had developed a complex civilization centered in the Valley of Mexico with cities, the largest being Tenochtitlán, the site of present-day Mexico City, and a class system supported by agriculture. Their extensive empire, which had begun to take shape in the 14th century and which followed the earlier Toltec Empire, included an elaborate trade network and tributary of peoples. The Mayan-speaking Maya, centered on the Yucatán Peninsula, also had developed a highly organized system of city-states supported by farming. They were also found in Central America. Most of the peoples in Central America had more in common with the Arawak (Taino) and Carib of the West Indies, with whom they are grouped in the Circum-Caribbean Culture Area. They lived in autonomous bands united politically and religiously under chieftains. For subsistence, they farmed as well as hunted and fished.

By the time Europeans reached the Americas, some highly organized societies had declined long before. In the Southwest, for example, the Anasazi civilization had fragmented, its peoples becoming ancestral to the Pueblo Indians. The Mound Builders of the east—peoples of the Adena, Hopewell, and Mississippian cultures located along the Ohio and Mississippi Valleys—had also dispersed. The Natchez living at the mouth of the Mississippi are thought to be direct descendants of Mississippian peoples, showing some of the cultural traits by the time Europeans settled among them.

In post-contact times, through all the stages of exploration of North America, Native Americans are part of the story not only with regard to the impact Europeans—and Euro-Americans in later generations—had on them, but also as guides and interpreters. (See NATIVE PEOPLES AND EXPLORATION.)

The Vikings

The Vikings are now credited with being the first Europeans to reach both Greenland and mainland North America (see VIKING EXPLORATION). The traditional Norse literature from the Middle Ages—the “sagas,” as they are known—refer to the discovery and temporary settlement of a place west of Greenland known as VINLAND. Such accounts were treated as legend until 1960, when archaeological evidence at L’Anse aux Meadows in the north of Newfoundland verified a Viking presence. Because knowledge of this land was not passed to other Europeans, there would be still another “discovery” five centuries later.

BJARNI HERJULFSSON is considered the first European to see North America. On a trip from ICELAND to visit his

father in Greenland, in about A.D. 985 or 986, he was blown off course, to the southwest. Although he reported spotting land, some of it wooded and some of it ice-covered—indicating any number of locations along northeastern North America—he did not claim to have made landings before returning to Greenland.

On a follow-up voyage of exploration, LEIF ERICSSON, the son of ERIC THE RED, the first Viking colonizer of Greenland—sailed westward from his new home in about 1001. He came upon and named three different regions: Helluland, after its extreme flatness; Markland, referring to a land of woods; and Vinland, the third, and most southerly. At Vinland, the Vikings built shelters and explored the area. The location might very well have been L’Anse aux Meadows in Newfoundland, or possibly a location in Labrador or Quebec. Ericsson also perhaps reached Nova Scotia, the St. Lawrence Seaway, or even other regions to the south, such as Cape Cod or Chesapeake Bay. In any case, he eventually returned to Greenland, where he lived out his life.

Some years later, in about 1005–07, Leif’s brother, THORVALD ERICSSON, led a colonizing expedition to North America’s east coast and perhaps settled at the same Vinland site. His time in North America was noted for the first contacts with indigenous peoples, whom the Vikings called Skraelingar or Skraelings. These may have been either Indians or Inuit depending on location. THORFINN KARLSEFNI, in about 1010, led still another colonizing expedition to North America’s east coast; the colony lasted until about 1013. The next year, Leif’s half sister, FREYDIS EIRÍKSDOTTIR, who had been part of Karlsefni’s group, joined her husband, Thorvard, in another attempt at a colony, supposedly at the same Vinland site, taking over previously built houses, returning to Greenland the next year after fighting broke out among the colonists.

The various accounts of these voyages vary in different Norse sagas. Nor is there any way to determine the exact location of the various colonies, despite the known Viking site at L’Anse aux Meadows.

European Awareness of the Americas

It is not known if the Vikings had a sense of the vastness of the lands they reached. If they followed the North American coastline southward, they may have conceived of Vinland as even larger than Greenland. However, no such information survived in Europe, and, if it had, later mariners would very likely have believed that the Vikings had reached Asia. Italian mariner and map dealer CHRISTOPHER COLUMBUS was one of several Europeans to devise a plan to sail westward across the Atlantic Ocean to the Orient, and King Ferdinand II and Queen Isabella I of Spain were eventually convinced to sponsor him on such an expedition. In August 1492, Columbus set sail, reaching the West Indies in the Americas the following October 12. Between 1493 and

1502, Columbus led three more transatlantic expeditions, and he explored many of the region's islands and eventually reached the mainland of South America. Although he never saw or made landfall in North America and he insisted until his death in 1506 that he had reached Asia, he began the process that made Europeans aware of the landmasses in the Western Hemisphere and the size of Earth.

On June 24, 1497, another Italian, JOHN CABOT, sailing for England, became the first known European since the time of the Vikings to see North America. Cape Breton Island, the eastern part of present-day Nova Scotia, is thought to be the likely location of a landfall, although he may have landed first on the coast of Newfoundland or even Labrador. He explored parts of northeastern North America and may have navigated as far south as Maine. That same summer, Italian AMERIGO VESPUCCI may have explored along coastal North America from Mexico to Cape Hatteras in present-day North Carolina, but his claim is unsubstantiated. In 1501–02, Vespucci later traveled to South America. In his account of his travels, he was the first to suggest that the lands he had visited were a continent previously unknown to Europeans and applied the term “New World” to the great landmass for the first known time. In 1507, German cartographer MARTIN WALDSEEMÜLLER, using Vespucci's account as a source, applied the Latinized version of Vespucci's first name to the continent of South America.

A Rush of Nations

Soon after John Cabot reached northeastern North America for England, so did GASPAR CÔRTE-REAL for Portugal. He probably reached the west coast of Greenland in 1500. Then, the next year, he navigated as far as the coast of Newfoundland and Labrador. In 1509, John Cabot's son SEBASTIAN CABOT explored North America's east coast from Newfoundland to Long Island, in search of a water route to the Orient—the NORTHWEST PASSAGE.

The Spanish established colonies in the West Indies and fanned out from there, overrunning native lands and expanding their knowledge of both South and North America. In 1513, JUAN PONCE DE LEÓN explored northward to Florida, exploring both its Atlantic and Gulf coasts. That same year, in Central America on the Isthmus of Panama, VASCO NÚÑEZ DE BALBOA became the first European to see the Pacific Ocean from the west coast of the Americas. In 1517, FRANCISCO FERNÁNDEZ DE CÓRDOBA explored the Yucatán, and JUAN DE GRIJALVA explored the east coast of present-day Mexico, which he called New Spain. In 1519–21, Spanish CONQUISTADORES under HERNÁN CORTÉS invaded the Valley of Mexico and conquered the Aztec Indians, establishing a permanent presence in their homeland. The extent of the Americas and the Pacific Ocean beyond became known to Europeans with the Spanish expedition under Portuguese mariner FERDINAND

MAGELLAN in 1519–22. After sailing southward along the coast of South America, he passed through the Strait of Magellan (see MAGELLAN, STRAIT OF) into the Pacific, then followed South America's west coast for a time before crossing the Pacific. After Magellan's death in the Philippines, one of his ships completed the first CIRCUMNAVIGATION OF THE WORLD. In 1528, PÁNFILO DE NÁRVAEZ led a colonizing expedition to Florida. Nárvaez was lost at sea in the Gulf of Mexico, but four survivors, including ÁLVAR NÚÑEZ CABEZA DE VACA and ESTEVANICO, a former slave from North Africa, landed in Texas and proceeded westward, eventually reaching Mexico in 1536, in what is considered the first extensive overland voyage by Europeans in what was to become the continental United States.

Other overland expeditions were soon organized. In 1539, ANTONIO DE MENDOZA, the viceroy of New Spain, sent out Franciscan missionary MARCOS DE NIZA, along with Estevanico, northward from Mexico. They reached as far as the Zuni Indian pueblos in present-day New Mexico, where Estevanico was killed by the Zuni. The Spanish hoped to locate wealth on a par with that of the Aztec as well as that of the Inca Indians of Peru, who had been conquered by FRANCISCO PIZARRO in the 1530s, and, based on Marcos de Niza's reports, believed that the Zuni pueblos were in fact the fabled Seven Cities of CIBOLA. In 1540, a much larger expedition under FRANCISCO VÁSQUEZ DE CORONADO entered the region. Various of his lieutenants explored throughout what was to become the American Southwest and made contact with various Indian peoples. Coronado himself led a contingent onto the southern plains as far as present-day Kansas, but failed to locate the hoped-for riches.

During the same period, starting in 1539, another Spanish expedition under HERNANDO DE SOTO, after landing on Florida's west coast, traveled throughout the American Southeast, crossing the Appalachians and reaching the Mississippi River. On de Soto's death, LUIS DE MOSCOSO assumed command and explored into present-day Texas. The survivors eventually built barges and descended the Mississippi to the Gulf of Mexico and the Spanish settlement of Tampuco in northern Mexico by 1543.

The Spanish also explored by sea northward along the Pacific coast. In 1539–40, FRANCISCO DE ULLOA, sent out by Hernán Cortés, explored the Gulf of California, the mouth of the Colorado River, and the Pacific coast of the Baja Peninsula. In 1540–41, HERNANDO DE ALARCÓN, the seaward portion of Coronado's expedition, organized by Antonio de Mendoza, also explored the Gulf of California and traveled a good distance up the Colorado. In 1542, JUAN RODRÍGUEZ CABRILLO headed a Spanish maritime expedition, sponsored by Antonio de Mendoza, along North America's west coast, reaching what is now northern California. On his death, BARTOLOMÉ FERRELO assumed command and is thought to have reached as far as the

present-day Oregon-California border in 1543. SEBASTIÁN MELÉNDEZ RODRÍGUEZ CERMENHO, in 1595, and SEBASTIÁN VISCAÍNO, in 1602–03, continued Spanish explorations along the California coast, exploring Monterey Bay and elsewhere.

The English explored the Pacific coasts of North and South America as well. In the course of the first English circumnavigation of world in 1577–80, SIR FRANCIS DRAKE reached as far north as Vancouver Island.

In the meantime, the French had also launched expeditions to the Americas. Once again, as was the case with Spain and England, it was an Italian mariner who carried out the first explorations in this part of the world for them. GIOVANNI DA VERRAZANO explored North America's east coast from present-day South Carolina to Newfoundland in 1524. Then, in the 1530s–40s, in the course of three expeditions, JACQUES CARTIER explored the St. Lawrence River system and surrounding areas in what is now eastern Canada. Both explorers, like other mariners before them, sought a Northwest Passage to the Orient.

The outlines of North America and parts of the interior were becoming known. European cartographers were recording information reported to them by various explorers. In 1585–94, Flemish cartographer GERARDUS MERCATOR published a comprehensive world atlas in which he applied the name *America* to both North and South America.

First Colonies

Although a number of permanent Spanish settlements were founded in the West Indies, Central America, and Mexico in the 16th century, a number of attempts to do so to the north failed. The French under JEAN-FRANÇOIS DE LA ROQUE DE ROBERVAL, in conjunction with Jacques Cartier's third expedition, founded a settlement on the St. Lawrence River in 1541. Because of hardship, the colonists returned to France the following year. In 1562, JEAN RIBAUT attempted to found a French Huguenot colony on Port Royal Sound in present-day South Carolina. When a relief expedition failed to arrive, the French abandoned the site. RENÉ GOULAIN DE LAUDONNIÈRE, in 1564, attempted to build a settlement on the St. Johns River in Florida. The next year, a Spanish military expedition under PEDRO MENÉNDEZ DE AVILÉS defeated the French, and that site was also abandoned. Artist JACQUES LE MOYNE DE MORGUES was one of the colonists who escaped along with de Laudonnière. His images of wildlife and Timucua Indians were the earliest known such images by a European in what is now the continental United States. On his expedition, Menéndez de Avilés founded St. Augustine 40 miles to the south of the French site, the first permanent European settlement in the continental United States.

Spanish expeditions out of Mexico eventually led to colonies in the American Southwest as well. In 1582–83,

ANTONIO ESTEVAN DE ESPEJO headed an expedition to western New Mexico and eastern Arizona, exploring the upper Rio Grande, upper Pecos River, and Little Colorado River. His reports helped lead to a subsequent colonizing expedition in 1598 under JUAN DE OÑATE, who founded a settlement, San Juan de los Caballeros, near an Indian pueblo and present-day Santa Fe, eventually moving to a new site, near another pueblo, San Gabriel de Yungue-Ouinge. From there, over the next years, he launched exploratory expeditions, leading some himself.

The English attempted a number of failed colonies along the Atlantic seaboard in the 1580s. In 1583, SIR HUMPHREY GILBERT led a colonizing expedition to Newfoundland, having been granted a commission by Queen Elizabeth I. Gilbert took formal possession of the island, although he decided to abandon the colony after only one month because of loss of life at sea, illness, and food shortages. Gilbert himself perished on the return journey. His half brother, SIR WALTER RALEIGH, received the commission to settle North America instead and, in 1584–87, sponsored three voyages to the Outer Banks region of present-day North Carolina. The second two were attempts at colonies. The first colony on Roanoke Island failed, in large part because of conflicts with Native Americans. The second colony, originally planned for Chesapeake Bay to the north, was headed by JOHN WHITE, who became known for his paintings of Native Americans. It, too, failed and, after White's return to England for supplies, the colonists were never seen again, resulting in the name the LOST COLONY.

Just to the north, in present-day Virginia, the English founded another colony. CHRISTOPHER NEWPORT commanded the fleet carrying colonists, and JOHN SMITH was military leader of a colony founded at Jamestown in 1607, the first permanent English settlement in the Americas. In 1620, the PILGRIMS, an English religious breakaway group, among them EDWARD WINSLOW, founded Plymouth Colony in present-day Massachusetts.

The French, after other failed attempts at colonies on the St. Croix River, the present border of Maine and New Brunswick, and at Port Royal in southeastern Nova Scotia, founded their first permanent French settlement in the Americas at Quebec City (the Huron Indian settlement of Stadacona) in 1608 under SAMUEL DE CHAMPLAIN. The Dutch, following the 1609 exploration by Englishman HENRY HUDSON of the Hudson River in present-day New York on their behalf and the follow-up expedition to the region under Dutchman ADRIAN BLOCK, founded the colony of New Amsterdam on the island of Manhattan in 1621.

The Swedish also maintained a colony in North America for a time, laying a claim in 1638 to some of the original Dutch holdings along the Delaware Bay. In 1655, with a stepped-up military effort, the Dutch ousted them and reclaimed the territory.

These various colonies served as launching points for exploratory and trading expeditions and led to further colonial development.

Early Explorations of Arctic North America

European maritime expeditions continued to seek the Northwest Passage—and a version of the same known as the Strait of Anian (see ANIAN, STRAIT OF), thought to exist along a more southerly route. In the 1570s–80s, Englishman SIR MARTIN FROBISHER headed a series of expeditions to the Arctic region, seeking an all-water northern route. The English especially were active in northern waters. In the first half of the 17th century, Henry Hudson, now sailing for his country of birth, and others, including SIR THOMAS BUTTON, WILLIAM BAFFIN, ROBERT BYLOT, LUKE FOXE, and THOMAS JAMES, explored Hudson Bay and surrounding waterways. English claims to the region were based on Hudson's 1610–11 journey. (See ARCTIC, EXPLORATION OF THE.)

Land, Furs, and Converts

With increasing numbers of settlers, new land was sought and new settlements were established in the 17th and 18th centuries during the colonial period. The French, located along the St. Lawrence River, developed their colonial economy around the FUR TRADE with Native Americans. They traveled along the Great Lakes and Mississippi River and onto the eastern plains to develop trading contacts. They eventually settled the mouth of the Mississippi as well. Many of the English traveled to North America as families and farmers, in the hopes of staking a claim and working a homestead. They settled along the Atlantic coast and, over time, pushed westward into and beyond the Appalachians. Soon after the founding of the HUDSON'S BAY COMPANY in 1670, the English built trading posts on Hudson Bay for the fur trade and began exploring westward in search of fresh supplies of furs. The Spanish also sought land for economic development, in particular mining, ranching, and farming, and pushed out of the Southwest west and east into California and Texas. The Dutch came to North America originally as traders under the auspices of the United New Netherland Company and the DUTCH WEST INDIA COMPANY but settled more and more farms along the Hudson Valley until losing their territorial claim to the English in 1664 (when the Dutch colony of New Netherland became New York). In the meantime, missionaries—especially of the Jesuit and Franciscan orders of the Catholic Church—traveling with traders or soldiers or on their own sought North American converts (see RELIGION AND EXPLORATION). All the activities of the various nationalities had impacts of one kind or another on native peoples—if not loss of life from disease or warfare, then displacement from lands and cultural dispossession.

Numerous explorers played a part in explorations of the colonial period, opening up new regions to subsequent settlement. In 1659–60, French fur traders MÉDARD CHOUART DES GROSEILLIERS and PIERRE-ESPRIT RADISSON explored Lake Superior and traveled to the headwaters of the Mississippi River. In 1668–69, they headed a maritime expedition to Hudson Bay, leading to the start of the fur trade in that region. In 1665–69, CLAUDE-JEAN ALLOUEZ served as a French missionary to peoples of the western Great Lakes and explored the south shore of Lake Superior and the Fox and Wisconsin Rivers. He is said to have preached to 22 tribes and to have baptized some 10,000 Indians. In 1673, French fur trader LOUIS JOLLIET and missionary JACQUES MARQUETTE explored from the western Great Lakes southward along the Mississippi River. In 1682, RENÉ-ROBERT CAVELIER DE LA SALLE and his associate, Italian HENRI DE TONTI, led a French expedition along the Mississippi River all the way to the Gulf of Mexico. During this journey, he claimed the entire Mississippi Valley for France. The next century, a number of French traders ventured onto the Great Plains. These included LOUIS-JOSEPH GAULTIER DE LA VÉRENDRYE and one of his brothers, François, who, in 1742–43, explored the northern plains as far west as the Black Hills of western South Dakota and eastern Wyoming (or possibly even the Bighorn Mountains in western Wyoming, part of the Rocky Mountain system); and PIERRE-ANTOINE MALLET and his brother, Paul Mallet, who, at about the same time, explored the central plains.

Early English colonial expeditions included that of German-born physician JOHN LEDERER in 1669–70; he explored the Piedmont and Blue Ridge of Virginia and North Carolina on behalf of the Virginia colony. His trip was soon followed, in 1671–73, by other explorations westward to the Appalachian frontier of Virginia and North Carolina, sponsored by ABRAHAM WOOD. In 1685, physician HENRY WOODWARD explored from Charleston, South Carolina, beyond the Savannah River into Georgia. In 1701–08, JOHN LAWSON explored the interior of the Carolinas northward from Charleston. In 1716, ALEXANDER SPOTSWOOD led an expedition to the Shenandoah Valley of western Virginia. By the mid-18th century, there was increasing activity in the Appalachian and trans-Appalachian regions. Among those involved, in 1750, another physician, THOMAS WALKER, explored and named the CUMBERLAND GAP through the Blue Ridge of the Appalachians, crossing it into what is now eastern Kentucky. DANIEL BOONE led hunting and colonizing expeditions through the mountain pass in the 1760s–70s.

Far to the north, Hudson's Bay Company employees began mapping lands to the west. In 1690–92, HENRY KELSEY explored the Assiniboine and Saskatchewan Rivers. In 1754–55, ANTHONY HENDAY explored the Canadian plains within 40 miles of the Rocky Mountains. In the

1760s–70s, SAMUEL HEARNE, with the help of Chipewyan Indian MATONABBEE, reached the Arctic Ocean and the Great Slave Lake. In 1772–75, MATTHEW COCKING explored what is now western Saskatchewan.

For the Spanish, in 1689, ALONSO DE LEÓN, born in Mexico, headed a Spanish military expedition from Coahuila, Mexico, across the Rio Grande to the Gulf Coast of Texas and founded a number of settlements in the Neches River region of eastern Texas. In 1748–50, JOSÉ DE ESCANDÓN led a colonizing expedition from Mexico to the lower Rio Grande in southeastern Texas. In 1698–1706, Italian Jesuit missionary EUSEBIO FRANCISCO KINO explored the Gila and Colorado Rivers in present-day Arizona, the latter of which he is credited with naming. He also explored the Gulf of California. The Spanish settled California after the 1769–70 expedition of GASPAR DE PORTOLÁ and Franciscan missionary JUNÍPERO SERRA. Serra stayed on to found a string of missions to the Indians, from present-day San Diego to San Francisco. The route between New Mexico and California was pioneered by colonial official JUAN BAUTISTA DE ANZA and Franciscan missionary FRANCISCO TOMÁS HERMENEGILDO GARCÉS in the 1774. Soon afterward, in 1776–77, Franciscan missionaries FRANCISCO ATANASIO DOMÍNGUEZ and FRANCISCO SILVESTRE VÉLEZ DE ESCALANTE, in an unsuccessful effort to create a route between the Spanish settlements of Santa Fe, New Mexico, and Monterey, California, explored parts of central Utah.

In the 18th century, Russia joined the other European nations in staking a claim in North America, based on the exploratory expedition of Danish mariner VITUS JONASSEN BERING in 1740–41 to the Aleutian Islands and Gulf of Alaska.

New Nations

The colonial phase of North American exploration can be said to have ended with the Declaration of Independence in 1776, or the Treaty of Paris of 1783—when Great Britain conceded defeat in the American Revolution—or the drafting of the first constitution of the United States of America in 1787. Yet there was still colonial activity. France, although it had ceded its North American holdings to Great Britain and Spain in an earlier Treaty of Paris at the end of the French and Indian War in 1763, for a brief period, from 1800 to 1803, controlled land in North America with the retrocession from Spain of the region stretching from the Mississippi River to the Rocky Mountains, known as the Louisiana Territory. The United States purchased these vast holdings in 1803 in what is known as the Louisiana Purchase. Canada remained under British control until the British North America Act of 1867 created the Dominion of Canada. Mexico achieved independence from Spain in 1821. Russia also maintained a North American presence until 1867 and its sale of Alaska to the United

States. Present-day boundaries among the three North American nations—the United States, Canada, and Mexico—were not decided until well into the 19th century. Yet, with the birth of the United States, came a new stage of exploration and settlement, which came to be called “Westward Expansion.”

In the decades after the American Revolution, much of the exploratory activity was in the Old Northwest, a region north of the Ohio River, west of the Appalachians, east of the Mississippi River, and south of Canada.

In 1776, British naval officer and accomplished navigator JAMES COOK explored the Pacific Northwest coast in search of the western opening of the Northwest Passage and reached as far north as Bering Strait. By the 1780s, British and American traders also regularly worked the Pacific coast, especially in Nootka Sound in present-day British Columbia. But they also extended their activity to Alaska in the north and in California in the south. A number of maritime expeditions increased geographic knowledge of the Pacific coast. American fur trader ROBERT GRAY, who had earlier commanded the first circumnavigation of the world in a U.S. vessel, explored the coast of the Pacific Northwest, including the mouth of the Columbia River in 1792. A British expedition under GEORGE VANCOUVER and WILLIAM BROUGHTON, which also circled the world in 1791–95, explored the same region.

Meanwhile, the Hudson’s Bay Company and a rival out of Montreal, the NORTH WEST COMPANY, sent out expeditions to map the Canadian West and what would become part of the American West. Its representatives included American-born PETER POND and SIMON FRASER and Scotsman SIR ALEXANDER MACKENZIE.

The Lewis and Clark Expedition

In early 1803, while the Louisiana Purchase was being finalized between the United States and France, MERIWETHER LEWIS, an army captain and private secretary of President Thomas Jefferson, won the appointment to head a government-funded expedition to explore the region. Lewis requested a former army comrade, WILLIAM CLARK, to be his coleader. The Corps of Discovery of just under 50 men (not all would complete the journey and others would join later) departed St. Louis by boat in May 1804. After wintering among the Mandan Indians at the confluence of the Missouri and Knife Rivers, during which time Shoshone Indian woman SACAJAWEA was hired as a guide and interpreter, the Corps of Discovery continued upriver, crossed the Rockies and reached the Columbia River, which carried them to the Pacific. They spent the winter of 1805–06 at the mouth of the Columbia in present-day Oregon. On the return trip Lewis and Clark separated for a time: Lewis explored the Marias River, which branched off from the Missouri to the north; Clark and his contingent, including

Sacajawea, explored the Yellowstone River to the south, another branch. The Corps of Discovery returned triumphantly to St. Louis in September 1806.

The Lewis and Clark Expedition, the first government-sponsored expedition across the uncharted western portion of North America, covering some 8,000 miles, established an overland route to the Pacific Ocean. Its contact with more than 50 Indian tribes—all peaceful except for one incident with the Blackfeet—contributed to the knowledge of North America's indigenous peoples. The expedition also made studies of wildlife, as requested by Jefferson, and brought back a large number of botanical species. Its geographic determinations led to subsequent expeditions, some relating to the western fur trade and others, government-sponsored. Former members of the Corps of Discovery continued to play a part in western exploration.

Dunbar, Freeman, and Pike

President Thomas Jefferson sponsored other expeditions to explore the newly acquired Louisiana Territory, including one under Scottish surveyor SIR WILLIAM DUNBAR. The expedition intended to ascend the Mississippi to its confluence with the Red River and attempt to find the Red River's source. Because of the threat of Spanish action against them, they decided instead to explore the Ouachita River northward into present-day Arkansas. In 1806, an Irish-born surveyor named THOMAS FREEMAN again attempted to explore the Red River for Jefferson, making it as far west as present-day Texarkana, Texas, before being turned back by Spanish authorities.

Meanwhile, in 1805–06, when the Lewis and Clark Expedition was on its return trip, army officer ZEBULON MONTGOMERY PIKE led a military expedition with a contingent of soldiers up the Mississippi from St. Louis by boat and sled as far as Leech Lake in present-day Minnesota. In 1806–07, Lieutenant Pike led a contingent of soldiers by boat from the Missouri River to the Osage River, then overland by horseback across the plains to the Republican River and southward to the Arkansas River, exploring it westward into present-day Colorado. In the Rocky Mountains Pike attempted to climb Pikes Peak, which is named after him. On the return trip, the expedition crossed the Rio Grande into Spanish territory; Pike and his men were captured by the Spanish and held for a time in Santa Fe. Pike's subsequent report discouraged settlement on the arid southern plains but led St. Louis traders to develop commerce by way of the Santa Fe Trail.

Traders West

The city of St. Louis, on the Mississippi River near the mouth of the Missouri, served as gateway to the West. Most travel westward from there in the early 19th century related to the fur trade. In 1808, American businessman JOHN

JACOB ASTOR founded the AMERICAN FUR COMPANY, and its subsidiaries soon afterward—the Pacific Fur Company and the Southwest Fur Company—with the plan of building a string of trading posts along the route Lewis and Clark pioneered. In order to create a western terminus, Astor sponsored a seaward expedition under ROBERT STUART, from New York City around South America, in 1810, to build Fort Astoria at the mouth of the Columbia River; the next year, he sent an overland expedition out of St. Louis—the Astorians—under WILSON PRICE HUNT.

In 1809, the ST. LOUIS MISSOURI FUR COMPANY was founded by William Clark, MANUEL LISA, JEAN PIERRE CHOUTEAU, AUGUSTE PIERRE CHOUTEAU, ANTOINE PIERRE MENARD, ANDREW HENRY, and others. The company eventually established a number of posts upriver.

With time, traders became familiar with the lands along the Missouri and its tributaries and in the Rocky Mountains as well. In 1822, another American entrepreneur, WILLIAM HENRY ASHLEY, along with Andrew Henry, founded the ROCKY MOUNTAIN FUR COMPANY. Many of the men who worked for and traded with Ashley came to be known as the MOUNTAIN MEN. They included legendary figures such as JAMES PIERSON BECKWOURTH, JAMES BRIDGER, JAMES CLYMAN, HUGH GLASS, THOMAS FITZPATRICK, EDWARD ROSE, JEDEDIAH STRONG SMITH, and WILLIAM LEWIS SUBLETTE. In the 1820s–1830s, they traveled the Native American trails and passes of the West and passed along geographic knowledge to others. Jed Smith, the “Knight of the Buckskin,” as his peers called him, traveled more than 16,000 miles in his career and pioneered the westward route via SOUTH PASS across the Rockies and from the Great Basin into California.

The fur traders came from many different places and many different walks of life. In 1832–35, BENJAMIN LOUIS EULALIE DE BONNEVILLE, a French-born former U.S. army officer led a fur-trading expedition across the Rocky Mountains and into Oregon. Mountain men JOSEPH WALKER, ZENAS LEONARD, and JOSEPH L. MEEK worked for him and helped pioneer the California Trail.

Working out of Alaska, in the meantime, Russian interests, organized as the RUSSIAN-AMERICAN COMPANY in 1799, developed the fur trade southward under the leadership of ALEKSANDR ANDREYEVICH BARANOV. By 1812 company fur traders had established a post in northern California.

In 1821, the Hudson's Bay Company and the North West Company merged under the name of the Hudson's Bay Company. It would continue as formidable opposition to the American fur companies. Other merchants developed the trade in buffalo hides as well as providing goods along routes west. In 1833, CHARLES BENT, born in Virginia and raised in St. Louis, established Bent's Fort as a trade center on the Arkansas River in southeastern Colorado.

In the late 1830s, the international fur market went into decline, partly because the beaver hat went out of style in favor of the silk hat. The depletion of fur-bearing animals and the advance of farming settlements also contributed to a changing way of life in the West. Many of the mountain men stayed active as soldiers, scouts, and guides in the subsequent period of expanding settlement.

Continuing Government Expeditions

The U.S. government continued to sponsor westward explorations long after Lewis and Clark. In 1819, Colonel Henry Atkinson led the first Yellowstone Expedition up the Missouri River, reaching as far as Council Bluffs in present-day Nebraska, where he founded Fort Atkinson. Other expeditions embarked from there, including that of Major STEPHEN HARRIMAN LONG of the U.S. Army Corps of Topographical Engineers, which crossed the Great Plains and reached the Rockies. In his report on the expedition, Long referred to the Great Plains as the “Great American Desert,” unsuitable for agriculture, which supported the earlier findings of Zebulon Pike. In 1825, Colonel Atkinson headed the second Yellowstone Expedition, which did in fact manage to navigate up the Yellowstone into present-day Montana, where he negotiated with Indian tribes.

The next decade, in 1834, General HENRY LEAVENWORTH, who for a time had been the commander at Fort Atkinson, and Colonel HENRY DODGE headed an expedition to the southern plains in order to negotiate treaties with tribes of the region—a region designated as the Indian Territory, where eastern tribes would be relocated—and explored the Arkansas and Red Rivers. The next year, Dodge explored from Oklahoma to the Rockies and explored the eastern portion of the Oregon Trail.

In the 1840s, as the army built more and more posts west of the Mississippi, the most active explorer for the federal government was JOHN CHARLES FRÉMONT. In 1838–39, after receiving a commission as second lieutenant in the Corps of Topographical Engineers, he joined Frenchman JOSEPH NICOLAS NICOLLET in a survey of the region between the upper Mississippi and Missouri Rivers. In 1841, Frémont led an expedition in a survey of the Des Moines River in Iowa. In 1842, Frémont headed his own expedition to the Oregon Territory, during which he mapped most of the Oregon Trail and determined the longitude of the South Pass. CHRISTOPHER HOUSTON CARSON (Kit Carson) served as guide for part of the expedition. In 1843–44, Frémont, again with Carson and with Thomas Fitzpatrick also as a guide, explored the Great Basin, more of the Rockies, and the eastern Cascade Range, and reached the mouth of the Columbia. Part of his mission was to complement the findings of the maritime expedition of Lieutenant CHARLES WILKES along the Pacific coast, part of the U.S. South Sea Surveying and Exploring Expedition. Frémont led his party

south and then east and crossed the Sierra Nevada in mid-winter. Frémont’s reports on the Great Plains—in particular the fertile regions of present-day Nebraska, Kansas, and Oklahoma—helped dispel the notion of a “Great American Desert.”

Other expeditions explored westward onto lands previously known only to Native Americans. In 1845, Colonel STEPHEN WATTS KEARNY led an expedition from Fort Leavenworth in Kansas to the upper Platte and Arkansas Rivers; Thomas Fitzpatrick again found work as a guide. JAMES WILLIAM ABERT led a party, under Kearny’s command, to western Oklahoma and the Texas Panhandle. Frémont led a party under Kearny in explorations of the Great Basin and Sierra Nevada, as well as northern California and southern Oregon; during and after this expedition, Frémont became involved in the Bear Flag Revolt of American settlers against the Mexicans in northern California and helped secure California for the United States in the U.S.-Mexican War of 1846–48. Kearny also participated in the war. Serving under him, Lieutenant WILLIAM HEMSLEY EMORY created the first scientific map of the Southwest, from the Gulf of Mexico to the Pacific Ocean.

In 1848–49, Frémont led a privately funded expedition from the plains into the mountains of northern New Mexico, in the hope of locating a practical central route for a proposed transcontinental railroad. He headed one last expedition in 1853, another privately funded one, exploring the Wasatch Mountains of northern Utah and the Sierra Nevada for another proposed railroad route.

Over the next decades, especially in the 1850s, the U.S. army conducted a number of topographic and surveying expeditions for wagon roads and railroads (see SURVEYING AND EXPLORATION). One of the last such exploratory and surveying expeditions was under the command of Lieutenant HENRY TUREMAN ALLEN to the Yukon, Koyok, and Copper Rivers of eastern Alaska in 1885.

Many Callings

In addition to the fur traders and military men, people of many callings helped increase awareness of the geography and natural science of North America in the 19th century and helped pioneer routes leading to non-Indian settlement. In the 1830s, a number of painters followed the fur traders and the military men on their expeditions: artist GEORGE CATLIN traveled on an American Fur Company ship up the Missouri, and later with General Henry Leavenworth and Colonel Henry Dodge to the southern plains; and Swiss artist KARL BODMER, along with German naturalist ALEXANDER PHILIPP MAXIMILIAN, also traveled on a fur company boat up the Missouri, in order to paint and study Native Americans. In the same period, another painter, JOHN JAMES AUDUBON, ventured from settled areas into the wilderness on his own—from Florida to Texas to

Labrador—to paint wildlife, becoming one of the foremost authorities of North American birds. Other frontier painters traveled to wilderness lands in the 1840s–50s: Canadian PAUL KANE, across Canada, from Toronto to Vancouver; and Swiss RUDOLPH FRIEDERICH KURZ, up the Missouri into the Dakotas.

Pioneers in the West also came from a variety of backgrounds. In 1841, Belgian missionary PIERRE-JEAN DE SMET led the first large-scale wagon train migration on the Oregon Trail, another journey for which former mountain man Thomas Fitzpatrick served as guide. That same year, JAMES SINCLAIR, a Métis working for the Hudson's Bay Company, pioneered a wagon route through the Canadian Rockies. In 1843, JESSE APPLGATE, a Kentuckian who had worked as a surveyor in St. Louis, and Presbyterian missionary MARCUS WHITMAN from New York helped lead the "Great Migration of 1843," the largest wagon train of emigrants to date along the Oregon Trail. In 1847, BRIGHAM YOUNG, who was a prominent leader in the Church of Jesus Christ of Latter Day Saints—better known as the Mormons—after journeying from New York, led a party of Mormons from winter quarters on the Missouri River to the Great Salt Lake Valley in Utah, pioneering what became known as the Mormon Trail. In 1863, JOHN MERIN BOZEMAN, who had originally traveled to the West from Georgia as a gold prospector, pioneered the Bozeman Trail, a wagon route from Colorado to Montana along the east side of the Bighorn Mountains and through the Bozeman Pass of the Belt Mountains. In 1865, JESSE CHISHOLM, a trader of Cherokee ancestry, blazed the Chisholm Trail, which became a primary cattle route from Texas to railheads in Kansas.

A number of scientists helped open both the American and Canadian West. In 1832, HENRY ROWE SCHOOLCRAFT, a geologist, ethnologist, and Indian agent, led an expedition to find the source of the Mississippi, which he identified correctly as Lake Itasca in northern Minnesota. In 1857–60, Englishman JOHN PALLISER, originally a sportsman and hunter, led a scientific expedition to western Canada for the British government, which explored the 49th Parallel from Lake Superior to the Pacific Ocean as well as passes in the Canadian Rockies. Geologist HENRY YOULE HIND, also born in England, led a simultaneous government expedition exploring the river systems of Manitoba and Saskatchewan.

In the 1860s–1870s, self-taught naturalist JOHN MUIR conducted studies in the Yosemite Valley and the Sierra Nevada in California. In 1869, in a federally funded expedition, geologist and ethnologist JOHN WESLEY POWELL led the first successful navigation of the Colorado River. He went on to head the U.S. Geological Survey, succeeding its first director CLARENCE KING. Another geologist, FERDINAND VANDEVEER HAYDEN, worked for the government in

the same period in studies of the Great Plains and Rocky Mountains.

West and North

The growing number of military forts and roads linking them enabled travel through and settlement in Native American ancestral lands. By the 1860s, the major routes linking east and west in the United States—the Santa Fe Trail, the Old Spanish Trail, the Oregon Trail, and its offshoots (the Central Overland Route, the California Trail, the Bozeman Trail, and the Mormon Trail)—were well established. The railroads would soon follow. By 1850, they connected the Atlantic coast with the Great Lakes; by 1853, with Chicago; and, by 1856, with the west side of the Mississippi. In the early 1860s, a transcontinental line was begun; by the end of the decade, in 1869, the Union Pacific and the Central Pacific met at Promontory Point, Utah. The 1880s saw another burst of railroad building. To the north, the transcontinental Canadian Pacific Railroad was completed in 1885.

A series of gold rushes affected the course of settlement in North America and accelerated the pace of westward expansion: the California gold rush of 1849; the Colorado (Pikes Peak) Gold Rush of 1858–59; gold rushes in Idaho and Montana in the 1860s; gold rushes in Arizona and Nevada in the 1870s; and the Klondike gold rush (to the Yukon Territory and Alaska) in 1896–98. In 1859, silver was discovered in Nevada, the Comstock Lode as it came to be known, and silver would soon be found in other western states as well.

To the north, Arctic exploration continued over the centuries, with a great number of expeditions—many of them British and many spurred on by the disappearance of Englishman SIR JOHN FRANKLIN in 1845. The first successful navigation of the Northwest Passage above the North American mainland was accomplished by Norwegian ROALD ENGELBREGT GRAVNING AMUNDSEN in 1903–06. In 1904–11, French Canadian JOSEPH ELZÉAR BERNIER charted northern islands in Arctic waters for Canada. To the south, in 1914, the opening of the Panama Canal across the Isthmus of Panama provided a practical passage between the Atlantic and Pacific Oceans and separated the continents of North America and South America by water.



The political map of North America continued to take shape well into the 20th century, with the United States, Canada, and Mexico, as well as the countries of Central America and the West Indies, defining external and internal boundaries. The demographic map continues to evolve as in earlier centuries, with North America a melting pot of peoples from around the world. Growing environmental awareness in the latter part of the 20th century has led many

people to rediscover and appreciate the land, with a sense of curiosity, adventure, and reverence inspired by both Native Americans and explorers from other continents.

Northeast Passage

The Northeast Passage is the sea route between the Atlantic Ocean and Pacific Ocean, from along the north coast of Norway to the eastern edge of SIBERIA at the BERING STRAIT. Many nations sought this passage to use as a trade route between Europe and China, and the quest to find it led to many geographic discoveries.

Europeans had knowledge of the seas to the north and east of Norway since at least A.D. 870, when a Viking by the name of Ottar sailed into the White Sea. Other Vikings later reached as far north and east as Novaya Zemlya. Also, the various peoples who lived in northern parts of much of Scandinavia, Russia, and Siberia over the centuries had extensive knowledge of these northern seas, due to their often nomadic lifestyles and their use of the sea for hunting and fishing. In the history of exploration, the search for the Northeast Passage was thus largely a European venture, motivated primarily by the desire for a predictable, commercially viable waterway between Europe and Asia.

The first attempts at a sea route westward from the Atlantic through the Americas to the Pacific—the NORTHWEST PASSAGE—were made in the late 1490s, following CHRISTOPHER COLUMBUS's first voyage of exploration for Spain in 1492. The interest in a Northeast Passage came later, European countries hoping to find a more direct route past Africa than the long southerly route around the CAPE OF GOOD HOPE.

Early English Expeditions

England was the first country to make a concerted effort at finding the Northeast Passage. Envious of the riches being acquired by the Portuguese and Spanish through commerce with the Orient during the 16th century, and frustrated by expensive and as yet unsuccessful attempts to find a Northwest Passage, the English augmented their search for new trade routes by looking east. They were encouraged in this endeavor by the 1549 publication of *Rerum Moscoviticarum Commentarii* (Notes on Muscovite Affairs). In this book, written by Sigismund von Herberstein, an ambassador from the Holy Roman Emperor to Russia, the author describes his journeys earlier that century and offers reports of regular sea voyages between the north coast of Russia and the west coast of Norway.

The first expedition in search of the Northeast Passage was sponsored by the MUSCOVY COMPANY. In 1553, under the directorship of SEBASTIAN CABOT, the company outfitted a fleet of three ships under SIR HUGH WILLOUGHBY, with RICHARD CHANCELLOR as second in command. Dur-

ing a storm off the north coast of Norway, their ships were separated. Willoughby continued to the east, where he sighted Novaya Zemlya, making the first known European sighting of this island group since the Vikings. Icy conditions kept him at a distance, however. Heading back westward, his ship became trapped in ice at the northern end of the Kola Peninsula, and he and his crew perished there during the winter. Chancellor, meanwhile, had managed to reach the port of Archangel at the mouth of the Dvina River, from where he traveled southward. He was invited to Moscow at the request of Czar Ivan IV (Ivan the Terrible). The prospect of trade with England appealed to the czar, and Chancellor returned to England with agreements in hand.

The Muscovy Company sponsored a follow-up expedition in 1556, giving STEPHEN BOROUGH, who had sailed with Chancellor, a small ship and crew. With help from Russian fishermen near the Kola Peninsula, Borough made his way to the north coast of Russia near the mouth of the Pechora River. From there, he continued eastward and eventually located a strait between Vaigach Island and Novaya Zemlya leading from the Barents Sea to the Kara Sea. As with Chancellor, icy conditions forced Borough's expedition to turn back prematurely. His report of the harsh conditions in that region dissuaded others from making further explorations there for 25 years.

In 1580, the Muscovy Company launched another expedition in search of the Northeast Passage: They sent two vessels, one captained by Arthur Pet and the other by Charles Jackman. Their instructions were to follow and then extend Borough's route. Pet succeeded in finding another channel to the Kara Sea, between Vaigach Island and the mainland (Yugor Strait), but ice and fog compelled him to make a swift return. Jackman's ship was lost with all hands.

Early Dutch Expeditions

In addition to the English, the Dutch were interested in a Northeast Passage for the purpose of trade. To compete with the English at Archangel, they founded the White Sea Trading Company in 1565. Their most visible agent was OLIVIER BRUNEL, who explored the region and made successful trading arrangements in Russia. He went farther east than the English had by traveling overland to the Ob River. In 1584, on a voyage of trade and exploration, Brunel fell short of the Kara Sea and drowned after making a landing in Pecora Bay.

Among the more renowned navigators to search for the passage was WILLEM BARENTS, also a Dutchman. In 1594, he reached the northern tip of Novaya Zemlya before ice blocked his fleet of three ships. Barents led a second expedition a year later, attempting to sail around the southern end of Novaya Zemlya. Near Vaigach Island, ice once again prevented progress eastward. Geographer JAN HUYGHEN VAN LINSCHOTEN was part of both expeditions.

The Dutch launched seven expeditions that year, none of which came closer to attaining the passage. With two ships, Barents conducted a third voyage in June 1596. Sailing to the north of Norway in order to investigate conditions in these untested waters, he charted Bear Island and reached the Spitsbergen group (both now part of Svalbard). The seas farther to the north proved inhospitable, and Barents sailed eastward to Novaya Zemlya and rounded its northern tip into the Kara Sea.

His second ship, headed by Jan Cornelizoon Rijp, returned to the west. With the change of seasons, Barents found his vessel trapped in the ice. He and his crew set up camp at the place he called Ice Haven on Novaya Zemlya, fashioning a shelter from driftwood. The group supplemented their dwindling rations by hunting foxes, but this was not enough to prevent the onset of SCURVY, from which Barents and several of his crew died. In July 1597, the surviving crew were aided by two Russian ships; they eventually reached the Kola Peninsula, where they found Rijp, who returned with them to the Netherlands in November 1597.

Henry Hudson

HENRY HUDSON, an Englishman, sailed for both the English and the Dutch in the early 17th century. In 1607, sponsored by the Muscovy Company, Hudson reached the east coast of GREENLAND and Spitsbergen, north of Norway. In 1608, again sailing for English interests, he reached the Barents Sea and Novaya Zemlya and was subsequently stopped by ice. In 1609, in the employ of the DUTCH EAST INDIA COMPANY, Hudson again attempted the Northeast Passage. He approached Novaya Zemlya once again, but, with icy seas beginning to trap his vessel and, under threat of mutiny, he headed westward across the Atlantic to the Americas and investigated the coast of Newfoundland and the Hudson River. As these expeditions seemed to prove the Kara Sea unnavigable, both the Dutch and the English turned their attention to the rich fishing and whaling grounds near Spitsbergen.

Russian Expeditions

The Russians initiated the next phase of exploration for a Northeast Passage. They had had knowledge of the north coast of their continent for centuries, through trade with and collecting taxes from indigenous peoples, but the desire to conduct wide-ranging commerce had been stifled by conflicts closer to home. In 1648, it is possible that SEMYON IVANOVICH DEZHNEV passed the eastern point of Siberia at East Cape (now known as Cape Dezhnev) while on a trading mission, but his account of that region's geography is somewhat confused. It was not understood at this time whether the Asian and North American continents were joined at this location. The lure of the unknown prompted Peter the Great, who became czar of Russia in 1682, to or-

ganize a number of voyages, known as the Great Northern Expeditions, to explore and map the Siberian coastline.

In one of them Danish explorer VITUS JONASSEN BERING set out overland in 1725 through Russia and Siberia to the Kamchatka Peninsula. In 1728, after building a boat, he and his men, including Russian naval officer ALEKSEY ILYICH CHIRIKOV, navigated through enough of the Bering Strait—which is named after Bering—to be satisfied that Asia and North America were separate landmasses. Bering returned to St. Petersburg in 1730, where authorities greeted his findings with skepticism. In 1733, Bering set out again, this time with a much larger expedition, which traced the Arctic coast from Archangel to the east, charting the region section by section, all the way to the mouth of the Kolyma River. In 1741, Bering again navigated the Bering Strait. It was on this voyage that he sighted the south coast of Alaska. After becoming stranded off the Kamchatka Peninsula, Bering and many of his men died of scurvy. Survivors managed to return to Russia, where they delivered a report of their findings. The survey of the Siberian coast was completed with the four-year journey of Baron Ferdinand Petrovich von Wrangel for Russia near the end of the 18th century.

James Cook

In 1776, the HUDSON'S BAY COMPANY backed an expedition to the Pacific headed by JAMES COOK in search of a water route across North America. In 1778, after passing through the Bering Strait and attempting to navigate eastward north of Alaska, it turned back westward because of PACK ICE and tried to locate the eastern outlet of the Northeast Passage, also finding that route blocked by ice.

Through the Northeast Passage

On a voyage in 1878–79, NILS ADOLF ERIK NORDENSKJÖLD, using the combination steamship–sailing ship *Vega*, finally navigated the Northeast Passage. Nordenskjöld, born in Finland of Swedish parents and trained as a chemist and mineralogist, was already a seasoned explorer by the time he attempted this expedition. With backing from the kings of Sweden and Norway and with coal and foodstuffs to last two years, he left Tromsø, Norway, on July 21, 1878. Conditions were favorable in the Kara Sea, and he reached Port Dickson on August 6, thus beginning the exploratory phase of the journey. On August 19, he sailed past the northernmost point of the Asian continent at Cape Chelyuskin and, on September 27, he reached North Cape. The following day, the *Vega* became icebound, and captain and crew made preparations for the winter. Superior planning made their winter at sea relatively comfortable, and Nordenskjöld kept himself and the others busy with numerous scientific projects. With the melting of the ice, the *Vega* was freed. On July 18, 1879, the expedition entered the Bering Strait, having

completed the passage. It later visited Japan and Sri Lanka before making use of the Suez Canal to return to Sweden on August 24, 1880. Nordenskjöld's two-volume account published the following year, *The Voyage of the Vega*, is a classic in the field of exploration as both an adventure story and as a scientific study, with detailed information on geography, climate, and native peoples.



Although the Northeast Passage had been traversed, the prospect of provisioning for a two-season journey made its use commercially unattractive. The Russo-Japanese War of 1904–05, however, awakened the Russians to the benefits of such a route, and the Russian government soon commissioned the construction of a pair of icebreakers to undertake more detailed surveys of these waters. In 1909, the *Taïmyr* and the *Vaygach* were put into service. Between 1909 and 1915, these ships conducted hydrographic studies (see HYDROGRAPHY) in the waters of the Bering Strait and completed the first east-to-west navigation of the passage. In 1932, under the direction of the Union of Soviet Socialist Republics (USSR; Soviet Union), OTTO Y. SCHMIDT made the first single-season passage. The Soviet Union established the Northern Sea Route Administration in that year for the development of Siberia's resources and for regular commercial shipping. Today, use of these northern sea-lanes has become practical and routine because of large fleets of icebreakers, ongoing aerial reconnaissance, and meteorological monitoring stations. The cargoes that pass through its waters are typically timber, ore, and other raw materials en route to processing factories in northern Asia.

North Magnetic Pole (Magnetic North Pole)

The Earth has a magnetic field, an area surrounding the planet in which objects experience an electromagnetic force. In other words, Earth acts as a giant magnet. The exact cause of terrestrial magnetism is unknown; theories relate to the matter and structure of Earth's core, one of which is the dynamo theory involving the interaction of motion and electrical currents in the liquid outer core. At one end of Earth, the northern end, the magnetic force is toward the ground; at the other end, the southern end, the magnetic force is away from the ground. (Earth's magnetic field reverses polarity on an irregular basis, from several thousand years to 35 million years, resulting in the opposite effect; the last such reversal was some 780,000 years ago.) The exact location of these points of magnetic polarity are referred to as the magnetic poles. The magnetic pole at the northern end is known as the North Magnetic Pole (written with or without capitalization). That at the southern end is known as the SOUTH MAGNETIC POLE. The terms also appear as magnetic north pole and magnetic south pole. The angle that Earth's mag-

netic field makes with the horizon is called the magnetic dip, leading to the alternative names dip poles or magnetic dip poles.

The North Magnetic Pole and the South Magnetic Pole do not correspond with the geographic poles of Earth's imaginary axis, known as the NORTH POLE and SOUTH POLE. Moreover, their location varies in the course of almost a century—as they do to a much less degree annually and even daily—a phenomenon known as polar wandering. The present location of the North Magnetic Pole is in the Queen Elizabeth Islands of northern Canada, about 800 miles from the North Pole.

For purposes of study, scientists have also defined Earth's magnetic field as a symmetrical magnetic field, averaging its direction and strength, and the hypothetical poles are known as geomagnetic poles, south and north. The North Geomagnetic Pole is situated near Thule, GREENLAND, about 780 miles from the geographic North Pole.

The effect of terrestrial magnetism had been evident for centuries through use of the magnetic COMPASS. William Gilbert, an English physician and scientist, carried out the first comprehensive study of Earth's magnetic field, publishing his findings in *De magnete* in 1600.

On May 31, 1831, British explorer SIR JAMES CLARK ROSS, as part of the 1829–33 expedition under SIR JOHN ROSS, located the North Magnetic Pole on the west coast of the Boothia Peninsula. During his expedition of 1903–06, in which he made the first successful crossing of the NORTHWEST PASSAGE, ROALD ENGELBREGT GRAVNING AMUNDSEN again measured the location of the North Magnetic Pole, finding it had moved from Ross's calculation. In 1948, Canadian scientists Paul Serson and Jack Clark confirmed that it had moved and determined that its location was 160 miles from Ross's calculation.

See also ARCTIC, EXPLORATION OF THE.

North Pole (North Geographic Pole, Geographic North Pole)

The North Pole, a cartographic point in the ice-covered Arctic Ocean, is considered the northernmost place on Earth, at a latitude of 90 degrees north and a longitude of 0 degrees, where all meridians of longitude converge. Its location is determined by the imaginary line, or axis, around which Earth rotates from west to east. The axis is perpendicular to the plane of the EQUATOR and passes through the center of Earth, terminating at geographic points referred to as the North Pole in the Northern Hemisphere and the SOUTH POLE in the Southern Hemisphere. From the North Pole, all directions on the surface of Earth are read as to the south. The North Pole is also referred to as the North Geographic Pole, to distinguish it from the NORTH MAGNETIC POLE, which is determined by Earth's magnetic field. Reaching

the North Pole was one of the great goals of world exploration and is part of the larger story of human activity in the Arctic.

In ancient times, as put forth by Roman scholar PLINY THE ELDER in the first century A.D., based on information from the travels of Greek scholar PYTHEAS, who explored the Arctic Ocean in the fourth century B.C., the northernmost place on Earth was thought to be ULTIMA THULE. It can be assumed that the Vikings, familiar with northern waters in the Middle Ages, came to know the dangers of venturing too far north because of DRIFT ICE and the limits of navigable waters because of PACK ICE. Starting in the 16th century, the European search for a NORTHEAST PASSAGE—a water route from the Atlantic Ocean to the Pacific Ocean, eastward across northern Europe and Asia—and a NORTHWEST PASSAGE—a water route westward through the Americas—led mariners, especially among the British and Dutch, to explore Arctic waters and sail as far north as possible. Even with growing awareness of Earth's true geography, belief in an open polar sea that would provide a route to Earth's northernmost point persisted well into the 19th century despite repeated encounters with the pack ice of the Arctic Ocean.

Concerted efforts to reach the North Pole began in the late 18th century and continued through the 19th century, with northernmost records being broken. In 1773, a British naval expedition under CONSTANTINE JOHN PHIPPS attempted to reach the North Pole by water and came up against impassable ice east of GREENLAND. In 1818, a British expedition, with ships commanded by DAVID BUCHAN and SIR JOHN FRANKLIN, reached European Arctic waters north of Spitsbergen (present-day Svalbard) before being forced back by pack ice. In 1827, another British naval expedition under SIR WILLIAM EDWARD PARRY, along with SIR JAMES CLARK ROSS, made an attempt on the North Pole from Spitsbergen, setting a northernmost record.

Attempts accelerated in the latter part of the century. In 1860–61, American ISAAC ISRAEL HAYES hoped to locate an open polar sea north of Greenland and Ellesmere Island, Canada's northernmost point, but failed. In 1868, the First Swedish North Polar Expedition under NILS ADOLF ERIK NORDENSKJÖLD failed to reach the North Pole from Spitsbergen; he failed again in 1872–73 on the Second Swedish North Polar Expedition. Meanwhile, in 1871, American CHARLES FRANCIS HALL reached as far as the Lincoln Sea from northern Ellesmere Island, setting a new record. In 1875–76, SIR GEORGE STRONG NARES made an unsuccessful attempt, again from northern Ellesmere Island, breaking the record. In 1879–81, in the course of an American expedition headed by GEORGE WASHINGTON DE LONG, into the Arctic Ocean by way of the BERING STRAIT, the ship became trapped in ice north of Wrangel Island, resulting in the eventual death of De Long and 12 others on the Lena River of SIBERIA. In 1893–96, a Norwegian expedition under FRIDT-

JOF NANSEN attempted to approach the North Pole by purposely having his ship become icebound and drift northward from the New Siberian Islands, after which he and his men continued by kayak and sledge, eventually turning back because of ice conditions after setting a new northernmost record. In 1897, Swede SALOMON AUGUST ANDRÉE tried to reach the Pole from Spitsbergen by air, in a BALLOON, perishing in the attempt. At the turn of the century, in 1899–1900, LUIGI AMEDEO DI SAVOIA D'ABRUZZI led an Italian expedition which attempted to reach the Pole from Franz Josef Land, setting the new northernmost record.

American ROBERT EDWIN PEARY, who carried out four Arctic expeditions to Greenland between 1886 and 1900, resolved to reach the North Pole. In his first attempt in 1902, from Cape Hecla on northern Ellesmere Island, he set a northernmost record for the Western Hemisphere. In a subsequent attempt in 1905–06, by way of the Robeson Channel, the north section of the passage between Ellesmere Island and Greenland, he set the new northernmost record in both hemispheres. In July 1908, Peary departed from New York for a third attempt. From Cape Columbia on Ellesmere Island, Peary, his assistant, MATTHEW ALEXANDER HENSON, and four Inuit (Eskimo) set out on March 1, 1909, and, after a monthlong trek across the frozen sea with sledges and dogs, reached the North Pole on April 6 (although there is some evidence he missed the Pole by a couple of miles). In the meantime, another American, FREDERICK ALBERT COOK, claimed to have reached the North Pole by the Ellesmere Island route on April 21, 1908. The controversy on who actually had been first to the Pole lasted for some time. Peary, with more geographic data to support his claim, received official recognition from U.S. Congress in 1911.

American RICHARD EVELYN BYRD and Floyd Bennett are credited with making the first airplane flight over the North Pole on May 9, 1926, although there is also controversy as to whether they missed the mark, which would make Norwegian ROALD ENGELBREGT GRAVNING AMUNDSEN, American LINCOLN ELLSWORTH, and Italian UMBERTO NOBILE, who passed over it by AIRSHIP three days earlier on May 12, the first to do so. In 1931, Australian SIR GEORGE HUBERT WILKINS attempted unsuccessfully to reach the Pole from Spitsbergen by submarine; that feat was accomplished in 1958, when the U.S. atomic submarine *Nautilus* under Commander William R. Anderson passed beneath the polar ice. Another milestone in the history of exploration was the first flight over the North Pole by a woman, American LOUISE ARNER BOYD, in 1955. In 1977, the nuclear icebreaker *Arktika* of the then Union of Soviet Socialist Republics (USSR; Soviet Union) became the first surface ship to reach the Pole. In 1981, British explorers Sir Ranulph Fiennes and Charles Burton reached the North Pole, having traveled there from the South Pole, becoming

the first men to circle the Earth Pole to Pole, having done so over a period of three years.

See also ARCTIC, EXPLORATION OF THE.

North Star (Pole Star, Polaris, Stella Maris)

The North Star—also called Pole Star or Polaris, or Stella Maris, for “star of the sea”—is the star located along the axis of the NORTH POLE. It is of value in navigation because its position remains relatively fixed throughout the year.

The North Star is a second magnitude star, meaning it is 1/30th as bright as the brightest star in the sky. For this reason it was not always obvious that it retained its position in the sky as the seasons changed. Located in the constellation Ursa Minor (the Little Dipper) at the end of the handle, the North Star is not presently along the exact polar axis, but rather about one degree off. This causes it to appear to wobble by two degrees throughout the course of a day.

The earliest information we have on the use of the North Star for navigation is from the Phoenicians. Using the North Star as their reference, they were able to sail at night, a competitive advantage for the trading nation. The Greeks learned how to navigate using the North Star from the Phoenicians, and they called it the “Phoenician Star.” The Venetian traveler to the Far East, MARCO POLO, reported use of the North Star in the Indian Ocean in 1290.

Arab travelers used the North Star along with a tool called the *al-kemal*, Arabic for “the consummation,” a rectangular plate made of horn or other material on which a string of knots was affixed to the center. The user placed the bottom of the rectangle on the horizon, and, by moving one’s arm toward oneself or away from oneself, located the North Star at the top of the rectangle. The user would determine a distance from the rectangle to his or her nose by means of the string of knots, each knot representing a previously determined latitude. In this manner, the user determined location along the latitudinal but not the longitudinal scale.

Interestingly, the North Star has not been the same star throughout history, a phenomenon caused by Earth’s rotation very slowly on its axis, like a spinning top pushed slightly off balance, causing the axis to point in a different direction over time. More than 4,000 years ago, the star indicating north would have been located in the constellation Draco. In about 10,000 years, the new North Star will be Vega of the constellation Lyra.

See also GREEK EXPLORATION; LATITUDE AND LONGITUDE; MUSLIM EXPLORATION; NAVIGATION AND EXPLORATION; PHOENICIAN EXPLORATION.

North West Company

The North West Company was one of two great Canadian fur-trading concerns that helped open the West, what is now

Canada and northern parts of the United States. It coalesced in Montreal, Quebec, the center of commerce on the St. Lawrence River, in 1779, then reorganized in the 1780s and was active under that name until 1821, when it merged with its older rival, the HUDSON’S BAY COMPANY. The North West Company’s founders and its traders, known as Nor’westers (or Northwesters), were mostly Scottish.

18th Century

Many Scots moved to Montreal after the British takeover of New France in 1763; other Scots, loyal to Great Britain, took refuge there during and after the American Revolution of 1775–83. With the city being a center of the FUR TRADE, Scottish merchants began investing in their own operations. Some allied themselves with French merchants, or hired French VOYAGEURS, traders who had worked for other firms, as well as the COUREURS DE BOIS, unlicensed traders, to take advantage of their expertise. In the field, however, the competition between traders often led to violence. In 1779, a number of Scots active in the fur trade—Simon McTavish, James McGill, and Isaac Todd—formed a company, which, after other merchants had joined, became organized as the North West Company in the winter of 1783–84. A rival firm, Gregory and McLeod, merged with the North West Company in 1787. It was decided that the various trading companies who invested in the North West Company, some of which had interests other than the fur trade, could maintain their separate identities, working in conjunction with other shareholders known as “wintering partners,” who conducted the trade in the field with Native American tribes.

Much of the activity of the Nor’westers was in Prince Rupert’s Land, or Rupert’s Land, an area of northern and western Canada comprising the drainage basin of HUDSON BAY. The territory had been granted to the Hudson’s Bay Company by King Charles II at the time of that company’s founding in 1670, but much of the fur-rich region remained untapped. Grand Portage on western Lake Superior became the primary meeting place, where goods were exchanged. Traders, traveling by large CANOE, took European trade goods from Montreal to rendezvous with traders, generally in smaller canoes, carrying furs collected in the wilderness. The furs were then shipped to Montreal, then England.

In 1778–79, Connecticut-born PETER POND, who had gone into partnership with McTavish in 1777, led a fur-trading expedition from Cumberland House on the Saskatchewan River northwest to the Athabasca River as far as Lake Athabasca, where he traded with Chipewyan Indians. Pond also made the first map of the region. A decade later, in 1789, SIR ALEXANDER MACKENZIE, who migrated from Scotland to Canada via New York with his father, explored from the Great Slave Lake along the Mackenzie

River (named after him) to the Arctic Ocean. On a subsequent expedition, in 1792–93, in search of a water route to the Pacific Ocean, Mackenzie explored the Peace and Smoky Rivers, followed the Parsnip River into the ROCKY MOUNTAINS, located the Fraser River and descended Bella Coola River to the Pacific Ocean, completing the first overland journey across North America north of the Rio Grande.

19th Century

Among other Nor'westers who made a significant geographic contribution was Vermont-born SIMON FRASER. In 1805–08, exploring west of the Canadian Rockies, he followed the Fraser River (named after him), to its Pacific Ocean outlet in British Columbia. London-born DAVID THOMPSON of Welsh descent, who had started out as a Hudson's Bay Company trader, was in the North West Company's employ during two expeditions, in 1797–99, in which he explored and surveyed a vast region: from Lake Superior to Lake Winnipeg and Lake Winnipegosis; around the upper Red River, the Assiniboine River, and the upper MISSOURI RIVER; perhaps even the source of the MISSISSIPPI RIVER; and around Lesser Slave Lake and the Athabasca River. In 1800, he located the source of the Saskatchewan River in the Canadian Rockies. In 1804, Thompson became a partner in the company. In 1807–11, he carried out additional surveys, locating House Pass and Athabasca Pass in the Canadian Rockies and tracing the COLUMBIA RIVER from its source to the Pacific. Later settling in Montreal, he created the first accurately detailed map of the Canadian and American West, an area encompassing some 1.7 million square miles.

One of the founding partners in the North West Company was New Jersey-born ALEXANDER HENRY (the older). In 1791, his nephew ALEXANDER HENRY (the younger) acquired his shares in the company and began establishing and commanding trading posts along the Red River in present-day North Dakota. Over the next years, he founded a chain of posts for the company all the way to the Pacific Ocean. Similarly, in 1816–19, DONALD MACKENZIE, Alexander Mackenzie's Scottish-born cousin, after working for the Pacific Fur Company, a subsidiary of JOHN JACOB ASTOR'S AMERICAN FUR COMPANY, founded a number of North West Company posts in the Pacific Northwest. From them, he sent out fur-trapping brigades in what is now Washington, Oregon, and Idaho. After 1803, Fort William (present-day Thunder Bay, Ontario) became the primary rendezvous depot, replacing Grand Portage, which by then was American territory.

Relations between the wintering partners and the eastern merchants were not always smooth, with the former feeling that Simon McTavish and other merchants ignored many of their recommendations and were taking more than

a fair share of profits. In 1798, a group of dissatisfied traders broke away from the new North West Company and formed what became generally known as the XY Company because of the identifying marks on the fur bales. Alexander Mackenzie joined them in 1800. After the death of Simon McTavish in 1804, the breakaway group rejoined the North West Company.

The North West Company, meanwhile, with its wide-ranging traders, made significant headway in its competition with its rivals. In the north, it was active even in the region of Hudson Bay, formerly just the Hudson's Bay Company's domain. In the Pacific Northwest, it was active in Oregon Country, claimed by both the United States and England. During the War of 1812 between the United States and England, the North West Company eventually purchased Astoria from the American Fur Company. Astor's Southwest Fur Company, a subsidiary of the American Fur Company, established in 1811, involved some North West Company interests for a short time, until the war.

Meanwhile, in 1811, the Hudson's Bay Company granted one of their stockholders, Thomas Douglas, earl of Selkirk, a small part of Rupert's Land, along the Red River in present-day Manitoba, for an agricultural community. The first settlers, predominantly Scottish and some Irish peasants, arrived on the land patent in the summer of 1812. Their governor, Miles Macdonnell, fearing food shortages, gave notice to the Métis—the mixed-blood descendants of Cree and other Indians and French and Scots—that they were bound to sell their extra meat to his community rather than elsewhere. He also forbade the running of buffalo on horseback. The Métis ignored both edicts. The North West Company, aggravated by this sponsoring of farmers in fur country by their rival, supplied arms to the Métis and incited them to action. Violence broke out in 1816. Robert Semple, who had replaced Macdonnell as the colony's governor, and a number of militiamen were killed. Although the opposing factions agreed to the compromise outlined in the Selkirk Treaty of 1817, ill feelings and harassment lasted. The Selkirk incident and other conflicts led to involvement of the British government, which encouraged a merger of the two Canadian companies. It was realized in 1821, with licensing by the British government of additional territory extending to the Pacific Ocean on the west and the Arctic Ocean on the north. Although the North West Company was the more active of the two in the fur trade at that time, with more partners, the older Hudson's Bay Company controlled many of the favored westward routes, and the name of the latter company was retained.



In 1987, the Hudson's Bay Company, then active in the retail business, sold off some of its department stores in northern Canada. The company that purchased them took

the name of the North West Company and currently operates out of Winnipeg, Manitoba.

See also COMMERCE AND EXPLORATION.

North-West Company See COMPANY OF MERCHANTS OF LONDON DISCOVERERS OF THE NORTH-WEST PASSAGE.

Northwest Passage

The Northwest Passage is the sea route linking the Atlantic Ocean and Pacific Ocean, located north of the North American continent. In the course of the search for a Northwest Passage—and a variation on the concept, the Strait of Anian (see ANIAN, STRAIT OF)—explorers came to define the boundaries of North America. The story of this search involves not only the stubborn desire of many individuals to find a profitable trade route but also their refusal to abandon an unproven idea in the face of difficult odds. From the time that Europeans found the Americas blocking their way to the Pacific until the time that the Northwest Passage was successfully navigated by ship, more than four centuries would elapse.

Europeans Reach the Americas

When Italian mariner CHRISTOPHER COLUMBUS, exploring for Spain, came upon islands of the WEST INDIES in the Caribbean Sea in December 1492, he believed that he had reached the SPICE ISLANDS (the Moluccas) of the EAST INDIES in the Pacific Ocean. Over the course of three voyages in 1493–1504, Columbus continued searching for confirmation of his whereabouts. These travels would ultimately take him south and west, to present-day Venezuela and Panama. Other Spanish voyages would begin to reveal the scope of the Americas.

The Portuguese expedition of PEDRO ÁLVARS CABRAL in 1500–01, which made the European discovery of present-day Brazil, also furthered knowledge of South American geography. In a bold attempt to find a passage westward, Portuguese mariner FERDINAND MAGELLAN, in service to Spain, sailed along South America's east coast, eventually passing CAPE HORN and entering the Pacific in 1520. Magellan proved a sea journey westward from Europe to Asia possible but not profitable: Most Europeans were deterred from using this route for trade because it was prohibitively time-consuming and expensive. The need for a passage to the north—a Northwest Passage—would soon take hold in the minds of European geographers, explorers, and businessmen.

First Attempts to Locate a Passage

Italian mariner JOHN CABOT was the first European to begin exploring the North American coast systematically. Sailing

for England in 1497, he made the European discovery of the islands of Labrador and Newfoundland. His expedition had been financed with the hope of his reaching the Orient. On coming upon these islands, Cabot believed, like Columbus, that he was in Asia. His misconception would soon become apparent. Still, the discovery of the rich fishing grounds of the Grand Banks proved a boon to the English fishing industry, and the king rewarded Cabot for his accomplishment. The results of Cabot's follow-up expedition in 1498 also failed to find the hoped-for passage. In 1500 and 1509, Cabot's son, SEBASTIAN CABOT, also made voyages of exploration in that area. The younger Cabot sailed past the northern tip of Newfoundland and possibly some miles into HUDSON BAY as well.

The Portuguese also explored the northern coastal regions of North America in the late 15th century. GASPAR CÔRTE-REAL claimed to have made a 1499 voyage, in which he explored the seas to the west of GREENLAND and found an outlet to the fabled Strait of Anian—another name for a supposed passage, this one thought to angle southwestward and separate North America from Asia. Now in competition with England after John Cabot's voyages, King Manuel I authorized a continuation of his explorations. In 1500, CÔRTE-REAL sailed along the west coast of Greenland, possibly crossing the ARCTIC CIRCLE, but was forced to turn back by PACK ICE. Like his predecessor Cabot, CÔRTE-REAL mistakenly believed that he had reached the northern latitudes of Asia on this voyage. On a subsequent voyage in 1501, he and his crew were lost at sea. In 1502, MIGUEL CÔRTE-REAL mounted an expedition in search of his younger brother, and he too disappeared.

The French began their quest for a westward route to the Pacific in 1524 by sponsoring Italian mariner GIOVANNI DA VERRAZANO. He set off in January of that year for the North American continent and a passage west, expecting initially to find it to the south. Blown by uncooperative winds, Verrazano landed north of his destination along the coast of the Carolinas. Sighting Pamlico Sound near Cape Hatteras, he divined that he had found the Pacific. Continuing northward, he explored New York harbor and the mouth of the Hudson River. On the final leg of his journey, Verrazano sailed along the coast of present-day Maine and on to the southern regions of Newfoundland, making a claim for French possession of the lands he had seen.

France sponsored another search for the Northwest Passage 10 years later with an expedition headed by JACQUES CARTIER. In April 1534, Cartier took two ships to the then well-known fishing grounds of the Grand Banks and sailed around Newfoundland, which he was the first to describe correctly as an island. Entering the Gulf of St. Lawrence, he proceeded westward to the Gaspé Peninsula. There, he made friendly contact with the Huron (Wyan-

dot) Indians, among them chief DONNACONNA, who offered two of his sons as guides. After exploring the shores of Quebec, Cartier returned to France. He was again instructed to find the Northwest Passage and lands of wealth. On a second journey to Canada in 1535, he explored up the St. Lawrence River to the site of present-day Montreal. He mounted a third trip to Canada in 1541, during which his progress up the St. Lawrence was blocked by the Lachine Rapids.

With more and more ships rounding South Africa into the Pacific and with knowledge of the Pacific Ocean growing, European nations began searching for the western outlet of the Northwest Passage, although the search in the west focused on the mythical Strait of Anian with a hoped-for outlet in a warm climate. The Spanish—who, by the first part of the 1520s, had established themselves in Mexico—sought a route by which they could carry Aztec gold and trade goods back to Europe. Hoping to help Spain dominate both sea and land in North America, HERNÁN CORTÉS solicited the cooperation of his king in the exploration and discovery of such a passage. While exploring California's coast in 1535, he mistook Baja California, a peninsula, for an island and assumed that the Gulf of California was the desired passage. In 1539, FRANCISCO DE ULLOA was sent to confirm the findings of Cortés and ventured northward in the Gulf of California. He found the mouth of the COLORADO RIVER instead. A 1542 expedition by JUAN RODRÍGUEZ CABRILLO explored the northwest coast nearly as far north as San Francisco. Cabrillo died the following year, and his pilot, BARTOLOMÉ FERRELO, made a trip farther north, reaching Cape Blanco on the Oregon coast. Failing to find better passage, the Spanish thus had to content themselves with the route around the tip of South America.

A New Round of Expeditions

After a hiatus of nearly 70 years, the English experienced a renewed interest in the discovery of the Northwest Passage and/or the Strait of Anian. Inspired by the geographic theories of SIR HUMPHREY GILBERT, SIR MARTIN FROBISHER organized an expedition. In June 1576, he sailed westward with a complement of three ships “in search of the passage to Cathay,” as China was then known. He thought for a time he had discovered a passage, but it turned out to be a bay on the southern end of Baffin Island, now known as Frobisher Bay. He returned to England with a piece of ore that an assayer of questionable character claimed to contain gold. While Frobisher's two subsequent expeditions to that area were motivated chiefly by the desire for gold, the explorer did manage to penetrate several hundred miles into the Hudson Strait. Frobisher's quest for gold ultimately proved futile: The ore he discovered was nothing more than FOOL'S GOLD, the mineral pyrite.

English ambitions for the passage continued with the voyages of JOHN DAVIS. He was an excellent navigator and the inventor of the Davis QUADRANT, an improved version of earlier navigational tools. Davis's first voyage took place in 1585, during which he continued the English exploration of Baffin Island, including Cumberland Sound. He thought the sound to be the long-hoped-for passage, but pack ice prevented him from confirming this. A kidnapped Inuit (Eskimo) man aided Davis in his second expedition; he guided Davis and his crew northward along the west coast of Greenland. From there, Davis then continued his exploration of Baffin Island and explored Exeter Sound. He also revisited Cumberland Sound. On a third journey the following year, Davis set a new record for northernmost point achieved, nearly 73 degrees north latitude, but was once again turned away by ice. He continued to be confident, however, that the passage lay just beyond, waiting to be discovered when the weather proved satisfactory.

On the North American west coast, the English became a major nuisance to the Spanish treasure ships, largely in the person of SIR FRANCIS DRAKE. As he conducted raids on the Spanish in the Pacific, Drake also sought the western end of the Northwest Passage. A trip in 1579 took him as far as Vancouver Island near the present United States–Canada border without results. The 1602–03 voyage of the Spaniard SEBASTIÁN VISCAÍNO traced a similar portion of coastline, with equally disappointing results.

The 1609 voyage to the North Atlantic by HENRY HUDSON, an Englishman funded by the DUTCH EAST INDIA COMPANY, is notable in that he searched for both the NORTHEAST PASSAGE and the Northwest Passage. He first headed northward along the west coast of Norway. Encountering treacherous ice near Novaya Zemlya and receiving strong criticism from his crew, he turned back. Hudson was a willful captain, however, and asserting his prerogatives, he chose to head westward. On the east coast of North America he investigated both Chesapeake Bay, Delaware Bay, New York Bay, and the Hudson River (named for him) before returning to Europe. The following year, this time in the employ of English merchants, Hudson forged through the strait that now bears his name and came upon Hudson Bay (also named for him). Heading southward, he and his crew entered James Bay. The ship wintered at the southernmost point; the next summer, as they were heading back north, the crew mutinied and set Hudson, his son John, and seven loyal sailors adrift. They were never heard from again.

The western side of Hudson Bay was still unexplored, and, with the belief that it would reveal a passage to the east, a new company was formed in England. The COMPANY OF MERCHANTS OF LONDON DISCOVERERS OF THE NORTHWEST PASSAGE, with some of the same members as the MUSCOVY COMPANY, sent SIR THOMAS BUTTON to the bay on a scouting mission in 1612. He landed on Hudson Bay's west

shore at the mouth of the Nelson River. The expedition wintered there; the following spring, Button sailed northward along the coast as far as Southampton Island. Once again, a promising body of water had yielded no route west. Nevertheless, Button had charted 600 miles of previously unknown coastline.

In 1615, WILLIAM BAFFIN, accompanied by ROBERT BYLOT (who had sailed with both Hudson and Button), again searched for an outlet along the west shore of Hudson Bay. In a second expedition the following year, Baffin and Bylot took a different route in search of the passage. Making for the extreme north along the coast of Greenland, they were determined to go beyond the haunts of the whalers of Davis Strait. Entering the region that came to be known as Baffin Bay, they set a new northernmost record at 78 degrees latitude. On the way home they discovered and named Lancaster Sound, which would later prove to be the opening to the actual Northwest Passage.

Another journey of note was conducted by Danish explorer JENS ERIKSEN MUNK. He embarked in May 1619, winding his way past Greenland to Frobisher Bay, then on to Hudson Strait and Hudson Bay. He and his crew wintered at Churchill River on the west shore of the bay and became severely ill with SCURVY and, perhaps, food poisoning. Only Munk and two others survived, managing to return to Denmark in September 1620.

The last search of this era occurred between two rival English expeditions. In May 1631, LUKE FOXE and THOMAS JAMES left England only two days apart, both bound for Hudson Bay. In August of that year, the two captains had dinner together at James Bay. Foxe returned to England, having been convinced by his observations that no outlet to the west existed in Hudson Bay, while James wintered on Charlton Island. James and his crew suffered horribly through the winter, the weather being severe and scurvy claiming some of his crew. When summer 1632 arrived, James investigated Foxe Channel before returning to England.

Hudson's Bay Company

Over the ensuing decades, the English and the French fought for decades for dominance of Hudson Bay and its lucrative FUR TRADE with the Indians. The HUDSON'S BAY COMPANY, chartered in 1670, was the sole legal representative of England in the area, while a number of French interests attempted to develop the region. Following the Treaty of Utrecht in 1713, which secured its outposts in the region, the Hudson's Bay Company began a new phase of exploration in the area. The newly appointed governor for the company was JAMES KNIGHT. In 1715, he sent William Stuart on a diplomatic mission to the Indians west of the post at Churchill. Stuart's travels lasted nearly a year. He returned with Chipewyan Indians, who told Knight of "Ships in the

Western Seas" and "a Yellow Mettle" to the northwest. Such tales proved irresistible to Knight, who sought support from his company for an expedition. He was close to 80 years old when he and his two ships sailed northward in 1719. It was late in the season, and they became trapped in the ice off Marble Island. In a particularly sad episode in the search for the passage, all members of the group perished. The remains of the ships were not found for another 50 years.

Political heat began to grow against the Hudson's Bay Company. Their royal charter granted the group a monopoly on trade in the region, yet they were lax in fulfilling their duty to explore the area and to expand the power of England, which was still in competition with France. A member of Parliament, Arthur Dobbs, enlisted the help of the Royal Navy and, in 1742, sent an expedition under CHRISTOPHER MIDDLETON to form a basis to challenge the company's monopoly. Middleton chose the warmest time of year for his expedition and achieved the northernmost point of the bay yet discovered. The European discovery of Wager Bay is credited to him, as is the discovery of Repulse Bay, where the narrow seas between Southampton Island and the continent were frozen. Dobbs insisted on a second expedition, which was captained by WILLIAM MOOR in 1746–47. He sailed into Chesterfield Inlet and farther into Wager Bay than Middleton had gone, once again to no avail.

SAMUEL HEARNE's overland expedition of 1770–72 for the Hudson's Bay Company helped dispel remaining myths. With the help of the Chipewyan MATONABBEE, he headed northwestward from Fort Churchill in the employ of the Hudson's Bay Company. At the Great Slave Lake, he turned to the north, eventually reaching the north shore of North America on the Arctic Ocean at the mouth of the Coppermine River. He was fully aware of his achievement on this journey, reporting back the absence of an inland waterway capable of accommodating oceangoing ships and making it apparent that the search for the Northwest Passage would have to concentrate on more northerly regions, counter to prevalent views of the Strait of Anian.

Pacific Northwest

In the 1770s, the Spanish stepped up their activities in the Pacific Northwest, including the search for a western outlet for a passage across North America. JUAN JOSEF PÉREZ HERNÁNDEZ was deployed in 1774 to explore the coast and to claim all the lands attractive for settlement as far north as 60 degrees north latitude. He made it as far north as Queen Charlotte Island, where he traded with the Haida Indians, a tribe that had been previously unknown to the Europeans. Unfavorable winds prevented him from proceeding farther, and he fell approximately 17 degrees short of completing his mission. The next year, two ships were sent north, one under the command of BRUNO HECETA and the other captained by JUAN FRANCISCO DE LA BODEGA Y QUADRA. Heceta

reached as far north as Vancouver Island before turning back, the ship taking on water and the crew beset by scurvy. Bodega y Quadra's ship continued northward. After achieving 58 degrees 30 minutes north latitude, he was turned away by rough seas. The most dramatic results were accomplished by Bodega y Quadra and Ignacio de Arteaga in 1779, when they passed the coast of Canada and explored the islands and bays of the Gulf of Alaska. Arteaga took possession of Hinchinbrook Island in July and sailed westward, grazing the tip of Kodiak Island before returning southward. Arteaga had found no passage and thus confidently reported that there was no chance of the British finding it either. Such an assessment was premature, since Arteaga had not ventured beyond the Alaskan Peninsula, where the sea offers entry among the Aleutian Islands.

The expedition that did go beyond the Aleutians had occurred the previous year, under the direction of Englishman JAMES COOK. After Hearne's discovery of the north shore of the continent in 1771, hope had been renewed for finding the passage. Jacob Stählin published a map that showed a great strait to the north of "Alaschka." In spring 1778, Cook sailed along the shore of Alaska, not realizing how far west he would have to go. He had hopes raised and dashed several times as so many prior expeditions had experienced. He explored Prince William Sound and found it to be a dead end. Cook Inlet, which doubled back to the east for a substantial distance, also proved not to be the desired passage. By August, Cook had found the BERING STRAIT and sailed northward, tracing the coastline as he went. Setting a record for northernmost point in that part of the world on August 18, at 70 degrees 41 minutes, he was turned back by ice as high and solid as a wall.

Trading became more established along North America's northwest coast in the following years, and competition intensified between Spain, England, France, and the United States. The Strait of Juan de Fuca still had not been adequately described, and, from 1786 until the mid-1790s, all four of these nations sent expeditions to stake their claims. The most thorough of these expeditions was conducted by GEORGE VANCOUVER in 1792–94. Sailing for the British, he mapped the coastline, circumnavigated Vancouver Island, and determined that the coastline from California and Alaska offered no outlet.

Meanwhile, others continued to seek a Northwest Passage by exploring westward by land. American-born ROBERT ROGERS, who established his reputation in the French and Indian War of 1754–63, dreamed of locating a water route to the Pacific and dispatched fellow soldier JONATHAN CARVER to the western Great Lakes and beyond to the MISSISSIPPI RIVER. But, because of a lack of supplies, the expedition proceeded no farther, lands to the west remained uncharted, and the issue of a water route west remained unresolved.

19th Century

At the start of the 19th century, there was still a belief that there was a practical water connection through North America. Even American MERIWETHER LEWIS of the U.S. Lewis and Clark Expedition of 1804–06 thought he might determine such a passage as he headed up the MISSOURI RIVER with the Corps of Discovery, eventually coming up against the ROCKY MOUNTAINS. Later exploration for such a passage concentrated on Arctic waters.

As Great Britain entered the second decade of the 19th century, it had a large and powerful navy that was underoccupied in the wake of the Napoleonic Wars. The growth of an interest in natural science, and Russian activity in Alaska ever since the voyages of VITUS JONASSEN BERING in the 1720s–1740s, helped to renew talk of exploration in the polar sea. The event that began this next phase came in 1817, when WILLIAM SCORESBY, JR., returned from a whaling expedition to the North Atlantic with the report of unusually clear seas north of the Arctic Circle. The news reached SIR JOSEPH BANKS who passed it to SIR JOHN BARROW, the head of the Admiralty, who immediately began preparations. An 1818 expedition led by SIR JOHN ROSS, with SIR WILLIAM EDWARD PARRY commanding a second ship, set out to explore east of Baffin Island. The first portion of their journey took them north along Greenland's west coast into Smith Sound. Finding it impassable, they looped to the south along the east coast of Ellesmere Island, where they came upon Jones Sound. This, too, was blocked by ice, and they proceeded southward to Lancaster Sound. Ross believed he sighted a chain of mountains blocking the end of the sound, which he named the "Croker Mountains." No one else had seen them, including Parry, who was greatly dismayed at having to turn back for England. Ross was criticized for this incident for some time to come.

The British navy wasted no time in planning another expedition to the Canadian Arctic for 1819. The navy decided to mount a two-pronged strategy, with a naval component headed by Parry and an overland caravan to the mouth of the Coppermine River led by SIR JOHN FRANKLIN. Parry entered Lancaster Sound, whereupon he soon debunked Ross's mountains as a mirage (and seeming to take some pleasure as he described in his journal the good conditions his ship encountered). After investigating Prince Regent Inlet, he headed westward, passing the NORTH MAGNETIC POLE as he skirted the permanent pack ice to the north. In August 1820, Parry was halted by ice at the northern end of Bank Island and headed back to England. Franklin's expedition traveled eastward, where they mapped more than 500 miles of coastline. They soon ran short of food, however, and the situation quickly deteriorated; murder and cannibalism infected the group. Franklin and a small group of survivors managed to return to Hudson Bay in 1822. Meanwhile, in 1821, Parry made another voyage

from Hudson Strait to Foxe Basin, entering Fury and Hecla Straits on the northern end of Melville Peninsula.

Franklin mounted a second expedition in 1825, this time traveling down the Mackenzie River to its outlet in the Beaufort Sea. Here, his party split: Franklin and GEORGE BACK traveled westward, and SIR JOHN RICHARDSON, also part of the original party, eastward. Franklin had hoped to meet with Captain FREDERICK WILLIAM BEECHEY, coming from the west via Alaska, but Beechey had been stopped by ice buildup. Franklin returned to the east after finding and naming Prudhoe Bay.

More than 10 years after the “Croker Mountains” incident, Captain John Ross was given a chance to redeem himself by the philanthropist Felix Booth, who, in 1829, financed Ross’s next expedition to map the passage. Returning to the region through Lancaster Sound, Ross and his nephew, SIR JAMES CLARK ROSS, sailed southward along the Boothia Peninsula, conducting land excursions as well. The expedition proved to be a long one. In May 1832, with their ship trapped in ice, captain and crew headed northward on foot. After about 300 miles, they came upon the wreck of the *Fury*, a ship Parry had used. They set up camp for the winter, living off the provisions on the abandoned ship. In spring, they made for Lancaster Sound and were rescued in August 1833. Ross was knighted the following year; he was also awarded a prize of £5,000 by Parliament, which he shared with his men.

As of 1837, the mapping of the Northwest Passage remained incomplete. On an expedition for the Hudson’s Bay Company in 1837–38, PETER WARREN DEASE and SIR THOMAS SIMPSON sketched in the northern edge of the continent between the Return Islands and Point Barrow. On a second expedition, from 1838 to 1839, they mapped the coast from Coronation Gulf to Rae Strait. Here they just missed solving the riddle of the passage because the strait, which Ross had navigated just a few years earlier, was frozen.

The most publicized story in the search for the Northwest Passage was the final voyage of Sir John Franklin. Leaving England in May 1845 with two ships, the *Erebus* and the *Terror*, he passed through Lancaster Sound, continuing northward past Devon Island into Wellington Channel. After circling Cornwallis Island and navigating Barrow Strait, he headed southward through Peel Strait and into Franklin Strait. In September 1846, pack ice began to form, and off the coast of King William Island in Victoria Strait the Franklin expedition was trapped. In June the following year Franklin died. Some of his men managed to make it south to the Boothia Peninsula, where they perished in 1848. The lack of news from the expedition was slow to generate a response. No rescue missions went out immediately to find Franklin and his crew, since it was known that they had supplies enough for three years. When it became ap-

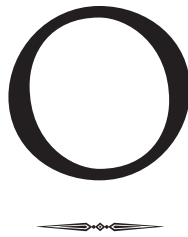
parent that Franklin was missing, however, there ensued a great outpouring of effort: Between 1847 and 1878, some 50 expeditions set out to find Franklin and to garner information of his expedition’s fate (see SEARCHES FOR MISSING EXPLORERS).

Through the Northwest Passage

ROALD ENGELBREGT GRAVNING AMUNDSEN headed the expedition that finally succeeded in traveling the whole length of the Northwest Passage in 1903–06. In making this journey, Amundsen used a small Norwegian fishing boat named the *Gjoa*, which proved easy to handle and quite sturdy. Amundsen was a meticulous planner and had provisions on board to last five years; furthermore, he was careful to take measures to provide safety and comfort for the crew of six. In order to avoid having his ship impounded by creditors, Amundsen left Norway in June 1903, under cover of night and in pouring rain. His expedition succeeded in its mission by sailing beyond Greenland into Baffin Bay and Lancaster Sound, then down Peel Strait into Franklin Strait. Along with the completion of the Northwest Passage, it was Amundsen’s objective to locate the North Magnetic Pole. Amundsen wintered at a bay on the south coast of King William Island, and he and his crew made measurements in the area until August 1905. In making the passage, he then proceeded through Rae Strait, staying close to the shore in Queen Maud Gulf, through Dease Strait and Coronation Gulf, into what came to be known as Amundsen Gulf. On September 2, the group became trapped in ice near King Point. While waiting for the thaw, Amundsen made an overland trek through the Yukon. In July 1906, when the ship was finally freed from the ice, he continued along the northern Canadian border, around Alaska, through the Bering Strait, and on to California. Amundsen had been preparing a navigation of the Northwest Passage for years. When he finally accomplished the elusive goal, he made it seem simple.



By the time it had been fully mapped and explored, the Northwest Passage was no longer considered to be the “holy grail” of trade routes. The Panama Canal, completed in Central America in 1914, created a practical water route through the Americas. Activity continued in Arctic waterways, for both trade and military purposes, but not as a passage between oceans. For a time it was thought that the route might be used west to east for carrying oil from the North Slope of Alaska to the eastern United States, but the building of the Alaska pipeline made that notion obsolete. The history of the Northwest Passage and the four-century-long search for it thus has more relevance in the geographic knowledge gained than in pioneering a new water route.



ocean currents

Earth's oceans have patterns of movement known as ocean currents. There are several major factors that contribute to the direction of ocean currents: Earth's rotation; wind friction at the surface of the water; variations in water density resulting from differences in temperature and salinity; and the effect of landmasses.

Surface currents flow in several basic circulatory patterns known as gyres. There are numerous regional exceptions, with many branch and feeder currents helping circulate waters. Surface currents are classified by intensity as "streams," the fastest at two to four miles per hour; the slower "drifts"; or the barely perceptible "creeps." Tidal currents, a type of surface current, are shaped by tide, the alternate rise and fall of waters caused by the gravitational effect of the Moon, Sun, and, to a lesser extent, other celestial bodies. There are also flow patterns in the deep ocean, including immense underwater cascades, or cataracts, that develop when cold water near the ocean floor spills over the edge of one ocean basin into another.

The TRADE WINDS are the basic wind systems in the Atlantic, the Pacific, and the Indian Oceans in both the Northern Hemisphere and Southern Hemisphere. In the Northern Hemisphere, they circulate in a clockwise direction, while in the Southern Hemisphere they move counterclockwise. They contribute significantly to the circular motion of the oceans. Another significant factor is the Coriolis effect (or, Coriolis force or Coriolis acceleration), named for its dis-

coverer Gaspar Coriolis, a 19th-century French civil engineer. This is an apparent force on winds, cloud, and aircraft caused by the rotation of Earth under them, such that their motion is deflected clockwise in the Northern Hemisphere and counterclockwise in the Southern Hemisphere, although speed is unaffected. The Coriolis effect arises from the fact that, because of the higher pressures at higher altitudes of the warm air masses near the EQUATOR relative to those at the same altitudes to the north, an airflow toward the NORTH POLE and the SOUTH POLE occurs. In the Northern Hemisphere this flow is deflected by friction to the right or eastward as Earth's surface rotates from west to east beneath it. The effect is zero at the equator and increases with increasing latitude; it is responsible for the prevailing westerly winds over North America. When winds and the Coriolis effect interact with the continents, the major circular current systems of the ocean, or gyres, are created. It is useful to remember that meteorologists name winds for the direction from which they come, and oceanographers cite the direction in which currents go.

The surface waters of the Atlantic have two large gyres, one in the North Atlantic and one in the South Atlantic. The currents of the North Atlantic, including the North Equatorial Current, the Canaries Current, and the GULF STREAM, flow in a clockwise direction, again caused by heating at the equator, which causes ocean water to move northward at the same time as it is being carried eastward by Earth's rotation. The Gulf Stream is thought to have been

slowed in the past by warming of North Atlantic waters, perhaps contributing to the ice ages. The currents of the South Atlantic, including the South Equatorial Current, Brazil Current, and Benguela Current, flow in a counterclockwise direction.

The North Pacific has a clockwise current system divided into four main sections. In the north is the North Pacific Current. This feeds the California Current, which becomes the North Equatorial Current, and then the Japan (Kuroshio) Current. The South Pacific has currents rotating in a counterclockwise direction, from the Antarctic Drift, to the Peru Current, and the South Equatorial Current, which is split into three parts by Australia and New Guinea.

In its southern regions, the Indian Ocean has counterclockwise currents similar to those of the Atlantic and Pacific. These include the South Equatorial Current, the Mozambique Current, and the West Australian Current. In the north, the currents are dominated by the seasonal monsoon winds.

In the higher latitudes of the Northern and Southern Hemispheres are counter-rotating gyres, one rotating counterclockwise in Arctic regions and one rotating clockwise in Antarctic regions. The Antarctic Circumpolar Current (West Wind Drift) encircles the globe, merging the waters of the Atlantic, Pacific, and Indian Oceans without interference of land.

Just to the north of the equator, in all three oceans, there runs an eastward-flowing equatorial countercurrent. When the two westward-flowing currents from each hemisphere meet land near the equator, water pressure builds up. Some of the water flows north and some flows south. A third current is formed in the middle, encouraged by the band of upwelling air in the region known as the DOLDRUMS. The doldrums are relatively calm and, combined with the slow-moving equatorial countercurrents, have been feared by sailors for centuries.

Once a current system was understood, it could be used to great advantage by the skilled navigator. By taking a route in harmony with a strong current, the sailor can add several knots to the speed of his ship. One of Italian mariner CHRISTOPHER COLUMBUS's accomplishments on his first transatlantic journey was using the Gulf Stream to return to Europe in 1493. The first charts to show ocean currents were drafted in about 1665.

Oceania

The term *Oceania* refers to a vast expanse of islands in the tropical and the subtropical regions of the Pacific Ocean. The islands of Oceania are divided into three main groups—Melanesia, Micronesia, and Polynesia. They are differentiated by the physical characteristics of the islands, as well as by the inhabitants on them. Of the physical characteristics,

the islands of Oceania are of two basic types—volcanic and coral. The volcanic islands are almost always the larger, and the only ones with mountains. They are primarily composed of basalt, a black volcanic rock. The coral islands, also called atolls, have a limestone base formed from the skeletons of the coral animal. These are small, low-lying, and have limited resources, although some are large enough to sustain human populations. The formation of atolls is not completely understood geologically, but it is believed that they, too, have a volcanic origin, their underwater formations offering corals a place to grow. When the volcanic substrate was eroded, or otherwise retreated to the ocean floor, the coral would continue to expand upon its base. In all, the islands of Oceania number some 25,000, only a few thousand of which are named.

In the west, Oceania begins where the Moluccas (SPICE ISLANDS) end. One of the largest of its islands, New Guinea, marks the western extent of Melanesia. The name *Melanesia*—based on the Greek roots for “black islands”—refers to their volcanic origin. Extending east and south, Melanesia includes the Bismarck Archipelago, the Solomon Islands, the Santa Cruz Islands, the New Hebrides, New Caledonia, and the Fiji Island group. To the north of Melanesia, yet forming an arc to the southeast, are the islands of Micronesia. The name *Micronesia* is from the Greek for “small islands.” Micronesia contains the Mariana Islands in the northwest, the Caroline Islands to the south, the Marshall Islands to the east and the Gilbert and Ellice groups. The name *Polynesia* means “many islands.” Polynesia is the most widely scattered group and also the most diverse morphologically. Polynesia forms a triangle to the east of Melanesia and Micronesia. The HAWAIIAN ISLANDS are at its apex to the north; NEW ZEALAND occupies the southwest corner; and Easter Island is situated in the southeast corner. Island groups and islands in the middle of the triangle include American Samoa, Cook Islands, French Polynesia (Society Islands, Marquesas Islands, Tubuai Islands, Tuamotu Islands, and Gambier Islands), Niue, Pitcairn Islands, Samoa (formerly Western Samoa), Tokelau, Tonga, Tuvalu, and the Wallis and Futuna Islands.

First Inhabitants

The process by which the islands of Oceania were settled is the subject of ongoing study. The best information comes from research on those peoples who are alive today—their physical characteristics, their technologies, religions, and arts. This is not a simple task, for there has been much mixing among the various ethnic groups that migrated to the islands. It is widely accepted that Melanesia was the first section of Oceania to be settled. Between 20,000 and 11,000 years ago, as the last ice age was ending, these islands became isolated from one another and the rest of Southeast Asia. It is believed that the first residents of the area at the time

were a group having Negroid characteristics. The stone-age tribes who continue to inhabit the mountains of New Guinea are the best living representatives of these people. As they diffused through the islands, they were met by another strain of aboriginal people, the Negritos, who were shorter of stature and came from the Andaman Islands, the Philippines, and Malaya. These may have been the peoples who also migrated to Africa and became the Mubuti. A third group also figures into the ancient settlement of Melanesia, and these are called the Ainoids; they possess Caucasian features, with lighter skin and hairier bodies. The Ainu people of Northern Japan are a modern incarnation of this stock. There were two or three great waves of migration of these peoples more than 10,000 years ago to the islands of Melanesia, which resulted in the mixing of blood and the creation of a new group. Melanesians of ancient ancestry have dark skin, curly hair, and a strong build. These people were hunter-gatherers and fishermen. They were joined by yet another group, a Proto-Malay people, between 4,000 and 5,000 years ago, who had light brown skin, straighter hair, and broad cheekbones. The Proto-Malays introduced the cultivation of plants and raising animals. They also made more advanced tools from stone.

The settlement of Micronesia was more recent than that of Melanesia, since many of the atolls of the region had yet to be formed when Melanesia was becoming populated. Micronesia was probably settled around 5,000 years ago, as the Proto-Malays swept into Melanesia. As the former Melanesians came upon these smaller, less fertile islands, they adapted their lifestyles to the resources available. They were no longer able to make pottery, and agriculture was more limited, so they became more practiced in the arts of the sea. Boat-building, seafaring, and navigation became the center of the culture in Micronesia.

The islands of Polynesia were populated last, probably starting with the Marquesas. It is generally held that the Polynesians originated in Southeast Asia, although some scholars believe they migrated to the region from the Americas. They show characteristics of a mixture of ethnic groups, with Asian and Caucasian features most apparent.

Arrival of Europeans

The European discovery of Oceania occurred in the early 16th century. The arrival of Europeans to the South Pacific was inspired by the SPICE TRADE, which had been monopolized by Arab merchants. The Portuguese were the first Europeans to arrive in the region, and it may have been Antonio d'Abreu who first saw Oceania when he made the European discovery of New Guinea in 1511. Commercial interests were paramount, however, and, after setting up operations in the Spice Islands, the Portuguese carried out few explorations of islands to the east. The Spanish, who had been excluded from the Portuguese route around Africa, es-

tablished the westward route to the Pacific in 1520, when FERDINAND MAGELLAN rounded South America. He made the European discovery of the Marianas Islands the next year.

In later years, growing commercial competition between Portugal and Spain led to growing knowledge of the South Pacific Islands. The Spanish took the lead. In 1528, ÁLVARO DE SAAVEDRA CERÓN found parts of the Caroline and the Marshall groups. In hopes of finding the GREAT SOUTHERN CONTINENT (*Terra Australis*), ÁLVARO DE MENDAÑA, also working for Spain, came upon the Solomon Islands in 1567. On a later expedition in 1595, he found the Marquesas and the Santa Cruz Islands. De Mendaña died on this journey, and command was assumed by his pilot, PEDRO FERNÁNDEZ DE QUIRÓS, who proved to be one of Oceania's more successful explorers, and, on his voyage of 1605–06, he made the European discovery of islands in the Samoa group, the Cook group, and the New Hebrides.

Other European nations began exploring the region for new markets. The Dutch began to challenge the Portuguese in the Spice Islands and started to reap great profits. WILLEM CORNELIS SCHOUTEN, who sailed for the DUTCH EAST INDIA COMPANY, discovered the Bismarck Archipelago in 1616. ABEL JANSZON TASMÁN, another Dutchman working for the same company, made the European discovery of New Zealand, parts of the Friendly Islands, and the Fiji group on his expedition of 1642–43. The other great Dutch explorer to navigate the waters of Oceania was JAKOB ROGGEVEEN, who located Easter Island and islands in the Samoan chain in 1722.

Growing Knowledge

Though they were late in arriving, the British made important contributions to the exploration of Oceania. Improved navigational technology helped fix the position of islands that had been discovered and rediscovered, names were sorted out, and more accurate maps were made. In his expedition of 1764–66, JOHN BYRON explored previously uncharted islands in the Marshalls and Marianas. SAMUEL WALLIS and PHILIP CARTERET were commissioned by the British Admiralty to journey to the Pacific in 1766; Wallis went on to make the European discovery of Tahiti, part of the Society Island group; Carteret made the European discovery of Pitcairn Island. Their findings were followed up by the most tireless and successful of all the explorers of Oceania and the Pacific, JAMES COOK. Cook visited the Society Islands and New Zealand on his first Pacific voyage of 1768–71. On his second Pacific voyage, in 1772–75, he returned to those islands again and visited New Caledonia and the New Hebrides. Cook's greatest accomplishments were made on his third Pacific voyage of 1776 to 1780. It was then that he made the European discovery of the Hawaiian Islands and charted the Cook and the Friendly Islands.

Modern Oceania

Because of their wide range, and the minute size of some of the islands, the complete cataloging of Oceania did not take place until the advent of SATELLITE technology. Their populations are still in flux, as atolls become depleted of resources, and political boundaries are shifted. Colonization has had a profound effect on the native peoples, because of foreign diseases, slavery, new religions, and other cultural practices. The human population of 1.2 million is still largely indigenous, with only 20 percent Asian and 7 percent European stock. Oceania has exported agricultural products such as copra (from the coconut), fruits, and timber. It has also given up her mineral deposits to the west, including phosphates. Today, tourism presents the best hope for a sustainable economy on many of the islands of Oceania.

See also PACIFIC OCEAN, EXPLORATION OF THE; POLYNESIAN EXPLORATION.

oceanography and exploration

Oceanography is the study of the world's oceans and makes use of all the scientific disciplines in studying them and studying their interactions with land and atmosphere. As HYDROGRAPHY—the surveying, charting, and sounding of water bodies—oceanography is a branch of geography.

It is often said that we know less about the world's oceans than we do about space. To deep-sea explorers, the water pressure in ocean depths presents technical challenges that rival those of walking on the Moon. Underwater exploration is also a resource-intensive activity, involving significant risks and uncertain reward. In recent decades deep-sea risks to both life and equipment have been reduced but by no means eliminated. For these reasons, the active environment of the undersea world has yet to be comprehensively explored, and there are still many species of plants and animals yet to be discovered.

Four Oceanographic Specialties

In order to allow for precise study of the world's oceans, oceanography has been divided into four principal specialties. One is physical oceanography, which is concerned with the motion of water in the oceans, from fast-moving OCEAN CURRENTS to the slower mixing processes that take place. The study of winds and temperatures are central to this specialty. Another division of oceanography is chemical oceanography. This field examines the chemical composition of seawater and its local variations, as well as all chemical reactions that occur in the ocean (and between the ocean and the ocean floor). As salinity (salt content) varies with temperature, the disciplines of chemical and physical oceanography intersect frequently. The third type of study, geological oceanography, looks at the changing topography of the ocean floor, in the past and present. The bottom of

the ocean is an active place and at least as varied in morphology as surface land. Finally, biological oceanography is the study of the flora and fauna living in the ocean. Water temperature, nutrients in the water, and conditions on the ocean's floor all influence which species thrive in which seas. For example, in the process of upwelling, winds generate surface currents that draw cool, nutrient-rich water from the ocean's bottom, creating favorable conditions for the development of plankton, which plays a critical part in the food chain for all other ocean life. Perhaps even more than in terrestrial systems, ocean subspecies are interconnected: The study and understanding of a single species is extremely difficult in isolation.

The Foundations of Oceanography

Humankind's study of the oceans began for practical reasons. The ancients traveled on the seas for a variety of purposes, including migration, trade, warfare, fishing, and tourism. To make these activities safer, travelers sought to understand the oceans' weather conditions and hazards. The MEDITERRANEAN SEA, a relatively hospitable body of water, served as an ideal laboratory for ancient peoples, such as the Minoans, Egyptians, Phoenicians, and Greeks, to practice their sea craft and to learn about the oceans, starting with the mariners, but also pursued by scholars, especially among the Greeks. The type of ancient text known as a PERIPLUS (plural form, *peripli*), associated especially with the Greeks and Romans, served as sailing and harbor guides, describing landmarks, harbors, anchorages, watering places, and winds and currents of familiar regions.

In the fifth century B.C., Greek philosopher Parmenides hypothesized that the Earth was round. At that time, there was much speculation concerning what lay at the edges of the world, such as unbearably frigid zones and whirlpools. As it developed, Greek geography became more accurate and detailed. ERATOSTHENES, a mathematician, astronomer, and geographer, calculated the circumference of Earth with good precision in about 250 B.C. The ratio of land to ocean and the geography and geology of coastlines were of interest to later Greek scholars such as STRABO, who, in about A.D. 18, theorized that one could circumnavigate the globe (see CIRCUMNAVIGATION OF THE WORLD) and wrote the work known as *Geographia*. The Greeks also began to classify living things into groups and subgroups and recognized the difference between oceanic mammals, such as whales, dolphins, and fish.

One aspect of oceanic exploration that has always depended more on the courage and fortitude of the individual than on the precepts of science and technology is the art of free diving. Archaeological evidence from Mesopotamia (in the form of shells that could only have been collected from the ocean floor) demonstrates that man has been free diving since at least 4500 B.C. Decorative objects made from

mother-of-pearl were popular in Egypt starting about 3200 B.C., which indicates that harvesting the oysters from which these decorative objects were made was an industry in its own right. Collecting sponges from the ocean bottom for various practical uses has been an activity of many ancient peoples. The Greeks are perhaps the most famous for their sponge diving, an endeavor that continues to this day.

Superstitions of the Middle Ages slowed the advancement of all the sciences, including oceanography. When HENRY THE NAVIGATOR, prince of Portugal, developed the CARAVEL to navigate the waters along the west coast of Africa in the 15th century, oceanography underwent a resurgence, again for practical reasons. Trade with the East was the goal, and maritime transportation, the means. Inclement weather and dangerous coastlines were merely obstacles to overcome. Europeans learned of the monsoon winds of the Indian Ocean from the Arab Muslims, who had been trading in the East for centuries. Ocean currents, which sailors always sought to take advantage of, became more important in navigation. In the late 15th century, Italian CHRISTOPHER COLUMBUS, who was innovative in many areas of seamanship, used the GULF STREAM to return to Spain, the sponsoring country of his expeditions. In the 17th century, on the way around Africa to the SPICE ISLANDS (the Moluccas), the Dutch discovered the “roaring forties,” winds which send a sailing ship speedily on its way eastward.

Pioneers of Oceanography

As trade routes were established, and the hydrography of ports and dangerous waters were mapped, ocean science began to be developed more independently. Englishman JAMES COOK, an excellent hydrographer in his day, is often credited with helping to legitimize study of ocean geography as a scientific inquiry in its own right. In 1759–60, working for his homeland of England, he mapped the lower portion of the St. Lawrence River and its outlets in northeastern North America. He returned to the region in 1763 and spent three years mapping the coast of Newfoundland. Cook is most famous, however, for his three expeditions to the Pacific Ocean, between 1768 and 1780. These voyages included explorations to the northern Arctic and the southern Antarctic regions. A staff of scientists traveled with him to make observations of the physical condition of the seas and to collect specimens of living creatures. JOHANN REINHOLD FORSTER, a German naturalist, made some of the earliest oceanographic studies, discovering differences in ocean temperature at different depths, the key to understanding the genesis of ocean currents and ultimately worldwide weather patterns. Cook was greatly aided in the accurate recording of his data by the use of the CHRONOMETER, which had recently been invented. Using the chronometer, Cook was able to compute longitude accurately, which then enabled him to map

more precisely the location of land, islands, currents, and weather patterns.

Another pioneer in oceanography was Frenchman LOUIS-FERDINAND MARSIGLI. In 1706–08, while living in southern France, he surveyed and studied the Mediterranean's coastline and floor, including the ocean's waves, tides, and currents. He also collected wildlife specimens, especially corals, and examined them under a microscope.

German naturalist and traveler ALEXANDER VON HUMBOLDT had a keen sense of the physical world, and his scientific inquiries led to the development of many of the basic concepts in geography and meteorology. During his extensive travels in South America at the turn of the 19th century, he observed the cool, humid climate of Peru and rightly made the connection between Peru's climate and a low-temperature current generated by the southern winds.

In 1770, Benjamin Franklin published a map of the Gulf Stream, using information he had obtained from whalers. For this he is credited with having originated oceanography in America. His pioneering study of detailed records—that is, ships' logs as an aid to oceanography—yielded the practical benefit of decreasing shipping times for merchant vessels. Another American innovator, MATTHEW FONTAINE MAURY, working for the U.S. Navy, studied the interaction between the weather and currents in the Atlantic Ocean. In 1842, the navy employed him as chart-keeper, which provided him with a wealth of material to study. The routes he designed made sea travel much more efficient. His 1855 book, *The Physical Geography of the Sea*, dealing with currents and depth soundings, is considered the first textbook of modern oceanography.

Englishman EDWARD FORBES took a multidisciplinary approach to the study of the sea. Trained in geology, biology, and paleontology, Forbes described the different layers of ocean and the life that inhabited them. In 1850, he postulated that beyond 1,800 feet below sea level, in what he labeled the Azoic zone, no life could exist. From a sample dredged on the ocean floor and preserved in alcohol, he came to believe in a primordial ooze that gave rise to life as we know it. It was later realized that his gelatinous ooze was a precipitate of calcium sulfate, caused by a reaction between the alcohol and seawater. Despite some of his wrong conclusions, Forbes has been referred to as the “father of marine biology” because of his focus on marine life and his methodology.

The Challenger Expedition

Several factors led the British government, in cooperation with the ROYAL SOCIETY, to sponsor the voyage of the *Challenger* in 1872–76. Though scientists had made oceanographic trips before it, the *Challenger* expedition is considered the beginning of serious ocean exploration. The controversy that Forbes had generated with his theories and

Britain's desire to maintain a lead in ocean science helped bring about the journey's funding. The leader of the expedition was SIR CHARLES WYVILLE THOMSON, a Scottish naturalist who had previous experience in ocean exploration, including dredging the North Atlantic. Among the scientific staff was Scottish chemist John Young Buchanan and Canadian John Murray, who would later play the key role of analyzing data from the voyage.

The *Challenger*, captained by SIR GEORGE STRONG NARES, departed Portsmouth on December 21, 1872. She had equipment on board to make meteorological, hydrographic, and magnetic measurements, as well as to conduct dredging operations. After taking readings in the North Atlantic, the ship proceeded to the South Atlantic and then on to the Pacific. The journey lasted three and a half years, covering 68,890 nautical miles. On its way, the expedition made 492 depth soundings, including one of 26,850 feet off the coast of Guam, a record that surpassed any previously imagined. The crew recorded temperatures at both the ocean's surface and in deep water, and took detailed measurements at 362 points concerning currents, water composition, and marine life. More than 4,700 new species of plants and animals were collected as well. From the dredging operations, Forbes's theory that life did not exist on the ocean floor was debunked. By the journey's end, on May 24, 1876, at Spithead, the ship had circumnavigated the world, but the bulk of the work remained to be done. Twenty-three years later, when the final report was compiled, it contained 29,500 pages bound in 50 volumes. The expedition, for all the knowledge gained, revealed how little humankind actually knew about the world's oceans.

National Expeditions

The *Challenger* expedition inspired other countries to explore the ocean as well. In 1874–76, the German ship *Gazelle* circumnavigated the world for oceanographic studies. The Russian ship *Vitiaz* also sailed around the world in 1886–89. Between 1890 and 1898, the Austrian ship *Pola* did important work on shorter trips in the Mediterranean Sea and RED SEA. One of the leaders in oceanography during this time was Alexander Agassiz, a Swiss-American businessman who used his fortune to pursue an interest in ocean topography. His travels, from 1877 to 1905, took him over 100,000 miles through the Caribbean Sea and the Pacific, mapping the ocean floor. During this time Agassiz developed new techniques in sounding and dredging. Another wealthy patron of oceanography was Albert I, prince of Monaco, active from 1848 to 1922. He was a naturalist and oceanographer who studied currents and topography and gave money to support research in many countries. Norwegian explorer FRIDTJOF NANSEN pioneered navigation in the Arctic Ocean on his expedition between 1893 and 1896. With his design of the *Fram*, with which he intended to drift

across the NORTH POLE, he demonstrated that a ship could survive being frozen in ice as it moves. Other nations that launched oceanographic studies at this time were the Netherlands, France, Japan, and the United States.

Expanding Technologies

Oceanography entered a new era in 1925 with the German ship *Meteor*. This craft was the first to use new electronic technology to take continuous soundings of the ocean floor while in motion. For two years, *Meteor* crossed and recrossed the Atlantic, mapping the bottom. Its studies gave oceanographers a much clearer picture of the varied terrain that exists there. The results of these expeditions also gave Germany an advantage in SUBMARINE warfare during World War II. Other technological developments expanded the scope of oceanography. In the 1930s, Americans CHARLES WILLIAM BEEBE and Otis Barton invented the BATHYSPHERE, a type of SUBMERSIBLE, making the DIVING BELL, nonpressurized and with an attached oxygen supply, obsolete. In the 1940s–1950s, Swiss AUGUSTE PICCARD improved on its design with the BATHYSCAPH. His son JACQUES ERNEST-JEAN PICCARD continued work on the bathyscaph, and, in 1960, he reached the bottom of the MARIANAS TRENCH in the Pacific, the deepest point on Earth. Remotely operated vehicles (ROVs) of varying designs have also become essential equipment in oceanographic studies. Moreover, the evolution of the DIVING SUIT has given divers greater freedom underwater. Developments in oceanography and technology have helped make possible recent advancements in underwater archaeology (see ARCHAEOLOGY AND EXPLORATION).

Oceanographic Institutions

A number of oceanographic institutions have been founded over the years. Among the first was the marine biological station at Naples, Italy, established in 1872. The Scripps Institution of Oceanography at La Jolla, California, was founded in 1901 and later became part of the University of California. The Oceanographic Museum of Monaco was established in 1910, and the Oceanographic Institution of Woods Hole in Massachusetts was founded in 1930.

International Cooperation

In the mid-20th century, a cooperative spirit grew around oceanographic research, with international institutions realizing that the ocean ties mankind to a common fate. Nowhere was this more apparent than in conducting the INTERNATIONAL GEOPHYSICAL YEAR (IGY) in 1957–58. For this project, 37 nations contributed the use of 80 ships to study the world's oceans. Scientists observed currents, tracked ice floes, collected meteorological data, and conducted magnetic surveys. Further, teams tested new oceanographic equipment and performed extensive mapping. The



Jacques Cousteau peers out of a two-person underwater observation chamber on the deck of the *Calypso*, as it docks in New York City for the 1969 International Oceanographic Congress. (Library of Congress, Prints and Photographs Division [LC-USZ62-119520])

IGY accomplished the most thorough investigation of the Indian Ocean done until that time. Members of the project also discovered that water at the bottom of the sea near Antarctica was as old as 2,000 years. French oceanographer and inventor JACQUES-YVES COUSTEAU, who founded the Cousteau Society in 1973, increased awareness of the world's oceans through his writings, documentaries, and television show.



As oceanography enters the 21st century, the main practical questions involve the effects of pollution and the sustainability of fishing stocks. With ever-larger oil tankers plying the world's oceans, the safety of these ships and the long-term damage to the oceans from the regular spills that occur, are debated. With the world's human population increasing, and the technology available to harvest large quan-

ties of marine life, the issue of fish population maintenance has become more important. Regions where cod and whales, for example, were once abundant are now regulated by severe restrictions or bans on harvest due to overfishing. The balanced use of the ocean has led to another field of study, marine policy, which seeks to integrate the acquired knowledge of the past and present to draft sensible international treaties.

See also ATLANTIC OCEAN, EXPLORATION OF THE; GEOGRAPHY AND CARTOGRAPHY; INDIAN OCEAN, EXPLORATION OF THE; PACIFIC OCEAN, EXPLORATION OF THE.

octant See QUADRANT; SEXTANT.

Ophir (King Solomon's mines)

Ophir is a city or region or mine mentioned in the Bible's Old Testament, the location of which is not known. It is

the place of “King Solomon’s mines,” the source of great quantities of gold. Solomon, king of the ancient Hebrews from about 972 to 932 B.C., reportedly entered into a contract with Hiram II, the king of Tyre, a city of the Phoenicians in present-day Lebanon, to build and navigate ships for an expedition. From the port city of Ezion-geber on the Gulf of Aqaba, the northeastern arm of the RED SEA, the fleet sailed to the land of Ophir. The expedition is said to have lasted three years and returned with gold as well as silver, gemstones, sandalwood, ivory, apes, and peacocks.

The story of Ophir, as well as Tarshish, another land mentioned in the Bible relating to King Solomon’s mines, proved an inspiration to explorers throughout history. MARCO POLO associated it with Japan; CHRISTOPHER COLUMBUS thought he might find it in the Caribbean Sea; ÁLVARO DE MENDANÍA named the Solomon Islands in the West Pacific Ocean after Solomon because of his belief he had found Ophir and Tarshish.

Ophir’s location has also been theorized as present-day Yemen on the south coast of the Arabian Peninsula; various locations in Africa, such as West Africa (the Gold Coast), Ethiopia, or Zimbabwe; the Indian subcontinent; the Ural Mountains in Asia; and even Australia or NEW ZEALAND. A recent theory holds that the site of Ophir is present-day Saudi Arabia, in the mountainous area, inland from the RED SEA, between Mecca and Medina, known as Mahd adh Dhabab (“cradle of gold”). Geological studies have revealed a large-scale ancient mining operation there with traces of gold remaining. Moreover, the region is along a 4,000-year-old trade route running south from the Gulf of Aqaba.

See also LEGENDS AND EXPLORATION; PHOENICIAN EXPLORATION.

Orinoco River

The Orinoco River, one of South America’s longest rivers, flows some 1,500 miles from the Serra Parima highlands in southern Venezuela, westward then northward, forming part of the Colombia-Venezuela border with its branch, the Guaviare. It then arcs northeastward to Venezuela’s Atlantic coast. (If the Guaviare branch is included, the Orinoco stretches 1,700 miles.) The chief tributary of the Orinoco is the Apure River, which, like the Guaviare, is part of the watershed of the ANDES MOUNTAINS. The Orinoco’s waters are also augmented by the Ventuari, Arauca, Meta, Mawaca, Caura, and Caroni Rivers. The Casiquiare, a unique river in that it does not have a reversible current but flows over marshland, forms a natural canal between the Orinoco and the Río Negro, a branch of the larger AMAZON RIVER. The Orinoco begins as a thin stream in the mountains, gradually expanding with runoff from rainwater and its many tributaries. It cascades over rocks, down a steep-sided valley, through rain forests and across the Llanos—the plains—of

central Venezuela. The river ends in a wide marshy delta of about 7,800 square miles, bounded by streams, the Corosimi and the Vagre, with the Corosimi considered the main stream of the river. Natural canals cut across the delta, which is made of giant sandbars with islands of fertile soil. The total drainage area of the Orinoco system is some 450,000 square miles. The Orinoco, four miles wide on average, is navigable for ships about 260 miles, and for smaller boats about 1,000 miles.

First Approaches

On his third voyage in 1498, after discovering the island of Trinidad, Italian mariner CHRISTOPHER COLUMBUS, backed by Spanish interests, reached the mainland coast of South America at the Gulf of Paria, near the Orinoco delta. Columbus stopped to explore the coast of present-day Venezuela westward before sailing back to the island of Hispaniola (present-day Haiti and Dominican Republic). The next year, Spaniard ALONSO DE OJEDA, who had commanded one of Columbus’s ships during his second expedition to the WEST INDIES, was given permission to explore the mainland coast Columbus had explored. While Spaniard AMERIGO VESPUCCI, part of Ojeda’s expedition, explored south and east from their landing point five degrees north of the EQUATOR, Ojeda followed Columbus’s track, exploring north and west. He gave the name Venezuela, or “Little Venice” to the coastal region on seeing a Native American settlement built in the water on piers. Ojeda made several attempts to colonize Venezuela, all of which were unsuccessful.

The later colonization attempts by Spanish conquistador DIEGO DE ORDAZ, beginning in 1530, led to a greater European understanding of the Orinoco. Ordaz sailed with Spanish expeditions to the West Indies in his early 20s. He served with Alonso de Ojeda in his conquest of parts of present-day Colombia and Panama in 1509 and with DIEGO DE VELÁSQUEZ in 1511 in his conquest of Cuba. He also served as an officer under HERNÁN CORTÉS in 1519–21, during the Spanish conquest of Mexico. After returning to Spain to report to King Charles I (Holy Roman Emperor Charles V), Ordaz was himself commissioned by the monarch to explore, conquer, and colonize the area of the coast of South America, called Venezuela, from the mouth of the Amazon River to Cape Vela. Ordaz sailed from Spain with three ships and 500 men. While he was able to locate the mouth of the Amazon River, he did not find a suitable landing place and sailed westward, into the Gulf of Paria. Native peoples told him of another great river, the Orinoco and, by June 1531, he had located its delta. Ordaz entered the Orinoco’s main outlet and explored upriver about 800 miles to its junction with the Meta River. He lost many men in the thick jungles, to disease, to the poison-tipped darts of the native peoples, and to the treacherous terrain.

El Dorado and the Orinoco

The native peoples told tales of a land of immense wealth in gold peopled by a white race like the Europeans that the natives called “Guiana,” somewhere in the highlands around the Orinoco. Ordaz searched vainly for this city of gold before returning to the coast. The stories convinced many of the existence of an empire to rival that of the Aztec Indians of Mexico and the Inca Indians of Peru, which supposedly had a capital city, Manoa, paved with gold and which glittered with jewels. This was one of the many tales that came to be associated with the mythical land of EL DORADO, which inspired numerous journeys on the Orinoco, with Spanish and other Europeans penetrating the dense jungles of the interior.

In the 1530s, several Germans who had been sent by Charles I of Spain to colonize Venezuela—AMBROSIUS ALFINGER, GEORG HOHERMUTH VON SPEYER, AND NIKOLAUS FEDERMANN—explored the inland plains and highlands and the Orinoco River system. Spaniard GONZALO JIMÉNEZ DE QUESADA searched around the Magdalena River in Colombia in 1536. In 1541, Jiménez de Quesada’s brother, Hernán Pérez de Quesada, traveled along the plains of the Orinoco. Later, from 1569–72, Jiménez de Quesada himself led a second expedition in search of El Dorado in eastern Colombia as far as the confluence of the Orinoco with the Guaviare River. To the south, in 1560, LOPE DE AGUIRRE, a Spanish conquistador, joined an expedition to search for El Dorado led by PEDRO DE URSÚA in the Amazon Basin. After a dangerous crossing of the Andes and following the Huallaga and Marañón Rivers, Aguirre incited a mutiny and murdered de Ursúa. The mutineers sailed down the Amazon, then crossed at some point somehow to the Orinoco. Aguirre led the mutineers down the Orinoco to the Caribbean coast before he was captured and beheaded.

In 1584, another Spaniard, ANTONIO DE BERRÍO, married to the daughter of the Spanish colonial governor of what is now eastern Colombia, embarked on his own search for El Dorado and ended up searching the Orinoco region for 10 years. In 1595, he was taken prisoner on the island of Trinidad by SIR WALTER RALEIGH, an Englishman who had been granted permission from Queen Elizabeth I to find the riches of Guiana for the English. Based on Berrío’s intelligence, Raleigh embarked from Trinidad to explore the Orinoco. He took 100 men in small boats up the different branches of the river until its confluence with the Caroni, one of the rivers bounding the Orinoco’s delta, about 100 miles from the sea. Raleigh and his men also explored other tributaries and Lake Parime. Shortage of supplies and tropical fever led him to abandon his search, and he crossed the Cano Macareo, one of many natural canals across the delta, and sailed back to England. In 1596, Raleigh published his account of his voyage through the Orinoco called *The Dis-*

coverie of the Beautiful Empire of Guiana, with a Relation of the Great and Golden City of Manoa . . . in the Year 1595.

After James I ascended the throne, Raleigh was implicated in a plot against the king and sentenced to death in the Tower of London. He was released in 1616, after convincing King James to allow him to mount another expedition in search of El Dorado. In Trinidad in 1617, he was stricken with a fever. His son Walter and Lawrence Kemys continued up the Orinoco. Before very long, however, they entered Spanish territory and attacked the settlement of San Thomé. Raleigh’s son was killed, and Kemys committed suicide. Raleigh himself returned to England, without having found Indian riches and having disobeyed the king’s order not to attack the Spanish. In 1618, he was beheaded.

Colonial Boundaries

Raleigh’s last expedition was the last great search for El Dorado, but the Orinoco continued to be explored for more mundane reasons. Of constant difficulty to the European nations was the determination of the boundaries of colonial territories, a source of strife among them. The Spanish established the Boundary Line Commission of Yturriaga and Solano, which surveyed the inland areas of Venezuela and other parts of the Spanish possessions in South America from 1757 to 1763, during which José Solano and Díaz de la Fuente made careful surveys of the Orinoco, especially its upper waters. The investigation confirmed the existence of the naturally formed Casiquiare canal.

In the Name of Science

German naturalist ALEXANDER VON HUMBOLDT and French botanist Aimé Bonpland had planned to travel to Egypt in 1798, but Napoléon’s conquest changed their plans. After the pair made a survey of Spain’s central plateau, Spanish king Charles IV gave Humboldt and Bonpland permission to explore Spanish possessions in the Americas. In November 1799, the pair left Caracas in Venezuela to study the Orinoco. Humboldt studied the fauna of the Orinoco, including the capybara, the largest rodent in the world, as well as the egg-laying habits of turtles along one of the Orinoco’s tributaries. He charted the course of the upper Orinoco and the Río Negro, making a CANOE voyage through the Casiquiare canal.

In 1849, British naturalist ALFRED RUSSEL WALLACE carried out ornithological research along the Río Negro and into the Orinoco by way of the Casiquiare. Still another explorer of the Orinoco was Francisco Michelena y Rojas, a Venezuelan diplomat and journalist. He traveled across the world, through America, Europe, Asia, and Africa from 1822 to 1842. He was commissioned in 1856 to explore the Río Negro. In the course of his expedition, he crossed the Casiquiare canal into the Orinoco and ascended the river 170 miles upstream, and a few miles up the Mawaca, one of its tributaries.



The Orinoco was of lesser importance for trade and transport than the Amazon, and today remains sparsely traveled. An important port city on the river is Ciudad Bolívar—formerly known as Angostura for “narrow,” because it is situated 373 miles from its mouth where the river narrows—founded in 1764 in northeastern Venezuela. Many of the river’s tributaries remained unexplored into the 20th century. In 1944, aerial exploration located the river’s main source in the Guiana highlands, and later explorations discovered small rivulets considered the river’s headwaters.

See also SOUTH AMERICA, EXPLORATION OF.

outrigger

An outrigger is a type of boat with a float attached parallel to the main hull by poles. The term *outrigger* can also refer to the float itself. The attached float or floats gives the craft

greater stability. Outriggers are made in a variety of configurations. They may be sail-powered, oar-powered, or both. The double-hulled CANOE relates to the concept of the outrigger. The double outrigger has floats extending from both sides for maximum safety. The outrigger can be built to quite large dimensions, more than 100 feet long. Some used in Sri Lanka carry as much as 30 tons of cargo.

Outriggers were unique to the Pacific Ocean and Indian Ocean until their concepts were incorporated into modern boats. The Polynesians and other peoples used them to travel among the islands, and they no doubt played a central role in migrations to NEW ZEALAND, HAWAIIAN ISLANDS, Tahiti, and countless other islands. With the proper skill, an outrigger was next to impossible to sink, a trait that would have encouraged the adventurous to explore. The vessel could also be quite fast, with a speed of 20 knots not uncommon.

See also SHIPBUILDING AND EXPLORATION.



Shown here, in a photograph from about 1922, are outrigger canoes in Hawaii. (Library of Congress, Prints and Photographs Division [LC-USZ62-105953])

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Pacific Ocean, exploration of the

The Pacific Ocean is the largest ocean on the planet, covering nearly a third of Earth's surface, 70 million square miles if adjoining seas are included. It is also the deepest ocean, with an average depth of about 14,000 feet, and contains the deepest point in all the oceans, the Challenger Deep of the MARIANAS TRENCH, at 36,198 feet. The Pacific is bounded by North America and South America in the east; Asia, Indonesia, and Australia in the west; and Antarctica in the south. (Antarctic waters are sometimes referred to as the Southern Ocean.) The BERING STRAIT separates the Pacific from the Arctic Ocean in the north. On rounding South America from the Atlantic Ocean, Portuguese mariner FERDINAND MAGELLAN, sailing for Spain in 1520, gave the waters the name *Pacific*, meaning "peaceful."

The portion north of the EQUATOR, or North Pacific, generally has a clockwise system of OCEAN CURRENTS, such as the Japan (or Kuroshio) Current. The portion south of the equator, the South Pacific, has currents rotating in a counterclockwise pattern.

The Pacific Ocean has more than 25,000 islands of volcanic and coral origin. Many are too small to support human populations, but of those that can, most were settled before the arrival of Europeans. OCEANIA refers to the region where the majority of Pacific islands are found. It is further classified into three groups according to geology and inhabitants: Melanesia, Micronesia, and Polynesia.

The Ancients and the Pacific

There is remarkably little ancient history of Pacific exploration. The Chinese, who bordered the ocean in the west, had large seaworthy ships by about 2800 B.C., which they used to sail into the Indian Ocean for trade with Malaysia, Indonesia, and India, but they were not inclined to venture eastward into the unknown (see CHINESE EXPLORATION). The Romans, who had contact with the Chinese by sea, starting in the first century B.C., had little concept of the vast ocean that lay beyond the Asian shoreline (see ROMAN EXPLORATION). Arab Muslims of the Middle Ages were not known to venture beyond the SPICE ISLANDS (the Moluccas), where the southwestern Pacific Ocean and northeastern Indian Ocean meet (see MUSLIM EXPLORATION). While the Indian Ocean was active with commerce, the Pacific remained largely untested. Even the voyages of CHENG HO for the Ming Dynasty in China in the early 15th century traveled south along Asia's coast to the familiar territory of the Indian Ocean rather than into the open Pacific. The Polynesians became early masters of the Pacific, using a tradition known as "wayfinding" for island-hopping expeditions over great expanses of Polynesia, but they did not document voyages (see NAVIGATION AND EXPLORATION; POLYNESIAN EXPLORATION).

Venetian merchant MARCO POLO, who traveled throughout China in the 13th century, was an early European to bring back word of the Pacific to Europe. He did not see the ocean himself but heard of it from his Chinese hosts. Europeans did not know that continents lay between Europe

and Asia until the late 15th century. Even after reaching the Americas in 1492, CHRISTOPHER COLUMBUS, an Italian mariner sailing for Spain, did not let go of the notion that he had in fact crossed the Atlantic Ocean to Asia.

Early European Sightings

Spaniard VASCO NÚÑEZ DE BALBOA made the first definitive European contact with the Pacific. While exploring present-day Panama in Central America with a small army, he saw the ocean on September 25, 1513. He claimed it for Spain, with no way of knowing its extent, and called it the Great South Sea. In 1516, he retraced his footsteps to the Pacific and explored along the Panamanian coast with boats he had built. At this time, Spain was in a heated rivalry with Portugal. The Portuguese had found the route around Africa to the Indian Ocean with the journey of BARTOLOMEU DIAS in 1487, and consequently they claimed exclusive right to trade with India and the Spice Islands. In order to challenge this monopoly, the Spanish needed to find an alternative route. This was the impetus for sponsoring Christopher Columbus on his 1492 expedition. As Spain was exploring the lands in the western Atlantic, they also hired Ferdinand Magellan away from Portugal to find a route around South America to the lucrative SPICE TRADE. They had little idea of the size of the Pacific at this point.

The epic journey of Ferdinand Magellan, from 1519 to 1521, is one of the most well known in the history of exploration. Departing from Spain on September 20, 1519, he made stops in Madeira and the CANARY ISLANDS before exploring the South American coast for a passage to the Pacific. On October 21, 1520, he finally found what would be named the Strait of Magellan (see MAGELLAN, STRAIT OF). In an incredible feat of seamanship, he managed to navigate the strait and entered the Pacific on November 28, 1520. After sailing northward along the South American coast, he found winds that carried his ships westward. The crossing took more than three months, and many of the crew died of SCURVY, caused by malnutrition. In March 1521, the expedition acquired fresh food and water in the Marianas Islands of Micronesia. Magellan was later killed in the Philippines, and command of the expedition eventually fell to JUAN SEBASTIÁN DEL CANO, who reached the Spice Islands. Continuing westward into the Indian Ocean and around Africa into the Atlantic Ocean, he completed the first CIRCUMNAVIGATION OF THE WORLD.

Continuing Spanish Exploration

After several conflicts with Portugal in the EAST INDIES, Spain negotiated for peace, signing the Treaty of Saragossa in 1529, in which Spain acknowledged Portuguese control of the Spice Islands in exchange for a large sum of money. Spain did have possession of the Philippines, however, and it became important to them to find dependable routes between Spanish ter-

ritories in the Pacific and the Americas. This was done with great difficulty and much loss of life. One such expedition, in 1564–65, under MIGUEL LÓPEZ DE LEGAZPI, westward from Mexico, led to the colonization of the Philippines. Alonso de Arellano, who captained one of the ships under Lopez de Legazpi's command, was separated from the fleet and managed to return to the Americas by way of the north-eastward-flowing Japan Current. ANDRÉS DE URDANETA, a geographer and priest who had accompanied Lopez de Legazpi, was navigator on a return trip to the Americas in 1565, following the same route. By the 1580s, an annual commercial fleet known as the Manila Galleon made the eastward crossing, carrying trade goods from the Orient to the Americas, from where they were shipped to Spain.

The Portuguese and Spanish both are known to have reached Japan in the 1540s. FERNÃO MENDES PINTO, who worked as a diplomat for the Chinese, and FRANCIS XAVIER, a Spanish missionary, both reached the islands of Japan.

The Spanish had by this time navigated Pacific waters northward from Mexico along the North American coast. In 1542–43, JUAN RODRÍGUEZ CABRILLO and BARTOLOMÉ FERRELO reached the approximate latitude of the present-day Oregon-California border. The Spanish also turned their attention to the South Pacific, with Peru as a launching point. In 1567–69, ÁLVARO DE MENDAÑA and PEDRO SARMIENTO DE GAMBOA led an expedition in search of the GREAT SOUTHERN CONTINENT (Terra Australis)—a continent theorized by the ancients to exist in the Southern Hemisphere balancing out landmasses of the Northern Hemisphere—in the course of which they made the European discovery of the Solomon Islands and Marshall Islands. In a 1595 voyage in search of more lands to colonize, Mendaña, on this expedition accompanied by PEDRO FERNÁNDEZ DE QUIROS, made the European discovery of the Marquesas Islands and Santa Cruz Islands.

Early English Exploration

In the meantime, the English had begun exploring the Pacific. SIR FRANCIS DRAKE headed an expedition in 1577–80, in search of the Great Southern Continent, as well as the western outlet of the Strait of Anian (see ANIAN, STRAIT OF), a fabled NORTHWEST PASSAGE from the Atlantic to the Pacific. He became the first European to navigate Drake's Passage, as the waters between the Atlantic and Pacific came to be known, and explored the west coast of North America as far north as Vancouver Island before continuing westward to the Spice Islands and into the Indian Ocean and back to the Atlantic, completing the first English circumnavigation of the world—and the second altogether.

Dutch Exploration

After declaring independence from Spain in 1581, the Dutch began looking to the Far East for trading opportuni-

ties. In 1602, they formed the DUTCH EAST INDIA COMPANY to reap profits from both the Indian Ocean and Pacific lands. In a 1605 expedition for the company, WILLEM JANSZ, while exploring the seas around New Guinea, made the European discovery of Australia, although not realizing they had observed two separate landmasses. (Several months later, LUIS VÁEZ DE TORRES, sailing for Spain, charted the strait, now known as Torres Strait, separating New Guinea from Australia.) In 1611, a Dutch captain named Brouwer used the westerly winds in the high southern latitudes to find a faster route to the East Indies. In 1616, Dirk Hartog made the European discovery of Dirk Hartog's Island and explored Australia's west coast. In 1615–16, JAKOB LE MAIRE and WILLEM SCHOUTEN, sailing for a rival Dutch company, sailed through Drake's Passage around the southern tip of South America, naming it CAPE HORN; they later made the European discovery of the Juan Fernández Islands off the coast of present-day Chile and determined the eastern extent of New Guinea. In 1642, ABEL JANSZON TASMÁN, searching for Terra Australis for the Dutch East India Company, made the European discovery of an island south of Australia, naming it Van Diemen's Land (present-day TASMANIA), as well as NEW ZEALAND, Fiji, and other islands. JAKOB ROGGEVEEN, also in the employ of the Dutch East India Company, made the European discovery of Easter Island and Samoa Island in 1722.

Continuing English Exploration

After Drake's earlier exploits, the next English pioneer in the Pacific was WILLIAM DAMPIER, who had completed a circumnavigation of the world over the years 1670 to 1691. He was chosen to command an ambitious scientific expedition to the Pacific. In 1699–1701, he explored Australia's west and northwest coast (although he had hoped to reach the east coast) and located Dampier Archipelago, then explored New Guinea's east coast and located Dampier Strait between New Guinea and the island of New Britain. His voyage set the precedent for other scientific journeys to the Pacific—one purpose of which was still discovering the Great Southern Continent—including those of JOHN BYRON in 1664–66 and SAMUEL WALLIS and PHILIP CARTERET in 1766–68. Byron explored previously uncharted islands in the Marshall and Mariana island groups. In the course of the Wallis-Carteret expedition, Wallis made the European discovery of Tahiti, and Carteret, of Pitcairn Island.

In the subsequent years, from 1768 to 1780, Englishman JAMES COOK headed three Pacific expeditions, which led to a new understanding of the world's largest ocean. He traveled to both the South Pacific and the North Pacific. Among his accomplishments were charting the coasts of New Zealand, proving that there were in fact two main islands; charting the east coast of Australia; crossing the ANTARCTIC CIRCLE; circumnavigating Earth in southern latitudes

and proving that the Great Southern Continent did not exist; charting islands of Oceania not visited since the earlier explorations of other nations in previous centuries, making the European discovery of New Caledonia; making the European discovery of the HAWAIIAN ISLANDS; charting the coastlines of northwestern North America as far north as the Aleutian Islands; and crossing the Bering Strait. A number of renowned scientists traveled with Cook, among them SIR JOSEPH BANKS on Cook's first Pacific expedition. (Banks went on to become president of the ROYAL SOCIETY and helped found the AFRICAN ASSOCIATION.)

French Exploration

In the late 17th century under the auspices of the FRENCH EAST INDIA COMPANY, the French began trading in the Indian Ocean and all the way to China by way of the Pacific. By 1695, they were making trips to the Spanish ports in Chile and Peru. French scientists sometimes traveled on board French trading ships and recorded information. French interest in the Pacific leaned toward the scientific, with commercial and colonial ambitions secondary, since the British navy was superior to theirs. In 1766–69, the same period Wallis and Carteret were on their journey, LOUIS-ANTOINE DE BOUGAINVILLE commanded the first French expedition around the world. The purpose of the government-sponsored scientific expedition was to locate the Great Southern Continent as well as to chart islands in the Pacific. In the western Pacific de Bougainville explored the Solomons and other island groups. Later French scientific expeditions were carried out by JEAN-FRANÇOIS DE GALAUB, comte de La Pérouse, in 1785–88 in the North and South Pacific, and by ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux, in 1791–95 in the South Pacific.

Russian Exploration

Early Russian expeditions, in the meantime, approached from the west overland through SIBERIA, many of them related to the FUR TRADE. By 1639, Russians were known to have reached the Sea of Okhotsk. The earliest recorded sighting of the Bering Strait was by a party of Cossacks under SEMYON IVANOVICH DEZHNEV in 1648. The next century, in 1725–30, Danish VITUS JONASSEN BERING, in service to the Russian navy, led the First Kamchatka Expedition to Siberia's Pacific coast. In 1740–41, Bering headed Russian naval exploration of the Bering Strait, the Gulf of Alaska, Kodiak Island, the Aleutian Islands, and the Commander Islands. In 1785–93, Englishman JOSEPH BILLINGS headed the Russian naval Northern Secret Geographical and Astronomical Expedition in search of the NORTHEAST PASSAGE from Siberia's northeast coast into Bering Strait and further explored the Aleutians and the Gulf of Alaska. In 1803–06, ADAM IVAN RITTER VON KRUSENSTERN headed

the first Russian circumnavigation of the world, during which he searched for outlets of both the Northeast Passage and Northwest Passage in the North Pacific.

Antarctica

The last Pacific region to be charted thoroughly was that of Antarctica. James Cook had failed to sight the mainland in his voyage of the late 18th century. The earliest confirmed sightings of the Antarctic mainland in 1820 were made by British naval officer EDWARD BRANSFIELD and American sealer NATHANIEL BROWN PALMER, where Pacific and Atlantic waters meet near the Antarctic Peninsula. German-born Russian naval officer FABIAN GOTTLIEB BENJAMIN VON BELLINGSHAUSEN made the earliest extensive exploration of the high latitudes near the coast in the course of his expedition of 1819–21 (and some claim made the first sighting of the Antarctic mainland). In the ensuing decades, explorers of varying nationalities approached Antarctica along different routes from the Pacific, Atlantic, and Indian Oceans. SIR JAMES CLARK ROSS led the first British scientific expedition to the region since Cook, reaching previously uncharted regions along the Pacific coast, while unsuccessfully searching for the SOUTH MAGNETIC POLE. The South Magnetic Pole was located on the Pacific coast in 1909 by Australian scientist SIR DOUGLAS MAWSON. The Pacific coast of Antarctica proved to be the launching point for the successful attempt to reach the SOUTH POLE by Norwegian ROALD ENGLEBREGT GRAVNING AMUNDSEN in 1910–12.

Oceanography

By the mid-19th century, oceanography—the study of the world’s oceans, a branch of geography—had become more scientific in its approach. The English voyage of the *Challenger* under SIR GEORGE STRONG NARES and SIR CHARLES WYVILLE THOMSON in 1872–76 was a breakthrough in knowledge gained. In 1948, during the voyage of the *Challenger II*, the deepest point in the oceans of the world—Challenger Deep in the Marianas Trench—was discovered. In 1960, Swiss scientist JACQUES ERNEST-JEAN PICCARD and U.S. Navy lieutenant Donald Walsh, using the BATHYSCAPH *Trieste*, explored the trench. During the INTERNATIONAL GEOPHYSICAL YEAR (IGY) of 1957–58, 37 nations contributed the use of 80 ships to study the world’s oceans (see OCEANOGRAPHY AND EXPLORATION).



In addition to being a link between continents on exploratory expeditions, the Pacific Ocean, with its some 25,000 islands, became a place of exploration unto itself through much of history. It has also proven a challenge to mariners over the centuries—from the ancient Polynesians, to the first circumnavigators, to early scientific explorers

such as James Cook, all the way to modern times and explorers of the deepest places on earth.

pack ice (ice pack, pack, pack-ice)

The term *pack ice*, also written *pack-ice*, or the *ice pack*, or simply the *pack*, is one of many terms relating to sea ice in both Arctic and Antarctic waters, much of which freezes over in wintertime, then thaws and breaks up to varying degrees in summertime. The term is sometimes used to denote the general ice field, that is, any extensive area of frozen water, such as that which covers much of the Arctic year-round. (One also sees the term *ice sheet* applied to an ice field of frozen water, but it more often is used to denote a permanent ice field on land.) But, more specifically, the term *pack ice* refers to the mixture of ice created by the annual freezing and thawing of water, along with various types of drifting ice, or DRIFT ICE, from the winter or winters before. The various formations of drift ice are squeezed together as the sea freezes over, often creating jagged shapes in the pack ice.

The term *ice island* refers to stretches of pack ice at least 10 times thicker than most of the ice surrounding it, formed from chunks of ice that once adhered to the shore. The term *ice shelf* is applied to a permanently frozen ice field extending from the Antarctic continent, such as the Ross Ice Shelf, Filchner Ice Shelf, Larson Ice Shelf, and Shackleton Ice Shelf.

At the edge of pack ice, where water is whipped up by sea swells, thick fog often forms. When set in motion by a storm, pack ice grinds together, creating noise. The vast winter pack ice extends hundreds of miles from the year-round frozen waters of the Arctic and from the ice-covered Antarctic continent, beyond the North and South Frigid Zones, invading the North and South Temperate Zones.

In the history of exploration, pack ice has played a role in setting the limits of regions explored or in the destruction of ships. A tragic example in the Arctic is the 1845–47 British expedition of SIR JOHN FRANKLIN, whose ships—the *Erebus* and the *Terror*—became icebound, and the crews eventually perished. Another British expedition, in 1914–17, headed by SIR ERNEST HENRY SHACKLETON, lost its ship—the *Endurance*—to the pack ice off Antarctica, although Shackleton managed to lead his men to safety.

Some explorers, such as Norwegian FRIDTJOF NANSEN in 1893–96, attempted to use pack ice to get closer to a goal—in this case an unsuccessful attempt on the NORTH POLE—having a specially designed ship, with a saucer-shaped hull to withstand the pressure of the ice and ride on top of it—the *Fram* (Forward)—purposely become icebound so that it would drift northward.

Icebreakers, ships with specialized hull designs and reinforced bows, first effectively used in the latter part of the 19th century, have become ever more efficient in pushing through pack ice.



In 1915, Sir Ernest Henry Shackleton's ship the *Endurance* was trapped in Antarctic pack ice. This photograph was probably taken by expedition member Frank Hurley. (Library of Congress, Prints and Photographs Division [LC-USZ62-104242])

See also ANTARCTIC, EXPLORATION OF THE; ARCTIC, EXPLORATION OF THE.

padrão

Padrão is the Portuguese word for “pillar.” Starting in the late 15th century, Portuguese maritime expeditions carried limestone pillars surmounted by a cross—typically with Portuguese, Latin, and Arabic inscriptions—on voyages of exploration in order to proclaim sovereignty over territory.

DIOGO CÃO was the first to carry *padrões* in his expedition of 1482–84 along the east coast of Africa. He placed a 13-foot pillar with Portuguese, Latin, and Arabic inscriptions at the mouth of the CONGO RIVER (Zaire River). For a time, the great river was known to Europeans as the Rio de Padrao, or “Pillar River.” Cão left a second marker about 500 miles to the south at Cape St. Mary. During a second voyage in 1485–86, he placed a pillar at Cabo Negro in present-day Angola and at Cape Cross in present-day Namibia. In 1487, BARTOLOMEU DIAS passed Cão's pillar and placed one several hundred miles to the south; the next year, he erected one

at the CAPE OF GOOD HOPE. In the course of his expedition of 1497–99, VASCO DA GAMA placed a marker at Mossel Bay in present-day South Africa; a second one in present-day Mozambique; and a third one at Calicut in present-day India. On the return trip, he placed a fourth at Malindi in present-day Kenya, and a fifth one at another location in Mozambique.

Some *padrões* have survived to modern times. One erected by Diogo Cão is housed at the museum of the Sociedade de Geografia in Lisbon; a second, at the Museum für Deutsche Geschichte in Berlin.

painting and exploration

Among artists, especially representational painters, there is a tradition of travel to seek out new subject matter. Before photography, painting, the application of shapes and colors on a surface, and the related drawing, the use of lines to create images, were the only means of documenting scenes. Artists willing to travel to remote places, sometimes referred to as “frontier artists” or “frontier painters,” made a special

contribution to the chronicles of exploration by making pictorial records of past ages. Some traveled on their own. Some were hired as official artists and drafted people on expeditions for pictorial documentation of places, peoples, and wildlife. Without the work of such artists, we would have no visual reference point of the pre-photographic age. Moreover, they further contributed to awareness of geography, anthropology, and natural history through their journals, letters, and travel accounts.

Early North American Scenes

The first known European artist to paint scenes in what is now the United States is Frenchman JACQUES LE MOYNE DE MORGUES, one of the colonists in the short-lived French Huguenot colony on St. Johns River in present-day Florida,

led by RENÉ GOULAIN DE LAUDONNIÈRE in 1564–65. He created watercolors of animals, plants, and Timucua Indians. Similarly, in 1584–87, Englishman JOHN WHITE created a pictorial record of the Outer Banks region of present-day North Carolina as part of SIR WALTER RALEIGH's attempted colonies (one of them the LOST COLONY).

Frontier Painters

American GEORGE CATLIN traveled on his own throughout North America in the 1830s–60s, with a trip to South America as well in the 1850s. He especially sought out images of Native Americans. Other such frontier artists specializing in Native American and western themes were American ALFRED JACOB MILLER, who painted landscapes



This engraving by G. Cook from a painting that Frederick William Beechey completed sometime before 1856 shows an exaggerated attack by walrus in a British expedition to Arctic waters in 1818 headed by David Buchan and John Franklin. Beechey was part of the expedition. (*Library of Congress, Prints and Photographs Division [LC-USZ62-20109]*)

and native peoples along the Oregon Trail in the 1830s; Canadian painter PAUL KANE, active in western Canada in the 1840s; and Swiss RUDOLPH FRIEDERICH KURZ, who sought subjects for his work on the MISSOURI RIVER and western plains in the 1840s–50s. Swiss artist KARL BODMER, traveled up the MISSOURI RIVER with German naturalist ALEXANDER PHILIPP MAXIMILIAN in the 1830s, in a productive collaboration. One individual who is famous as both an artist and naturalist, becoming one of the foremost authorities on North American birds, was American JOHN JAMES AUDUBON, active in the early to mid-1800s.

Military Expeditions

Some artists active in North America in the mid-1800s were part of military land expeditions. For example, in the 1840s,

lieutenant and artist HENRY JAMES WARRE traveled with lieutenant MERVIN VAVASOUR in a British military reconnaissance of the Pacific Northwest. His sketches of Oregon country were later made into engravings and published. American brothers, trained in art and drafting, BENJAMIN JORDAN KERN, EDWARD MEYER KERN, and RICHARD HOVENDON KERN served as naturalists and topographers for JOHN CHARLES FRÉMONT, who headed an expedition for the U.S. Army's Corps of Topographical Engineers in the ROCKY MOUNTAINS in the 1840s.

Maritime Expedition Artists

Many maritime exploratory expeditions had official artists, who often doubled as or worked closely with naturalists. Englishman JOHN WEBBER was part of a British expedition to the Pacific Ocean in search of the NORTHWEST PASSAGE in 1776–80, headed by JAMES COOK. Austrian FERDINAND LUCAS BAUER and Englishman WILLIAM WESTALL served under MATTHEW FLINDERS in the British expedition to Australia of 1801–03. German LOUIS CHORIS was part of OTTO VON KOTZEBUE's Russian naval expedition to the Pacific in search of outlets of NORTHEAST PASSAGE or Northwest Passage in 1815–18. Frenchman JACQUES ARAGO was the official artist and writer under LOUIS-CLAUDE DE SAULCES DE FREYCINET in the French naval CIRCUMNAVIGATION OF THE WORLD in 1817–20. Englishman FREDERICK WILLIAM BECHEY, who went on to become a naval officer, painted scenes while on Arctic expeditions under SIR JOHN FRANKLIN and SIR WILLIAM PARRY in 1818–20.

Travelers and Painters

THOMAS BAINES, an English painter, participated in land expeditions in both Australia and Africa in the mid-19th century. In Africa, he was part of Scottish missionary DAVID LIVINGSTONE's Zambezi expedition. In Asia, also in the mid-19th century, Englishman THOMAS WITTLAM ATKINSON, traveling with his wife, writer LUCY ATKINSON, visited SIBERIA, Mongolia, and central Asia and produced hundreds of paintings. Renowned Russian painter NICHOLAS CONSTANTINOVICH ROERICH, traveled with his wife, writer Elena Blavatsky Roerich, to central Asia in the 1920s, and also produced an enormous body of work.

A more recent example of an artist continuing the tradition of artist/traveler is MARGARET URSULA MEE, a British botanical painter who worked in the Brazilian rain forest of South America from the 1950s to 1980s.



The above are just a small sampling of artists who, throughout the ages, have explored little known parts of the world and re-created what they saw on paper and canvas.

See also PHOTOGRAPHY AND EXPLORATION.



papyrus boat See CANOE.

periplus

The term *periplus* (plural form, *peripli*) is the Latin transcription of the Greek *periplous* (plural form *periploi*) for “a sailing around” or “circumnavigation.” In its usage, as associated with the explorations of the ancient Greeks and Romans, it came to refer to maritime voyages in general, along stretches of coasts as well as around entire bodies of water or islands. It also came to be used for written accounts of such voyages, sometimes as a report of newly explored lands and sometimes as sailing guides, describing landmarks, harbors, anchorages, watering places, and winds and currents of familiar regions. Or it was a combination of both. Many of the peripli from ancient times have not survived, or survive only in fragments as quoted in the works of later historians.

Peripli—some existing in whole or in part, or mentioned in other accounts—offer geographic information of the MEDITERRANEAN SEA, Black Sea, RED SEA, Persian Gulf, Arabian Sea, Indian Ocean, and their coastal regions; as well as the Atlantic coast of parts of Africa and Europe, including the British Isles. An early periplus that is not extant but receives mention in later accounts indicates Greek activity along the Atlantic coast of Europe in the sixth century by a Greek sailor from Massilia (present-day Marseille, France). The reported Greek translation, entitled *Periplous*, of HANNO’s account of his journey along the Atlantic coast of Africa in about 470 B.C., as well as the Roman poem relating HIMILCO’s voyages along the Atlantic coast of Africa in about 450 B.C., indicate how the Carthaginians ventured from the Mediterranean Sea to unknown regions for the purpose of exploration and not commerce or colonization. An extant periplus dating from about 350 B.C. and bearing the name Scylax (although certainly not the Greek SCYLAX from the sixth century B.C. who sailed for the Persians) contains information on the Mediterranean Sea, the Black Sea, and a stretch of the African coast. Greek historian Arrian, in his famous work *Indica* of the second century A.D., draws on the periplus of the Greek NEARCHUS about his expedition from the coast of India to the head of the Persian Gulf on behalf of ALEXANDER THE GREAT in 325–324 B.C. Greek STRABO and Roman PLINY THE ELDER, in their writings in the first century A.D., take information from Greek PYTHEAS’s account of his Atlantic journey to northern parts of Europe in about 325 B.C.

A frequently cited periplus, because it provides such a wealth of information about early East Africa, including commercial activities among peoples of Egypt, East Africa, and the Indian subcontinent, as well as about navigation in the Indian Ocean, is the *Periplus of the Erythraean Sea* (also spelled *Erythrean*). It was written in about A.D. 100 by an anonymous Greek merchant who lived in Alexandria, Egypt.

The Italians continued the tradition of the periplus with similar pilot books known as *portolano* (plural form, *portolani*), which evolved into a graphic representation known as a PORTOLAN CHART.

See also CARTHAGINIAN EXPLORATION; GEOGRAPHY AND CARTOGRAPHY; GREEK EXPLORATION; MAPS AND CHARTS; NAVIGATION AND EXPLORATION; ROMAN EXPLORATION.

Phoenician exploration

The ancient people known as the Phoenicians lived along the east coast of the MEDITERRANEAN SEA, starting in the third millennium B.C. About 200 miles long and five to 15 miles wide, Phoenicia extended eastward along the coast roughly to the Lebanon Mountains in present-day Lebanon; northward to the Eleutherus River (now known as the Kebir River); and southward to Mount Carmel. The Phoenicians came to be influential as traders throughout the Mediterranean Sea region. In the Bible they are referred to as Sidonians, related to the Canaanites. The Greeks first referred to them as Phoenicians, from the word for “purple,” because of a dye they traded.

The Phoenicians lived in allied city-states. Byblos, a site near present-day Beirut, Lebanon, inhabited since about 5000 B.C., came to be an important Phoenician center by about 2800 B.C. Early in their history, the Phoenicians were under the influence of Mesopotamian peoples, the Sumerians and the Akkadians. The Egyptians, out of northern Africa, occupied their territory from about 1800 to 1400 B.C. The conflict between the Egyptians and Hittites of present-day Syria, starting in about 1400 B.C., led to eventual Phoenician independence and the rise of many city-states. The port cities of Sidon (Sayda) and Tyre (Sour; Sur), 22 miles to the south, came to alternate as the primary seat of Phoenician political power. By the mid-13th century B.C., the Phoenicians had become known in the region as accomplished shipbuilders and mariners and as reliable traders. In later centuries, they established colonies in the western Mediterranean as well, such as Utica and Carthage in North Africa. Each Phoenician city-state had its special deity, referred to as Baal for a god and Baalat for a goddess; temples were centers of political and civic activities.

The Phoenicians are known as the first people to develop an exclusively alphabetic system of writing, that is, creating a standardized system of symbols representing sounds, instead of the hieroglyphics and cuneiform of the other cultures in the region; the Greeks eventually adopted and altered their alphabet. The Phoenicians also devised a standardized system of weights and measures and were known as skillful architects. Their manufactured goods—textiles and dyes, colored glass, metalwork, and ivory carv-

ings—were highly valued as well. They also traded wood from the cedar trees of their homeland.

In later centuries, the Phoenician city-states had to resist peoples from the east, in particular the Assyrians, Chaldeans, and Persians. Although some city-states fell to invaders, the Phoenicians continued to operate as navigators, traders, and artisans, sometimes in the servitude or employ of other peoples. The Greeks came to take over much of the region's trade. With the Greeks evolving into a naval power, the Phoenician traders lost their monopoly. Phoenician culture of the eastern Mediterranean came to be absorbed into Hellenistic culture. In 332 B.C., Tyre fell to Greco-Macedonian forces under ALEXANDER THE GREAT during his push into Asia. The Carthaginians, the predominantly Phoenician inhabitants of Carthage, remained a powerful presence in the western Mediterranean until defeated by the Romans in the second century B.C. In A.D. 64, Phoenicia became part of the Roman province of Syria, and the name *Phoenician* was no longer used.

As wide-ranging seafarers, the Phoenicians are important to the history of exploration in establishing contacts between peoples and gaining and spreading geographic knowledge. They explored the entire Mediterranean, from the Dardanelles to the Iberian Peninsula, in their large boats, GALLEY ships propelled mostly by oarsmen with some wind power, the pilots using stars and landmarks for navigation. It is thought that they established coastal colonies on the southeastern Iberian Peninsula by about 1100 B.C. Among these were Gadir (later Gades, or modern Cádiz, Spain) beyond the Strait of Gibraltar (see GIBRALTAR, STRAIT OF), which perhaps served as a stopover point for expeditions into the Atlantic Ocean.

An early expedition in which the Phoenicians participated, as recorded in the Bible, was to OPHIR in the 10th century B.C. Under a contract between King Solomon of Israel and Hiram II, the king of Tyre, Phoenicians served as shipwrights and navigators for the three-year expedition. The location of Ophir, which is known as the location of “King Solomon’s mines,” the source of gold, is not known, but it may have been in Arabia, which would indicate the Phoenician exploration of the RED SEA. The writings of fifth-century B.C. Greek historian HERODOTUS indicate that, sailing for the pharaoh NECHO II in about 600–597 B.C., Phoenician seafarers navigated the Red Sea southward from the Gulf of Aqaba to the Indian Ocean and possibly carried out the first circumnavigation of Africa, returning to the Mediterranean by way of the Atlantic and the Strait of Gibraltar. It is also possible that the Phoenicians ventured westward through the Strait of Gibraltar long before the historical record indicates. It is in fact recorded by Greek and Roman writers that Carthaginians—HANNO and HIMILCO of Phoenician descent—reached the Atlantic in the fifth century B.C.

See also CARTHAGINIAN EXPLORATION; EGYPTIAN EXPLORATION; GREEK EXPLORATION; ROMAN EXPLORATION.

photography and exploration

Photography, or “writing with light” as the Greek root words translate, revolutionized exploration starting in the 19th century, much as other technological advancements did in earlier ages. With the means of obtaining permanent images through chemical reaction on light-sensitive materials, explorers could bring back an objective visual record from their journeys and not have to rely on the artist’s eye (see PAINTING AND EXPLORATION).

Origins of Photography

No one individual is credited with inventing photography. The camera obscura of the 16th century was the antecedent of the camera. The optical apparatus consisted of a box into which light passed through a tiny hole or lens and projected an image onto a glass screen; artists use the device to recreate the perspective of three-dimensional space on a flat surface through tracing. An important breakthrough in chemistry was that of the German anatomy professor Johann Heinrich Schulze, who, in 1727, discovered that silver nitrate darkened upon exposure to light. By the early 1800s, British chemists Thomas Wedgwood and Sir Humphry Davy succeeded in producing images of objects on leather treated with silver salts and exposing them to sunlight (now called “photograms”). However, they were unable to halt the darkening and disappearance of the images.

Drawing on other progress in optics (the science of the laws of light) as well as in chemistry, a number of different individuals invented photography in the first half of the 19th century. In 1816, French physicist Joseph Nicéphore Niépce created the first negative, on paper, and, in 1827, the first known photograph, on metal. In 1839, his colleague, French painter Louis Jacques Mandé Daguerre, invented a method of making a direct positive image on a silver plate, which came to be known as the daguerreotype. In the meantime, in 1839, British scientist Sir John Frederick William Herschel had discovered a chemical solution—hyposulfite of soda or “hypo”—which acted as a fixing agent on photosensitive paper, and, by 1841, fellow English scientist William Henry Fox Talbot had refined the calotype, a process in which a paper negative was developed outside the camera and bathed in a chemical solution, enabling an infinite number of paper positives. (His *The Pencil of Nature*, published in 1844, with 24 original prints, was the first book ever to contain photographs.) In 1851, another Englishman, Frederick Scott Archer, invented the collodion negative process or “wet plate” technique, in which a glass plate was coated with silver iodide and exposed while still wet, a process which came to displace the others. The collodion



William Henry Jackson took this photograph of a Manchu shaman in Russia in 1895. It was published in *Harper's Weekly* two years later. (Library of Congress, Prints and Photographs Division [LC-USZ62-78790])

process was used for the ambrotype, a glass negative backed with black material, creating the effect of a positive image, and the tintype, which substituted an iron plate for glass.

The Beginnings of Photojournalism

The daguerreotype, the first photographic process to gain popularity, was especially used for portraits. But early photographers also used it to capture less contrived images of historic events, such as the California gold rush of 1849. French photographer Maxime DuCamp traveled to Egypt in 1849–50 and made calotypes of temples and pyramids. British photographer Roger Fenton's work in the Crimean War of 1853–56 is considered the first work of a photojournalist. Another early photojournalist, American Mathew Brady, who had first taken daguerreotypes, created a photographic corps to document the American Civil War of 1861–65, using equipment for the collodion process, including large cameras, tripods, and portable darkrooms.

Photography and Government Surveys

Photography became an official tool of exploration in the United States after the Civil War. Timothy O'Sullivan, who originally worked under Brady, traveled with CLARENCE KING and GEORGE MONTAGUE WHEELER in U.S. governmental surveys of the American West in the 1860s–1870s; John K. Hillers explored the Grand Canyon with JOHN WESLEY POWELL in the 1870s; and William Henry Jackson accompanied FERDINAND VANDEVEER HAYDEN to the Yellowstone River and ROCKY MOUNTAINS, also in the 1870s.

Images from the Frontier

Other photographers traveled to other continents, such as British Samuel Bourne in India and Scotsman John Thomson in China. Books with photographs of foreign lands, containing the first such views seen by many, became best-sellers for publishers. Starting in 1900, American Edward

Curtis began documenting Native Americans with photographs, much as GEORGE CATLIN had done with painting.

Photography in Arctic and Antarctic Exploration

Photography played an important part in early 20th-century exploration of the Arctic and the Antarctic. Australian photographer and later aviator SIR GEORGE HUBERT WILKINS was official photographer of the Canadian Arctic Expedition of 1913–18 under VILHJALMUR STEFANSSON. Another Australian, James Francis (“Frank”) Hurley, was official photographer for the Imperial Trans-Antarctic Expedition of 1914–17 under SIR ERNEST HENRY SHACKLETON.

An Evolving Technology

With continuing improvements, photography became more and more practical in the 20th century. By 1925, the 35-mm camera had been designed in Germany by Oskar Barnack of the Ernst Leitz company. Black-and-white film became faster, freeing the photographer from such great dependency on the artificial light of the flash. Ten years later, color film for transparencies, or slides, was introduced, and, in 1942, color negative film. Advancements in photography were carried over into motion pictures, which Thomas Alva Edison and his employee William K. L. Dickson helped develop in the United States in the 1880s–90s, and the brothers Auguste and Louis Lumière introduced to the world in France in 1895. Digital photography, the process of recording still images electronically rather than photochemically, and video recording, doing so with moving images, are now widespread technologies.

Modern Uses

Photography has played a part in modern surveying and cartography; the term *photogrammetry* refers to the use of photography in surveying and in making MAPS AND CHARTS (see SURVEYING AND EXPLORATION). AERIAL PHOTOGRAPHY has been used for photogrammetry and, in conjunction with advancements in aviation, has revolutionized exploration; early aviators in the Arctic and Antarctic, such as American RICHARD EVELYN BYRD, first demonstrated the value of taking photographs from the air (see AVIATION AND EXPLORATION). Aerial photography has also given us a visual record of other celestial bodies in SPACE EXPLORATION.

Pilgrims

A pilgrim is a person who travels to foreign lands, generally for religious purposes, such as visiting a sacred place or seeking religious freedom. These journeys are known as pilgrimages. When capitalized, *Pilgrim* refers to any of the group of early English settlers who founded the Plymouth colony in present-day Massachusetts. Established in 1620, theirs was the first permanent English settlement in the Northeast,

founded 13 years after the Jamestown settlement in Virginia. The Pilgrims have also been referred to as the “Forefathers” or “Founders.”

The group originally came together at Scrooby, a village in Nottinghamshire, England. By the early 17th century, they had formed a separatist Protestant church opposed to the rites and the monolithic control of the Church of England; they were part of the general religious movement known as Puritanism. Early leaders included John Robinson and William Brewster. In 1607–08, most of the Separatists (as they became known) emigrated from England to the Netherlands, where the religious laws were more liberal, and settled in Leyden. In their new homeland they worked mostly as artisans and laborers.

Hoping for a better life in the Americas, some members of the group voted to emigrate there. In 1619, William Brewster and William Bradford received backing from the Virginia Company of London, one of two English companies chartered to colonize North America (see VIRGINIA COMPANY). About half the church members—some among those who had moved to the Netherlands and some among those still in England—planned to go. The initial intent was that the Netherlands Pilgrims would sail the *Speedwell* to England and join their English brethren. The *Speedwell* would then cross the Atlantic together with a second ship bearing other émigrés. But the *Speedwell* proved unseaworthy, and 102 men, women, and children crammed onto the *Mayflower*, a ship of 180 tons burden formerly used to carry wine. The vessel sailed under Captain Christopher Jones. The Leyden group of Separatists, who referred to themselves as “Saints,” were only 35 in number; they called the other passengers “strangers.” The *Mayflower* left Plymouth, England, on September 16, 1620. A storm drove it north of its intended landing site, and, on November 21, it reached Provincetown, Cape Cod, in present-day Massachusetts. For a month, the Pilgrims explored along the coast; on



This bank note vignette on American history from the 1870s–80s shows the Pilgrims. (Library of Congress, Prints and Photographs Division [LC-USZ62-96003])

December 21, they entered Plymouth Harbor, territory granted to the Virginia Company of Plymouth.

While still on board ship, the leaders drew up the Mayflower Compact, which was signed by every adult male, Separatists and Strangers alike. The document formed a government based on the principle of rule by the will of majority and promising allegiance to the English king. John Carver was selected as governor of the Plymouth colony (he was succeeded in 1621 by William Bradford). EDWARD WINSLOW was elected to the ruling council. The Pilgrims later obtained patents from the Council for New England that legalized the chosen settlement site at present-day Plymouth, Massachusetts.

The winter of 1620–21 proved difficult for the colonists, and many of them died. The following spring, the Pilgrims were helped greatly by Native Americans of the Wampanoag Confederacy. Under the leadership of the grand sachem Massasoit, and with SQUANTO, who had earlier traveled to Europe, interpreting, the Wampanoag taught the newcomers planting and fishing methods. That fall, the Pilgrims and the Wampanoag shared a bountiful harvest; out of this event there developed the American tradition of an annual Thanksgiving.

Over the next years, the Pilgrims explored the surrounding region. Trade was conducted up and down the coast. In 1622, Squanto led an expedition by ship to Narragansett Bay in present-day Rhode Island. Miles Standish, who had been a professional soldier in Europe, became the Pilgrims' military leader and led a number of expeditions against Native American and rival colonists in neighboring regions. In 1632, Edward Winslow undertook one of the earliest European explorations of present-day Connecticut.

The Plymouth colony was absorbed by the Massachusetts colony in 1691. William Bradford wrote the *History of Plimoth Plantation*, published in 1656. He is credited with the first use of the term *Pilgrims* for the founders of the colony.

See also RELIGION AND EXPLORATION.

Pillars of Hercules See GIBRALTAR, STRAIT OF.

pinnacle

The term *pinnacle* refers to a small ship used for auxiliary duties connected with a larger vessel. It is taken from the Latin root word for “pine,” a wood used in shipbuilding. Among the Romans, a pinnacle was propelled by oarsmen and camouflaged for reconnaissance missions. During the EUROPEAN AGE OF EXPLORATION of the 15th, 16th, and 17th centuries and afterward, it was more often a sailing ship. A pinnacle would usually be transported on the deck of the flagship vessel during a voyage. Sometimes they sailed alongside the fleet, but their small size made them vulnerable to loss in the open

ocean. They were used as tenders for the larger ships, that is, for transporting people and supplies to and from shore. They are also associated with the exploration of coasts, inlets, and rivers.

See also ROMAN EXPLORATION; SHIPBUILDING AND EXPLORATION.

piracy

An act of piracy is a crime on the high seas outside the normal jurisdiction of any nation and without the granted authority of a nation. A pirate—a word from the Greek *peirateia* and Latin *piratia*, the same root of “peril”—refers to a person who commits an act of piracy. They can be thought of as the “highwaymen” or “brigands” of the sea. Piracy is an ongoing story throughout maritime history and, as a result, is associated with world exploration.

Some among the Phoenicians, who, by the mid-13th century B.C., had become the dominant seafaring people of the MEDITERRANEAN SEA, were known to commit acts of piracy, raiding ships without official sanction. They and early mariners among the Greeks were also the victims of piracy. The Romans, who became a naval power in the Mediterranean and into the Atlantic Ocean from the third century B.C. to the fifth century A.D., helped counter piracy. In the Middle Ages, the Vikings raided ships as well as coastal settlements throughout western Europe. Private vessels operated by Arab Muslims raided ships in the Mediterranean. Pirates also preyed on merchant ships in the North Sea and Baltic Sea; one of the purposes of the HANSEATIC LEAGUE, an association of German merchants and communities founded in the 13th century, was to counter this constant threat.

Starting in the 16th century, the tradition of piracy continued with ships based along the BARBARY COAST of North Africa (a region named for the Turkish pirate Khayr ad-Din Barbarossa), following the final Christian defeat of the Muslims in Spain in 1492 and their dispersion there. Barbary pirates came to be known as “corsairs,” a French word for a ship from the Latin root word for “course.” Some of them were in effect PRIVATEERS, independent mariners (and their ships) having been granted the right by a nation to participate in a naval military action against an enemy. Some of them preyed as far north as the English Channel. The corsairs were active into the early 19th century.

Meanwhile, English privateers, such as SIR FRANCIS DRAKE and SIR JOHN HAWKINS of the 16th century, preyed on Spanish trade in both the Atlantic and Pacific Oceans, following the European discovery of the Americas and Spanish plunder of Native American civilizations (see TREASURE AND EXPLORATION). Pirates and privateers of the 17th century—mostly English, Dutch, and French who operated out of the Caribbean Sea against Spanish interests—became known as “buccaneers,” from the French word

boucan, a type of grill used to cook meat plundered from Spanish cattle plantations (see SPANISH MAIN). Another term for pirates is *freebooters*, from the Dutch *vrijbuiter* for “free booty.”

The growth of national navies in the 17th, 18th, and 19th centuries helped decrease piracy, as did the development of new maritime technologies—the steam engine in the 19th century and diesel engines in the 20th century. Yet one still hears of acts of modern piracy.

See also GREEK EXPLORATION; MUSLIM EXPLORATION; PHOENICIAN EXPLORATION; ROMAN EXPLORATION.

pirogue (piragua)

A pirogue (also *piragua*) is a type of dugout CANOE, built with a variety of features and in a range of sizes. The pirogue could be shaped by carving and by burning out the center of a log. Often, sections within the boat were separated by bulkheads, to form a place to store cargo and to give the vessel strength. Most commonly the pirogue was propelled by oarsmen, but some used the supplementary power of a sail. Although heavier than other varieties of river craft, and, as a result, less convenient for portaging over land, the pirogue was sturdy and dependable in strong currents.

Dugout canoes have been made and used all over the world where trees grow to a sufficient size. In America, the pirogue was developed for navigating river systems and carrying goods, especially furs. When North America was being explored by Europeans and Euro-Americans, there was an abundance of large trees along the rivers, some six feet in diameter with trunks running 40 feet before the first limbs. Subsequently, the builder was not limited in the size of his craft by the available timber. An average-sized pirogue was eight feet long and two to three feet wide. Cedar, cottonwood, and walnut were the preferred woods for making a pirogue.

The typical crew of a larger pirogue was three—a rower in the front, one amidships, and a steersman at the stern. To construct a raft, two pirogues would be bound together at a distance of eight to 10 feet and planks would be placed on the intervening space to create a deck for the crew and goods.

In addition to the KEELBOAT, early expeditions along the MISSISSIPPI RIVER and MISSOURI RIVER—such as that under MERIWETHER LEWIS and WILLIAM CLARK in 1804—made use of the pirogue.

See also SHIPBUILDING AND EXPLORATION.

planisphere

Planisphere refers to the representation of the circles of a sphere on a plane, that is, a two-dimensional representation of a three-dimensional space. It is a word that was used commonly in antiquity with regard to cartography.

The term has fallen out of use as the variety and sophistication of mapmaking techniques have developed. Modern maps are labeled according to the method used to generate them, such as a MERCATOR PROJECTION, or Lambert Equal-Area Projection.

Today, the term *planisphere* is most often used to refer to a projection of the celestial sphere and the stars on a plane, sometimes with adjustable circles for showing the varying position of the stars.

See also GEOGRAPHY AND CARTOGRAPHY.

Plymouth Company See VIRGINIA COMPANY.

Polaris See NORTH STAR.

Pole Star See NORTH STAR.

Polynesian exploration

Polynesians are the peoples of Polynesia, islands in a vast triangular-shaped area of the Pacific Ocean, which along with Melanesia and Micronesia make up the South Pacific Islands, or OCEANIA. In the north, the HAWAIIAN ISLANDS form the top point of Polynesia’s triangle; to the southeast, Easter Island occupies the right-hand corner; to the southwest NEW ZEALAND bounds the left-hand corner. Polynesia consists of American Samoa, Cook Islands, Easter Island, French Polynesia (Society Islands, Marquesas Islands, Tubuai Islands, Tuamotu Islands, and Gambier Islands), Hawaiian Islands, New Zealand, Niue, Pitcairn Islands, Samoa, Tokelau, Tonga, Tuvalu, and the Wallis and Futuna Islands. Fittingly, the term *Polynesia* is derived from a Greek word for “many islands.”

There are many characteristics, both physical and cultural, which make the Polynesians a group unto themselves. There are also variations within the group, which point to a complex ancestry. The questions of where they originated and where they migrated and how they managed to travel great distances by water are still being debated.

Physically, Polynesians are tall, well-proportioned, and strong. They have lighter skin than their neighbors to the west in Melanesia and to the northwest in Micronesia, and their hair is straight or wavy. There is, however, a range of features among these peoples, with very light skin found, people with red hair, and men with beards. In short, they show characteristics of a mixture of ethnic groups, with Asian and Caucasian features most apparent.

The strongest indication of Polynesian common identity is shared language. All speak the same language with different dialects. They have other cultural characteristics in common as well. They typically worship some form of

sun god, produce similar-looking statues and artwork, and before the arrival of Europeans, had no concept of money and did not weave or make pottery.

That a group of people could maintain such changeable features of their culture while spread out over such a wide area suggests a fairly recent migration over a relatively short period of time. On this topic, the questions are far from settled. The earliest estimate for the start of the migrations is about 1000 B.C. Many scholars now agree, based on linguistic and agricultural traits, that Polynesians originated from Southeast Asia. They possibly reached the Marquesas Islands and radiated outward in about A.D. 300. The Marquesas manifest some of the earliest evidence of human habitation in Polynesia (120 B.C.), and are centrally located. Others have suggested that Polynesians came from the shores of North America, South America, or both. The wind and current systems of the Pacific are more favorable for a westward migration than eastward travels from Asia. Norwegian anthropologist THOR HEYERDAHL has supported the view that Polynesians migrated from the Americas, and he conducted his famous voyage of the *Kon-Tiki* in 1947 to prove the possibility.

Whatever the time frame, or place of origin, the feats of seamanship accomplished by the Polynesians were admirable. There are several factors that made transoceanic voyages possible. One was the double CANOE. Arising from the OUTRIGGER, a craft unique to the Pacific Ocean, the double canoe could carry people and cargo in significant quantity and was fairly stable in the open ocean. Another was knowledge of techniques of navigation. Polynesians practiced a rudimentary form of stellar navigation by identifying certain islands with the stars that were found directly above them; for example, Sirius marks the location of Tahiti. By sailing in the direction of a particular star, one could reach their destination. Polynesians also made maps with sticks bound together by coconut fiber, with shells added to represent islands. (See NAVIGATION AND EXPLORATION.)

An ancient Polynesian mariner whose name has endured in the legends of the Maori, New Zealand's native peoples, is KUPE. According to Maori tradition, he traveled across much of Polynesia in the 10th century and reached New Zealand.

portolan chart

The Italian term *portolano* or *portulano* (plural forms, *portolani* or *portulani*) refers to early written descriptions about landmarks, winds, and currents used by pilots in navigating waters, similar to the Greek manual known as a PERIPLUS. With time, the portolani evolved into charts, graphic representations of bodies of water and coastlines, probably first created to be used in conjunction with pilot books for purposes of navigation. The growing use of the magnetic COM-

PASS, or mariner's compass, for multiple readings of a coastline, enabled the making of more accurate charts and resulted in their orientation north-south, not east-west. Although lines showed the bearings between important ports, portolan charts did not depict LATITUDE AND LONGITUDE as devised by ancient Greek cartographers, such as PTOLEMY.

The earliest reports of such charts date from the late Middle Ages. MARCO POLO, an Italian explorer of the Far East in the latter part of the 13th century, mentions a chart of the coast of CEYLON (present-day Sri Lanka). But it is assumed there had been earlier graphic representations. The oldest existing portolan chart—the Pisan Chart by Italian cartographer Petrus Vesconte—represents coastlines and ports of the MEDITERRANEAN SEA and dates from about 1300. Its high degree of accuracy, with distances drawn to scale, indicates that its makers drew on the work of earlier cartographers. Early portolan charts were published individually on single sheets of parchment. In time, they began to appear in atlases. The Laurentian Portolano, for example, published in 1351, includes eight charts and covers territory from the British Isles to India, including parts of Africa.

A French-derived word for a nautical chart is “rutter.”

See also GEOGRAPHY AND CARTOGRAPHY; MAPS AND CHARTS; NAVIGATION AND EXPLORATION.

Prester John

Prester John was a legendary monarch and priest, whose kingdom was believed to exist in Asia and Africa. The myth began in the Middle Ages but endured into the RENAISSANCE and provided incentive for numerous voyages of exploration. *Prester* is an early version of “priest” or “presbyter,” an elder in the early Christian church.

The earliest known reference to the mythic figure of Prester John is found in the writings of Otto von Freisingen, bishop of Freising (Otto of Freising). In his *Historia de Dubabus Civitatibus*, published in 1158, he described how, in about 1145, Hugh, the bishop of Jabala in what is now Syria, in a meeting with Pope Eugenius in Rome, reported that a priest-king named John ruled a Nestorian Christian kingdom beyond lands controlled by Muslims. (The Nestorians were a sect of Eastern Christians who followed the teachings of Nestorius, patriarch of Constantinople, condemned as a heretic by the Council of Ephesus in A.D. 431 for believing in two distinct natures, God as a divine being and Jesus as a man.) According to Hugh, the Christian ruler had defeated an army of infidels and would likely help with further support of the CRUSADES. (The time frame fits a real battle occurring in September 1141 near Samarkand in present-day Uzbekistan in which Yeliutashi, ruler of the empire of Kara-Khitai, defeated Sultan Sanjar, the Seljuk Turk

ruler of Persia; rumors soon reached Europe that Yeliutashi was a Christian, and it has been theorized that his people, the Kara-Khitai, were confused with the Kerait tribe, a Nestorian Christian people of central Asia.)

The second known mention of Prester John is in a letter from about 1165 from Prester John himself—presumably forged by a European—addressed to Emanuel I, the Byzantine emperor of Rome, describing a huge peaceful and wealthy Christian kingdom in India, but one besieged by infidels. Some of the later hundreds of published versions of similar letters are addressed otherwise, such as to the pope or the king of France. In 1177, Pope Alexander III sent out his physician, Magister Philippos, with a reply for Prester John, but there is no record what became of him.

The belief in Prester John's Asian kingdom persisted into the 13th and 14th centuries. Early European travelers to Asia, such as GIOVANNI DA PIAN DEL CARPINI, WILLIAM OF RUBROUCK, MAFFEO POLO, NICCOLÒ POLO, MARCO POLO, JOHN OF MONTECORVINO, ODORIC OF PORDENONE, and GIOVANNI DE MARIGNOLLI, hoped to make contact. Marco Polo heard of a Christian ruler of the Kerait people, who had been slain by the forces of GENGHIS KHAN of the Mongols in the early 1200s and thought perhaps he had been Prester John.

Without any confirmation of the legend in Asia, attention shifted to Africa in the 14th century. Letters appeared as early as 1340, describing Abyssinia (as Ethiopia was then called) as the location of Prester John's illusive kingdom. Because geography of the period was so vague, with eastern lands—from East Africa to India—lumped together in the minds of many Europeans, what now seems such a shift of attention appears less arbitrary. *The Travels of Sir John Mandeville* by SIR JOHN MANDEVILLE (perhaps a made-up traveler), published between 1357 and 1371, was one of the various works describing Prester John's fantastic kingdom.

The hope of finding Prester John was reported as one motivation for the 15th-century voyages along the coast of West Africa, sponsored by HENRY THE NAVIGATOR, prince of Portugal. Prester John was increasingly reported as a “white” Christian king, and his land was becoming ever more exotic in descriptions—a gold-laden kingdom through which a mighty river flowed whose banks were sprinkled with precious stones and where there was a FOUNTAIN OF YOUTH from which he drank. He also supposedly had an army of thousands of warriors who could help in a Christian holy war against Islam. In 1487, King John II of Portugal dispatched PERO DA COVILHÁ to Abyssinia to confirm reports of a Christian emperor there. Covilhá reached the region and became an adviser to the monarch, known as the Negus, but did not return to Europe. In 1520, a Portuguese priest, FRANCISCO ÁLVARES, also spent time with the Negus. He wrote an account of his African experiences, entitled *The Prester John of the Indies*, published in 1540.

Some of the earliest printed maps show Prester John's realm in Africa, and cartographic references lasted into the 17th century. But with more and more European travelers reaching the region, the association of Prester John with East Africa gradually faded as did the legend in general.

See also LEGENDS AND EXPLORATION; MONGOL EXPLORATION; MUSLIM EXPLORATION.

prime meridian (Greenwich meridian)

The term *meridian*, also known as a line of longitude, is the name applied to any imaginary line on Earth's surface, running north-south and passing through the NORTH POLE and the SOUTH POLE, and at a right angle to the EQUATOR. *Prime meridian* refers to the meridian designated as zero degree longitude, from which all other points of longitude are measured.

With regard to a line of latitude, the equator, at Earth's widest point of circumference and equidistant from the North and South Poles, is a natural choice for being considered prime, that is, zero latitude. But no one meridian can be so determined, and countries established varying systems for setting the time of day. As a result, early world maps lacked a standardized grid of LATITUDE AND LONGITUDE. In 1884, the Washington Meridian Conference was held to determine an international standard and established that the prime meridian passed through the original site of the Royal Observatory in Greenwich, England. As a result, the prime meridian is also known as the Greenwich meridian. A number of terms have been applied to the standard of time based on the prime meridian: Greenwich Meridian Time, Greenwich Mean Time, Greenwich Civil Time, and Greenwich Time.

See also GEOGRAPHY AND CARTOGRAPHY; MAPS AND CHARTS.

privateers

A privateer is a private ship, or the commander or one of the crew of that ship, commissioned by a sovereign nation to take action against an enemy. The commission, known as letters of marque and reprisal (or, more commonly, letters of marque), enabled private individuals to fit out an armed vessel and attack and seize ships, crews, and merchandise. The practice started in the Middle Ages, when European nations hired private merchant vessels to create a navy or help fill out an existing navy. Privateers, in their wide-ranging voyages for military and commercial purposes, played a part in world exploration.

The term *pirate* refers to a person who commits a crime on the high seas, or an act of PIRACY. Some of the men who worked as privateers and whose vessels also became known by that term, began as pirates on pirate ships. (The terms *corsair*, *buccaneer*, and *freebooter* are also applied to pirates,

some of whom were in effect acting as privateers.) But other men were private businessmen and mariners who received authorization from their governments to commit what would otherwise be considered acts of piracy and to keep much of the profits for themselves.

An explorer who may have participated in at least one privateering expedition in his early career was Italian CHRISTOPHER COLUMBUS, who later had the sponsorship of the Spanish government in his expeditions across the Atlantic Ocean in the late 15th and early 16th centuries. In 1522, Italian GIOVANNI DA VERRAZANO, sailing as a privateer on a French ship, successfully raided two of HERNÁN CORTÉS's ships, returning from Mexico with Aztec Indian gold. This led to his commission for a French voyage to the Americas.

Englishman SIR JOHN HAWKINS developed the SLAVE TRADE in the 1560s, between England, Africa, and the Americas, considered at that time a violation of international law, which led to his arrest by the Spanish. He eventually went on to serve in the Royal Navy and helped secure English victory against the Spanish Armada in 1588. His younger cousin, SIR FRANCIS DRAKE, who sailed with him on several occasions against Spanish interests, carried out the first English CIRCUMNAVIGATION OF THE WORLD in 1577–80 as a privateer. SIR JAMES LANCASTER, who was part of the expedition, went on to sponsor and organize expeditions in search of the NORTHWEST PASSAGE. CHRISTOPHER NEWPORT, who also accompanied Drake on raids, carried the first English colonist to Virginia in 1607. SIR MARTIN FROBISHER, another Englishman, also sailed as a privateer in the 1560s, later becoming an Arctic explorer. Englishman SIR ANTHONY SHERLEY, who later became a diplomat, led a privateering expedition in 1596. GEORGE POPHAM, who founded a short-lived colony in Maine in 1607–08, was a part of privateering raids in the WEST INDIES. Englishman WILLIAM DAMPIER, in the late 17th century, served in both pirating and privateering raids in the South Pacific Ocean and Caribbean Sea. With an interest in the natural sciences, he was later commissioned an officer in the Royal Navy and placed in command of the first English government-sponsored expedition to the Pacific, carried out in 1699–1701. In 1703, he embarked on another privateering expedition to the Pacific coast of South America. A Scottish crew member, ALEXANDER SELKIRK, was marooned in the Juan Fernandez Islands. After his rescue in 1709, his story became the inspiration for the 1719 novel *Robinson Crusoe* by Daniel Defoe. It is interesting to note how many of the above were knighted in the course of their careers.

Privateering was practiced on a large scale in the American Revolution in 1775–83 and the War of 1812. In the former, the Patriot navy consisted of almost 1,700 re-outfitted private merchant ships as opposed to 64 official Continental Navy ships. The practice of privateering was

abolished by the Declaration of Paris of 1856, of which the United States, Spain, Mexico, and Venezuela were not signatories. In the American Civil War of 1861–65, only the Confederacy made use of privateers. The United States officially renounced the practice during the Spanish-American War of 1898. At the Hague Conference of 1922–23, the international ban on privateering was extended to aircraft.

pundits

The word *pundit* is a variation of *pandit*, a Hindi term for a “learned expert,” applied especially to scholars, teachers, officials, and clerks. It is derived from the Sanskrit *pandita* of the same meaning. It also came to be applied by the British to native Indian explorers of the 19th century, hired to work on the Great Trigonometrical Survey of India.

The British survey of the Indian subcontinent had begun in the early 19th century, first under the direction of the BRITISH EAST INDIA COMPANY, then under the British government. SIR GEORGE EVEREST participated from 1819 to 1843. During that time most of India was mapped. The British, concerned about the intentions of both Russia and China in the region, wanted geographic knowledge of border countries as well, in particular Tibet to the north in the HIMALAYAS, which had been closed to Europeans since 1792.

In the 1860s, Thomas George Montgomerie, a captain in the Bengal Engineers who had headed surveys in Kashmir, devised a plan to accomplish this task. The British would hire native Indians or inhabitants of neighboring countries, train them as surveyors, and have them travel the countries disguised as Buddhist merchants or pilgrims. Since the surveyors were to enter countries illegally, they were in effect spies and would possibly be executed if captured. The recruits were trained in geography, astronomy, and memorization. They also received medical training. They practiced walking with a consistent stride for purposes of measurement. Each was provided with special instruments, crafted in British India: what seemed like traditional Buddhist prayer beads, but with 100 beads instead of the normal 108 and with every 10th bead larger than the rest, for keeping track of paces; a prayer wheel holding a COMPASS and slips of paper for taking notes; a hollowed-out book concealing plane tables for mapping; a hollow walking stick holding a thermometer for measuring the temperature at which water boils, a way to measure altitude; and a false-bottomed travel chest to carry a SEXTANT for determining latitude.

Each surveyor was given a code name. Some of their names are now famous in the history of exploration, although, for years, even into the 20th century, they were given little recognition. NAIN SINGH, the first native surveyor in the field, was called “the Pundit.” Eventually, all the

native surveyors came to be known as such. In 1864–66, Nain Singh crossed the eastern Himalayas into Tibet and visited the city of LHASA and explored the upper Brahmaputra River. In 1867, he explored the western Himalayas and the upper INDUS RIVER. In 1873, Nain Singh traveled with his cousin, KISHEN SINGH, from northern India to Chinese Turkestan, reaching the Takla Makan desert. In 1878–82, Kishen Singh journeyed as far north as Mongolia's GOBI DESERT. Pundit KINTUP explored Tibet in 1879–84 and determined that Tibet's Tsangpo River is the same as India's Brahmaputra. Another pundit, Hari Ram, explored the region around the world's tallest mountain, MOUNT EVEREST, in 1871–72; later in his career, he crossed northern Nepal from west to east.

Not all the pundits succeeded in their missions, and some were executed or sent back to India. Yet, over the decades, the pundits managed to map many of the lands north of India.

Punt (Pwnt)

Punt, an ancient land, was a source of luxury goods for the ancient Egyptians. The name *Punt*, or *Pwnt*, means “the sacred.” The exact location of Punt, and its cities or villages,

is unknown, but much can be extrapolated concerning it from historical descriptions. It was a fertile land, with a variety of plant and animal species, requiring some days to reach from the head of the NILE RIVER by way of the RED SEA. The most likely locations for Punt are the Horn of Africa, either along the north coast along the Gulf of Aden, or the south coast in the Indian Ocean where Somalia is today. But Punt may have included lands in what is now eastern Sudan, Eritrea, and Ethiopia in Africa, or Yemen on the Arabian Peninsula. Or the name may have referred to all the southern parts of Africa and Arabia, of which the Egyptians were aware.

The first record of Punt is from HANNU's trade expedition for Egypt in about 2450 B.C. Hannu carried back precious minerals and spices to Egypt during the reign of Sahure. In about 1492 B.C., Queen HATSHEPSUT of Egypt organized a mission to Punt to obtain spices, exotic trees, precious metals, ivory, leopard skins, and monkeys. Records of these journey survive as carved reliefs, narrated with hieroglyphics, adorning the walls of her temple of Deir el-Bahari. Some of the inscriptions relate that the people of Punt believed the visitors from the north were supernatural beings who had descended from the sky.

See also EGYPTIAN EXPLORATION.



quadrant

A quadrant is an instrument used to measure the angular elevation of a celestial body and thereby determine geographic location for purposes of navigation. The name derives from the graduated arc displaying the reading, which spans 90 degrees, one fourth of a circle. The term *quadrant* is sometimes used interchangeably with other measuring devices based on the same principles. The octant, based on an arc of 45 degrees, and the SEXTANT, based on an arc of 60 degrees, were invented at about the same time in the 18th century. Hadley's Quadrant, invented by Englishman John Hadley in the early 1730s, was actually the first octant. The sextant became the tool of choice in celestial navigation. (The term *sextant* is now the most widely used term and is sometimes applied to all such measuring devices.)

The first quadrant, actually a version of the ancient ASTROLABE, was a simple wooden triangle with a wooden plumb bob on a thread, used to give a reading of the celestial body's altitude in relation to the horizon, which could be compared to tables of figures from earlier readings (see EPHEMERIS). From the computations, the user could determine approximate latitude. Later quadrants were made from brass. The CROSS-STAFF was a T-shaped device, which gave a more accurate reading. In the late 1500s, English mariner JOHN DAVIS added a reflector to the cross-staff so the Sun could be observed without damage to the eyes; that device became known as the backstaff.

Davis went on to invent what is known as the Davis Quadrant, probably during his Arctic voyages of the 1580s–90s; the device was first described in 1595. The Davis Quadrant consisted of two triangles instead of one. The smaller triangle had a mounted lens, which projected an image of the celestial body to a sighting slot aimed at the horizon. The larger triangle had two handles, a big arc with a scale, and an arm that slid along the arc to give measurements.

See also LATITUDE AND LONGITUDE; NAVIGATION AND EXPLORATION.

quintent See SEXTANT.

Quivira (Aguivira, Cuivira, La Gran Quivira, Quebira)

The legend of Quivira, also spelled Cuivira, Quebira, and Aguivira, is part of the story of the legend of CIBOLA, supposedly the location of seven cities, also known as the Seven Cities of Antillia, founded by seven Portuguese bishops, with wealth on a par with that of the Aztec and Inca civilizations. Such legends spurred on European exploration of the Americas, in particular among the Spanish. A 1540 expedition sent out from Mexico by ANTONIO DE MENDOZA, the viceroy of New Spain, and led by FRANCISCO VÁSQUEZ DE CORONADO, sought to determine if the Zuni Indian pueblos in what is now western New Mexico were the kingdom of gold

and jewels. Finding no great wealth here, the Spanish were primed for rumors of another location. A Plains Indian, probably of the Pawnee tribe, the TURK, who had been held captive among the Towa Indians of Cicuye Pueblo (Pecos Pueblo) on the Pecos River, described a wealthy civilization to the northeast on the southern plains to HERNANDO DE ALVARADO, one of Coronado's lieutenants.

In spring 1541, Coronado, Alvarado, and Franciscan friar JUAN DE PADILLA, who was driven by the hope of locating the cities founded by the seven bishops, set out with a large expedition from New Mexico, across the Texas Panhandle, and then north through present-day Oklahoma and into Kansas. The Spanish came into contact with Plains Indians, probably in what is now central Kansas near the great bend of the Arkansas River (although some writers have assigned the location of contact with Plains Indians to be the Canadian River area of the northeast Texas Panhandle), but found no wealthy cities. It is thought that the villages were of the Wichita Indians. The Spanish also encountered a party of Pawnee Indians. Coronado eventually had the Turk executed, because of his deception as well as an attempt to incite the Pawnee against the Spanish. Another Plains Indian

by the name of Ysopete then became the chief guide. The mythic land was never found, but the Spanish returned to Mexico with new geographic knowledge.

It has been theorized that the Turk sincerely believed that the powerful medicine of the Pawnee represented riches. It is more likely that the Pueblo Indians promoted the idea of wealth to be found elsewhere to rid themselves of the Spanish, and that the Turk, as part of the scheme, hoped to be taken back to his homeland.

In the early 1600s, the Spanish colonizer of New Mexico, JUAN DE OÑATE, searched for both Cibola and Quivira in the lands surrounding his settlement near present-day Santa Fe.

The legend of Cibola and Quivira persisted. Quivira became known as La Gran Quivira and, depending on rumors, its believed location shifted, the name appearing on early maps of the southern plains, Southwest, and even California. One of the ruins at the Salinas Missions National Monument, south of present-day Albuquerque, New Mexico, where the Piro Indians once lived, is known as Gran Quivira. Quivira has also endured as a place name in Kansas.

See also LEGENDS AND EXPLORATION.

R



raft

A raft is a floating structure, made from a variety of materials attached together, such as logs or bundled reeds. In some instances, certain materials, such as airtight animal bladders, are added to provide greater buoyancy. Rafts have been used from prehistoric times and can be considered the earliest watercraft. With time, ancient peoples devised ways to hollow out a single log or shape materials so that they moved through water with less resistance, making a type of craft generally known as the CANOE.

The balsa raft, or simply the balsa, consists of five or six logs of buoyant balsa wood bound together with cordage or hardwood pins. Propelled by oars or poles in shallow water, it might also have a sail, typically triangular. Some balsa rafts have a tent on deck for shelter and supplies, enabling them to stay at sea for weeks. Drag anchors make them safer than other types of small craft which can be sunk by waves. Some also have centerboards, making them less prone to drift.

In the legends of South American peoples, there is knowledge of the abundant islands of the South Pacific Ocean. Balsa rafts were made by the Inca Indians, who may have used them to colonize Polynesia (see POLYNESIAN EXPLORATION). Norwegian explorer and anthropologist THOR HEYERDAHL set out to prove the possibility of this migration by making a balsa raft and sailing it from Peru. After three months at sea, he landed on the Tuamotu Archipelago in Polynesia. The journey is chronicled in his book *Kon-Tiki* (1948).

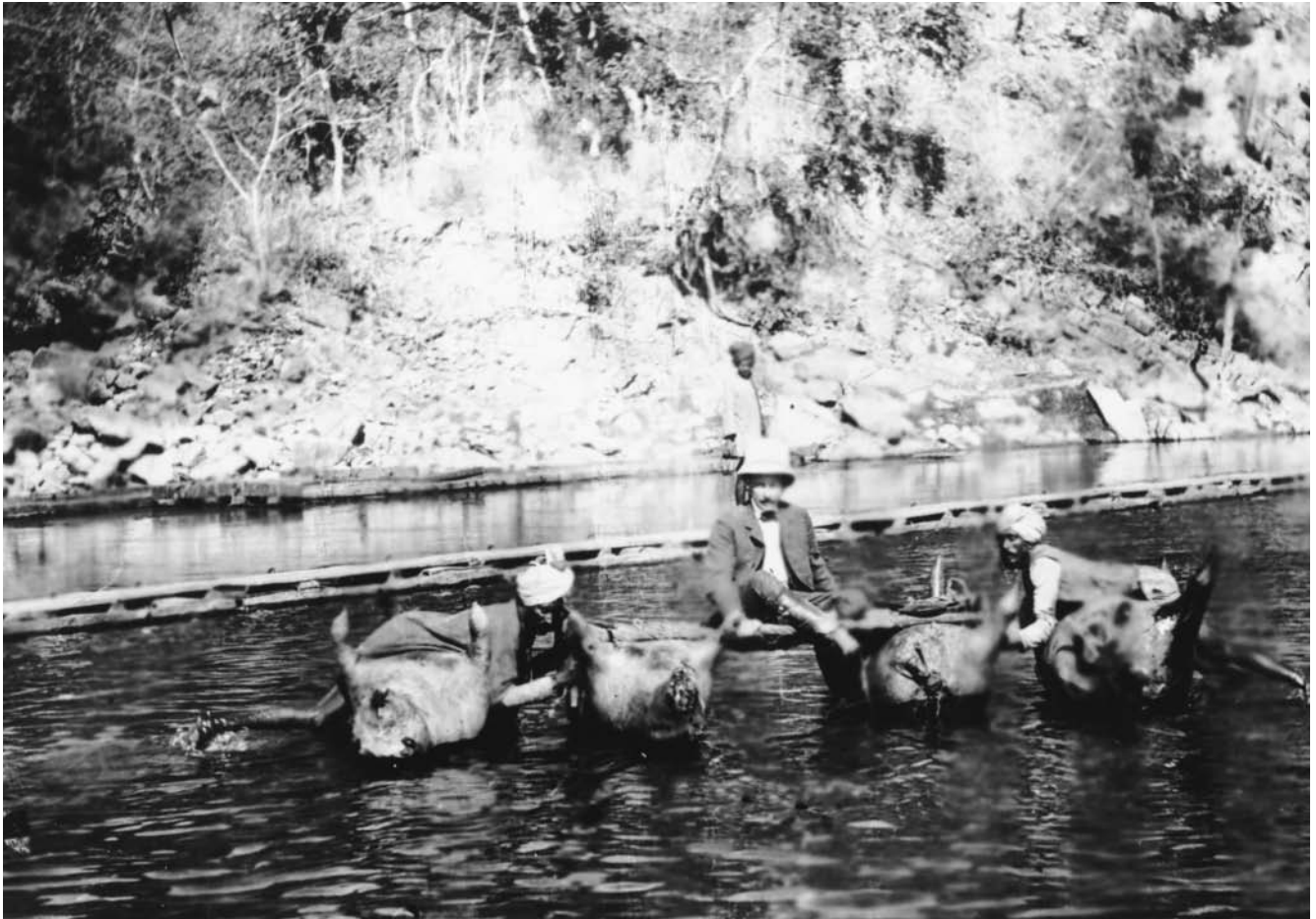
According to legend, in the 15th century, Inca ruler Tupac Yupanqui led a fleet of 400 balsa rafts in an exploration of the Pacific, a trip that lasted about a year. In the 16th century, Spanish conquistador FRANCISCO PIZARRO observed Native Americans using balsa rafts to conduct trade along Ecuador's coast. The raft would not have been practical for overseas trade, however, due to the lack of space for cargo. The balsa raft is still in use today in Brazil where it is called a *jangada*.

A type of raft common to Native Americans in present-day California, made from bundled tule reeds, is also sometimes referred to as a balsa.

See also SHIPBUILDING AND EXPLORATION.

Red Sea

The Red Sea is an inland sea separating northeastern Africa from the Arabian Peninsula of Asia. Its name results from the color at times cast by dying algae. It stretches 1,200 miles from Suez, Egypt, to the strait of Bab el Mandeb and obtains a maximum depth of 9,970 feet and a maximum width of 220 miles. The northern end of the sea is divided into the gulfs of Suez and Aqaba by the Sinai Peninsula. The Gulf of Suez is connected to the MEDITERRANEAN SEA by the Suez Canal, dug in the 19th century. At its southern end, the strait of Bab el Mandeb, about 20 miles long, connects the Red Sea to the Gulf of Aden, part of the Arabian Sea. The dangers of navigating the strait of Bab el Mandeb led to its name, meaning "gate of tears" in Arabic. The Red



Shown here, in a late 19th- or early 20th-century photograph, is a raft of inflated pigskins in India. (*Library of Congress, Prints and Photographs Division [LC-USZ62-35117]*)

Sea formed some 20 million years ago as tectonic activity along what is called the Great Rift Valley separating the Arabian Peninsula from Africa.

Ancient Trade and Exploration

The Red Sea is first encountered in recorded history with the rise of the Egyptian civilization. As trade with other parts of the world developed, Egyptians developed a taste for spices, incense, and other products from Asia and Africa, which were carried to Egypt by camel caravan arriving from the Arabian Peninsula. The first recorded explorer, HANNU, was sent by pharaoh Sahure in about 2450 B.C. to search for the sources of the riches. He is thought to have traveled to what the Egyptians referred to as the land of PUNT—a land to the south either in Africa or on the Arabian Peninsula—by way of the NILE RIVER and returned by way of the Red Sea. The Egyptians launched other such large expeditions southward over the centuries (see EGYPTIAN EXPLORATION). Hieroglyphics indicate that in about 1492 B.C., HATSHEPSUT sent five ships

to Punt by way of the Red Sea route, which successfully obtained and returned with valuable goods—spices, woods, minerals, and animals. As early as the 13th century B.C., Egyptian rulers had a canal dug from the Red Sea to the Nile River delta and thus a water route to the Mediterranean.

The Phoenicians and Greeks, known as mariners, mastered the waterways of the region (see GREEK EXPLORATION; PHOENICIAN EXPLORATION). The writings of fifth-century B.C. Greek historian HERODOTUS indicate that, sailing for the pharaoh NECHO II in about 600–597 B.C., Phoenician seafarers followed a Red Sea route southward from the Gulf of Aqaba to the Indian Ocean and possibly carried out the first circumnavigation of Africa, returning to the Mediterranean by way of the Atlantic Ocean and Strait of Gibraltar (see GIBRALTAR, STRAIT OF). The first Greek credited with navigating the Red Sea was SCYLAX, a mariner sent by Darius I, emperor of Persia, in 510 B.C., to explore the course of the INDUS RIVER to the east. It is reported that Scylax traveled that river to the Arabian Sea, then around the tip

of Arabia into the Red Sea, on which he reached the Gulf of Suez, from where he returned to Persia.

The importance of the spice and incense trade to the Mediterranean region was immeasurable. Before his death in 323 B.C., ALEXANDER THE GREAT planned an expedition to the southern tip of Arabia to set up a sea route for the trade, but with the dissolution of his empire, it was never undertaken. The Romans gained control of Egypt with the defeat of Antony and Cleopatra. In about 25 B.C., a Roman prefect of newly annexed Egypt, GAIUS AELIUS GALLUS, left the port of Cleopatra in present-day Suez with a large expedition in order to wrest control of the spice and incense trade from the kingdom of Saba. Gallus sailed along the Arabian coast of the Red Sea, then headed inland near the northern border of present-day Yemen. He was, however, unable to overcome the Sabaeans in their principal city of Marib, and he returned unsuccessful to Egypt.

Overland travel was very expensive, and spices, silks, and incense, all at a high demand in Egypt and throughout the Roman Empire, were brought by trade caravans coming to the Romans from the East over Persia or from the south over the Arabian Peninsula (see ROMAN EXPLORATION). To further complicate Roman travel access, Arabs withheld their knowledge of the Arabian Sea. Roman sailors gradually learned to navigate the Arabian Sea and Indian Ocean, using monsoon winds. By the first century A.D., the Romans had established a direct sea route from Egypt to India, sailing through the middle of the Red Sea to avoid the pirates centered on the Arabian coast (see PIRACY).

When the Muslims conquered Egypt in the seventh century A.D., Red Sea traffic became mainly that of transporting Islamic pilgrims to Mecca from western lands, including present-day Morocco and Spain (see MUSLIM EXPLORATION).

Sea Routes

Toward the end of the Middle Ages, as contact and trade between West and East increased, so did interest in sea routes. The Portuguese, who were sending expeditions to try to discover a sea route from the Atlantic Ocean to India by rounding the southern tip of Africa, sent an expedition in 1487 to explore the southeast coast of Africa. PERO DA COVILHÃ, a Portuguese bodyguard to King John II of Portugal, sailed with Afonso de Paiva to Alexandria. The two disguised themselves as Arab traders and sailed with an Arab trading vessel in the Red Sea to the Arabian port of Aden in present-day Yemen. Covilhã continued across the Arabian Sea to India, then along the east coast of Africa.

The Portuguese continued their quest to dominate sea routes to Asia. In 1497–99, VASCO DA GAMA reached India by rounding Africa. Several years later, in 1506, the Portuguese attempted to gain complete control of the trade routes between Egypt and India when AFONSO DE ALBU-

QUERQUE conquered the island of Socotra in the Gulf of Aden. The Portuguese, however, failed to conquer Aden.

By the eighth century A.D., the ancient Egyptian canal between the Nile and the Red Sea was atrophied with misuse. It was not until 1858 that a Frenchman, Vicomte Ferdinand Marie de Lesseps, having obtained the blessings of the Egyptian ruler Said Pasha, formed a company that endeavored to build a canal to connect the Red Sea with the Mediterranean via Suez. The canal, 121 miles long, was completed in 1869.

The British purchased Egypt's share of the canal in 1875, mostly in order to facilitate transport to its colonial possessions in the East and exercise dominance over trade. In 1882, Britain occupied the Sinai Peninsula and the rest of Egypt. In response, the French set up trade agreements and finally established a colony, French Somaliland, on the African coast, at the strategic entrance to the Red Sea.



Today, the Red Sea continues to be an important link between East and West. The Suez Canal was nationalized by the Egyptians in 1956. The canal and the Red Sea serve as an essential route for oil tankers bringing oil from Africa and Arabia to Europe and the United States. There are continued archaeological discoveries in the Red Sea, including ships and their cargoes from prior centuries, bringing to life the richness of ancient trade and travel in the region.

See also INDIAN OCEAN, EXPLORATION OF THE.

reed-bundle canoe See CANOE.

religion and exploration

The movement of peoples, which has occurred throughout history, whether by migration, conquest, or exploration, inevitably has been accompanied by the movement of ideas and beliefs. In some instances, the beliefs themselves have spurred on travel to foreign lands, as in the case of missionaries, purposely sent to propagate religion. Since many of the missionaries followed an academic tradition, many of them were well equipped to record information of their experiences abroad.

The Ancient World

The development of organized “religions” as opposed to tribal cults was completely intertwined with the development of kingship. The first chiefdoms, kingdoms, and cities emerged when agricultural practices improved enough to generate food surpluses. In order to have chiefs and priests who do not themselves produce any food, it is obviously necessary to have surplus food. Though archaeologists disagree as to which came first, food surpluses or chiefs

demanding them, at some point the cycle was set in motion; rulers demanding ever greater production leading to greater concentration of power in a few hands in order to coordinate still greater food production. Rulers—the chief or king—were presented as deities who could influence the supernatural world and ensure rain and a good harvest.

However, the conquests of the ancient world were not accompanied by missionary zeal as we think of it today. Religion in the ancient world was relativistic rather than absolute. The gods of one culture could be adapted to those of another—thus Jupiter and Minerva of the Romans (see ROMAN EXPLORATION) were easily identified with the Zeus and Athena of the Greeks (see GREEK EXPLORATION); Mercury fused with Hermes and also with Lugus of the Celts. When the Hyksos—a Semitic people from Syria—ruled Egypt, their Storm God became one with Seth of the Egyptians (see EGYPTIAN EXPLORATION). Based as they were upon the forces of nature, the essential identity of these gods was clear. Assyrians adopted most of their gods from their rivals the Babylonians even as the two empires competed and warred against each other. Peoples from all over the Near East, including Elamites, Medes, Persians, and Jews, lived in the city of Babylon; yet apparently there were no ethnic or religious conflicts. Most outsiders worshipped both their own gods and those of Babylon. The unification of Upper and Lower Egypt in about 3000 B.C., which might have occasioned the imposition of one region's gods upon another, instead brought about a revision of religious belief in which all gods, both local and regional, were unified into a single scheme or hierarchy. The Greek city-states of the Hellenic world often fought bitter wars with one another, yet they shared belief in the Olympian gods. For the Olympic Games, held every four years, a sacred truce was declared and erstwhile rivals in war, such as Spartans and Athenians, competed on the athletic field.

Conquest typically followed the pattern of initial military subjugation, taking of prisoners, slaves, and booty; imposition of control, tribute, and taxes; decrees to make sacrifices to the conquerors' gods—but then settlement and mutual cultural influence. This was particularly true when the conquerors were nomads. In some instances, nomadic conquest would be preceded by a period of contact between nomads and a civilization during which the former would be strongly influenced by the latter—thus the Goths and Vandals, whose invasions helped cause the breakup of the Roman Empire, were already half-Romanized and, within a century, began rebuilding Rome in a semblance of its old image and constructing elaborate Christian churches.

The Missionary Impulse

In their travels, humans obviously carry culture, technology, and spiritual beliefs with them. The missionary impulse largely appeared first during the period from the fifth cen-

tury B.C. to the seventh century A.D., during which Buddhism, Christianity, and Islam were born. Other major world religions—Hinduism, Confucianism, Judaism, Taoism (Daoism), and Shinto—have shown few missionary tendencies. Confucianism, in part blended Taoism and Buddhism, with its ethics of humaneness and tolerance, did not foster missionary aspirations except within China as its scholars traveled to different cities to converse with their rulers (see CHINESE EXPLORATION). Part of the tenets of Shinto, a religion of and for Japan alone, is the acceptance of the validity of other religions.

Perhaps the earliest expression of the missionary impulse came from the prophet Zarathustra (Zoroaster) in Persia probably in the sixth century B.C. His first convert, Prince Vishtapa of Bactria, was so zealous as to fight several holy wars in defense of his new faith. Missionaries carried word of Zarathustra's doctrine, which because known as Zoroastrianism, throughout the Persian Empire.

The Spread of Buddhism

Although Buddha (Siddhārtha Gautama) lived in the sixth century B.C., significant Buddhist missionary activity only began about 200 years after his death. As a result of the third of four "Major Councils," which explored and codified Buddha's message over a period of several centuries, in the third century B.C., Ashoka, ruler of the Mauryan Empire, sent missionaries to southern and northwestern India and even as far as the MEDITERRANEAN SEA. Between the second century B.C. and the first century A.D., Mahayana Buddhists developed the doctrine of the triple nature of Buddha; one of these was the "body of transformation," in which form the Buddha nature appears on Earth to convert mankind. Buddhism spread to central Asia and from thence to China around the first century A.D. Its missionaries arrived in Korea in the fourth century A.D., in Japan in the sixth century, and came to Tibet by the seventh century. Though not explorers in the European sense, Buddhist missionaries traveled to lands utterly foreign to them, their motivation being the conviction of the rightfulness of Buddha's teachings. Later on in the seventh century A.D., religious fervor led Chinese Buddhist monk HSÜAN-TSANG to travel back to India in search of Buddhist texts, braving a Chinese imperial ban on leaving the country. In the end he traveled more than 40,000 miles through central Asia, bringing back to China a wealth of religious, cultural, and geographic knowledge.

A central characteristic of Buddhism has always been its promotion of freedom of thought. Buddha himself did not seek to impose his ideas on others but instead invited people to investigate them and decide for themselves. One can freely follow Buddha's teachings without abandoning one's own traditions and culture. For example, the Tantric form of Buddhism followed by Tibetans incorporates the many gods and demons of traditional Tibetan belief.

The Spread of Islam

At the time of Muhammad's birth in about 570, central Arabia was the only part of Arabia free of Sassanian Persian domination. Mecca was the principal city-state in this central region; the Meccans were important traders and caravan leaders and had permission from surrounding empires—Persia, Byzantium, and Abyssinia—to conduct trading expeditions through their territories. The culture of the Arabian peninsula had long been characterized by a contradictory mix of rural backwardness and urban sophistication, the large desert interior inhabited by nomads and the periphery having urban centers whose existence depended upon the SPICE TRADE. Rather like barbarian Europe during the same period, Arabia was profoundly influenced by the civilizations of Mesopotamia and later of the Mediterranean without itself developing a cohesive civilization until the rise of Islam, as Europe was to do under the influence of Christianity. Arabian peoples had been trading with southern Mesopotamia since the sixth millennium B.C. The spice trade became important by 1200 B.C.; myrrh and frankincense were traded to Egypt as well as Mesopotamia. Arabia was for millennia a crossroads of the ancient world. Mecca was situated close to a spice route along the Red Sea to Gaza. By the seventh century, as beneficiary of self-destructive wars between the Bedouin of the interior and the Byzantine and Sassanian Persian urban cultures of the periphery, Mecca had inherited from the Roman and Byzantine cities of Petra and Palmyra centrality in the spice trade. Mecca was spared as a result of its unique status as possessing the shrine of the Ka'ba, which attracted pilgrims from all over Arabia. It was in a mountain cave near Mecca that Muhammad, a wealthy merchant, reportedly received revelations from the angel Gabriel in a long series of visitations beginning in A.D. 610.

Though the spiritual primacy of Mecca gave Muhammad his opportunity to gather followers, the presence in the Ka'ba of the shrines of many gods and cults also ensured that there would be many bitter rivals to this new faith whose god aimed to displace all others. The persecution Muhammad and his first followers experienced, so severe that they were driven out of Mecca to Medina in 622, together with their victorious war to recapture Mecca in 630, may have set off the first explosive wave of conquests. By the 640s, the Muslims had overrun most of Syria, Iraq, Persia, and Egypt.

Islam focused the competing energies of the Arabian tribes through a novel type of political consolidation wrought by an elite of sedentary tribesmen from Mecca and Medina, heirs to Muhammad's legacy, a combination of spiritual, political, and commercial influence. The means of consolidation ranged from the ideological to the materialistic. The latter included the granting of gifts and promises of booty and land from conquered territories.

Missionary fervor seems to have been directed more or less exclusively toward Arabs, however. What early Muslims wanted from their new subjects was peaceful acceptance of their rule, one of their main aims being to secure new territories within which to pursue trade.

In many instances, the Arab conquerors encountered sophisticated civilizations far in advance of their own tribal culture. They swept through lands ruled by the Byzantine and Persian Sassanian empires. The Arabs left the apparatus of government and of educational institutions in place, allowing their bureaucracies to continue their activities unimpeded, only reserving the top positions for themselves. Over time, non-Arabs in the conquered lands, wishing to take part in the Arabs' success, began converting to Islam, the only way to rise in government. Only Muslims could serve in the army and this, too, attracted converts who wanted to share in the booty won by the always victorious Arab armies. Arabs thus were missionaries by example; the fantastic success of their enterprise seemed to prove the superiority of their religion. By the eighth century, non-Arab converts were exerting considerable influence on affairs throughout the Arab empire.

Muhammad and his new religion benefited from his connection through his wife, a wealthy spice merchant, with the spice trade. Her status facilitated acceptance of Islam in Arabia and the spice routes acted as conduits for its doctrine to travel. Here, too, conversion was often based on the elevated status accorded Muslims with regard to trading opportunities. Later in the ninth and 10th centuries, the spice networks would be the vehicle for the spread of Islam to southeast Asia, central Asia, and China and sub-Saharan Africa. Later still, when Portuguese explorers arrived in southeast Asia in search of black pepper, Islam became a rallying cry for resistance against the newcomers.

The Islamic requirement to make a pilgrimage to Mecca led some Muslims living in one corner of the Islamic world to continue their travels beyond Mecca. ABU ALI AHMAD IBN RUSTA, for example, in the 10th century, traveled to Europe's lower Volga region and on to Malaya and Indonesia. ABU AL-HASAN MUHAMMAD IBN JUBAYR, in the 12th century, traveled from his native Spain to Mecca, then on to Egypt and Iraq, visiting Sicily on his return journey.

As Christian missionaries were to do, Muslim travelers contributed greatly to the intellectual and scientific aspects of exploration. The tolerance of Islamic culture toward other cultures made it the heir of the intellectual traditions of the Greeks and Romans, rejected by the Christian world as pagan; many Latin and Greek texts were translated into Arabic. This resulted in a flowering of philosophic, literary, and scientific endeavor by Muslims, such as 12th-century Arab author and cartographer ABU ABD ALLAH MUHAMMAD ASH-SHARIF AL-IDRISI, who drafted what were considered the finest world maps of his time.

Early Christian Travels

During Christianity's first centuries, missionary work was largely confined to the Greco-Roman world. With the conversion of fourth-century Roman emperor Constantine, Christianity became the official religion of the Roman Empire, and conversion beyond the inner circle of true believers who had formed the early Catholic Church was at first a largely pro forma affair, as with non-Arab converts to Islam, undertaken for political and economic advancement. The Greco-Roman world was largely an urban culture, and concern for pagans and barbarians in rural areas and beyond Roman control was minimal.

Aside from St. Martin of Tours in the fourth century, who worked in Roman Gaul, the first missionary to venture beyond the periphery of the Roman world was St. Patrick, a Roman Briton who converted the Irish in the first part of the fifth century. His missionary zeal was carried on by Irish monks in succeeding centuries, though at first their urge to wander arose from an extreme asceticism as a substitute for actual martyrdom, a withdrawal from secular society first into hermits' cells and monasteries in the most isolated places and storm-racked islands they could find in Ireland, then out of Ireland altogether. In general in the Middle Ages, religious zeal led people to want to abandon normal life, to loosen the bonds of the ordinary in search of the eternal. Many entered monasteries; many more went on pilgrimages.

The movement out of Ireland, which would lead to Irish missionary work in Scotland, England, on the Continent, and beyond, was led by Saints Columba and Columbanus in the latter half of the sixth century, Columba to the island of Iona off Scotland and Columbanus to Gaul; both founded important monasteries. The half-legendary SAINT BRENDAN, who may have explored the Atlantic Ocean in a CURRAGH, was said to have been ordained a priest in A.D. 512, only some 50 years after Saint Patrick's death. He may have been an early precursor of Columba and Columbanus and in his later years seems to have lived on Iona.

For centuries after the fall of the Roman Empire, European society was focused mainly inward, as the tribal peoples who had overrun the empire struggled to cohere into stable regimes and as the feudal system developed. The main impetus for travel abroad remained religious, and many made pilgrimages to the Holy Land. One of these was ARCULF, a Frankish cleric who traveled to Palestine, Alexandria, and Constantinople (present-day Istanbul) in the 680s. His was the only journey of the time to be documented in writing, because he landed on Iona and described his experiences to the abbot, Saint Adamnan, who wrote a book about them; at this period of widespread illiteracy the Irish monasteries were the center of learning in Europe.

The Crusades

The CRUSADES, a series of military expeditions undertaken by European Christian powers to recover the Holy Land in

the Near East from the Muslims, lasting from the late 11th century through the late 13th century, were religious in inspiration and marked the first attempt at expansionism and colonialism by Christian nations beyond Europe. Alexius I Comnenus, the emperor of the Eastern Roman (Byzantine) Empire, appealed to European nations for help against Islamic invaders. Soon afterward, in 1095, Pope Urban II gave a speech at the Council of Clermont in France encouraging aid to Byzantium against the threat. Peter the Hermit (Peter of Amiens) and other wandering preachers helped spread the message of a "holy war." Over the next year, Europeans from all walks of life joined in the effort, with economic and territorial implications as well as religious. There were nine officially sanctioned Crusades as well as other endeavors to assert Christian rule and worship in the Near East and North Africa.

Christian Envoys to the Far East

During the Crusades, Italy had become the primary launching point for travel from Europe to the Near East and North Africa. As a result, Italian cities prospered, and Italian merchants replaced Byzantines and Muslims as the dominant traders in the Mediterranean. Italian port cities remained the commercial center of activity in the Mediterranean—and the link between East and West—for years to come. Yet significant European expansion to the east in this period was blocked not only by the Islamic empire but also by the rising power of the Mongols. Under GENGHIS KHAN in the early 13th century, the Mongols conquered China, then pushed westward to Russia, eventually reaching eastern Europe. The Mongols allowed local populations to practice their own religions and even adopted Buddhism to a degree. Yet, concerned with their intentions and hoping to develop a political and economic relationship, Christian rulers sent envoys to Mongol-held territory (see MONGOL EXPLORATION.)

In 1245, GIOVANNI DA PIAN DEL CARPINI, a Franciscan friar, traveled as an envoy of the Catholic Church to the current khan of the Mongol Empire, Ogadei. Leaving Lyons, France, he traveled some 3,000 miles across eastern Europe and central Asia to the Mongol imperial encampment in Karakorum. Though his peace overtures were rebuffed by the khan, he was able to assess the Mongols' strength and the danger they posed to the disunified European powers. Del Carpin's mission paved the way for other papal envoys to the khans, such as WILLIAM OF RUBROUCK, a Flemish Franciscan who, in 1253, sailed from Constantinople over the Black Sea and by way of the Volga and Ural Rivers to the Caspian Sea, making the observation that it was not connected with the northern ocean as had been thought in Europe. In his account of his journey, he made the earliest known speculation that silk originated in a land east of Mongolia called Cathay. Less than 10 years later, two Venetian merchants, MAFFEO POLO and NICCOLÒ POLO, trav-

eled to the court of Kublai Khan at Cambaluc (present-day Beijing, China). Thus were the links forged that would enable the diplomatic career of MARCO POLO, who in 1275–92 traveled throughout the Far East on behalf of Kublai Khan.

Meanwhile, the papacy continued in its diplomatic and missionary efforts in China. Kublai Khan was more welcoming to Westerners than his predecessors had been, and he permitted the establishment of a cathedral and church school in Peking (Beijing) by Italian Franciscan friar JOHN OF MONTECORVINO in the 1290s. In 1307, John was named the first archbishop of Peking, though his successor, appointed in 1333, never arrived there. In 1318, ODORIC OF PORDENONE, another Italian Franciscan, perhaps inspired by John's success in converting thousands of Chinese, began an epic 12-year journey through Asia, visiting John but traveling also to CEYLON (Sri Lanka), Borneo, and Java, observing the spice trade there, through Southeast Asia, and later into Tibet, to the city of LHASA and along the northern slopes of the HIMALAYAS. Also in the late 13th century, in the opposite direction, a Nestorian Christian monk born in China, RABBAN BAR SAUMA, during the course of a pilgrimage to Jerusalem, became involved in diplomatic efforts to the West on behalf of the Mongols. Though he never arrived in Jerusalem, he did travel to Constantinople, Rome, and even Paris.

The Black Death, the bubonic plague, which reached Europe in the mid-14th century, slowed down European expansionism for several decades (see DISEASE AND EXPLORATION). When European society finally emerged from this difficult period, it was energized. And the Catholic Church, the authority of which was questioned because of its powerlessness in the face of the epidemic, became opportunistic once again.

Catholicism and Conversion

VASCO DA GAMA, a Portuguese explorer who pioneered the sea route to Asia around the CAPE OF GOOD HOPE in 1497–99, when asked in India what he sought coming so far, replied, "Christians and spices." Spanish and Portuguese expansion received its initial impetus from the Reconquista, or reconquest, of the Iberian Peninsula from the Moors, the Muslims who had originally invaded the region in 711. Over the next centuries, there was close cooperation between the Vatican and the Portuguese crown. During the 15th century, the papacy issued a bull, *Romanus Pontifex*, which constituted a formal charter for Portuguese expansion. Portuguese explorers were instructed to "subdue, enslave or conquer any Pagan or Muslim" they encountered. In 1493, five papal bulls granted to King Ferdinand II and Queen Isabella I of Spain spiritual and material sovereignty over a region vaguely defined as "such islands and lands . . . as you have discovered or are about to discover." The European explorers of the 15th and 16th centuries in Africa and

the Americas believed that they were carrying a superior religion to heathens, and missionaries accompanied many voyages of exploration in order to convert any indigenous peoples they encountered. The very humanity of native peoples was questioned. In 1512, Pope Julius II issued a doctrine proclaiming that Indians of the Americas were after all descended from Adam and Eve.

Another institution that would play a major role in missionary efforts was the Spanish Inquisition, begun in 1483 at the command of monarchs Ferdinand and Isabella. An offshoot of the Reconquista, the Inquisition was fueled by the anxieties and spiritual instability caused by the long presence in Spain of non-Christians, principally Muslims and Jews who had settled in Spain protected by the cloak of Islamic religious tolerance. In its first 15 years, the Inquisition, conducted by the Dominican order, executed 2,000 Spaniards; in the 1540s, its efforts were directed against Protestants in Spain.

The Protestant Reformation

This movement to propagate Christianity abroad had no sooner begun than there arose at the Catholic Church's back in Germany a grave challenge to the supremacy of the universal Christian empire: the Protestant Reformation. In 1517, German monk Martin Luther published his Ninety-Five Theses. The Church had come to seem remote from the needs and sufferings of ordinary people, a perception that must have been strengthened by the trauma of the Black Death and the worsening climate, and Luther based his initial attack on the sale of indulgences to finance the building of St. Peter's Basilica in Rome, perhaps seen as particularly egregious in the midst of such hard times. One of the first results of Luther's work was the Peasants' War of 1524–26, whose proponents justified their actions by invoking (though mistakenly) his ideas. The Catholic Church's Counter-Reformation in response to Luther's movement further spurred the Catholic countries of Portugal, Spain, and France to win new territories for the one true Church.

Jesuits in Asia and Africa

If a large part of the impetus and justification for conquest of new lands derived originally from the Crusades and the struggle against the Moors, a primary mission of the religious order that would be in the forefront of missionary work, the Society of Jesus, known as the Jesuits, was to carry out the Counter-Reformation. The primary focus of its founder, Saint Ignatius Loyola, was conversion of Muslims; the name the order was given in the papal bull, which approved its founding in 1540, "*Societas Jesu*," had been borne a century before by a military order whose mission was to fight the Turks. Yet, although Ignatius may have known little about the schism in the Church taking place in Germany, soon after his order was founded its members

were sent by the pope to southern and western Germany and Austria to win back their people to the fold.

At first the Portuguese were slower than the Spanish to mount a major missionary effort in newly claimed lands. In India, such work only began in earnest with the arrival in 1542 in Goa, a major port on the west coast of India, of FRANCIS XAVIER, one of the seven founding members of the Jesuit order. Xavier established missions and made many converts in India, the Malay Peninsula, and Japan. The Jesuits were soon deeply engaged in exploration of the Asian interior. BENTO DE GÓES, for example, in the early 17th century, journeyed from India to China, the first inland trip there by a European in 300 years. In 1624, ANTONIO DE ANDRADE became the first European to reach Tibet since Odoric of Pordenone three centuries before. Andrade established a mission at Tsarapang and discovered one of the sources of the GANGES RIVER.

The Portuguese conquest of Ceuta in North Africa led to attempts to extend their sphere of influence deeper into that continent. HENRY THE NAVIGATOR, prince of Portugal, perhaps in retaliation for the defeat and death of his brother Prince Fernando in an attempt to capture Tangier in 1437, became obsessed with the desire to find the kingdom of PRESTER JOHN and join forces with fellow Christians in conquering all of Africa. The church granted him spiritual jurisdiction over all lands to the south of Portuguese territories on the north coast. Later, in the late 16th century, PEDRO PÁEZ, a Spanish Jesuit, sought Prester John in Ethiopia, during his journeys discovering the source of the Blue Nile and converting the emperor of Ethiopia, Negus Susenyos, to Christianity.

Franciscans in the Americas

The Franciscan order, born out of a movement inspired by the life of Saint Francis of Assisi in the late 12th and early 13th century, also carried out extensive missionary work. In the early 16th century, as the Spanish engaged in the conquest of Mexico, beginning in 1519 with the expedition of HERNÁN CORTÉS, the Franciscans were convinced that the end of the world was near, which would usher in the final and third age of man, the age of the spirit. This age would be characterized by love, peace, and unity for all mankind. When word came of the presence in the Americas of the Aztec, Franciscans believed that they were one of the 12 Lost Tribes of Israel who were prophesied to appear at the Last Judgment. By 1524, Franciscan missionaries, led by a group called the “Twelve Apostles,” were engaged in conversion of the native Mexicans. The fact that the Aztec had a religion very different from that of Jews and Christians led the Franciscans to conclude that they had been taken over by the devil; in their eyes the destruction that accompanied the Spanish conquest, the victories of Cortés, even the plague of smallpox, which killed many thousands of the native

Mexicans, were miracles that would clear the way for the re-establishment of Christ’s kingdom. Their missionary work among the survivors, however, was relatively benign; they conducted mass baptisms and marriages during the first years of the conquest in the 1520s. They believed that in order to combat the devil in Mexico, they had to learn as much as they could about native culture. As a result, almost all surviving eyewitness accounts of Aztec culture were written by Franciscan monks. When priests of the Dominican order arrived in 1526 with their Inquisition, they were skeptical about the genuineness of these conversions, observing that the native peoples continued to carry on idolatrous practices. By the 1530s, the Inquisition was in full swing in the Americas, with interrogations, torture, and burnings at the stake.

The Spanish CONQUISTADORES were organized into a type of military/commercial expedition with roots both in the Reconquista and in maritime trading ventures; heavily armed troops were led by a “captain” who was very likely the main investor in the expedition; in return for paying most of their own expenses in arms and provisions, the troops could expect a share in whatever wealth the expedition realized. Often such expeditions included a missionary and chaplain, such as JUAN DE PADILLA, a Franciscan who was with Cortés in Mexico in 1528 and later was attached to the expedition of FRANCISCO VÁSQUEZ DE CORONADO, which traveled north to present-day Arizona and New Mexico and onto the southern plains in 1540–42. With a detachment from this expedition, Padilla visited seven villages of the Hopi and also heard about a great river to the west later to be named the COLORADO RIVER. Another participant in this expedition was Franciscan MARCOS DE NIZA, whose report of mistakenly seeing what he took to be one of the legendary Seven Cities of CIBOLA, during an earlier expedition, helped prompt the expedition.

The pattern of a missionary traveling with a military man continued over the centuries in Spanish exploration. In 1768, for example, Franciscan missionary JUNÍPERO SERRA traveled with army officer GASPAR DE PORTOLÁ to California, where, over the next decade and a half, Serra founded a string of missions between San Diego and San Francisco. This was the start of the creation of the so-called Mission Indians, California Indians who were forced to live at or near the missions and became identified by the name of the mission.

Jesuits in the Americas

The Jesuits were in the forefront of missionary exploration in the Americas as elsewhere. JOSÉ DE ACOSTA, for example, ministered to the Inca in Peru and also to the Aztec for 15 years from 1571. Beneficiary of the high academic standards of his Jesuit education, Acosta was a naturalist and engaged in detailed study of the flora and fauna of South

America and also of the languages and customs of the native peoples. On his return to Europe he produced one of the earliest accounts of the natural history of the Western Hemisphere, which included descriptions of the use of the coca leaf and of the experience of altitude sickness in the ANDES MOUNTAINS. CRISTÓBAL DE ACUÑA, a Spanish Jesuit who traveled on the AMAZON RIVER in the mid-17th century, published the earliest known account of that region. This pattern of activity was to be followed many times by missionary explorers all over the world, who often were the most highly educated members of expeditions and wrote detailed accounts of new geographic features, rivers, lakes, seas, and mountains, and of new plants and animals that would have been ignored by their lay companions more interested in discoveries that could make them rich.

In New France to the north and beyond, French Jesuits such as JACQUES MARQUETTE and other missionaries continued to play a leading role in exploration and scientific study of the peoples, flora, and fauna of the new land, and also in consolidation of France's hold on its new territories. The impetus for the establishment of a French presence in Canada came from the burgeoning FUR TRADE, the result of new methods of processing the fur into felt for hats, highly fashionable in Europe. In the 40 years after the founding of New France by SAMUEL DE CHAMPLAIN in 1608, a dozen Jesuit mission posts were built in Huron (Wyandot) Indian territory. FRANÇOIS DOLLIER DE CASSON, a Sepulcian priest, in the 1670s helped to develop Montreal into a major city, laying out plans for streets, public buildings, and churches. He went with several expeditions throughout the Great Lakes region, including to Lake Erie, where he erected a cross to claim the territory for Louis XIV.

The continuing existence of New France soon began to be threatened by incursions by the Iroquois (Haudenosaunee) Indians who, having decimated the beaver populations in their native Mohawk Valley in trading with the Dutch of Fort Orange, the precursor of Albany, New York, had become determined to seize control of the Huron trapping grounds. In 1648, the Iroquois gained a decisive victory over the Huron, destroying the Christian mission posts and killing missionaries. GABRIEL LALEMANT and JEAN DE BRÉBEUF were two Jesuits killed in this war; they were later canonized by the Church as martyrs of North America. For decades after this the Iroquois continued to fight a kind of guerrilla war with the French; in the latter 17th century, Jesuit SIMON LE MOYNE joined with an Iroquois of the Onondaga nation and a Christian convert, Daniel Garakontie, to work for peace. The two organized prisoner exchanges, which helped defuse tensions; Le Moyne established ties with tribal leaders of the Iroquois and obtained permission to send Jesuit missionaries to the region. One of these, JACQUES BRUYAS, lived for several years with the Mohawk and other tribes and subsequently produced a

dictionary of the Mohawk language. In 1665–69, CLAUDE-JEAN ALLOUEZ served as a French missionary to peoples of the western Great Lakes and explored the south shore of Lake Superior and the Fox and Wisconsin Rivers. He is said to have preached to 22 tribes and to have baptized some 10,000 individuals.

Jesuits continued missionary activity among Native Americans well into the 19th century, moving on to new tribes as exploration and emigration shifted west. PIERRE-JEAN DE SMET, a Belgian, studied to become a Jesuit at a seminary near St. Louis, Missouri, in the 1820s. After spending 10 years in Europe raising funds for missions, he returned to St. Louis and traveled up the MISSOURI RIVER to found a mission among the Potawatomi. Over the next decades, he worked and traveled among tribes of the northern plains, including the Sioux (Dakota, Lakota, Nakota), Flathead, Blackfeet, and Nez Perce.

Protestant Missionaries

Protestant denominations also became active around the world. The PILGRIMS, a breakaway group, part of the Puritan movement out of England, founded the second permanent English settlement in North America in 1620. In the ensuing decades, Puritans and ministers of other Protestant denominations ventured onto Native American lands. One of these was John Eliot, a nonconformist influenced by the Congregationalists. He established a number of religious communities in Massachusetts, backed by the Society for the Propagation of the Gospel Among the Indians, created in 1649 by the English Parliament. He became known as the "Apostle to the Indians" and set an example of effectiveness for later Protestant missionaries.

In the early 19th century, JOHN CAMPBELL, a Scot, worked in the interior of South Africa having been sent there by the London Missionary Society, founded in 1795 during the evangelical revival taking place in England. Intended as a nondenominational body, it also had its roots in the Congregationalist movement in England and the United States. ROBERT MOFFAT and MARY MOFFAT, Methodists who worked in South Africa and explored the Kalahari Desert, were affiliated with the London Society, which also sent missionaries to China, where they would become important agents of change. GEORGE GRENFELL, an English Baptist, worked in the Congo region of central Africa in the late 19th century.

Social Activism

Although missionaries helped to bring about European expansion into new lands, in many cases they worked to mitigate the hardships faced by native peoples being displaced by European settlers. Bartolomé de las Casas, a Catholic missionary to the Arawak (Taino) Indians of the WEST INDIES, exemplified a socially active missionary concerned with the

rights of indigenous peoples. English minister JAMES RICHARDSON was an antislavery activist in Africa in the mid-19th century. Part of the impetus for Scottish missionary DAVID LIVINGSTONE's extraordinary efforts to discover the source of the NILE RIVER and his exploration of other important waterways in Africa was to foster the development of a commerce to replace the African SLAVE TRADE. He hoped that water routes would facilitate trade among the many tribes skilled in crafts and farming who inhabited central Africa. SAMUEL MARSDEN worked to reform the penal colony in New South Wales in Australia in the early 19th century and negotiated a peace treaty with the Maori of NEW ZEALAND.



Religion, the means by which humans have tried to come to grips with or comprehend a reality beyond reach of our senses, has always been intertwined with the material, from the first chiefs and kings who, in return for their supposed intercession with the gods, assured the fertility of the land, to the Muslims, whose military prowess and commercial success helped propagate Islam, and to Christian missionaries who aided in European expansion. The role religion should play in worldly affairs has been problematic. The Franciscan order, for example, grew out of a movement advocating a life of poverty and simplicity, modeled on the life of Saint Francis, whose inspiration was Jesus himself. Yet very quickly challenges to this ideal arose among Franciscans, which split into two groups, one adhering to the ideal of poverty and the other modifying this to allow monks to hold property in common. During the Middle Ages, popes wielded great political power and even waged wars. While missionaries aiding in exploration and conquest seems paradoxical, missionary efforts exemplified the best and the worst aspects of expansion.

Renaissance

The term *Renaissance*, French for “rebirth,” is applied to a cultural movement and a time period in Europe in the 14th, 15th, and 16th centuries, and carrying over into the 17th century. It is considered the transitional phase between the Middle Ages and modern times. The concept of rebirth is associated with the Renaissance because of a revival of pre-medieval classical influences, in particular from the civilizations of the ancient Greeks and Romans. Such cultural classifications are of course too pat. It is an oversimplification to regard the Middle Ages as the stagnant Dark Ages. Scholarship and the arts are a continuum, and individuals grew even as societies and institutions stagnated. Moreover, other peoples, such as the Arab Muslims and the Chinese, were breaking new intellectual ground during the medieval period, and some of their learning in geography and other

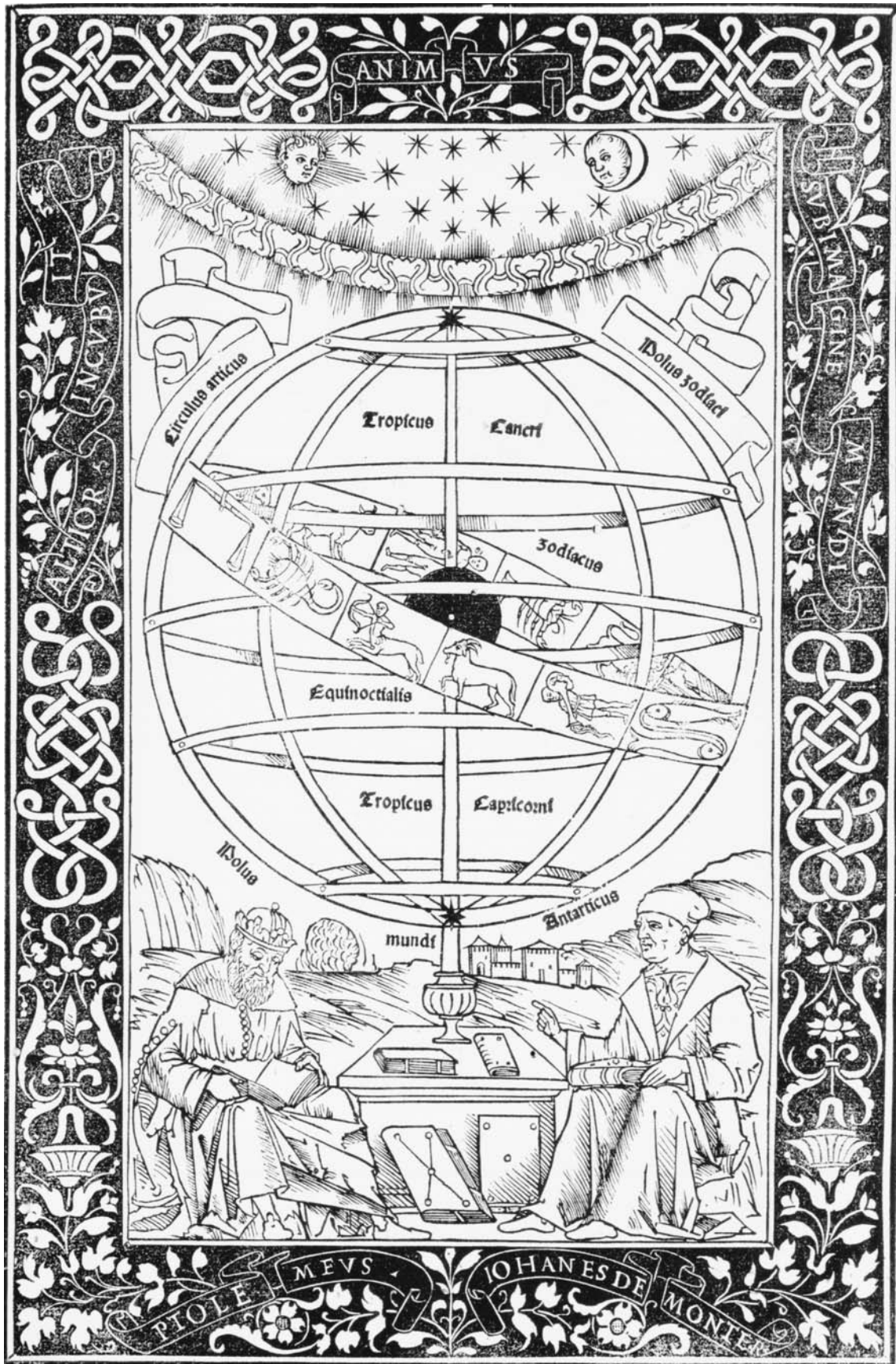
fields reached Europeans as well. The CRUSADES of the 11th through 13th centuries, in which Christian European armies invaded the Near East, led to increasing cultural contacts. Yet there were events and developments—many of them surrounding individuals—during the centuries associated with the Renaissance that can be regarded as culturally transforming, making the concept of such a period a helpful one in historical studies.

Culture and Transformation

During the 14th century, scholars and writers, especially in Italy, read the classics with a new focus on the power of reason and the worth of the individual. The movement associated with this fresh interpretation has come to be known as humanism, as heralded by 14th-century Italian poet and scholar Petrarch (Francesco Petrarca). The fall of Constantinople (present-day Istanbul) to the Ottoman Turks in 1453—in effect, the end of the Eastern Roman Empire (or Byzantine Empire), which had been centered there—drove Byzantine scholars to western Europe, giving new impetus to classical and Muslim studies and their relevance in contemporary life. Moreover, Spanish victories over the occupying Moors out of North Africa—the final victory in 1492—and the capture of various universities, led to greater access to Muslim scholarship, as well as to Greek scholarship from texts that had been in Muslim hands. The development of the movable type printing press by German goldsmith and printer Johannes Gutenberg, in the mid-15th century, made texts available to a wider audience. A new freedom of expression in painting, sculpture, architecture, and music, as well as in philosophy and writing, emphasizing the contribution of the individual as opposed to the anonymity of many of the artists of the Middle Ages, resulted. In the sciences, intellectual curiosity, a willingness to experiment, and an adherence to reason and objectivity led to new discoveries, such as the telescope early in the 17th century. A 15th–16th-century Italian artist, architect, and scientist, Leonardo da Vinci, is representative of this new approach to intellectual and creative pursuits in the Renaissance. Dutch scholar Desiderius Erasmus, his contemporary, made the case that the study of Christian theology should be open to all, not just the clergy. Such views played a part in the Reformation, led by Martin Luther, another contemporary, whose activities in Germany resulted in the founding of Protestantism. Political and social institutions were also reexamined during these centuries, with a new sense of optimism regarding the lot of humankind and a new emphasis on education.

Age of Exploration

The other great theme running through the Renaissance—and that which relates directly to the history of exploration—is the expanding worldview resulting from geographic



This frontispiece from a 1496 text shows Ptolemy and his Renaissance translator, Joannes Regiomontanus, beneath a sphere representing the heavens. (Library of Congress, Prints and Photographs Division [LC-USZ62-95164])

discoveries. HENRY THE NAVIGATOR, prince of Portugal, who had the vision to sponsor voyages of exploration from Portugal along the coast of Africa in the 15th century, is an important Renaissance figure. Certain expeditions—that of Italian CHRISTOPHER COLUMBUS for Spain across the Atlantic Ocean to the Americas in 1492, of Portuguese VASCO DA GAMA for Portugal around Africa to India in 1497–98, and of Portuguese FERDINAND MAGELLAN for Spain in the first CIRCUMNAVIGATION OF THE WORLD in 1519–21, along with others of the period—were momentous in that they changed cartographic awareness and set in motion the colonizing and commercial endeavors of the great international powers. Portugal, Spain, the Netherlands, France, and England became active around the world over the next centuries. Developments in shipbuilding and in navigation contributed to expanding frontiers (see also SHIPBUILDING AND EXPLORATION; NAVIGATION AND EXPLORATION). The latter part of the Renaissance, starting in the 15th century into the 17th century, when Europeans came to get a closer-to-accurate sense of the extent of the Earth, has been referred to as the EUROPEAN AGE OF EXPLORATION.

rocket

As wind power was to the EUROPEAN AGE OF EXPLORATION, so is rocketry to 20th- and 21st-century SPACE EXPLORATION. A rocket is a conveyance powered by a self-contained supply of fuel and an agent of combustion, usually oxygen. The force of the resulting exhaust gases of the rocket engine propel the rocket, a cylindrical tube, in the opposite direction. The term *rocket* is applied to primitive black-powder devices as well as to giant space launch vehicles.

Jet engines are different from rocket engines in that they are not self-contained, drawing an oxidizer from the surrounding atmosphere; they are also called air-breathing engines. Rocket engines provide the most powerful thrust for their weight. And since they provide their own oxygen, they can operate above Earth's atmosphere. In addition to the launching and maneuvering of a spacecraft carrying people or of an artificial SATELLITE or SPACE PROBE for exploratory and scientific aeronautics, rockets are used for a number of purposes: as projectiles and missiles in warfare; as emergency signaling devices (signal rockets); to carry scientific equipment into the upper atmosphere for collecting data (sounding rockets); to assist in the takeoff of airplanes with heavy loads; and to boost pilots from jet planes in distress. Rockets have also been used for centuries as fireworks. Model rockets are another form of entertainment.

It is believed that the CHINESE (see CHINESE EXPLORATION) invented the rocket, originally paper or cloth tubes filled with gunpowder (an explosive mixture of potassium nitrate, sulphur, and carbon) and attached to long sticks for stabilization, creating "arrows of flying fire." They are men-

tioned in accounts of 13th-century battles involving Chinese, Mongols (see MONGOL EXPLORATION), and Arab Muslims (see MUSLIM EXPLORATION). Europeans tended to use early rockets as signaling devices or as fireworks. Firearms, which were more accurate, became the preferred weapon. In India rockets—iron tubes attached to bamboo sticks—were used in warfare against British forces in the early 1800s. A British inventor by the name of William Congreve developed a rocket capable of traveling two miles and conceived the idea of attaching explosive devices to rockets, the first warheads. England used Congreve rockets against the United States in the War of 1812, leading to "the rockets red glare" in *The Star-Spangled Banner*, the U.S. national anthem. In the mid-1800s, another British inventor, William Hale, invented a stickless rocket that was spin-stabilized, thus improving accuracy. Similar barrage rockets, acting as incendiary devices, were used in other wars of the 19th century, such as the Civil War.



Scientist Robert H. Goddard poses with an early rocket in this photograph, thought to have been taken in 1925. (Library of Congress, Prints and Photographs Division [LC-USZ62-127240])

In the late 1800s, Austrian physicist Ernst Mach theorized the use of rockets to obtain supersonic speeds and German inventor Hermann Ganswindt reached the conclusion that a self-contained rocket would be the only engine able to function in the vacuum of space. In the early 20th century, Russian inventor Konstantin Eduardovich Tsiolkovsky, American physicist Robert Hutchings Goddard, and Rumanian-born mathematics teacher Hermann Oberth, who worked in Germany, independently promoted the use of rocketry in spaceflight, developing ideas of liquid fuel and multistage booster rockets as launch vehicles.

In the 1920s and 1930s, rocket engineers of many different nationalities developed rocket technology. A number of successful liquid-propellant launches were carried out in Germany, the United States, and the Union of Soviet Socialist Republics (USSR; Soviet Union). Germany also began a secret rocket program for military purposes in the 1930s. In 1942, during World War II, the Germans under Wernher von Braun conducted the first successful launch of the A-4 (later called the V-2) rocket, a long-range guided missile (about 200 miles) propelled by liquid fuel. A total of 1,027 V-2s were launched against Allied targets. The Germans also worked on solid-fuel rockets.

After World War II, the United States and the Soviet Union intensified their lagging rocket research, competing over German research and technology. Wernher von Braun, in fact, began working for the Americans. The cold war between the two nations, as well as the "space race," led to the development of intercontinental ballistic missiles, which travel in the outer atmosphere, and multistage launch vehicles, capable of carrying payloads beyond Earth's atmosphere. Other rocket technology was applied to thrusters, small rockets used to steer or change the speed of spacecrafts or satellites, for changing their orbit or sending them back to Earth (retro-rockets).

U.S. rockets have included the Viking, Vanguard, Redstone, Jupiter, Atlas, Titan, Agena, Centaur, Saturn, Athena, Taurus, and Delta. A Saturn-type three-stage rocket, the *Saturn V*, the largest rocket ever built, was used in the APOLLO PROGRAM to launch spacecraft to the Moon. The U.S. SPACE SHUTTLE is a reusable rocket and spacecraft in one. The Soyuz rocket, developed as part of the SOYUZ PROGRAM, has been central to both the Soviet Union's and Russia's space program, replacing the earlier Vostok rocket used in the VOSTOK PROGRAM and the VOSKHOD PROGRAM. A more recent Russian rocket is the Proton, with K and M models. Rockets of other nations include the EUROPEAN SPACE AGENCY's *Ariane 4* and *5*; the Chinese *Long March 2C* and *2E*; the Japanese *H-2*; the Indian *PSLV* (Polar Satellite Launch Vehicle); the Israeli *Shavit 2*; and the multinational, privately owned *Sea Launch Zenit-3SL*, which is launched from a converted oil platform in the Pacific Ocean southeast of Hawaii.

Rocket design has to take into consideration a number of factors: type of propellant; size and shape of exit (exhaust) nozzle; the number of stages required to lift an intended payload; and navigation equipment, such as internal gyroscopes (a device with a spinning disk mounted in a stationary base) to track orientation. Chemical rocket engines are powered by either liquid propellants (typically hydrogen as fuel and oxygen as oxidant) or solid propellants (typically nitroglycerine) burned in a combustion chamber, the gas of which is expelled at supersonic velocities. Rockets with nuclear engines, which heat fuel by radiation from reactor cores, and ion engines, which use thermoelectric power to expel ions rather than gases, have also been built and used experimentally.

Rocky Mountain Fur Company

The Rocky Mountain Fur Company was one of several fur-trading companies established to pursue the North American FUR TRADE, at its peak in the 1820s–1830s. In February 1822, WILLIAM HENRY ASHLEY, a Virginian, and ANDREW HENRY, a Pennsylvanian, formed the company and organized the first expedition up the MISSOURI RIVER to its headwaters in the northern ROCKY MOUNTAINS in present-day Montana. Henry, who been involved with the earlier ST. LOUIS MISSOURI FUR COMPANY, was active in the field the first years of operation, but, on returning to St. Louis with a load of furs in summer 1824, gave up the fur trade to develop lead-mining interests in Missouri.

The Rocky Mountain Fur Company employed many of the men who would become known as MOUNTAIN MEN: JAMES PIERSON BECKWOURTH, JAMES BRIDGER, ROBERT CAMPBELL, JAMES CLYMAN, HUGH GLASS, THOMAS FITZPATRICK, HENRY FRAEB, CALEB GREENWOOD, DAVID E. JACKSON, EDWARD ROSE, JEDEDIAH STRONG SMITH, WILLIAM LEWIS SUBLETTE, WILLIAM HENRY VANDERBURGH, LOUIS VASQUEZ, and JOHN WEBER. In July 1825, at Henrys Fork of the Green River in what is now northern Utah, Ashley sponsored the first annual rendezvous of trappers and Indians, where goods were exchanged.

At the rendezvous the following year, Ashley sold his interests to David Jackson, Jedediah Smith, and William Sublette, who reorganized again in 1830. James Bridger, Robert Campbell, and CHRISTOPHER HOUSTON CARSON (Kit Carson) trapped for the Rocky Mountain Fur Company. Thomas Fitzpatrick eventually became a principal in the company. The company was dissolved in 1834, although the principals remained active in the western trade for some years.

See also COMMERCE AND EXPLORATION.

Rocky Mountains

The Rocky Mountains (also called the Rockies) are the largest mountain system in North America. Although estimates

vary, they extend at least 2,000 miles from central Mexico through Canada to the Arctic. Their borders are not clearly defined; some consider the Yukon, Mackenzie, and Alaskan Ranges in Canada and Alaska as part of the Rocky Mountain system, and the Sierra Madre Occidental in Mexico as well. Geographers do agree the system includes at least 100 distinct ranges. The Rocky Mountains are bordered on the east by the Great Plains, and on the west by the Interior Plateau and Coast Mountains (in Canada) and by the Rocky Mountain Trench (a valley that runs from northwestern Montana to northern British Columbia), the Columbia Plateau, and the Great Basin (in the United States). In Mexico, a central plateau separates the southern continuation of the Rockies. The characteristic jagged peaks and flat-topped elevations of the relatively young Rockies were formed by crustal uplifts reshaped by glaciers.

The Rocky Mountain system is divided into four sections: the southern, central, northern, and Canadian Rockies. The southern Rockies (located in New Mexico, Colorado,

and southern Wyoming) include the Sangre de Cristo, Laramie, San Juan, Sawatch, and Park Ranges. The Colorado Plateau of the Four Corners region (northeastern Arizona, southeastern Utah, southwestern Colorado, and northwestern New Mexico) is sometimes discussed as part of the southern Rockies. The central Rockies, or middle Rockies (located in northeastern Utah, western Wyoming, eastern Idaho, and southern Montana) include the Bighorn, Beartooth, Asaroka, Wind River, Salt River, Teton, Snake River, Wasatch, and Uinta Mountains. The Uinta Mountains are the only range in the Rockies running east-to-west, instead of north-to-south. The northern Rockies (located in northern Idaho, western Montana, and northeastern Washington) include the Sawtooth, Cabinet, Salmon River, Clearwater Mountains, and Bitterroot Range. The Canadian Rockies are located in southwestern Alberta and eastern British Columbia. (To the north the Yukon Territory and Alaska are part of the same mountain system; and the Sierra Madre Oriental in Mexico can be considered a southern extension of the chain.)



Shown, in a 1941 photograph, is a vista of the Rocky Mountains in Glacier National Park, Montana. (*Library of Congress, Prints and Photographs Division [LC-USF34-058094-D]*)

The various subdivisions differ geologically (that is, by origin, ages, and types of rocks) and physiographically (that is, by landforms, drainage, and soils), yet they all have high elevations and great local relief (that is, the vertical difference between the base and the summit of ranges). The highest peak in the Rocky Mountain system is Mount Elbert in Colorado, at 14,433 feet above sea level. More than 100 named peaks measure at least 10,000 feet; these include Pikes Peak (14,110 feet) and Longs Peak (14,255 feet) in the Southern Rockies; Gannett Peak (13,804 feet), Grand Teton (13,771 feet), and Fremont Peak (13,730 feet) in the central Rockies; and Granite Peak (12,799 feet) and Borah Peak (12,662 feet) in the northern Rockies. The highest peak in Canada is Mount Robson, at 12,972 feet.

North America's Continental (or Great) Divide, the highest points of land separating the waters flowing west and south from the waters flowing east and north, runs along the Rocky Mountain ranges. (Early travelers along the Oregon Trail called it "Uncle Sam's Backbone.") Among the largest rivers that are part of this watershed is the longest river in the United States, the MISSOURI RIVER, which originates in the northern Rockies and flows generally east and south to join up with the MISSISSIPPI RIVER near St. Louis, Missouri; the Mississippi feeds the Gulf of Mexico, an arm of the Atlantic Ocean. The Arkansas River begins in the central Rockies and flows south and east to the Mississippi River in Arkansas. The Rio Grande flows from the southern Rockies south and east to the Gulf of Mexico. The COLORADO RIVER flows from the central Rockies south and west to the Gulf of California, part of the Pacific Ocean. The COLUMBIA RIVER flows from the Canadian Rockies south and west to the Pacific Ocean. The Snake River, out of the central Rockies, flows generally west to the Columbia. The Fraser River flows out of the Canadian Rockies first northwest, then south to the Pacific. The Saskatchewan River flows out of the Canadian Rockies generally east into Lake Winnipeg, which is drained by the Nelson River, flowing to HUDSON BAY, an arm of both the Atlantic and Arctic Oceans. The Pace River flows out of the Canadian Rockies generally east and north to the Great Slave Lake, which has an outlet to the Mackenzie, which flows to the Arctic Ocean. And the Liard River, farther north, flows out of the Canadian Rockies generally east and north, also to the Mackenzie River.

Grasslands cover much of the Rockies' lower elevations. Higher up are found extensive forests, mostly of conifers. The forests give way to grasses and scattered shrubs. The peaks have little vegetation up high. Some of the tallest have year-round snow and ice caps.

First Reports

The high peaks, rough terrain, and early winters of the Rockies proved a significant barrier to western movement,

and the Rockies were one of the last regions of North America to be thoroughly explored by nonnative peoples. The earliest European explorers to see the Rockies were Spaniards, and the first sightings were from the south. In 1540, an expedition under FRANCISCO VÁSQUEZ DE CORONADO entered present-day New Mexico and explored some of the country north of present-day Albuquerque, the southern limits of the Sangre de Cristo Mountains. In 1582–83, Spanish merchant and prospector ANTONIO ESTEVAN DE ESPEJO, who traveled north out of Mexico, ventured farther northward in the Sangre de Cristo Mountains. Starting in 1598, JUAN DE OÑATE founded a number of Spanish settlements near the upper Rio Grande, but, over the next decades, the occupants were not known to venture northward into the Rocky Mountain system, instead venturing eastward onto the Great Plains, or westward toward California.

Early Traders

Nearly a century and a half later, in 1742–43, a French Canadian fur trader, LOUIS-JOSEPH GAULTIER DE LA VÉRENDRYE, led an expedition across the Missouri River and northern plains—probably as far west as the Black Hills of western South Dakota and eastern Wyoming. Yet the mountains they later described may have been the Bighorn Mountains in western Wyoming. The next decade, in 1754–55, ANTHONY HENDAY, a British fur trader for the HUDSON'S COMPANY, explored the Canadian plains to territory known to be within 40 miles of the Rockies, although he made no mention of sighting peaks in his journals. In 1776–77, Franciscan missionaries FRANCISCO ATANASIO DOMÍNGUEZ and FRANCISCO SILVESTRE DE ESCALANTE, in an unsuccessful effort to create a route between Santa Fe, New Mexico, and Monterey, California, headed northward and traveled through Rocky Mountain country, including the San Juan Mountains in Colorado and the Wasatch Mountains in central Utah.

In 1793, SIR ALEXANDER MACKENZIE, a Scottish-born fur trader in the employ of the NORTH WEST COMPANY, traveled into the Canadian Rockies of British Columbia and crossed the Continental Divide, eventually descending the Blackwater River westward, then crossing over to the Bella Coola River and descending it to the Pacific, thus completing the first overland journey across North America north of the Rio Grande.

In the ensuing years, other fur traders worked the Canadian and northern Rockies, establishing numerous posts, among them British-born DAVID THOMPSON, who worked for the Hudson's Bay Company and the North West Company in the course of his career and mapped much of the Pacific Northwest. In 1798–1800, he explored the Athabasca and North Saskatchewan Rivers of Alberta. In 1807, he established a route through the Canadian Rockies of British

Columbia by way of Howse Pass and, in 1810, to the north, by way of the Athabasca Pass. Thompson then descended the Columbia all the way to its mouth, reaching it on July 14. Another explorer for the North West Company, American-born SIMON FRASER, thoroughly explored the watershed of the river named after him, the Fraser.

Lewis, Clark, and Pike

The U.S. government had launched the Lewis and Clark Expedition several years prior. After departing from St. Louis in spring 1804 and wintering in the Mandan Indian villages in North Dakota, where the river bends westward, MERIWETHER LEWIS and WILLIAM CLARK and the Corps of Discovery, including their Shoshone Indian guide SACAJAWEA (Sacagawea), set out on April 7, 1805, reaching the Great Falls of the Missouri on June 2. From that point they could have headed directly west and reached the Rockies in four days (as they were later told by Indians) but followed the Missouri to its source—the Three Forks of the Missouri, arriving on July 27. Two weeks later, on August 12, Lewis climbed up to the Continental Divide. He had hoped to look down upon a plain to the west, with a large river that would carry them to the Pacific, but saw only more mountains.

The Corps of Discovery crossed Lemhi Pass on the present-day border between Montana and Idaho. The expedition came upon a Shoshone village and Sacajawea's brother Cameahwait. The Shoshone provided them with horses, which the Corps of Discovery used to cross the rugged Bitterroot Range by way of Lolo Pass into present-day Idaho. The expedition eventually reached the Clearwater River Valley. Nez Perce Indians instructed them in the making of the dugout CANOE that they used to descend the Clearwater out of the mountains. They eventually reached the Snake River, then the Columbia, following it to the Pacific, where they spent the winter before returning eastward. On the return trip, in the eastern Rockies, Lewis took the more direct northern route from Lolo Pass through Lewis and Clark Pass to the Great Falls of the Missouri, while Clark followed the original loop to the south. They met up at the mouth of the Yellowstone and together rode the Missouri back to St. Louis, arriving on September 23.

In 1806, U.S. Army officer and explorer ZEBULON MONTGOMERY PIKE was commissioned to explore the headwaters of the Arkansas and Red Rivers. He followed the Arkansas River to the tablelands in the southern Rockies of present-day Colorado. While there, he attempted to climb Pikes Peak, which was later named for him.

Later Traders

Much of the subsequent 19th-century exploration of the Rockies was motivated by an interest in the FUR TRADE. In 1808, American businessman JOHN JACOB ASTOR

founded the AMERICAN FUR COMPANY, planning to establish a string of trading posts east and west of the northern Rockies. Astor sponsored a seaward expedition under Scotsman ROBERT STUART, from New York City around South America, in 1810, to build Fort Astoria at the mouth of the Columbia River as the westernmost post. The next year, he sent out an overland expedition from St. Louis—the Astorians—under WILSON PRICE HUNT that crossed the southern reaches of the Bighorn Mountains and the Wind River Mountains, then through Teton Pass into the Snake River Valley. In 1812–13, Robert Stuart, still working for Astor, traveled from Astoria in Oregon eastward through the SOUTH PASS through the Wind River Range in Wyoming, then descended the Platte and Missouri Rivers to St. Louis.

In 1809, a number of traders centered in St. Louis founded the ST. LOUIS MISSOURI FUR COMPANY. Among them were William Clark, MANUEL LISA, JEAN PIERRE CHOUTEAU, AUGUSTE PIERRE CHOUTEAU, ANTOINE PIERRE MENARD, and ANDREW HENRY. With time, traders pushed farther and farther into the Rocky Mountains.

In 1822, WILLIAM HENRY ASHLEY, along with Andrew Henry, founded the ROCKY MOUNTAIN FUR COMPANY. Many of the men who worked as trappers and traders for Ashley came to be known as the MOUNTAIN MEN after the Rockies, including THOMAS FITZPATRICK and JEDEDIAH STRONG SMITH. The mountain men traveled the trails, passes, and rivers of the Rockies, especially the northern and central ranges. In 1824, Jed Smith rediscovered the South Pass and spread word of it to other trappers.

Meanwhile, Canadians remained active in the region. In 1816–19, DONALD MACKENZIE, Alexander Mackenzie's cousin, also sent out fur-trapping brigades for the North West Company throughout the Pacific Northwest and the northern Rockies. In the 1820s–30s, JOHN M'CLOUGHLIN, based on the Columbia River, also directed operations in the region for the Hudson's Bay Company. PETER SKENE OGDEN worked a wide area for him, including the northern Rockies.

A number of traders established posts to the south, convenient to work the southern Rockies. ANTOINE ROBIDOUX, an American born in St. Louis of French Canadian ancestry, was perhaps the earliest non-Spanish trader working out of Taos, New Mexico. In 1828, he founded Fort Uncompahgre on the Gunnison River in southwestern Colorado; in 1837, he also founded Fort Uinta, or Robidoux Rendezvous, in northeastern Utah. From 1832 to 1844, he and his five brothers dominated the trade between that region and southern Arizona, providing north-south supply routes along the Rockies' eastern and western slopes. In 1833, brothers CHARLES BENT and WILLIAM BENT, whose parents from Virginia had raised them in St. Louis, along with CÉRAN DE HAULT DE LASSUS DE ST. VRAIN, born in

St. Louis of French ancestry, founded Bent's Fort on the Arkansas River in southeastern Colorado and developed their fur trade in that region. That same year, LOUIS VASQUEZ, another St. Louis native who had worked for Ashley, established a post, Fort Vasquez, on the South Platte River near present-day Colorado and, in the late 1830s, blazed a trail to Bent's Fort. Kentucky-born CHRISTOPHER HOUTON CARSON (Kit Carson), who had trapped in the Rockies in the 1830s, worked as a hunter and guide out of Bent's Fort in 1840–42.

Another fur trader, BENJAMIN LOUIS EULALIE DE BONNEVILLE, born in France but raised in the United States and a former U.S. army officer, led a fur-trading expedition across the Rocky Mountains by way of South Pass to Utah in the early 1830s.

Across the Great Divide

Crossing the Rockies along the Oregon Trail, which included South Pass, became an accepted part of travel west. In 1841, Belgian missionary PIERRE-JEAN DE SMET led the first organized wagon train migration on the Oregon Trail, with Thomas Fitzpatrick serving as guide. That same year, to the north, Métis JAMES SINCLAIR pioneered a wagon route through the Canadian Rockies by way of White Man's Pass in British Columbia for the Hudson's Bay Company.

Mapping the Rockies

Over the years, the U.S. government sponsored expeditions to the eastern Rockies, among them those under Major STEPHEN HARRIMAN LONG in 1820 and Colonel HENRY DODGE in 1835. During the 1840s–50s, JOHN CHARLES FRÉMONT, appointed a lieutenant in the army's Corps of Topographical Corps of Engineers, led a number of expeditions into the Rockies, with Kit Carson as guide for some of them. Frémont crossed the range by way of South Pass twice, climbed Frémont Peak in the Wind River Range, explored the Wasatch, Uinta Ranges, Sangre de Cristo, and San Juan Ranges. Frémont produced accurate surveys including elevations, distances, and LATITUDE AND LONGITUDE that were a boon to pioneers and explorers. In 1845, STEPHEN WATTS KEARNY, again with Thomas Fitzpatrick as guide, explored the Rockies, including South Pass. In the 1860s–80s, the U.S. government sponsored various scientific surveys of the Rockies and other parts of the West under geologists FERDINAND VANDEVEER HAYDEN, CLARENCE KING, and JOHN WESLEY POWELL. In 1857–59, JOHN PALLISER led a British scientific expedition to western Canada, during which he surveyed the passes of the Canadian Rockies.



Nowadays, the Rockies are developed for mining, lumbering, livestock, and recreation.

See also NORTH AMERICA, EXPLORATION OF.

Roman exploration (ancient Roman exploration)

According to legend, ancient Rome was founded in 753 B.C. on Palatine Hill, a hill on the east bank of the Tiber River in what is now west-central Italy, just inland from the MEDITERRANEAN SEA. The settlement eventually expanded into a city on six other hills. The native inhabitants of the region known as Latium (now part of Lazio) spoke Latin, although, with time, the city became a melting pot of many different peoples and cultures.

In its early stages, the Etruscans, living in the northwest in what is now the region of Tuscany, exerted political influence on the native inhabitants, and Rome was ruled by kings. By 509 B.C., the Romans had rid themselves of outside rule and developed a republican government. In subsequent centuries they gradually expanded their domain into other parts of Italy and neighboring lands. Victory in the Punic Wars against the Carthaginians in 264–146 B.C., and in the Macedonian Wars against the Macedonians and Greeks in 215–168 B.C., as well as other military actions, led to increasing Roman power. Rome assumed control of Egypt in 30 B.C., wresting power from the Greeks. In 27 B.C., the republic collapsed, and Rome was ruled by emperors, the first being Augustus (formerly Gaius Octavius). The Roman Empire reached its greatest extent by A.D. 117, including territory in northern Africa, northern Europe, and the Middle East. Emperor Constantine I (Constantine the Great) recognized Christianity as the official religion and established a new capital, Constantinople (present-day Istanbul, Turkey) in A.D. 330. In 395, the empire was divided into the Western Roman Empire and the Eastern Roman Empire. The Western Roman Empire gradually broke up by the fifth century because of economic decline, internal political unrest, and invasions by Germanic peoples from the north. The Eastern Roman Empire, also known as the Byzantine Empire, endured for another millennium until 1453, when Constantinople was captured by the Ottoman Turks.

Although the Romans took over some of the trading activities of the Greeks, they did not develop a trading culture on a level with other Mediterranean peoples, such as the Minoans, Phoenicians, Egyptians, and Greeks. Much of their trade, especially into Asia for exotic products, such as spices and silk, was carried out by foreigners. As was the case with the great military trek into Asia by Macedonian ALEXANDER THE GREAT, most of the Roman expeditions into unknown lands were for the purpose of conquest. The subsequent building projects of the Romans, including roads and bridges and even entire towns, served to unite lands that had previously been isolated from one another. A great dissemination of ideas resulted as the Roman Empire absorbed other cultures, and eventually there was also a consolidation of geographic knowledge, as recorded by scholars.

Rome's greatest contribution to the history of exploration is the opening of contact between Mediterranean peoples and peoples of northern Europe, including the British Isles. An early expedition by Greek PYTHEAS in about 325 B.C. through the Strait of Gibraltar (see GIBRALTAR, STRAIT OF) along the coast of Spain, France, and Britain as far as the Baltic Sea, brought back some knowledge of northern regions, but it was the Roman military machine and its actions against northern tribes that united Europe. In 58 B.C., general GAIUS JULIUS CAESAR led a military expedition to Gaul (present-day France), and, in 55–54 B.C., he reached Britain. The Roman subjugation of Britain was not completed until the following century. In A.D. 59–61, forces under general SUETONIUS PAULINUS, appointed military governor of Britain, suppressed a Druid revolt. General GNAEUS JULIUS AGRICOLA, also military governor, further explored the British Isles in A.D. 77–84, possibly sailing around them. He also led a military exploration into Scotland in A.D. 80.

The Romans also furthered geographic knowledge of Asia and Africa. In 19 B.C., Cornelius Balbus, a Roman governor of Tunisia, crossed Africa's Libyan Desert in actions against desert tribes. In about 25 B.C., army officer GAIUS AELIUS GALLUS led a military expedition to the Arabian Peninsula. Before his service as military governor of Britain, in A.D. 42, Suetonius Paulinus led a military expedition from the coast of North Africa southward across the Atlas Mountains to the northern edge of the SAHARA DESERT. Eight years later, army officer JULIUS MATERNUS led a military expedition from Africa's north coast across the Sahara, possibly reaching Lake Chad. In A.D. 45, HIPPALUS, a Greek mariner in service of Egypt, then under Roman domination, navigated a direct sea route across the Arabian Sea from Africa to India, furthering earlier knowledge gained by another Greek, EUDOXUS, who had explored the water route between Africa and India in two expeditions between 120 and 115 B.C. Other military expeditions, as the Roman Empire expanded, brought back new geographic information to Rome. By A.D. 29, a Roman military expedition had reached Africa's upper NILE RIVER in Ethiopia and Sudan. The emperor Nero, who ruled in A.D. 54–68, sent out an advance party with an exploratory purpose—to locate the source of the Nile—prior to a planned military campaign. Based on descriptions, the party is thought to have reached the marshes of the White Nile, known as the Sudd.

Many of the discoveries of Roman military expeditions were published in about A.D. 18 by STRABO, a Greek scholar working in Rome. PLINY THE ELDER, who had served as a Roman cavalry officer in both Europe and Africa, also was active as a geographer in the first century A.D. The only one of his works to survive, *Historia Naturalis*, published in A.D. 77, offered a comprehensive study of the known world at that time. PTOLEMY, a hellenized Egyptian living in Alexan-

dria while it was under Roman rule, published a description of world geography in A.D. 127–147.

See also CARTHAGINIAN EXPLORATION; EGYPTIAN EXPLORATION; GREEK EXPLORATION; MINOAN EXPLORATION; PHOENICIAN EXPLORATION.

roundship

The roundship was the vessel typical of northern European countries during the second half of the Middle Ages. Its most direct ancestor was the LONGSHIP of the Vikings. It shared some of the design features of the COG. In the course of evolving from the longship, the roundship took on its own characteristics and was used in warfare as well as commerce.

The first roundships were clinker-built, that is, having overlapping planks. This had been advantageous for the longships due to the integrity of the seams and flexibility in rough seas. With the invention of the saw in Europe, shipbuilders could fashion square planks, which could be laid edge to edge, or carvel-built, thus creating a smoother surface that could pass more easily through water. The shape of the roundship also evolved. The roundship was stouter than the longship, sitting deeper in the water and with more room for cargo. A deck was added on top of the ship's shell, giving the crew more room to work and sleep, while the hull could be filled with supplies and trade goods.

The roundship became a multipurpose vessel, used for both trading and for war. Being the workhorse of its day, it also was referred to as the MERCHANT SHIP. For warfare, additional platforms—castles—were built on the front and back of the vessel allowing better observation and offering additional shelter underneath. As roundships became too heavy to propel by oars, sails were added for propulsion, initially a single square sail, then several larger sails for larger hulls. Eventually smaller sails were added to the bow and stern castles. The masts on which these sails were attached would later be built on the main deck. A spar was sometimes added to the bow to hold a spritsail.

Another innovation the roundship incorporated was the stern rudder. A rudder mounted to the side was adequate for the longship, but to navigate the larger and tubbier roundship, the center-mounted stern rudder proved much more efficient and reliable.

As the design of the roundship became well understood, its length grew beyond the 100-foot mark. The smooth, round hull was stable in the ocean, and made the ship dependable, if not elegant. The roundship predated the EUROPEAN AGE OF EXPLORATION, but many of its features were incorporated into the CARAVEL and the CARRACK, which would carry European explorers throughout the world's oceans.

See also SHIPBUILDING AND EXPLORATION.

Royal Geographical Society (RGS)

The Royal Geographical Society (RGS), founded in England in 1830, is an organization dedicated to advancing the science and public knowledge of geography. Now affiliated with the Institute of British Geographers (IBG), RGS-IBG is the largest geographic society in Europe with a membership of almost 15,000, among them academics and professionals in the field of geography and related disciplines as well as lay people. At its central offices in London, a library, picture library, and map room have extensive collections. There are eight regional branches on the British Isles and one overseas in Hong Kong. RGS-IBG holds more than 150 lectures and conferences each year and directs three overseas field research programs. Its Expedition Advisory Centre helps train youth for careers in geography-related occupations. RGS-IBG currently publishes three scholarly journals, a research bulletin, a newsletter, and a popular magazine. It also bestows awards to people around the world for accomplishments in geography and exploration.

The Royal Geographical Society can trace its origins to the founding of the Raleigh Dining Club—named after 16th–17th-century Englishman SIR WALTER RALEIGH—in 1827. Members divided the world into cartographic divisions and became responsible for studying and passing on knowledge of a particular area. SIR JOHN BARROW, second secretary of the Admiralty, and other members eventually decided to establish a more organized institution and, under the patronage of King William IV, the RGS came into being in 1830. The next year, it merged with the AFRICAN ASSOCIATION, which had been founded by SIR JOSEPH BANKS in 1788 for the promotion of British voyages of exploration to Africa. Barrow was the organization's first vice president, then, following the terms of Viscount Goderich, earl of Ripon, and Sir George Murray, served as president in 1835–37.

In the 19th century and early 20th century, the Royal Geographical Society, often working in conjunction with the British government, was active in the sponsoring of expeditions in addition to furthering knowledge of geography. In the 1830s, it offered financial and other support in the explorations of German-born naturalist SIR ROBERT HERMANN SCHOMBURGK to British Guiana in South America. THOMAS SIMPSON, who explored the Arctic regions of Canada, received a medal the first year of the society's existence. Schomburgk received one in 1840. Queen Victoria, who began her reign in 1837, eventually granted the society a Royal Charter for “the advancement of geographical science” and “the improvement and diffusion of geographical knowledge.”

Not all investments in exploratory expeditions paid off, however, and, by the late 1840s, the Royal Geographical Society's activities were limited. Sir Roderick Murchison, who served as president of the society from 1851 to 1870, helped

bring the society to international prominence by sponsoring expeditions, especially to Africa. Among the explorers who received at least partial backing were SIR RICHARD FRANCIS BURTON, JOHN HANNING SPEKE, JAMES AUGUSTUS GRANT, SIR SAMUEL WHITE BAKER, and DAVID LIVINGSTONE.

Many notable explorers were members of, were sponsored by, or received awards from the Royal Geographical Society. To name a few, scientist SIR FRANCIS GALTON received an award in 1853. Pundit NAIN SINGH, who helped survey India, received a medal in 1877. World traveler ISABELLA LUCY BIRD BISHOP became the first woman member of the Royal Geographical Society in 1892, and GERTRUDE MARGARET LOWTHIAN BELL, who explored the Middle East, was the first woman to receive a medal in 1919. During the presidency of Sir Clements Markham in 1893–1905, the Royal Geographical Society made a mark in polar exploration, sponsoring the British Antarctic Expedition under ROBERT FALCON SCOTT among other expeditions. Asian explorer SIR FRANCIS YOUNGHUSBAND served as president late in his career in 1919–22. The society also helped back a British Mount Everest Expedition of 1953, in which SIR EDMUND HILLARY and Sherpa TENZING NORGAY reached the summit of Mount Everest (see EVEREST, MOUNT) in the HIMALAYAS. Hillary received a medal in 1958. French oceanographer JACQUES-YVES COUSTEAU and Norwegian anthropologist THOR HEYERDAHL were awarded medals in the 1960s.

Some of the work of the Royal Geographical Society has been carried out in conjunction with the much older ROYAL SOCIETY (of London for Improving Natural Knowledge), founded in 1660.

Royal Society (Royal Society of London for Improving Natural Knowledge)

The Royal Society is the oldest scientific organization in Britain, and among the oldest in Europe. Founded in 1660 by a group of upper-class and well-educated men in London, it was incorporated in 1662 with the full title, Royal Society of London for Improving Natural Knowledge.

At the time of its founding, European culture was in a period of transition from the RENAISSANCE to the Enlightenment. While the Renaissance had occurred in response to the superstition of the Middle Ages, and placed an emphasis on creative expression and secularism, the Enlightenment sought to foster the gains made in rational thought. With inventions, such as the telescope in the early 17th century, and the beginnings of the scientific method pioneered by philosophers such as Francis Bacon, the European mind began to form a mechanistic view of the universe, with the aim of gaining control over the destiny of human society. The founders of the Royal Society were interested in encouraging the exchange of ideas of natural science, especially

the physical sciences. Physicist Sir Isaac Newton served as its president from 1703 until his death in 1727.

With the prestige and political connections of its membership, the Royal Society has worked closely with the British government to plan and outfit a number of notable voyages of exploration. Among the most well-known was JAMES COOK's first expedition to the South Pacific Ocean in 1768, in order to time the transit of Venus across the Sun. Accompanying Cook on this journey was wealthy naturalist SIR JOSEPH BANKS, future president of the Royal Society and founder of the AFRICAN ASSOCIATION. The society has shown particular interest in polar exploration, aiding in many expeditions, including the 1818 expedition by DAVID BUCHAN to the Arctic Ocean, SIR JAMES CLARK ROSS's search for the SOUTH MAGNETIC POLE in 1840, and ROBERT FALCON SCOTT's first voyage to Antarctica in 1901. In some instances it has cosponsored expeditions with the ROYAL GEOGRAPHICAL SOCIETY, founded in 1830.

The Royal Society continues to operate to this day and continues to have many important scientists on its rolls. Since the society acts as advisers to the British government, members receive annual stipends for their efforts. Among the society's regular contributions to scientific debate is publication of its *Proceedings* and *The Philosophical Transactions*.

Rub' al-Khali See EMPTY QUARTER.

Russian-American Company

The Russian-American Company was a colonial trading company, established to develop the North American FUR TRADE for Russian interests. The brainchild of merchant GRIGORY IVANOVICH SHELIKOV and directed in its most productive years by ALEKSANDR ANDREYEVICH BARANOV, it existed from 1799 to 1867.

Promyshlenniki

Soon after VITUS JONASSEN BERING's and ALEKSEY ILYICH CHIRIKOV's voyage of exploration to Alaska on behalf of Russia in 1741, the *promyshlenniki*—Russian fur traders and hunters—who had been active in SIBERIA, reached the Aleutian Islands and eventually the Alaskan mainland, where they found a bountiful supply of furs, especially sea otter, seal, and fox. In the early years, the traders formed ad hoc companies to work the region with no rules governing their operations or their exploitative treatment of the Aleut, the native peoples on the Aleutians, and the Inuit (Eskimo), on the mainland. The royal court in St. Petersburg was primarily concerned with the *yasak*, the 10 percent tax on furs. Nor did the *promyshlenniki* have competition from other colonial powers.

Shelikov's Vision

By the 1780s, however, British and American traders also worked the region. To protect their territorial claims and economic interest, the Russians, under the impetus of Shelikov, and his employer Ivana L. Golikov, who had set up a base at Okhotsk on the Pacific coast of Siberia, began establishing permanent colonies in North America, the first at Three Saints on Kodiak Island in 1784. The efforts of Shelikov and Baranov, in his employ, led to profitable returns. By the 1790s, they had eliminated much of the competition, and the 40 or so ad hoc companies formed each year had become only three and then finally one, the United American Company. During the next several years, while Baranov ran the field operation, Shelikov lobbied for a royal charter in St. Petersburg. Czar Paul I granted the charter in 1799, four years after Shelikov's death, to his widow, Natalia Aleksevna, and son-in-law, Nikolay Petrovich Rezanov, authorizing the formation of the Russian-American Company. The charter granted the company monopoly trading privileges in all Russian territory in North America, including the Aleutians, Alaska, and territory as far south as 55 degrees latitude north. The czar was to receive a third of the profits.

Under Baranov

Baranov served as director of the company from 1800 to 1818. In 1799, he established a settlement at New Archangel (present-day Sitka) on what became known as Baranof Island in the Alexander Archipelago. It was destroyed by Tlingit Indians in 1802, but was rebuilt two years later, becoming the headquarters of expanding fur-trading operations. In 1812, Baranov also founded a southern settlement, Selenie Ross (later known as Fort Ross), near Bodega Bay in northern California. Because of reported involvement with foreign traders as well as complaints by Russian traders regarding abusive treatment of native peoples, the directors of the company retired Baranov in 1818. The new royal charter of 1821, which expanded operations to 51 degrees north latitude, also stipulated that the managers (or governors as they came to be known) of the Russian-American Company had to be naval officers.

Later Years

The Russian-American Company, despite its success in harvesting millions of furs, never established a large colonial population of Russians, partly because of the czar's refusal to allow the presence of serfs in North America. The harshness of conditions and the shortages of supplies also kept the colony small. Other trading companies—the HUDSON'S BAY COMPANY (which had merged with the NORTH WEST COMPANY in 1821) and the AMERICAN FUR COMPANY—offered growing competition. Moreover, the naval officers in charge were more concerned with territorial encroachments than the fur business. The continuing resistance of the Tlingit,

known to the Russians as the *Kolush*, also limited operations. With declining profits in the 1840s, the czarist government took over operations from the merchants.

The Crimean War in 1853–56, in which Russia was defeated by an alliance of nations, including Great Britain, France, the Kingdom of Sardinia (now parts of Italy and France), and the Ottoman Empire (now Turkey), drained resources from other international endeavors. In 1867, Russia sold Alaska to the United States, at which time the Russian-American Company was dissolved.

Trade and Exploration

Considerable exploration was carried out in conjunction with the fur trade as well as under the direct auspices of the Russian-American Company. In the 1780s, Shelikov himself initiated exploratory expeditions along the Gulf of Alaska. DMITRY IVANOVICH BOCHAROV, who explored the Aleutians and coastal Alaska in the 1780s and who, in 1791, located a passage through the eastern end of Alaska Peninsula, connecting Bristol Bay and Gulf of Alaska, worked for Shelikov. GERASIM ALEKSEYEVICH IZMAILOV sailed with Bocharov on some of these expeditions and, in 1791, explored the Kenai Peninsula on the Gulf of Alaska in command of his own ship. GAVRILOV LOGINOVICH PRIBYLOV, who located the Pribilof Islands in the Bering Sea in 1786, was a fur trader.

Baranov explored the Gulf of Alaska and various inlets, such as Cook Inlet, Prince William Sound, and Yakutat Bay in the 1790s, and explored southward along the coast from the Gulf of Alaska to San Francisco Bay in present-day California in 1804–05. GAVRIIL IVANOVICH DAVYDOV of the Russian navy worked for the Russian-American Company for part of his career in the early 1800s. ANDREY GLAZUNOV was in the employ of the Russian-American Company when he explored the Yukon and Kuskokwim Rivers of western Alaska in 1834–35. LAVRENTY ALEKSEYEVICH ZAGOSKIN commanded company ships in exploratory expeditions of

the Yukon, Kuskokwim, and other rivers of the Alaskan interior in 1842–44.

Other expeditions related to the fur trade in that maps and charts were sought to develop commercial interests. In 1768–70, PYOTR KUZMICH KRENITSYN led a maritime expedition charting the Aleutian Islands and the western end of Alaska Peninsula. Other explorations of coastal Alaska were carried out by VASILY MIKHAILOVICH GOLOVNNIN in the course of his voyage of 1807–11; by Swedish-Finnish ARVID ADOLF ETHOLEN sailing for Russia in 1821; and by ALEKSANDR FILIPPOVICH KASHEVAROV in 1832–42.

Still other Russian voyages of exploration sought to establish a water route between Russian America and European Russia to further develop commercial interests in conjunction with the Russian-American Company. Englishman JOSEPH BILLINGS, along with ANTON BATAKOV and GAVRIIL ANDREYEVICH SARYCHEV, led the Russian naval Northern Secret Geographical and Astronomical Expedition of 1785–93 in search of a passage from Siberia's northeast coast into the BERING STRAIT and also explored the Aleutians and the Gulf of Alaska. In 1803–06, the first Russian CIRCUMNAVIGATION OF THE WORLD under ADAM IVAN RITTER VON KRUSENSTERN and YURY FYODOROVICH LISIANSKY sought to find a water route to avoid transport across Siberia. In 1815–18, a Russian naval expedition under OTTO VON KOTZEBUE searched for outlets of the NORTHEAST PASSAGE or NORTHWEST PASSAGE in the North Pacific. Other Russian circumnavigations of the world were carried out by MIKHAIL PETROVICH LAZAREV, in 1822–25, and FYODOR PETROVICH LITKE, in 1826–29.

Through some of these and other expeditions, much geographic and navigational knowledge of North America was accumulated. Mikhail Dmitrievich Tebenkov, governor of the Russian-America Company, compiled it in *Atlas of the Northwest Coasts of America: From Bering Strait to Cape Corrientes and the Aleutian Islands*, published in 1852.

See also COMMERCE AND EXPLORATION.



Saguenay

The legend of a fabled land known as Saguenay originated with the Huron (Wyandot) Indians. Frenchman JACQUES CARTIER, who explored along the St. Lawrence River in his second expedition to Canada in 1535–36, visiting the Huron villages of Stadacona (present-day Quebec City, Quebec) and Hochelaga (present-day Montreal, Quebec), was informed by Chief DONNACONNA of a land rich in jewels and precious metals, with white-skinned inhabitants. Supposedly, it could be reached from a branch of the St. Lawrence River.

Cartier took the Huron chief to Europe with him in order to gain backing for a subsequent expedition. Donnaconna, who met King Francis I of France and other members of the royal court, never returned to his homeland, succumbing to disease. Yet Cartier received the backing he desired and returned to North America in 1541.

Cartier and his expedition entered a branch of the St. Lawrence located to the north of Stadacona—now known as the Saguenay—and followed it westward, eventually reaching a region where he found what he thought was gold and precious stones. The French took samples and returned to France with them in 1542. When tested, the minerals turned out to be pyrite (FOOL'S GOLD) and quartz. In 1543, JEAN-FRANÇOIS DE LA ROQUE DE ROBERVAL, who had provided financing for Cartier, also searched for Saguenay along the St. Lawrence and Saguenay Rivers.

Frenchman SAMUEL DE CHAMPLAIN retraced Cartier's route along the St. Lawrence and into the Saguenay years

later, in 1603. He also explored along the Ottawa River in 1613, still hoping to find the fabled land.

See also LEGENDS AND EXPLORATION.

Sahara Desert

The Sahara of North Africa is the world's largest desert at some 3.5 million square miles. East to west, it extends more than 3,000 miles from the Atlantic Ocean to the RED SEA, and, north to south, about 1,200 miles from on or near the MEDITERRANEAN SEA to the valley of the NIGER RIVER and the steppes of the Sudan to the south. In western stretches of the north, the Atlas Mountains and steppes lie between it and the sea; and, in western stretches of the south, the Sahel, a semiarid region of sparse grasses and shrubs, lies between arid desert lands and wetter tropical areas. The Sahara's boundaries are ever shifting, with parts of the Sahel, for example, turning to desert in recent years because of drought. The Sahara Desert includes most of Mauritania, Western Sahara, Algeria, Niger, Libya, and Egypt; southern portions of Morocco and Tunisia; and northern portions of Senegal, Mali, Chad, and the Republic of Sudan. The western Sahara is sometimes referred to as the Sahara proper. The eastern Sahara is discussed as three regions: the Libyan Desert, west of the valley of the NILE RIVER in eastern Libya, central and western Egypt, and northwestern Sudan; the Arabian Desert, or Eastern Desert, between the Nile Valley and the Red Sea; and the Nubian Desert in the northeastern Sudan. The name *Sahara* is Arabic for "desert."

The vast Sahara region is not uniform. Terrain varies from regions of sandy wastes and dunes (making up about 15 percent of the Sahara, much of it in the Libyan Desert), to rocky and gravelly plains and plateaus (about 70 percent), to mountains, oases, and transition zones (about 15 percent). The Sahara as a whole is a tableland with an average elevation from about 1,300 to 1,600 feet; some areas in the north, such as the Qattara Depression in Egypt, are below sea level. Mountains include the Ahagger (Hoggar) in southern Algeria, rising to more than 9,000 feet; the Tibesti in northern Chad, rising to more than 11,000 feet; and the Aïr (Azbine, Asben) in northern Niger, rising to more than 6,000 feet. With an average annual total of less than five inches of rainfall during the winter months, with some torrential downpours in the summer, vegetation is sparse and shrubby, with none at all in sand dune country; in the oases can be found some trees, in particular date palm, doum palm, tamarisk, and acacia. There are no permanent rivers in the Sahara; the bordering Nile and Niger Rivers are fed by rains outside the desert. With the rains come wadis, intermittent streams descending from highlands. A number of chotts, or lakes, and boggy salt marshes can be found. Scattered oases are formed by the water table reaching the surface. Winds can be fierce; names for the dust-laden, damaging winds include *harmattan*, *khamzin*, *simoom*, and *sirocco*. Wildlife includes gazelle, antelope, hyena, jackal, fox, badger, hare, hedgehog, chameleon, cobra, and migratory birds.

Inhabitants of the Sahara's interior include the Tuareg, one of the non-Arab Berber tribes, centered in mountainous regions of the central Sahara; the Tibbu (Tébu), another Berber people, in the Tibesti Mountains; and mixed Berber and Arab peoples in western lands.

Ancient Reports

The Sahara has always been a formidable barrier, separating Mediterranean peoples from those to the south. The ancient Egyptians controlled oases in desert regions east and west of the Nile, providing routes of commerce (see EGYPTIAN EXPLORATION). The Carthaginians also traded with peoples to the south. In about 480 B.C., Carthaginian admiral HANNO led an expedition from Carthage through the Strait of Gibraltar (see GIBRALTAR, STRAIT OF) to the open waters of the Atlantic, then southward, exploring Africa's coastal lands to the south, some of them the western extent of the Sahara (see CARTHAGINIAN EXPLORATION). Greek historian HERODOTUS, in his writings later that century, described an expedition of five Berber princes across the Sahara to a great southern river, perhaps the Niger (see GREEK EXPLORATION). The Romans carried out a number of military expeditions to the south between 19 B.C. and A.D. 86, among them those headed by SUETONIUS PAULINUS across the Atlas Mountains to the desert's northern edge in A.D. 42, and by JULIUS MATERNUS, who possibly commanded the first Eu-

ropean crossing of the desert north-to-south as far as Lake Chad in A.D. 50 (see ROMAN EXPLORATION). Earlier that century, Greek geographer STRABO had written of the Sahara in his *Geography*, published in about A.D. 18. Roman geographer PLINY THE ELDER wrote about it in *Historia Naturalis*, published in A.D. 77. Hellenized Egyptian PTOLEMY of the second century A.D. also described desert lands of North Africa.

Berbers and the Arabs

It is thought that the camel was introduced into North Africa in the first century A.D., enabling a greater range of activity for nomadic peoples, first the Berbers, centered in the highlands, then the Arabs. Trans-Saharan trade was developed during the Middle Ages, involving salt from the desert, gold, and slaves from West Africa and cloth, jewelry, and other products from Mediterranean cities. Control of the oases was interdependent with control of commerce. A number of Muslims wrote about the Sahara, including 10th-century merchant ABU AL-QASIM IBN ALI AL-NASIBI IBN HAWQAL, 12th-century scholar ABU ABD ALLAH MUHAMMAD ASH-SHARIF AL-IDRISI, and 14th-century scholar ABU ABD ALLAH MUHAMMAD IBN BATTUTAH. Spanish cartographer ABRAHAM CRESQUES, in his *Catalan Atlas* of about 1375, indicated camel caravan routes across the Sahara, based on information from Jewish traders.

European Interest

In the ensuing centuries, European nations showed increasing interest in the Saharan trade, in particular Italy and Portugal. Mariners sailing along Africa's west coast for HENRY THE NAVIGATOR, prince of Portugal, in the 15th century, such as Italian ALVISE DA CADAMOSTA and Portuguese DIOGO GOMES, sought information about inland trade. Gomes reported of the city of TIMBUKTU on the Niger, part of the great trading network. Meanwhile, Berbers and Arabs continued to control the overland routes. In the 16th century, Arab LEO AFRICANUS, as a diplomat for the sultan of Morocco, crossed the Sahara to Timbuktu.

The extent and limits of the Sahara were not understood by Europeans until the end of 19th century. Much of what was learned resulted from British expeditions seeking to define the course of the Niger and reach Timbuktu. German FRIEDRICH CONRAD HORNEMANN, who entered the Sahara from the northeast out from Cairo in Egypt, is credited as the first modern European to travel there in 1798–1801, soon to be followed by Scotsman MUNGO PARK in 1805–06, who approached from the southwest and the Gambia River. Later expeditions included those of JOSEPH RITCHIE and GEORGE LYON in 1818–19, and WALTER OUDNEY, HUGH CLAPPERTON, and DIXON DENHAM in 1821–25, both British expeditions heading southward from Libya. In 1827–28, Frenchman RENÉ-AUGUSTE CAILLIÉ crossed the Sahara from



This photograph from the late 19th or early 20th century shows merchants in the Sahara Desert. (*Library of Congress, Prints and Photographs Division [LC-USZ62-93064]*)

south to north. Later expeditions to explore and chart the Sahara were headed by Frenchman HENRI DUVEYRIER in the 1850s–60s, German FRIEDRICH GERHARD ROHLFS in the 1860s–70s, German GUSTAV NACHTIGAL in the 1860s–70s, and Frenchman PAUL-XAVIER FLATTERS in the 1880s. In the 20th century, scientific expeditions and surveys from the air were carried out as well.



The Sahara remains a sparsely inhabited region, with few maintained roads. The nomadic way of life continues, with desert inhabitants traveling by camels and maintaining herds of sheep and goats; some peoples still transport salt over the old trade routes. New oases have been created through drilling. The Sahara is rich in metallic minerals such as iron, copper, manganese, tin, nickel, chromium, zinc, lead, cobalt, silver, and gold, resulting in mining activity. Deposits of oil and natural gas are also found.

See also AFRICA, EXPLORATION OF.

St. Brendan's Isle

St. Brendan's Isle was a land in the Atlantic Ocean purported to be visited by sixth-century Irish monk SAINT BRENDAN. It has been identified as various actual places by a number of different scholars, but the truth of the past has been mingled with myth to the point where final conclusions are impossible. Accounts of Saint Brendan's voyage demonstrate real knowledge of the waters of the Atlantic, however, and, as a result, are considered worthy of study as possible history and not just legend.

Brendan was born in county Kerry in the Irish town of Tralee, or nearby, in about A.D. 484. Having been ordained in 512, he showed great zeal in propagating the Catholic faith, founding a monastery in Ardfert to the north of Tralee and one at Clonfert in Galway. Reliable evidence credits him with embarking on a number of voyages: to Wales on the British Isles; to Brittany in what is now northwestern France; and to the Hebrides Islands west of Scotland. Whatever the true extent of his travels, he seems to have

been energetic and restless and to have departed his homeland for extended periods of time. Perhaps it was due to these absences that he became the center of tales incorporating the experiences of a number of different missionaries. Known also as Saint Brendan the Navigator, he has continued to be a popular figure and is the patron saint of Kerry. Place names commemorating Brendan throughout the islands and coasts of western Ireland and Scotland attest to his significance; there is even a Brendansvik or Brendan's Bay in the Faeroe Islands, more than 350 miles north of Scotland.

An activity that was performed around the time of Brendan was the sea pilgrimage. This practice, analogous to Christ's time in the desert, entailed an Irish monk traveling out to sea in a CURRAGH, a type of small craft, to search for a barren island where he might obtain solitude and wisdom. Some of these journeys took on a missionary aspect if the lands were inhabited. Monks sometimes led a group of pilgrims on these journeys. In the course of such expeditions, Irish travelers founded settlements in the Orkney Islands, the Shetlands, and the Faeroes. There were also Irish colonies in ICELAND by the ninth century.

After three centuries, Irish colonial activity drew to a close, and many great romantic tales came to be written about the sea pilgrimages. The literature surrounding the travels of the Irish monks, including Brendan, came into popularity about the same time that the English were fascinated with the Arthurian legends. In this way, the Irish came to understand and contend with the politics and morality of their time and to take pride in their heritage. Brendan became the hero in several of these works. One of the earliest surviving accounts is *The Book of Lismore* from the early 10th century. In this work, Brendan hears the voice of God, who tells him that he has been chosen to find a resting place. He collects a number of monks and three currachs and sets out among the islands of the North Atlantic. As a sign from God, a whale visits them every Easter at sea, on whose back they celebrate Mass. The search for land proves futile, however, and, after five years, they return to Ireland.

In the *Navigatio Sancti Brendani* (The Voyage of St. Brendan), written sometime between 900 and 920, the tales become even more fanciful. Hearing of an Eden from a monk, Barinthus, Brendan decides to search for it. For this trip, he builds a large curragh and sets out westward with other monks. After visiting several islands, the geography of which correspond to real places, he and his followers proceed westward. On the way, they encounter a number of fantastic creatures—a race of small people, pygmies, giant sheep, and sea-cats. Fifteen days sailing from an island of strong men, they spot a bird of exotic plumage carrying a cluster of grapes the size of apples. After seven more days, they reach the island from where the grapes had come. They interpreted this as the way station to their paradise, for next

they proceeded through a fog bank and came upon a vast land of sweet-smelling flowers and mild weather. After hiking for weeks, they reached a river, where an angel informed them that this land—the “Land Promised to the Saints”—was reserved for others to Christianize in the future and that it was time to return to their vessel.

The *Navigatio*, despite its embellishments, contains the most cohesive narrative of these early tales, without the large gaps between places visited that other writings have. It also demonstrates a real knowledge of winds and currents that gives the modern reader reason to believe that at least some of the book has a basis in fact.

St. Brendan's Isle has been identified as any number of places. In one of the stories, Brendan observes an island where volcanic activity is taking place. This could only have been Iceland. Other island groups are identified, some of which had Irish outposts. Since GREENLAND is visible from the mountains of Iceland and would probably be found in the course of a circumnavigation of Iceland, it is likely that the Irish knew of it before the Vikings. Some of the legends describe icebergs encountered by the travelers, which also fits the idea of the legendary isle being situated in the North Atlantic.

Other theories associate Saint Brendan's voyages with island groups off southern Europe and northern Africa. The CANARY ISLANDS, the AZORES, and the Madeira Islands all have been put forth as a possible landing place. On his 1492 globe of the world, German MARTIN BEHAIM placed a “Saint Brendan's Island” west of the Canaries. It has also been theorized that Brendan crossed the Atlantic to the Bahama Islands off North America. The description in the *Navigatio* of an extensive land with a friendly climate would apply to the east coast of North America, but whether this had its roots in actual experience or in the wishful thinking of those making a case for the Irish discovery of the Americas even before the Vikings in about 1000 will probably never be known for certain.

See also LEGENDS AND EXPLORATION.

St. Louis Missouri Fur Company

The St. Louis Missouri Fur Company, which came to be known as the Missouri Company, was one of the early North American companies established to develop the FUR TRADE up the MISSOURI RIVER to its headwaters in the northern ROCKY MOUNTAINS and beyond. It was founded in St. Louis in February 1809, 10 months after JOHN JACOB ASTOR chartered the AMERICAN FUR COMPANY. Both sought to compete with the HUDSON'S BAY COMPANY and the NORTH WEST COMPANY, Canadian enterprises.

The founding partners of the St. Louis Missouri Fur Company were JEAN PIERRE CHOUTEAU and one of his sons, AUGUSTE PIERRE CHOUTEAU; MANUEL LISA, who had

conducted trade with the Osage Indians in the Missouri region; WILLIAM CLARK of the Lewis and Clark Expedition; Reuben Lewis, MERIWETHER LEWIS's brother; ANTOINE PIERRE MENARD; ANDREW HENRY; Benjamin Wilkinson; Sylvestre Labadie; William Morrison; and Dennis Fitzhugh. Articles of Association and Copartnership were signed in front of Meriwether Lewis.

The first expedition, including all the partners and 172 men, departed St. Louis in spring 1808, traveling up the Missouri with nine barges loaded with trade goods. The company's main outposts were Ft. Mandan at the confluence of the Missouri and Knife Rivers in present-day North Dakota, built during that expedition, and Ft. Manuel (also known as Ft. Raymond) at the confluence of the Yellowstone and Bighorn Rivers in present-day Montana, established by Lisa two years before.

The company was successful in its first few years. Yet, with shrinking profits, it gave up its activity in the northern Rockies, abandoning Ft. Manuel in 1811 and Ft. Mandan in 1812, concentrating its trade along the Missouri. The War of 1812 also interfered with some of its activity. JOSHUA PILCHER became a partner in 1819, then became president the next year after Lisa's death. CHARLES BENT also became involved with the company in its final years. One of the company's fur brigades was wiped out by Arikara Indians in 1823, leading to a punitive military campaign under Colonel HENRY LEAVENWORTH. Meanwhile, Astor's American Fur Company was thriving. By 1825, the partners in the Missouri Fur Company had given up their shared endeavor.

See also COMMERCE AND EXPLORATION.

Sandwich Islands See HAWAIIAN ISLANDS.

satellite (artificial satellite)

The term *satellite* refers to any natural or human-made object moving in orbit around Earth or around another celestial body. The Moon is thus a "satellite" of Earth. In popular usage, the term has come to be applied primarily to artificial objects. The earliest SPACE EXPLORATION was carried out by artificial satellites before humans were launched into space, by the former Union of Soviet Socialist Republics (USSR; Soviet Union) and the United States.

Both nations began developing their satellite programs in the 1950s, as advances in ROCKET technology made launches possible. The INTERNATIONAL GEOPHYSICAL YEAR (IGY), from July 1, 1957, to December 31, 1958, was the target time for launches by both nations. Project Vanguard of the U.S. Navy was selected as the first official U.S. program. (The U.S. Army meanwhile had a rival plan, Project Orbiter.)

The first artificial satellite, the Soviet Union's *Sputnik 1* (the full name: *Iskustvennyi Sputnik Zemli* for "fellow world traveler of the earth"), almost 23 inches in diameter and about 183 pounds, was launched on October 4, 1957, an event that is considered the start of the "space race" between the Soviet Union and the United States. On November 3, 1957, the much larger *Sputnik 2*, at about 1,120 pounds was launched, carrying the first animal (a dog named Laika) into space.

The rocket that was to carry the first Vanguard into space exploded the following December 6. The first U.S. satellite, *Explorer 1*, was launched on January 31, 1958, with help from the Army Ballistic Missile Agency engineers. It made a significant discovery, the first indications of the Van Allen belts, a zone of trapped radiation surrounding Earth. *Explorer 3*, launched on March 26 of that year, performed tests that proved their existence. In the meantime, *Vanguard 1* was successfully launched on March 17, 1958. The following July, the United States founded the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA).

Satellite technology was soon applied to specific needs on Earth. Since April 1, 1960, and the launching of *Tiros 1*, the first weather (meteorological) satellite, thousands of artificial satellites have been launched into orbit around Earth—by many different nations and of varying sizes and serving a variety of purposes. In addition to weather satellites, there are application satellites, which test ways of improving satellite technology itself; communications satellites, for television and other systems; navigation satellites, for navigation systems on Earth; reconnaissance satellites, to survey Earth's landforms and resources as well as human activity (some of them specifically "spy satellites" or "military satellites"); and research satellites, which are also called exploratory satellites, for scientific studies of space (the Hubble Space Telescope, launched by the United States in April 1990, is a research satellite). A SPACE STATION is also a type of artificial satellite, although in popular usage it is rarely referred to as such. A SPACE PROBE is not considered a satellite since it leaves the orbit of Earth (yet may become a satellite of another planet or a moon).

Artificial satellites have been placed into orbit mainly through the use of rocket technology. Since 1984, the United States has also used the SPACE SHUTTLE to launch, service, and retrieve satellites. The systems of the satellites are powered in a number of ways: by solar cells; by batteries (in some cases charged by solar cells); by nuclear reactors; and by generators (which produce electricity from the decay of radioisotopes). Satellites, which are computerized, contain control, tracking, receiving, transmitting, information collecting, and storing equipment.

Satellite technology has made possible the Global Positioning System (GPS), which has become the primary system of navigation (see NAVIGATION AND EXPLORATION).

scurvy

Scurvy is a deficiency disease caused by a lack of vitamin C. Failure to satisfy the body's need of the vitamin causes the weakening of capillaries. Hemorrhaging eventually occurs, and a multitude of symptoms may result. These include swollen gums, loosened teeth, internal bleeding, lethargy, difficulty in thinking, and various forms of bodily disfigurement. If left untreated, scurvy results in death.

Scurvy was described in an Egyptian papyrus of 1550 B.C., but its causes remained unknown for centuries. It probably caused more loss of life during the EUROPEAN AGE OF EXPLORATION than shipwrecks. It was a particularly difficult condition to diagnose because the early symptoms resembled those of many other diseases. Once it had taken hold of a crew, the effects would be devastating.

The voyage of Portuguese VASCO DA GAMA around the CAPE OF GOOD HOPE in 1497–99, in which half the crew were lost to scurvy, demonstrated the dangers of long trips without fresh provisions. Among other famous examples of the blight of scurvy occurred on the first CIRCUMNAVIGATION OF THE WORLD, headed by FERDINAND MAGELLAN for Spain in 1519–21. On the first leg of his journey, before reaching the islands of the South Pacific Ocean, he lost a large percentage of his crew to the disease. After his death on the island of Mactan in 1521, his crew straggled home. Of an original complement of 250 men, only 18 remained to complete the voyage, the majority of the dead victims of scurvy. The 1595–97 voyage of Dutchman CORNELIUS HOUTMAN to the island of Java resulted in the loss of two-thirds of his crew to scurvy and fever. Perhaps the largest loss of life occurred on the circumnavigation carried out by Englishman GEORGE ANSON in 1740–44, where he lost more than 1,000 men to scurvy. This extreme number of casualties led the Royal Navy to increasing its efforts to cure the problem.

The problem of scurvy was not limited to long, open-sea voyages. Since the science of the disease was not well understood, scurvy occurred on trips along coastlines and also on dry land. The 1774 Spanish exploration of the Oregon coast by BRUNO HECETA is an example of one such journey cut short by scurvy. Frenchman RENÉ-AUGUSTE CAILLIÉ suffered from scurvy while exploring the upper water of Africa's NIGER RIVER in 1827.

Knowledge of a cure for scurvy was slow to materialize. In winter 1535–36, the French expedition under JACQUES CARTIER to northeastern North America suffered an outbreak of scurvy. The Huron (Wyandot) Indians demonstrated how to make a tea made from evergreen trees, which, because it contained vitamin C, saved many Frenchmen without their recognizing the cure. Among the first Europeans to propose a remedy was Sir Richard Hawkins, who, in 1593, wrote that citrus fruit seemed to help cure the problem. James Lind, a Scottish naval doctor who had suc-

cessfully treated sailors with oranges and lemons, publicized a cure in *A Treatise on Scurvy* years later, in 1753. Understanding was still incomplete, however, and his solution was met with skepticism among experienced seamen, for fruit juices did not retain their vitamin C indefinitely. Attempted antidotes for the disease are many and varied throughout the annals of exploration. They include coconut milk, beans, fresh turtle meat, berries, spruce beer, wild celery, purslane, fresh fish, hops, and watercress.

The man who is given credit for getting the problem of scurvy under control was Englishman JAMES COOK. On his voyage to the South Pacific in 1768–71, he used a variety of foodstuffs to ensure the health of his crew. The biggest breakthrough was in the use of sauerkraut, a preserved food high in vitamin C. He did not lose a single man to scurvy on the voyage. The replacement of sailing vessels with the steamship in the mid-1800s finally solved the centuries-long problem of scurvy at sea. The speed of these new ships allowed for food to retain its vitamin content before going bad. Yet explorers still had to deal with the disease. Examples abound of Arctic and Antarctic expeditions caught short of supplies and suffering outbreaks of scurvy, for example that of Englishmen SIR JOHN FRANKLIN in the 19th century and ROBERT FALCON SCOTT in the 20th century. Scurvy was the first disease to be understood as being caused by a vitamin deficiency. Advances in food preservation such as canning and refrigeration have helped eliminate it as a general problem. The isolation and production of vitamin C has also contributed to reduced risk of scurvy. Today, scurvy may be treated with tablets or syrup and is seen only in the most critical of circumstances.

See also DISEASE AND EXPLORATION.

searches for missing explorers

A recurring theme in the history of exploration is the search for missing explorers, with a number of expeditions prompted, at least in part, by the disappearance of earlier expeditions. In the course of many of these searches, new geographic discoveries were made.

The Lost Colony

The mysteries and failures in the history of exploration have captured the public's imagination as much as the successes. A case in point is the story of the LOST COLONY in North America—the failed attempt of the 1587 English colony sponsored by SIR WALTER RALEIGH in what is now northeastern North Carolina—which still fosters speculation. Part of the power of the story is that the colony's governor, JOHN WHITE, returned to England for supplies, leaving his daughter and newly born granddaughter there, but was unable to return for three years because of the Spanish Armada's invasion of England. White found only a single word of the

colonists' whereabouts—"CROATOAN"—the name of an Indian village. With a storm approaching, the relief ship was unable to investigate further, and White was never able to mount another relief operation. The search still continues, with archaeologists still hoping to turn up some definitive trace.

The La Pérouse Expedition

Well-publicized official French searches for a missing expedition occurred in the late 18th century and early 19th century. The two ships of the expedition under renowned French naval officer and navigator JEAN-FRANÇOIS DE GALAUB, comte de La Pérouse—the *Astrolabe* under his command and the *Boussole* under PAUL-ANTOINE-MARIE FLEURIOT DE LANGLE—went missing in 1788. The comte de La Pérouse expedition had departed France on August 1, 1785. After sailing around CAPE HORN and exploring in the Pacific Ocean, including coastal regions of North America and Asia, the expedition had sailed to Botany Bay, the location of present-day Sydney, on the east coast of New Holland (Australia). On March 10, 1788, the Frenchmen had departed Botany Bay with the intention of exploring the continent's north coast around the Gulf of Carpentaria and had vanished. (Some of the expedition's geographic findings survived, however, because interpreter JEAN-BAPTISTE-BARTHÉLEMY DE LESSEPS, as planned, had traveled overland from the Kamchatka Peninsula on the Bering Sea by way of SIBERIA to Paris with records taken through the fall of 1787.)

In 1791, rear admiral ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux, was given the assignment of finding La Pérouse. The expedition, consisting of two ships, the *Recherche* and the *Espérance*, had other purposes as well. It was to survey the coasts of Australia, Van Diemen's Land (TASMANIA), and New Caledonia (see OCEANIA). Departing France in September 1791, it accomplished many of its goals, including various coastal surveys. It also located new islands west of the Solomons, known as the D'Entrecasteaux Islands. Yet d'Entrecasteaux found no evidence indicating the fate of the La Pérouse expedition, not even in the Admiralty Islands, where rumors placed the lost Frenchmen. Off the east coast of New Guinea, d'Entrecasteaux explored Vanikoro Island, one of the Santa Cruz group north of the New Hebrides. Soon afterward, d'Entrecasteaux died at sea from SCURVY and dysentery.

Another French expedition, this one headed by naval officer JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE, set out to the South Pacific in April 1826 to map and study the natural history and native languages of the same region that d'Entrecasteaux had explored; it had the additional assignment of searching for La Pérouse. While the Dumont d'Urville expedition was underway, Peter Dillon, the captain of a British vessel, had seen relics from a shipwreck among the natives of Tikopia Island, also in the Santa Cruz group.

As with all mariners of the day, he was well aware of the missing French expedition. From the locals as well as Europeans living among them from earlier voyages, Dillon learned that a European ship had been stranded on a reef and that the crew had built a small boat from the wreckage and eventually had headed westward. Some accounts told of a second ship destroyed on the reef, the few survivors of which had been attacked and killed by natives. Two castaways from one ship or the other had supposedly lived for a time on Vanikoro Island—one now dead and the other having departed with a group of native peoples. Dillon managed to recover a number of objects from a shipwreck in the region, including a bronze ship's bell, and eventually took them to Paris. In the meantime, Dumont d'Urville, who had named his ship the *Astrolabe* in honor of La Pérouse's vessel, traveled to Vanikoro Island and retrieved other objects. He also erected a monument there to the memory of the lost Frenchmen. In France, Baron de Lesseps, who had left the La Pérouse expedition in Kamchatka in 1787, confirmed that the found relics were indeed from the original *Astrolabe*. In 1964, a search expedition located the remains of the second ship, the *Boussole*, off Vanikoro Island, confirming the native peoples' stories.

The Franklin Expedition

The most famous of missing expeditions—and certainly the one that helped spur on the most subsequent voyages of exploration—was that of SIR JOHN FRANKLIN. Franklin had built a successful career as a British naval officer by charting much of the Arctic coast of the Canadian mainland in expeditions in 1819–22 and 1825–27, of which he had written in two well-received books. In 1828, he received a knighthood. Later that same year, he married Jane Griffin, who became Lady JANE FRANKLIN. In 1836–43, he served as governor of Van Diemen's Land. In 1844, after his return to England, Franklin received a commission from the British Admiralty to lead another expedition to the Canadian Arctic with the goal of navigating east to west through the long-sought NORTHWEST PASSAGE.

The *Erebus* under Franklin's command, along with the *Terror* under Lieutenant FRANCIS RAWDON MOIRA CROZIER, sailed from England on May 29, 1845. The ships were last seen by a Scottish whaling vessel on July 26, 1845, in upper Baffin Bay, west of GREENLAND, near the approach to Lancaster Sound. By 1847, without any word from or of the expedition, concern began to mount. Franklin's disappearance became international news. Over the next decades, some 50 expeditions, involving approximately 2,000 men, were launched to solve the mystery of what happened to the *Erebus* and the *Terror* and, during them, much was learned of the Arctic regions of the Western Hemisphere.

In 1847–49, SIR JOHN RICHARDSON, along with JOHN RAE of the HUDSON'S BAY COMPANY, led a British land-

based expedition which reached Canada's Arctic coastline by way of the Mackenzie River, then proceeded eastward to Dolphin and Union Strait. In 1849–50, Rae continued the search on his own, reaching Victoria Island. In 1848–49, SIR JAMES CLARK ROSS led a British naval expedition, which traveled through Lancaster Sound as far as Barrow Strait and southward from Somerset Island into Peel Strait. In 1850–51, James Clark Ross's uncle, SIR JOHN ROSS, wintered in Barrow Strait on the schooner *Felix*, sponsored privately by Sir Felix Booth, in the hope of finding some trace of Franklin, but to no avail.

The British Admiralty sponsored a number of expeditions in the 1850s to the Canadian Arctic, part of the motivation of which was to determine the outcome of the Franklin expedition. In 1850–54, SIR ROBERT JOHN LE MESURIER McCURE, who had sailed on the earlier expedition with James Clark Ross, led an expedition that entered Arctic waters from the west by way of the BERING STRAIT. While proceeding eastward, he located Prince of Wales Strait between Banks Island and Victoria Island; he also reached a point far enough west—Mellville Island, which had previously been reached from the east—to prove that a Northwest Passage did in fact exist. At about the same time, in 1850–55, SIR RICHARD COLLINSON, also approaching from the west, explored the Arctic coasts of Alaska and Canada as far east as Victoria Island. Spending the winter of 1852–53 there, he retrieved some pieces of iron from Inuit (Eskimo) that had probably come from one of Franklin's ships. Also during this period, in 1852–54, SIR EDWARD BELCHER headed an expedition from the east that navigated west of Lancaster Sound. SIR FRANCIS LEOPOLD MCCLINTOCK, part of this expedition as well as the earlier James Clark Ross's expedition, located Eglington Island and Prince Patrick Island at the edge of the Beaufort Sea.

In the meantime, Lady Franklin, distraught over the disappearance of her husband, had been using her resources and prestige to promote continuing searches. In 1848, she offered a reward for the rescue of her husband or for information as to his fate. She later gained the support of American shipping magnate Henry Grinnell, who, in 1850–51, sent out an expedition under EDWIN JESSE DE HAVEN, a U.S. naval officer. While trapped in the PACK ICE north of Baffin Island and Lancaster Sound and drifting with it for some 1,000 miles, he located Grinnell Land on northern Devon Island. Lady Franklin paid for a number of expeditions from her own funds as well. In 1853–55, ELISHA KENT KANE, another U.S. naval officer, led the Second U.S. Grinnell Expedition in search of John Franklin. On this voyage, expedition members explored Greenland's Humboldt Glacier and Ellesmere Island.

The expedition that located the first irrefutable proof of the missing Franklin expedition was headed by John Rae, who had explored earlier with Richardson. In his expedi-

tion of 1853–54, during which he explored the Boothia Peninsula and located a strait (Rae Strait), thus proving that King William Island was not connected to the Canadian mainland, he interviewed an Inuit who told him of a story of Europeans marching southward from King William Island toward the estuary of the Back River and eventually perishing. Rae also managed to retrieve relics of the Franklin expedition. Yet Rae also reported that expedition members perhaps had resorted to cannibalism in their final days.

Lady Franklin, upset at these reports and determined to find more evidence, hired experienced Arctic explorer Francis McClintock to mount still another expedition in 1857. While in Arctic waters, he erected a monument on Beechey Island commemorating Franklin's Arctic exploits. He also circumnavigated King William Island, confirming that it was an island. On King William Island, a party headed by McClintock found a sledge and several skeletons. Another party led by Lieutenant W. R. Hopson crossed Simpson Strait to the Boothia Peninsula on the Canadian mainland and found letters written by Franklin's men, indicating that Franklin and other expedition members had died while the ship had been icebound and that the survivors under Lieutenant Crozier had perished in an abortive attempt to reach the Hudson's Bay Company's post, Fort Resolution, on the Back River. The expedition returned to England in 1859.

Although the fate of the Franklin expedition had been determined, other expeditions continued to search for clues as to the exact course of events. Two American expeditions found additional remains, skeletons as well as artifacts: One, in 1864–69, again backed by Grinnell and headed by American journalist CHARLES FRANCIS HALL, traveled by ship to King William Island and Boothia Peninsula; another, in 1878–80, sponsored by the AMERICAN GEOGRAPHICAL SOCIETY and a whaling company, and headed by physician and lawyer FREDERICK SCHWATKA, traveled overland by sledge from Hudson Bay to King William Island. Schwatka's expedition covered more than 3,000 miles, the longest sledge journey on record until that time.

Norwegian ROALD ENGELBREGT GRAVNING AMUNDSEN, during the first crossing of the Northwest Passage in 1903–06, located two skeletons of expedition members on King William Island.

Dr. Livingstone

Another famous search that fascinated the general public took place in Africa. After establishing his reputation on earlier expeditions to Africa and receiving acclaim in England, Scottish missionary DAVID LIVINGSTONE had returned to Africa in 1866 to investigate the continent's central watershed and locate the source of the NILE RIVER. After departing from Mikindani on the coast of present-day Tanzania in

East Africa, he lost touch with the outside world. Three years passed without any word. James Gordon Bennett, Jr., publisher of the *New York Herald*, sponsored British-born SIR HENRY MORTON STANLEY to undertake a search for Livingstone. Bennett instructed Stanley to cover other stories first, however, so that he stood a better chance of determining the fate of the missing explorer rather than just report that he was still missing. Eighteen months later, in January 1871, Stanley arrived in Zanzibar, an island off Tanzania, and, with funds provided by the newspaper, he hired *pagazi* (porters), guides, hunters, and armed escorts, along with pack animals. He departed Bagamoyo on the mainland on March 21, 1871, and, based on reports from slave traders, headed for Ujiji on the east shore of Lake Tanganyika, reaching it on November 10. There, he found the missionary and greeted him with probably the most famous words in the history of exploration, “Dr. Livingstone, I presume.”

Livingstone was short on supplies and weakened by disease but did not consider himself lost or missing. He convinced Stanley to explore the northern end of Lake Tanganyika with him but refused in turn to accompany Stanley back to Europe, continuing with his explorations of the great lakes of Africa and their relation to the great rivers. Livingstone succumbed to dysentery in a native village near Tabora on May 1, 1873. Native people working for him transported his body to the coast, from where it was shipped to England. He received a state funeral in London’s Westminster Abbey on April 18, 1874.

In the meantime, Stanley had returned to England and published *How I Found Livingstone* in 1872, which became a best-seller. He also received a gold medal from the ROYAL GEOGRAPHICAL SOCIETY. Stanley’s experiences on his search for Livingstone inspired him to embark on his own African explorations, and he would make a number of important geographic findings through 1889.

Australian Expeditions

A missing expedition in Australia’s interior has remained a mystery. In 1848, German FRIEDRICH WILHELM LUDWIG LEICHHARDT, who had led a number of other successful expeditions, set out from McPherson Station west of Brisbane on the Darling Downs in present-day Queensland with seven others in an attempt to cross Australia from east to west, but was never heard from again.

Over the next 90 years, various expeditions—nine major ones and numerous small ones—searched for Leichhardt’s party. All subsequent explorers of Australia’s interior hoped to solve the mystery. The fact that Leichhardt had set out with plans to cross the continent meant that the search could not be narrowed down. Englishman SIR AUGUSTUS CHARLES GREGORY received sponsorship from the British government as well as the Royal Geographical Society for an 1855 expedition in search of lands suitable for livestock in

what is now the Northern Territory as well as traces of the missing expedition. From the Joseph Bonaparte Gulf, Gregory traveled generally eastward and, on reaching the Pacific at Bustard Head in Queensland, had located thousands of square miles of lands suitable for grazing and had completed the first west-to-east crossing of northern Australia. But he had found nothing of Leichhardt.

Skeletal remains turned up by Aborigines prompted a search from the west in 1869 by Australian-born JOHN FORREST. He set out from the west coast, from Perth in Western Australia. The bones turned out to be those of stray horses from an 1854 expedition. Forrest continued eastward, however, as far as Mount Weld on the western edge of the GREAT VICTORIA DESERT, and he charted much new territory suitable for livestock.

Other expeditions turned up objects—bones, a coin, and a tomahawk—but nothing that could be linked directly to Leichhardt’s party. Various theories have been put forth. One holds that some among Leichhardt’s party mutinied and killed their leader, only to be killed by Aborigines. Rumors persisted that one among them—Adolf Classen—lived among the Aborigines for years. It has also been theorized that the men were caught in one of the frequent flash floods of Queensland, or that they died in bushfires, or simply of thirst in desert lands.

The 1860–61 Australian expedition of Irishman ROBERT O’HARA BURKE and Englishman WILLIAM JOHN WILLS—an attempt to cross the continent south to north, from Melbourne to the Gulf of Carpentaria—cost them their lives. A total of four rescue expeditions were sent out. Camel driver John King was found alive; the remains of Burke, Wills, and expedition member Charles Gray were also eventually found. It was determined that, during the doomed expedition, an advance party of four had separated from a larger party. Of the smaller group, Burke, Wills, and Gray had perished from starvation and exposure. John King had managed to survive on food provided by Aborigines. The relief expeditions furthered geographic knowledge of the region.

20th-Century Searches

In the 20th century, in the Arctic and Antarctic regions as well as in MOUNTAIN CLIMBING around the world, search and rescue operations have searched for the missing. After the British expedition under ROBERT FALCON SCOTT had reached the SOUTH POLE in January 1912, his team was trapped in a nine-day blizzard on the return journey and perished at the end of March. It took another eight months for a search party to locate their remains and records of the expedition, at a point only 11 miles from a depot with food and fuel.

In the Arctic, one famous explorer lost his life while searching for another famous explorer. In 1928, after Italian

UMBERTO NOBILE'S AIRSHIP passed over the NORTH POLE, it was forced to make a crash landing after icing over and in dense fog on its way back to Spitsbergen (present-day Svalbard). Some 1,500 men—from Italy, Norway, Sweden, and the Union of Soviet Socialist Republics (USSR; Soviet Union)—and 16 ships and 21 airplanes took part in search and rescue efforts. One of them was Norwegian ROALD ENGELBREGT GRAVNING AMUNDSEN, who had beaten Scott to the South Pole by a month and who had also flown with Nobile over the North Pole in an earlier airship expedition in 1926. Despite having publicly feuded with Nobile over the use of airships in polar exploration, Amundsen set out by airplane to Spitsbergen, but perished in a crash in northern waters. Nobile was later rescued, but eight men died in his expedition, and he was officially condemned for the disastrous outcome.

In 1924, on Mount Everest (see EVEREST, MOUNT) in the HIMALAYAS, Englishmen GEORGE HERBERT LEIGH MALLORY and Andrew “Sandy” Irvine disappeared when nearing the summit. Despite searches over the years, Mallory's body was not found until 1999.

Seven Cities of Cibola See CIBOLA.

sextant

A sextant is a highly accurate instrument used to measure the angular elevation of celestial bodies and thereby determine geographic location. The name derives from the graduated arc displaying the reading, which spans 60 degrees, or a sixth of a circle. In modern terminology, the word *sextant* is used to refer to a number of instruments based on the same principals, such as the QUADRANT, quintant, and octant. But, in more accurate usage, the quadrant is based on an arc of 90 degrees; the quintant is based on an arc of 72 degrees; and the octant (also called Hadley's Quadrant) is based on an arc of 45 degrees.

The sextant is operated by aligning three reference points: an object in the heavens, the horizon, and the location of the observer. The reading is based on the principle that a reflected ray of light leaves the surface of a plane at the same angle at which a direct ray strikes the surface. The device's frame is triangular in shape, the bottom side being an arc of 60 degrees with a scale written on it (the vernier). An arm—known as the index or image arm—fixed at the top point of the triangle swings along the arc. A small index mirror is mounted perpendicular to the frame near the top. A telescope is attached just below. In front of the telescope is a horizon glass, half transparent and half mirror. The index mirror is used to reflect the celestial body (Sun, Moon, star, or planet) into the mirror half of the horizon glass, then into the telescope. The index arm is then slid along the arc so that

the horizon can be seen through the transparent half of the horizon glass and the reflected image of the Sun lined up with it. The position of the index arm on the arc indicates the altitude of the celestial body. The time of day or night is noted simultaneously by the position of the index arm on the arc. The reading along with navigational tables (see EPHEMERIS) enables a navigator to determine LATITUDE AND LONGITUDE. Multiple readings are often taken to ensure accuracy.

On land, the irregularity of the terrain makes the use of the sextant impractical but not impossible. An artificial horizon can be utilized, consisting of a pool of mercury or another horizontal reflecting surface; by observing both the celestial body itself and its reflection in the mercury, a reading can be obtained.

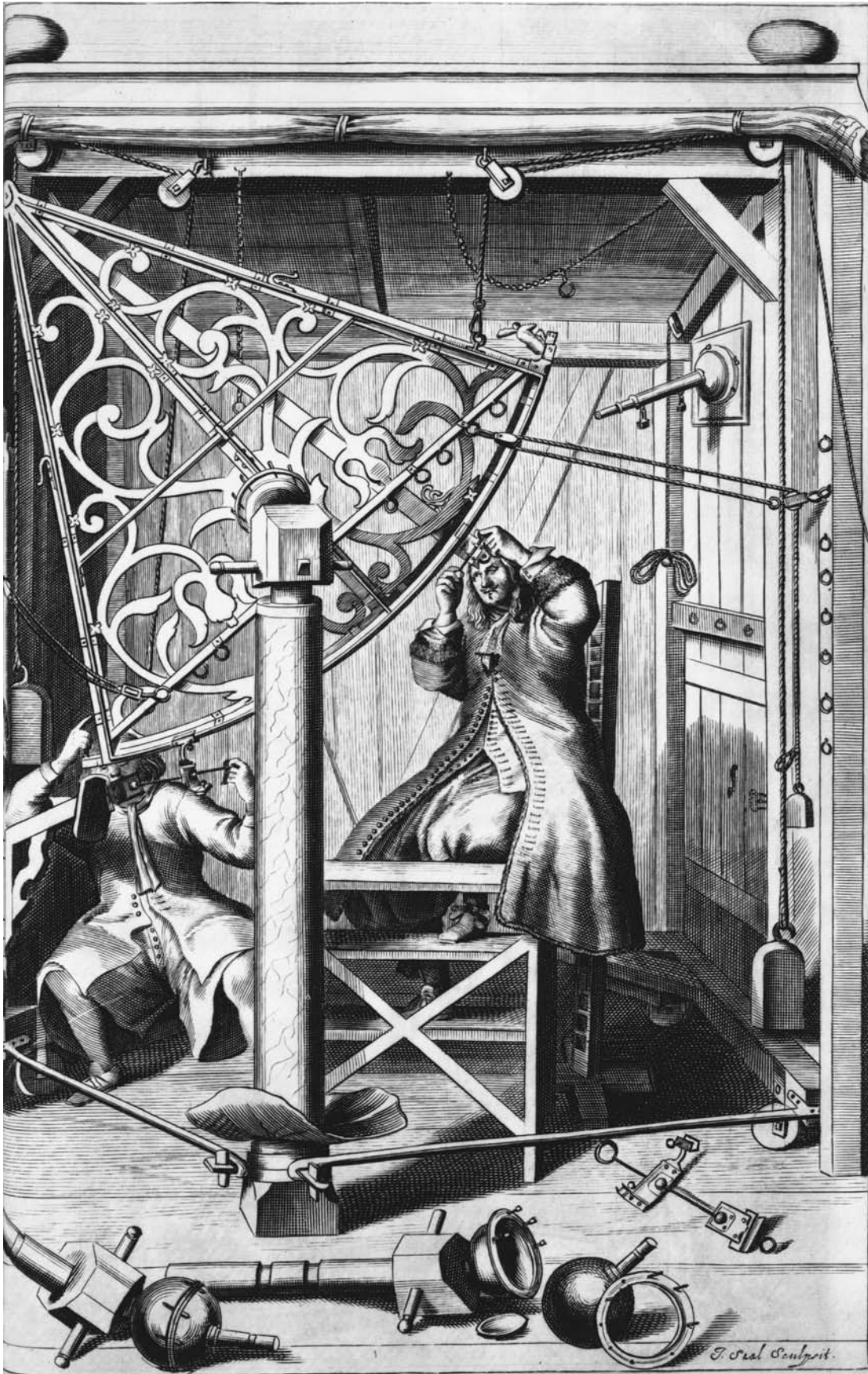
The sextant, which revolutionized celestial navigation, was developed over the course of several centuries and replaced the ASTROLABE and CROSS-STAFF. Its earliest ancestor was the Davis Quadrant, a variation on the cross-staff, invented by English mariner JOHN DAVIS in the late 16th century. The 17th–18th-century English physicist Sir Isaac Newton articulated the optical principles by which the instrument could operate and even drew a sketch of it, but never made a working model. The sextant was invented independently in England and America in the early 1730s in response to a challenge by England's ROYAL SOCIETY and the English parliament to solve the problem of how to measure longitude accurately.

The proper use of a sextant requires practice and skill. For this reason, its usefulness has always depended on the navigator operating it. The instrument itself has also become more accurate over the years. One variation is the bubble sextant (and bubble octant) used in stormy weather at sea and in aerial navigation. The image of the celestial body under observation is lined up with the edge of the bubble (much like the bubble of a carpenter's level) instead of the edge of the horizon, allowing the observer to find a horizontal plane for the field of view.

See also NAVIGATION AND EXPLORATION.

Sherpas

Sherpas are a people of the HIMALAYAS living on the mountains' southern slopes mostly in Nepal, as well as some in Sikkim, a northern state of India. They are Tibeto-Nepalese, their ancestors having entered the region from Tibet to the north. (Other Nepalese, known as Indo-Nepalese, entered the region from the south.) The Sherpas for the most part practice Buddhism. They are known for their MOUNTAIN CLIMBING skills. In fact, the term, which is derived from the Tibetan *Sharpa*, for “inhabitant of an eastern country,” is also used specifically for Himalayan mountain guides and porters.



In this engraving from the 17th century, a six-foot-long sextant is being used to measure angular distances between pairs of stars. (Library of Congress, Prints and Photographs Division [LC-USZ62-95177])

European climbers, especially the British teams who made attempts on climbing Mount Everest (see *EVEREST, MOUNT*) in the 1920s, recognized the Sherpas as invaluable for their geographic knowledge, physical prowess, and survival skills. The Sherpas participated in many of the 20th-century expeditions in the Himalayas and the Karakoram Range; expedition leaders often teamed the best Sherpa climbers with the best of the Europeans. The partition of the subcontinent into India and Pakistan in 1947 limited some of the activities of the Sherpas, however, because they could no longer travel unimpeded to the Karakoram and other western Himalayan ranges.

TENZING NORGAY, the most famous of all Sherpa climbers, was teamed with Englishman SIR EDMUND PERCIVAL HILLARY in an assault on Mount Everest in 1953, and became the first human to reach the summit. He also became the Sirdar (chief) of a professional association of Sherpa climbers. Other Sherpas became legendary as well: Ang Dawa, Gyalzan, Niyima, Pa Norbu, Pasang, and Pemba, among many others. Many have passed on the tradition of mountaineering to their offspring, who continue to earn their living as guides for modern-day expeditions.

shipbuilding and exploration

People have used waterways for transportation since ancient times and crafted vessels of many different materials, shapes, and sizes to do so. Design was determined by the types of waterways to be navigated, as well as materials available for construction. The evolution of watercraft is also related to the organization of humankind into larger and larger societies, where larger vessels made trade more efficient. Simultaneously, the need to defend a nation's shores or a nation's ships from *PIRACY* or from naval actions of other nations became important. Ships thus became specialized for both commercial purposes and military purposes.

Myriad Watercraft

The earliest craft—any floating structure used to carry people or possessions—can be grouped together under the category *RAFT*. With time, humans began making them more practical out of which came the first true boats. Prehistoric drawings illustrate the use of animal skins sewn together around wooden frames in Europe, and archaeological evidence indicates the use of skin coverings and reindeer antler frames as early as 9000 B.C.

The dugout *CANOE*—the basic design, a hollowed-out log—was one of the earliest forms of watercraft, found in places where trees grew large enough to make them. They were propelled by a paddle or paddles. Other peoples made use of bark for their canoes—especially birch bark—or animal skin as a covering over a wood frame. Reed-bundle canoes were made in other places, such as the *NILE RIVER*

region in Africa (the papyrus boat) and in the *ANDES MOUNTAINS* of South America (the bulrush boat). The round *CORACLE* of northern Europe used skins.

From the simplest designs, more sophisticated and specialized boats evolved. The Inuit (Eskimo) of Arctic regions shaped the double-paddled kayak out of the skin of sea mammals and wood or bone frames. Native Americans of the Pacific Northwest used large cedar trees to make dugouts as long as 100 feet. Some eastern Native Americans began using the light birch bark as a covering over wooden frames to make their canoes practical for inland portages. The Polynesians devised the *OUTRIGGER*—a type of canoe with attached floats or double-hulled to keep it from flipping over in travel among ocean islands (see *POLYNESIAN EXPLORATION*). A type of seaworthy skin boat known as the *CURRAGH* evolved in the British Isles out of the coracle. The *PIROGUE*, which came to be used on the *MISSISSIPPI RIVER* and *MISSOURI RIVER* in North America in the 19th century, evolved from the canoe.

The Ancient Tools of Shipbuilding

The earliest shipbuilding tools were stone and bone. The invention of the metal-casting process dates to the inception of the Bronze Age, in about 3500 B.C., in the Middle East. This was followed by the Iron Age, which began in the second millennium B.C. The adz was perhaps the most basic tool necessary, used for hollowing out logs and shaping wood. Others include the modern equivalent of the ax, chisels, and hammer. Drills were made with a bit, handle, and leather straps for turning the apparatus back and forth. Saws were also made, both small and larger ones operated by two to cut planks. Much of what we know of the early shipwright's tools comes from the recovery of wrecks.

Early Mediterranean Ships

The best representations of early craft come from relief carvings of the ancient Egyptians (see *EGYPTIAN EXPLORATION*). As their society along the Nile River became more unified in the third millennium B.C., the Egyptians expanded their trading and military activities into the *RED SEA* and *MEDITERRANEAN SEA*. They received aid in building their ships from the Phoenicians. The vessel that dominated the region was the *GALLEY*, a vessel of shallow draft, propelled by oars. The Minoans also used early galleys (see *MINOAN EXPLORATION*).

The Phoenicians became known as professional shipbuilders and mariners (see *PHOENICIAN EXPLORATION*). Much of their economy was based on their advantageous position between the East and the West; they could trade for products arriving in the region by land from lands to the east, and transport them by ship to the west. In their homeland in present-day Lebanon, the Phoenicians also had access to cedar trees, which were well suited to produce large

vessels. They eventually imported metals to fashion fittings for their ships. They also produced the finest sailors, who were hired by other area powers, to mount expeditions.

The next great shipbuilders in the Mediterranean region, supplanting the Phoenicians, were the Greeks, who also crafted galleys (see GREEK EXPLORATION). Greece was developed into a maritime power, not only because of her abundance of raw materials, but also because of the great length of her coastline, with hospitable bays and inlets, and the large number of islands off the mainland. Like the Egyptians, Greeks also learned a great deal concerning shipbuilding, navigation, and commerce from the Phoenicians.

Galleys were built as warships as well as cargo ships, leading to design differentiation, with some vessels favoring speed and maneuverability while others sought to maximize cargo capacity. Larger and larger galleys came to be built, with, it is reported, as many as six levels of rowers. As such extravagant ships were ordered, placement of the rowers became a major challenge to the designers.

The Romans, who also utilized galleys, came to control the Mediterranean as their empire grew, and they needed grain and other supplies from their provinces. The Etruscans of the Po River valley in northern Italy were skillful shipbuilders. They also had the most experience in navigation and trade.

Designs of the East

During the third millennium B.C., by about 2800, while the galley was being developed in the West, independently, in China, the JUNK was created, a seaworthy craft that uses battened sails. The Chinese used junks to sail from the East Pacific into the Indian Ocean (see CHINESE EXPLORATION).

The Chinese had an incentive to develop their own ocean-going fleets during the Roman era to bypass the overland SILK ROAD and the monopoly that the Persians had in the silk trade. Reports of direct contact between Rome and China date from 100 B.C. Water routes had been developed by the dawn of the Christian era.

Probably in the first century B.C., Arab boatmakers shaped the first DHOW, a boat high in the stern with a pointed bow and a LATEEN RIG triangular sail. They became common in the Indian Ocean and the Mediterranean and helped the Muslims gain dominance in the Middle East starting in the seventh century A.D. (see MUSLIM EXPLORATION).

The designs of both the junk and the dhow have endured to this day.

Ancient Harborworks

Over the course of its lifetime, a ship would need to use a variety of facilities for repair and storage, in addition to the standard docks for loading and unloading of cargo. These harborworks were more permanent than the ships them-

selves, and their excavation has revealed that large ships were in regular use a long time ago, and that much of our knowledge of them has been lost. The earliest known artificial enclosure for ships was discovered in Lothal, India, on the Arabian Sea. It has an entrance and exit for ships, a sluice gate to control the water level, and was constructed with kiln-fired brick. It dates from the third millennium B.C. In the sixth century B.C., the Greeks built numerous breakwaters to shield their harbors from the abuse of waves. Such investments point to a thriving industry. Today the Mediterranean continues to reveal harborworks of varied design, which were built before the time of Christ.

Viking Longships

The Vikings of Scandinavia also built a type of galley, generally known as the LONGSHIP. The longship proper was actually the Viking warship; they crafted shorter versions with a deeper draught as cargo ships. They made use of sails as well as oars. Their seaworthy ships provided them with a mobility unmatched in the history of Europe, during their years of extensive exploration and colonization, from about 800 to 1100 (see VIKING EXPLORATION). Of major importance was the fact that the Viking ships were clinker- or clincher-built—that is, the planks were fastened to one another instead of to a rigid skeleton of ribs. This gave them a great deal of flexibility—they could flex and give when hit by a heavy sea. As a result, they could withstand a great deal of battering while at the same time being light in weight.

Southern and Northern Europe in the Middle Ages

After the fall of Rome in the fifth century A.D., there was a lull in the construction of large ships in the West. This situation changed later in the Middle Ages—notably in the Mediterranean and the Baltic Sea. In the Mediterranean, the Italian city of Amalfi built trading vessels and became the most important commercial center of its time. It was soon eclipsed, however, by Venice, which displayed great energy and was able to produce more ships. After the Fourth Crusade in the early 13th century (see CRUSADES), Venice obtained a trading monopoly with Constantinople (present-day Istanbul, Turkey), partially as a result of supplying transportation to the invaders. The fleets of Venetian galleys continued to grow, making Venice fabulously wealthy. The city began to decline only with the coming of the RENAISSANCE, when the distribution of resources became more widespread.

On the north coast of Europe, a different type of trade was taking place, and, to withstand the rigorous conditions of the sea, a different type of ship was being built. The Baltic, Germanic, and Scandinavian countries of the region were located near rich fishing grounds and had timber forests. For transport they built sturdy, rounded vessels—the ROUNDSHIP and the COG. The HANSEATIC LEAGUE, which

arose in this area, consolidated its power with a treaty in 1241. It became highly profitable, in no small measure due to its shipbuilding. The center of the shipbuilding industry was Gdańsk (formerly also known as Danzig).

The city of Bruges in the Netherlands rose to prominence in the 13th century as the western edge of the Hanseatic League territories. Its location provided a convenient stopover for ships on their way to the Mediterranean. Its strategic position was not lost on the Dutch, who used their profits to develop their own industries, including shipbuilding. They also improved their waterways by deepening rivers and building canals. Dutch vigor was soon to be eclipsed by the Portuguese, however.

The European Age of Exploration

Much credit for the EUROPEAN AGE OF EXPLORATION, starting in the 15th century and lasting into the 17th century, goes to HENRY THE NAVIGATOR, prince of Portugal. After conquering the port of Ceuta in North Africa in 1415, and being impressed by the cosmopolitan nature of the city, he established a naval college at Sagres the following year and gathered experts in navigation and shipbuilding. His shipbuilders developed the CARAVEL, a ship of moderate size and rounded shape with a LATEEN RIG, a hybrid between ships of northern design with Arab-style lateen rigging. The resulting craft was easy to maneuver and relatively sturdy. The exploration of the African coast was accomplished with caravels, and gave Portugal a head start in shipbuilding. Profits from the trade route to the East around the CAPE OF GOOD HOPE provided resources for further expansion, and the city of Lisbon, at the north of the Tagus River—the Iberian Peninsula's longest river—became Europe's center of ship construction. Lisbon was better suited than Bruges or Venice for this activity, not only for the quality of its harbors, but also because the expansive forests along the Tagus River were easily harvested and logs could be floated down the river to the sea. Lisbon dominated European shipbuilding from the 15th century well into the 16th century. Much of the Spanish Armada was built in its yards.

The wealth that Portugal and Spain gathered from across the seas eventually corrupted their economies through inflation and waste. This allowed England, the Netherlands, France, and the other countries of Europe to increase in importance. Building ships was a key part of their efforts. King Henry VII of England commissioned the *Great Harry*, a CARRACK of large proportions, which was completed in 1515, the first ship of the English navy.

While England focused on warships, the Dutch were more concerned with trading vessels. The “Dutch Merchantman” became a workhorse of world trade. The Dutch were also aggressive in exploiting fisheries in the Baltic and North Atlantic Seas, at one point having more than 3,000 ships in use. The busiest ship-building city came to be Zaandam, surpassing Lisbon in the 1600s.

The Colonial Age

In the struggle to dominate the seas, the Dutch and the English emerged triumphant in the 17th century. In France, economic reforms by King Henry IV and Cardinal Richelieu made shipbuilding a national priority in the late 16th and early 17th centuries. Two war fleets and a merchant marine were built. In Sweden, Gustavus Adolphus, who ruled as king in 1611–33, made special efforts to expand his navy. Peter the Great, czar of Russia from 1689 to 1725, was alarmed that Russia was being left behind by western European nations, and he personally studied the art of shipbuilding. His efforts at bringing his country up to date were highly successful.

With the creation of the East India companies in the 17th century—the BRITISH EAST INDIA COMPANY, DUTCH EAST INDIA COMPANY, and FRENCH EAST INDIA COMPANY—shipbuilders of the various nations built a type of large MERCHANT SHIP known as the East Indiamen, three-masted, armed with cannons, and displacing some 800 tons.

Throughout the history of exploration, countries built ships in their colonies, first to replace those that were no longer seaworthy, and later as an industry unto itself. Mexican shipyards built ships of the GALLEON type for Spain and for trade with the Philippines and the Americas in the 16th century. The French also built ships in North America.

The English colonies in America found abundant timber to build their own vessels. In 1641, Massachusetts took an active role in its destiny by beginning to build its own merchant fleet. The colony had become frustrated by the unfavorable terms that English merchants imposed on it due to its lack of hard currency. With their own ships, they could market their goods independently. They even built metal works to custom-make the fittings for their ships from the raw iron, which they imported. Shipyards sprang up all along the coast of North America, but the Massachusetts industry retained the lead. In 1722, there were 15 yards in Boston alone. In the 1770s, before the Revolutionary War, the colonies produced more than 2,000 ships for domestic use and for lease or sale to other countries.

Ships became more and more varied and specialized. Speed became a primary concern in certain types of commerce, in order to prevent PIRACY and to outrun warships, such as in the Atlantic SLAVE TRADE. The quest for speed led to the development of clipper ships by the 1830s, with streamlined hulls, sharp bows, an overhanging stern to reduce contact with the water, and three tall masts with as many as five sails each.

Working Conditions

As the size of ships grew larger, their construction became more hazardous. Injury and death of workers resulted from two primary causes—falling timber during the plank-cutting process, and falling off the scaffolding during a ship's assembly. The degree to which voluntary labor was used by

an employer varied according to time and place; for example, in colonial America, indentured servitude was a common way for the builder to increase profits. Slavery was used in other parts of the world more extensively. In Europe, however, shipyard workers had above-average status and were paid accordingly.

With Exploration in Mind

The usual situation of the explorer with regard to the ships he could use was dependence on what was available. The stories are many of explorers being promised one thing and being given far less. Also, a ship could deteriorate rapidly from consumption by shipworms and the battering of the sea. Italian CHRISTOPHER COLUMBUS needed to make re-



A descendant of the Inca navigates his bulrush boat with sail on Lake Titicaca in Peru in 1924. (Library of Congress, Prints and Photographs Division [LC-USZ62-106341])

pairs to his ships in the AZORES before crossing the Atlantic in 1492.

Englishman JAMES COOK's *Endeavour*, with which he made his first Pacific voyage in 1768–71, was originally built to carry coal along the English coast but was refitted for a long voyage.

The PACK ICE encountered by polar explorers inspired innovations in design, notably the *Fram*, designed by Colin Archer, a Scot, under the guidance of Norwegian FRIDTJOF NANSEN, for an Arctic expedition of 1893. The *Fram*, with a saucer-shaped hull, was made to sit on top of the ice as it froze, rather than being crushed, and was highly successful in fulfilling its mission.

Much exploration was carried out by PINNACE, an auxiliary boat carried aboard the main vessel—either a rowboat or sailboat—used to navigate coastal inlets and rivers. Other boats played a part in the history of exploration in that they were a primary means of transportation during certain periods of history, such as the KEELBOAT, used in the FUR TRADE on the MISSOURI RIVER in the early 19th century, as well as by MERIWETHER LEWIS and WILLIAM CLARK when they journeyed upriver in 1804.

Into Modern Times

In 1769, Scottish engineer James Watt patented the steam engine, ushering in a new age in water transport. Change was not immediate, with sailing ships being built, and many of the early steamships having both sails and engines. Early steamships had paddle wheels for propulsion. In 1838, regular passage across the Atlantic Ocean was offered by steamship. The introduction, in 1840, of the screw propeller, with submerged rotating blades to propel boats, further revolutionized shipbuilding. With time, ships came to be built of iron and steel. Steam engines also evolved, from coal-fired to oil-fired by the late 19th century. In 1897, a diesel engine—running on petroleum-based liquid fuel—was introduced. These improvements made year-round navigation in the Arctic and Antarctic more feasible, with icebreakers able to break through pack ice. The diesel-powered SUBMARINE was developed by a number of different nations in the early 20th century. Some submarines came to be nuclear-powered. In 1958, the first nuclear submarine succeeded in making an undersea transit of the North Pole.

See also NAVIGATION AND EXPLORATION.

Siberia

Siberia is a vast area of land stretching over 5,207,900 square miles from the Ural Mountains in the west to the Pacific Ocean in the east, and from the Arctic Ocean in the north to Kazakhstan, Mongolia, and China in the south. Most of it lies in the present-day nation of Russia, with a small part in northern Kazakhstan. Siberia is divided into three

geographic regions: The West Siberian Plain, a swampy and forested area is situated between the Urals and the Yenisey River; from there, the Central Siberian Plateau, at a height between 1,000 and 4,000 feet extends to the Lena River; and, from there, to the Pacific Ocean, often called Far East Russia, lie mountain ranges and uplands.

Three large rivers cross Siberia, all flowing north and draining into the Arctic Ocean: the Lena, the Ob, and the Yenisey. Another major river, the Amur, flows east to the Sea of Okhotsk, which opens to the Pacific. Just southeast of the central Asian Plateau is Lake Baikal. With a maximum depth of 5,371 feet, Lake Baikal is the deepest lake in the world and is estimated to hold one-fifth of Earth's freshwater. Siberia has several mountain ranges, including the Yablonovy and Stanovoy Mountains, which run from the border of Mongolia northeast, to the Sea of Okhotsk. The Altai Mountains, with peaks generally between 10,000 and 13,000 feet, stretch along the bottom of the West Siberian Plain, while the Sayan mountains lie just south of the Central Siberian Plateau. To the northeast, along the Kamchatka Peninsula, which extends into the Bering Sea, is a chain of volcanic peaks, including some active volcanoes, and Siberia's highest peak, Klyuchevskaya Sopka, at 15,584 feet.

Siberia for the most part has long, cold winters and short, moderate summers and is divided into three zones of vegetation. Directly south of the Arctic Ocean is the tundra, a marshy, treeless plain about 270 miles wide covered with permafrost, bearing moss, lichens, and flowers, as well

as small shrubs in the summer. South of the tundra is the taiga, a belt of primarily coniferous forests, followed by more deciduous forests. And finally the steppe, a large grassland, stretches to Siberia's southern limits.

Early Reports

There is evidence that nomadic peoples roamed across Siberia 50,000 years ago, but the first settled communities date from the 11th century B.C. These communities, along southern Siberia, had intercourse with the SILK ROAD, a principal route of trade between the East and the West. The southern steppe of Siberia was the road for the Scythians as they advanced into Europe ca. 700 B.C., the Sarmatians in the third century B.C., and the Hsiung-Nu (Huns) in the fourth century A.D. Conquered by the Mongols in the 13th century A.D., southwestern Siberia became an independent Mongolian kingdom called Siber, with the dissolution of the Mongolian Empire in the 15th century (see MONGOL EXPLORATION). The term *Siber*, from which *Siberia* is derived, is Mongolian for "sleeping land."

It is thought that in the ninth century A.D. people to the west of Siberia began to form states. One of the most prosperous of these was located at Novgorod, subsisting on hunting and trading furs. The earliest recorded voyage into Siberia by a Novgorodian was Uleb in 1032, who reported his voyage to the land called "the Iron Gates," which is probably the region around the Pechora River. Other voyagers visited what they called the "land of Yugra," or the Ural



This photograph demonstrates one method of transportation in Siberia in the late 19th century. (Library of Congress, Prints and Photographs Division [LC-USZ62-128127])

Mountains; “the country beyond the portage”; and the “land of midnight,” which probably referred to the area around the lower Ob River. In 1363, a large expedition of Novgorodians explored the lower Ob.

Looking Eastward

Another principality arose around this time along the Volga River, called Moscow. Moscow extended its power and fought with people living further east, the Voguls. The Muscovites chased the Voguls into Siberia, in the region of the Irtysh River, a tributary of the Ob. In 1478, Moscow conquered Novgorod, and, by the middle of the 15th century, was receiving tribute from the Tatar rulers of Siberia. A powerful merchant family of Moscow, the Stroganovs, were given title to a large stretch of land up to the Ural Mountains. With their lands harassed by Vogul raiders from over the mountains in Siberia, the Stroganovs sent YERMAK and a band of Cossacks to subdue them. Yermak conquered the Mongolian khanate of Sibir’, as it was known, claiming all of Siberia for the Russian leader or czar, Ivan IV Vasilyevich, or Ivan the Terrible. He was, however, killed in 1584 or 1585, trying to maintain command of the region. The Muscovites moved into Sibir’ and took control, establishing forts along the Ob. The route from Moscow to Siber was long and dangerous because of the warlike Voguls, and Muscovites continued to search for better routes. In 1597, Artemy Babinov discovered a land route to the Tura River, which cut 700 miles from the journey and which remained the principal land route to Siberia for almost 200 years.

By the beginning of the 17th century, the Russians had explored and occupied most of the Ob River Valley. Russian merchants then moved on to explore the Yenisey Basin, sailing down the Yenisey River, and building forts. Fur hunters ventured eastward and reached the Lena River. There, they encountered the Yakuts, a Siberian people with a highly advanced culture who lived in houses, wore Russian-like clothing, and kept horses. The fine quality of furs returned from the eastern reaches of Siberia inspired more expeditions there. In 1639, a small band, broken off from a group exploring the rivers in the east, crossed a pass in the Dzhugdzhur Range and sailed down the Ulya River to the Sea of Okhotsk. The Russians had reached the North Pacific Ocean. Other expeditions soon followed. In the 1640s–50s, MIKHAIL STADUKHIN explored the Arctic coast of Siberia around the Kolyma River and on the Gulf of Anadyr. The earliest recorded sighting of the BERING STRAIT was by a party of Cossacks under SEMYON IVANOVICH DEZHNEV in 1648.

Russian exploration continued in Siberia into the Amur River Valley, much of it also carried out by Cossacks and much of it for the FUR TRADE (see COSSACK EXPLORATION). Cossacks PYOTR BEKETOV and VASILY DANILOVICH POYARKO in the 1630s–40s spread Russian influence eastward.

The Russian fur trader YEROFEY PAVLOVICH KHABOROV established the first Russian settlements along the Amur in the 1650s. Cossacks also soon reached the Kamchatka Peninsula. LUKA MOROZKO and VLADIMIR VASILYEVICH ATLASOV explored Kamchatka in 1695–96. In time, the native Kamchadals had been conquered, and the Russians had founded posts along the length of the peninsula.

Peter the Great

At that time, in 1696, Peter the Great became czar of Russia. Interested in the West, and hoping to assemble a coalition against the Ottoman Empire of the Turks, Peter traveled with a great embassy to Europe. He brought back with him hundreds of skilled Europeans to work and train Russians and tried to learn as much as possible about European navigation. This exposure to the West, combined with the expanding power of what was becoming a Russian empire, under the hand of Peter, spurred the scientific exploration of Siberia in the 18th century. Peter was most interested in the possibility of a water route from the Arctic Ocean to China and India, due to the difficulties and expense of reaching those countries over land.

In 1719, Peter sent an expedition of two topographers, Ivan Yevreinov and Fyodor Luzhin, to explore the Kuril Islands off the southern end of the Kamchatka Peninsula. Later, in January 1725, Peter sent Dutch seaman VITUS JONASSEN BERING to head an expedition to determine once and for all if Asia and America were connected. It was not until 1728, after the czar’s death, that Bering and his expedition were able to set out. Bering was unable to determine conclusively, but surmised that there existed a strait of passage from the Pacific to the Arctic Ocean. A later British expedition under FREDERICK WILLIAM BEECHEY thoroughly explored the Bering Strait in 1828.

DANIEL GOTTLIEB MESSERSCHMIDT, a German scientist, was another European who Peter brought to Russia in 1716. Messerschmidt, trained in medicine, was also acquainted with natural history, geography, and archaeology. From 1720 to 1727, he traveled throughout Siberia, exploring many rivers and steppes, discovering many mineral resources, and collecting specimens. He even discovered the skeleton of a mammoth.

Great Northern Expedition

Meanwhile, Bering’s expedition had failed to satisfy the Russian Admiralty, and a second, much larger expedition was ordered in 1733. Often called the “Great Northern Expedition” for its scope and investigations of the Arctic, it consisted of an unprecedented 977 members. The expedition was divided into parts, reminiscent of the steps in Russia’s eastward expansion over Siberia: surveying the Arctic Ocean from Arkhangelsk to the mouth of the Ob River; from the Ob to the Yenisey; from the Yenisey to the Lena;

and from the mouth of the Lena to the Kamchatka Peninsula. In concert with these divisions, Bering again led an exploration of the strait bearing his name. The expedition included many Western European-trained scientists, who made notes of ethnography, botany, geology, geography, and history.

Later Expeditions

Other Russians continued to explore the coast of Siberia and the Arctic Ocean through the latter half of the 18th century and the first part of the 19th century. Many of them, such as GRIGORY IVANOVICH SHELIKOV and ALEXANDR ANDREYEVICH BARANOV, were fur traders. Others, such as ANTON BATAKOV and GAVRIIL ANDREYEVICH SARYCHEV were mariners (Batakov worked under JOSEPH BILLINGS, an Englishman hired by the Russian government to head the Northeastern Secret Geographical and Astronomical Expedition).



In the 20th century, during the years the territory was part of the Union of Soviet Socialist Republics (USSR; Soviet Union), Siberia became known to the West as a place of exile for criminals and political prisoners, as it had been in earlier centuries. With vast stands of timber and huge deposits of oil, gas, and minerals, Siberia now plays an important role in the Russian economy. Industrialization that started under the Soviet Union has created a serious pollution problem, however.

See also ARCTIC, EXPLORATION OF THE; ASIA, EXPLORATION OF.

Silk Road

The Silk Road was not a constructed road but rather the name applied to a collection of overland routes crossing nearly 4,000 miles of Asia and used for about 1,500 years for trade between the East and the West. It was named for silk, the most precious and desired commodity that passed over it, an exceptionally soft fabric made by hand in the East from the cocoons of the silkworm, which was originally native to China and lived on the mulberry tree.

Even before the establishment of the Silk Road in the second century B.C., Chinese goods like silk, jade, and bronzes reached the Near East and ultimately the West on small camel caravans as early as 1000 B.C., ancient traders braving harsh terrain and dangerous brigands on the road. But these caravans were dangerous and few. Silk was worn by Persian nobility and coveted by ALEXANDER THE GREAT, the Macedonian leader of the fourth century B.C., becoming a sign of wealth in ancient Greece and Rome. The Asian goods were bartered for European goods, such as glass, amber, coral, pearls, woolens, and linens.

But the Silk Road was not established because of increasing demand of what were and remained expensive luxury items. Instead, it was the result of a diplomatic mission intending to secure an alliance to defend the nascent Han Empire of China from Mongolian nomads called the Huns (Hsiung-nu, or Xiongnu) who threatened settlements of the Chinese.

Founding of the Silk Road

In 128 B.C., the Han emperor, Wu Ti, sent diplomat CHANG CH' IEN to gain an alliance with people the Chinese called Yue-chi in central Asia (and known in the West as the Scythians). In about 118 B.C., after having been captured and then escaping from the Huns, Chang Ch'ien continued westward, reaching Bactria in northern Afghanistan. He returned to China from there, but received reports of peoples farther to the west, including the Persians, Greeks, and Romans. Chang Ch'ien failed to gain any alliances, but his stories of Western civilizations encouraged a desire to trade. Embarking on a second mission in 115 B.C., he sent envoys to Persia and the eastern Roman provinces, laden with silks and gold. The route that Chang Ch'ien had taken developed into the Silk Road, kept stable and passable by the power of the Chinese Empire and the Parthian Empire of Persia as well as the flourishing Roman Republic (see CHINESE EXPLORATION; ROMAN EXPLORATION).

Roman geographer PLINY THE ELDER of the first century A.D. wrote about the Silk Road in *Historia Naturalis* of A.D. 77. Twenty years later, in A.D. 97, Chinese diplomat KAN YING was sent on a mission to Rome during the Han dynasty in the hope of forming an alliance to secure the Silk Road in the face of central Asian rivals. He failed to reach Rome but did reestablish contacts with peoples in China's western provinces. In about A.D. 120, a Greek merchant by the name of Maës Titanius sent out representatives along the Silk Road; they reached Kashgar. Their reports reportedly were used by hellenized Egyptian PTOLEMY in his writings about the silk trade in his *Geographia*, produced in A.D. 127–147 (see GREEK EXPLORATION).

Traveling the Silk Road

Goods from China were carried by caravan from city to city and oasis to oasis—where water and food, as well as fresh camel and horses, could be obtained. Few caravans or merchants traveled the entire Silk Road. Goods were bartered all along the Silk Road. Moreover, a new caravan might be organized to transport the cargo to the next trade center. Most of the traders were peoples of central Asia or Persians, since for much of China's history, Chinese travel outside its territorial holdings was forbidden. Local residents of the many different ethnic groups along the way served as translators among peoples from many lands. In addition to merchants, other travelers used the routes developed by them, such as

diplomats and missionaries, as well as emigrants seeking out new opportunities. Many travelers from China, such as religious scholars FA-HSIEN in the fourth–fifth century A.D. and HSÜAN-TSANG in the seventh century A.D., used parts of the route to reach India. But travel was dangerous—because of climatic extremes as well as bandits—and corpses and bones reportedly littered the Silk Road.

The caravans would leave first from Chang’an in northern China, heading west along a narrow corridor between the GOBI DESERT and the Nan Shan mountains, before splitting into two routes, one skirting the northern and another the southern edge of the forbidding Takla Makan desert, 360,000 square miles of shifting sand dunes squeezed between the Kunlun range to the south and the Tian Shan range to the north. These two paths rejoined in the foothills of the Pamir range. Other routes crossed the steppes of Mongolia before continuing into Europe, or merged at the forks of the main road, which had split in the Pamirs, part of which headed through the Tian Shan range for Samarkand, part headed for Bactria and Kabul in present-day Afghanistan (where a route connected the road to India through the KHYBER PASS). Routes varied somewhat due to climate, openings and closings of mountain passes, and the drying up of oases, as well as political situations, the rise and fall of empires, and the fortunes of nomadic brigands who preyed on the caravans.

Later Use

Trade was reduced by the fall of the Han Empire in China in the third century A.D., and reignited by the rise of the T’ang (Tang) in the seventh century. Trade declined again, with the fall of the T’ang dynasty in the 10th century, only to be renewed by the vast conquests of the Mongols under GENGHIS KHAN in the 13th century (see MONGOL EXPLORATION). Westerners now ventured over the caravan routes to China, most important was the Polo family of Venetian merchants—MAFFEO POLO, NICCOLÒ POLO, and MARCO POLO—who, upon their return to Europe, brought back stories of Chinese wealth, which fanned the flames of European imagination and the desire for Oriental goods. After the dissolution of the Mongol empire into smaller states, and increased warfare among them, travel and trade became dangerous. The rise of the Islamic Turks who, in 1453, conquered Constantinople (present-day Istanbul), the capital city of Byzantium that sat on one of the most important arms of the Silk Road as it passed into Europe, effectively cut off much of the trade. But because of growing demand and the increasing power of nations in Europe, such as Spain, Portugal, and England, sea routes to the East were sought.

By Sea

With the discovery of routes from the Atlantic Ocean around the CAPE OF GOOD HOPE of Africa into the Indian

Ocean by the Portuguese, and other sea routes to the East, and because sea travel was faster and safer and could transport more cargo quickly, the Silk Road dwindled in importance in the 15th and 16th centuries before falling entirely out of use, while its oases became deserts.



The Silk Road no longer exists as a trade route. But following what once constituted it offers a fascinating view into the past. Modern cities of Bukhara, Kashgar, Khiva, Samarkand, Tashkent, and Turfan are full of history. In 1906–08, Anglo-Hungarian archaeologist SIR MARC AUREL STEIN followed a stretch of the ancient Silk Road into western China and discovered the Caves of the Thousand Buddhas, a series of temples built into caves, at Tunhuang.

See also COMMERCE AND EXPLORATION.

slave trade

Slavery, a practice in which humans are considered property for labor or other services, has occurred in all parts of the world and in all types of societies—from primitive hunting-gathering groups to complex agriculturally based civilizations. It has endured from ancient to modern times, sanctioned by many nations through much of the 19th century. And the slave trade, like other areas of commerce, has played a part in world exploration by providing incentive to reach distant lands and opening up routes of travel.

Slavery in Ancient Times

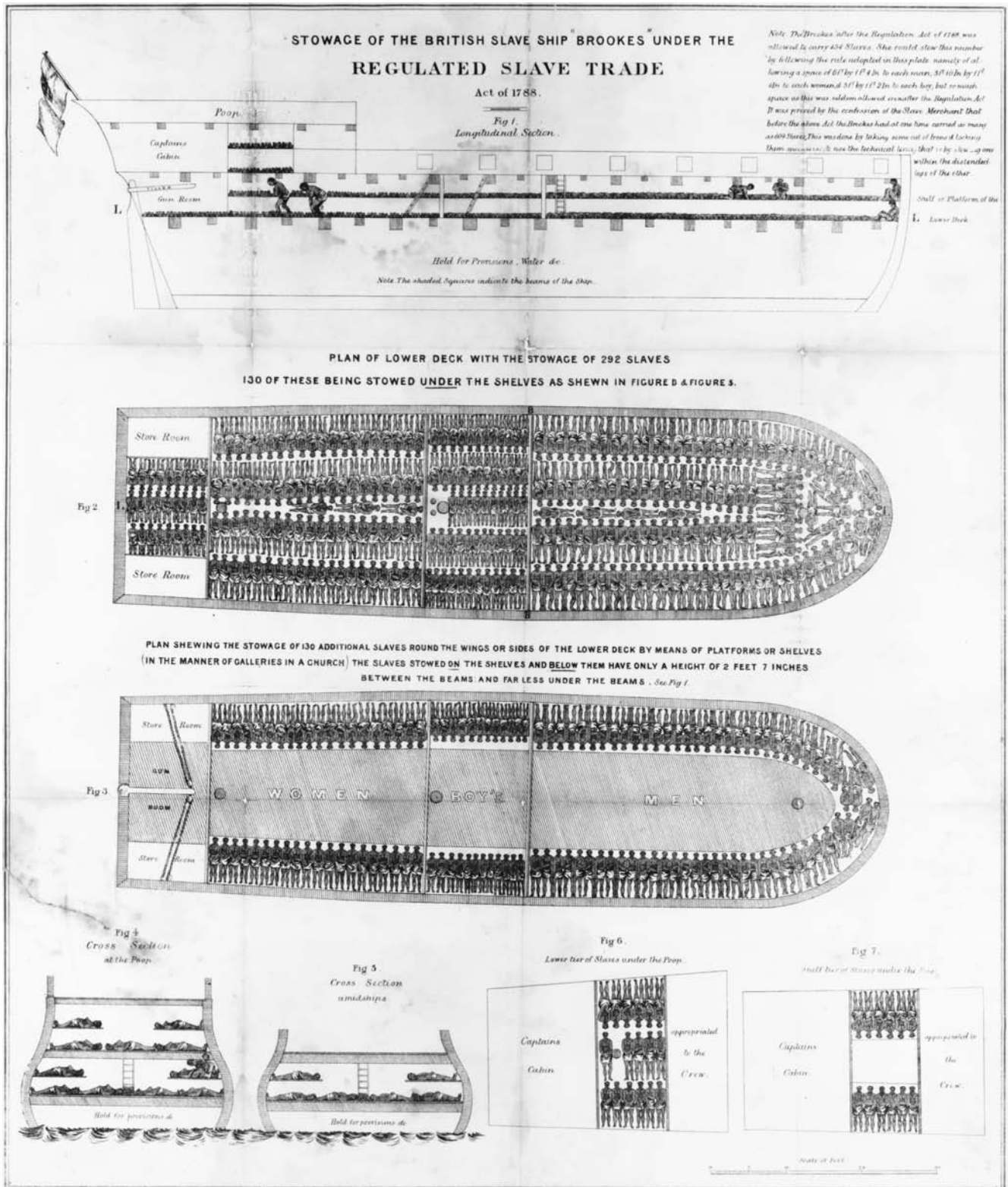
The Egyptians, Greeks, Romans, and Chinese, known for their explorations, as well as most other ancient peoples around the world, utilized slavery to maintain a labor force. Many slaves were acquired as prisoners of war; others in raids specifically for the purpose of slaving; and others in trade. Those captured or traded might end up as workers on roads or buildings or farms; as concubines and prostitutes; as domestic servants and, in some instances, when educated, as tutors; and as soldiers. Another common use of slaves in the ancient world was as oarsmen on GALLEY ships. The Romans also used slaves in gladiatorial combats. In many societies, the number of slaves and their country of origin were considered matters of prestige. (See CHINESE EXPLORATION; EGYPTIAN EXPLORATION; GREEK EXPLORATION; ROMAN EXPLORATION.)

Slavery in the Middle Ages

Slavery persisted through the Middle Ages. The early forms of Christianity and of Islam did not condemn the practice. Arab and Berber Muslims had developed trade routes across Africa’s SAHARA DESERT and the RED SEA for markets in the Middle East in pre-Islamic times and continued using them; other peoples, seafaring Muslims from Arabia and Persia,

came to use the Indian Ocean as a trade route to East Africa for markets in Asia, especially Arabia, Persia (present-day Iran), and India (see MUSLIM EXPLORATION). During the

same period, the Vikings out of the north raided coastal areas and also took slaves, but mainly for personal use, not in trade for profit (see VIKING EXPLORATION). Meanwhile,



This etching shows deck plans and cross sections of a late 18th-century British slave ship. (Library of Congress, Prints and Photographs Division [LC-USZ62-44000])

in the Americas, pre-Columbian civilizations, such as the Maya, Aztec, and Inca, made use of slave labor in building, agriculture, and warfare on a large scale. Other peoples kept captives among them as slaves.

Slavery in most societies was regulated by custom or law. Various social systems were practiced in which laborers were not considered property themselves, although they were legally bound to their work. Serfdom, involving agricultural laborers in medieval Europe, was one such system. Some societies made provisions for the earning of freedom by slaves.

Early Portuguese Slave Trade

The 1440s are cited as the start of the institutionalized European slave trade. In 1441, an expedition sponsored by HENRY THE NAVIGATOR, prince of Portugal, under NUÑO TRISTÃO and Anton Gonçalves, sailed in the Atlantic Ocean along Africa's west coast. Tristão reached Cape Blanco; Gonçalves landed at the Rio de Oro and captured a number of natives, whom he took back to Portugal and presented to Prince Henry. Three years later, Tristão reached Arguin Island, part of present-day Mauritania. In 1448, he established a fort there, which became the first Portuguese slaving station. With subsequent expeditions along the coast, the Portuguese extended their influence and built more posts.

A thriving and systematized trade developed, with Europeans exchanging trade goods—textiles, beads, tools, alcoholic beverages, and eventually guns—to Africans for African captives. Farther south, Portuguese merchants also came to travel the Senegal and Gambia Rivers into the interior. Meanwhile, Muslim slavers continued to use the trans-Saharan routes as far south as what became known as the Slave Coast—the coasts of present-day Nigeria, Benin, and Togo along the Bight of Benin. The Portuguese reached this region by the 1470s. By the 1480s, they were also slaving as far south as the CONGO RIVER (Zaire River) beyond the Muslim trading territory. At the end of the 15th century, with the voyage of VASCO DA GAMA, the Portuguese had sailed all the way around Africa and reached India by water. Soon afterward, along Africa's east coast, they were raiding Muslim trading centers and establishing their own posts. At the various slave ports would be found slave camps, where slaves were interred after forced marches and before being shipped to markets.

Other Nations Enter the African Slave Trade

Portugal had a head start on other European countries in the large-scale slave trade, but, starting in the latter half of the 16th century, England entered the field. SIR JOHN HAWKINS completed the first successful English transatlantic slave-trading expedition in 1562–63, sailing to present-day Sierra Leone, where he obtained a cargo of slaves from Portuguese traders, then to the Caribbean island of Hispaniola (present-day Haiti and the Dominican Republic), where he ex-

changed the slaves to Spanish colonists for sugar and hides, then back to England. France, the Netherlands, Denmark, Sweden, and Prussia soon entered the trade as well.

Native American Slaves

In the meantime, early European visitors to the Americas—CHRISTOPHER COLUMBUS, an Italian exploring for Spain at the end of the 15th century, being one of them—took Native Americans as slaves, and the enslavement of Native Americans would persist for centuries in a variety of forms, some of them limited slavery or indentured servitude, that is, forced tribute or labor resembling European serfdom. Yet it never reached the scale of the African slave trade, partly because the system surrounding the acquisition of new slaves was already in place in Africa. Another factor limiting the use of Native Americans in the slave trade was that it was in the new colonies themselves where slave labor was desired, and peoples near their homelands were more likely to attempt escape or revolt. Native Americans also proved more susceptible to European diseases (see DISEASE AND EXPLORATION).

Triangular Trade

The colonization of the Americas created new markets for slaves, and the slave trade between Europe, Africa, and the Americas became known as the “triangular trade.” That is to say, the commerce surrounding the Atlantic slave trade moved in a triangle. European ships transported manufactured goods to Africa's west coast, where they would be bartered for slaves. The slaves were then transported to the colonies in North and South America, where they would be exchanged for mostly agricultural goods, especially cotton, tobacco, sugar, and molasses, as well as rum. These products would then be carried back to Europe.

The development of the plantation system—self-contained estates dedicated to farming particular crops on a large scale, especially tobacco and cotton—in the Caribbean and in North America's southern colonies in the latter half of the 17th century led to a growing demand for slaves. Business interests of various American colonies also entered the slave trade, providing their own vessels for shipping. An estimated 12 million slaves were taken from Africa to the Americas in the transatlantic slave trade, with as many as two million perishing from malnutrition and disease on the ocean journeys. The majority of the surviving 10 million ended up in the WEST INDIES, Central America, and South America, with lesser numbers to North America. (It is estimated that some 42 percent of the African slaves were sold to the sugar plantations of the Caribbean; 38 percent to Brazilian sugar plantations and mines; 15 percent to plantations and mines in other parts of Latin America; and 5 percent to North American colonies.) The African Diaspora, as it is known—the dispersion of African peoples resulting from the slave trade—led to the collapse of West African civilizations. Starting in the 17th century, European traders



Possibly engraved in the late 1700s or early 1800s, this slave auction house was in New York City. (*Library of Congress, Prints and Photographs Division*)

also operated in the Indian Ocean, acquiring slaves to work on Indian Ocean island colonies, such as the Mascarene Islands. Some slaves out of East Africa were also transported westward around the CAPE OF GOOD HOPE to the Americas.

Abolitionism

Throughout history, there has been a dedicated opposition balancing and modifying the practice of slavery. Some of the earliest voices speaking out against it were missionaries (see RELIGION AND EXPLORATION). SAMUEL FRITZ, a Jesuit missionary from Bohemia (part of the present-day Czech Republic) who explored the AMAZON RIVER and its tributaries in South America in the late 1600s and early 1700s, attempted to protect Indians from Portuguese slavers. The humanistic precepts of 18th-century French philosopher Jean-Jacques Rousseau and of other individuals associated with the Age of Enlightenment, along with growing democratic ideals in Europe, helped create a climate antithetical to slavery. German naturalist and geographer ALEXANDER VON HUMBOLDT, who also explored northern parts of South America at the turn of the 19th century, was outspoken in denouncing the practice.

The antislavery movement became organized and effective in the 19th century. JAMES RICHARDSON, who participated in a British expedition to West Africa in the 1850s with HEINRICH BARTH and ADOLF OVERWEG, was a leading member of the English Anti-Slavery Society. DAVID LIVINGSTONE, a Scottish missionary who traveled widely in Africa in the 1850s–1870s, hoped to abolish the slave trade by establishing Christian missionary stations and alternative commerce. Before his explorations in Africa in the 1870s–1880s, VERNEY LOVETT CAMERON served as a naval

officer in a British campaign against Ethiopia to end the East African slave trade.

The slave trade was abolished before slavery itself, with Denmark banning it in 1792, and Great Britain in 1807, and other European nations soon afterward. The United States prohibited the foreign slave trade in 1808. By the end of the 19th century, institutionalized slavery itself was abolished in most nations, although various forms of slavery are still practiced on a small scale in some parts of the world.

See also COMMERCE AND EXPLORATION.

South America, exploration of

With an area of about 6.8 million square miles, South America is the fourth-largest continent on the globe. It is bordered by the Pacific Ocean to the west, the Atlantic Ocean to the east, and the Caribbean Sea, an arm of the Atlantic, to the north. South America, from the Caribbean Sea in the north to its tip in the south, where the Atlantic and Pacific meet, stretches 4,600 miles, and from east to west, at its widest point, is 3,210 miles wide. The continent is joined to Central America (see CENTRAL AMERICA, EXPLORATION OF), considered the southern extent of North America, by the narrow isthmus of Panama.

Modern-day South America is divided into 12 nations, including Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, and Venezuela. The Galápagos Islands, noted for their unique species of animals, lie 650 miles into the Pacific from the South American coast. The Juan Fernández Islands and Easter Island also lie in the Pacific, while the Fernando de Noronha Archipelago and the Falkland Islands lie in the Atlantic. In the north lie Trinidad and Tobago, the Netherland Antilles, and other islands of the WEST INDIES. The Tierra del Fuego Archipelago sits at the southern end of South America, separated from it by the Strait of Magellan (see MAGELLAN, STRAIT OF), four to 20 miles wide and 200 miles long. CAPE HORN on Horn Island is the continent's southernmost point of land.

The continent is divided into high mountains and plateaus, thick rain forest and jungle, and shallow valleys and long flat plains. The ANDES MOUNTAINS, the second-highest mountain range in the world, rise on the western side of the continent. Its peaks include ACONCAGUA, which is the highest in the Western Hemisphere at 22,834 feet above sea level, as well as Mercedario, Tupungato, Illampu, and Illimani, all more than 20,000 feet. The Andes also includes active volcanoes, especially in Chile, such as Cotopaxi and Tunguragua. In the Andes, between southeastern Peru and western Bolivia, is Lake Titicaca, 12,545 feet above sea level, with an area of about 5,000 square miles, and a maximum depth of 700 feet that never freezes over, making it the

highest navigable lake in the world. Other, shorter highlands lie to the east. One is usually called the Guiana Highlands, a plateau, forest covered on the main, but also with flat grassy plains, which lies in southern Venezuela, Guiana, and northern Brazil. Other South American highlands include the Brazilian and Patagonian Highlands.

South America has three principal lowlands, the largest being the basin of the AMAZON RIVER, followed by the basin of the ORINOCO RIVER to the north, and the Paraguay-Paraná basin to the south, which merges with the valleys and plains of the Pampas and the Gran Chaco of Argentina and Brazil. The three rivers drain an area of about 3.7 million square miles. The Amazon River is the second-longest in the world, at 4,000 miles, but is the largest in terms of volume, discharging a fifth of all the freshwater that drains into the oceans. It flows roughly west to east, rising in the Andes, and drains into the Atlantic Ocean just below the EQUATOR. The Orinoco, at about 1,500 miles (1,700 if a particular branch is considered), flows in an arc through Venezuela, originating in the Guiana Highlands and draining into the Caribbean. The Paraguay-Paraná basin supports the Paraguay and Uruguay Rivers, which enter the Atlantic through the La Plata estuary in Argentina.

The climate of South America is mainly determined by distance from the equator. The area around the equator is hot, with long, wet summers and short, dry winters. The farther away from the equator, the shorter the summer and longer the winter, with the risk of drought. Much of the area around the equator is filled with dense rain forest, supported by the heat and summer rains. The west coast of South America is dryer, and with the high elevations of the Andes, cooler. Past the TROPIC OF CANCER, the winters are cold and the summers cool with higher precipitation to the south.

Animal life displays great isolation and singularity, having many different species from those found on North America. The rain forest in particular has a myriad of species. Large South American mammals include the tapir, jaguar, peccary, coati, giant anteater, spectacled bear, and monkeys, as well as alpacas, llamas, and vicuñas (members of the camel family). Among the larger birds are the condor, flamingo, and rhea. Large reptiles include anacondas, boas, caimans, crocodiles, and iguanas.

Native Peoples

It is estimated that as many as 30 million Native Americans lived in South America when Europeans first arrived. Some of them had developed complex civilizations, many of them centered in the Andes. The various peoples speaking as many as 1,550 distinct languages are sometimes grouped into the following culture areas for purposes of study: the central and southern Andes and adjacent Pacific coastal regions, where complex farming civilizations, such as that of the Inca, developed; northern South America, where the

peoples lived a way of life similar to lower Central America and Caribbean peoples, with small villages and some farming; the tropical forests of eastern South America, which offered a wealth of resources to the hunting-and-gathering peoples also living in scattered villages, many of them along the Amazon River; and the colder regions in the south, to the east and south of the Andes, consisting of nomadic hunter-gatherers.

The Quechua-speaking Inca became the most dominant people on the continent. It is thought that some groups were consolidated as early as A.D. 1000 in what is known as the pre-Inca period; they had evolved out of and had been influenced by earlier dominant cultures of the region, such as Tiahuanacan, Chavin, Chimu, Nazca, Moche (Mochica), and Paracas. Inca legend has it that the Inca lived first around Lake Titicaca in the Andes of southeast Peru and northwest Bolivia, and later moved, in about 1200 A.D., northward into the more fertile valley of Cuzco, where they conquered the inhabitants and established their capital. The name *Inca* is derived from *Ynca* for the prince of the ruling family.

The early Inca period is given as A.D. 1200 to 1440. From 1440 to 1500, the Inca expanded their territory, conquering the Chibcha Indians of present-day Colombia, the Aymara Indians of present-day Bolivia, and the Araucanian Indians of present-day Chile. At its height, the empire of tributary tribes covered about 350,000 square miles centered in the Andes, but stretching to the Pacific coast, and into the Amazon Basin—from what is now northern Ecuador to central Chile. Two emperors, Pachacuti Inca Yupanqui and his son, Topa Inca Yupanqui, developed a state religion and set up a complicated system of administration to govern their lands. The empire was divided into quarters, each governed by a blood relative of the emperor. Each quarter was divided further with an elaborate collection of officials, which at its base had an official to oversee every group of 10 peasants. Peasants throughout the empire were required to provide as a tax a certain amount of labor every year for public works. This facilitated the creation of a system of 10,000 miles worth of stone roads and rope bridges across gorges.

The Inca also built great cities, such as Cuzco and Machu Picchu, with stone palaces, temples, and fortresses, often covered with precious metals. They developed elaborate art forms, especially in metalwork and textiles, as well as writing, calendar, and counting systems.

Inca emperor Topa Inca Yupanqui died in 1493, just as Europeans were arriving in South America, and was succeeded by Huayna Capac. In 1525, both Huayna Capac and his successor died, setting off a civil war between Huayna Capac's remaining sons, Huáscar and Atahualpa, in which Atahualpa triumphed. It was Atahualpa who would face off against the Europeans.

First European Sighting

Italian mariner CHRISTOPHER COLUMBUS, sailing for Spain, was the first European to see South America. The Portuguese had been developing a route to the markets of the Orient south and east around Africa into the Indian Ocean, a program that began under the auspices of HENRY THE NAVIGATOR, prince of Portugal. Columbus proposed to sail west over unexplored ocean, thinking he would circle the globe and reach the east coast of Asia in less than 3,000 miles. King John II of Portugal rejected his plan in 1484, and, again in 1488, after Portuguese BARTOLOMEU DIAS reported reaching the CAPE OF GOOD HOPE, which signaled success in the Indian Ocean route. In 1492, however, Queen Isabella I of a newly united Spain agreed to the small initial bankroll, advised that the cost was slight and the potential for payoff great. Columbus sailed westward from Spain with three ships on August 3, 1492.

With the crew of one ship on the verge of mutiny after over a month sailing in open ocean, land was spied on October 12. The first land is thought to have been a small island of the Bahamas that Columbus named San Salvador. Columbus later found a larger island he called Española—later Hispaniola (present-day Haiti and the Dominican Republic)—and eventually returned to Spain with gold, parrots, and native peoples. He made a second, larger expedition of 17 ships in 1493, with soldiers, colonists, livestock, tools, and seeds. Columbus passed and named many islands in the Caribbean, also exploring along the coasts of Cuba and Jamaica. Still thinking he had reached the outlying islands of Asia—thus the eventual name of WEST INDIES for the islands of the region—he returned to Europe in 1496.

Columbus embarked on his third voyage in 1498. He sent half his fleet of six ships directly to Hispaniola and sailed with others to the Cape Verde Islands off Africa, then followed a more southerly route across the Atlantic. On July 31, 1498, he sighted and named the island of Trinidad. Continuing southward, he entered the Gulf of Paria off present-day Venezuela. He met native peoples there and traded with them for pearls. Although he only sighted islands, he noted the abundance of freshwater flowing into the gulf and surmised he had found a great mainland. He never sighted the delta of the Orinoco River, but sailed westward, examining the coast before returning to Hispaniola.

Coastal Explorations

ALONSO DE OJEDA commanded one of Columbus's ships on his second voyage in 1493 and remained to help establish the settlement of Isabella on Hispaniola, exploring the interior of the island and warring with native peoples. In 1497, he returned to Spain, seeking authority and supplies to mount his own voyage of exploration. Ojeda was granted permission in 1499 to explore the mainland territory that Columbus had discovered the previous year. He set sail with a small fleet in

May 1499, accompanied by JUAN DE LA COSA, a cartographer who had been Columbus's pilot, and AMERIGO VESPUCCI, a Florentine who represented Italian banking interests that had partly financed the voyage. Ojeda's ship reached South America off the coast of present-day French Guiana, five degrees north of the equator. Ojeda sailed northward, stopping at Trinidad and Margarita Island. On August 9, along a coastal inlet on the mainland, he spied a native settlement of houses supported in the water by piers. Reminded of Venice, Ojeda gave the name *Venezuela* to the place, which came to be used for the entire area.

Vespucci's ship reportedly arrived on the coast of Brazil, near Cape São Roque, about five degrees south of the equator. He sailed northwestward and may have explored the Brazilian coast as far as the mouth of the Amazon River, which he explored a short distance upstream. After meeting up with the rest of the expedition in Santo Domingo, Vespucci returned to Spain, arriving in September 1500. By that time, Portuguese admiral PEDRO ÁLVARS CABRAL had reached Brazil and taken formal possession for the Portuguese. Cabral, who had close ties to the Portuguese court but little experience as a navigator, was selected in 1499 to lead a trading mission to India, after Portuguese mariner VASCO DA GAMA reported success in rounding Africa's Cape of Good Hope.

Cabral commanded 13 ships, carrying more than 1,200 men, including merchants, soldiers, missionaries, and some convicts. While earlier voyages had kept close to the coastline of Africa, Cabral followed the advice of Vasco da Gama and sailed due south from the Cape Verde Islands, far into the open ocean to avoid unfavorable winds. Cabral intended to utilize strong westerly winds south and west of Africa to carry his fleet past the Cape of Good Hope and into the Indian Ocean. On April 22, 1500, after sailing southwest into uncharted waters, he sighted the coast of Brazil, at about 17 degrees south of the equator. The fleet anchored there, within sight of Mount Pascoal. Cabral went ashore four days later, taking formal possession of Brazil for Portugal, calling it Terra da Vera Cruz (land of the true cross). He did not know, however, if he had discovered an island or a continent.

A Spaniard had landed earlier that year in northeastern Brazil. The navigator, VICENTE YÁÑEZ PINZÓN, was one of a group of brothers who had served with Columbus on his voyages to the Americas. In 1495, he was given permission by the Spanish crown to lead his own expedition to the Indies. Pinzón did not sail until November 1499, with a fleet of four ships. After reaching the Cape Verde Islands, he sailed southwestward, crossing the equator. On January 20, 1500, he sighted South America, naming the cape Santa María de la Consolación. From that point, Pinzón sailed northwestward and explored the mouth of the Amazon River, which he named La Mar Dulce (the sweet water sea) because of its abundance of freshwater, which was fit to

drink a distance out to sea. He explored the Amazon for about 50 miles, before sailing farther northwest along the coast of the Guianas and Venezuela. In the Gulf of Paria, he sighted the island of Tobago, Trinidad's smaller companion, which he called the Isla de Mayo. Pinzón returned to Spain in September 1500, carrying a cargo of tropical wood, 20 native slaves, and a South American opossum, the first marsupial seen in Europe.

At this time, Amerigo Vespucci, who had just returned from his voyage with Alonso de Ojeda, was taken into service by Portuguese king Manuel I to explore the land of eastern Brazil. After sailing from Lisbon, he landed again at Cape São Roque in August 1501. Vespucci headed southward from that point, hoping to determine the extent of the mainland. He reached a harbor on New Year's Day, 1502, which he named Rio de Janeiro. Continuing southward, he reached the mouth of the Río de la Plata. He followed the Patagonian coast southward and, according to his account, reached a point 50 degrees south of the equator. He returned to Portugal in September 1502.

Vespucci's accounts were published in 1507 by German cartographer MARTIN WALDSEEMÜLLER, along with updated maps of the world based on the most recent explorations. While Columbus continued to imagine he had encountered islands off the Japanese archipelago or off the coast of China, Vespucci referred to the lands using the phrase *New World*. Waldseemüller agreed that the lands were new, and called them "America," using the Latinized version of Vespucci's name. (Later, in 1585–94, when Flemish cartographer GERARDUS MERCATOR published his world atlas, he gave the name to the northern continent as well, and, from that time, the two continents have been called North and South America.)

The Spanish still hoped to find a southwest passage, by which they could sail past the South American continent and reach the Orient. King Ferdinand of Spain commissioned JUAN DÍAZ DE SOLÍS, a Spaniard who had become an accomplished navigator sailing with the Portuguese around the Cape of Good Hope, to search the South American coast for the passage in 1508. Díaz de Solís had sailed with Vicente Yáñez Pinzón in 1506 throughout the Caribbean, and, in June 1508, he sailed with two ships from Spain, joined as commander by Pinzón. They had abandoned their search for a strait in the Caribbean, and sailed southward, as Vespucci had done. But they continued to follow the coast to 41 degrees south, discovering the mouth of the Río Negro. Pinzón and Díaz de Solís disagreed over how to continue the journey, and the expedition returned to Spain and to rebuke from the crown.

Early European Settlements

Years before, in January 1502, Alonso de Ojeda himself embarked on another voyage to South America, in order to es-

tablish a colony in Venezuela. Ojeda established a settlement in Venezuela he called Santa Cruz. It was constantly besieged by native peoples, and when supplies dwindled after nine months, his men mutinied. Ojeda was arrested, and brought in chains to Hispaniola and the Spanish authorities. Spain had established a council, called the Council of the Indies, to direct exploration and settlement in the new territories. Its president, Bishop Fonseca, interceded and obtained Ojeda's release.

In 1505, Ojeda attempted yet again to colonize the Venezuelan coast and was again unsuccessful. Then, in 1508, Ojeda sent Juan de la Cosa to Spain in order to obtain a royal commission to colonize Venezuela. The Spanish crown named Ojeda governor of the area from Cape Vela to the Gulf of Darien, roughly the coast of present-day Colombia all the way to Panama. On Hispaniola, among others Ojeda recruited was FRANCISCO PIZARRO, a Spaniard who was to play the greatest and perhaps most infamous part in the exploration and conquest of South America. Pizarro made his first voyage to the West Indies in 1502, after running away from home as a young man, sailing with the fleet of Nicolás de Ovando, who had been appointed governor of Hispaniola to replace Christopher Columbus's short tenured successor, Francisco de Bobadilla.

From Hispaniola, Pizarro sailed with Ojeda in November 1509. Ojeda's first landfall was at present-day Cartagena, Colombia, but he suffered a disastrous attack by native peoples. Rescued by the forces of another colonizing expedition led by Diego de Nicuesa, Ojeda moved his colony to the west, founding San Sebastián on the east shore of Panama's Gulf of Uraba. Supplies were running dangerously low, however, and Ojeda set sail for Hispaniola, leaving Pizarro in charge. After 50 days, Ojeda had not returned, since his ship had been wrecked off the coast of Cuba. Pizarro was forced to kill the horses for food, and then, with the remaining men, he abandoned the settlement. He encountered Martín Fernández de Enciso, who had financed Ojeda's expedition, and was sailing for San Sebastián with relief supplies. Together they changed course and sailed to the coast of Panama not far from Colombia, where they endeavored to create a new colony.

En route, Fernández de Enciso discovered a stowaway on his ship, VASCO NÚÑEZ DE BALBOA. At this time in his early thirties, he had sailed to the Americas with Rodrigo de Bastidas in 1501, but, by 1510, his career as a conquistador had not been successful, and he found himself in debt, with few possessions other than his sword and his dog, Leoncico. Enciso let Núñez de Balboa, who had experience on the coast of Panama, remain aboard his ship reluctantly. Núñez de Balboa helped Enciso and Pizarro choose a site for the new settlement, which was called Santa María de la Antigua.

In 1511, Enciso incited a mutiny among his men by forbidding them to trade with the native peoples for gold.

Núñez de Balboa took command of the colony. The Spanish crown commissioned him interim governor and captain-general of Panama, known then as Darién, in Central America. Pizarro became Núñez de Balboa's chief lieutenant. In 1513, Núñez de Balboa led an expedition across the Isthmus of Panama. He and his dog ascended the hill, becoming the first European to sight the Pacific Ocean on September 25. Four days later, he and his men reached the coast.

After Núñez de Balboa's sighting of the Pacific, the search for a passage across the continent gained urgency. Juan Díaz de Solís, who had been imprisoned for ending his search for a passage in 1509, was released two years later, and, in 1512, named Spain's Pilot Major, succeeding Amerigo Vespucci in that post. In November 1514, Díaz de Solís was commissioned to again search for a southwest passage to the Pacific, which Núñez de Balboa had named the South Sea. In October 1515, Díaz de Solís sailed from Spain in command of three ships. After reaching Rio de Janeiro on the South American coast, he headed southward and took possession of the lands that now make up much of Uruguay. Díaz de Solís came across an estuary, which he imagined at first to be the opening of a southwest passage.

Díaz de Solís sailed up one of the main tributaries of what he called the Río Solís, which is today the Uruguay River. Near present-day Buenos Aires, he took a landing party ashore to capture Native Americans to bring back to Spain during which he was killed. The expedition was taken over by Francisco de Torres, Díaz de Solís's brother-in-law. Before returning to Spain, he collected a cargo of Brazil wood, which served as a textile dye and was highly prized. As they returned, one ship was wrecked on the Island of Santa Catarina. Eleven men survived the wreck and befriended the native peoples.

Around the Continent

Those who returned to Spain on the second ship of Francisco de Torres reported that the coast of South America appeared to curve southwestward. This gave hope to Portuguese navigator Fernão de Magalhães, who, in 1517, after a falling out with the King of Portugal crossed into Spain, renounced his citizenship, and was called by the Spanish name FERDINAND MAGELLAN. Magellan had sailed with the Portuguese in the EAST INDIES, and it is likely he sailed with his friend FRANCISCO SERRANO to the SPICE ISLANDS (the Moluccas), one of the principal goals of European explorers. He surmised, based on MARTIN BEHAIM's 1492 globe, and data provided by the astronomer and cosmographer Ruy Faleiro, that the Spice Islands really fell within the portion of the world granted to Spain by the Treaty of Tordesillas. Furthermore, the evidence of Díaz de Solís's men combined with secret Portuguese navigational charts he had most likely seen convinced him there was a strait separating South America from the GREAT SOUTHERN

CONTINENT that was believed to exist in the southern latitudes, which would allow him to sail westward and reach the East Indies.

In September 1519, after gaining approval of Spanish king Charles I (Holy Roman Emperor Charles V), Magellan sailed from Spain with five ships and about 250 men. He sailed along the coast of Africa as far as Sierra Leone before crossing the Atlantic. He explored inlets on the Brazilian coast including the Bay of Guanabara and the estuary of the Río de la Plata, which Díaz de Solís had also imagined to be the opening of a southwest passage. Along the southwest coast of present-day Argentina, he entered the bay of San Julián, to wait out the Southern Hemisphere's winter months. He called the area Patagonia, or "Land of Big Feet," after the native peoples he observed who wore large footwear. He quelled a mutiny among his Spanish crew, who resented a Portuguese commander, and, after one ship wrecked on the Patagonia coast, Magellan set out before the end of winter to continue to search for the passageway.

The ships passed 50 degrees south of the equator, and after a few days sighted a strait beyond a cape, named Cape Virgenes. The passage was narrow in places, and winding. One night, a ship mutinied and returned to Spain. The three remaining ships continued to traverse the passage. The southern side of the strait was a rocky land, scattered with strange fires, the camps of native peoples. Magellan called it Tierra del Fuego, or Land of Fire. After 38 days sailing through icy waters, the ships passed into a great tranquil ocean, which Magellan named the Pacific. The 360-mile-long strait was later named the Strait of Magellan. Eventually, the expedition, after Magellan's death in the Philippines, completed the first CIRCUMNAVIGATION OF THE WORLD.

Conquest of the Inca

The east and north coasts of South America had been well charted by this time, but the interior remained relatively untouched, and the west coast a complete mystery. One of the men of Díaz de Solís's expedition left behind on the Island of Santa Catarina, Portuguese sailor ALEJO GARCÍA, married a Native American woman, and together they had a child. With the aid of the native peoples, García explored thoroughly the area of the Paraguay-Paraná basin. Probably in 1524, he ascended the Paraguay River nearly to its source. The next year, García accompanied a band of Native Americans into the Andes. He heard tales of a great civilization located in the mountain range, with great wealth in gold and silver. He obtained several bars of silver himself, and was perhaps the first European man to come to the attention of the Inca.

In 1522, Basque-born Spaniard PASCUAL DE ANDAGOYA, sailing from Panama, began to survey the west coast of South America, after the Spanish conquest of the Aztec in

Mexico. He sailed as far south as Cape Corrientes on the Pacific shore of Colombia and returned to Panama with reports of a highly advanced and wealthy native kingdom called “Biru.” These were the Inca.

In Panama, Francisco Pizarro heard of Andagoya’s report, which bolstered rumors he had heard from native peoples, and decided he would conquer the people of “Biru” and gain their wealth. The next year, Pizarro entered into partnership with DIEGO DE ALMAGRO, a Spanish conquistador of whose life little is known before he arrived in Panama in 1514. In 1524, the two set out to explore the Pacific coast of present-day Colombia. Exploring the Gulf of Buenaventura, Pizarro lost two-thirds of his 80 men to attacks from native peoples and to disease. The Spanish authorities prohibited any further exploration, but Pizarro and Almagro ignored them and, in 1526, reached as far south as the Gulf of Guayaquil on the coast of what is now southern Ecuador. The expedition landed at the Inca town of Tumbes, where the Spanish found evidence of the highly advanced civilization of the Inca and of their riches. Pizarro’s chief mariner, Bartolomeo Ruíz, after sailing farther down the coast, reported the existence of greater Inca cities.

Pizarro sailed for Spain in 1528 in order to seek support from the crown for a large-scale conquest of the Inca. He brought back, among other things, gold and jewels from Peru, captured native peoples, and a llama to show to King Charles I. At about the same time, HERNÁN CORTÉS had returned to Spain with reports of his successful conquest of the Aztec. Pizarro’s expedition received enthusiastic support. He returned to Panama with his half brothers GONZALO PIZARRO, HERNANDO PIZARRO, Juan Pizarro, and Martín Pizarro.

In January 1531, the expedition left Panama with 180 men and 27 horses. Francisco Pizarro landed at San Mateo Bay and occupied the Inca town of Tumbes without opposition. The current Inca emperor, Atahualpa, decided to allow the Spaniards to penetrate deep into the realm, where they would be trapped and easily destroyed.

Pizarro was joined by HERNANDO DE SOTO, who had arrived in Panama in 1514, and took part in exploration and conquest of parts of Central America. De Soto took men and horses from Panama and Nicaragua to the island of Puna off the coast of Peru at his own expense. He was also joined by SEBASTIÁN DE BENALCÁZAR, who had accompanied Columbus in 1498, and later established himself as a military and colonial leader in Central America. Pizarro led the combined forces over the Royal Inca Road, eastward through the Andes and the Piura valley, entirely without Inca resistance. Finally, on November 15, 1532, the Spanish arrived in the deserted city of Cajamarca, where just out of town Inca emperor Atahualpa encamped, with reportedly 50,000 men.

Pizarro sent his half brother Hernando as an emissary to the emperor. Hernando presented Atahualpa with a Bible, which he said would teach him about Christ. When the Bible did not speak to him, Atahualpa cast it to the ground. The Spaniards took it as an insult to their faith and as a good excuse to attack. They charged the Inca with horses, which the native peoples had never seen, and fired upon them with their cannon. The Spanish killed thousands of Inca, and took Atahualpa prisoner, suffering few casualties.

Atahualpa offered the Spanish a roomful of gold for his release. Pizarro agreed, and the Inca began to bring gold from across their empire. During the months of his captivity, Atahualpa learned Spanish and writing, and spent time playing chess with Pizarro. The room was filled with artistic and religious works, which the Spaniards melted down. All told, the Inca brought 1,325 pounds of gold. This did not satisfy Pizarro. The emperor, while in captivity, had ordered his half brother Huáscar killed, lest he make an alliance with the Spanish. Pizarro tried and convicted Atahualpa for conspiracy, and sentenced him to be burned. In deference to Atahualpa’s partial embrace of Christianity, Pizarro baptized him, and had him publicly strangled in July 1533.

While destroying Inca resistance in the surrounding areas, Pizarro and his men learned of another Inca kingdom in Ecuador to the north, based around the provincial Inca capital of Quito. In 1534, Sebastián de Benalcázar set off to capture Quito. Benalcázar gained the support of local Canari native peoples as he traveled northward. He was met by the forces of Inca chief Ruminahui beneath Ecuador’s highest peak, Chimborazo, and he defeated them. He occupied Quito and, in 1535, he established the port city of Guayaquil.

Pizarro marched through Peru on the roads created by the Inca, capturing the Inca capital at Cuzco, enslaving many of its inhabitants and seizing its gold. Diego de Almagro, Pizarro’s erstwhile partner, quarreled with him over their respective positions and power. The conflict was averted in December 1534, when the Spanish authorities appointed Almagro the governor of a new Peruvian province called New Toledo and allowed him to lead an expedition of conquest to the south. Pizarro founded a new capitol called the City of Kings, which he adorned with his riches, at the mouth of the Rimac River. This became Lima, Peru.

Almagro left Cuzco in July 1535 with 750 Spaniards and thousands of native allies. He embarked in the middle of winter, and his men suffered in the severe cold of the high Andes. After traveling through the central Andes, Almagro turned westward and reached the coastal Copiapó Valley, then followed the coastal plain of modern Chile into the Central Valley. Repeatedly attacked by native peoples, and unable to find another civilization like the Inca, Almagro turned back, dissatisfied.

Pizarro had established Manco Capac II, one of Huayna Capac's sons, as ruler in Cuzco for a time, in an effort to maintain the illusion of a continuity of Inca rule. In 1536, during the turmoil that accompanied the rift between Pizarro and Almagro, the Inca ruler escaped from Cuzco and led a revolt against Spanish rule. Pizarro defeated assaults on Lima by four Inca armies. The Inca loss of life from European diseases also helped in the Spanish conquest (see DIS-EASE AND EXPLORATION).

Almagro's men, on their return journey to the north, crossed the Atacama Desert along the north coast of Chile; many died of thirst. In 1537, after crossing the Andes again, they finally reached Cuzco, which, at the time, was besieged by Manco Capac. Almagro succeeded in breaking the siege, but he was soon embroiled in another conflict with Francisco Pizarro, as both claimed Cuzco as part of their dominion. Hernando Pizarro's forces captured Almagro in Cuzco in April 1538, and, with the tacit approval of Francisco, Almagro was publicly executed.

Legendary Kingdoms

Spanish conquests of the Aztec in Mexico, then later the Inca, had fueled the excitement generated by tantalizing hints of another advanced civilization with great wealth.

In 1525, Venetian mariner SEBASTIAN CABOT was commissioned to lead a large Spanish expedition to the EAST INDIES, after report of Magellan's voyage proved the feasibility of an all-water route to the Orient around South America. Cabot was charged with visiting the Spice Islands and to make a geographic survey of the South American coast. Cabot left Spain with four ships and 200 soldiers and colonists in April 1526. He sailed southwestward from the Cape Verde Islands and, the following September, reached the port of Recife, Brazil.

Sailing south along the coast, Cabot sighted and named the island of Santa Catarina. Entering the estuary of the river the expedition of Juan Díaz de Solís had explored 10 years earlier, Cabot discovered and rescued the shipwrecked survivors. The survivors told him of legends of riches in the South American interior, and they gave him the Inca silver that Alejo García had obtained. Cabot named the river Río de la Plata, or the River of Silver, and he abandoned his plans of traveling to the Far East. Instead, Cabot explored the inland waterways of the Paraguay and Barajevo Rivers in present-day Argentina, Uruguay, Paraguay, and Brazil, as well as the Paraná River. Cabot found little gold, however, and returned to Spain in 1530.

Spaniard DIEGO DE ORDAZ, like Pizarro, served with Alonso de Ojeda in 1509, in his efforts to colonize present-day Colombia and Venezuela. Returning to Spain after serving in the conquest of Mexico, Ordaz was given his own commission to explore, conquer, and colonize Venezuela. He sailed with 500 men from Spain, reaching the mouth of

the Amazon, but chose to sail on to the mouth of another great river of which the native peoples had informed him, the Orinoco. He explored upriver about 800 miles and heard tell of a land somewhere in the Guiana highlands around the source of the river ruled by a group of white people like the Europeans, and in possession of wealth in gold and jewels. This was similar to stories Sebastian Cabot had heard from native peoples and survivors of Díaz de Solís's expedition, but with a more definite location to the mythical empire.

Sebastián de Benalcázar in Quito heard tales from a captured Native American in 1535 of a kingdom to the east, toward the Guiana highlands, ruled by a monarch speckled with gold dust, whom Benalcázar called EL DORADO, the gilded one. Benalcázar headed northward into the interior of modern-day Colombia, where he established the settlements Popayán and Cali, then he turned east to search for the city of gold. The same decade, the region was being explored from the east in search for the Guiana empire by Germans involved in a colonizing expedition in Venezuela that had been sponsored by the king of Spain, Charles I (Holy Roman Emperor Charles V). AMBROSIUS ALFINGER, GEORG HOHERMUTH VON SPEYER, and NIKOLAUS FEDERMANN traveled inland in Venezuela and Colombia.

Another mission, led by GONZALO JIMÉNEZ DE QUESADA, was sent from Santa Marta on the Caribbean coast of Colombia to explore the Magdalena River, to search for El Dorado and to locate a passable route to the Spanish in Peru. Jiménez de Quesada heard reports that an advanced civilization existed to his west, on the slopes of the Andes, and took his expedition away from the river. He entered the lands of the Chibcha and, in March 1537, began his conquest. He claimed "New Granada" and founded the city of Santa Fe de Bogotá as its capital. He acquired a fortune in gold and precious stones from the native peoples and finished his conquest in 1539. Around this time, two European expeditions appeared in the area, one led by German explorer Nikolaus Federmann, and the other that of Sebastián de Benalcázar. The three disagreed over who had rights to the territory, and all three sailed in late 1539 or 1540 for Spain to have their dispute arbitrated.

European Inroads

By this time, Francisco Pizarro had appointed his half brother Gonzalo governor of Quito. He, too, had heard stories from the native peoples about riches to the east, including a land that was supposed to contain forests of cinnamon, a very valuable spice, and again of the land of El Dorado, where the bottom of a lake was lined with gold and jewels. Francisco authorized Gonzalo to search for La Canela, the Land of Cinnamon, and for El Dorado. Pizarro took with him 300 Spaniards, about 4,000 native slaves from Quito, as well as a large herd of pigs for food, llamas as pack animals,

and hunting dogs. FRANCISCO DE ORELLANA, lieutenant governor of Guayaquil, joined Pizarro's expedition, which after seven months reached the upper Coca River. He located some cinnamon there, but not nearly as much as he had been led to believe existed. With the men facing starvation, he sent Orellana downriver to locate food.

In late 1541, Orellana and his men improvised a boat, and, along with Native Americans traveling by CANOE, sailed down the Coca, with promises to return within 12 days. After being swept into the Napo River, Orellana discovered a village with plenty of food. He decided then to construct a larger boat and continue sailing downriver into what the Spanish called the Marañón, or tangle of rivers. The Spanish passed into the Río Negro, one of the tributaries of the Amazon, and, on their way, they were attacked by a group of native peoples in which the women fought alongside the men and were likened to the Amazons of Greek legend, thus possibly resulting in the name of the river; the name of the river is more likely probably derived from the native word *amassona* for "boat destroyer." Orellana and his men entered the Atlantic Ocean on August 26, 1542, the first Europeans to sail the length of the Amazon.

At about the same time, Spaniard DOMINGO MARTÍNEZ DE IRALA was exploring the upper Paraguay River in South America's southernmost river basin. Martínez de Irala had first sailed to South America with PEDRO DE MENDOZA in 1535. Mendoza had been appointed the first governor of the territory that had been claimed by Juan Díaz de Solís for Spain, had been explored by Sebastian Cabot, and had had its southernmost extremity fixed by Ferdinand Magellan's passage through the Strait of Magellan. Mendoza's expedition, departing in August 1535, had consisted of 14 ships carrying more than 2,000 colonists to the Río de la Plata, where he had established the city Santa María del Buen Aire (of the fair winds), which later became Buenos Aires.

Mendoza, in addition to colonizing, had been charged with exploring the area, especially the river system, in an effort to find a route to Peru and the riches of which Cabot had reported. He sent two of his deputies, JUAN DE AYOLAS and Martínez de Irala. The two had explored the Río de la Plata up to the Paraná and Paraguay Rivers. Mendoza had died at sea, and Martínez de Irala had succeeded him as governor, serving until 1540, when ÁLVAR NÚÑEZ CABEZA DE VACA, who had explored the Southeast and Southwest of North America between 1528 and 1536, took his place. It was Cabeza de Vaca who had sent Martínez de Irala to explore the Paraguay River in 1542. Martínez de Irala followed the river 250 miles above the settlement Asunción. On his return there, Cabeza de Vaca was deposed by the settlers, and Martínez de Irala regained his place. In 1546, he embarked on another expedition into the interior, reaching the eastern slopes of the Andes.

Gonzalo Pizarro had returned from his failed expedition to search for El Dorado in 1542 to discover his half brother Francisco murdered by followers of the late Diego de Almagro's half-Indian son and heir, Don Diego Almagro, and a Spanish viceroy set in his place. Gonzalo, who had been intended as his half brother's successor, began a rebellion against the viceroy. In 1547, Spaniard PEDRO DE VALDIVIA, who had been an officer under Francisco Pizarro, returned from his explorations in present-day Chile to assist in putting down Gonzalo Pizarro's revolt. He was rewarded with support against Gonzalo for an expedition to colonize Chile to the south of Peru. Valdivia followed the Inca road along the Pacific coast, crossing the Atacama Desert as Almagro had done before. On February 12, 1541, he founded Santiago, Chile, the first permanent Spanish settlement there. He encouraged agricultural settlements in Chile, because it did not possess the mineral resources Peru did. He explored across the Andes into the plains of western Argentina, and, in 1544, reestablished the seaport at Valparaíso.

That same year, the Spanish viceroy of Peru commissioned Spanish adventurer PEDRO DE URSÚA to lead an expedition to search for the legendary wealth of El Dorado and the native peoples of Omagua. Ursúa had set out for Peru in 1552 after spending a handful of successful years as governor of Bogotá (a post he occupied at age 20) and later as the mayor of the coastal town Santa Marta. He left Lima, Peru, in February 1559 with 300 Spaniards as well as native peoples and slaves, and began to cross the Andes. After many delays due to inadequate financing, Ursúa led his men down the Huallaga River, into the Marañón, finally entering the main course of the Amazon in December 1560. On January 1, 1561, one of his men, LOPÉ DE AGUIRRE, murdered Ursúa and his deputy and incited a mutiny. Aguirre hoped to take the mutineers to Panama to rebel against the Spanish authorities. He and his men sailed down the Amazon, crossing into the Orinoco, likely by way of the Río Negro, and they followed it to the Caribbean, laying waste to several native villages along the way. Aguirre and his men attacked and captured the island of Margarita, before they were besieged in the mainland town of Barquisimeto. The Spanish beheaded Aguirre and quartered his body as a warning to rebels.

In 1562, cartographer DIEGO GUTIÉRREZ incorporated the reports of many of these explorations into the interior of South America into a map of the continent. Gutiérrez was employed by Spain's House of Trade for the Indies, an arm of the Spanish government, which licensed sailors and maintained maps of the world. By this time, lusting after gold and other riches, Spanish CONQUISTADORES had visited much of South America's interior, in comparison to North America, the interior of which would not be so well known until the early 19th century.

With much of South America under their sway, the Spanish continued their colonization and exploitation. Spain's other main competitor, Portugal, also had laid claim to a large part of South America. After Christopher Columbus landed in the Americas in 1492, Spain petitioned Pope Alexander VI for a monopoly on trade in the western Atlantic, which resulted in a line of demarcation to the west of which Spain was given trading rights, and to the east of which rights were granted to Portugal. After the 1494 Treaty of Tordesillas, this longitudinal line was fixed at 370 leagues west of the AZORES. The landing of Pedro Álvares Cabral in Brazil in 1500, in territory allowed to the Portuguese, gave them rights to colonize Brazil.

Despite Spain and Portugal's claims to the territory, other European powers attempted to make inroads into the continent as well. In 1598, Dutch sailor OLIVER VAN NOORT was commissioned by a collection of Dutch merchants to embark on an expedition to the Spice Islands and the Far East, through the Strait of Magellan. The expedition sailed from Rotterdam in September 1598, heading for Rio de Janeiro on the South American coast. The ships, driven back by storms, sought shelter on the Brazilian coast, where crew members were lost to attacks from the native peoples. After wintering on the uninhabited island of Santa Clara, the expedition followed the coast of Patagonia and entered the Strait of Magellan in November 1599. Crew members frequented the north shore of the strait, suffering more native attacks and loss of life. They explored three uncharted bays. In early February 1600, the expedition and its ships entered the Pacific and followed the coast of Chile northward, attacking Spanish ships and Spanish settlements. The viceroy of Peru sent a fleet to capture them, but the Dutch escaped, sailing westward into the Pacific.

The English, too, had a capable navy, and it was not long before the stories of El Dorado attracted their attention. In 1595, Queen Elizabeth I approved the plans of English adventurer and explorer SIR WALTER RALEIGH to search for the city of Manoa and the empire of Guiana and its supposed riches. Raleigh sailed with five ships in February, and, after a stormy crossing landed in Trinidad, where he attacked Spanish settlements. Capturing ANTONIO DE BERRÍO, a Spanish official, he heard more reports of El Dorado. He centered his exploration on the Orinoco River, which he explored upstream in small boats. Lacking supplies and afflicted with fevers, Raleigh and his men abandoned their search and returned to England.

In 1610, Englishman SIR THOMAS ROE sailed on a voyage to find gold on the northeast coast of South America. With approval from King James I and the financial backing of Raleigh, Roe left Plymouth with two vessels on February 24. He landed on the coast of the Guianas highlands, and

after locating the mouth of the Amazon, he sailed 200 miles upriver. From there, he explored another 100 miles farther using small boats. Afterward, Roe explored the coastline as far as the delta of the Orinoco before returning empty-handed to England in 1611.

In 1617, Raleigh undertook one more expedition to search for El Dorado. He had been sentenced to death after being implicated in a plot against King James I, but convinced the monarch to let him search for the City of Gold one last time. His ships reached Trinidad, where Raleigh became sick with fever. Raleigh's son, Walter, and Lawrence Kemys entered the Orinoco but soon entered Spanish territory, and fought with Spanish settlers at San Thomé, in violation of orders from the king. Walter was killed, and Kemys committed suicide shortly thereafter. Raleigh also returned empty-handed to England, and, under his original sentence, he was beheaded in 1618.

In 1616, Dutch merchant JAKOB LE MAIRE organized an expedition with navigator WILLEM CORNELIS SCHOUTEN, which departed Holland in June 1615. Early the next year, after passing through what became known as Le Maire Strait, they found South America's southernmost point of land, part of the Tierra del Fuego Archipelago, south of the Strait of Magellan. They named it Cape Horn, not because the area resembled a horn, but after their home port of Hoorn in the Netherlands.

While the Portuguese claimed the area of Brazil east of the line of demarcation set by the Treaty of Tordesillas, French, Dutch, and English trading settlements arose in the territory around the Amazon Basin. In the early 17th century, the Portuguese began to take heightened military action against foreign encroachment. Throughout the 1620s, Portuguese soldier PEDRO DE TEIXEIRA took part in many raids to evict foreign settlers throughout the region, around the Amazon's Xingu tributary and the northern delta near the Guianas highlands. Afterward, the only real threat to the Portuguese hold on its Amazonian territory came from the Spanish, who were slowly pushing eastward from Peru and modern-day Ecuador. In 1637, the Portuguese were spurred into action when two Spanish Franciscans arrived in Portuguese territory after a journey down the Amazon from Ecuador. Teixeira was ordered by the local Portuguese colonial governor to map the length of the Amazon and claim territory for Portugal. He assembled a large expedition, which embarked upstream by canoe in October. In July 1638, Teixeira made the European discovery of the Río Negro and arrived on foot in Quito, Ecuador, in the late summer, to the great astonishment of the Spanish. The alarmed authorities sent Teixeira and his expedition back down the Amazon, with a group of Spanish observers led by Jesuit priest CRISTÓBAL DE ACUÑA. On the return trip, Teixeira marked a point on the Aguarico River, the point at which the river crossed the boundary line, which according

to treaty separated Spanish from Portuguese territory in the New World.

With the Spanish and Portuguese militarily asserting their control of the northern part of the continent, the French turned their attention to the continent's southern portion, which had not yet been settled by Europeans. In 1665, the French sent priest CHARLES-EDOUARD DE LA NOUÉ to explore the territory, which, while nominally belonging to the Spanish since the explorations of Magellan, France hoped to colonize. Traveling in the region of Patagonia and Tierra del Fuego for several years, Noué was captured by native peoples. He learned their language and customs, adapted their form of dress, and was eventually accepted as an equal. After a time, Noué was allowed to escape on a passing ship. In 1675, he published an account of his travels, describing the region's rugged terrain and inhospitable climate and hostile native peoples, which discouraged further French attempts to colonize the area.

In 1675, the Dutch sent another mission to the southern tip of South America, not for purposes of colonization, but, as before, to explore and improve the route to the Pacific, around Cape Horn. The expedition, led by German sailor SIGISMUND NIEBUHR, first sailed to Rio de Janeiro, before heading southward, and entered the Le Maire Strait, off the south coast of Tierra del Fuego. He mapped out navigational hazards and made depth soundings along the strait. Returning to Holland, he published an account and a navigational chart of the Le Maire Strait, which showed it to be a more practical alternative to the Strait of Magellan for a journey around South America.

Scientific Exploration

The first exploration of South America in the enlightenment tradition, entirely without political, pecuniary, or religious motive, was made by French scientist and mathematician CHARLES-MARIE DE LA CONDAMINE in the first half of the 18th century. La Condamine was hampered in his efforts by the Spanish authorities, who continued to suspect the presence of foreigners.

In 1735, after being elected to the French Academy of Science, La Condamine set out for South America as leader of part of an expedition to measure the arc of a meridian of longitude at the equator and near the Poles in order to determine whether English physicist and mathematician Sir Isaac Newton, who had died eight years earlier, had been correct in believing the Earth to bulge out at the equator. The team began their work outside of Quito on the Plain of Yarqui, but due to interference from local authorities, La Condamine was forced to make an eight-month-long journey to Peru. By his return, the results had come in from Labrador, where the other half of the study was being conducted. The results validated Newton.

La Condamine remained in the area around Quito, making inquiries in natural science until 1743, when he decided to journey down the length of the Amazon River before sailing back to France. Before he embarked, he obtained copies of the only map of the entire length of the Amazon, made by SAMUEL FRITZ, a Jesuit missionary from Bohemia who had lived among the native peoples of the Amazon River in the late 17th and early 18th centuries.

In his trip down the Amazon, La Condamine studied the life of the native peoples and made navigational observations. He determined that the Río Negro flowed into the Amazon from the northwest and not the north. But most important, he put his geographic and mathematical skills to use, and finally determined the coordinates of the line of demarcation established by the Treaty of Tordesillas, ending at last the dispute between the Portuguese and Spanish.

A later naturalist, Spaniard FÉLIX DE AZARA, had traveled to South America in 1781 as commissioner of a Spanish government survey. He stayed on in South America until 1801, during which time he studied the natural history of the Paraná and Paraguay Rivers.

German naturalist ALEXANDER VON HUMBOLDT carried out some of the most important natural science studies of South America. Along with French botanist Aimé Bonpland, Humboldt was granted permission to perform scientific surveys throughout the Spanish possessions in the Americas. Humboldt had had a keen interest in natural sciences from an early age, and, in his studies, he gained an extensive knowledge of languages, biology, astronomy, and geology. With his family connections, he was able to obtain the backing of Charles IV of Spain for a plan to explore the Americas. Humboldt and Bonpland sailed from La Coruna in northern Spain and arrived on the Venezuelan coast in July 1799. Over the next year, they pursued various scientific inquiries around the Orinoco River basin. Humboldt made many astronomical observations to clear up discrepancies in maps of South America. He also studied animals, including the capybara, the world's largest rodent; electric eels; and the Arrau turtles who laid their eggs by the millions on the bank of one of the Orinoco's tributaries. Later, Humboldt and Bonpland started from Cartagena and, ascending the Magdalena River, headed toward the eastern slopes of the Andes. Humboldt made observations of the effect of high altitude on the boiling point of water. In Ecuador, the pair attempted to climb Mount Chimborazo, reaching a record 19,000 feet, before lack of oxygen forced them to turn back. Humboldt also plotted the magnetic equator and proved that Earth's magnetic field decreases as one approaches the equator. He studied the climate along the coast of Peru. In his travels, he crossed the Andes five times. He and Bonpland went on to explore Mexico.

The flora and fauna of South America and its islands, the most distinctive after those of Australia and highly

varied, drew many European naturalists in the 19th century. One of these was Frenchman ALCIDE-CHARLES-VICTOR DESSALINES D'ORBIGNY, who collected plant and animal specimens there in the 1820s–30s.

Studies in South America led to one of the most important biological theories ever formulated. In 1831, a young theology student at Cambridge University, who had recently abandoned a medical career, was appointed the official naturalist for a British scientific expedition to the coast of South America after his skills as a naturalist had come to the attention of John S. Henslow, a Cambridge professor of geology and botany. CHARLES ROBERT DARWIN sailed from Devonport in December 1831, aboard the HMS *Beagle*, commanded by ROBERT FITZROY.

The *Beagle* sailed to Bahia, Brazil, where Darwin explored inland, collecting specimens from the Brazilian rain forest. He collected more specimens by traveling with an Irish planter to his coffee plantation 100 miles north of Rio de Janeiro. Later, Darwin explored up the Río de la Plata, discovering fossilized bones in Uruguay. In Patagonia, he followed the Santa Cruz River to within sight of the Andes. He studied the native peoples of Tierra del Fuego, then, after rounding Cape Horn, he made explorations into the interior of Chile. In Chile, Darwin experienced a heavy earthquake and witnessed the eruption of Osorno. Before heading westward, the *Beagle* stopped at the Galapagos Islands, where Darwin noticed similar species on different islands adapted differently to local conditions. The expedition circled the Earth and returned to England in 1836.

Over the following years, Darwin formulated a theory of evolution by natural selection as an explanation for the origin of species, but he was reluctant to publish it until 1858, when he received a paper from ALFRED RUSSEL WALLACE, another British naturalist who had formulated a similar theory. Wallace and fellow self-taught naturalist HENRY WALTER BATES had read Humboldt's accounts of South America, as well as Darwin's own report of the voyage of the *Beagle*, and, in 1848, the two had sailed to the mouth of the Amazon to make their own exploration. They had explored and collected specimens in the Amazon Basin. Wallace had explored the Orinoco River before returning to England in 1852. Wallace next traveled to Southeast Asia, and it was there he wrote the paper that would come into the hands of Darwin in 1858. The two agreed to publish jointly, and, in 1859, with Wallace's supporting text, Darwin came out with his landmark volume, relying on his observations in South America, *On the Origin of Species*. Bates meanwhile had continued his studies in South America, returning to England in 1858.

Darwin and Wallace got together again, along with British botanist WILLIAM HOOKER, to secure a pension for RICHARD SPRUCE. Spruce was a self-educated botanist who, after spending some time in the Pyrenees in France, em-

barked on an expedition to the Amazon Basin in 1849. Primarily an expert in mosses, Spruce was also charged by the British to collect seeds of the cinchona tree to be grown outside of the Amazon and Andes for its bark. In the 17th century, a monk in Peru had observed the native peoples using the tree's ground-up bark to treat fevers. The use spread to Europe, where it was found effective against malaria. The drug isolated from the bark is called quinine and is known to kill some stages of the malaria parasite. Spruce spent a total of 17 years in the Amazon and Andes, during which time he discovered many new plant species. He also investigated the religious use of plant-based hallucinogens by native tribes. (See NATURAL SCIENCE AND EXPLORATION.)

Explorers in the 20th Century

Even after extensive European settlement, parts of South America remained unexplored and a challenge to explorers. One such adventurous traveler was American HARRIET CHALMERS ADAMS, who traveled more than 40,000 miles on the continent and made four crossings of the Andes in 1903–06, writing about the lands she visited for *National Geographic* and other magazines. Another American, historian HIRAM BINGHAM, explored Inca sites in the Andes, also in the early 20th century.

It was not until the advent of airplanes that the most remote places became known, and some tributaries of main rivers remained mysterious and uncharted well into the 20th century. In 1924–25, American ALEXANDER HAMILTON RICE made the first use of aircraft to explore South America. (See AVIATION AND EXPLORATION.)



The Amazon rain forest continues to be a source for medicines and a haven for an amazing diversity of animal and plant life. Outside of the Inca Empire, which methodically expanded through the Andes and even into the rain forest, much of South America was crisscrossed by small bands of native tribes leaving scarce traces. With the coming of the Europeans, first the coastlines were mapped, then conquistadors plunged into the interior, usually with one goal in mind—riches. On a whole, the native peoples were treated ruthlessly, and the lands and forests were pillaged of resources, which included brazil wood, rubber, silver, gold, and diamonds. There were rare exceptions to the rapacity among the European conquerors, mostly rewarded by mutiny, as in the case of Fernandez de Enciso, who refused to allow his Spaniards to engage in predatory trading with the native peoples. Rare, too, was any encouragement to develop sustainable settlements, as Pedro de Valdivia was forced to do in Chile because of a lack of mineral wealth and resources. Much of South America has remained impoverished, its wealth flowing back to Europe, and its own manufacturing and educational institutions left undeveloped.

Today, eagerness to exploit South America's resources combined with the legacy of colonial neglect threatens to destroy much of the continent's natural wealth and native ways of life, which attracted so many biologists, botanists, and anthropologists in the 19th century, and still does today.

South Magnetic Pole (Magnetic South Pole)

Earth has a magnetic field, an area surrounding it in which objects experience an electromagnetic force. In other words, Earth acts as a giant magnet. The exact cause of terrestrial magnetism is unknown; theories relate to the matter and structure of Earth's core, one of which is the dynamo theory involving the interaction of motion and electrical currents in the liquid outer core. At one end of Earth, the northern end, the magnetic force is toward the ground; at the other end, the southern end, the magnetic force is away from the ground. (Earth's magnetic field reverses polarity on an irregular basis, from several thousand years to 35 million years, resulting in the opposite effect; the last such reversal was some 780,000 years ago.) The exact location of these points of magnetic polarity are referred to as the magnetic poles. The magnetic pole at the southern end is known as the South Magnetic Pole (written with or without capitalization). That at the northern end is known as the NORTH MAGNETIC POLE. The terms also appear as magnetic south pole and magnetic north pole. The angle that Earth's magnetic field makes with the horizon is called the magnetic dip, leading to the alternative names dip poles or magnetic dip poles.

The South Magnetic Pole and the North Magnetic Pole do not correspond with the geographic poles of Earth's imaginary axis, known as the SOUTH POLE and NORTH POLE. Moreover, their location varies in the course of almost a century—as they do to a much less degree annually and even daily—a phenomenon known as polar wandering. The present location of the South Magnetic Pole is off the Adélie Coast of eastern Antarctica, 1,600 miles from the geographic South Pole.

For purposes of study, scientists have also defined Earth's magnetic field as a symmetrical magnetic field, averaging its direction and strength, and the hypothetical poles are known as geomagnetic poles, south and north. The South Geomagnetic Pole is situated near Vostok, Antarctica, about 780 miles from the geographic South Pole.

The effect of terrestrial magnetism had been evident for centuries through use of the magnetic COMPASS. William Gilbert, an English physician and scientist, carried out the first comprehensive study of Earth's magnetic field, publishing his findings in *De Magnete* in 1600.

In his Antarctic expedition of 1839–43, Englishman SIR JAMES CLARK ROSS, having located the North Magnetic Pole in an earlier expedition, tried vainly to pinpoint the South

Magnetic Pole. On January 16, 1909, Australian scientist SIR DOUGLAS MAWSON, British geologist T. W. Edgeworth David, and physician Alistair F. Mackay, part of the 1907–09 British Antarctic Expedition under SIR ERNEST HENRY SHACKLETON, reached a point 190 miles inland from the west shore of the Ross Sea, where they determined by their compass readings that they had reached the South Magnetic Pole. Confirmation of the magnetic poles shifting resulted from a 1948 study of the North Magnetic Pole by Canadian scientists, Paul Serson and Jack Clark.

See also ANTARCTIC, EXPLORATION OF THE.

South Pass

The ROCKY MOUNTAINS once presented a formidable obstacle for anyone heading westward. During the 19th century, most western-bound travelers made their way across the Continental Divide via the South Pass. Located in southwestern Wyoming at the southern end of the Wind River Range, the South Pass has an elevation of 7,550 feet. It is not a narrow gorge flanked by rock faces, however, but a 25-mile-wide plateau covered with grass and shrubs. Peaks can be seen in the distance. Originally a Native American trail, the South Pass became known as the easiest way across the Rocky Mountains, with wagon travel possible, and was incorporated into three pioneer routes across Wyoming, the Oregon, Mormon, and California Trails, thus becoming a gateway to the Far West. The climb was so gradual up and over the pass that travelers did not realize they had crossed the Great Divide until they noticed streams flowing the other direction. A number of explorers are associated with it.

Scotsman ROBERT STUART, in the employ of JOHN JACOB ASTOR and his Pacific Fur Company, a subsidiary of the AMERICAN FUR COMPANY, is credited with making the non-Indian discovery of the South Pass. He had traveled by ship to the trading post Astoria at the mouth of the COLUMBIA RIVER in 1810–11. In June 1812, he set out with six companions eastward overland for St. Louis, following the Columbia and Snake Rivers (although one man, John Day, reportedly went insane and had to be sent back to Astoria). Fearing an attack by Crow Indians, Stuart and his party detoured to the north to the valley known as Jackson Hole. They then followed an Indian trail through Hoback Canyon along the western edge of the Wind River Range. On October 23, ascending into the mountain, they located an opening, which would come to be known as the South Pass.

After descending the Sweetwater River, the North Platte River, the Platte River, and finally the MISSOURI RIVER, they reached St. Louis, where Stuart reported the pass through the Rockies to Astor. Both men and the others who traveled with Stuart kept knowledge of it to themselves, apparently

for the transportation advantages it gave them in the FUR TRADE.

In 1823, because the Missouri River route through present-day Montana to the Rockies was cut off by resistance from Arikara Indians, JEDEDIAH STRONG SMITH and a party of MOUNTAIN MEN, including JAMES CLYMAN, THOMAS FITZPATRICK, and WILLIAM LEWIS SUBLETTE, headed southeastward into present-day Wyoming. They crossed the Bighorn Range by way of the Granite Pass to the Bighorn River, but were prevented from proceeding westward to the Union Pass by heavy snows. From Crow Indians, Smith learned of another pass to the south. The party headed for it and, by following the Wind River, then the Sweetwater River, they located the South Pass in February 1824 and crossed over to the Green River near the present Wyoming-Utah border, which would become the location of the first annual fur traders' rendezvous.

From that time on, the South Pass was known to fur traders. The earliest known successful crossing with loaded wagons through the pass was carried out by an expedition under BENJAMIN LOUIS EULALIE DE BONNEVILLE in 1832, heading for a summer rendezvous. In 1836, missionaries MARCUS WHITMAN and HENRY HARMON SPALDING traveled with an American Fur Company caravan from St. Louis, guided by Thomas Fitzpatrick. They became the first non-Indian travelers along that route not involved in the fur trade, and their wives became the first known non-Indian women to cross the Continental Divide. In 1841, Belgian missionary PIERRE-JEAN DE SMET led the first organized wagon train migration on the Oregon Trail, with Thomas Fitzpatrick serving as guide. Other emigrants came to use the pass as well, and it became part of what became known as the Oregon Trail, from Independence in western Missouri across central Nebraska following the Platte and North Platte Rivers and southern Wyoming through the South Pass, then following the Snake River across Idaho to the Columbia River and Oregon. In 1843, JESSE APPLIGATE, Marcus Whitman, and others organized the "Great Migration of 1843," a wagon caravan of some 1,000 emigrants to the Oregon Country.

The year before, JOHN CHARLES FRÉMONT led a U.S. government expedition to the region, one purpose of which was to chart the South Pass. Frontiersman CHRISTOPHER HOUSTON CARSON (Kit Carson) served as a guide. In 1843–44, Frémont headed another exploratory expedition, during which he again traveled the South Pass with Carson. In 1845, STEPHEN WATTS KEARNY led a U.S. military expedition that crossed through the South Pass. More and more emigrants continued to use the pass. In 1847, BRIGHAM YOUNG, who was a prominent leader in the Church of Jesus Christ of Latter-Day Saints—better known as the Mormons—led a party of Mormons along a trail, which for some stretches paralleled and which

for some stretches made use of the South Pass, then headed southwest into Utah.

With the California Gold Rush of 1849, the South Pass saw even more traffic west. What became known as the California Trail branched off from the Oregon Trail at Soda Springs, Idaho, then traversed desert country of Nevada to eastern California. The trail followed the Donner Pass through the Sierra Nevada. Between 1841 and 1866, approximately 350,000 migrants traveled through the South Pass. In 1858, the Lander Road, the first road to be surveyed and built in the Rockies, provided a shortcut from the South Pass to Fort Hall on the Snake River. In 1860–61, the Pony Express made use of the South Pass in carrying mail westward from St. Joseph, Missouri. In 1862, stagecoaches began using Central Overland Trail that branched off from the Oregon Trail at the junction of the North Platte and South Platte Rivers, then ran south of the Oregon Trail in southern Wyoming and bypassed the South Pass.

When gold was discovered on the southeastern end of the Wind River Range in 1867, South Pass City was founded along the pass. The completion of the transcontinental railway two years later limited travel along the South Pass since it followed the Overland Trail through the Rockies.

South Pole (South Geographic Pole, Geographic South Pole)

The South Pole, a cartographic point on the Antarctic continent, is considered the southernmost place on Earth, at a latitude of 90 degrees south and at a longitude of 0 degrees, where all meridians of longitude converge. Its location is determined by the imaginary line, or axis, around which Earth rotates from west to east. The axis is perpendicular to the plane of the EQUATOR and passes through the center of Earth, terminating at geographic points referred to as the South Pole in the Southern Hemisphere and the NORTH POLE in the Northern Hemisphere. From the South Pole, all directions on the surface of Earth are read as to the north. The South Pole is also referred to as the South Geographic Pole or Geographic South Pole, to distinguish it from the SOUTH MAGNETIC POLE, which is determined by Earth's magnetic field. A marker of the precise location of the South Pole has to be set every year because a glacier caps the pole and drifts slightly more than one inch a day. (The Ceremonial South Pole, marked by international flags of nations that signed the Antarctic Treaty of 1961, is allowed to drift with the ice.) The South Pole, like the North Pole, took on great symbolic significance for explorers, and the quest to reach it is part of the larger story of human activity on the Antarctic continent.

The British Antarctic Expedition of 1907–09, led by SIR ERNEST HENRY SHACKLETON, after locating the Beardmore

Glacier and crossing the Polar Plateau, missed reaching the South Pole by only 97 miles. ROBERT FALCON SCOTT led another British attempt on the Pole, with a plan to set out from McMurdo Sound and follow the route across the Beardmore Glacier and Polar Plateau pioneered by Shackleton. In the meantime, a Norwegian expedition under ROALD ENGELBREGT GRAVNING AMUNDSEN planned an approach from the Bay of Whales on the edge of the Ross Ice Shelf and across the Axel Heiberg Glacier. Amundsen's party of five set out on October 19, 1911, and reached the South Pole on December 14. Scott's party set out on November 1, 1911, and reached the Pole on January 17, 1912, whereupon they learned that they had failed in their attempt to be first. On the return journey, Scott's team of five all perished on being trapped in a nine-day blizzard. Another milestone in the history of Antarctic exploration was accomplished by American RICHARD EVELYN BYRD, who, on November 29, 1929, during the First Byrd Antarctic Expedition, became the first man to fly over the South Pole.

The United States maintains a base at the South Pole, known as the Amundsen-Scott South Pole Research Station, for the purposes of scientific study, including earth sciences, meteorology, glaciology, geophysics, upper-atmosphere physics, astrophysics, and biomedicine. The first permanent station there was established in 1957 as part of the INTERNATIONAL GEOPHYSICAL YEAR, and it functioned until 1975, when the present station was occupied.

See also ANTARCTIC, EXPLORATION OF THE.

Soyuz program

The Soyuz program is a program of SPACE EXPLORATION of the former Union of Soviet Socialist Republics (USSR; Soviet Union) and now Russia, the name of the program referring to spaceflights using the Soyuz type of piloted spacecraft as well as the Soyuz type ROCKET. The program began in 1967, subsequent to the VOSTOK PROGRAM and the VOSKHOD PROGRAM, having been proposed five years earlier as part of the Soviet Union's push to put the first human on the Moon. When the United States succeeded in doing so in 1969 in its APOLLO PROGRAM, the Soyuz spacecrafts were redesigned to carry people and supplies to SPACE STATIONS, which included the Salyut stations, *Mir*, and currently the *International Space Station*.

The first piloted Soyuz missions, after several unmanned test flights of the new spacecraft, put the cosmonaut (*cosmonauts* is the Russian term for ASTRONAUTS) Vladimir M. Komarov into orbit on April 23, 1967. He became the first person to die in a spaceflight when the parachute on his descent module malfunctioned. During a dual flight, *Soyuz 2* and *Soyuz 3* failed in an attempt to rendezvous and dock in space in October 1968; *Soyuz 4* and *Soyuz 5* succeeded in doing so in January 1969. The suc-

cessful U.S. Moon landing the following July led to the redirection of the Soyuz program. The Soviet Union placed three spacecraft in simultaneous orbit in October 1969, with *Soyuz 6*, *Soyuz 7*, and *Soyuz 8*. Launched in June 1970, *Soyuz 9* set a record at the time for humans in space, 17 days. In April 1971, *Soyuz 10*, the first space station mission, failed to dock with *Salyut 1*. But *Soyuz 11* successfully accomplished the task the following June. In July 1975, *Soyuz 19*, with ALEXEI ARKHIPOVICH LEONOV as commander, in the first such joint mission, rendezvoused and docked in space with an American Apollo spacecraft. There have been some 80 Soyuz flights.

The Soyuz rocket uses liquid fuel, kerosene, and liquid oxygen to launch the Soyuz spacecraft. Soyuz spacecrafts have three modules: the front orbital module is oval in shape; the middle descent module, for entry, is bell-shaped; and the rear service module, containing rocket engines and solar panels to supply electricity, is cylindrical.

space exploration

Humans have always looked to the Sun, Moon, and stars and have devised systems of thoughts to explain them and have dreamed of ways to reach them. In recent time, space exploration has become a remarkable reality.

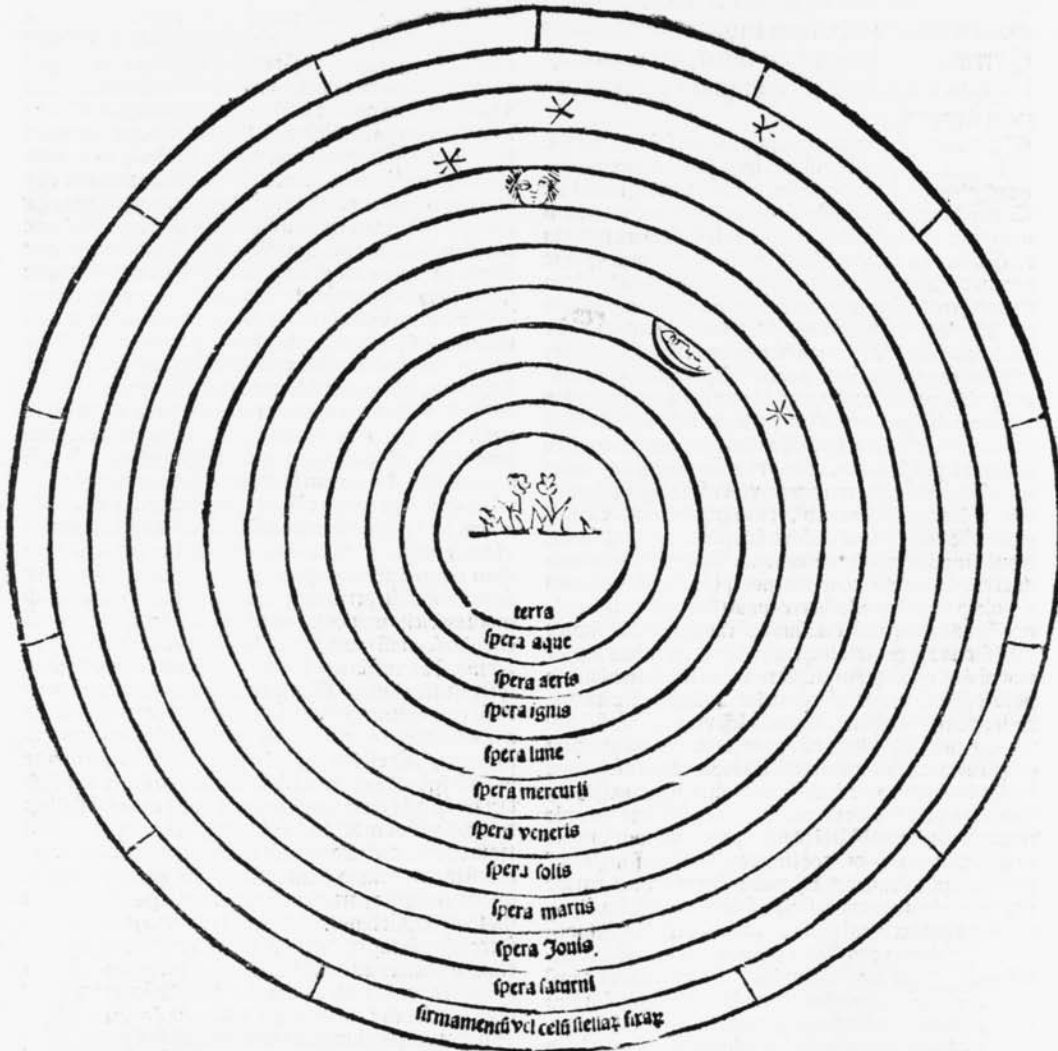
The Science of Astronomy

Space exploration can be said to begin with the early astronomers, who utilized the scientific method to explain celestial phenomena. HIPPARCHUS of Greece and PTOLEMY of Alexandria of the second century B.C. were among those laying the foundations of the science of astronomy, although they theorized an Earth-centered solar system, a concept that endured well into the RENAISSANCE. In 1543, astronomer Nicolaus Copernicus of Poland published *De revolutionibus orbium coelestium*, in which he described the Sun as the center of a solar system, with the planets in orbit around it. In 1609, Johannes Kepler, a German, established that the orbits of planets are elliptical, not circular. The next year, Italian scientist Galileo constructed the first complete astronomical telescope and began viewing features on the Moon and eventually the moons of Jupiter. His studies determined a more accurate scale of distance in space. English physicist Sir Isaac Newton, active in the late 17th and early 18th centuries, helped further the understanding of the solar system with his studies of the laws of motion and laws of gravitation.

Rocketry and Aviation

In the meantime, ROCKET technology was being developed. Probably the Chinese, in the 13th century, were the first to conceive the notion of placing gunpowder within a tube to propel a device as gases rushed out (see CHINESE

Sectundus.



26.
60.

Dubius autem dubitationibus entibus de quibus merito utique quilibet dubitabit tentandus dicere quod videtur dignus esse reputantes promptitudinem magis imputari verecundie quam audacie: si quis propter philosophiam stare: et parvas sufficientias diligit: de quibus maximas habemus dubitationes. **Lectio. XVII.**

Distinctio determinavit philosophus de stellis ostendens earum naturam: motum ordinem et figuram. hic solvit quasdam dubitationes circa predicta. Et circa hoc duo facit. primo ponit questiones. 2º solvit eas ibi. Sed nos ut de corporibus etc. Circa primum tria facit. primo excusat se a presumptione tractandi has difficiles questiones. 2º movet eas ibi. Adhuc autem etc. 3º ostendit questionum difficultatem ibi. De his quod etc. Dicit ergo primo. cum circa stellas sint dubitationes: id quod no-

bis videtur ita. scilicet quod nos dignus esse omne quod promptitudo hominis consideratis huiusmodi questiones magis debeat imputari verecundie. id est bene latari vel modestie quam audacie. id est presumptioni: sed debet ille qui huiusmodi dubitationes considerat diligere parvas sufficientias. id est parvas sufficientes rationes ad iuveniendum de illis rebus de quibus habemus maximas dubitationes. et hoc propter desiderium: quod quis habet ad philosophiam: ut scilicet principia stent. id est sic permanent. **¶** Deinde cum dicit.

¶ Adhuc autem multis existentibus talibus: non minime mirabile: propter quam quidem causam non semper plus distantia a prima latatione moventur pluribus motibus: sed intermedia plurimis. **¶** Rationabile utique videbitur esse primo corpore una latatione propinquissimum in minus moveri motibus: puta duobus: habitu autem tribus aut aliquo alio tali

f 4

EXPLORATION); such methods of propulsion were refined over the centuries, typically for purposes of warfare until the 20th century, when three scientists—Russian inventor Konstantin Eduardovich Tsiolkovsky, American physicist Robert Hutchings Goddard, and Romanian-born mathematics teacher Hermann Oberth—began theorizing rocket use in spaceflight.

While rocketry progressed, so did techniques of aviation (see AVIATION AND EXPLORATION). The first ascents in a hot-air BALLOON were conducted in the late 18th century, and the first ascents in an AIRSHIP, in the mid-19th century, all in France. And, in 1903, American brothers Orville and Wilbur Wright accomplished the first airplane flight.

Rocket technology progressed rapidly in the 1930s and 1940s, World War II providing impetus to develop it as weaponry. Advances were applied by the United States and the former Union of Soviet Socialist Republics (USSR; Soviet Union) to space exploration in the 1950s, during the cold war between the two nations.

Science Fiction as Inspiration

While science and technology were making spaceflight a possibility, writers were providing inspiration. In A.D. 160, Lucian of Samos, a Greek, wrote a story of flight to the Moon on artificial wings. Centuries later, a number of writers captured the public's imagination with their science fiction novels, in particular Frenchman Jules Verne's *De la Terre à la Lune (From the Earth to the Moon)*, published in 1865, and Englishman H. G. Wells's *The First Men on the Moon*, published in 1900. Science fiction, as a literary genre, and later a film and television genre, continued to presage developments in space exploration throughout the 20th century.

Satellites in Space

The first triumph of space exploration was the launching of the artificial SATELLITE *Sputnik 1* by the Soviet Union on October 4, 1957. On November 3, *Sputnik 2* carried the first living creature into space, a dog. The United States launched its own satellite on January 1, 1958, and reorganized its space program under the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, better known as NASA.

Humans in Space

The Soviet Union, with the VOSTOK PROGRAM, also achieved another first, placing the first human in space—cosmonaut YURI ALEKSEYEVICH GAGARIN—on April 12, 1961. He was also the first human to orbit space. Three weeks later, on May 5, the United States placed its first human in space—ALAN BARTLETT SHEPARD, JR.—on a sub-orbital flight. On July 21, 1961, American Virgil I. (Gus) Grissom completed a second suborbital flight. JOHN HER-

SHELL GLENN, JR., became the first American to orbit Earth on February 20, 1962. These early U.S. flights were part of the MERCURY PROGRAM. On June 16, 1963, the Soviets put the first woman in space—VALENTINA VLADIMIROVNA TERESHKOVA—aboard *Vostok 6*. An American woman, SALLY KRISTEN RIDE, first reached space 20 years later, on June 18, 1983. Still another Soviet first was part of the VOSKHOD PROGRAM: On March 1965, ALEKSEI ARKHIPOVICH LEONOV performed the first extravehicular activity (EVA), or “space walk.” The following June, EDWARD HIGGINS WHITE, II, carried out the first American EVA, as part of the GEMINI PROGRAM.

Space Probes

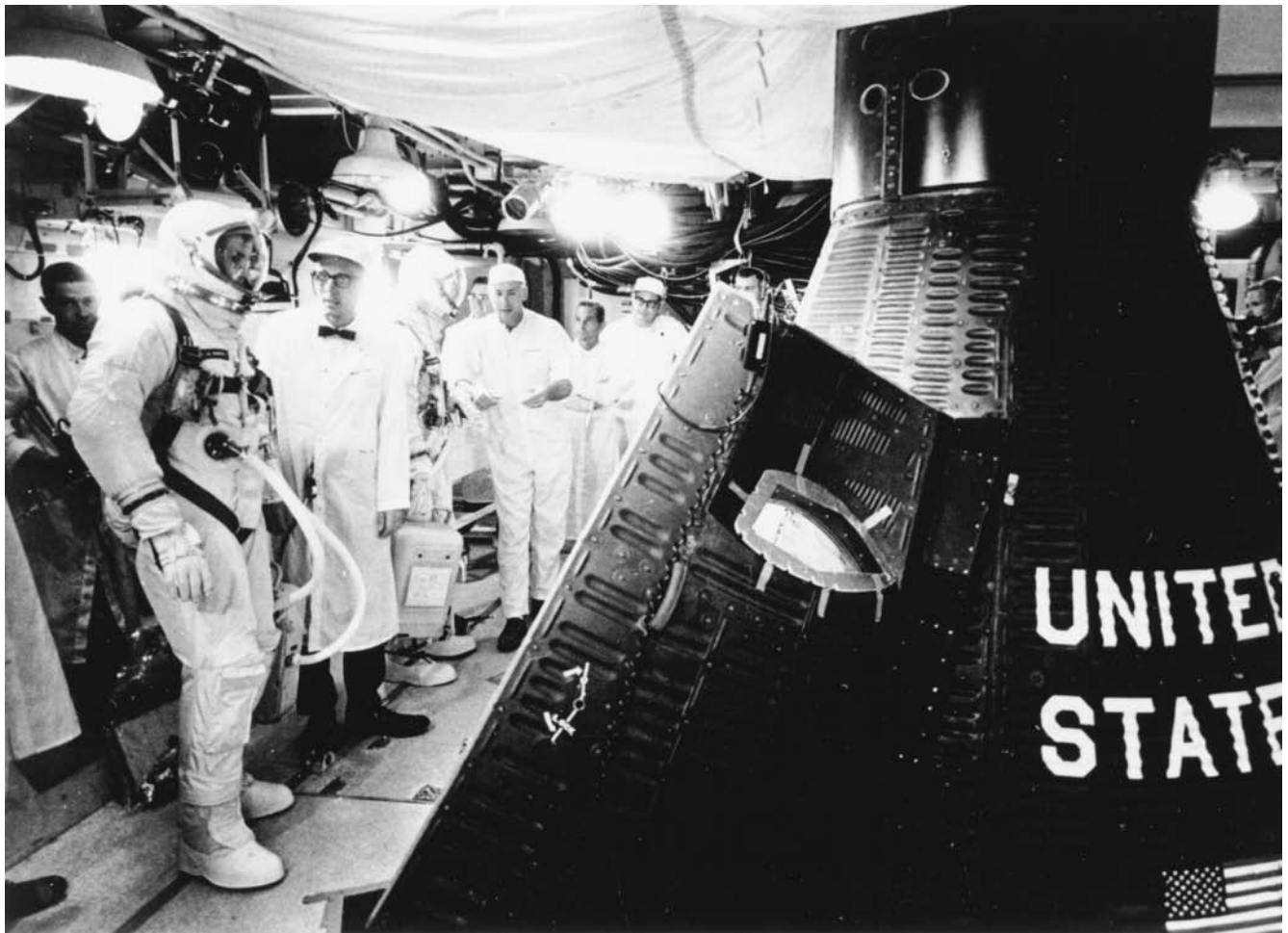
In addition to Earth-orbiting satellites and piloted spacecraft, various nations have made use of the SPACE PROBE for exploration, unmanned space vehicles carrying scientific equipment launched beyond Earth's gravitational field and directed to the Moon, another planet, or another planet's moon or moons. The United States launched the first probe, *Pioneer*, on October 11, 1958, but it failed to escape Earth's pull. *Luna 1*, a Soviet probe, launched in January 1959, became the first human-made object to escape Earth's orbit. In September of that year, *Luna 2* became the first artificial object to hit the Moon. And that October, *Luna 3* sent back the first photographs of the dark side of the Moon.

Humans on the Moon

The Soviet Luna and Zond probes and the U.S. Ranger, Surveyor, and Lunar Orbiter probes were launched with the goal in mind of sending humans to the Moon. The United States achieved this significant first in space exploration with its APOLLO PROGRAM; on July 20, 1969, with the *Apollo 11* mission, NEIL ALDEN ARMSTRONG and Edwin “Buzz” Aldrin, Jr., became the first humans to land on the lunar surface. Five subsequent Apollo missions carried humans to the Moon.

Space Stations

With the U.S. success on manned lunar missions, the Soviets shifted their SOYUZ PROGRAM to developing a SPACE STATION and studying the effects of long-term spaceflight on humans. Between 1971 and 1984, they launched seven Salyut space stations. The United States built its own space station, *Skylab*, which was occupied by three sets of crews in 1973. The first module of the *Mir* space station was launched in 1986, with other components added over the next 10 years (with Russia taking over control of it in 1991, after the breakup of the Soviet Union). Starting in 1995, Russia and the United States participated in joint *Mir* missions, with both cosmonauts and ASTRONAUTS spending extended periods of time in space. In 1995, Russian Valeriy



In this 1965 photograph, astronauts prepare for a simulated Gemini test at Cape Kennedy in Florida. (Library of Congress, Prints and Photographs Division [LC-USZ62-121458])

Polyakov completed a record 14 months aboard *Mir*; the next year, astronaut Shannon Lucid set an American space-flight endurance record of 188 days.

International cooperation in space programs has continued to the present. Many different nations are involved in the building of an *International Space Station* to be finished by 2006. The first module was launched in 1998. Eleven of the participating nations are members of the EUROPEAN SPACE AGENCY, an organization of presently 15 nations founded in 1975; Brazil, Canada, and Japan are also involved in the project.

Space Shuttle

In the 1980s, the United States began using the Space Transportation System (STS), popularly known as the SPACE SHUTTLE. It is a reusable spacecraft, launched by rockets but with gliding capabilities for landings. It has become the primary vehicle for building and taking supplies to the *International Space Station* and for the launching, servicing, and

repairing of artificial satellites. It has also the ability to conduct numerous scientific experiments. The *Columbia* disaster in 2003 (following the earlier *Challenger* disaster of 1986) has led to a reexamination of space shuttle safety issues, however.



Humans have thus traveled as explorers into Earth orbit time and again; they have even reached the Moon. Interplanetary travel might someday become a reality. Exploration to the Sun and other planets has been carried out by space probes, with humans participating from Earth, since the 1960s; the Sun, Mars, Venus, Mercury, Jupiter, Saturn, Uranus, Neptune, and some of their moons have been visited or approached. There have even been rendezvous with asteroids and Halley's Comet. Many more such missions are planned.

Space has been referred to as the final frontier. Its highly organized missions, depending to such a degree on technol-

ogy and such a large support team, seem to have little in common with the expeditions of ancient and even more recent explorers on land and sea. Yet the impulse to visit, examine, and understand unknown places is consistent with motivation for exploration through the ages.

space probe

Humans have traveled in orbit around the Earth time and again. They have also journeyed to the Moon. But for travel to other parts of the solar system, they have been dependent on space probes, which have instrumentation, including cameras, to collect scientific data and radio transmitters to send the data back to Earth. Unlike an artificial SATELLITE that is placed in orbit around Earth, a space probe is launched by a powerful enough ROCKET so that it escapes Earth's gravitational field and can navigate among other celestial bodies. Some probes are directed to orbit the Moon, another planet, or another planet's moons (becoming satellites, in effect), or to fly by one or more planets; others are directed to soft-land scientific equipment on lunar or planetary surfaces.

The first space probe, *Pioneer 1*, was launched by the United States, under the direction of the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA), on October 11, 1958, one year after the first satellite, *Sputnik 1*, was launched by the Union of Soviet Socialist Republics (USSR; Soviet Union) and almost nine months after the first U.S. satellite, *Explorer 1*, was launched. *Pioneer* did not accomplish its attempted goal of orbiting the Moon, but it reached an altitude of some 72,800 miles in outer space, gathering data on meteors, temperature, radiation, and magnetic fields, before falling back toward Earth and disintegrating in the atmosphere.

The Soviet Union achieved the greatest early success in lunar exploration with the Luna series. *Luna 1*, launched in January 1959, became the first human-made object to escape Earth's orbit, but missed striking the Moon. The following September, *Luna 2* became the first artificial object to do so. That October, *Luna 3* sent back the first photographs of the far side of the Moon.

The United States, after a number of failures, achieved some success, and gained experience for its APOLLO PROGRAM and the goal of placing humans on the Moon, with its Ranger, Surveyor, and Lunar Orbiter probes of the 1960s, which sent back photographs, performed soft-landings, and mapped the Moon. In 1968, the Soviet Union sent the first Zond probes in preparation for their own piloted missions. On July 20, 1969, with the *Apollo 11* mission, NEIL ALDEN ARMSTRONG and Edwin "Buzz" Aldrin, Jr., became the first humans on the Moon's surface. In 1970, with *Luna 17*, the Soviet Union succeeded in placing the first wheeled vehicle on the Moon, *Lunakhod 1*, a re-

mote-controlled rover. The final Luna mission, *Luna 24*, took place in 1976. The United States put the probe Clementine in Moon orbit in 1994, using a laser to study topography, and the Lunar Prospector in orbit in 1999, to study surface composition as well as gravitational and magnetic fields.

There have been numerous space probes into interstellar space beyond the Moon. The United States has launched many probes, exploring to the end of the solar system and beyond from the 1960s to the present. The Mariner series explored Mars, Venus, and Mercury in the 1960s–70s. *Pioneer 10* passed through the asteroid belt and became the first artificial object to escape the solar system in 1973; *Pioneer 11* studied Jupiter and Saturn. Because of the great distances involved, some of these missions last decades; *Pioneer 11*, for example, launched in 1973, continued to send data back to Earth until 1994. The Viking series of the 1970s studied Mars, *Viking 2* of 1975–76 being one of the early success stories, with transmission of photographs and chemical analyses. Yet it found no trace of life on the Red Planet. The Voyager series launched in the 1970s passed by and made studies of Jupiter, Saturn, Uranus, Neptune, and their moons. In 1980, *Voyager 1* exited the solar system, followed by *Voyager 2* in 1989; in 1998, *Voyager 1* passed *Pioneer 10* to become the most distant human-made object in space. The *Magellan* probe, launched in 1989, orbited Venus. The *Ulysses* probe (shared by the EUROPEAN SPACE AGENCY) of the 1990s conducted studies of the Sun. The *Galileo* probe of the 1990s studied Venus, the Moon, the asteroids, Jupiter, and Jupiter's moons. The Mars *Pathfinder* and Mars *Global Surveyor* of the 1990s continued studies of Mars: *Pathfinder* returned many images from the surface and carried out 15 chemical analyses; *Global Surveyor*, in orbit, mapped the planet and took photographs of features to suggest the presence of water on or below the surface. The NEAR (Near Earth Asteroid Rendezvous)-Shoemaker studied the asteroid Mathilde and landed on the asteroid Eros. Launched in 2001, *Odyssey* is a successful orbiter around Mars, sending back numerous images into 2004.

Meanwhile, other nations have launched probes. The Soviet *Mars* probes of 1971–74 studied Mars. The Soviet Venera series of the 1960s–80s studied Venus. The Soviet Union's *Vega 1* and *2* probes, Japan's *Sakigake* and *Suisei* probes, and the European Space Agency's *Giotto* probe rendezvoused with Halley's Comet in 1986. The Japanese *Nozomi* probe of the late 1990s studied Mars.

Those mentioned are the success stories. Some probes, like the Soviet Union's *Phobos 1* and *2* to Mars in the late 1980s, and the U.S. *Mars Climate Orbiter*, *Mars Polar Lander*, and twin probes referred to as *Deep Space 2* in the late 1990s, failed in their missions. In fact, two-thirds of all probes to Mars have failed.

Many more space probes are planned, some of them already launched for later rendezvous with their targets. The joint U.S.-European *Cassini* probe, for example, launched in 1997, is intended to explore Saturn, its rings, and some of its moons on arrival in 2004. With the planet Mars closer to Earth in 2003–04 than it has been in 7,300 years, numerous nations have sent space probes to study it.

space shuttle

Space shuttle is the popular name of the Space Transportation System (STS), a reusable spacecraft of the United States. It was developed by the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) in the 1970s and first used in the 1980s as a reusable launch, orbital, and landing vehicle, which can transport humans and cargo to and from Earth. Despite setbacks over the years, it has proven a practical means of SPACE EXPLORATION. It has been used for the launching, servicing, and repairing of a variety of types of artificial SATELLITE; to retrieve previously deployed spacecraft; for the building and carrying of supplies to a SPACE STATION; and to conduct scientific experiments. For many of these tasks, extravehicular activities, popularly known as space walks, are required.

The space shuttle is launched vertically, two solid rocket boosters propelling the spacecraft for about two minutes to an altitude of about 28 miles before separating and falling into the ocean, where they are retrieved and later refurbished for reuse. The orbiter has three main liquid-propellant engines, the first reusable ROCKET engines, which fire for about eight minutes until reaching the desired altitude for orbit. An external fuel tank, the only part of the shuttle that is not recycled, is jettisoned, breaking up in the upper atmosphere and falling in pieces into the ocean. Other smaller engines are used for maneuvers when in orbit. The spacecraft's hull is protected from the friction and heat of reentry into the atmosphere by some 24,000 silicate fiber tiles. Directed by the crew, the winged orbiter glides to Earth and makes a horizontal landing on a runway.

The space shuttle crew consists of the commander and pilot, trained ASTRONAUTS, as well as up to five more people, some of them nonastronauts, including a mission specialist and payload specialists. The crew compartment is the front of the craft with a cargo bay (60 by 15 feet) behind it. The orbiter's crew compartment has three levels: the flight deck, from where the commander and pilot control the craft; the mid-deck, where the galley, toilet, sleep stations, along with storage and experiment lockers are located; and the utility area, with air and water tanks. In the mid-deck are also a hatch for entrance and egress before and after landing, and an airlock hatch into the cargo bay. The cargo bay doubles as a workstation; its doors give access to space.

The first space shuttle, *Columbia*, was launched on April 12, 1981. The space shuttle program completed numerous successful launches over the course of five years until January 28, 1986, with the *Challenger* disaster. A failure of a rubber sealant ring between two segments of one of the solid rocket boosters, made brittle by cold weather, led to the escape of burning fuel and an explosion 73 seconds after launch. The entire seven-member crew perished, among them Christa McAuliffe, a high school teacher from New Hampshire, who would have been the first teacher in space. The space shuttle program was suspended for design modifications until September 28, 1988, with the flight of the shuttle *Discovery*.

Three other space shuttles have been used in addition to the *Columbia* and *Challenger*: the *Discovery*, since 1983; the *Atlantis*, since 1985; and the *Endeavour*, since 1991. (The *Enterprise*, named after the vehicle in the fictional television series *Star Trek*, a prototype space shuttle, was launched from a 747 airplane in 1977 to test design features.) The vehicles' frames have remained the same, with the technology evolving and the craft being refitted over the years.

Successful missions since the *Challenger* disaster have included the launching of several exploratory spacecraft: *Magellan* in May 1989, a probe to the planet Venus; *Galileo* in October 1989, a probe to Jupiter; *Ulysses* in October 1990, a probe to the Sun; and the *Hubble Space Telescope* in April 1990, the placement in orbit of a telescope for astronomical studies, and a follow-up mission in December 1993, for repair of the telescope. In July 1995, the shuttle *Atlantis* rendezvoused and docked with the Russian space station *Mir*, the first in a series of nine linkups. The shuttle is also central to the building of the *International Space Station*, the first module of which was launched in 1998.

On February 1, 2003, the space shuttle program suffered another disaster when the *Columbia*, the first shuttle ever to fly a mission, broke up over Texas on reentry—because of damage to protective paneling on the left wing when a piece of foam insulation from the external fuel tank came loose and struck it during launch. This was the first accident during landing for NASA in 42 years of spaceflight. All seven crew members died, among them the first Israeli astronaut, Ilan Ramon.

The Union of Soviet Socialist Republics (USSR; Soviet Union) began its own space shuttle program in 1988, designing the Buran spacecraft; on the breakup of the Soviet Union in 1991, Russia inherited the program but halted it two years later. The United States plans to retire the space shuttle in 2012 and is designing a new generation of shuttle vehicles.

space station (space platforms)

The term *space station* refers to a facility in space, where humans live for extended periods of time. They are a type of ar-

tificial SATELLITE, in permanent orbit around Earth, unlike spacecraft, which stay in orbit relatively short periods of time. They relate to SPACE EXPLORATION as service centers for spacecraft and as laboratories for scientific experiments. In the future, they may serve as spaceports for travel to other parts of the solar system. They are self-contained systems, with their own oxygen, water, and food, yet need maintenance and restocking from Earth. They also have been referred to as space platforms.

A Russian inventor and ROCKET designer, Konstantin Eduardovich Tsiolkovsky, is credited with conceptualizing orbiting space stations for the purpose of interplanetary travel, in the early 20th century, long before the first spaceflight. The former Union of Soviet Socialist Republics (USSR; Soviet Union) launched the first space station, *Salyut 1*, in April 1971, 14 years after it launched the first artificial satellite, *Sputnik 1*. The *Soyuz 10* crew, part of the SOYUZ PROGRAM, docked with the space station four days later but could not enter it. The *Soyuz 11* crew, cosmonauts Georgi Dobrovolski, Viktor Patsayev, and Vladislav Volkov, made a successful docking on June 7, 1971, and lived on the station for three weeks. The Salyut series of space stations, a total of nine, were relatively small structures launched fully assembled and designed for up to three people. New docking and space assembling technologies were developed in the course of the program. The first Salyut stations had open-loop life support systems, designed to discard all waste matter into space. But closed-loop life-support systems were developed—the recovery of oxygen from carbon dioxide and the recycling of water—to decrease dependency on supplies carried from Earth.

The United States launched its first space station, *Skylab*, on May 14, 1973, its crew of three ASTRONAUTS—Pete Conrad, Joe Kerwin, and Paul Weitz—following on May 25 after a delayed launch. The NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) provided rockets and spacecraft for *Skylab* missions from the APOLLO PROGRAM. Like the first Salyut stations, *Skylab* was fully assembled on Earth and had open-loop systems. With a telescope mount, it was the first manned solar observatory in space. Two other sets of crews lived on *Skylab* that year. It remained unoccupied until July 1979, when it reentered the atmosphere and disintegrated from the heat of friction, its pieces brought down in the Indian Ocean, with some mistakenly hitting isolated parts of Australia.

The Soviet Union followed its Salyut program with the *Mir* space station, the first permanently manned space station. The first core module was launched on February 19, 1986; six other modules were added through 1996. Soviet spacecraft of the Soyuz program originally ferried crews and supplies to *Mir*, but later the United States helped with the SPACE SHUTTLE. Crews of the *Mir* over the years consisted of people of many different nationalities, more passengers

than all previous space stations combined. After numerous repairs and growing technical problems, *Mir* was directed back to Earth, falling into the Pacific Ocean in March 2001.

The United States began a program to launch its own permanent space station, *Freedom*, in 1984. Ten years later, after the breakup of the Soviet Union, the program was combined with Russia's *Mir 2* project, with the goal of building an *International Space Station (ISS)*. Eleven nations in the EUROPEAN SPACE AGENCY, along with Brazil, Canada, and Japan, are involved in the project. The first component, a Russian-built core module, was launched in 1998. The first crew, two Russians and one American, arrived in 2000. Construction is planned through 2006; *ISS* will eventually support a crew of seven.

Spanish Main

The phrase *Spanish Main* was first generally applied to the “mainland” of Spanish America, especially the territory along the north coast, from the mouth of the ORINOCO RIVER westward to the isthmus of Panama, and comprising most of present-day coastal Venezuela, all of Colombia, and part of Panama. The phrase also came to be used in reference to waters off the mainland, that is, the southern portion of the Caribbean Sea, along with Spanish-held islands. Sometimes it was applied to the entire Caribbean basin.

The earliest use of the phrase is not known. Early mariners used the term *the main* to refer to any mainland. Non-Spanish people active in the Caribbean were most likely to cite the Spanish Main as distinct from territory controlled by other European nations. Starting in the late 16th century, along with the Spanish colonization of the region and its use as a transatlantic shipping center—especially to transport gold, silver, and gemstones plundered from indigenous peoples or forcibly mined by them—came PIRACY, some of it carried out by PRIVATEERS sanctioned by the English government, such as SIR FRANCIS DRAKE (see TREASURE AND EXPLORATION). Pirates were active in the Caribbean into the 19th century, and the phrase *Spanish Main* is most often associated with their activities.

speleology

Speleology is the scientific study of caves and cave systems. A cave is a natural underground cavity large enough for people to enter (sometimes the term *cavern* is used for a large cave). *Cave system* refers to a number of interconnected caves. Speleology includes classifying caves geologically, measuring and mapping them, analyzing their water systems, and reporting on flora and fauna found in them. In its infancy as a discipline in the late 19th century, speleology was regarded as a branch of geography since much of the activity associated with it was finding caves. Now it is perceived as a subdivision

of geology. It also draws on the disciplines of chemistry, hydrology, climatology, and biology. Speologists also employ surveying techniques (see SURVEYING AND EXPLORATION). And since caves have long served as shelters for humans, speleology and archaeology sometimes go hand-in-hand (see ARCHAEOLOGY AND EXPLORATION). One now-common application of speleology is the tracing of underground waters to monitor and prevent pollution.

The term *speleology* is derived from the Greek words for “cave” and the “study of.” In Middle English, *spelunk*, from the Latin *spelunca*, a derivation from Greek, was another name for a cave or grotto. *Speluncar* endured into modern English as an adjective form, meaning “pertaining to caves,” but fell out of usage by the mid-19th century. In 1895, Frenchman Edouard-Alfred Martel founded La Société de Spéléologie, the bulletin of which was called *Spelunca*. The term *spelunker* for someone who explores caves and *spelunking* for the act itself came into usage in the United States in the late 1930s and early 1940s. *Spelunking* remains a common term for the exploration of caves, along with *spelunker*, the term for those people who do the exploring. Yet most nonscientists skilled in spelunking techniques and equipment—such as special shoes, helmets, ladders, cables, and lamps—prefer the terms *caving* and *caver*. The term *cave diving* refers to exploring caves underwater.

Speologists and geologists have classified caves into primary caves and secondary caves. Primary caves were formed at the same time as the surrounding rocks, with the space of the cave remaining empty. Secondary caves were formed sometime after the formation of the surrounding rocks. Most caves are secondary caves, and the most common type of secondary cave is a karst cave, formed in limestone, gypsum, or other soluble rocks by dissolution.

The exploration of caves has grown in popularity in recent decades. The National Speleology Society, a U.S. organization, founded over 60 years ago and located in Huntsville, Alabama, now has more than 10,000 members. The National Caves Association, founded in 1965 and centered in Park City, Kentucky, is a nonprofit organization of publicly and privately owned caves and caverns developed for public visitation. There are many other such organizations in countries around the world. The Union Internationale de Spéléologie (UIS), founded in 1965 with its central office in the Czech Republic, is the international body for speleology and caving.

spelunking See SPELEOLOGY.

Spice Islands (Moluccas, Maluka)

Spice Islands is a former name for the Moluccas, a collection of islands between Celebes and New Guinea in the Malay

Archipelago, situated where the South Pacific Ocean and Indian Ocean meet. They encompass some 32,307 square miles, 90 percent of which is ocean. The Moluccas (or Maluka) are currently a province in the eastern portion of the Republic of Indonesia. The largest island is Halmahera, and the province’s capital is the city of Ambon on the island of Ambon. Other significant islands in the group are Ternate, Ceram, Buru, and Tidore. Because they were formed by volcanic activity, the Moluccas are mountainous. The climate is humid, and the soil fertile. The cloves, nutmeg, mace, and pepper produced by the islanders, and their central role in the SPICE TRADE, gave rise to the name Spice Islands.

For centuries before the arrival of Europeans, the Spice Islands were visited by Chinese from the east and Arab Muslims from the west; traveling by ship, both peoples were attracted by the islands’ agricultural goods (see CHINESE EXPLORATION; MUSLIM EXPLORATION). To protect their profits, the Arab traders who sold these commodities to Europe kept secret their location. The desire of European merchants to circumvent these Arab traders was a major motivating factor in what became the EUROPEAN AGE OF EXPLORATION, beginning in the 15th century.

The probable first European visitor to the Moluccas was Italian LUDOVICO DI VARTHEMA in 1505. The Portuguese, who had already begun trading in India with VASCO DA GAMA’s voyage of 1497–99, were anxious to get to the source of these precious spices. In 1511, Portuguese mariner and trader FRANCISCO SERRANO, after accompanying AFONSO DE ALBUQUERQUE in the conquest of the Malayan port of Malacca on the west coast of the Malay Peninsula, investigated the Spice Islands. After being appointed viceroy of Ternate, he established a Portuguese trading post there in 1513. A Spanish expedition originally headed by Portuguese mariner FERDINAND MAGELLAN reached the Spice Islands across the Pacific from the east in 1521 during the first CIRCUMNAVIGATION OF THE WORLD. Portuguese domination of the Spice Islands was henceforth challenged by the Spanish, who asserted that the islands were located in their half of the world according to Alexander VI’s papal bull of 1493. The dispute was resolved with the Treaty of Saragossa of 1529, in which the Spanish emperor, more interested in developing Spain’s possessions in the Americas, agreed to drop the claim in exchange for a cash payment from Portugal.

For most of the 16th century, Portugal held a tight monopoly on exports from the Spice Islands to Europe. In October 1579, SIR FRANCIS DRAKE made the first English voyage to the region and reached a trade agreement with the sultan of Ternate, beginning an intermittent English presence in the region. In 1595, CORNELIUS HOUTMAN was recruited by a group of Dutch merchants to open trade with the Spice Islands. Although not profitable, the expedition was successful in its defiance of the Portuguese. In April

1602, the newly chartered DUTCH EAST INDIA COMPANY sent its first fleet of ships to the islands. By the mid-1600s, through naval actions and privateering, the Dutch had gained control of the island group. Conflict with England was resolved by an agreement between the two countries to divide up their interests. England expanded its trading activities in India, and the Dutch maintained their presence in the Spice Islands.

The population of the Moluccas is ethnically diverse, including Malay, Papuan, and Javanese peoples. The native population has intermarried with Europeans over the centuries, especially the Portuguese and Dutch. About 60 percent of the people are Muslim; the rest, mostly Christian. Agriculture is still central to the economy; food crops include cassava, taro, yams, and sweet potatoes. The sago palm provides starch as a dietary staple as well as wood for building. Spices are no longer the main export products, but rather coconut, coffee, and wood products.

See also ASIA, EXPLORATION OF.

Spice Route

The SPICE TRADE, that is, the trade of spices and incense from the East to the West has followed many routes over its long history from Asia to the Near East, Africa, and Europe. The main overland route stretched over thousands of miles of forbidding landscape through central Asia and is commonly called the SILK ROAD, because it carried in addition to spices and incense, silks and other luxury items from China and India. The caravans traveling this route often consisted of thousands of camels. The goods might be sold to lands along the eastern and southern MEDITERRANEAN SEA, or distributed by sea by Phoenicians, Greeks, or other mariners to more distant lands (see GREEK EXPLORATION; PHOENICIAN EXPLORATION).

Yet overland travel was more expensive, dangerous, and slower than travel by sea, and so, even before the establishment of the Silk Road, in the second to first century B.C., spices and incense were brought by ship from India, across the Indian Ocean, through the Arabian Sea to the south coast of the Arabian Peninsula. Traders would hug close to the land, sailing through the Indian Ocean, to the coast of present-day Yemen. From there, where several wealthy kingdoms flourished in the centuries B.C., the goods would travel by boat through the RED SEA, which was dangerously infested with pirates, or by caravan to Mediterranean coastal regions, such as Alexandria in North Africa, another center of the spice trade.

The southern area of Arabia, occupied by modern-day Yemen, was called Arabia Felix (Happy Arabia) by the Romans for its great wealth as an important intermediary in the spice trade, as well as the source of frankincense and myrrh, gathered from trees growing just south of the Rub' al-Khali,

the desert region also known as the EMPTY QUARTER. The wealth supported the development of great kingdoms and many wealthy cities. The most noted kingdom was that of the Sabaeans, which flourished from the 10th century B.C. until about 115 B.C.; Marib was the capital city. This area was possibly that referred to as PUNT by the ancient Egyptians, who sent several seafaring expeditions through the Red Sea, including that of HANNU in about 2450 B.C., which returned to Egypt with spices and incense (see EGYPTIAN EXPLORATION). The Red Sea and the Arabian Sea were dangerous routes to take because of the pirates who habitually sallied out from the Arabian and African shores. The Sabaeans controlled the overland trade routes to Palestine and to Egypt, which cross deserts and mountains, passing through the part of Arabia called Arabia Petrea (Stone Arabia) by the Romans.

In about A.D. 45, a Greek merchant by the name of HIPPALUS endeavored to avoid the coasts altogether, sailing down the center of the Red Sea and through the Arabian Sea to India, and his route became commonplace, reducing the length and dangers of the journey East, as well as the dependence on the Arabs. Traders, at great risk to their ships and cargoes, began catching the yearly monsoon winds to sail across the Arabian Sea and back.

The Red Sea/Arabian Sea route remained a standard route for hundreds of years. Ships could travel between the Red Sea and the NILE RIVER by an ancient Egyptian canal, and from the Nile to the Mediterranean Sea. The growth of the Roman Empire resulted in the eradication of PIRACY in the Mediterranean Sea and Red Sea (see ROMAN EXPLORATION). Even after the breakup of the Roman Empire in the fifth century, Arab traders continued to do a brisk business, and the wealth fueled the expansion of the Islamic empire after the founding of Islam in the seventh century.

The main artery for the overland spice trade was Constantinople (present-day Istanbul, Turkey), the capital of the Eastern Roman Empire (or Byzantine Empire). After the CRUSADES of the late 11th to the late 13th centuries, the merchants in the Italian port city of Venice became responsible for most of the spices entering Europe, bringing them through the Mediterranean from ports on the coast of the Near East, a region known as the LEVANT.

With the Venetians holding a monopoly on Mediterranean trade with the Middle East, and with the rise to power of the Turks in Asia Minor, trade through Constantinople slowed to a trickle. European nations began sending out ambitious oceangoing expeditions to locate new trade routes with the East. The 1497–99 Portuguese voyage of VASCO DA GAMA southward in the Atlantic along the west coast of Africa, around the CAPE OF GOOD HOPE, then northward in the Indian Ocean along Africa's east coast, and across the Indian Ocean to India, created a viable route. A Spanish expedition headed by Portuguese mariner

FERDINAND MAGELLAN in 1619–22, which crossed the Atlantic, rounded South America, and crossed the Pacific, eventually completing the first CIRCUMNAVIGATION OF THE WORLD, proved that the EAST INDIES could be reached from the west. The English and the Dutch continued searching for water routes to the Orient, both a NORTHWEST PASSAGE through the Americas and a NORTHEAST PASSAGE to the north of Europe and Asia. These passages were not accomplished for centuries, however, because of ice conditions in the Arctic Ocean.

In the 19th century, even after the importance of the spice trade had dwindled, the establishment of European colonies in the East created a demand for other commodities. A quick route was therefore needed, which led to the digging of the Suez Canal, completed in 1869.

See also COMMERCE AND EXPLORATION.

spice trade

The common seasonings used to flavor foods today, including pepper, nutmeg, cinnamon, and cloves, were, for much of history, precious luxuries. As late as the 16th century in Europe, one small ship full of spices could make a fortune for the investors on an expedition of several ships and make its crew rich as well. Spices played an important role in flavoring foods and preserving their freshness, and incense was used in religious ceremonies by all the early peoples of the Near East and North Africa. Spices and herbs also served as the primary ingredients in many medicines. These spices, for the most part, along with fragrant resins and gums, such as frankincense, myrrh, and other incense, came from the East, over land and by sea. The importance of the spice trade endured from ancient times throughout the Middle Ages and RENAISSANCE and led to the establishment of various land and sea routes between Europe, Africa, and Asia and spurred on the search for oceanic routes as well (see SPICE ROUTE).

The Ancient Trade

The quest for spices and incense inspired what some consider the first voyage of exploration. An Egyptian, HANNU, set out to the RED SEA coast with 3,000 men at the orders of the Egyptian pharaoh Sahure in around 2450 B.C. and built ships which he sailed to the land the Egyptians called PUNT. It is not known what Hannu brought back, but later, in about 1492 B.C., Egyptian Queen HATSHEPSUT sent another expedition to Punt. It returned with incense, including frankincense, myrrh, and, of special importance, myrrh seedlings, which were planted in Egypt (see EGYPTIAN EXPLORATION). The conquests of ALEXANDER THE GREAT in the fourth century B.C. brought more contact between Mediterranean peoples and those in the East. At this time, Arab traders still had a monopoly on the spices traveling by

sea, and told fabulous stories of how they were obtained, in order to preserve the secret of their origin and to discourage any attempt to break their lucrative monopoly.

By about the time the Romans became interested in gaining hold of the spice trade, demand for spices was so great that Eastern traders were taking advantage of powerful monsoon winds to sail from India to Arabia, at great risk to life and cargo. The returns were great enough, though, to justify any risk. The spice trade passed through Alexandria, making it one of the most important centers for commerce in the ancient world. In about 25 B.C., after the Romans had annexed Egypt, under the reign of Augustus, officer GAIUS AELIUS GALLUS set out on an expedition to Arabia in order to conquer the Sabaeans, who occupied a kingdom on the southern end of the Arabian Peninsula, from where much of the trade passing through Alexandria originated. The Romans called this southern tip of the Arabian Peninsula, in modern-day Yemen, Arabia Felix, or Happy Arabia, because of the wealth it derived from trade in spices and resins. Gallus failed to subjugate the Sabaeans and to conquer their principal city of Marib, and returned to Egypt with only new geographic knowledge for the Romans (see ROMAN EXPLORATION).

The Spice Trade in the Middle Ages

The Arabs maintained control of much of the spice trade for centuries, and their control solidified with the rise of Islam. The Prophet Muhammad, who launched the religion, was married to a woman made wealthy by the spice trade. The Muslims carried Islam throughout Arabia, uniting the entire peninsula by the time of his death in A.D. 632 (see MUSLIM EXPLORATION).

By the eighth century, the Islamic empire had spread from North Africa in the West to Persia in the East. Trade continued between the East and West, if somewhat abrogated, until the conquest of the Arabs by Turks from the Anatolian Peninsula in the mid-11th century. The Turks, converting to Islam as they conquered, were more hardened against the Christians in the West than their Arab predecessors. The Turks threatened Constantinople (present-day Istanbul, Turkey), the seat of the Eastern Roman Empire (Byzantine Empire), and cut off Christian pilgrimages to the Holy Land. This sparked the CRUSADES, the military actions by European Christians against the Muslims of the Near East from the late 11th century to the late 13th century. Crusaders returning to Europe from the East had a greater desire for Eastern goods, among them spices.

Venice, a city in northern Italy, was the primary port for trade between East and West at this time. It was from Venice that Venetian merchant MARCO POLO set out for the East in 1271 with his father, NICCOLÒ POLO, and uncle MAFFEO POLO, and wound up traveling throughout China and the vast empire of the Mongols. Returning by sea, after 24

years, Marco Polo's account brought back detailed reports of the source of the spices craved by Europeans.

The Enduring Spice Trade

Just as early mariners attempted new routes to profit from the spice trade, so did mariners during the RENAISSANCE, helping prompt what has become known as the EUROPEAN AGE OF EXPLORATION. The Portuguese established a route around Africa. The Spanish ended up reaching the Americas and navigating the Pacific Ocean.

HENRY THE NAVIGATOR, prince of Portugal, developed a plan to reach India and the SPICE ISLANDS (the Moluccas) by rounding the tip of Africa. BARTOLOMEU DIAS rounded the CAPE OF GOOD HOPE in 1488, and VASCO DA GAMA, in 1497–99, crossed the Indian Ocean to India and returned to Portugal with a load of pepper. Meanwhile, Italian mariner CHRISTOPHER COLUMBUS was proposing a plan to sail westward across the uncharted waters of the Atlantic Ocean to reach the Spice Islands in the east. In 1492, sailing for Spain, he reached the WEST INDIES, so named because he thought them the outlying islands of the EAST INDIES, and began to search for gold and spices. In 1497, another Italian, JOHN CABOT, who had experience sailing for Venice in the spice trade, sailed under English sponsorship in 1497, reaching North America.

Portuguese mariner FERDINAND MAGELLAN, after a rift with the king of Portugal, moved to Spain and proposed a southwest passage through or around South America, in order to reach the Spice Islands. Five ships were provided. Magellan managed to sail from the Atlantic through South America's Strait of Magellan (see MAGELLAN, STRAIT OF) to the Pacific Ocean, then cross it to the Philippines, where he died in 1521, wounded by native arrows. Two of his ships reached the Spice Islands, and one ship, the *Victoria*, under JUAN SEBASTIÁN DEL CANO, managed to return to Spain in 1522, completing the first CIRCUMNAVIGATION OF THE WORLD. The load of cloves more than paid for the entire expedition and made the surviving sailors rich.

With ocean routes established, in the 17th century, European merchants founded companies, typically with royal charters and stockholders, to develop the Eastern trade, among them the BRITISH EAST INDIA COMPANY, the DUTCH EAST INDIA COMPANY, and the FRENCH EAST INDIA COMPANY. As the reach of European mariners expanded and as colonial empires grew, spices became a more affordable commodity. Spices were farmed on plantations and transplanted around the globe, and, in the 17th and 18th centuries, other commodities grew in importance, and other motives for exploration superseded the demand for spices. Yet many of the spices at the center of the centuries-long spice trade are still widely used throughout the world.

See also COMMERCE AND EXPLORATION.

sponsors of exploration

Not all individuals important to the history of exploration traveled to uncharted lands. Some among them changed the course of history by sponsoring expeditions. Some were sponsors and explorers both, who spent part of the time in the field. Sponsorship was provided for a variety of purposes; included among those backing expeditions were government leaders, merchants, scholars, mapmakers, publishers, and wives.

Henry the Navigator

Perhaps the most famous visionary and sponsor who made a huge impact on how the world was perceived was Portuguese nobleman Prince Henry. Although he never traveled beyond the region of the MEDITERRANEAN SEA, he became known to history—because of an 1868 biography by British writer Richard Henry Major—as HENRY THE NAVIGATOR. He also has been referred to as “the explorer who stayed home.” In 1416, Henry decided to live at Sagres near Cape St. Vincent, the southwesternmost point in Portugal, and there founded a naval depot and, soon afterward, an observatory and a school of navigation, where he brought together astronomers, mapmakers, and mariners. Over the next years, he sponsored numerous expeditions to the AZORES and along the coast of West Africa. Just after his death in 1460, his mariners reached as far as Cape Palmas, where the African coast turns eastward. Henry's contribution to exploration as a sponsor is often cited as the start of the EUROPEAN AGE OF EXPLORATION.

Kings, Queens, Presidents, and Other Officials

Many of those sponsors cited with regard to continuing the European Age of Exploration are kings and queens. In Portugal, after Prince Henry's death, various Portuguese kings sent out expeditions. King John II, who ruled from 1481–95, sponsored a new round of expeditions southward along the coast of Africa, including those of DIOGO CÃO in 1482–84, which reached the CONGO RIVER (Zaire River), and BARTOLOMEU DIAS in 1487–88, which sailed around the tip of the continent, locating the CAPE OF GOOD HOPE. Manuel I, who ruled Portugal from 1495 to 1521, dispatched VASCO DA GAMA on a voyage in 1497, in which he rounded Africa, reached India, then returned to Portugal in 1499.

The joint rulers of Aragon and Castile in Spain in 1479–1504—Ferdinand II and Isabella I—are famous for having sponsored CHRISTOPHER COLUMBUS's voyage across the Atlantic Ocean in 1492, as well as his subsequent expeditions in the Americas. Their grandson, Charles I, king of Spain from 1516 to 1556 (and as Charles V, Holy Roman Emperor from 1519 to 1556) sponsored the first CIRCUMNAVIGATION OF THE WORLD under FERDINAND MAGELLAN in 1519–22, as well as many expeditions in the

Americas for purposes of colonization, such as that of FRANCISCO PIZARRO in Peru in 1531–33.

Many of the Spanish CONQUISTADORES in turn became sponsors. For example, Pizarro sent out his half brother GONZALO PIZARRO and FRANCISCO DE ORELLANO to the AMAZON RIVER in 1541–42. Another Spaniard, DIEGO VELÁSQUEZ, who became governor of Cuba in 1514, sent out numerous expeditions in the Caribbean region, including that of HERNÁN CORTÉS, who explored Mexico in 1519–21 (although Cortés later tried to bypass Velásquez by seeking the endorsement of King Charles directly). Cortés later sent out FRANCISCO DE ULLOA, who explored northward to the Gulf of California and Baja California in 1539–40, as well as other expeditions. Another Spanish official known as a sponsor of explorations is ANTONIO DE MENDOZA, viceroy of New Spain in 1535–49, who sent out expeditions to the American Southwest, such as that of FRANCISCO VÁSQUEZ DE CORONADO in 1540–41.

An English courtier, soldier, and man of letters—SIR WALTER RALEIGH—although he headed two expeditions to the ORINOCO RIVER in northern South America, in 1595 and 1617, is best known regarding the history of exploration as a sponsor for failed colonies in 1584–87 along the coast of what is now northeastern North Carolina. The colonists of the second attempt vanished, leading to the mystery of the LOST COLONY.

Elizabeth I, who ruled England and Ireland from 1558 to 1603, was known as a sponsor of explorations in her own right. In 1577–80, for example, with her backing and that of English merchants, SIR FRANCIS DRAKE completed the first English circumnavigation of the world.

Nearly a century later, from Fort Henry, just to the north in what is now southeastern Virginia, colonial military leader ABRAHAM WOOD sent out exploratory expeditions westward. The men whom he sponsored—THOMAS BATTS, ROBERT FALLAM, GABRIEL ARTHUR, and JAMES NEEDHAM—were the first known Englishmen to explore the APPALACHIAN MOUNTAINS and beyond.

The third president of the United States, Thomas Jefferson, who served from 1801 to 1809, had long contemplated an overland expedition across the North American continent and recommended his private secretary MERIWETHER LEWIS to the Congress as leader of the Corps of Discovery. Lewis enlisted former soldier WILLIAM CLARK as his coleader. In 1804–06, the Lewis and Clark Expedition traveled from St. Louis in present-day Missouri to the Pacific Ocean at the mouth of the COLUMBIA RIVER and back.

Trading Companies and Geographical Societies

Many expeditions received backing in the name of commerce. Various trading companies—the HANSEATIC LEAGUE, LEVANT COMPANY, MUSCOVY COMPANY, CATHAY COMPANY,

COMPANY OF MERCHANTS OF LONDON DISCOVERERS OF THE NORTHWEST PASSAGE, VIRGINIA COMPANY, BRITISH EAST INDIA COMPANY, FRENCH EAST INDIA COMPANY, DUTCH EAST INDIA COMPANY, and DUTCH WEST INDIA COMPANY—all played a part in world exploration (see COMMERCE AND EXPLORATION).

Various fur-trading companies—the HUDSON'S BAY COMPANY, NORTH WEST COMPANY, AMERICAN FUR COMPANY, ST. LOUIS MISSOURI FUR COMPANY, ROCKY MOUNTAIN FUR COMPANY, and RUSSIAN-AMERICAN FUR COMPANY—had much to do with the opening of North America to non-Indian settlement. Some of the owners or directors of these firms, such as JOHN JACOB ASTOR of the American Fur Company, were businessmen who sent representatives into the wilderness. Others, such as ALEKSANDR ANDREEVICH BARANOV of the Russian-American Company and WILLIAM HENRY ASHLEY of the Rocky Mountain Fur Company, traveled to remote areas themselves. Ashley was also known as the trader who employed many of the MOUNTAIN MEN early in their careers (see FUR TRADE).

Other organizations sponsored expeditions for the purpose of knowledge. Among these were the ROYAL SOCIETY and ROYAL GEOGRAPHICAL SOCIETY of England and the AMERICAN GEOGRAPHICAL SOCIETY of the United States, all three still in existence today, although now acting as disseminators of information and not as sponsors of expeditions. Another company, the AFRICAN ASSOCIATION, important in sponsoring early British expeditions to Africa, merged with the Royal Geographical Society. SIR JOSEPH BANKS, founder of the African Association, was a naturalist. SIR JOHN BARROW, founder of the Royal Geographical Society, had studied mathematics and geography before becoming second secretary of the Admiralty.

A Wife and a Newspaper Publisher

One sponsor of a number of expeditions—Englishwoman JANE FRANKLIN—did so out of loss. Her husband, SIR JOHN FRANKLIN, had departed for the Canadian Arctic in 1845. By 1848, with no word of him, she began raising support for privately funded expeditions. American shipping magnate Henry Grinnell became involved as a sponsor as well, backing a number of expeditions: under EDWIN JESSE DE HAVEN in 1850–51; ELISHA KENT KANE in 1853–55; and CHARLES FRANCIS HALL in 1860–62 and in 1864–69. An expedition Lady Franklin financed herself under SIR FRANCIS LEOPOLD MCCLINTOCK in 1857–59 helped determine that her husband's ship had become icebound and that he and the entire crew had perished (see SEARCHES FOR MISSING EXPLORERS).

James Gordon Bennett, Jr., publisher of the American newspaper *New York Herald*, decided to back an expedition for the sake of a story when, in 1871, he sent out journalist

SIR HENRY MORTON STANLEY to search for missing Scottish missionary DAVID LIVINGSTONE. He sponsored subsequent explorations as well, such as that to the Arctic under GEORGE WASHINGTON DE LONG in 1879–81.



It should be kept in mind that, although some voyages of exploration were conceived of and paid for by the travelers themselves, most of those affecting world history had sponsors. Gaining the sponsorship and raising the funds to mount expeditions were sagas in themselves. Italian Christopher Columbus, for example, had conceived of his expedition westward across the Atlantic years before he made the journey and had presented his plan to King John II of Portugal—and had sent his brother Bartholomew to do so to King Charles VII of France and King Henry VII of England—and had invested a great deal of time and resources before gaining the eventual support of Ferdinand and Isabella of Spain.

Sri Lanka See CEYLON.

Strait of Anian See ANIAN, STRAIT OF.

Strait of Gibraltar See GIBRALTAR, STRAIT OF.

Strait of Magellan See MAGELLAN, STRAIT OF.

submarine

A submarine is a water craft designed to spend substantial periods of time underwater. Unlike a SUBMERSIBLE, which is usually intended to make deep dives and collect a variety of scientific information, a submarine is more like a surface boat in its mobility. The development and use of the submarine has been closely tied to military objectives, although it did play a role in exploring the Arctic.

The earliest record of a submarine-type vessel comes from the writings of Olaf Magnus, a Swedish historian. He mentioned the capture of two underwater boats that the residents of GREENLAND had made in the early 16th century to attack European trading ships because of unfair practices. The underwater craft were enclosed with sealskin and had oars on either side for locomotion. Dutchman Cornelius van Drebbel built a similar vessel in 1620. He lived in England, where he built a submarine covered with leather, with six oars on each side, capable of diving to about 12 feet. His second submarine became well known as it traveled the Thames. King James I took a ride in it.

During the American Revolution of 1775–83, a submarine was invented by David Bushnell to sink British ships in New York Harbor. The *Turtle* was a single-person, egg-shaped craft moved by a propeller turned by the operator. On its first mission in 1776, Sergeant Ezra Lee could not affix an explosive device to the British flagship, the *Eagle*, because of a layer of copper used to protect the vessel from shipworms. Although it was spotted, the *Turtle* managed to escape British capture. It was then taken ashore and dismantled, remaining a secret until after the war. The first successful sinking of a ship by submarine occurred during the U.S. Civil War when the Confederate craft *Hunley*, using an explosive charge attached to a long pole, managed to sink the *Housatonic* on February 17, 1864. The explosion that sunk the *Housatonic* also took the *Hunley* and all her crew.

There were many attempts at building submarines in the 19th century. American Robert Fulton, inventor of the steamship, designed a vessel and won a contract with the French government to produce it. His 21-foot-long craft, the *Nautilus*, was built at Rouen, France. Fulton used water for ballast and compressed air for surfacing. The craft was operated successfully in 1800 and 1801, remaining submerged for six hours while fresh air was supplied by a tube from above, but it did not excite the French enough to continue the project. Englishman Reverend George William Garrett built the first steam-powered submarine in 1878. The ship given credit for being the first modern submarine was the *Gymnote*, built in France in 1886. It was cigar shaped, 60 feet long and 6 feet wide, and electrically powered. It could travel at five knots underwater to a distance of 100 miles. This vessel spurred England, Germany, and the United States to increase their efforts at submarine development.

The U.S. Navy contracted John Philip Holland in 1895 to build a state-of-the-art submarine. The first model he and his partner, Simon Lake, made did not fulfill the navy's expectations. Holland then produced a craft independently, which proved more useful. It was 54 feet long, had a crew of six, and used a dual-propulsion system—a gasoline engine for surface cruising and a battery-powered electric motor for underwater travel. In 1900, the U.S. Navy purchased it from Holland, naming it the *Holland*.

By World War I (1914–18), the United States, the United Kingdom, Germany, and Russia had all developed diesel-powered submarines, which operated on electrical batteries while underwater and could range across entire oceans. For a time, German U-boats (*Uterseeboot*) had the advantage until the Allied powers developed depth charges to counter them. Diesel-electric submarines, with improved torpedo designs, continued to play a significant role in naval battles of World War II (1939–45).

The idea of exploring the sea under the NORTH POLE by submarine is thought to have been first conceived by

French writer Jules Verne in his novel *20,000 Leagues Under the Sea*, published in 1870. This prospect fascinated SIR GEORGE HUBERT WILKINS, an Australian explorer who had been to the Arctic with VILHJALMUR STEFANSSON, and in the Antarctic with SIR ERNEST HENRY SHACKLETON. In 1930, Wilkins began modifications on the U.S. Navy submarine 0-12 with Simon Lake and Commander Danenhower. The retrofitting included vertical drills for making holes in the ice. The rechristened *Nautilus* (the name taken from Verne's novel) sailed in June 1931. After accidents and mechanical problems, she arrived at the PACK ICE near Spitsbergen (present-day Svalbard), where the decision was made to proceed despite the mysterious disappearance of part of the diving apparatus. Wilkins and the *Nautilus* did not succeed in reaching the North Pole, for his craft was not powerful enough to penetrate the ice along its journey, but he did set a new record for farthest north, at 82 degrees.

Reaching the North Pole by submarine and breaking through the ice was more difficult and dangerous than had been imagined. The underwater surface of the pack ice varied greatly in thickness and terrain. Several technological advances came together to make it possible. One was the

GYROCOMPASS, which minimized the effects of the submarine's steel hull on directional readings. Another was sonar (*sound navigation ranging*), which could detect obstacles without visual information. A third advance was the invention of the nuclear submarine, championed by Admiral Hyman G. Rickover. The nuclear submarine could remain submerged for much longer periods than conventional craft, since nuclear reactors could move the large vessels quietly and efficiently and maintain the crew in relative comfort. In August 1958, another submarine named the *Nautilus*, the first nuclear submarine (built by the Electric Boat Company, which had been founded by John Philip Holland), succeeded in making the first undersea transit of the North Pole, cruising under the polar ice from Point Barrow, Alaska, to a point between Spitsbergen, Norway, and Greenland. On March 17, 1959, at the North Pole, another U.S. craft, the *Skate*, succeeded in breaking through a fairly thin layer of ice to the surface. There, the crew scattered the ashes of Hubert Wilkins, who had died the previous December.

Nuclear submarines have been used for other scientific missions. In the 1990s, for example, the U.S. Navy and



The *Nautilus*, the U.S. Navy's first atomic-powered submarine, is shown here on its initial sea trials in 1955. (Library of Congress, Prints and Photographs Division [LC-USZ62-103120])

civilian scientists conducted SCICEX (Scientific Ice Expeditions) under the polar ice, during which the Arctic Ocean floor was mapped, ice was measured, and water samples were analyzed.

See also OCEANOGRAPHY AND EXPLORATION; SHIP-BUILDING AND EXPLORATION.

submersible

A submersible, or research submersible, is a specialized vehicle or station used to explore the ocean bottom. Many are designed for specific projects, and so they are often unique in their features and capabilities. Many are also designed to withstand extreme water pressure, which exists at great depths. A submersible differs from a SUBMARINE in having greater diving range but less mobility.

The development of submersibles relied on the construction of an apparatus that could resist water pressure while a person or persons made observations in an undersea environment. Americans CHARLES WILLIAM BEEBE, a biologist, and Otis Barton, an engineer, developed the BATHYSPHERE in 1926. They established various records for depth on several occasions, including a dive in 1934, when they came to the end of their cable at 3,028 feet. The BATHYSCAPH *Trieste II*, designed by Swiss physicist AUGUSTE PICCARD, was another important invention in the evolution of the submersible. In January 1960, it reached the greatest depth in the ocean at 35,800 feet in the MARIANAS TRENCH.

With the success of the *Trieste II*, the ultimate challenge of the ocean had been met, but it was not necessary for all craft to explore the greatest depths. Auguste Piccard and his son, JACQUES ERNEST-JEAN PICCARD, also designed a mesoscaphé for diving to 6,000 feet. The mesoscaphé used propellers like a helicopter to maintain its depth. In 1959, JACQUES-YVES COUSTEAU designed and built a two-man diving saucer. His vehicle was limited to a depth of 1,000 feet but was well suited to exploring the continental shelf due to its excellent maneuverability.

The *Aluminaut* was one of the largest mobile submersibles ever produced. Designed to operate to 15,000 feet, the 51-foot vehicle incorporated durable construction with a buoyancy system similar to that of a submarine. It was built by the General Dynamics Corporation for the Reynolds Aluminum Company and carried a crew of six. Perhaps the most well-known submersible is the R.V. *Alvin*. Based at the Woods Hole Oceanographic Institute, *Alvin* has proven to be a flexible and effective research tool with a long life. In 1966, both the *Aluminaut* and *Alvin* participated in the successful recovery of a hydrogen bomb, which the U.S. military had lost off the coast of Spain. In 1974, *Alvin*, along with two French submersibles, the *Archimède* and the *Cyana*, conducted Project FAMOUS (French-American

Mid-Ocean Undersea Study). This project explored the Mid-Atlantic Ridge, diving as deep as 9,000 feet. It was the most extensive study of a region of the ocean floor to date, finding evidence of recent volcanic activity and support for theories of seafloor spreading.

Along with moving underwater craft, submersibles may be stationary structures from which saturation diving may occur. These are also known as research habitats or habitat projects. Not all of them are designed for great depths either; in fact, most function at less than 60 feet. The pioneering work in this field has been carried out by the U.S. Department of the Interior with the Tektite project. Tektite I was conducted in 1969 off St. John in the Virgin Islands and experimented with an artificial atmosphere and its physiological effects on divers over the course of several weeks. Later, the Sealab missions were also in this category, with Sealab III operating at more than 500 feet.

The 1960s were the heyday for submersibles, with many projects developed. In the 1970s, many of the tools that had been developed for scientific purposes were bought by commercial interests and the military. Today, submersibles are mainly used for oil exploration, defense, and underwater archaeology, including the study and recovery of sunken ships. The cost of operating a submersible is high since most vehicles require that ballast be replaced after each dive and that a support ship and crew accompany them. The trend has been toward smaller, unmanned probes operated by remote control—remotely operated vehicles (ROVs).

See also ARCHAEOLOGY AND EXPLORATION; OCEANOGRAPHY AND EXPLORATION.

surveying and exploration

Surveying is the accurate measurement of Earth's surface or just beneath it. A branch of applied mathematics, it determines position, dimension, and contour of land areas through linear or angular measurements based on principles of geometry and trigonometry. The results of a survey are typically represented on a chart, map, GLOBE, or plans (see MAPS AND CHARTS). Many explorers were trained in surveying methods, and many exploratory expeditions had the primary or secondary purpose of surveying.

Techniques of Surveying

There are two basic types of surveying: land and hydrographic. Land surveying is further subdivided into plane surveying and geodetic surveying. In plane surveying, a small portion of Earth's surface, in which Earth's curvature is negligible, is treated as a horizontal plane. Plane surveys are usually calculated on a rectangular grid, aligned north-south and east-west. Two methods of measurement are utilized, depending on the type of terrain to be surveyed: In a traverse survey, the directions (bearings) and distances of successive

lines are calculated; in triangulation, an area is divided into hypothetical triangles from a known baseline, that is, the position of a third point is determined by the angle it makes with each end of the baseline. Geodetic surveying, or geodesy, is used for larger areas where the curved shape of Earth, the geoid, must be taken into consideration. Two points, or stations, many miles apart are selected, and the LATITUDE AND LONGITUDE of each is determined astronomically, creating a baseline from where triangulation can be applied. Hydrographic surveying deals with bodies of water—seas, rivers, harbors, and lakes—and coastlines. Soundings from control points are carried out by hand, sonar soundings, or radar. The findings—bottom contours, channels, shoals, and buoys—are recorded on charts for purposes of navigation.

Other subgroups of surveying are classified according to purpose or methods. As for purpose, topographic surveying determines the contour of the land—or relief—through both horizontal and vertical measurements (three-dimensional traversing). Cartographic surveying is used for the specific purpose of making maps. Engineering surveying, construction surveying, route surveying, and mine surveying are other applied types of surveying. Terms such as *transit surveying*, *plane-table surveying*, and *photogrammetric surveying* (using photography) refer to methods of surveying.

Surveying equipment ranges from simple measuring tools to electronic devices. Instruments used for direct linear measurements include the COMPASS, Gunter's chain (or surveyor's chain), the tape, the rod, the plumb bob, the level, and the telescope. The compass enables a surveyor to determine directions. A chain is the standard unit of length or measuring band used in surveying, equivalent to 66 feet. Gunter's chain, named after its inventor, Edmund Gunter, a 16th–17th-century English mathematician, is divided into 100 links, as is the alternative engineer's chain. The calibrated tape has largely replaced the chain. The rod, with marked gradations, allows for a sighting from a specially designed telescope. The plumb bob—a weight on a line—enables the determination of a vertical line. The level enables the determination of a horizontal line; early levels used a bubble of water centered in a glass tube. The plane table is an early measuring device, consisting of a drawing board mounted on a tripod, with a ruler for pointing at objects, allowing for the plotting of lines directly from observations. The first telescope designed specifically for surveying was known as a theodolite and consisted of a telescope that could swing vertically. A variation, the transit theodolite—also known as the transit compass or simply the transit—can be transited (rotated) about both horizontal and vertical axes. Transits are tripod-mounted and have leveling devices, such as the spirit-level bubble, and magnetic compasses on them. Various electronic instruments are now also utilized to determine distances in surveying, such as the geodimeter,

which uses light waves, and the tellurometer, which uses microwaves. Photography is also used in surveying, especially AERIAL PHOTOGRAPHY.

History of Surveying

Surveying dates from ancient times and has played a part in marking boundaries in many societies. It was highly developed among the ancient Egyptians (see EGYPTIAN EXPLORATION). In the fourth century B.C., bematists, or surveyors, traveled with ALEXANDER THE GREAT's army into Asia, measuring their progress. During their occupation of Egypt starting in 30 B.C., the Romans acquired Egyptian surveying instruments, knowledge of which passed to other peoples (see ROMAN EXPLORATION). Many explorers were trained surveyors, and many surveyors went on to other professions as well. The first and the third presidents of the United States, George Washington and Thomas Jefferson, for example, both worked as surveyors as young men.

Many maritime expeditions included men trained as surveyors who charted coastlines. Some surveying expeditions were sent out as follow-ups to other expeditions: In his expedition of 1579–80, PEDRO SARMIENTO DE GAMBOA, a Spanish mariner also trained as a scientist, surveyed the Strait of Magellan (see MAGELLAN, STRAIT OF), which had been reached by a Spanish expedition earlier that century under FERDINAND MAGELLAN. Surveying is central to the story of other maritime expeditions. English mariner JOHN KNIGHT, during a 1601 expedition in search of the NORTHWEST PASSAGE for the BRITISH EAST INDIA COMPANY, disappeared after going ashore with a surveying party on the Atlantic coast of Labrador. The first official U.S. government CIRCUMNAVIGATION OF THE WORLD in 1838–42 under CHARLES WILKES and GEORGE FOSTER EMMONS was known as the United States South Sea Surveying and Exploring Expedition.

As for the exploration of land areas, many official surveys were carried out in the 19th century. Many of the most famous explorers of Australia's interior were surveyors. Both JOHN JOSEPH WILLIAM MOLESWORTH OXLEY and SIR THOMAS LIVINGSTONE MITCHELL served as surveyor general of New South Wales. Brothers SIR AUGUSTUS CHARLES GREGORY and FRANCIS THOMAS GREGORY were surveyors, as were JOHN MCDOUALL STUART and JOHN FORREST. In India, first the British East India Company, then the British government, sponsored the Great Trigonometrical Survey, headed for a time by SIR GEORGE EVEREST. After India had been surveyed and mapped, the PUNDITS, locally born emissaries, surveyed parts of Tibet and other lands to the north.

In the United States, a number of official expeditions were sent out starting in the 1830s. JOHN CHARLES FRÉMONT and JOSEPH NICOLAS NICOLLET headed such early expeditions. Subsequent surveys, from the late 1840s to the



This photograph by William Henry Jackson shows expedition members of the U.S. Geological and Geographical Survey of the Territories in the 1870s. Ferdinand V. Hayden sits at the far end of the table. (*National Archives, Photographs [NWDNS-57-HS-282]*)

late 1870s, especially to establish wagon routes and railroads, were carried out by the U.S. Army Corps of Topographical Engineers and other branches of the military under a number of officers, including RANDOLPH BARNES MARCY, JAMES HERVEY SIMPSON, HOWARD STANSBURY, LORENZO SITGREAVES, JOHN WILLIAM GUNNISON, AMIEL WEEKS WHIPPLE, EDWARD GRIFFIN BECKWITH, JOHN GRUBB PARKE, JOHN B. POPE, HENRY LARCOM ABBOTT, JOSEPH CHRISTMAS IVES, EDWARD FITZGERALD BEALE, JOHN N. MACOMB, WILLIAM FRANKLIN RAYNOLDS, GEORGE MONTAGUE WHEELER, and DAVID SLOAN STANLEY. (Mojave Indian chief IRATEBA served as a guide for Sitgreaves, Whipple, and Ives.) The U.S. government also sponsored geological surveying

under FERDINAND VANDEVEER HAYDEN, CLARENCE KING, and JOHN WESLEY POWELL.

Some of the later African explorations that gained new geographic knowledge were sent out as surveys, such as in the SAHARA DESERT by Frenchmen PAUL-XAVIER FLATTERS in 1880–81 and FERNAND FOUREAU in 1900–01.

Also in the 20th century, much of the Arctic and Antarctic came to be surveyed, especially through the use of aerial photography. RICHARD EVELYN BYRD, LINCOLN ELLSWORTH, and SIR GEORGE HUBERT WILKINS were aviators who conducted aerial surveys of these regions.

See also GEOGRAPHY AND CARTOGRAPHY; NAVIGATION AND EXPLORATION.



Tasmania

Tasmania lies 150 miles off the southeast coast of Australia. Bass Strait separates the two landmasses. To the west and south is the Indian Ocean; to the east is the Tasman Sea, an arm of the Pacific Ocean. An island of 26,383 square miles, Tasmania is associated with a number of smaller islands, most important is the Furneaux Group, situated to the northeast. The terrain of Tasmania is mountainous, its highlands a geological continuation of Australia's GREAT DIVIDING RANGE. Mount Ossa, rising 5,305 feet from a central plateau, is Tasmania's highest peak. Coastal plains are found in the northwest and northeast. Southern and western regions are especially exposed to ocean winds and heavy rain. The Tasmanian devil and the Tasmanian wolf (also called Tasmanian tiger), both marsupials (pouched mammals), are found on the island.

Dutchman ABEL TASMAN made the European discovery of Tasmania. While searching for the GREAT SOUTHERN CONTINENT (Terra Australis), under the sponsorship of the DUTCH EAST INDIA COMPANY, he sighted land on November 24, 1642. Difficult seas prevented him from landing, but he managed to send the ship's carpenter ashore to perform the rites of possession. Tasman named the territory Van Diemen's Land after the governor-general of the EAST INDIES. (It was renamed Tasmania in 1853.)

The island was not visited again by Europeans until 1773, when Englishman TOBIAS FURNEAUX explored part of its coastline as captain of the *Adventure* on JAMES COOK'S

second British expedition to the Pacific in 1772–74. Separated from Cook aboard the *Resolution*, Furneaux made the European discovery of Adventure Bay on the south coast, one of the finest anchorages in the world. Furneaux incorrectly concluded that Tasmania was part of mainland Australia. In 1798, MATTHEW FLINDERS and GEORGE BASS, also sailing for England, circumnavigated the island. Flinders named the waterway between the island and Australia Bass Strait. In 1791–94, a French expedition under ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux surveyed the south coast. PHILIP PARKER KING conducted surveys of coastal Australia and Tasmania in his British expedition of 1817–22.

Great Britain, which had claimed the island in 1788, sent an 18-year-old lieutenant by the name of John Bowen there to establish a penal colony in 1803. Tasmania became known as the "jail of the Empire." The European population of the island grew, and, by 1825, the city of Hobart at the mouth of the Derwent River had become as large as Sydney, Australia. The island also became a way station for the colonization of New South Wales, the southeastern region of Australia. The Van Diemen's Land Company sponsored the exploration of the interior of Tasmania. Among those working for it was Danish mariner JORGEN JORGENSON in the 1820s–30s. In 1840–42, Polish geologist SIR PAUL EDMUND DE STRZELECKI engaged in explorations of the interior, some of them sponsored by SIR JOHN FRANKLIN, then governor of the colony. Another scientist who explored

Tasmania was British naturalist SIR JOSEPH DALTON HOOKER who, as part of SIR JAMES CLARK ROSS's expedition to southern waters in 1839–43, made an inventory of the island's plant life.

Tasmania's Aborigines are thought to have crossed to the island by way of a LAND BRIDGE more than 35,000 years ago. They numbered about 5,000 when Europeans arrived. A tribal people, probably of Melanesian stock, they had a remarkable relationship with their environment, which bordered on the magical when viewed through the eyes of the European observer. CHARLES ROBERT DARWIN commented on their powers of camouflage when he visited the island in 1836, during his travels on the *Beagle*. With increasing European settlement, they were driven from ancestral lands and systematically persecuted. The Aborigines retaliated against the settlers on a number of occasions, and, in 1830, the British began an offensive to isolate them once and for all. They were removed to Flinders Island, part of the Furneaux Group, where the population languished. Later, some were allowed to return, but, in 1876, the last of the Tasmanian Aborigines died.

In 1901, with Australian independence from Great Britain, Tasmania was federated as a state of the Australian Commonwealth. Its capital is Hobart.

See also AUSTRALIA, EXPLORATION OF.

Terra Australis See GREAT SOUTHERN CONTINENT.

Thule See ULTIMA THULE.

Timbuktu (Timbuctoo, Tombouctou, Tombuto)

The city of Timbuktu is in the West African country of Mali. It sits on the southern edge of the SAHARA DESERT, just to the north of the great bend of the NIGER RIVER. In the latter half of the Middle Ages, Timbuktu was at its peak as a center of trade. Guarded to the north by Muslims and insulated to the west and south by thick jungle and African tribes, Timbuktu was inaccessible to Europeans. Still, information of the city made it to Europe, with exaggerated descriptions of wealth. Such stories made Timbuktu a destination for explorers, long after its glory had faded. The name of the city has been variously spelled as Tombouctou, Timbuctoo, and Tombuto.

Timbuktu was founded in the 11th century by the Tuareg, a nomadic Berber people of the Sahara who practiced Islam, yet retained vestiges of their earlier tribal religion. As a place to meet and trade on the Saharan camel caravan routes, the city grew and was eventually incorporated into the Mali Empire in the 14th century. During this period it prospered, as salt was brought from the north and ex-

changed for gold from the west. The earliest mention of the lands that would become Mali come from Greek historian HERODOTUS in the fifth century B.C. He mentions the "Silent Trade," a curious practice that endured through the 15th century, when it was described by Italian navigator ALVISE DA CADAMOSTO. He related how the Moors brought salt across the Sahara from the north to the middlemen of Mali. From Mali, the salt traveled to the fringes of the gold-mining regions, where the blocks of salt were left in a known location while the traders of Mali retreated and built a fire. The smoke from the fire alerted the Wangara, who mined the gold, and a quantity of the metal was placed on each salt block. After the Wangara had disappeared, the Malinese returned, and if the payment was deemed acceptable, the gold was taken and the salt left. If not, the gold and salt were left for the bargaining to continue.

Food, copper, textiles, and slaves were traded as well. Later, as part of the Songhai Empire in the 15th and 16th centuries, Timbuktu reached its height of prosperity with a population of as many as 1 million. It also became a center of Muslim education. The first of various raids and plunder by neighboring peoples occurred in 1591, beginning the city's economic and cultural decline.

Arab traveler ABU ABD ALLAH MUHAMMAD IBN BATUTAH's reports of Timbuktu from a visit in 1352 are among the earliest to have survived. Over a century later, in 1458, DIOGO GOMES was exploring the Gambia River for Portugal and brought back news of the city from his contact with native peoples. Based on his travels of 1512–14, Arab LEO AFRICANUS wrote a vivid description of the busy city. He told of large quantities of gold possessed by the king; a cavalry of 3,000; an educated class of doctors, priests, and judges; artisans who sold their handiwork; and slaves taken as tribute from surrounding lands.

The European expeditions in search of Timbuktu began with Englishman DANIEL HOUGHTON in 1790. Traveling for the AFRICAN ASSOCIATION, he began his journey from the Gambia River and made it inland 400 miles before being robbed and left to die by an Arab caravan. Scotsman MUNGO PARK came closer on a trip in 1795, most likely sighting the city as he sailed down the Niger in 1806. But he did not live to tell about it. In 1825, Scotsman ALEXANDER GORDON LAING led an expedition from the north across the Sahara, which reached Timbuktu in August 1826. He was the first European confirmed to have seen the city. He also died on the return journey, however.

RENÉ-AUGUSTE CAILLIÉ was the first person from Europe to reach Timbuktu and return to describe it. The son of a baker in France, Caillié became fascinated with Africa while young. In 1816, at age 17, he found work on a ship bound for Africa, and deserted his post once he got there to join an expedition in search of Mungo Park. In 1825, the Geographical Society of Paris offered a prize of 10,000

francs for the first person to visit Timbuktu and report on the city. Caillié, who was in Sierra Leone at the time, was determined to win the prize. In 1827, after preparing himself by learning Arabic, he departed Freetown on the west coast and proceeded eastward. On April 20, 1828, he reached Timbuktu. In Paris, where he claimed the prize, he described Timbuktu as mud houses surrounded by yellow sand and no longer a political or economic power.

Another explorer of note who sought Timbuktu was Scotsman HUGH CLAPPERTON, who, in 1825, investigated the Niger to the west with the hope of reaching the city. He died of dysentery in the city of Sokoto before he could fulfill his ambition. In 1853, German scholar HEINRICH BARTH reached Timbuktu while on an extensive tour of Africa and spent nine months studying the peoples. Another German, OSKAR LENZ, also was a visitor to Timbuktu, which he reached on his 1879–80 expedition. A colonial French army occupied Timbuktu in 1893–94.

Timbuktu, as it has been for centuries, is a regional trade center, with salt a principal commodity.

See also AFRICA, EXPLORATION OF; MUSLIM EXPLORATION.

trade winds

The trade winds are the basic wind systems in the Atlantic, the Pacific, and the Indian Oceans in both the Northern Hemisphere and Southern Hemisphere. In the Northern Hemisphere, they circulate in a clockwise direction, while in the Southern Hemisphere they move counterclockwise. Trade winds form in the subtropical regions known as the horse latitudes (between 25 and 30 degrees) to the north and south of the EQUATOR, regions of high pressure. Their direction is determined by the Coriolis effect (or Coriolis force or Coriolis acceleration, an apparent force on winds, clouds, and aircraft because of the rotation of the Earth under them, such that their motion is deflected clockwise in the Northern Hemisphere and counterclockwise in the Southern Hemisphere, although speed is unaffected). This gives the winds an angular component of approximately 20 degrees.

Among the most positive aspects of the trade winds, as far as sailors were concerned, is their predictability. Their direction remains fairly constant throughout the seasons, with only a slight shift to the north during summer in the Northern Hemisphere. Their constancy gives them the primary influence they have on ocean currents.

Winds are named for the direction from which they originate, and so, off the coast of the Iberian Peninsula are the northeast trades. These were the winds Italian mariner CHRISTOPHER COLUMBUS, sailing for Spain in the 1490s, used to convey his ships to the Caribbean Sea.

A major exception to the trade winds system occurs seasonally in the Indian Ocean. There, with the Indian

subcontinent heated during the summer, the moist air from the Tropics is drawn to the land. The trade winds are supplanted by the monsoon winds, and the direction of the wind is reversed. This phenomenon was observed in ancient times, and used to advantage by Arab sailors, who would time their travels accordingly. When Portuguese VASCO DA GAMA made the first European journey to India in 1497–99, he hired a pilot in Africa who insisted on waiting for the monsoon winds before proceeding eastward.

traverse board

In the 15th to 17th centuries, the word *traverse* was a nautical term meaning to tack or to change the direction of a vessel when heading close into the wind (or beating to windward), thus making a zigzag course because sailing directly into the wind is impossible. The traverse board became an important device in early navigation because it enabled a navigator to keep track of the direction and speed a vessel sails. It consists of a small wooden board in the shape of a COMPASS with directions marked on it and eight holes for each half hour of the watch. At its rectangular base are other holes laid out in horizontal lines.

It was the responsibility of the officer of the watch to stick a peg into the compass holes every half hour (or sometimes every hour) to record each of the courses sailed, and stick a peg into the other holes to record the estimated speed during each course based on the process of DEAD RECKONING. The courses and calculated distances were then recorded on a chart.

An accomplished English navigator, JOHN DAVIS of the late 16th century, who also invented the Davis QUADRANT, designed a traverse book, or deck log, which served the same purpose as the traverse board. It is in the form of a ship's log or journal with a column for time spent on each course, a column for calculated distance of each watch, a column for observations of the Sun, and a column for additional comments. One also sees the term *traverse table* in texts describing early navigational tools, including Davis's traverse book. It is also used in a general sense to describe a table giving the difference of latitude and departure that corresponds to any given course and distance.

See also LATITUDE AND LONGITUDE; NAVIGATION AND EXPLORATION.

treasure and exploration

The quest for treasure is a recurring theme in the saga of world exploration. Discovering precious metals and stones in foreign lands, raiding shipping routes established by other nations, and reaching newly discovered goldfields have all been an incentive for numerous expeditions.

Ancient Treasure-Hunting

Gold, silver, and gemstones have been a standard of wealth from ancient times. The ancient Egyptians sought riches in distant lands, as indicated by Egyptian queen HATSHEPSUT's expedition down the RED SEA to the land of PUNT in the 15th century B.C. (see EGYPTIAN EXPLORATION). Her envoys returned with gold and silver among other desired items, such as spices, incenses, and exotic animals (another form of treasure in ancient times). The Egyptians developed mining as central to their economy to the point that they had a papyrus map—dated to about 1300 B.C.—showing the location of all the gold mines in their empire. The Bible's Old Testament tells of OPHIR, the location of "King Solomon's mines."

Conquest and plunder go hand in hand, and civilizations preyed on one another for treasure. ALEXANDER THE GREAT led his armies from Macedon and Greece to North Africa and Asia in the fourth century B.C. and plundered the riches of many different peoples. Numerous expeditions of the Romans, such as those against the Carthaginians in North Africa in the third and second centuries B.C., or those led by GAIVS JULIVS CAESAR into northern Europe in the first century B.C., brought booty from conquered peoples and helped pay for new expeditions (see ROMAN EXPLORATION). The first confirmed historical reference to diamonds occurs in first-century A.D. Roman literature, and it assumed they came from the mines of Golconda in India, the only source of the stones at the time.

Spain's Plunder of the Americas

Discovering treasure provided justification for military and exploratory expeditions. In the course of his late 15th-century voyage to the Americas, the acquisition of gold became an early focus for CHRISTOPHER COLUMBUS, an Italian mariner sailing for Spain, after he failed to reach the Orient. By trading gold to Columbus's men, the Arawak (Taino) tribe, led by GUANCANAGARI, raised the first expectations of finding gold in those lands newly visited by Europeans.

Columbus failed to make a fortune in his explorations, but the Spanish soon did so in other parts of the Americas. The Spanish conquest of the Aztec and Inca Indians under HERNÁN CORTÉS and FRANCISCO PIZARRO respectively in the first half of the 16th century led to a redistribution of great wealth between continents. By that time, the Aztec and Inca had accumulated vast amounts of gold and silver through mining or by exacting tribute from peoples they themselves had conquered and had shaped the precious metals into exquisite objects. BERNAZ DÍAZ DEL CASTILLO, a firsthand witness, described the Aztec wealth and the Spanish plunder of it in his history of the conquest of New Spain, published in 1632, long after his death. The Aztec and Inca also used gemstones in their ornamental objects

and jewelry, including jade, obsidian glass, crystal, turquoise, and emeralds.

The Spanish CONQUISTADORES appropriated the precious metals and gemstones. They melted down most of the gold and silver artwork into ingots for shipping back to Europe, where it was given to King Charles I of Spain (Holy Roman Emperor Charles V). The Spanish also took control of the mines in the lands they had conquered, using Native American labor. Other mines were sought and developed. For example, in 1545, silver was discovered in the ANDES MOUNTAINS of southern Bolivia. The next year, the town of Potosí in what is now Bolivia was founded and eventually became the world's leading silver center, with a population of some 150,000. The flow of precious metals from the Americas to Europe shaped world economy for years to come, with Spain becoming the richest and most powerful nation and building its overseas empire (see COMMERCE AND EXPLORATION). The wealth helped pay for continuing explorations and continuing exploitation of colonies (see COLONIZATION AND EXPLORATION).

Treasure Fleets

The transport of treasure also shaped maritime history. A complicated trading route was developed by Spain's Indies Bureau of Trade, a government office founded in 1503. The route was maintained for more than two centuries, from 1530 to 1792. A royal fleet of ships—of the GALLEON-type vessel, designed to carry heavy cargoes or armaments—sailed from Spain every year with European items. In the Americas, it separated into three smaller fleets and spread out, delivering its goods at various ports. One group eventually reached Portobello in present-day Panama and picked up silver from Peru (shipped there by way of the Pacific Ocean, then carried by mule to the Atlantic coast). Its next stop was Cartagena in present-day Colombia to collect emeralds from Colombia, gold from Ecuador, and pearls from Venezuela. A second group sailed to Veracruz, where it picked up gold and silver from Mexico, and spices, silks, and porcelain from China (shipped to Acapulco in Mexico via the Philippines on the Manila Galleon—an annual fleet established in the 1580s—then transported overland to the Atlantic coast). A third, smaller group traveled to Trujillo in present-day Dominican Republic to receive indigo dye. The fleet met up in Havana in present-day Cuba, the departure point back to Spain.

Sailing in numbers helped protect shipping against PIRACY. Some of the raids on treasure ships were carried out by PRIVATEERS, sanctioned by governments. English privateers, including SIR FRANCIS DRAKE in the 16th century and WILLIAM DAMPIER in the 17th century, raided Spanish ships in both the Atlantic and Pacific. Pirates based in the Caribbean as well as on the BARBARY COAST of North Africa were active well into the 19th century.

Legendary Lands

The Spanish sponsored many more expeditions throughout much of the Americas, hoping to locate treasure on a par with that of the Aztec and Inca. Various expeditions fanned out from Spanish holdings in Aztec and Inca territory, eventually to North America as well. In the early 1540s, HERNANDO DE SOTO led the first extensive expedition in the American Southeast, seeking treasure. At the same time, FRANCISCO VÁSQUEZ DE CORONADO explored much of the American Southwest and the southern plains. Legends of wealthy cities and lands—that of EL DORADO in South America and the Seven Cities of CIBOLA and QUIVIRA in North America—spurred on these explorers as well as those of other nations. Such legends typically involved treasure (see LEGENDS AND EXPLORATION). A pattern emerged in which Native American tribes described rich tribal lands elsewhere as a tactic to rid themselves of the outsiders.

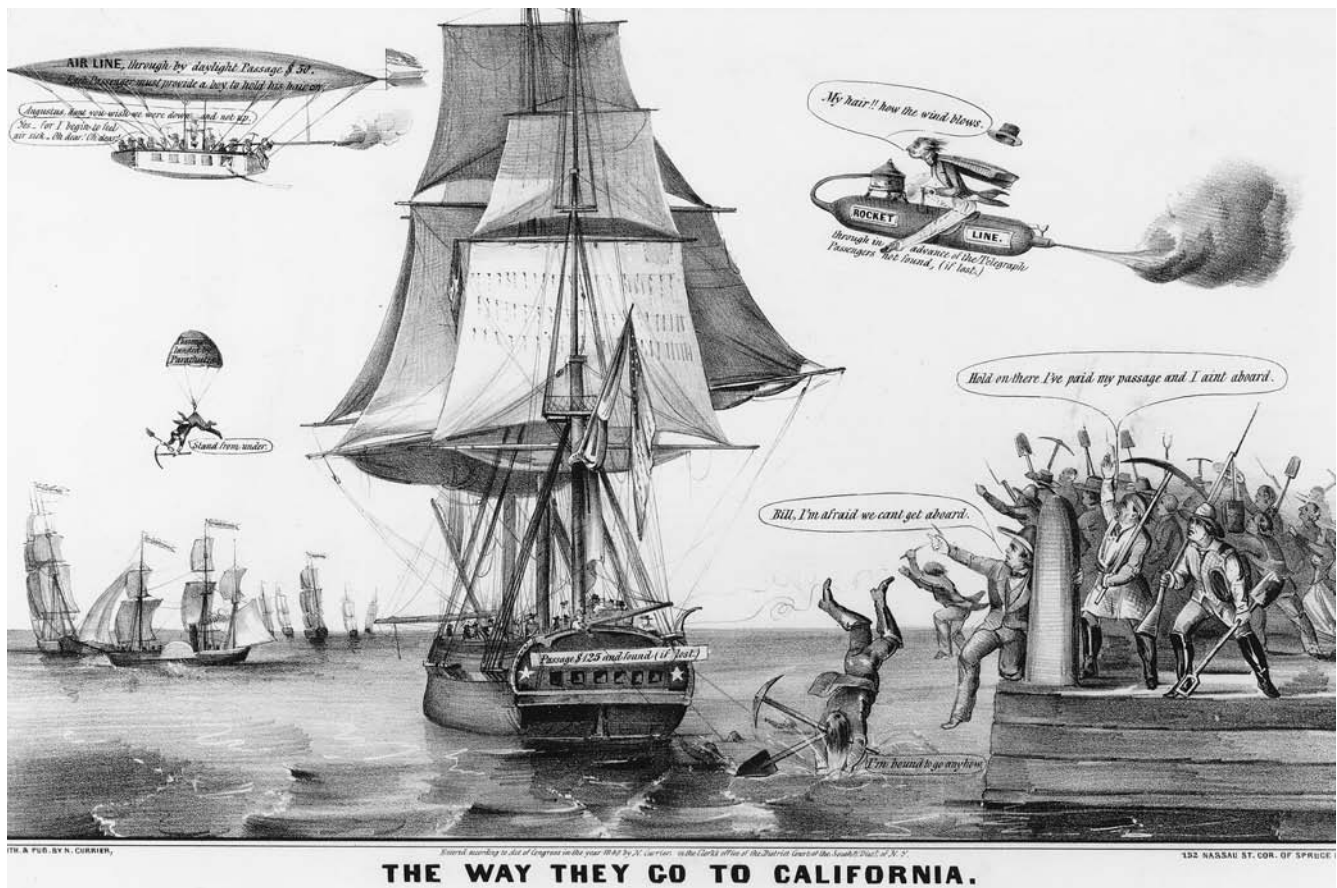
A comparable legend surrounding the mythical PRESTER JOHN took shape in the 12th century as that of a Christian ruler of a kingdom in Asia who might offer help

to European nations against Muslims. But it expanded by the 14th century into that of a ruler of an extravagantly wealthy kingdom in Africa, where gold and gemstones were bounteous.

The French sought a land known as SAGUENAY in what is now Canada in the early 16th century. Their dreams of Native American treasure led to JACQUES CARTIER's mistakenly believing that iron pyrites were gold, leading to the alternate name for the mineral, FOOL'S GOLD. Later in the century, Englishman SIR MARTIN FROBISHER, exploring for England, brought a sample of fool's gold back from Baffin Island in northern Canada, believing it to be gold, leading to the organization of the CATHAY COMPANY and expeditions to mine the valueless ore.

Gold Rushes

Another phenomenon related to treasure and exploration is that of gold rushes, the travel to areas where gold has been discovered. New routes were explored and established to remote places. The California Gold Rush of 1849, the Colorado (Pikes Peak) Gold Rush of 1858–59, and the



This cartoon satirizes the frenzy in obtaining passage to California during the gold rush of 1849. (Library of Congress, Prints and Photographs Division [LC-USZ62-104557])



This photograph shows miners heading for the Klondike gold fields by way of Chilcoot Pass, Alaska, in 1898. (Library of Congress, Prints and Photographs Division [LC-USZ62-057312])

Klondike Gold Rush to the Yukon Territory and Alaska of 1896–98 helped lead to the opening of parts of North America. Similarly, the discovery of gold on other continents—in wilderness areas north of Rio de Janeiro in Brazil in the late 17th century, in New South Wales and Victoria in Australia in 1851, in Western Australia in the 1880s, and in Witwatersrand in South Africa in 1884—has also led to migrations of peoples and a redrawing of the world map. And the discovery of other precious minerals or stones—such as diamonds in Brazil in 1726 and South Africa in 1866—led to movements of peoples and the opening of new regions.

tropic of Cancer

The tropic of Cancer is a parallel of latitude, a cartographic feature based on natural phenomena, $23^{\circ}27'$ north of the EQUATOR. On a representation of the world, it delineates the farthest point north at which the Sun can be seen directly overhead at noon, the Sun's rays striking the Earth vertically. This event happens one day a year: the

summer solstice in the Northern Hemisphere, on or about June 22.

The tropic of Cancer marks the northern boundary of the tropical, or torrid, zone, as separate from the north temperate zone. The imaginary line crosses the SAHARA DESERT in Africa, central India, southern China, the Pacific Ocean north of Hawaii, Mexico, and the Caribbean Sea.

The name *Cancer*, from the Latin word for “crab,” was originally applied to one of 12 astrological constellations. In the second century B.C., Greek astronomer HIPPARCHUS observed that, on the summer solstice in the Northern Hemisphere, the Sun appeared to be within the boundaries of the Cancer sector of the zodiac. The first European expedition to reach the tropic of Cancer was under Portuguese AFONSO GONÇALVES BALDAYA in 1436.

See also GEOGRAPHY AND CARTOGRAPHY; LATITUDE AND LONGITUDE; MAPS AND CHARTS.

tropic of Capricorn

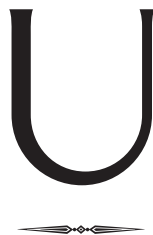
The tropic of Capricorn is a parallel of latitude, a cartographic feature based on natural phenomena, $23^{\circ}27'$ south of the EQUATOR. On a representation of the world, it delineates the farthest point south at which the Sun can be seen directly overhead at noon, the Sun's rays striking the Earth vertically. This event happens one day a year: the summer solstice in the Southern Hemisphere, on or about December 22.

The tropic of Capricorn marks the southern boundary of the tropical (or torrid) climatic zone, as separate from the south temperate zone. The imaginary line crosses southern Africa, the island of Madagascar, the Indian Ocean, central Australia, the Pacific Ocean south of Tonga, and south-central South America.

The name *Capricorn*, from the Latin words *caper*, for “goat,” and *cornu*, for “horn,” was originally applied to one of 12 astrological constellations. In the second century B.C., Greek astronomer HIPPARCHUS observed that, on the winter solstice in the Northern Hemisphere (that is, the summer solstice in the Southern Hemisphere), the Sun appeared to be within the boundaries of the Capricorn sector of the zodiac.

See also GEOGRAPHY AND CARTOGRAPHY; LATITUDE AND LONGITUDE; MAPS AND CHARTS.

Turkey Company See LEVANT COMPANY.



Ultima Thule

Ultima Thule is a phrase coined by Roman scholar PLINY THE ELDER in the first century A.D. to describe the northernmost land that could be reached by humankind. His information was based on the travels of Greek scholar PYTHEAS, who reportedly explored Arctic waters in the fourth century B.C.

Pytheas was a remarkable figure, not only for being perhaps the first Arctic explorer, but also for his scientific accomplishments. His first endeavors were in astronomy and geography, including the calculation of the latitude of his city to an accuracy of half a percent. Yet his geographic findings were met with skepticism for centuries after his death. His most vigorous detractor was Greek geographer STRABO of the first and second centuries A.D., who accused him of spreading untruths. History has been much kinder to Pytheas than Strabo was. Much of what Pytheas observed has been verified. Unfortunately, Pytheas's account of his journey, *On the Ocean*, has not survived. The sources that have come down are quotes and paraphrases from those ancients who had access to his work, many of them his critics.

The voyage that Pytheas made, in about 325 B.C., was probably financed by the merchants of Massilia (present-day Marseilles), a bustling trading town on what is now France's south coast. His mission was to find the source of tin and amber in the north, which had previously been carried overland, or on the ships of Carthaginians, who made handsome profits through their control of the sea-lanes (see CARTHA-

GINIAN EXPLORATION). Pytheas managed to navigate past the Strait of Gibraltar (see GIBRALTAR, STRAIT OF) into the Atlantic Ocean and head northward in his GALLEY or galleys, eventually reaching the British Isles. The people of England had experience in mining tin and gathering amber. They regularly traded with foreigners, and Pytheas was given a friendly reception.

In the course of his commercial transactions, Pytheas was told of the northern land of Thule. The etymology of the word remains the subject of great debate and numerous theories. Among them is the Old Saxon word *Thyle*, meaning "boundary" or "limit" as the root word. The Gothic word *Tiule* has a similar meaning. There are even words of Nordic origin, which mean "sun" or "darkness," which could have given rise to the name *Thule*.

The time for travel to Thule was said to be six days from the north of Britain. Considering such a journey feasible, Pytheas set off to find it. There are few details of the land itself, but the observations he made confirm that he approached or even crossed the ARCTIC CIRCLE. First, he mentions visiting a place where the Sun never sets, indicating northern latitudes. He also describes an ocean where the elements mix into a thick substance he calls "sea lung." This was the source of much ridicule by Strabo. Yet such a description is consistent with the PACK ICE, frothy water agitated by the wind and dense fog of northern waters. It was the ice that stopped Pytheas, forcing a return southward.

The actual location of Thule continues to be argued, and with little hope of resolution. There are three major theories. The 19th–20th-century Norwegian explorer FRIDTJOF NANSEN supported the idea that Thule was Norway. In his scholarly work *In Northern Mists*, he uses a process of elimination to persuade the reader of this point of view. A second theory, that Thule was ICELAND, has the largest number of supporters. Although this is the most southern location of the three, the distance of six days sail from England is consistent with its location, and the pack ice would certainly have presented problems for the ancient explorer. The third theory names Jan Mayen Island as Thule's location. The location of this island is certainly far

enough to the north, but the conditions of the ocean would most likely have been too severe for the ships of Pytheas's expedition. Others name the Shetland Islands off the coast of Scotland, but this is a less likely choice because of its more southerly location.

Today, there exists a town of Thule on the northwest coast of GREENLAND. The Danish-Inuit (Eskimo) explorer KNUD JOHAN VICTOR RASMUSSEN established a scientific observatory there that has evolved into the most important military base of the United States on Greenland. The mystery of Ultima Thule receded over the centuries as humankind pushed to the NORTH POLE.

See also LEGENDS AND EXPLORATION.



Van Diemen's Land See TASMANIA.

Viking exploration

The people known as Vikings were actually a number of different Scandinavian peoples of northern Europe—ancient Danes, Norwegians, and Swedes related in their Germanic language and culture—who have come to be identified as one for a period of their history. During the Middle Ages, from about 800 to 1100, they traveled widely as traders, raiders, and settlers. They became known by other names in other parts of Europe, including Norsemen (from Northmen), and were feared as warriors. *Viking* in fact means “warrior.” Much of what is known about the Vikings comes from medieval literature of other European peoples, as well as from their own literature—the Norse sagas—accounts of historical events celebrating their heroic past, including exploratory sea voyages—which the Scandinavians began writing after adopting Christianity and writing in the Roman alphabet in addition to their traditional runic writing. These sagas, once thought to be legends, have proven to be accounts of real events, based on archaeological evidence.

Scandinavian peoples lived in small, scattered villages, and practiced farming, fishing, and hunting. With extensive coastlines in their homelands containing numerous fjords, they used the sea for fishing and trade and for raiding to capture slaves. They developed the LONGSHIP, a type of GALLEY, propelled primarily by oars but with a single sail

used in some winds. The *drakkar* (or *lanskip*, for “longship”) was the warship, and the *knörr* (or *hafskip* for “halfship”), shorter and much deeper in draught, the voyaging and cargo ship. The *knörr* especially was sturdy and enabled the Vikings to travel in open seas (see SHIPBUILDING AND EXPLORATION). During what is referred to as the Viking age, Scandinavian mariners were the most skilled navigators and traveled farther than any other people (see NAVIGATION AND EXPLORATION).

Living in the extreme north of Europe, Scandinavians had not been conquered by the Romans, nor, during the Viking age, had they yet come under Christian influence. Rather, they practiced their traditional pagan religion, similar to that of other Germanic peoples. Their gods included Odin, the god of war; Thor, the god of thunder; and Balder, the god of light. In their mythology, Loki and other evil giants did battle with the Norse gods.

The Scandinavians had a political organization in which warfare played a central role. A warrior elite gained status through success in raiding by which they obtained booty to distribute to their retainers. The spoils of war were desired as much or more as proofs of warrior prowess and bravery as for material gain. Moreover, Viking warriors believed that if they died heroically in battle, they would join Odin in Valhalla, a palace in the realm of the gods.

By the beginning of the ninth century, parts of Scandinavia had begun to consolidate into kingdoms. This growing centralization may have played a part in Viking

expansion in that some chieftains or warriors, used to an independent status, sought to earn prestige and carve out their own power base or even establish a new homeland. A growing population also strained local resources. Knowledge of the wealth of certain peoples to their south no doubt provided incentive.

The earliest Viking raids were quick forays against coastal settlements by small groups of warriors. In the late eighth and early ninth centuries, single or several ships typically carried out solo raiding ventures. The Vikings sometimes camped in foreign lands for the winter. By about 850, the expeditions grew in size, and participants chose to settle some of the conquered lands. The Danes and Norwegians tended to engage in raiding and colonization more than the Swedes, who focused on trading. The Swedes generally went east and south; the Danes and Norwegians generally west and south.

Swedes settled the east coast of the Baltic Sea and traded with and sometimes raided inland peoples. There is evidence that the Vikings traveled inland into present-day eastern Europe as early as the eighth century. Some groups followed the Neva River, which took them to Lake Ladoga. Viking travel into eastern Europe often involved dragging their ships against the current of the predominantly north-flowing streams and portaging them over stretches of land.

To Slavic peoples of eastern Europe, the Scandinavians were generally known as Varangians. Some of the Viking raiders united under the leader Rurik in 862 at Novgorod, a center of trade on the Volkhov River in present-day Russia, which feeds Lake Ladoga, and became known as Rus, or Ruser.

The Scandinavians eventually reached the south-flowing Dnieper River, establishing a base at Smolensk in present-day Russia. By way of the Dnieper, they had access to the Black Sea and the city of Constantinople (present-day Istanbul, Turkey), which they had first raided in 860 and where they came to trade regularly. From there, they also sailed by way of the Dardanelles (a strait), the Sea of Marmara, and the Bosphorus Strait into the MEDITERRANEAN SEA. The Vikings also traveled the south-flowing Volga River, which took them to the Caspian Sea. The Swedish Vikings are also thought to have reached even Baghdad and Jerusalem. Among the settlements they reestablished was Kiev on the Dnieper in present-day Ukraine, which under Prince Oleg, from about 882 to 912, was capital of a Rus principality.

In the course of their travels, the Vikings met with Finnic, Slavic, and Turkic peoples. At Bulgar, a trade center at the bend of the Volga River, they also probably encountered caravans of Chinese as well as Arab Muslims. A traveler AHMAD IBN FADLAN, a non-Arab Muslim who was at Bulgar in summer 922, later described Scandinavians in his work *Kitah* (Book).

The Viking presence in England began at least by about 790, when Lindisfarne (Holly Island) in the north was attacked. The Viking presence in Ireland, according to medieval records, began five years later with an attack on an unidentified island called Rechru. Scandinavian kingdoms eventually arose at Dublin, Limerick, and Waterford. The Viking king of Dublin was able to launch his own raids in England.

The Vikings in the British Isles came mostly from what is now Denmark and were generally referred to as Danes by the local peoples among whom they settled. In addition to coastal settlements, they also came to control surrounding islands, such as the Hebrides, Orkneys, and Shetlands. Norwegian Vikings settled the Faeroe Islands, far out to sea in the North Atlantic.

In the early ninth century, Vikings also gained control of parts of coastal France and traveled up rivers for other raids. In 845, the Vikings navigated the Seine River to attack Paris. Those Vikings who settled in Normandy (French for “land of the Northmen”), which was officially ceded to them by the king of France, Charles III, in 911, became known as Normans.

From their new staging areas or homes on the British Isles or on the coastal mainland—typically at the mouths of rivers—the Vikings launched expeditions farther to the south. In about 858, Bjorn Ironside, the son of a Danish king, and his lieutenant Hastein led a fleet of 62 longships in raids from the mouth of the Loire River in France along the Iberian Peninsula through the Strait of Gibraltar (see GIBRALTAR, STRAIT OF) and into the Mediterranean Sea, where they reached coastal North Africa, the Balearic Islands off Spain, and coastal southern France. A fleet of Moorish ships eventually drove them back to the Atlantic, and they returned to France four years after departure. Normans came to expand their holdings; in the second half of the 11th century, William the Conqueror invaded England, and Roger I, Sicily.

The Vikings reached ICELAND in the North Atlantic in the second half of the ninth century. The Irish had already settled the island by 800 and possibly a lot earlier (see SAINT BRENDAN’S ISLE). According to one saga, in about 860, NADDOD, a Norwegian Viking, was blown off course while traveling from Norway to the Faeroe Islands and reached the east coast of Iceland. Another Norse saga holds that, about the same time, GARDAR SVARSSON, a Swedish Viking, circumnavigated Iceland and built the first Viking house there on the north coast. Floki Vilgerdarsson, another Norwegian, is said to have built a house on the east coast. The first permanent settler is said to have been Ingólfur Arnarson, who established a farm at present-day Reykjavík on the southwest coast in about 874.

From Iceland, the Vikings ventured even farther to the west. Norwegian Viking ERIC THE RED is considered

the European discoverer of GREENLAND in about A.D. 982, although it may have been earlier sighted by Bjarni Gunnbjörn. Eric the Red established a settlement at present-day Julianehaab. From Greenland, the Vikings traveled farther westward. Norwegian BJARNI HERJULFSSON, in about 985 or 986, was blown off course and spotted land, three distinct coastlines, he later reported to those in Greenland. In about 1000, Eric the Red's son, LEIF ERICSSON, also reportedly blown off course, came to a land that came to be known as VINLAND, somewhere in northeastern North America, very likely Newfoundland, Labrador, or Quebec. (The VINLAND MAP, supposedly found in 1957, showing the location of Vinland, turned out to be a forgery.) Other Vikings would later attempt to colonize Vinland, among them Leif's brother THORVALD ERICSSON in about 1005, THORFINN KARLSEFNI in about 1010, and his half sister FREYDIS EIRÍKSDOTTER in about 1014. Those colonies failed. The Norse settlement in Greenland endured until the early 15th century, when the outbreak of the bubonic plague cut off communication with Scandinavia. Yet their settlements in Europe endured and the Vikings became part of the ethnic mix of many European nations.

What is defined as the Viking age ended by the 12th century. By that time, European kingdoms were able to defend themselves against their raids; three great Scandinavian kingdoms had emerged that became Denmark, Norway, and Sweden; and Christianity had been introduced into Scandinavia.

Vinland

Vinland is the name given to a place in North America visited by the Vikings in the beginning of the 11th century. It represents the location of the first known European visit to the Americas (see VIKING EXPLORATION).

The earliest surviving reference to Vinland is from *Adami Gesta Hammaburgensis ecclesiae pontificum* (translated as *History of the Archbishops of Hamburg-Bremen*) written by Adam of Bremen in about 1075. He was a German who had obtained his information from Danish king Sweyn Estrithson. In this work, Adam of Bremen mentions a land with grapes, which make superior wine, as well as self-sown wheat. He also mentions an ice buildup to the north, which makes sailing impossible. Scholarly research has shown that Adam's writings were not always accurate, and it is likely that his mention of grapes and wine came from the interpretation of the word *Vinland*. In German this would refer to a land of wine, but in the Old Norse the prefix *vin* means a grassy field. In any case, the work of Adam of Bremen led to the repetition of this characteristic of Vinland in the sagas written more than a century later.

The chief sources of information on Vinland come from two Norse sagas, *Groenlendinga* (or the *Saga of the*

Greenlanders) and *Eiríks saga* (or the *Saga of Eric the Red*). These stories had been passed down by word of mouth for centuries before being written. The first to be recorded, the *Saga of the Greenlanders*, written in ICELAND in about 1200, has proven to be the more reliable of the two.

The story of the temporary settlement of Vinland begins with Viking BJARNI HERJULFSSON in about 985 or 986. On a trip from Iceland to visit his father in GREENLAND in a LONGSHIP, he was blown off course, to the southwest. Although he spotted land—three distinct coastlines, he reported—he did not make a landing. Eventually, he made his way to Greenland, where he related his findings.

According to the sagas, on a voyage of exploration to find the land that Herjulfsson had seen, LEIF ERICSSON embarked with a crew of 35 from Greenland in about 1001. He came upon three different regions: The first he named Helluland, after its extreme flatness; the second he named Markland, referring to a land of woods; the third, and most southern, he called Vinland. At Vinland, he built houses and probably stayed for a year. He then returned to Greenland.

The next reported visit to Vinland involves Leif's brother THORVALD ERICSSON in about 1005. He took up residence in the houses Leif had built and was the first to see the native inhabitants of the land, whom he called Skraelingar or Skraelings, a derogatory term meaning a "wretched and ugly creature." It is significant because it is the first account of European and Native American contact. In a confrontation with the Skraelings, Thorvald was killed. After two years in Vinland, the remaining members of the party decided to return to Greenland.

Despite earlier troubles encountered, the following expedition was a journey of colonization. Gudrid, the widow of Thorstein—Leif and Thorvald's brother—convinced her new husband, THORFINN KARLSEFNI, to organize a group to settle Vinland in about 1010. With four ships, as many as 160 people, livestock, and supplies, they landed on its shores. Conditions in their settlement were poor, and, after trading and fighting with the native peoples, Karlsefni and his company returned to Greenland.

FREYDIS EIRÍKSDOTTER, the half sister of Leif, looms large in the sagas' account of a follow-up effort in about 1014. Freydis sailed to Vinland with her husband, Thorvald, in a small longship with two Norse brothers, Helgi and Finnbogi, who owned a larger boat. In Vinland, she reportedly took over the houses her brother had built. Later, desiring the boat owned by Helgi and Finnbogi, she fomented a murderous rampage in which the brothers and their allies were killed. On their return to Greenland, the story of the murders came out, but Freydis's punishment was mitigated because of her relationship to Leif.

Although different sagas give different details about these various voyages and colonies, the fact of Norse

settlements in Iceland and Greenland is not in dispute. It seems likely that from Greenland the enterprising Vikings would reach the North American continent a short distance away. The actual location of Vinland is another matter. Academic speculation has yielded more than 500 hypothetical sites, from Labrador to Florida. To support their theories, scholars have not only used the latitudes where grapes are found, but also astronomical observations in the sagas, which relate to the seasons and the length of days. The one thing lacking in the theories was physical evidence.

In 1960, Norwegian explorer and writer Helge Ingstad and his wife, archaeologist Anne Stine Ingstad, began an excavation at the town of L'Anse aux Meadows in the north of Newfoundland. They discovered the remnants of eight houses of Norse design, similar to those excavated in Iceland and Greenland, with walls and roofs, which had been sod, laid over a supporting frame. In the middle of the floor were long narrow firepits used for heating, lighting, and cooking. Recovered artifacts also resembled those from other Viking sites: a stone oil lamp; a soapstone spindle whorl, used as the flywheel of a handheld spindle; a whetstone for sharpening tools; a bronze, ring-headed pin, used to fasten cloaks; the fragment of a bone needle, probably used in knitting; a small decorated brass fragment that once had been gilded; and iron nails or rivets used in boat-making. A great deal of slag from smelting and working of iron was also present. Some of these implements confirm the presence of women in the settlement.

Their findings did not preclude all other locations for Vinland, but established archaeological proof that the Viking discovery of North America predated that of CHRISTOPHER COLUMBUS for Spain by nearly 500 years. The site of the excavation is now a National Historic Site of Canada as well a World Heritage Site.

A map known as the VINLAND MAP, reportedly found in 1957, showing the location of Vinland in North America, turned out to be a forgery.

Vinland Map

The Vinland Map is a world map that shows an island to the southwest of GREENLAND called Vinland. There are two inlets on the island, which could easily correspond to Hudson Strait, with HUDSON BAY at its end, and the Gulf of St. Lawrence leading to the St. Lawrence River. If authentic, the Vinland Map would be the earliest map to represent North America, confirming the Norse sagas and the discovery of the Americas by the Vikings.

In 1957, the Vinland Map was reportedly found in a manuscript relating the mid-13th-century travels of Friar GIOVANNI DA PIAN DEL CARPINI to the lands of the Mongols. The best estimate of the time of its creation was in

about 1440, since it contained close similarities to a map published in 1436 by Venetian B. Andrea Bianco.

Donated to Yale University in 1965, the Vinland Map was revealed to the public that same year by R. A. Seton, Thomas E. Marston, and George D. Painter in their book *The Vinland Map and the Tartar Relation*. Upon its publication, the Vinland Map generated much excitement, scrutiny, and skepticism. The skepticism proved well founded, for, in 1974, Yale announced that the map was a forgery. The ink used to make it contained a titanium oxide compound, which had not been invented until the 1920s. Although it was revealed as a fraud, experts on early Scandinavian exploration pointed out that the Vinland Map in no way detracted from what was known of Viking travels to North America.

See also VIKING EXPLORATION.

Virginia Company

Virginia Company refers to two English commercial joint-stock corporations, chartered by King James I at the same time in 1606, for the purpose of reasserting sovereignty over North America and colonizing it. One was the Virginia Company of London, which also came to be known as the London Virginia Company, or the London Company. The second was the Virginia Company of Plymouth, also known as the Plymouth Company and later the Council of New England. The name *Virginia*, honoring the Virgin Queen, Elizabeth I, James's predecessor, was used broadly to describe the Atlantic coast of North America. The new colonizing attempts were the first since the failed attempts of the 1580s on Roanoke Island in present-day North Carolina, sponsored by SIR WALTER RALEIGH for Queen Elizabeth.

The Virginia Company of London received a patent to develop a colony in a 100-square-mile region on the Atlantic Ocean between latitude 34 and 41 degrees north; the Virginia Company of Plymouth received a patent to do so between 38 and 45 degrees north. The overlapping territory could be settled by either company, although any settlement by one had to be at least 100 miles away from the other. Each company had the power to appoint a local council, which was under the authority of a council in England, acting on behalf of the king, as well as a governor and other officials. The companies also had the responsibility to provide settlers, ships, and supplies for the colonization attempts.

In December 1606, the Virginia Company of London dispatched a fleet of three ships under CHRISTOPHER NEWPORT, with military leader JOHN SMITH. The colonists landed in Chesapeake Bay near the mouth of the James River in May 1607, where they erected James Fort. The colony became known as Jamestown, the first permanent English settlement in America. Because of the mortality rate from disease and conflicts with the Powhatan Indians,

as well as the lack of profits, the charter for the Virginia Company of London was revoked in 1624, and Virginia became a Crown colony.

The ships of the Virginia Company of Plymouth's first colonizing expedition were captured by the Spanish. A second attempt led by GEORGE POPHAM departed from Plymouth in May 1607 and settled on the west bank of the Kennebec River, near present-day Popham Beach, Maine, the following August. After a severe winter, during which Popham died, the colonists finally abandoned the site, returning to England in October 1608. By 1609, the Virginia Company of Plymouth had become inactive, and the Virginia Company of London received an individual charter.

In 1620, the Virginia Company of Plymouth received a new charter from James I as the Council for New England, with rights to develop territory between 40 and 48 degrees north, from sea to sea. That same year, the PILGRIMS, among them EDWARD WINSLOW, had secured a patent to settle in territory of the Virginia Company of London to the south. They sailed from Plymouth, England, on the *Mayflower*, and landed at present-day Plymouth, Massachusetts, in December 1620, to the north of the agreed-on territory. At that time, they drew up the Mayflower Compact, pledging allegiance to the English king, later obtaining patents from the Council for New England, legalizing their settlement site. The Pilgrims, through the FUR TRADE with Native Americans, eventually liquidated their debts to the merchants of the Council for New England. The Virginia Company of Plymouth was disbanded in 1635.

Voskhod program

The Voskhod program of the former Union of Soviet Socialist Republics (USSR; Soviet Union) consisted of SPACE EXPLORATION using the Voskhod type of spacecraft, accommodating two or three people with more functions controlled by the crew than in the smaller but similar spacecraft of the earlier VOSTOK PROGRAM. The name *Voskhod* means "dawn" in Russian. The Voskhod program competed with the GEMINI PROGRAM of the United States.

The first mission of the Voskhod program, *Kosmos 47*, launched on October 6, 1964, was to test modifications of the Vostok capsule. Six days later, three cosmonauts (see ASTRONAUTS), Vladimir Komarov, Konstantin Feoktistov, and Boris Yegorov were launched on *Voskhod 1*. They completed 15 orbits of Earth, the first three-person spaceflight in history. Moreover, Feoktistov, who had helped design the spacecraft, became the first engineer in space, and Yegorov became the first physician in space. Another flight, *Kosmos 57*, was launched on February 22, 1965, to test the airlock design. Despite its malfunctioning, on March 18, 1965, Pavel Belyayev and ALEKSEI ARKHIPOVICH LEONOV were

launched on *Voskhod 2*. During the mission of 17 orbits, Leonov carried out the first extravehicular activity, or "space walk."

Vostok program

The Vostok program of the Union of Soviet Socialist Republics (USSR; Soviet Union) accomplished several firsts in SPACE EXPLORATION. On April 12, 1961, in *Vostok 1*, YURI ALEKSEYEVICH GAGARIN became the first human to be in space and to orbit Earth. On June 16, 1963, in *Vostok 6*, VALENTINA VLADIMIROVNA TERESHKOVA became the first woman in space.

The Vostok program (*vostok* means "east" in Russian) competed with the MERCURY PROGRAM of the United States, which put the first American in space, ALAN BARTLETT SHEPARD, JR., on May 5, 1961. The "space race" between the two nations had begun in 1957, with the launch of the first SATELLITE, *Sputnik 1*, by the Soviet Union. The design of the Vostok spacecraft evolved from that of Kosmos spy satellites; early models were tested under the name Kurabl-Sputnik, with dogs aboard. They consisted of two basic parts, the capsule and the equipment module. The next generation were designed to carry a single cosmonaut (see ASTRONAUTS).

A total of six Vostok spacecraft were launched carrying cosmonauts. After Gagarin's pioneering mission, Gherman Titov became the first human to eat and sleep while in space during the *Vostok 2* mission of August 1961. *Vostok 3* and *4*, in August 1962, were in orbit at the same time, another first. Over the course of five days in June 1963, cosmonaut Valeri Bykovskii orbited Earth 81 times on *Vostok 5*, establishing a record for the longest solo space mission. Tereshkova, the first woman in space, flew the last Vostok mission. A seventh launch was planned, but the Soviet Union decided to concentrate on the VOSKHOD PROGRAM, developing spacecraft able to carry two or three people.

The cosmonauts in Vostok flights controlled few of the spacecraft functions. In emergencies they could, however, override an automatic orientation system with a code provided in an envelope attached to the capsule wall. A retro-rocket directed the craft out of orbit and back to Earth. A heat shield protected the capsule from incineration during reentry into the atmosphere. The equipment module, which separated from the capsule, burned up as it plunged toward Earth. The capsule's descent was slowed by parachute and it was eventually retrieved. At about two miles above Earth, the cosmonaut ejected from the capsule in an ejection seat, then separated from the seat and also landed by parachute.

The Vostok program proved that humans could survive the rigors of spaceflight: launching under the force of ROCKET propulsion; weightlessness over an extended period of time; reentry into Earth's atmosphere; and landing.

voyageurs

The term *voyageur* is French for “traveler.” It came to be applied to a man who traveled into wilderness areas, typically by CANOE, to conduct the FUR TRADE. The profession began in New France (present-day eastern Canada) under SAMUEL DE CHAMPLAIN, who sent out expeditions by way of Native American waterways—first along the Ottawa and French Rivers, then in the Great Lakes. The first voyageurs were therefore French, and the term originally applied to them alone.

The term came to be used for any wilderness participants in the fur trade, such as trappers—something akin to the MOUNTAIN MEN of the American West. In later years, the term came to be applied to paddlers transporting goods and people for the licensed companies, such as the HUDSON’S BAY COMPANY and NORTH WEST COMPANY, as distinct from the COUREURS DE BOIS, the “runners of the woods,” unlicensed fur traders. Early official expeditions, such as that of LOUIS JOLLIET and JACQUES MARQUETTE in

1673, which traced the course of the MISSISSIPPI RIVER, made use of voyageurs. Many later explorers of Canada, such as PETER POND and SIR ALEXANDER MACKENZIE, active in the late 18th century, also traveled with voyageurs. Regular trades routes were eventually established into the Canadian West and Northwest, as well as northern parts of present-day United States, and men of other European ancestry, especially the Scottish, took up the profession as well, as did the Métis, people of mixed ancestry, many of them descended from French voyageurs and their Native American mates.

The voyageurs adapted many Native American customs. They copied canoe designs, using birch bark as a covering, which made the boats light enough to portage over land between rivers, streams, lakes, and ponds. They also traveled by dogsleds and snowshoes. Buckskin was the favored material for clothing. Pemmican—a food made from dried meat, melted fat, and berries—served as a practical trail food.



West Indies

The West Indies is an archipelago lying between southeastern North America and northern South America. The arc formed by the thousands of islands stretches about 2,500 miles from off the coast of Florida to the coast of Venezuela, and separates the Atlantic Ocean from the Gulf of Mexico and Caribbean Sea. The West Indies, also called the Antilles, include the Bahamas in the north; the Greater Antilles (Cuba, Jamaica, Puerto Rico, as well as a single island, formerly known as Hispaniola, with two nations, Haiti and the Dominican Republic) in the center; and the Lesser Antilles (Virgin Islands, Leeward Islands, Windward Islands, Barbados, Netherland Antilles, Trinidad, Tobago, Aruba, and other islands off Venezuela) in the south.

Italian mariner CHRISTOPHER COLUMBUS first applied the name “Indies” when he explored the region for Spain in 1492, believing he had reached islands off the coast of India, associating them with the EAST INDIES. The name *Antilles* also came to be used in Spain and in France; Antillia was the supposed name of a mythical land supposedly existing in the Atlantic (the antecedent of the legend of the Seven Cities of CIBOLA).

Many of the West Indies are mountainous, formed by a partly submerged mountain range, and some islands have active volcanoes; other islands are flat, formed from coral and limestone. All the islands, except the northern Bahamas, have a tropical climate, moderated by the cooling effect of the Atlantic Ocean and the TRADE WINDS, which blow from

the northeast (enabling passage in sailing ships from Europe). Hurricanes occur frequently in summer and fall. Some of the islands were originally heavily forested with altitude and latitude determining tree types, from pine to palm. Animal life includes the hutia and agouti—types of rodents—the iguana, and a wide variety of turtles, birds, and fish. Native peoples practiced some farming along with hunting, fishing, and gathering. The Ciboney Indians, their origin unknown, lived in small areas of western Hispaniola and western Cuba. They were eventually pushed westward by the Arawak Indians, or Taino, out of South America. Another people, the Carib Indians, displaced the Arawak from the Lesser Antilles before the islands were visited by Europeans.

Spanish Arrivals

A saga of exploration and colonialism is of course attached to each one of the many islands in the West Indies. Spanish arrival among them is also the beginning of the story of the European exploration of all the Americas (apart from the Vikings in northeastern North America centuries before), with explorers and colonizers venturing south, west, and north from the islands. The region was the first colonized by Europeans and the last to remain as colonies. The West Indies became a cultural crossroads, with many different European nations active among them. The transatlantic SLAVE TRADE led to an African presence there as well.

Christopher Columbus landed first on a small island of the Bahamas that he named San Salvador, probably Watling

Island (although some scholars have theorized that he first landed on Samana Cay, 65 miles to the southeast), on October 12, 1492, at two o'clock in the morning. His expedition later reached Cuba, which he believed the Asian mainland, and Hispaniola, which he believed to be Japan. On Hispaniola, he made contact with the Arawak Indian GUANCANAGARI. Columbus returned with gold, parrots, and native people to Spain in March 1493, but not the hoped-for riches. That same year, he headed a second, larger expedition of 17 ships back to the West Indies, still believing they were part of Asia. This time, he took with him soldiers, colonists, livestock, tools, and seeds. He navigated a more southerly route, and, before returning to Hispaniola again, he passed and named many of the Lesser Antilles and sighted the Virgin Islands and Puerto Rico. Later on, he further explored the coast of Cuba and reached Jamaica. Columbus had attempted to found settlements at two different sites on Hispaniola during his first expedition. On the second voyage, he gave orders to found Santo Domingo on the south shore of Hispaniola in the present-day Dominican Republic. The oldest permanent settlement in the Americas, it became the seat of Spanish rule in the West Indies and, as a base of expansion, the “mother of settlement” of Latin America. Columbus returned to Europe in 1496. He later led two more expeditions to the Americas—in 1498–1500 and 1502–04. On his third voyage, he reached the South American mainland—the so-called SPANISH MAIN—and the island of Trinidad. On his fourth voyage, he explored the coast of Central America.

The transatlantic crossing became commonplace for Spanish ships. Before long, they had conquered the tribes of Jamaica, Hispaniola, and Cuba. DIEGO VELÁSQUEZ, who had sailed with Columbus in 1493, along with his lieutenant PÁNFILO DE NÁRVAEZ, were central to these military operations. Velásquez, who declared himself governor-general of Cuba, founded Havana in 1519, which became another launching point for Spanish exploratory expeditions. San Juan, founded in 1511 on an island in a bay off Puerto Rico, became still another center of activity.

Staging Posts

Other Spaniards famous for explorations elsewhere—many of whom became known as CONQUISTADORES—spent part of their careers in the West Indies. JUAN PONCE DE LEÓN, who explored Florida in 1519, had previously served as governor of Puerto Rico. LUCAS VÁSQUEZ DE AYLÓN, who organized an expedition to the coast of present-day South Carolina in 1520, was a colonial official at Santo Domingo. HERNÁN CORTÉS, who conquered the Aztec of Mexico in 1521, had served under Velásquez in Cuba. FRANCISCO PIZARRO, who conquered the Inca of Peru in 1533, had served under Nicolás de Ovanda, governor of Hispaniola. In 1535, GONZALO FERNÁNDEZ DE

OVIEDO Y VALDEZ, who was a colonial official in the West Indies and the official historian of the Americas, published the first volumes of *Historia general y natural de las Indias Occidentales* (General and Natural History of the West Indies).

The ports of West Indies eventually served as staging posts for Spanish ships carrying cargo to other settlements and plundered riches from the Aztec and Inca back to Spain (see TREASURE AND EXPLORATION). In the second half of the 16th century, other nations began to show interest in the region. SIR JOHN HAWKINS completed the first successful English transatlantic slave-trading expedition in 1562–63, exchanging African slaves to Spanish colonists for sugar and hides, which he transported back to England. With ongoing conflict between England and Spain, English PRIVATEERS, such as SIR FRANCIS DRAKE, commissioned by Queen Elizabeth I, began raiding Spanish shipping in the 1560s.

Colonial West Indies

By the end of the 16th century, the native population of the West Indies had been decimated—from the spread of European diseases, warfare, and forced labor—with only a few pockets remaining. By the mid-17th century, England, France, and the Netherlands had established settlements in the West Indies. By that time also, sugar plantations had been introduced to the region. During the colonial period, most islands were deforested.

Colonial conflicts would continue over the next centuries, with colonial influence enduring to modern times. In the late 19th century, the United States also became active in the region politically and economically. With the Spanish-American War of 1898, Spain lost its last possessions in the West Indies. Great Britain granted independence to most of its colonies in the 1960s. Some of the West Indies islands are still British, French, Dutch, and American dependent territories, however. The island of Margarita is part of Venezuela.

See also CENTRAL AMERICA, EXPLORATION OF.

whaling and sealing

The hunting of sea mammals took mariners to waters of high latitudes and played a part in the history of exploration. Whaling and sealing as a means of subsistence have been a traditional activity of native peoples of Arctic regions for millennia. Yet, in more recent centuries, whaling to obtain oil, meat, bone, and other by-products, and sealing, especially for furs, became an organized business.

Whaling and Exploration

Whaling of many of at least 75 species of whales as a commercial enterprise dates back to the ninth century, early such activity carried out by the Basques of northern Spain and southwestern France in the Bay of Biscay of the Atlantic

Ocean. By the mid-16th century, when those waters became depleted, whalers ventured as far as Newfoundland off northeastern North America. After a Dutch expedition under WILLEM BARENTS in search of the NORTHEAST PASSAGE reached Spitsbergen (present-day Svalbard) in the Arctic Ocean north of Norway in 1596, and an English expedition under HENRY HUDSON for the MUSCOVY COMPANY in 1607 reported whales in the archipelago's vicinity, Spitsbergen became a center of whaling for the Dutch and the English. Basques were often hired for their crews. By the mid-17th century, when whale herds had been reduced in those waters, whalers hunted around GREENLAND. During whaling expeditions in 1806–17, especially in Arctic waters east of Greenland, an English whaler and his son, WILLIAM SCORESBY, SR., and WILLIAM SCORESBY, JR., made studies of natural science and navigation, reporting to England's ROYAL SOCIETY. The Davis Strait to the west of Greenland also was a rich hunting ground for a time.

America also became involved in the whaling business, starting in the mid-17th century, early hunters setting out from such places as Sag Harbor on Long Island in New York, and Provincetown on Cape Cod in Massachusetts, and the Island of Nantucket also in Massachusetts. In 1791, an American ship first rounded South America's CAPE HORN for hunting in the Pacific Ocean. By 1830, New Bedford on coastal Massachusetts had become the most important whaling center. New London, Connecticut, and San Francisco, California, also became important whaling ports. Norway, Japan, and Russia also became active in whaling.

Early hunters launched their rowboats from shore, in order to kill whales with handheld lances and hand-thrown harpoons. They later began launching their rowboats from ships. Whaling ships became larger over the centuries, from sloops of 30 to 40 tons, to schooners and brigs of 100 to 150 tons, and, by the 19th century, to ships and barks of twice that weight. By the late 19th century, large steamships were also used, some of them factory ships, on which whales could be processed after being killed. By the 19th century, voyages commonly lasted three or four years. The invention, in about 1856, of a harpoon containing an explosive head by the Norwegian Sven Foyn revolutionized whaling. The last rich hunting grounds were found in the waters off Antarctica. In 1904, a whaling station was founded on the island of South Georgia in the South Atlantic (where SIR ERNEST HENRY SHACKLETON sought help in his aborted Antarctic expedition of 1914–16). Modern whaling is heavily regulated, with many of the species endangered, such as the sperm whale, whose oil was once valued above that of all others.

Seal Hunting and Exploration

Seal hunting for food, oil, and hides, like whale hunting, has been a traditional part of subsistence for a number of north-

ern peoples, in particular the Inuit (Eskimo) of the North American Arctic. The term *seal* is applied broadly to a number of pinnipeds, or fin-footed mammals: the eared seals, which include the fur seal, the species most hunted for furs, and the sea lion; and the earless seals—the true seals—some of which are also valued for their furs, especially the harp seal, whose pups have fluffy white coats, and the ringed seal. The commercial hunting of seals dates back to 1515, when a cargo of fur seal skins arrived from Uruguay to the markets in Seville, Spain. During the next centuries, sealing was carried out on a small scale. In the 18th century, various nations became active in the seal fur business. In 1786, during the period that the Russians were expanding their fur-trading activities into Alaska, GAVRILO LOGINOVICH PRIBILOV (also known as Gerasim Pribilof) made the European discovery of the Pribilof Islands in the Bering Sea, which serve as an annual mating place for a large portion of the fur seal population. The Pribilof Islands are also known as the Fur Seal Islands.

At about the same time, sealers began hunting in southern waters and on southern islands, such as the Falklands. American EDMUND FANNING, who participated in and sponsored many expeditions to the South Pacific, participated in the sealskin trade. He was one of the sponsors of NATHANIEL BROWN PALMER's sealing expedition to waters south of CAPE HORN in 1829, which led to one of the earliest sightings of the Antarctic Peninsula. A Scottish sealer, JAMES WEDDELL, sailing for Great Britain in 1822–23, explored the South Orkney Islands and reached a southernmost point in the Atlantic's Weddell Sea not surpassed until the next century. Englishman JOHN BISCOE, also a sealer, circumnavigated Antarctica in 1831–32. Macquarie Island, south of TASMANIA in the South Pacific, as well as the Crozet Islands and Kerguelen Islands in the southern Indian Ocean, also became places for sealing.

It has been estimated that more than 25 million fur seals have been slaughtered for their skins from 775 to 1900. In the late 19th and early 20th centuries, nations came to agree on regulations to protect diminishing herds and endangered species. The controversy has continued to modern times because of the threat to the survival of certain species and the cruelty involved in clubbing seals to death, including pups, in order not to damage their coats.

women explorers

In historical studies of exploration, one encounters the names of many more men than women. Yet women played a significant role as wives of explorers, sponsors of expeditions, as well as explorers in their own right. Like men, they explored for a variety of reasons: to break free of society's constraints; to earn a living; out of religious conviction; as inspiration for their writing; to find subjects for painting; for

scientific studies; or, simply, in order to rise to the challenge of being a woman explorer.

Since the beginning of time, those with wanderlust have found a way and means to travel. While the opportunity to explore traditionally has come to men in many ways, it has not been readily granted to women. Women typically had to overcome societal obstacles before even facing the obstacles of the journeys themselves.

Some of those who managed to voyage beyond their homeland were women of privilege; others came from poverty and repression. Traveling as a companion to a husband or lover enabled travel for some women. Some women traveled as guides to expeditions, or as captives. Others dressed in the clothes of a man in order to travel.

Sponsors

In some instances, the role of sponsor—that is, the person having vision, incentive, wherewithal, and dedication to launch an expedition—was as critical as actions in the field (see SPONSORS OF EXPLORATION). In the case of HATSHEPSUT, the first woman pharaoh, who, in about 1492 B.C., sent a maritime trading expedition southward via the RED SEA to the land of PUNT in the region of the Gulf of Aden—one of the first known exploratory expeditions—her name has survived as the most significant with regard to the journey.

Ferdinand II and Isabella I, the joint rulers of Aragón and Castile in Spain in 1479–1504 sponsored Italian mariner CHRISTOPHER COLUMBUS's voyage across the Atlantic Ocean in 1492, leading to European awareness of the Americas. It is thought that it was indeed Isabella, called la Católica (the Catholic), an energetic and involved leader, who first believed such an undertaking was worth the investment, having been so advised by the finance minister Luis de Santangel. One of her motivations was the finding of new converts to Christianity.

Elizabeth I, who ruled England and Ireland from 1558 to 1603, also recognized the economic possibilities of exploration and colonization—in large part because of competition with Spain—and supported the ventures of such men as SIR FRANCIS DRAKE, SIR HUMPHREY GILBERT, and SIR WALTER RALEIGH.

In the mid-19th century, Lady JANE FRANKLIN, widow of SIR JOHN FRANKLIN, lost in the Canadian Arctic after departure from England, persistently raised funds for private expeditions to find him, when she was not satisfied with the results of government-backed endeavors.

For Better or for Worse

A number of wives played important roles in the lives of explorer husbands—and not only in offering moral support and maintaining their interests at home, but also as companions in foreign lands.

One wife, through happenstance, became known as an explorer in her own right. Ecuadorean woman ISABELA GODIN DES ODANAIS was wife of Frenchman Jean Godin des Odanais, part of a French scientific team. In 1769, after waiting for almost two decades, she set out on a journey down the AMAZON RIVER out of central Peru to be reunited with him. When everyone in her party perished, she had to wander in the rain forest alone for nine days before being rescued by Indians and rejoining her husband in Cayenne in French Guiana. She is the first known woman to descend the entire Amazon.

Protestant missionaries were very often a husband and wife team. Englishwoman MARY MOFFAT traveled to southern Africa to marry and be with missionary ROBERT MOFFET and helped him found a mission at Kuruman on the edge of the Kalahari Desert. She remained in Africa until 1870. Their eldest daughter Mary married Scottish missionary DAVID LIVINGSTONE in 1845 and traveled with him on a number of his subsequent African expeditions, dying on the ZAMBEZI RIVER in 1862.

In 1872, Englishwoman ELIZABETH SARAH MAZUCHELLI and her husband, Anglican clergyman Francis Mazuchelli, traversed the Singalila Mountains of eastern Nepal during a two-month, 600-mile trek from Darjeeling into the HIMALAYAS of northern Sikkim. She wrote about her Himalayan journey in the book *The Indian Alps and How We Crossed Them*, published in 1876.

The wives of two American missionaries to the American West—Narcissa Whitman, wife of MARCUS WHITMAN, and Eliza Spalding, wife of HENRY HARMON SPALDING—became the first known non-Indian women to cross the ROCKY MOUNTAINS while traveling with their husbands in 1836.

In the 20th century, two different wives, DELIA JULIA DENNING AKELEY and MARY LEONORE JOBE AKELEY, both American-born, worked and traveled with their husband, American naturalist CARL ETHAN AKELEY, in Africa. They were known as explorers in their own right, Delia in East Africa after her divorce, and Mary in the Canadian northwest before her marriage and in the Belgian Congo after her husband's death. Both wrote about their travel experiences.

Wives and Guides

Another woman who traveled with her husband—and actually proved much more critical to the success of the expedition than he—was Shoshone Indian SACAJAWEA. When her husband, French Canadian fur trapper TOUSSAINT CHARBONNEAU was hired by MERIWETHER LEWIS and WILLIAM CLARK at the Mandan Indian villages on the MISSOURI RIVER in early 1805, he had to convince them to allow his wife (whom he reportedly had won in a gambling game with Hidatsa Indians) to accompany them. Her giv-

ing birth to a baby (JEAN-BAPTISTE CHARBONNEAU) that February did not help his case. Yet, on the journey to the Pacific Ocean and back with the Corps of Discovery, she proved invaluable as a guide and interpreter. She even managed to procure horses from her brother Cameahwait, chief of a Shoshone band, in the course of the trip. Her participation through the return to the Mandan villages helped the expedition maintain mostly peaceful relations with the many other tribes encountered. In his writings about the journey, William Clark praised Sacajawea for her resourcefulness and criticized her husband for general incompetence.

Several years later, in 1811–12, another Native American woman, MARIE DORION of the Ioway tribe, played a similar role for the Astorians under WILSON PRICE HUNT for

fur trader JOHN JACOB ASTOR, serving as a guide beside her husband PIERRE DORION, JR.

Earlier in history, in 1519–21, Aztec woman MALINCHE served as HERNÁN CORTÉS's interpreter during the Spanish conquest of the Aztec Indians in present-day Mexico. Although they had a son together, Cortés eventually presented her as a gift to one of his military colleagues.

One Hand on the Pen

Many women are known as explorers through their writings. One of the earliest to record her experiences away from home was Chinese woman WEN-CHI, who, in about A.D. 190, at age 12, was abducted by the Hsiung-Wu, also known as the Huns. She later wrote about her experiences living as a nomad on the Mongolian steppes in a series of



In this early 20th-century photograph, Harriet Chalmers Adams is shown on an expedition to the Gobi Desert. (Library of Congress, Prints and Photographs Division [LC-USZ62-97426])

poems, known as *Eighteen Songs of a Nomad Flute*. A woman who helped begin the tradition of travel writing was Englishwoman CELIA FIENNES, who, in the late 17th and early 18th centuries, traveled throughout the British Isles on horseback. Her journals were published as *Through England on a Side-Saddle* in 1888.

IDA REYER PFEIFFER, an Austrian woman, circumnavigated the world twice, from west to east and east to west. She wrote about it in *A Woman's Journey Round the World*, published in 1852, and *A Woman's Second Journey Round the World*, published in 1856. ISABELLA BIRD BISHOP, the first woman member of the ROYAL GEOGRAPHICAL SOCIETY, earned this honor by also traveling much of the globe. She was initially instructed to travel by her doctor. She wrote about her travels in *The English Woman in America*, published in 1856, among many other works.

Many women continued this tradition of travel writing in the late 19th and early 20th centuries. ISABELLE EBERHARDT, a Russian-German woman born in Switzerland, converted to Islam, began dressing as a man, and traveled through North Africa in the late 19th century, chronicling her expeditions in many books and French newspapers. MAY FRENCH SHELDON, an American publisher and author in central Africa, was one of the first European women to visit many villages in present-day Kenya and Tanzania. She wrote an account of her experiences in East and central Africa, including her attempt to scale MOUNT KILIMANJARO, in *Sultan to Sultan*, published in 1892. British author MARY HENRIETTA KINGSLEY recorded her two-year journey through West and central Africa in three books, including *Travels in West Africa*, published in 1897.

American HARRIET CHALMERS ADAMS wrote about crossing the ANDES MOUNTAINS of South America and of other travels, including to the GOBI DESERT of central Asia, in the early 20th century, for *National Geographic* and other magazines. She was elected to the Royal Geographical Society and became the first president of the Society of Women Geographers. British archaeologist GERTRUDE MARGARET LOWTHIAN BELL traveled widely in the Middle East in the late 19th and early 20th centuries; she wrote extensively about her experiences, including *Amurath to Amurath*, published in 1911.

Frenchwoman ALEXANDRA DAVID-NÉEL became known as a journalist after she became the first European woman to obtain an audience with the Dalai Lama in exile in India, in 1911. She later became the first European woman to reach the Tibetan city of LHASA, which she described in *My Journey to Lhasa*, published in 1927. British travel writer and archaeologist FREYA MADELINE STARK had many maladies in her life, among them heart attacks, malaria, and dengue fever. None of them detoured her from her travels in the Hadramawt region of southern Arabia and central Asia, which she wrote about in a number

of works, including *The Valley of the Assassins*, published in 1934.

Natural Science

Some women traveled for the sake of science. In the 1860s–70s, German naturalist KONCORDIE AMALIE NELLE DIETRICH spent 10 years collecting the single largest assemblage of natural flora and fauna in Australia. British painter MARGARET URSULA MEE traveled throughout the Amazon Basin over a period of 32 years in the mid-20th century, making a visual record of plant life.

Disguised as Men

Ancient Egyptian queen Hatshepsut was known for wearing men's clothing to further her position of power. Writer Isabelle Eberhardt, mentioned above, also donned men's clothing to facilitate travels. Spanish woman CATALINA DE ERAUSO is also among those successful at traveling as a man. In the early 17th century, in disguise, she fought as a soldier and worked in mining camps in Argentina and Chile. In the 1760s, Frenchwoman JEANNE BARET, disguised as a male crewmember, participated in LOUIS-ANTOINE DE BOUGAINVILLE's official French expedition to the South Pacific, and she may have been the first woman to circumnavigate the world. In the early 19th century, Englishwoman HESTER LUCY STANHOPE adopted male dress in order to travel freely in Israel, Lebanon, and Syria. During her travels, she lived among the Bedouin in the Syrian Desert.

In the Name of Exploration

As has been the case with men, some women considered exploration a calling. Dutch woman ALEXANDRINE PETRONELLA FRANZINA TINNÉ and American LOUISE ARNER BOYD pursued careers as explorers. In the 1860s, Tinné explored portions of the NILE RIVER and SAHARA DESERT, eventually losing her life there to Tuareg tribesmen. Boyd, who came from a wealthy family, organized and led a number of expeditions to the Arctic in the mid-20th century. Both women supported the efforts of scientists, who were with them on some of their travels. In 1955, Boyd became the first woman to fly over the NORTH POLE.

Mountain Climbing

Two early woman mountaineers were ANNIE SMITH PECK and FANNY BULLOCK WORKMAN, both American and both active in the late 19th and early 20th centuries. After climbing in the Alps, Peck turned her attention to South and Central American peaks. Workman traveled throughout Europe, North Africa, the Far East, and central Asia. Among the mountains she climbed were the Himalayas.

The first woman to climb Mount Everest (see EVEREST, MOUNT) was Japanese Junko Taibei on May 16, 1975. Eleven days later, on May 27, Phantog, a Tibetan woman,



Fanny Workman sits next to climbing equipment on one of her expedition in the late 19th or early 20th century. (Library of Congress, Prints and Photographs Division [LC-USZ62-70538])

also made the ascent. The first American woman to reach the summit of the tallest mountain in the world was Stacey Allison in 1988.

Women in Space

With the arrival of the space race, certain women—in particular VALENTINA VLADIMIROVNA TERESHKOVA of the Union of Soviet Socialist Republics (USSR; Soviet Union) and SALLY KRISTEN RIDE of the United States—had a chance to make space history. In 1963, the VOSTOK PROGRAM mission made Valentina Tereshkova the first woman launched into space. She spent 70 hours in orbit. Twenty years later, Sally Ride became the first American woman in space. She orbited Earth for six days aboard the SPACE SHUTTLE.



The above are but a few of the women whose travels are relevant to the history of exploration. They journeyed for varied reasons, but all can be said to be adventurers and pioneers. They endured hardships and demonstrated resourcefulness that many considered beyond the capabilities of women, helping change stereotypical views even as they contributed to knowledge of the regions they visited. In modern times, it has become commonplace for women to travel widely and help explore the remote places of Earth and beyond.

writing and exploration

A rich literature is attached to world exploration. Writings by explorers or about them is filled with challenge, adventure, drama, and description. It is writing and documentation that defines history, and the history of exploration and the gaining of geographic knowledge provides a fascinating view of the saga of humankind. Yet writing is not just the means of telling and preserving the story; it is part of the story. Accounts about travels spurred on other travels. The success of books regarding one expedition helped justify and pay for others. Moreover, travel writing developed as a calling unto itself.

Writing and the Ancients

Tracing the careers of early explorers helps give a sense of the importance of writing in both preserving and shaping the chronicle of exploration. Four Greeks of the sixth and fifth centuries B.C., HECATAEUS OF MILETUS, HERODOTUS, CTESIAS OF CNIDUS, and XENOPHON, who traveled beyond their homeland—Hecataeus and Herodotus up the NILE RIVER, Ctesias to Persia (Iran) and India, and Xenophon from Persia to Greece—are sources for much of what we know about the period (see GREEK EXPLORATION). But they also sparked interest about foreign lands among their contemporaries and subsequent generations. While ostensibly a

historical account of the wars between the Greeks and Persians, Herodotus's *History* consists of a mixture of observation and myths, which sometimes veer wildly from the truth, similar to earlier Greek poetry, and with literary themes examining the consequences of the meetings of different peoples, and contrasting the values of democracy and tyranny. They helped inspire ALEXANDER THE GREAT in his campaign against Persia in the fourth century B.C., which resulted in the hellenization of much of the Middle East and a dissemination of Greek culture and literature. The Romans took up this tradition as they expanded their domination over the Mediterranean world in the early centuries B.C., spreading Roman culture and the Latin language (see ROMAN EXPLORATION).

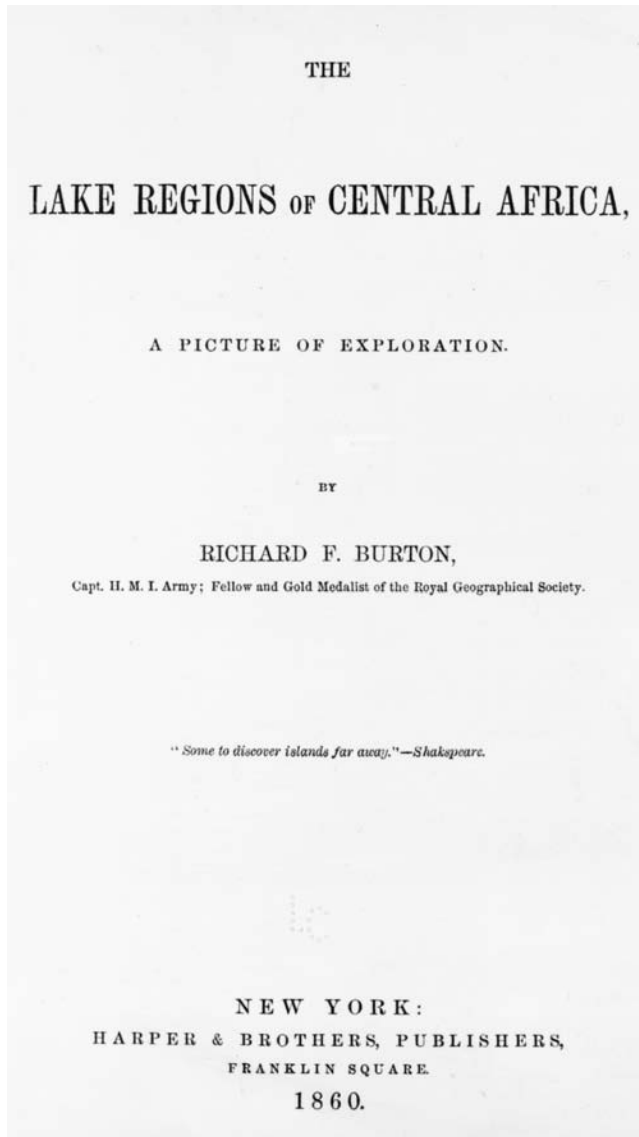
Cartographers, who are also part of the story of writing and publishing, drew on their accounts and those of other early travelers. Those who recorded and passed on the evolving view of the world from their own travels and/or the travels of others include Greeks ERATOSTHENES of the third and second centuries B.C. and STRABO of the first century A.D., Roman PLINY THE ELDER of the first century A.D., and hellenized Egyptian Ptolemy of the second century A.D. (see GEOGRAPHY AND CARTOGRAPHY).

Writings of the East

Writers and cartographers of the East, as in China, also disseminated knowledge gained through exploration (see CHINESE EXPLORATION). In about A.D. 220, the Han dynasty collapsed, which had united China in an empire for about 400 years. In subsequent years, Buddhism, a religion that had developed on the GANGES RIVER in India, was passed into China. But the Chinese Buddhists had learned from translated texts and word of mouth, leading to doctrinal disagreements. In A.D. 399, a Buddhist monk in China, FA-HSIEN, embarked on a voyage to India in order to make copies of original Buddhist texts in Sanskrit, translate them, and resolve these questions. Fa-hsien's journey lasted 15 years, and took him over the Takla Makan desert and through the HIMALAYAS to the INDUS RIVER and then across northern India, but he eventually returned to China with a wealth of Buddhist texts.

Fa-hsien was followed two centuries later, in A.D. 629, by another Chinese Buddhist monk, HSÜAN-TSANG, for the same purpose. After a long journey through central Asia and India, he too returned with Buddhist scriptures. Another scholar, I-CHING, set out for India in 671 in search of Sanskrit texts and traveled in Indonesia as well. Chinese cartographers, such as CHU SSU-PEN of the 14th century, defined the known world at the time based on others' accounts.

Many of the most famous Arab Muslims who played a part of the history of world exploration were geographers as well as writers (see MUSLIM EXPLORATION). ABU AL-HASAN



This title page is from an 1860 book on Africa by Sir Richard Burton. (*Library of Congress, Prints and Photographs Division [LC-USZ62-108547]*)

ALI AL-MASUDI traveled to Islamic lands in the 10th century; ABU ABD ALLAH MUHAMMAD ASH-SHARIF AL-IDRISI did so in the 12th century; and ABU ABD ALLAH MUHAMMAD IBN BATTUTAH did so in the 14th century. Ibn Battutah also voyaged southward into Africa beyond the world known to his peers.

Renaissance Writings

Among Europeans, early explorers such as German PETHAHIA OF REGENSBURG of the 12th century, Italian MARCO POLO of the 13th century, and Italian ODORIC OF PORDENONE of the 14th century shaped the European worldview during and after their lives with their tales of

foreign lands (all three men had the help of writers in recording their travel accounts). In 1375, ABRAHAM CRESQUES published a world atlas based largely on their accounts. This work was a milestone of the early RENAISSANCE, the name applied to a cultural phase in Europe from the 14th century into the 17th century, a time of new accomplishments in scholarship and the arts and a new awareness of the world (see EUROPEAN AGE OF EXPLORATION).

The development of the movable type printing press by German goldsmith and printer Johannes Gutenberg in the mid-15th century, part of the phenomenon of the Renaissance, made books accessible to a wider audience, and some of the most successful early books capturing the public's imagination involved accounts of distant lands. For example, Italian FRANCESCO ANTONIO PIGAFETTA, who served as Portuguese FERDINAND MAGELLAN's private secretary in the first CIRCUMNAVIGATION OF THE WORLD in 1519–20, kept a daily record of the voyage, which was published in Paris in 1540 and reached a large readership. BERNAL DÍAZ DEL CASTILLO's account of the Spanish conquest of the Aztec Indians of the 1520s in Mexico, in which he participated, was not published until the 17th century, but became the primary source for that event.

Various Approaches to Writing

Many different approaches to writing have furthered knowledge of exploration and geography. An 18th-century French historian PIERRE-FRANÇOIS-XAVIER DE CHARLEVOIX traveled in North America for the purpose of research, which was later incorporated in his six-volume *History of New France*. Other scholars who traveled for their work—such as German naturalist ALEXANDER VON HUMBOLDT in the late 18th century and 19th century, and British archaeologist JAMES THEODORE BENT in the late 19th century—recorded their findings in writing, which were passed on to the public through publishing (see NATURAL SCIENCE AND EXPLORATION and ARCHAEOLOGY AND EXPLORATION). The journals of MERIWETHER LEWIS and WILLIAM CLARK about their 1803–06 expedition have been published time and again. The role of the less renowned MOUNTAIN MEN in the FUR TRADE in the 1820s–30s, such as WARREN ANGUS FERRIS, might not be known if not for their own accounts of their careers, or as told to others who wrote about them. In some instances, professional writers became known in other capacities. For example, British-American journalist SIR HENRY MORTON STANLEY, who was in Africa in much of the 1870s–80s, became known as an explorer and colonizer first and as a writer second.

Travel Writing

In its modern incarnation of travel writing, the purpose of the trip is writing about the trip. Yet, with regard to earlier ages, the phrase is applied to any account involving travels.



Cloud from avalanche descending between two granite peaks on Bilaphond glacier.

Frontispiece.

**TWO SUMMERS IN
THE ICE-WILDS OF
EASTERN KARAKORAM**
THE EXPLORATION *of* NINETEEN
HUNDRED SQUARE MILES
OF MOUNTAIN AND GLACIER
By FANNY BULLOCK WORKMAN *and*
WILLIAM HUNTER WORKMAN
WITH THREE MAPS AND ONE HUNDRED AND
FORTY-ONE ILLUSTRATIONS BY THE AUTHORS

E. P. DUTTON & COMPANY
681 FIFTH AVENUE, NEW YORK

This frontispiece and title page were included in a 1917 book by Fanny Workman and her husband. (*Library of Congress, Prints and Photographs Division [LC-USZ62-108069]*)

WEN-CHI, a Chinese woman who was abducted by the Hsiung-nu (Huns) and who lived as a nomad on the Mongolian steppes in the second century A.D., wrote about her experiences in *Eighteen Songs of a Nomad Flute*. This might also be called a captivity narrative. In the 16th century, Portuguese FERNÃO MENDES PINTO wrote about his travels in the Far East on returning to Portugal and earned the sobriquet “Prince of Lies” because many of his adventures seemed too fantastic to be believed.

An early traveler whose writings became an intrinsic part of her wanderings was CELIA FIENNES. In the late 17th and early 18th century, she journeyed throughout England, keeping a journal of her experiences. Travel writing became a tradition for the British in the 19th century, especially for women. LUCY ATKINSON, ISABELLA LUCY BISHOP, ANNE ISABELLA BLUNT, MARY HENRIETTA KINGSLEY, and ELIZABETH SARAH MAZUCHELLI all can be said to have engaged in travel writing. This tradition carried over into the 20th century with ALEXANDRA DAVID-NÉEL and FREYA MADELINE STARK.

Austrian IDA REYER PFEIFFER, active in the 19th century, and Swiss ISABELLE EBERHARDT, active at the turn of the 20th century, might also be called travel writers. Americans who engaged in travel writing in the 19th century are HENRY MARIE BRACKENRIDGE, JOHN TREAT IRVING, and MAY FRENCH SHELDON; and, in the 20th century, HARRIET CHALMERS ADAMS and PAUL BELLONI DU CHAILLU.

Exploration and Literature

Once, when in old age, the British author and explorer CHARLES MONTAGU DOUGHTY had been asked why he had made his journey through the deserts of the Arabian Peninsula in the 1870s, he replied that he had made his voyage “to redeem the English language.” The only way for Doughty to capture his experience, far from the orderly landscape of England, was to abandon the built-up literary conventions, and to adopt a mode of expression from his environment, the Arabian desert. Doughty wrote his account of his explorations, *Travels in Arabia Deserta*, published in 1888, a work of more than 600,000 words, in a

style that hearkened back to an earlier period of English literature, to Edmund Spenser and the King James Bible, but he injected in it something new too, unique to the desert, for he took the inspiration for his style from the looser grammar and foreign rhythms of Arabic. His account was read by a generation of 20th-century writers including D. H. Lawrence, T. S. Eliot, and James Joyce, and inspired THOMAS EDWARD LAWRENCE (Lawrence of Arabia) in his Arabian travels and in writing his own account of his experiences in the Middle East, *Seven Pillars of Wisdom*, published in 1935. Whether or not Doughty had truly made his journey for the sake of language, his comment illustrates his understanding of the potential impact of exploration on the world's literature.

Beyond firsthand accounts of explorers, traders, and adventurers such as Doughty's account, are the works that take up exploration as a conceit around which main themes are built. These stories are older than written records, going back to the third millennium B.C., to the epic story of *Gilgamesh*, a legendary king of ancient Sumeria who embarks on a mythical journey in search of the secret of everlasting life. This could represent a journey through the Near East, up to the Black Sea. The myth wrestles with the questions of an individual's life and death and his place in the universe, while he makes a long voyage, much like the ones that were made by Sumerian and later Akkadian rulers (such as SARGON) in Mesopotamia to secure trading rights and maintain hold of the kingdom. Another early work of literature that uses a voyage through unknown lands as its central theme is the *Odyssey*—a Greek epic attributed to a circa ninth-century Greek poet Homer—recounting the 10-year voyage of Odysseus (the Roman Ulysses) home, from Troy. While grappling with fate and the gods, Odysseus encounters lands throughout the MEDITERRANEAN SEA, an area explored by early Greek traders. The work relates observations of the strange peoples and lands visited by Odysseus and his ship similar to those made by later Greek historians, such as Herodotus and Xenophon, whose writings reflect growing contacts among foreign cultures.

The effects of the travels of Chinese scholars had a profound influence on Chinese culture and literature. The influences can be seen in a 16th-century Chinese novel *Hsi Yu Chi* (known in the West as *Monkey* because one of the supernatural characters is a monkey spirit), by Wu Ch'eng-en, written during the Ming dynasty in China, when the Chinese were undergoing a reappraisal of their past after being freed from the rule of the Mongols. The work's Chinese title literally means a "Journey to the West," and, in it, Hsüantsang is fictionalized alongside a motley group of fantastic characters who embark on a journey to India. The book mixes both Confucian and Buddhist philosophy and religious images, reflecting the mixing of Chinese culture under influence from Indian thought in the West, and the many

fabulous happenings along the way represent the issues raised by the interaction of foreign cultures.

The European explorers of South America wrote accounts no less fabulous than those of Herodotus. Missionaries told stories of giants with oversized feet, of cities of gold and forests of cinnamon, and of women who fought like men. European seafarers spread throughout the seas, and Europeans established settlements. In 1609, nine ships under English sea captain CHRISTOPHER NEWPORT set out from England with 500 colonists on board, heading for John Smith's Virginia colony, and one ship, the *Sea Adventure*, (also listed as *Seaventure*) was wrecked in a storm off the coast of Bermuda. The island was a miraculous haven, and after nine months, the colonists were rescued. The accounts of survivors, by SILVESTER JOURDAIN and William Strachey, are generally regarded to have been the inspiration for Shakespeare's purportedly last and one of his most popular plays, *The Tempest*. Set on an island ruled by a European castaway, Prospero, and his daughter, Miranda, and populated by an indigenous native, Caliban, whom Prospero enslaves, a frightful storm strands a group of Europeans on the island. Among the themes dealt with are the implications of colonizing inhabited lands, and the dubious but compelling prospect of founding a utopian kingdom in new worlds.

A shipwreck inspired another work of literature, which is in great part a meditation on European exploration and colonization. ALEXANDER SELKIRK, a Scottish seaman on a privateering expedition along the Pacific coast of South America, was marooned on the island of Mas Tierra, one of the Juan Fernández Islands, in 1704. He survived four years on the island, building himself a shelter and hunting wild goats, before being rescued by other PRIVATEERS. This story came to the attention of Daniel Defoe, who then wrote his first novel based upon it, *Robinson Crusoe*, published in 1719. The novel was instantly popular, dealing with the novelties and excitement of exploration, as well as touching on the fundamental human problem of isolation. *Robinson Crusoe* has remained popular up until the present day, spawning many versions and imitations.

Irish satirist Jonathan Swift embarked on his own exploration of human nature, in a more pointed and fantastic way than Defoe had done. In a direct literary line from Homer's *Odyssey*, but, drawing on the abundant travel narratives of his day, he told the story, in *Gulliver's Travels*, published in 1726, of Lemuel Gulliver, a country doctor who enlists himself as a ship's doctor and embarks on a sea voyage during which he visits strange lands. In Swift's book, however, the discoveries of the inhabitants of these strange lands tell the reader more about the inhabitants of England than anything else.

The genre of science fiction—although wide-ranging in themes, some of them beyond the range of human

possibility—draws from the spirit of exploration. One of the earliest writers associated with the genre, Frenchman Jules Verne, wrote a number of books which presaged real events, *De la Terre à la Lune* (*From the Earth to the Moon*), published in 1865, and *Vingt Mille Lieues sous les mers* (*20,000 Leagues Under the Sea*), published in 1870. These works, along with other works such as *Voyage au centre de la Terre* (*Journey to the Center of the Earth*), published in 1864, create fictional characters very much in keeping with real-life explorers.



Exploration challenges humankind's view of the world and has led to the dissemination of knowledge as well as a body of literature. Moreover, the literature itself has inspired further voyages. The above-mentioned writers and their works help give a sense of the intrinsic relationship of writing and exploration, but it should be kept in mind they are just a sampling. Many explorers wrote accounts of their expeditions. And many writers and historians not known as explorers have added to the literature of exploration.



Yangtze River (Chang, Changjiang)

The Yangtze River, also known as the Chang, is the longest river in China and the third-longest in the world, after the NILE RIVER and the AMAZON RIVER. It extends for 3,900 miles, originating in the snows of the Kunlun mountain range at the eastern end of the Tibetan Plateau, and flows through central China into the East China Sea, a small arm of the Pacific Ocean. The Yangtze and its tributaries have a drainage area of some 650,000 square miles, taking the bulk of its waters from a number of tributaries: the Han, Yalong, Jialing, Min, and Tuo He, on the north and the Wu, on the south. As it discharges about 770,000 cubic feet of water into the sea, the Yangtze deposits 6 billion cubic feet of sediment annually, creating fertile soil, ideal for the growing of rice.

From its delta, the Yangtze rises gradually by only about 130 feet in its first 1,000 miles, making an excellent channel for ship traffic, except for the steep Yangtze gorges the river passes through at a distance of about 200 miles. Farther up-river, navigation becomes difficult due to shifting sandbars and becomes unnavigable at Pingshan at a height of about 1,000 feet above sea level. The river quickly rises in Upper Tibet to an altitude of 16,000 feet. While the river is commonly called the Yangtze, the name applies in China only to its last 300 to 400 miles of its extent, Changjiang (long river) being its official name. Local names apply to other parts of the river, such as Jinsha (golden sand) in its upper reaches.

Communication and Trade

The Yangtze has served as the principal route of communication and trade in China, from ancient times until the present (see CHINESE EXPLORATION). The first European on record to have seen the river is MARCO POLO, a Venetian merchant who traveled through China for almost 20 years in the 13th century. In his account, he recorded his impressions of the vast magnitude of ships on the Yangtze, saying that in one place they dwarfed all the traffic on every European waterway, put together. The first systematic exploration of the river from the West took place in the middle of the 19th century. The French, who had begun to colonize Indochina, sent expeditions to explore the Mekong River, which runs parallel to the Yangtze, though farther south and separated by a high ridge. Frenchman MARIE-JOSEPH-FRANÇOIS GARNIER accompanied an expedition, which followed the Mekong River before heading northward into China. When ERNEST-MARC-LOUIS DE GONZAGUE DOUDART DE LAGRÉE, the leader of the expedition, died, Garnier took control and under his command the expedition followed the upper Yangtze to the port city of Shanghai.

Once China was opened to Western travel, the port of Shanghai became an important entry point. Christian missionaries, such as Englishwoman ANNIE ROYLE TAYLOR, who, in 1892, attempted to enter LHASA, the Forbidden City of Tibet, traveled from there, as did other Westerners hoping to penetrate the interior of China. Another Frenchman, CHARLES BONIN, spent seven years exploring China



Shown here, in a photograph from about 1918, are Chinese junks on the Yangtze River. (*Library of Congress [LC-USZ62-102719]*)

at the end of the 19th century and made the first scientific survey of the river, charting its course. At the turn of the 20th century, the Yangtze and its tributaries carried nearly half of China's maritime commerce.

Canal and Dam

The river is still an immensely important waterway, and is joined by a canal called the "Great Canal," more than 1,100 miles long, to China's other important river, the YELLOW RIVER (or Huanghe). This canal has been of importance to transportation since it was first dug during the Wu Dynasty in about 486 B.C. It has been extended over time and redone for the last time over six years during the Sui dynasty from

A.D. 605 to 610. In addition, the Chinese government has been building a dam since 1994—the Three Gorges complex—near Yichang, in order to control the annual flooding of the river caused by snowmelt in the mountains. It will also generate electricity. The lake formed by the dam will displace some 1 million people and will flood many historical sites.

See also ASIA, EXPLORATION OF.

Yellow River (Huang, Huanghe, Hwang Ho)

At 3,395 miles, the Yellow River, or Huanghe (also spelled in English Hwang Ho), is China's second-longest river after the



YANGTZE RIVER (Chang), and the sixth-longest in the world. The Chinese call the river Yellow on account of the silt it carries in exceptionally high concentration. The river originates in the Kunlun Mountains of western China, fed by springs and high lakes, flowing turbulently eastward through deep gorges before turning northeast into the Ordos Desert, a part of the GOBI DESERT. This part of the river, called the “great northern bend,” ends after the river flows several hundred miles due east and turns to the south. Here, between the Shaanxi and Shanxi provinces, the river flows through a valley of especially fertile soil, known as loess. The river picks up the majority of its silt in this region where sudden heavy rains erode the soil, and where it is joined by its main tribu-

taries, the Wei and Fen Rivers. Thereafter, the river emerges onto the broad North China Plain where it meanders for a little more than 100 miles through one of China’s principal agricultural regions before emptying into the Gulf of Bo Hai, an arm of the Yellow Sea.

Civilization and Sorrow

The Yellow River is known as the “Cradle of Chinese Civilization” because the earliest evidence of Chinese civilization is found in its valley, and Chinese tradition traces its history, and indeed all Chinese ancestry, back to Huang Ti (Huangdi), the Yellow Emperor. Huang Ti, legend has it, was a marauder making his living plundering throughout the North China Plain but moved up into the plateaus of yellow loess soil. The settlement he founded supposedly prospered and gave birth to Chinese civilization. It is known that the Yellow River Valley was populated by scattered groups of neolithic peoples from about 9,000 to 6,000 years ago, and by 4,000 years ago, settled populations and technological and agricultural developments are found in the loess regions. Not yet highly eroded, the elevated fertile plains provided a perfect location for development.

The Yellow River is also called “China’s Sorrow” because of the catastrophic flooding to which it is prone. As farming spread through the North China Plain, farmers built dikes to protect their crops from periodic flooding. These dikes caused the river to deposit more silt as sediment on the riverbed, raising the river, and necessitating yet higher dikes. Now, in places, the river is as high as 30 feet above the surrounding ground level and far more susceptible to flooding. There is always danger of the many dikes or levees breaking. Historically, the river has flooded thousands of times, most devastatingly in 1931, when flooding covered 34,000 square miles of the densely populated North China Plain, leaving 80 million people homeless and 1 million people dead.

East and West

Chinese civilization developed in the Yellow River Valley and in the Yangtze River Valley in relative isolation, due to surrounding mountains and deserts and to the marauding tribes, which threatened trade caravans. Technological innovations such as the wheel made their way from the West, but it was not until the second century B.C. that communication with peoples living to the west became regular (see CHINESE EXPLORATION). The Han dynasty flourished in China but was threatened by the activities of the Hsiung-nu (Xiongnu, or Huns) in central Asia. CHANG-CH’IEN, a Chinese diplomat, was sent west in 138 B.C. to make a military alliance with the Yue-chi (known in the West as the Scythians). His expedition failed and he was held in captivity by the Huns for many years, but he eventually brought back reports of the West, including of the Roman Empire. A second

expedition revealed a trade route from the headwaters of the Yellow River, which skirted hostile tribes, and led to the establishment of the SILK ROAD, which developed into a main pathway for East-West trade.

The Yellow River, aside from its signal agricultural importance, was an important river for travel and trade. Its traffic—mostly of a type of boat known as the JUNK—amazed one of the first Western visitors to China, Italian merchant MARCO POLO. At that time, in the 13th century,

the Yellow River emptied directly into the Yellow Sea. It has changed its course in the eastern portion of the river several times in its history.

Starting in 1893, CHARLES BONIN spent seven years exploring China, during which he made the first modern scientific surveys of the Yangtze and Yellow Rivers, charting their courses.

See also ASIA, EXPLORATION OF.



Zaire River See CONGO RIVER.

Zambezi River (Zambesi River)

The Zambezi River (also spelled Zambesi), the fourth-largest river of Africa, follows a double S-shaped course as it flows 1,700 miles across much of southern Africa. It begins in northwestern Zambia, about 5,000 feet above sea level, and flows south through eastern Angola and western Zambia, to the border of northeastern Botswana, then flows east between Zambia and Zimbabwe, finally crossing central Mozambique and emptying into the Indian Ocean through many outlets. The Zambezi's many tributaries were once confused with the river systems of the CONGO RIVER (Zaire River) and the NILE RIVER to the north. Much early African exploration was carried out for the purpose of understanding the various sources and tributaries.

Portuguese Exploration

The Portuguese were the first to explore and make use of the Zambezi River. In 1505–14, a convict named Antonio Fernandes explored the region on a quest for gold. Although he found no gold, he determined that the Zambezi was navigable for 300 miles from its mouth upriver and concluded that it presented the best route for inland trade. In 1531, the Portuguese founded the outpost of Sena, and, in 1560, Tete farther upriver, both in present-day Mozambique. The Sena settlement became the first point of contact

between Europeans and the Bantu people. The Bantu claimed that the Zambezi was a river so great that no one knew its source. Portuguese traders eventually traveled some 800 miles inland.

In 1798, in the hope of joining Portuguese possessions on Africa's east and west coast, FRANCISCO DE LACERDA ascended the Zambezi from Tete and managed to make it past the Quebrabasa Rapids. He then entered the Luangwe River, one of the Zambezi's major tributaries. He died of fever near Lake Mweru, and his men returned to Tete via the Zambezi, failing to accomplish the east-to-west crossing of the continent.

The Livingstones

The Zambezi later captured the imagination of one of Africa's greatest explorers, Scottish missionary DAVID LIVINGSTONE. In 1851, after traveling northward through the Kalahari Desert with his wife, MARY MOFFAT LIVINGSTONE, and children, he stumbled upon a section of the upper Zambezi not yet seen by Europeans. Realizing the danger of the tropical climate, he sent his family back to England and resumed explorations in the region in 1853. Traveling from Capetown with ox carts and native porters, he came to Linyanti, the capital of the Makololo people. After a month-long fever, he hired more men and proceeded up the river by CANOE to the north. He succeeded in exploring a large portion of the upper Zambezi before heading west to the coast, reaching Luanda in present-day Angola. On his way back



This photograph shows a vista of the Zambezi River in the mid-20th century. (*Library of Congress, Prints and Photographs Division [LC-USZ62-98036]*)

from Luanda, he once again traveled the river. In 1855, he became the first European to witness the 420-foot Victoria Falls, which he named after Queen Victoria (local native peoples called it Mosiottatunya for the “smoke that thunders”). Continuing by river and overland, he reached the east coast at Quelimane in 1856. In so doing, he completed the first known voyage across the southern section of the continent.

Livingstone returned to England after his continental crossing and found himself a national hero. He had witnessed the misery of the SLAVE TRADE in Africa and had made it his goal to replace it with “Christianity and commerce,” believing that, if Africans could produce their own commodities for export, there would be less slaving. The Zambezi was a key part of his vision. For his next series of expeditions beginning in 1858, he obtained a paddle-wheel steamship to explore up the Zambezi from the east coast and establish trade contacts. His wife accompanied him. His expedition was soon frustrated by the rapids at Quebrabasa. When Livingstone had made his extensive studies of the Zambezi, he had heard of the Quebrabasa Gorge, but had not seen it. The description he was given, of “a few rocks in the river,” gave him hope that river would be navigable for

some distance. When this proved impossible, he steamed northward up the Shire River, and reached Lake Nyasa (Lake Malawi). While traveling on the Zambezi in 1862, his wife died of tropical fever. This sent Dr. Livingstone into a deep depression and may have been the reason that he quit his activities on the Zambezi. For the next two decades, he continued to explore Africa, but in other locations, pursuing other mysteries.

Livingstone had outlined the course of the Zambezi and described its independence from the Congo and Nile systems. More work would remain to be done concerning its minor tributaries. During his 1873–75 expedition, Englishman VERNEY LOVETT CAMERON studied various of the region’s smaller rivers, traveling the watershed between the Congo and Zambezi. In 1890, Scotsman JOSEPH THOMSON made additional explorations of the upper Zambezi.



Today, many of the lands that surround the Zambezi are fertile and populated, and long sections are used for local traffic. A number of hydroelectric plants along the river generate power for the peoples of Africa.

See also AFRICA, EXPLORATION OF.

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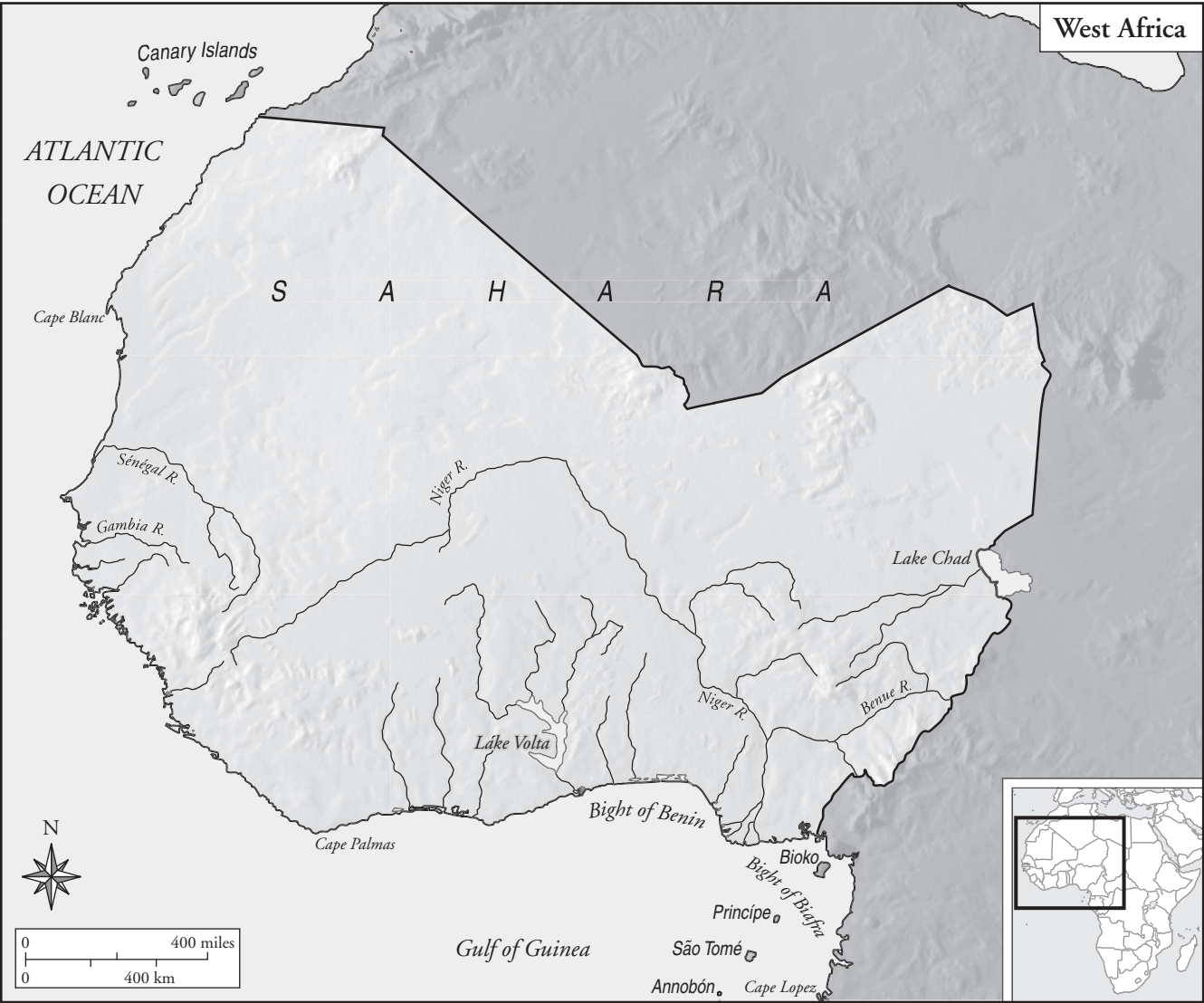
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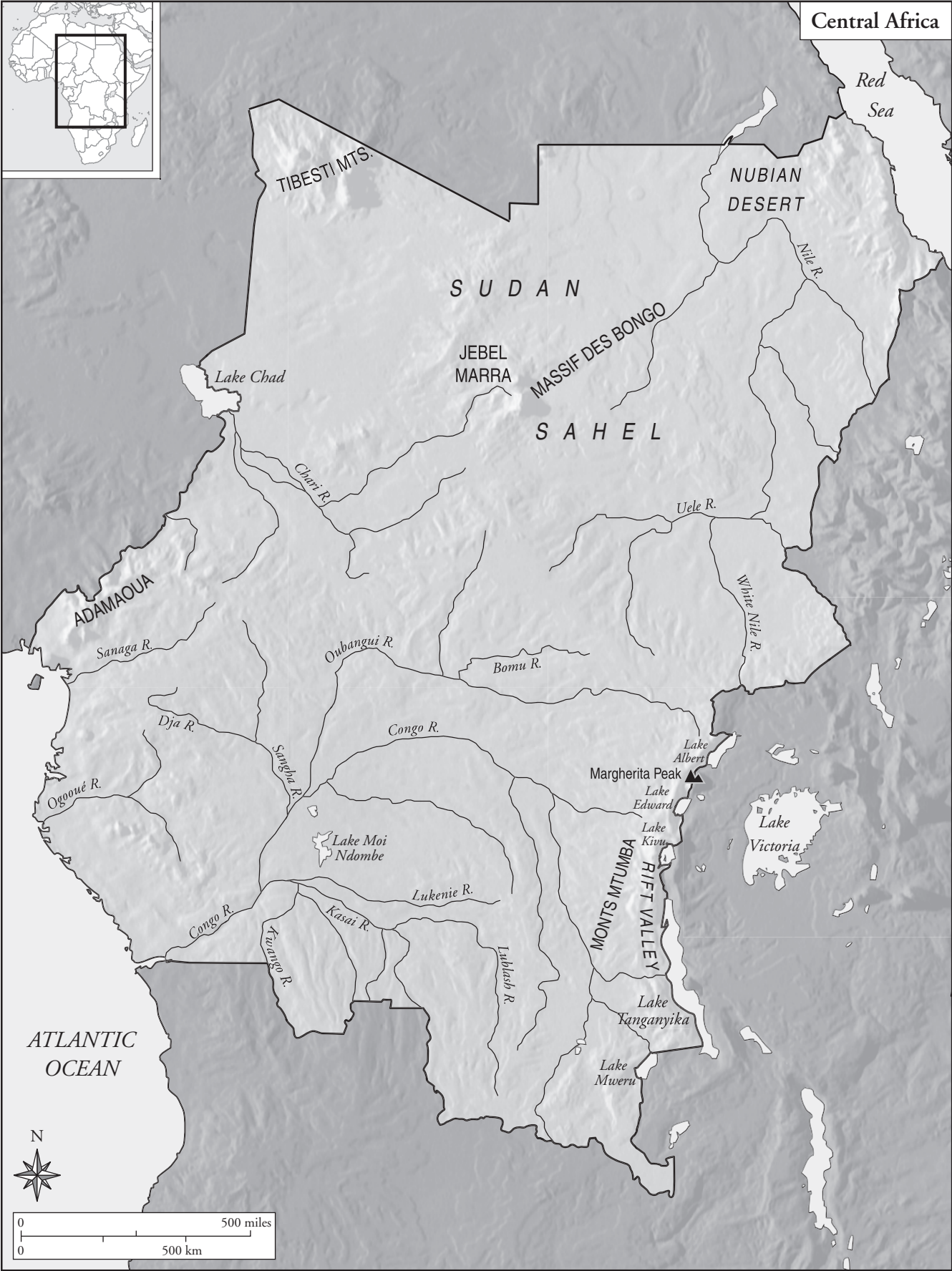




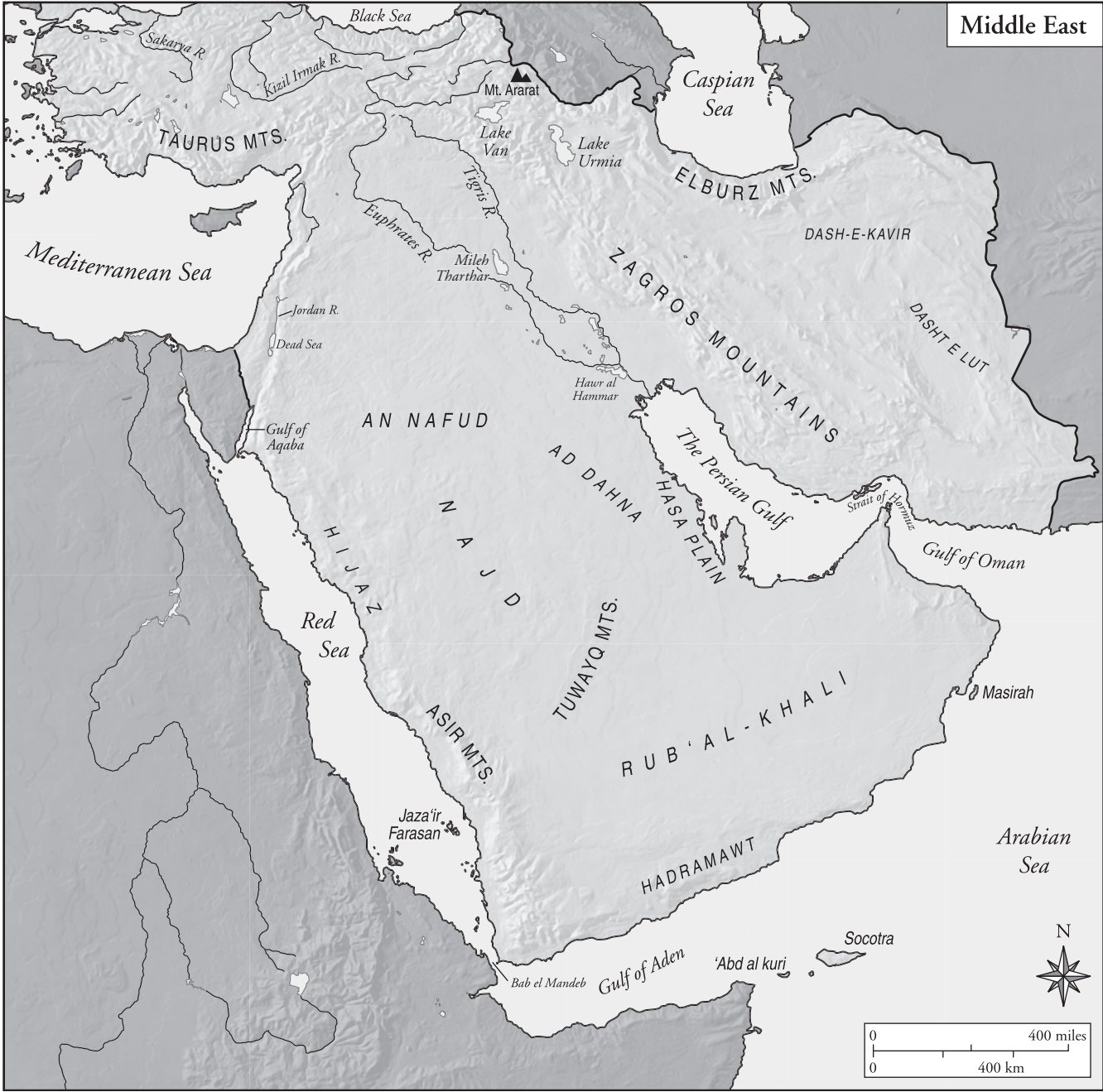










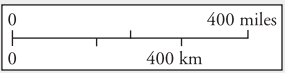








South Asia













South Polar Region

ATLANTIC OCEAN

AFRICA

INDIAN OCEAN

• Bouvet I.

• Prince Edward Is.

South Georgia I.

• Croseti Is.

Falkland Is.

South Orkney I.

Antarctic Circle

Scotia Sea

South Shetland Is.

Average permanent extent of sea ice

Weddell Sea

DRONNING MAUD LAND

TIERRA DEL FUEGO

SOUTH AMERICA

PALMER LAND

RONNE ICE SHELF

GREATER ANTARCTICA

Bellinghousen Sea

ELLSWORTH LAND

LESSER ANTARCTICA (WEST ANTARCTICA)

TRANSANTARCTIC MOUNTAINS

QUEEN MARY LAND

90° W

South Pole

90° E

Amundsen Sea

MARIE BYRD LAND

ROSS ICE SHELF

(EAST ANTARCTICA)

WILKES LAND

Ross Sea

Balleny Is.

• Macquarie Is.

PACIFIC OCEAN

Campbell I.

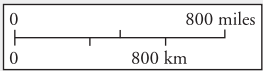
• Auckland I.

Tasmania

Antipodes Is.

NEW ZEALAND

AUSTRALIA

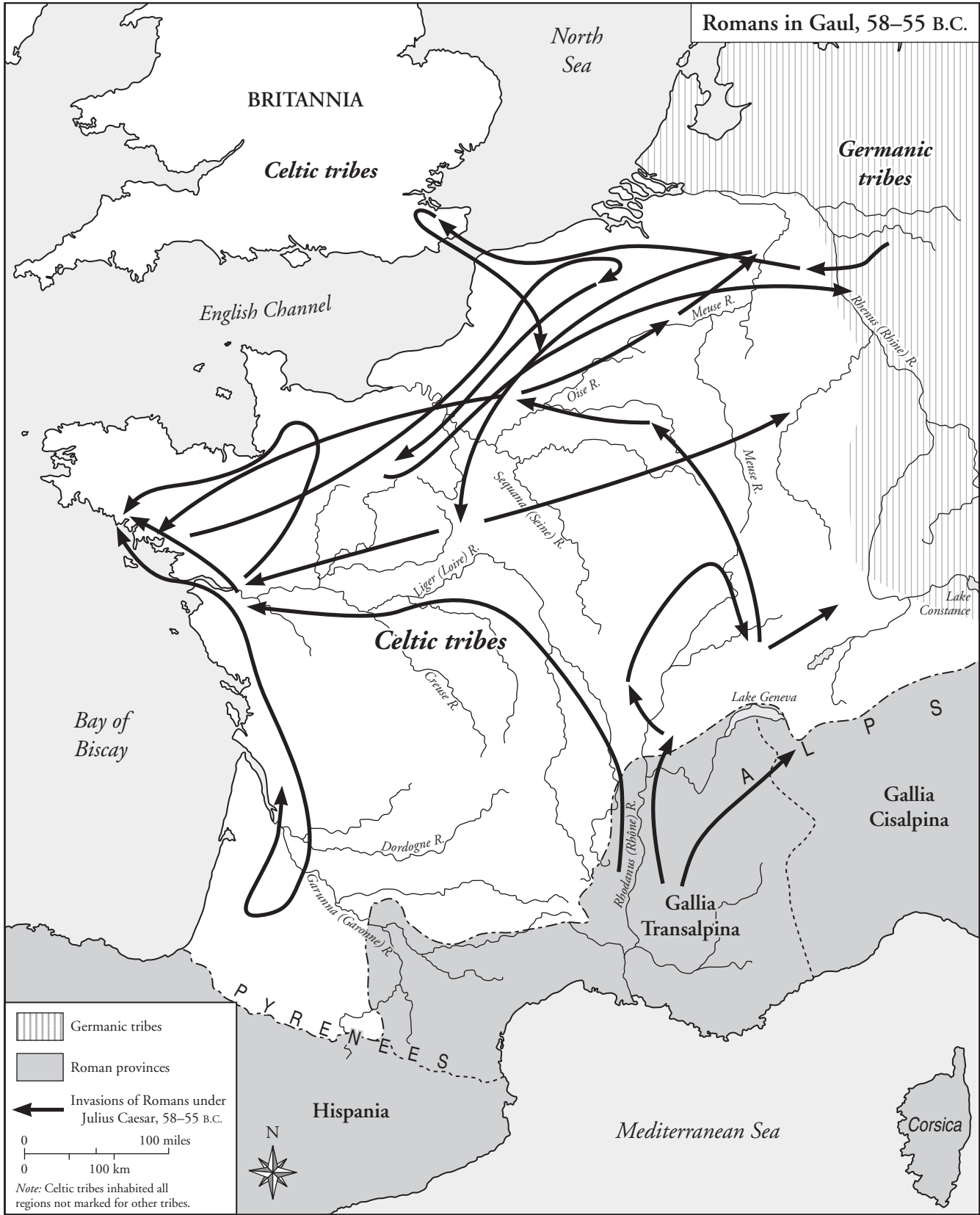


180°

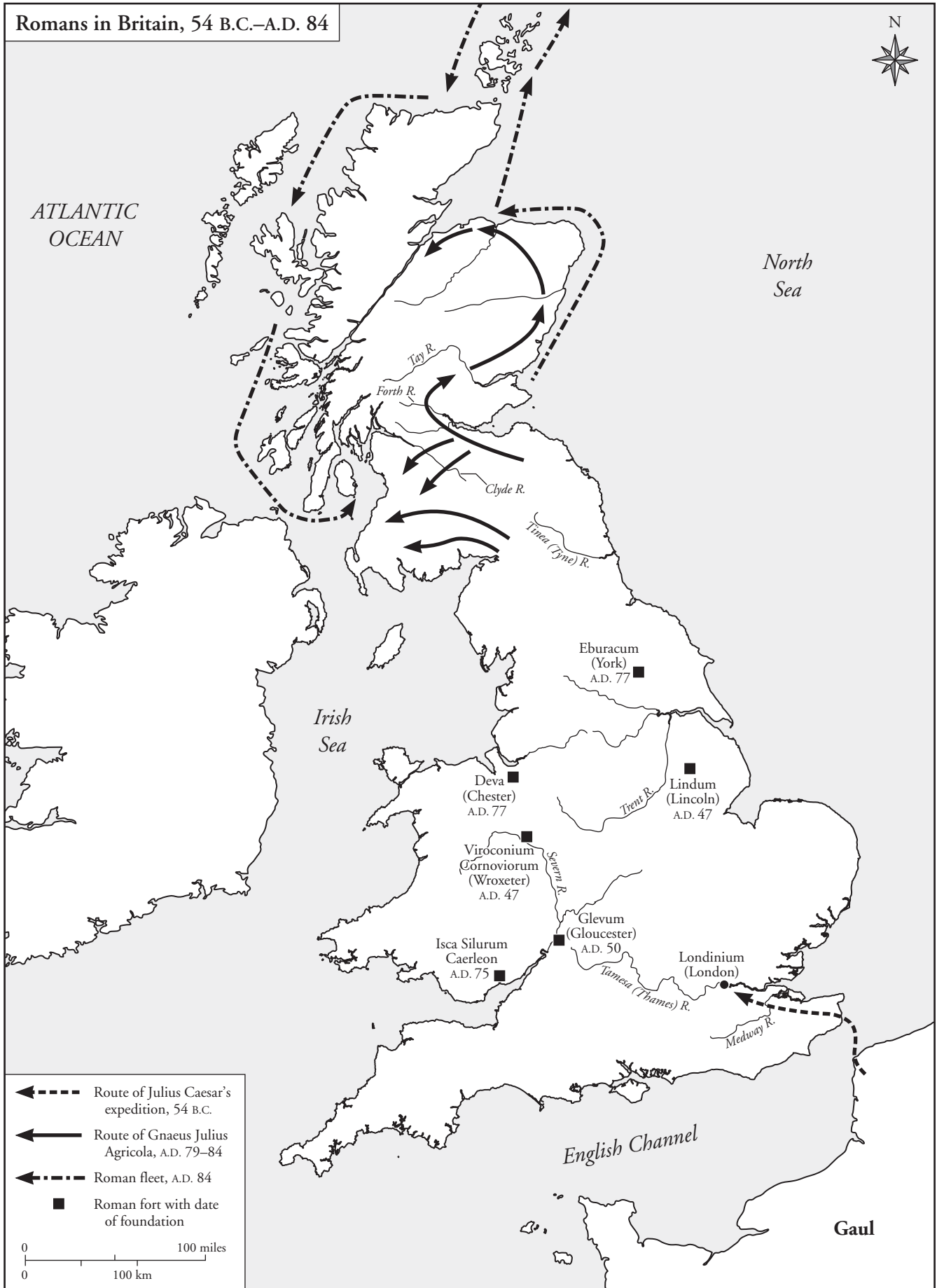
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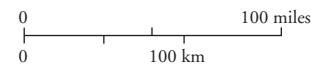




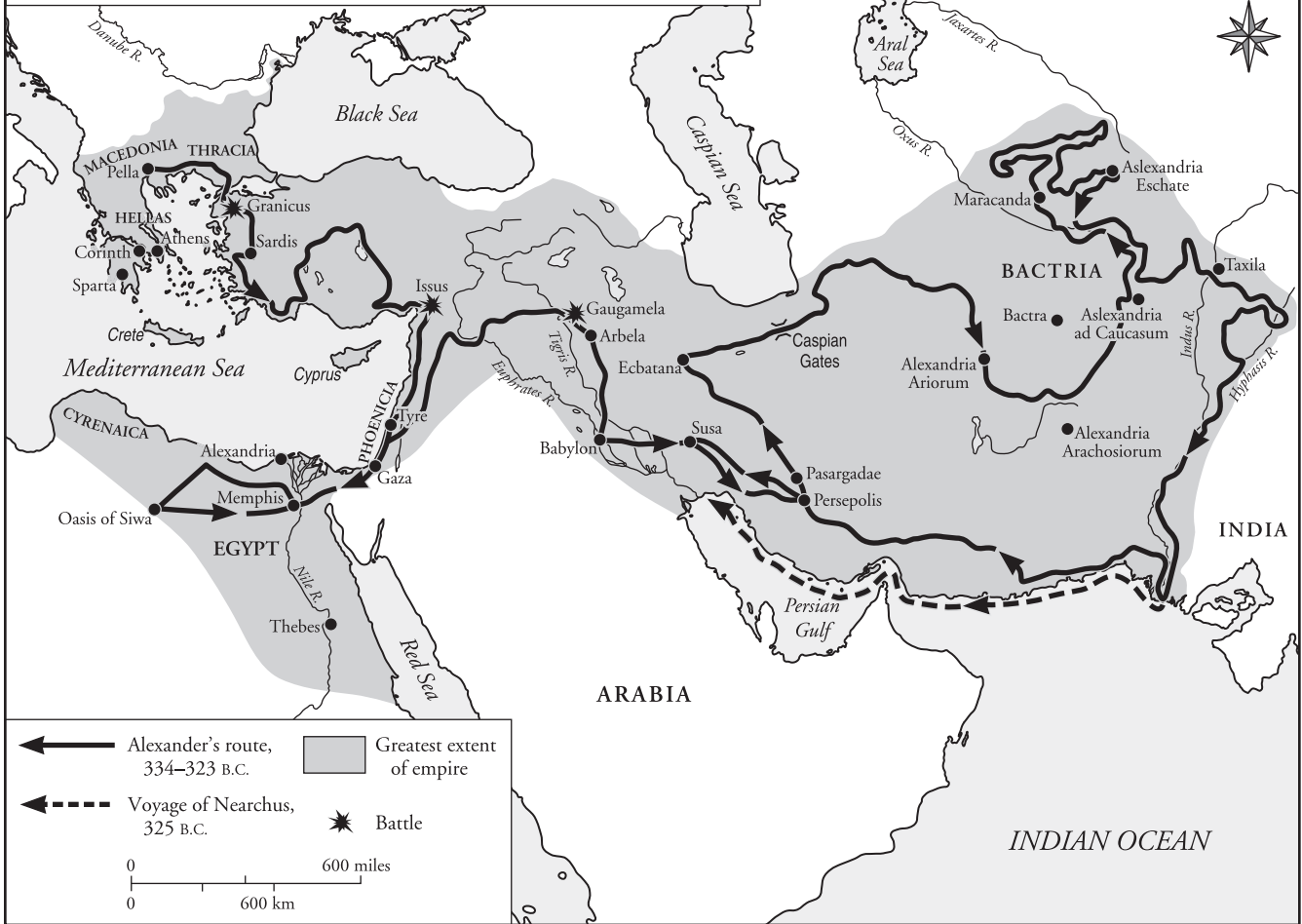
Romans in Britain, 54 B.C.–A.D. 84



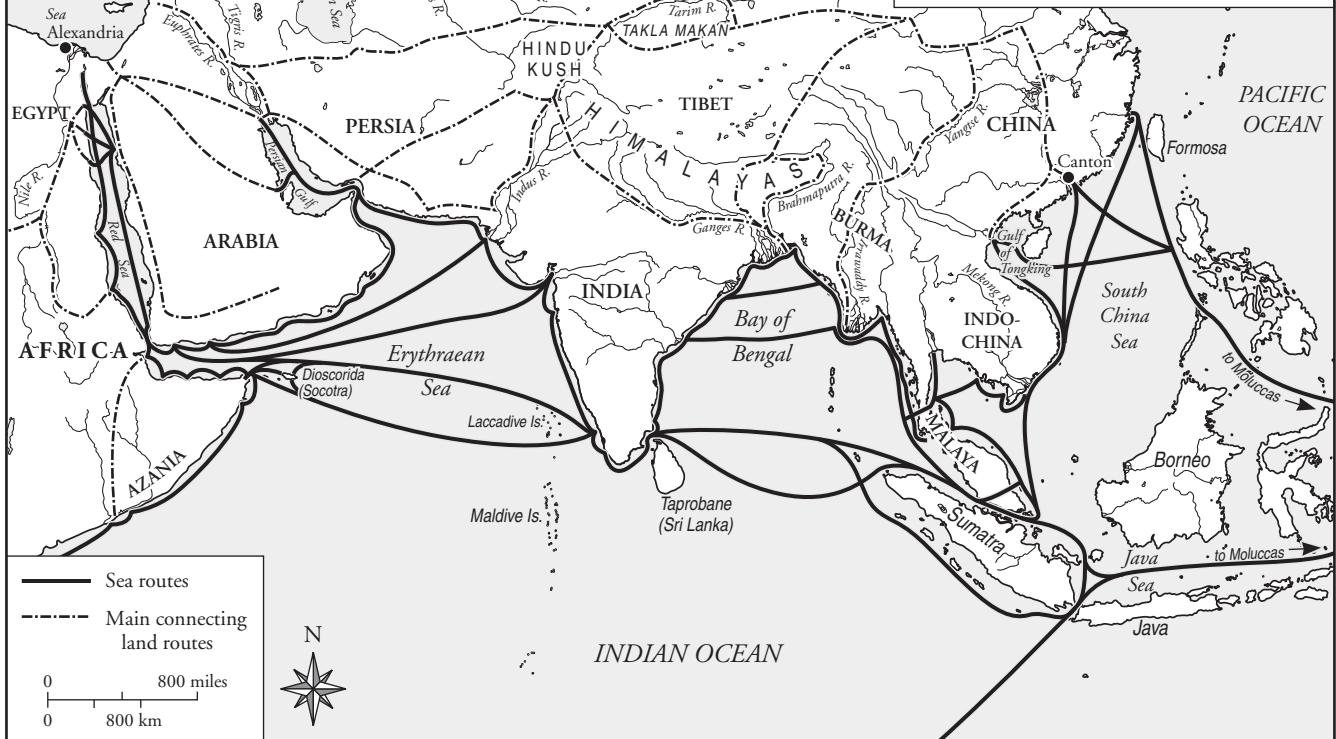
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- ← - - - Route of Gnaeus Julius Agricola, A.D. 79–84
- ← - - - Roman fleet, A.D. 84
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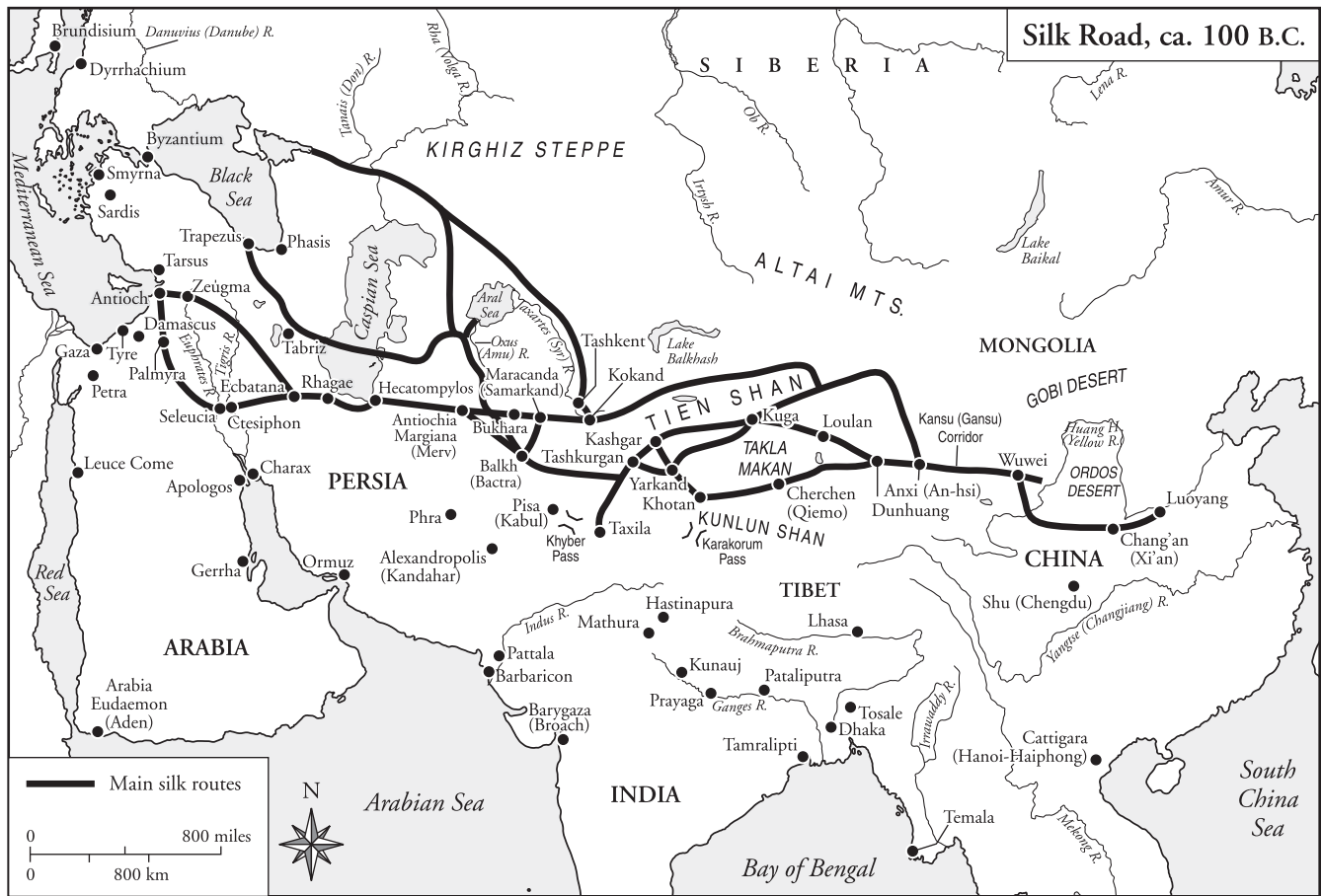


Military Expeditions of Alexander the Great, 334–323 B.C.



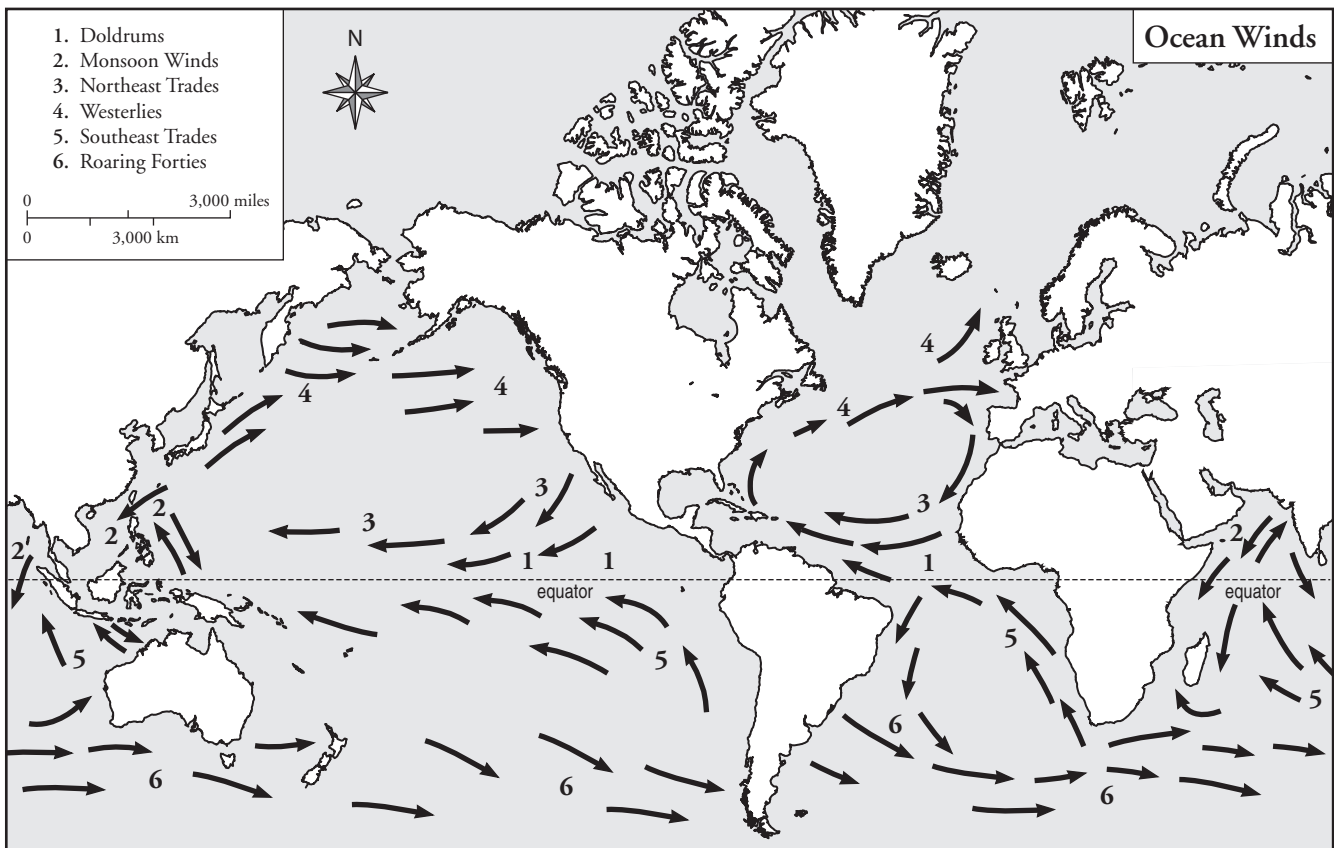
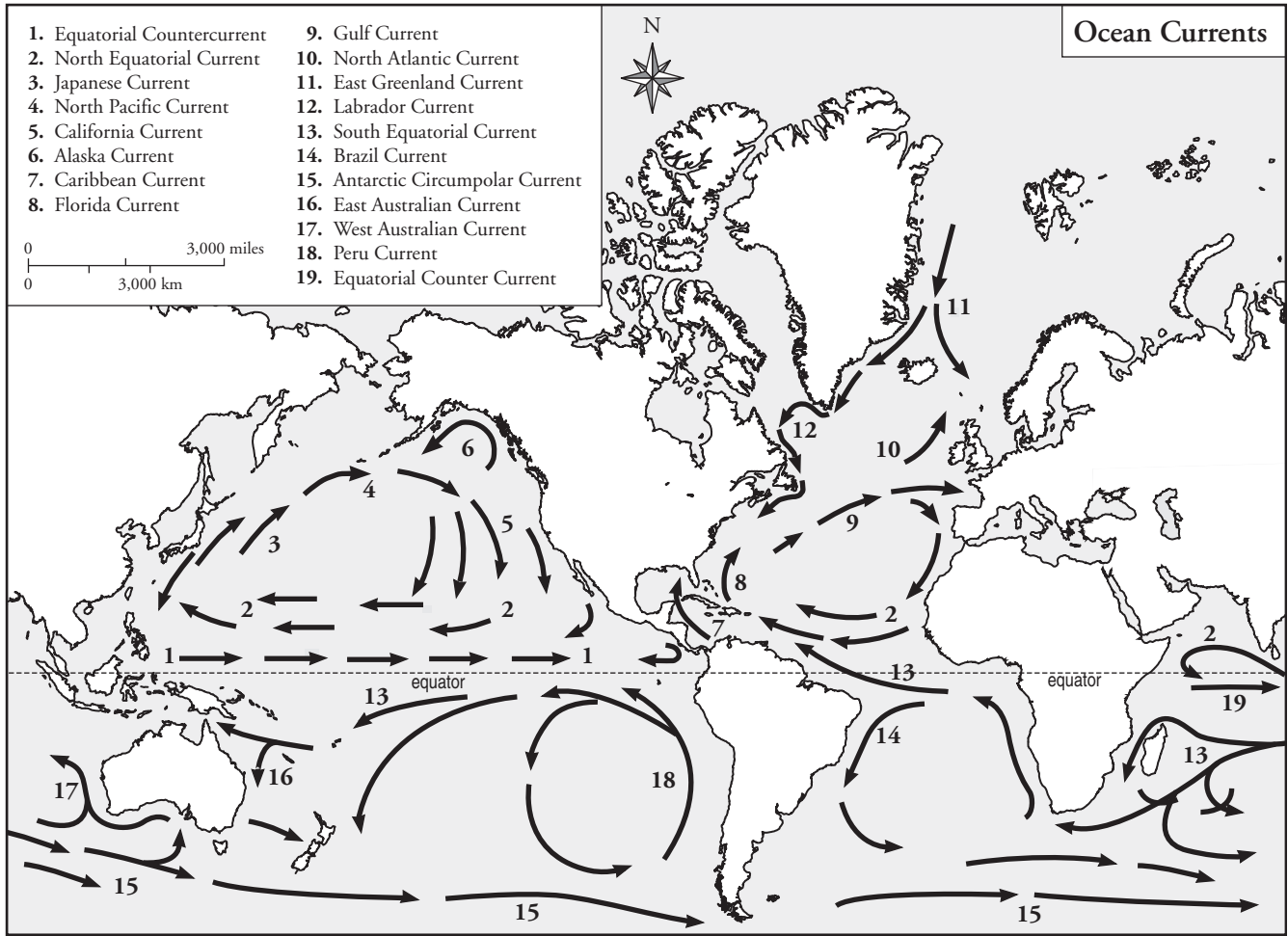
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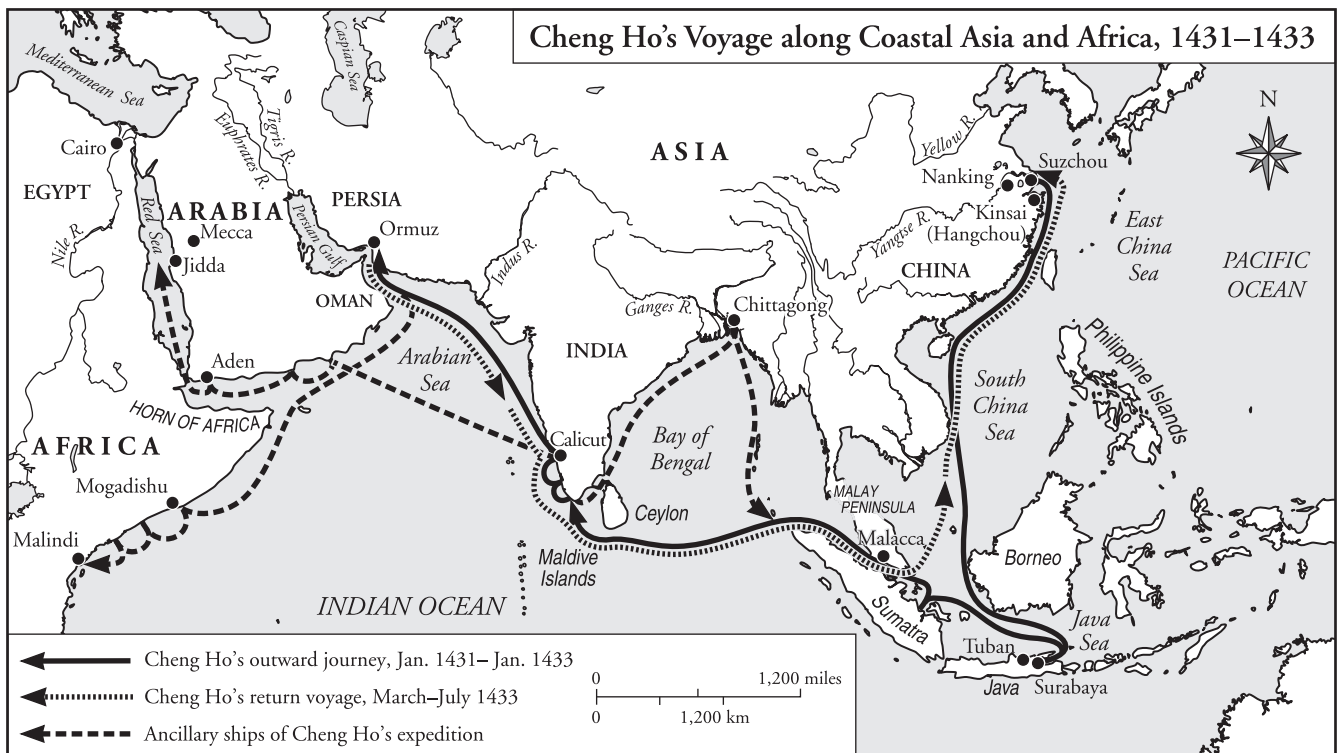


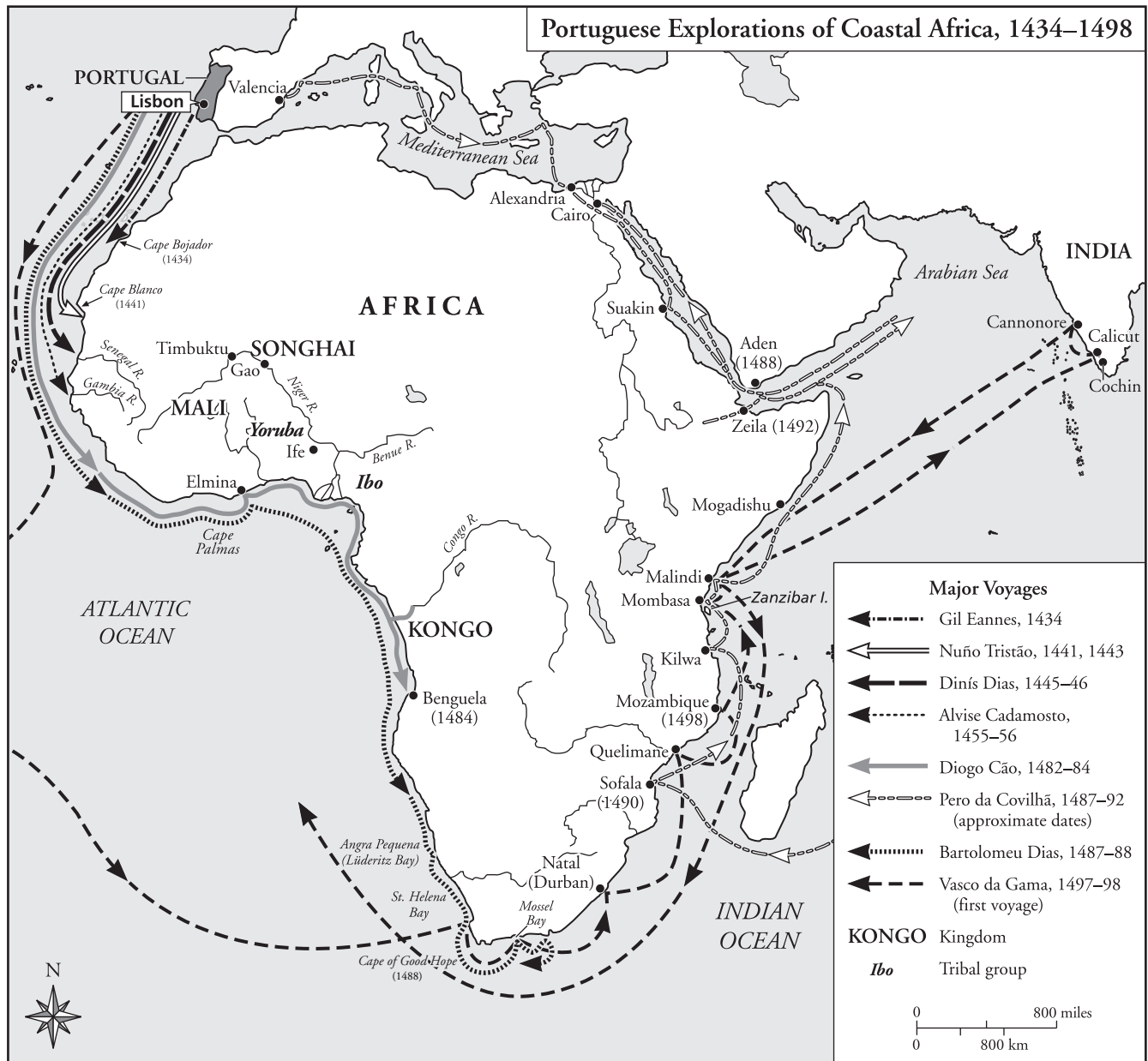


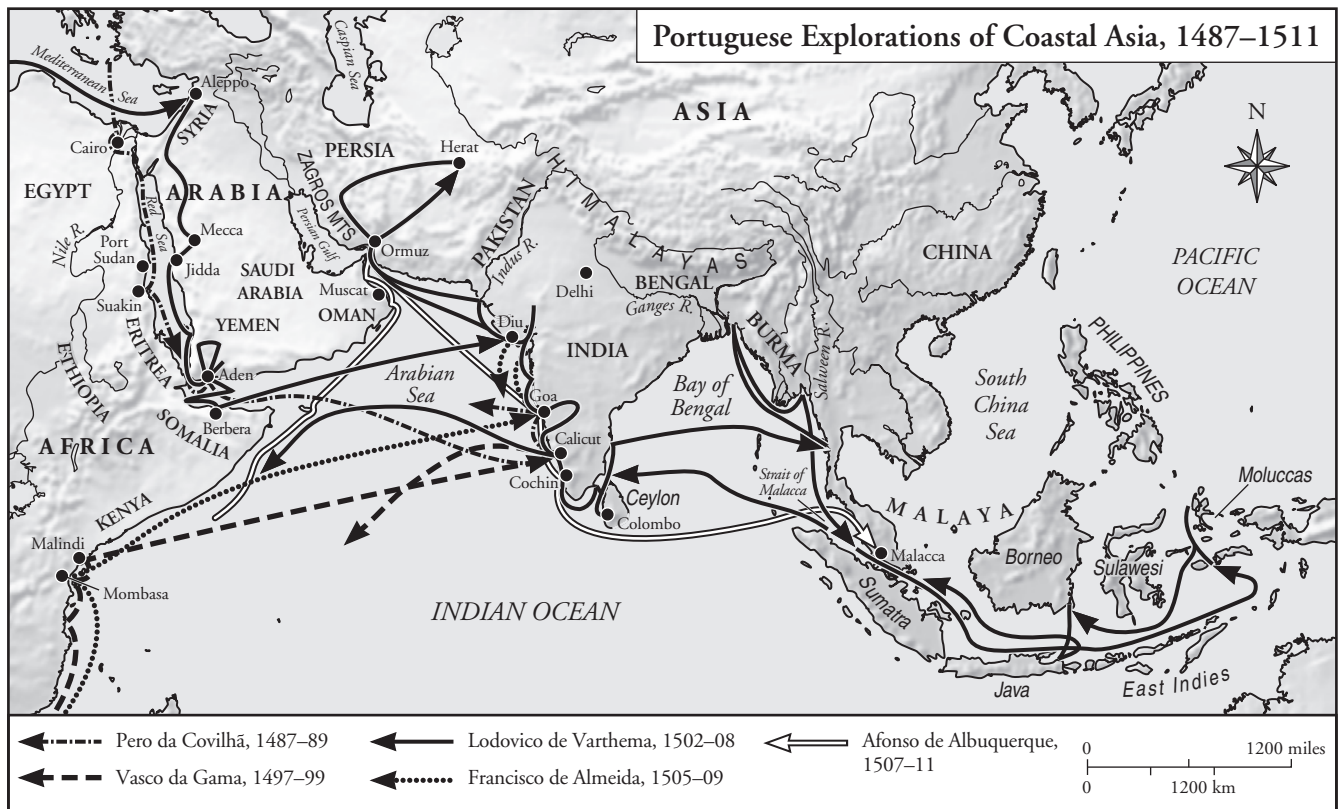
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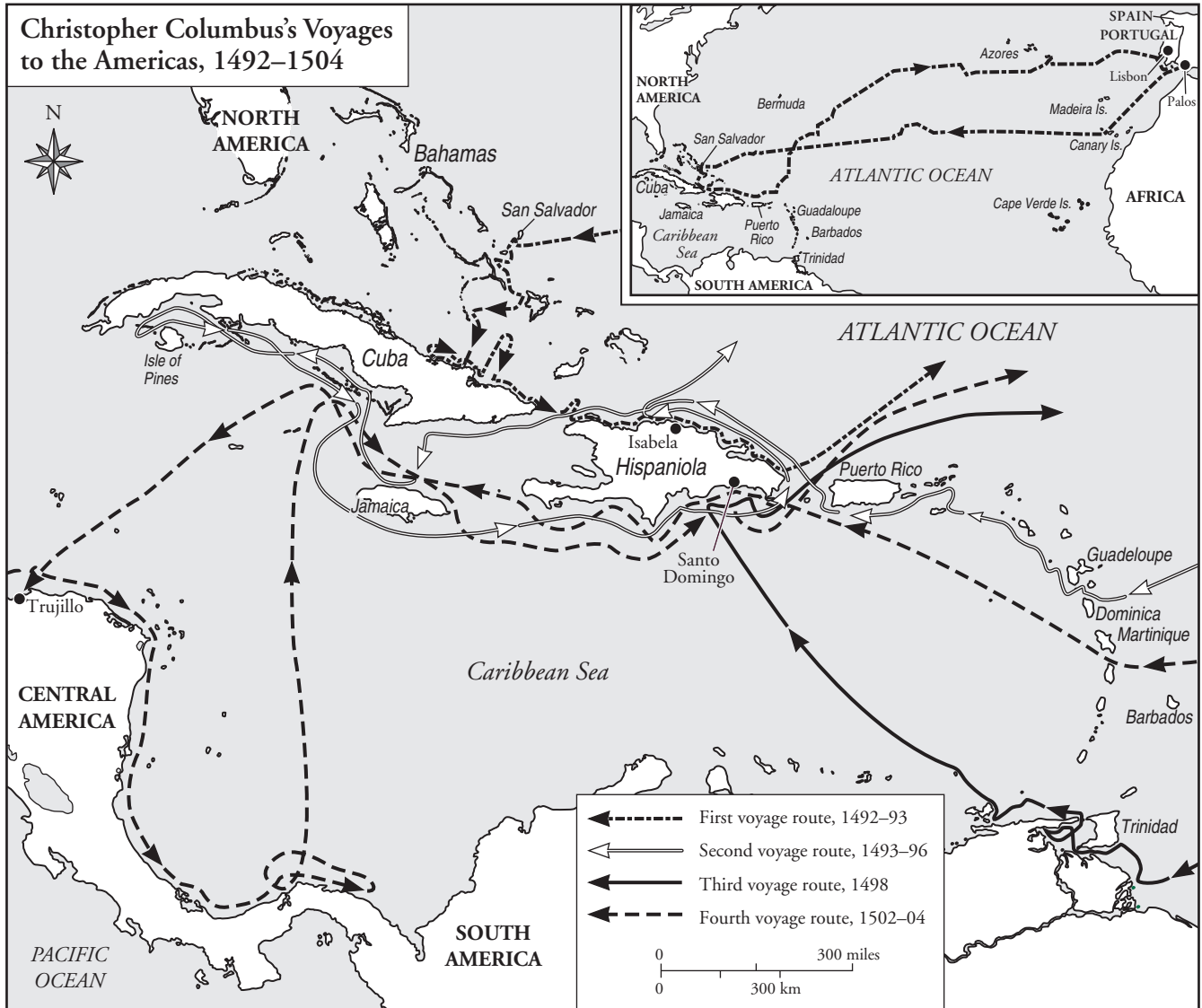
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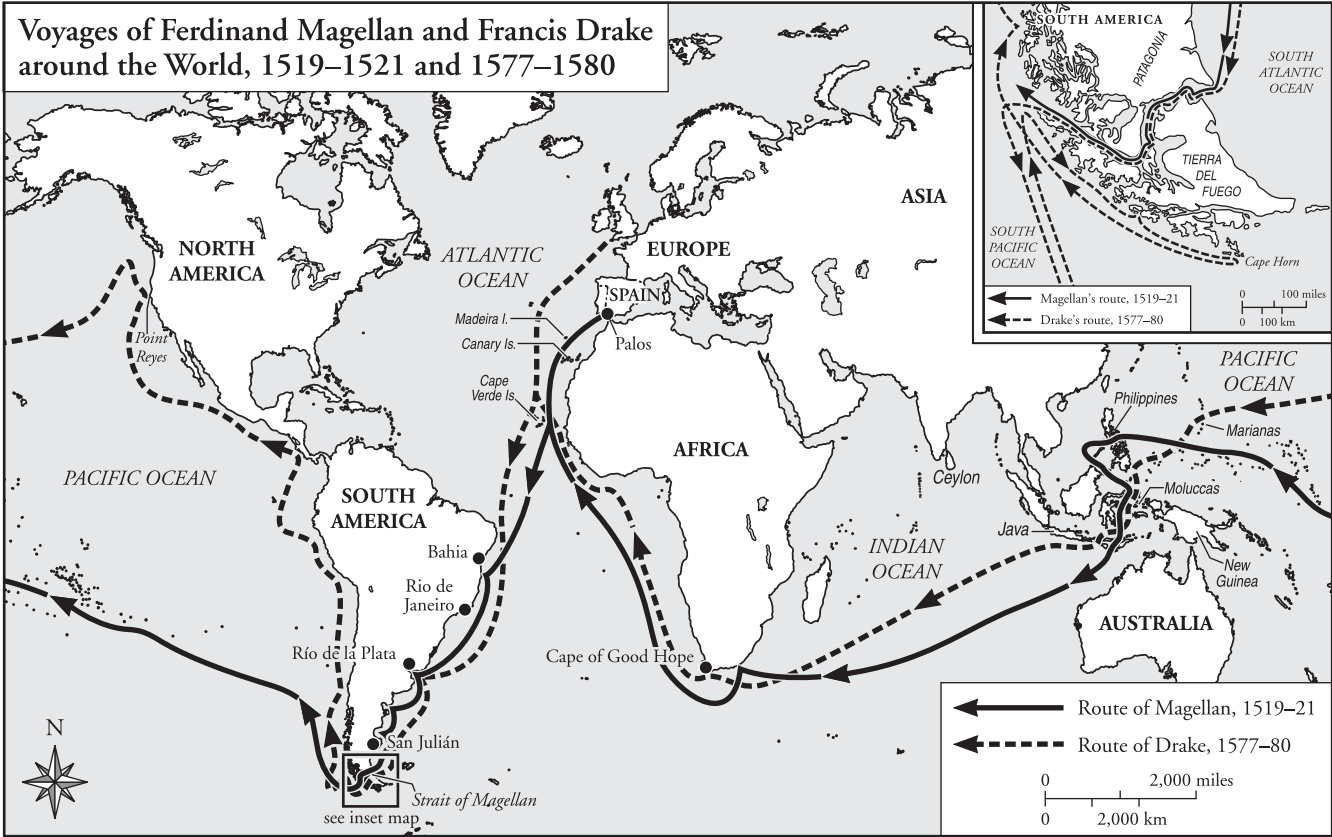


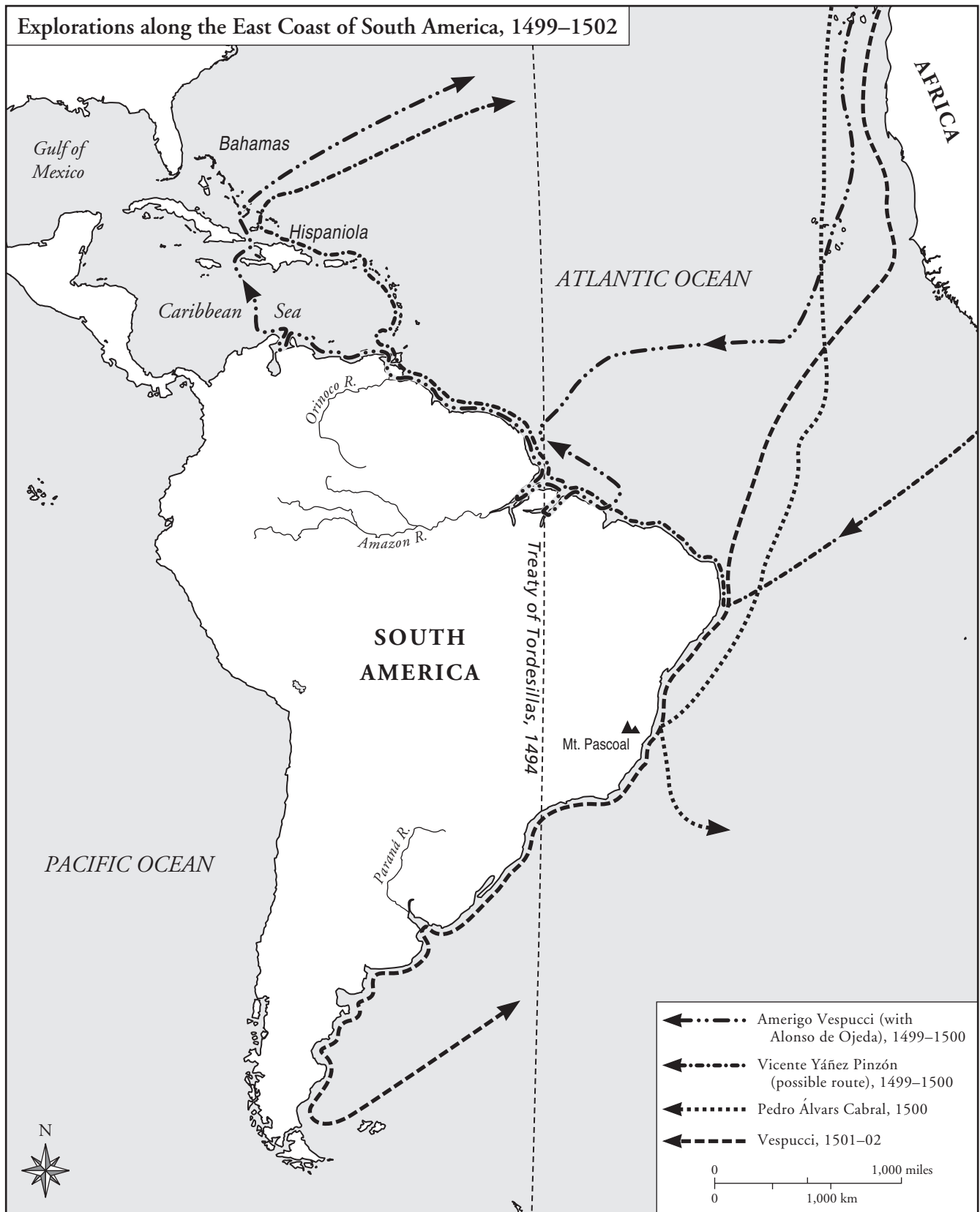




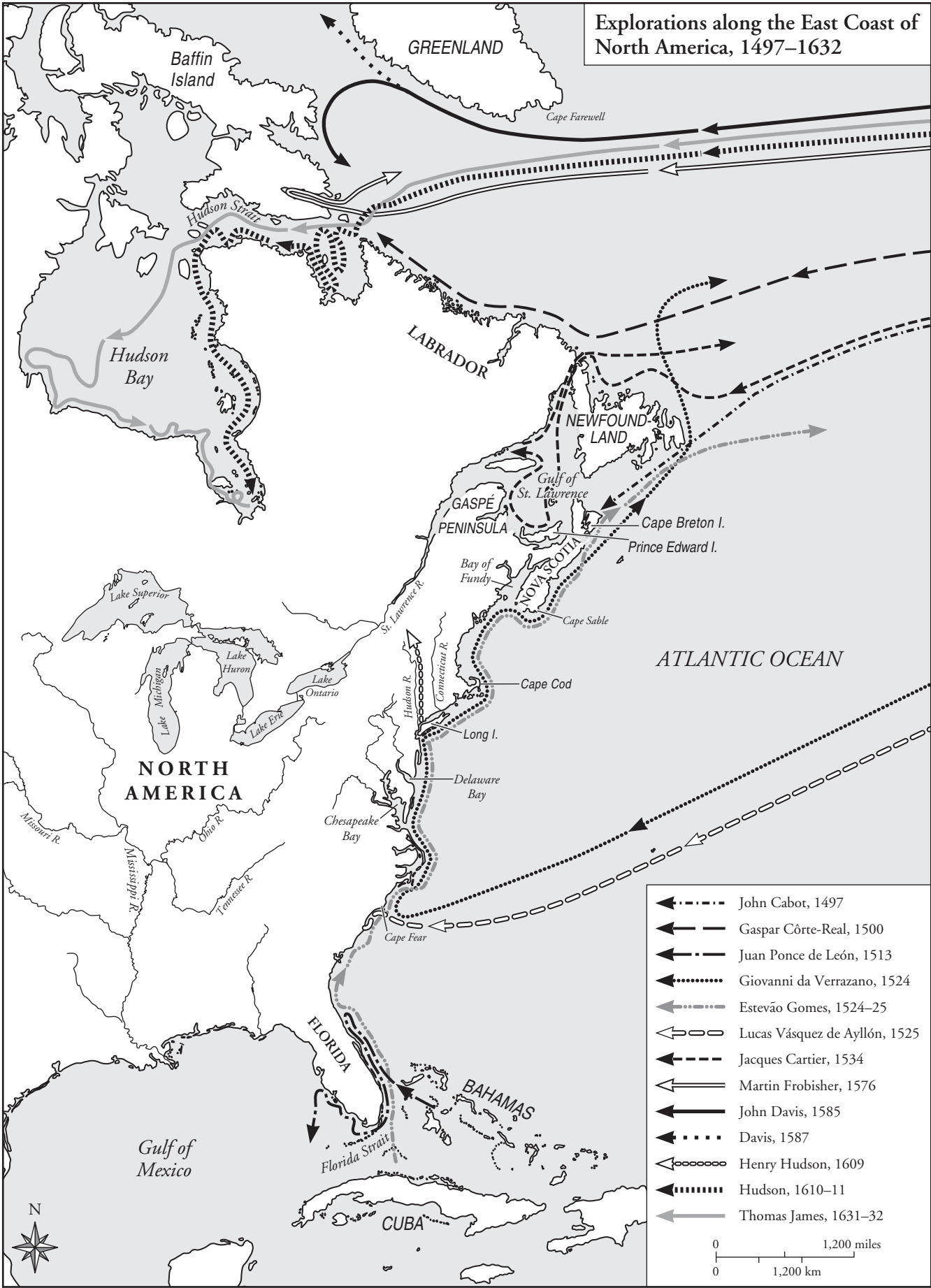




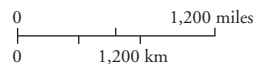




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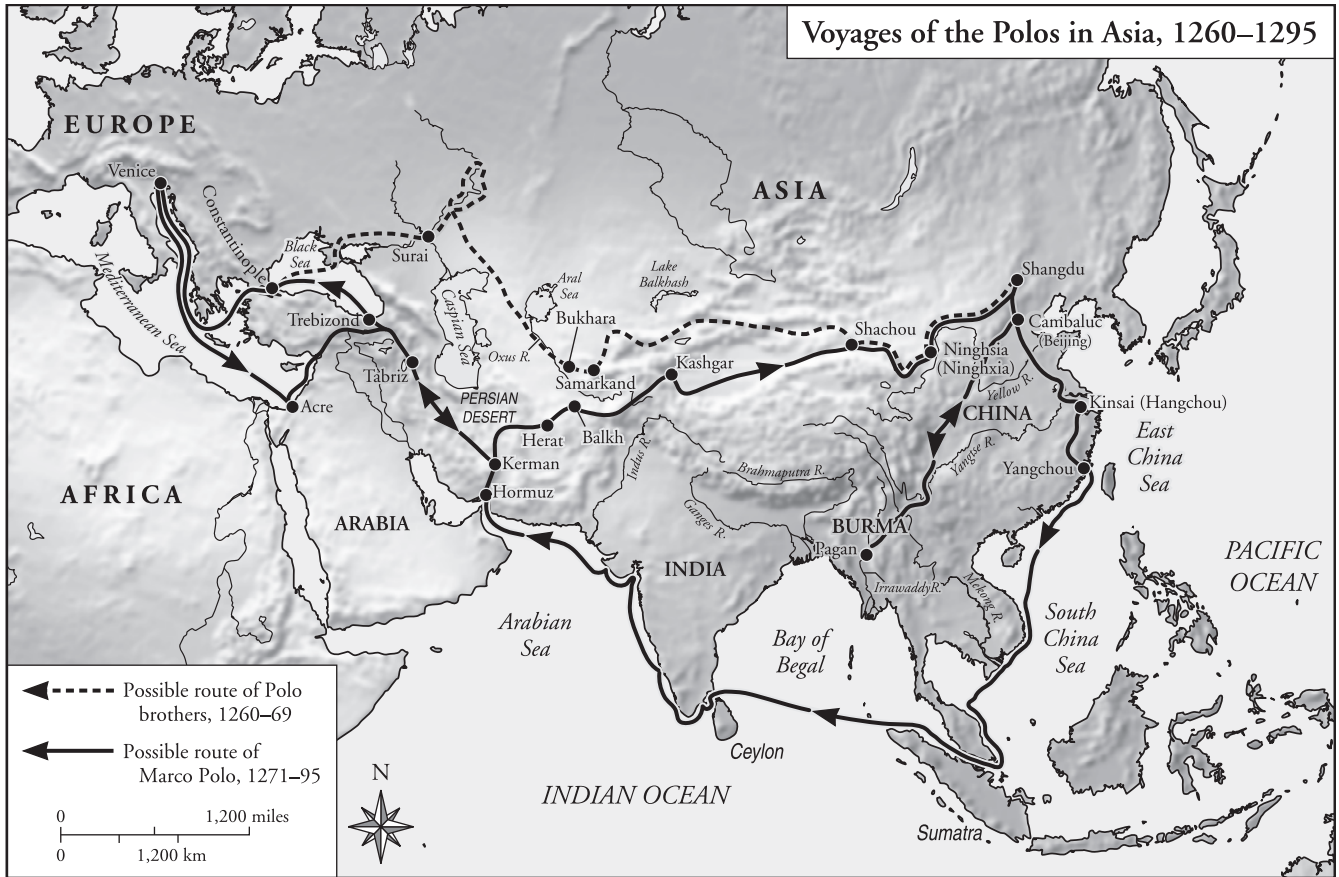


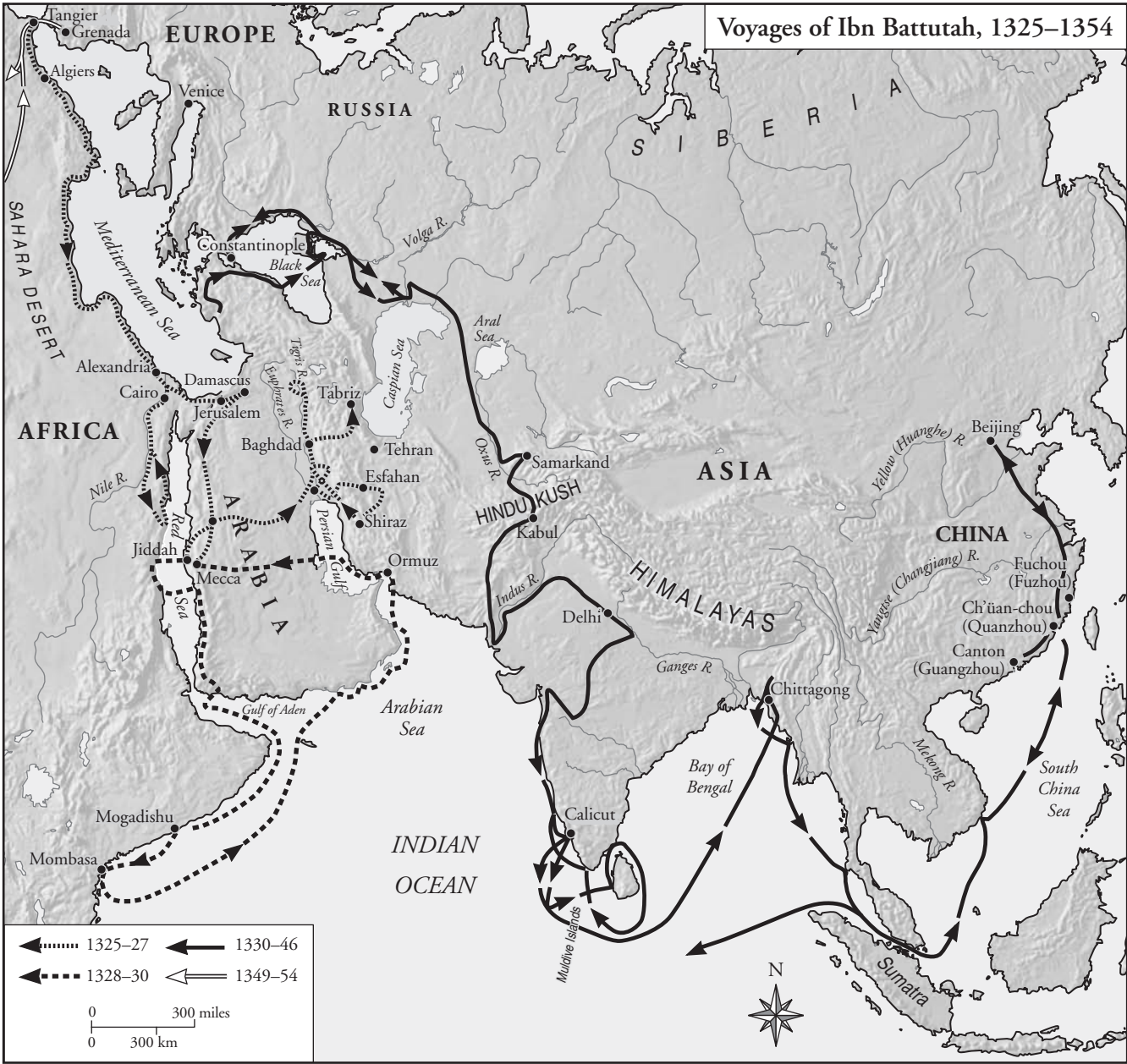
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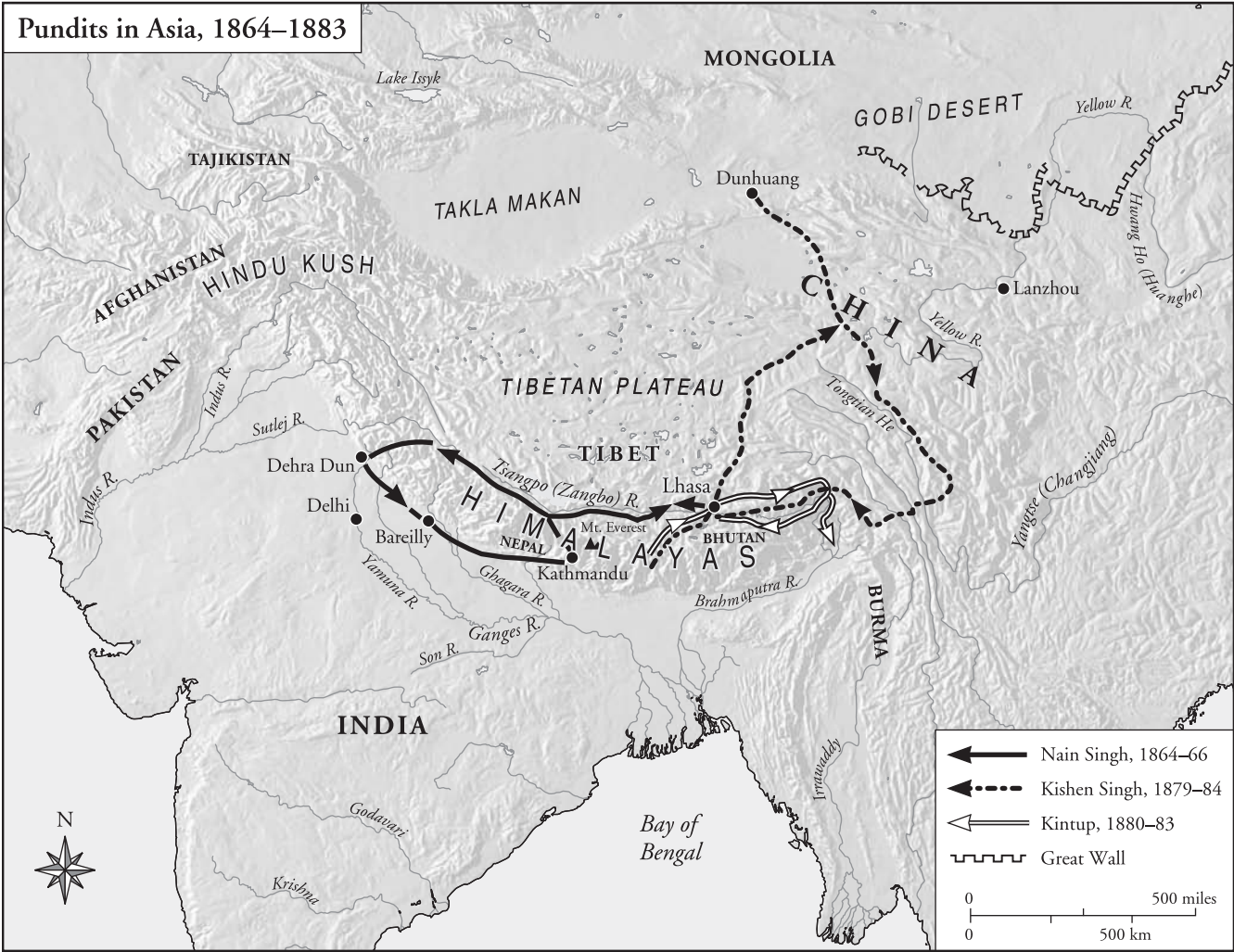
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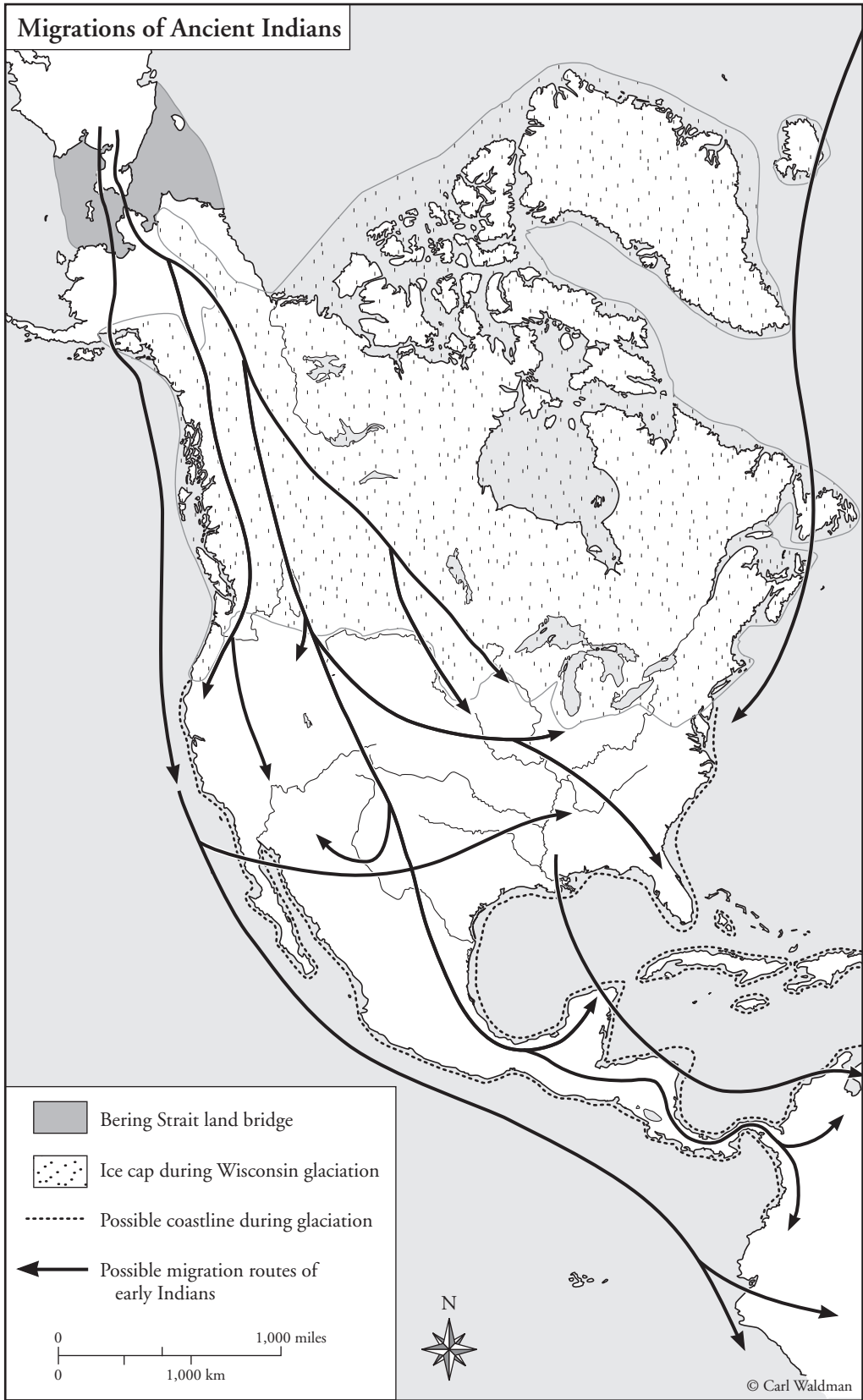


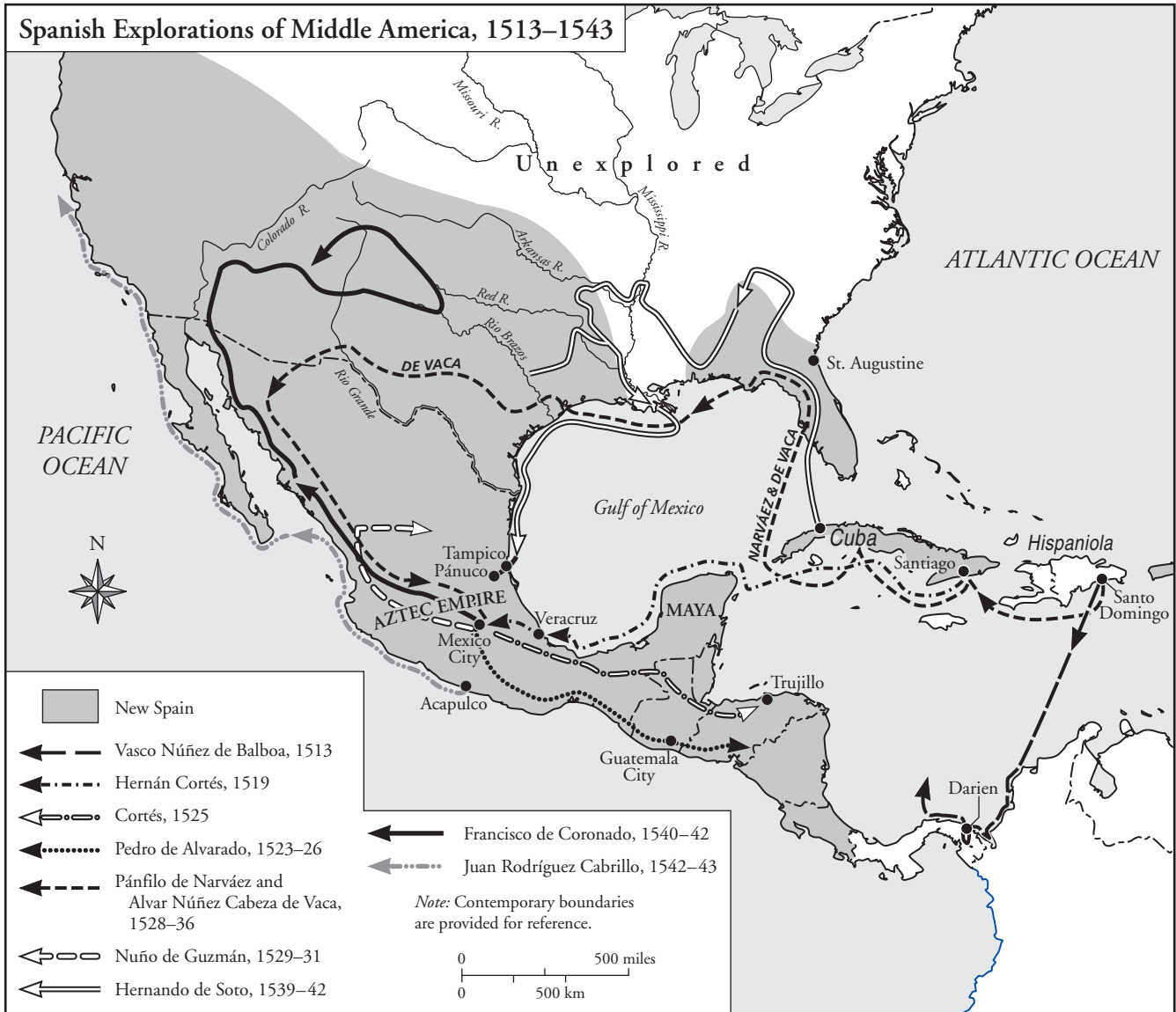
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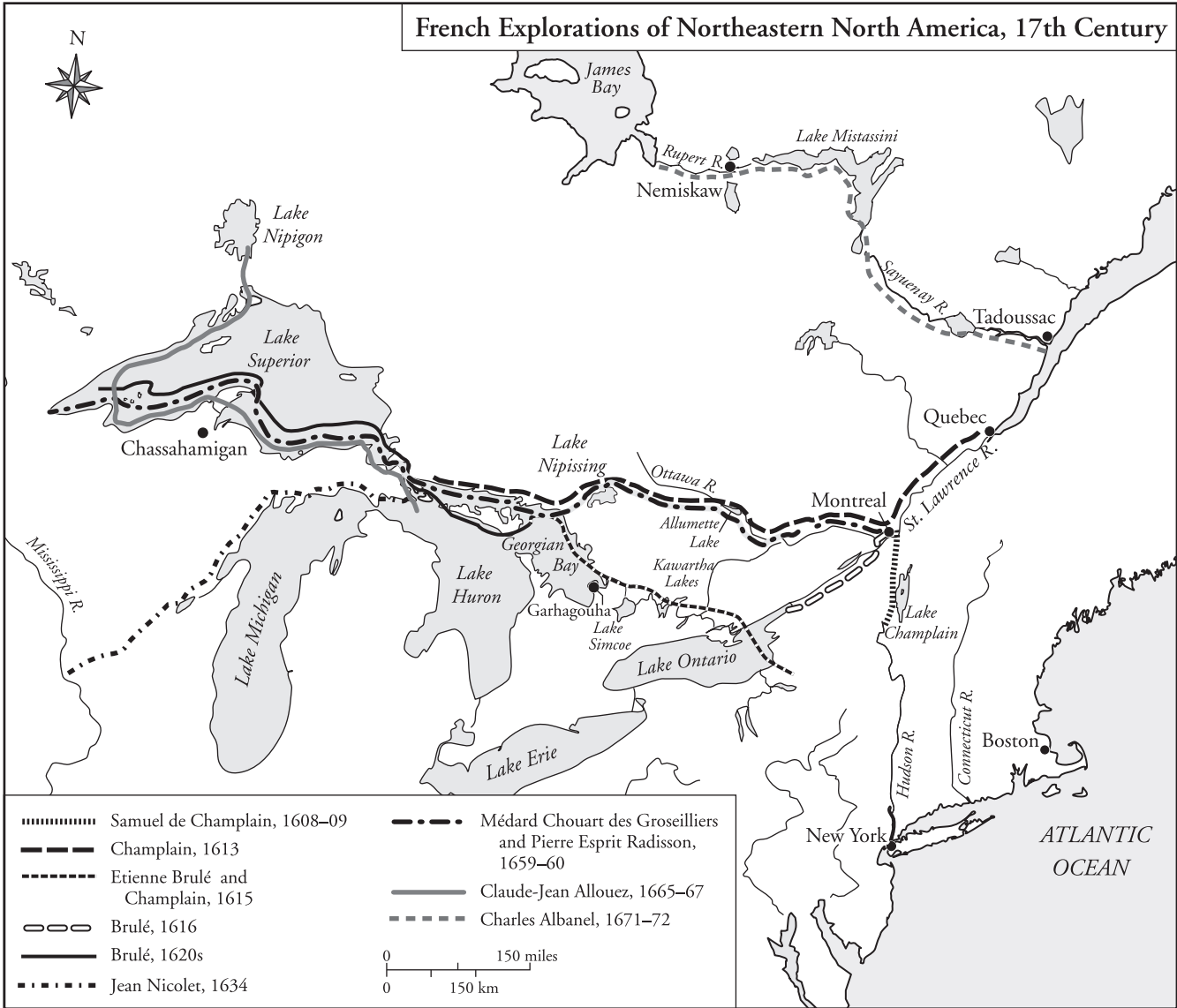
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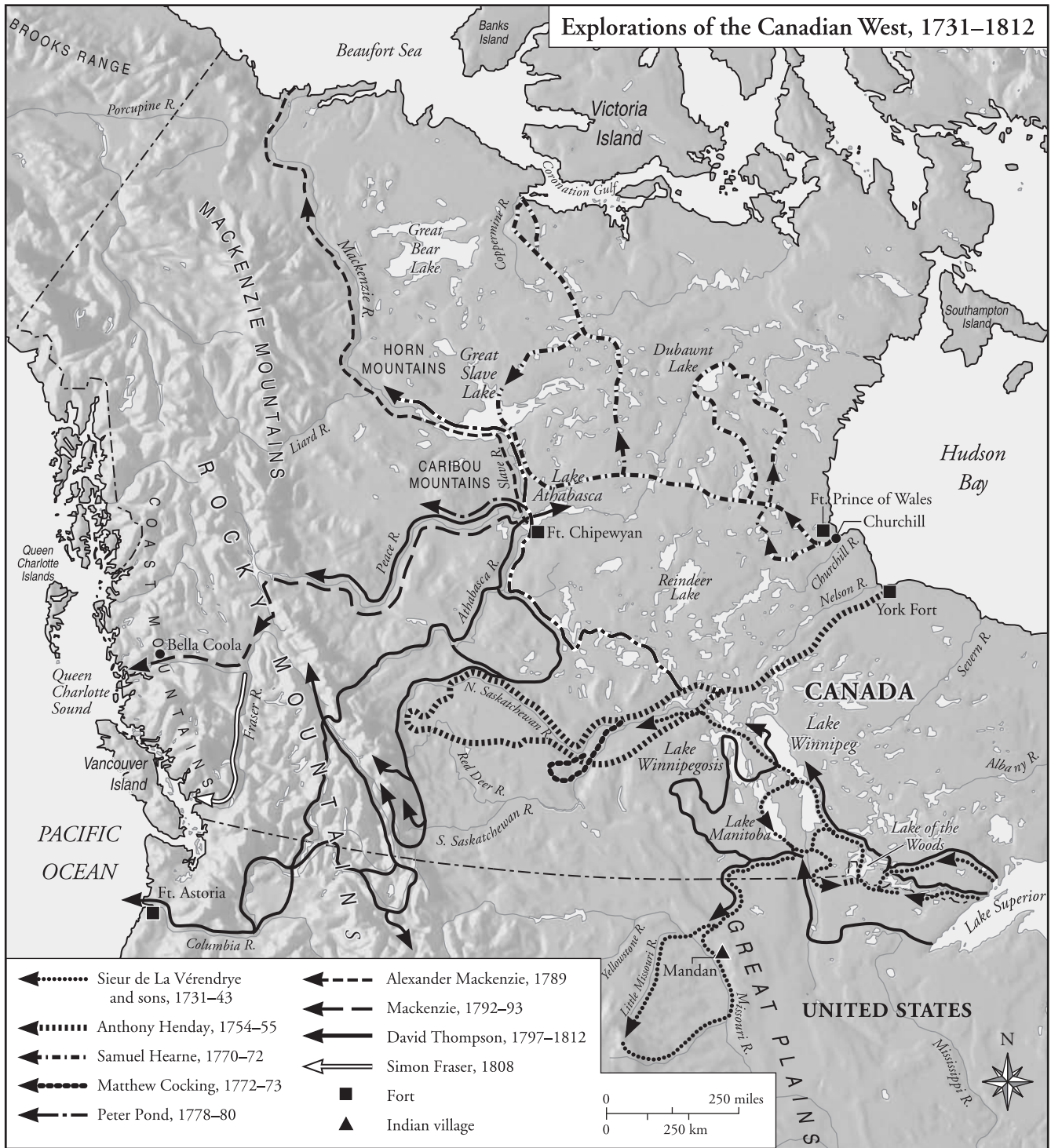


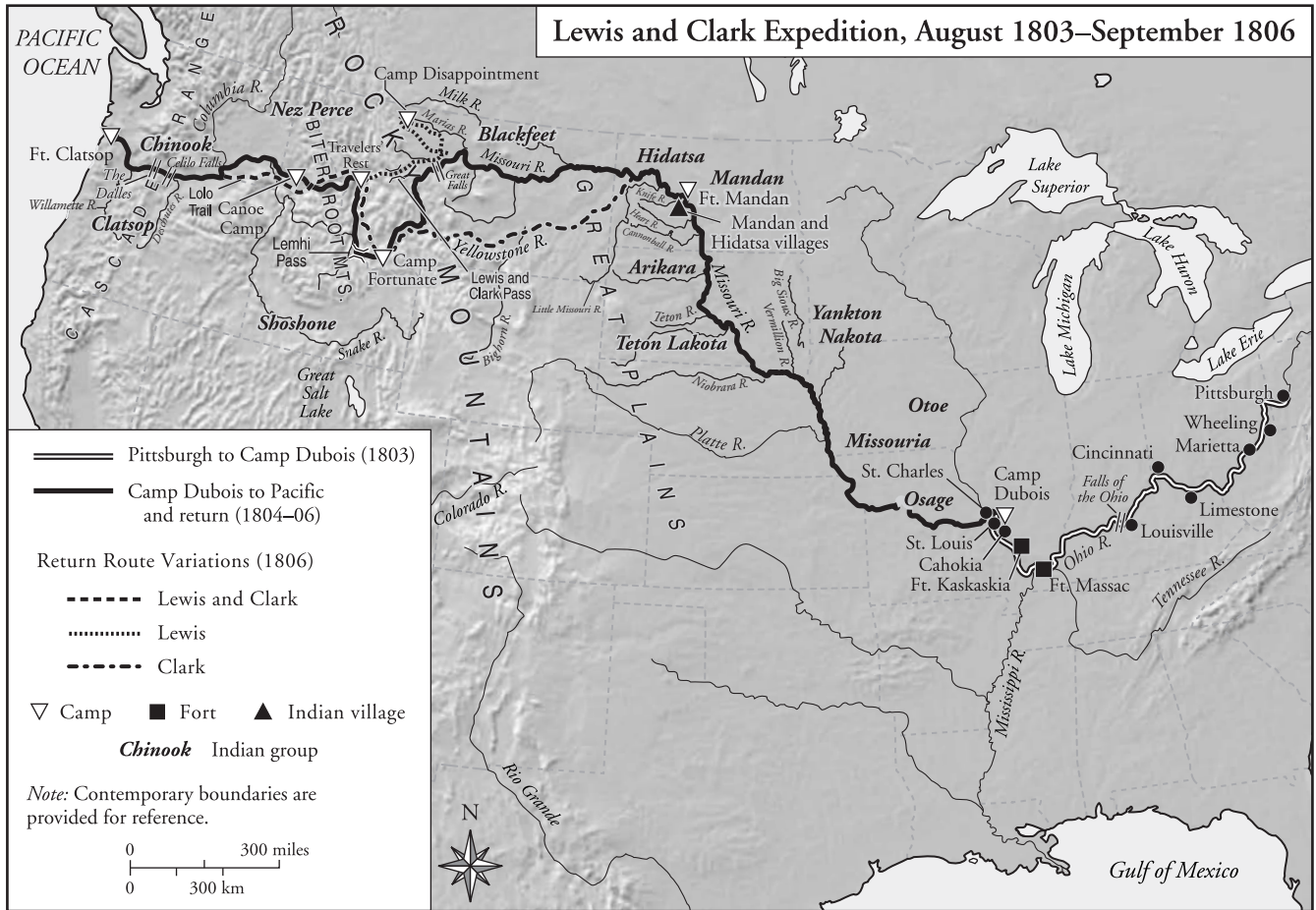


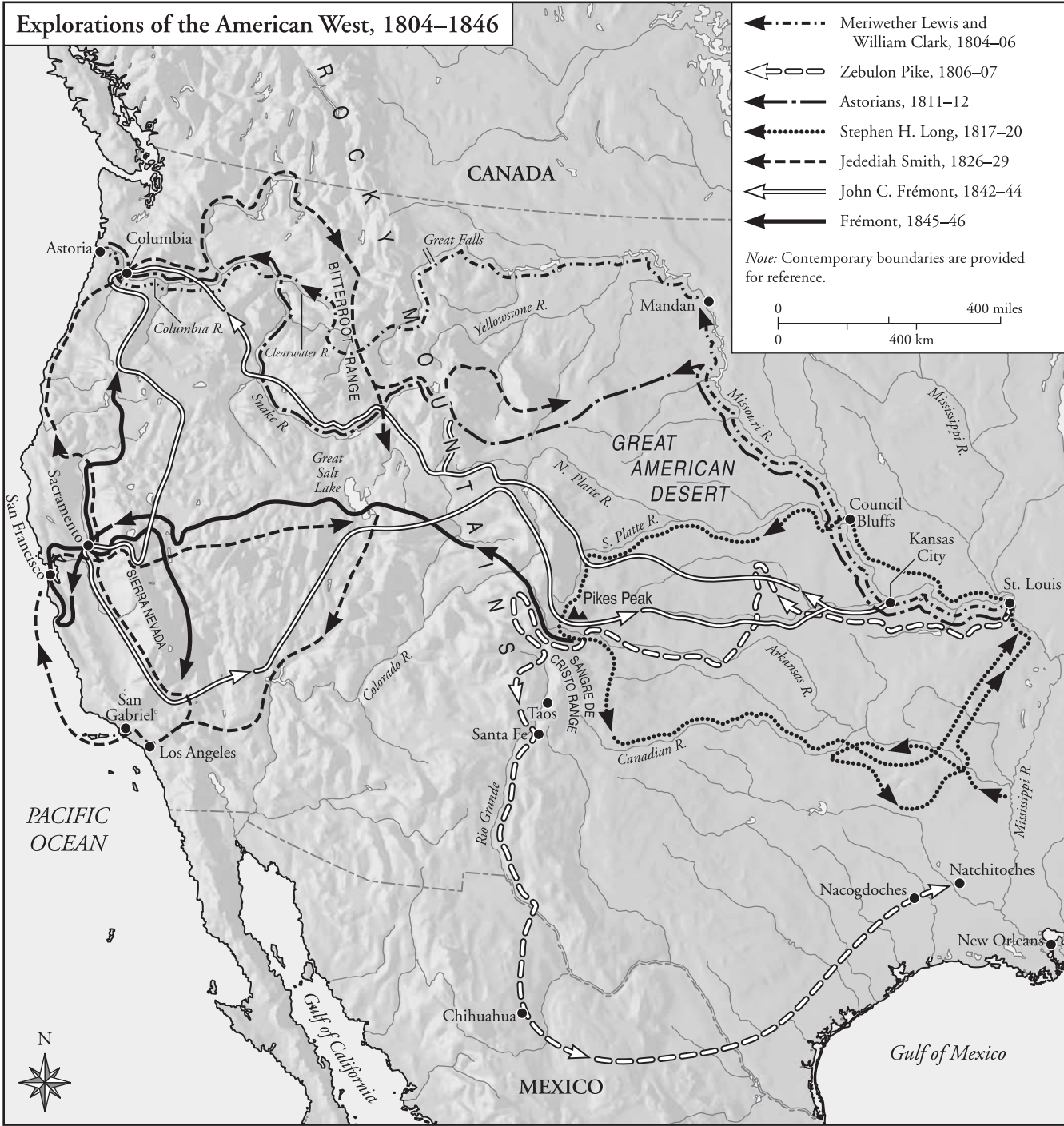






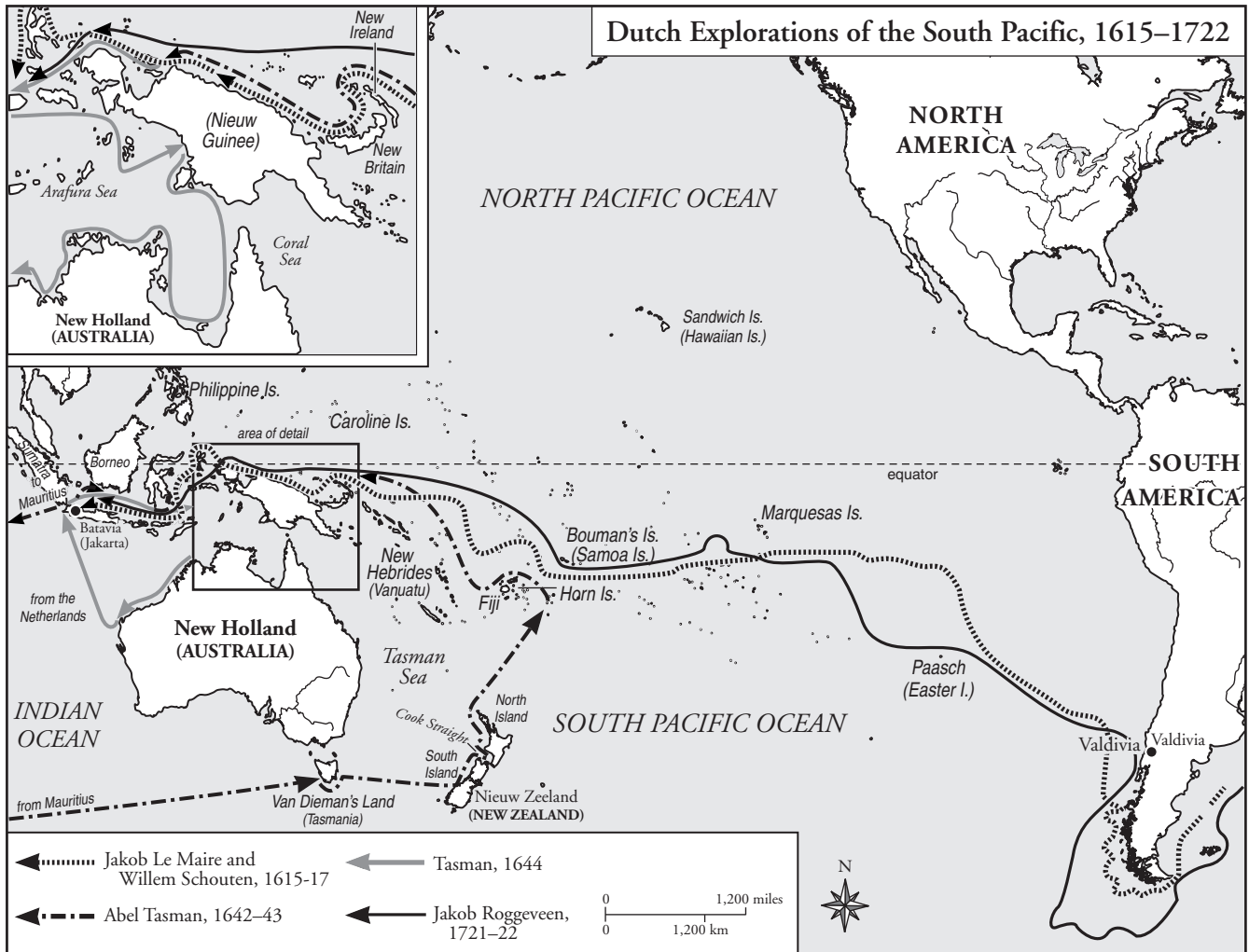


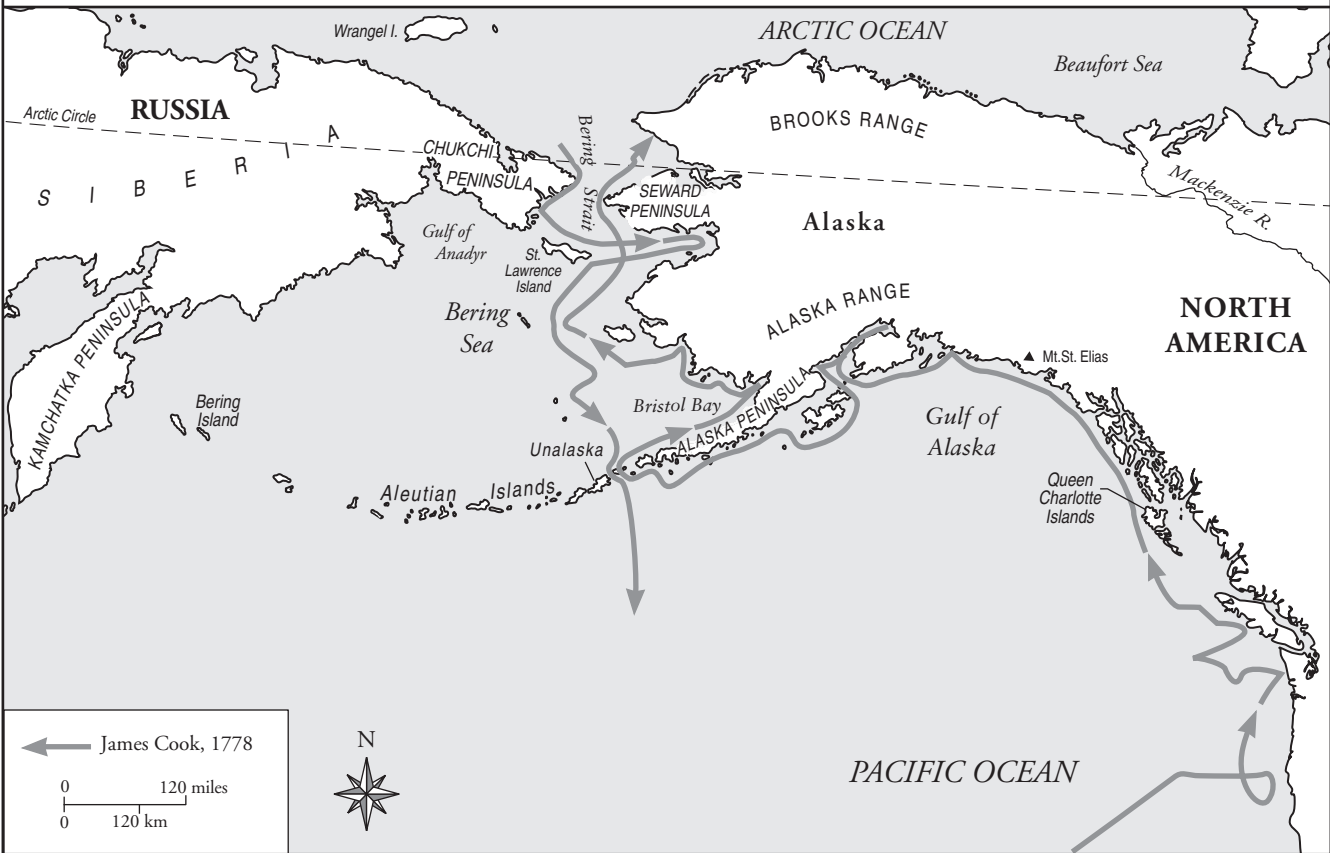
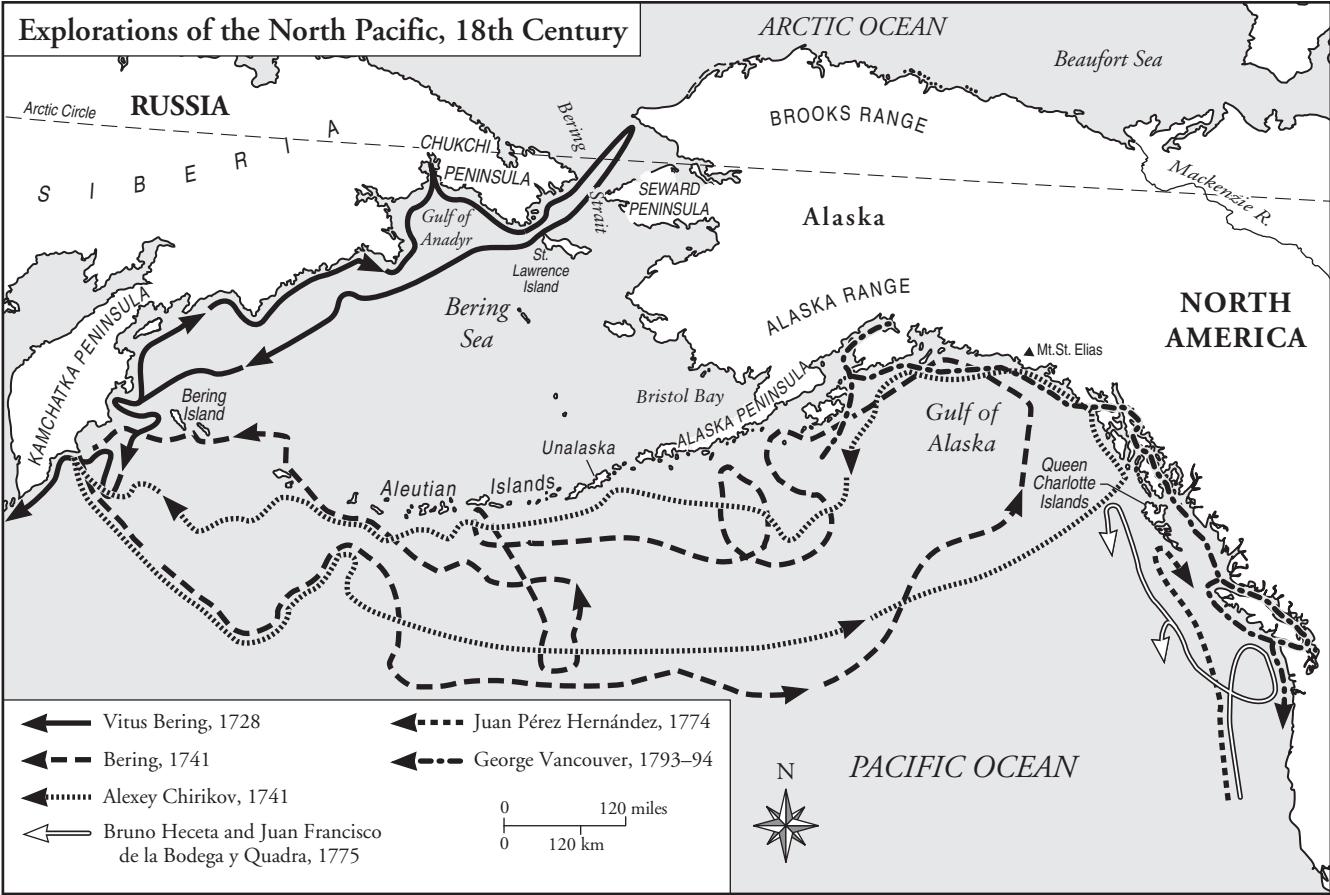


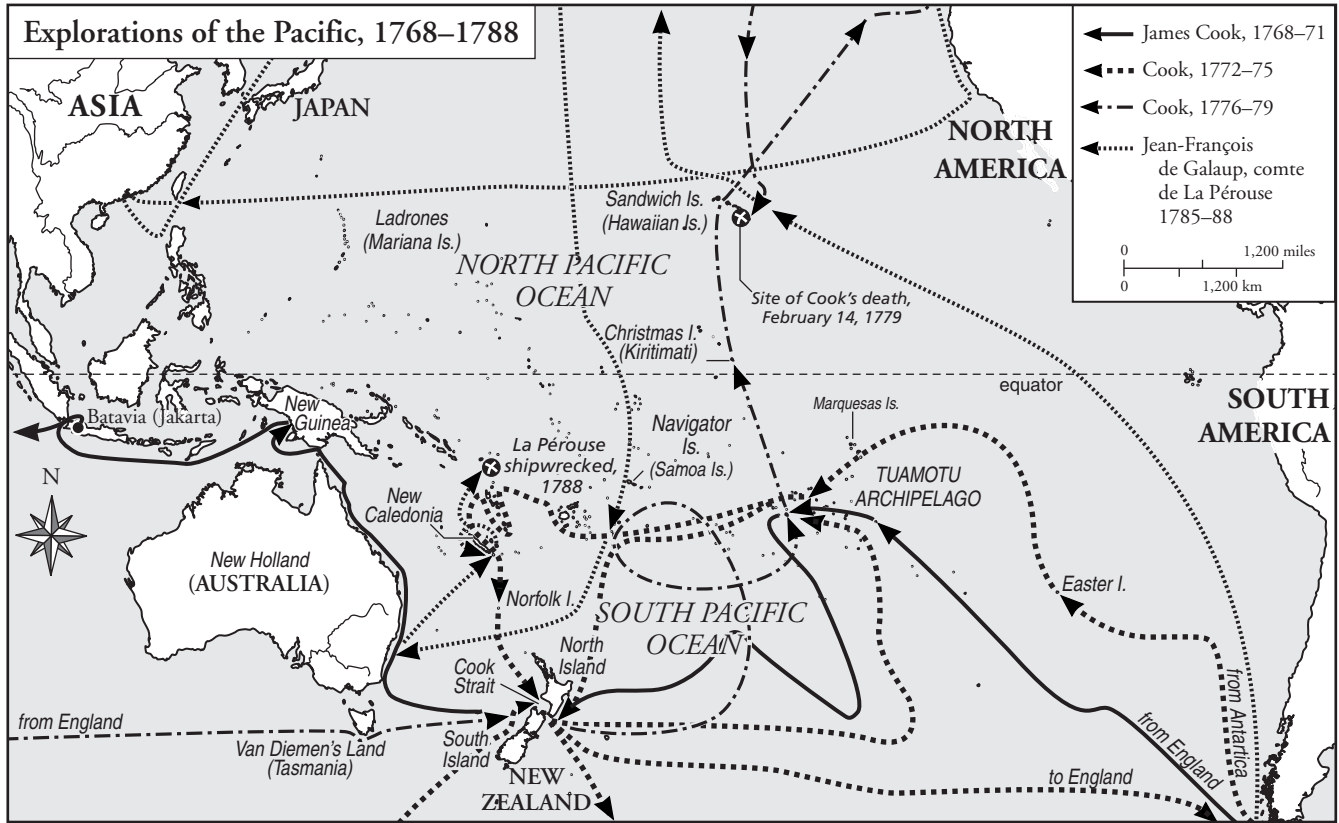


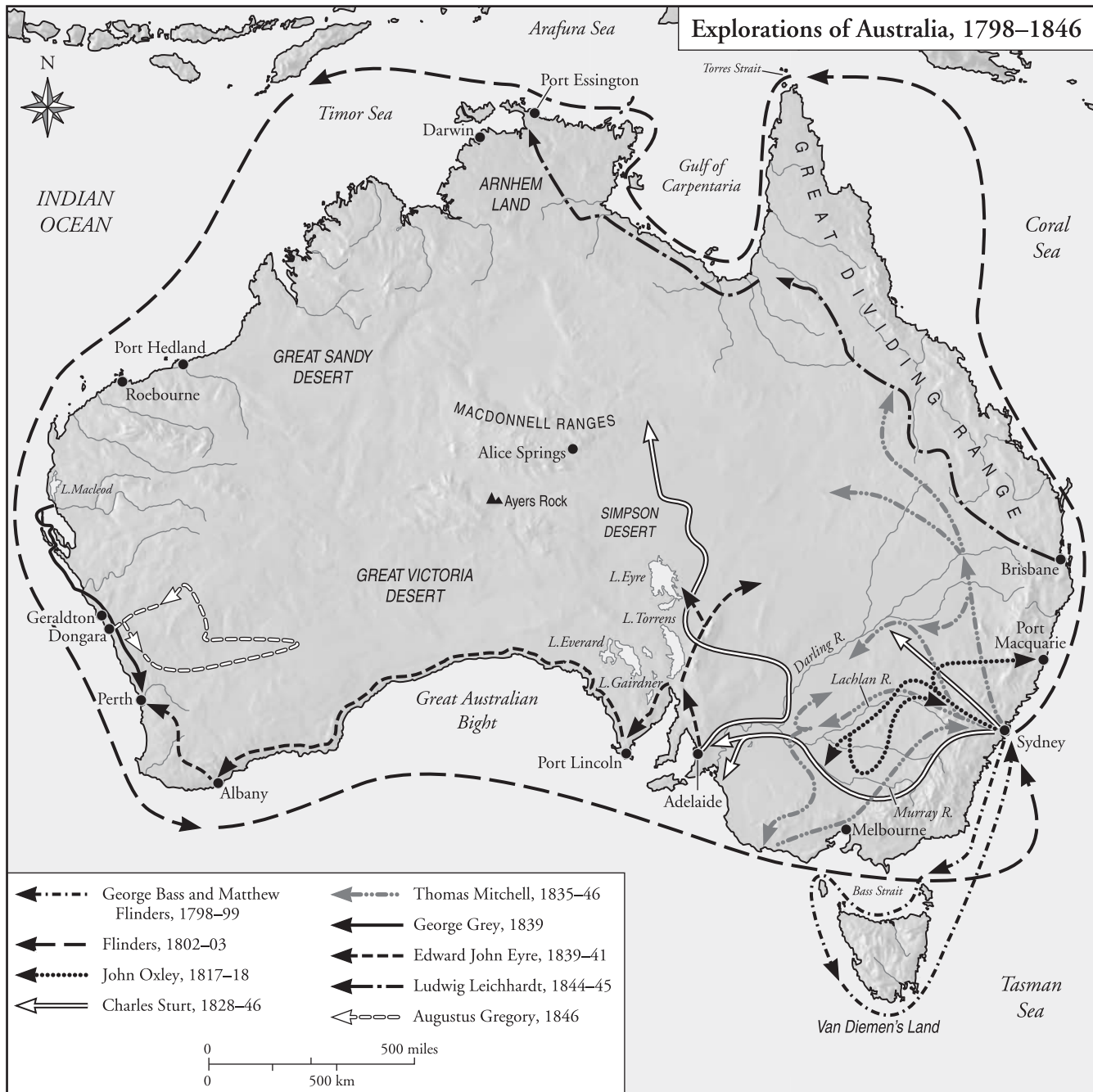
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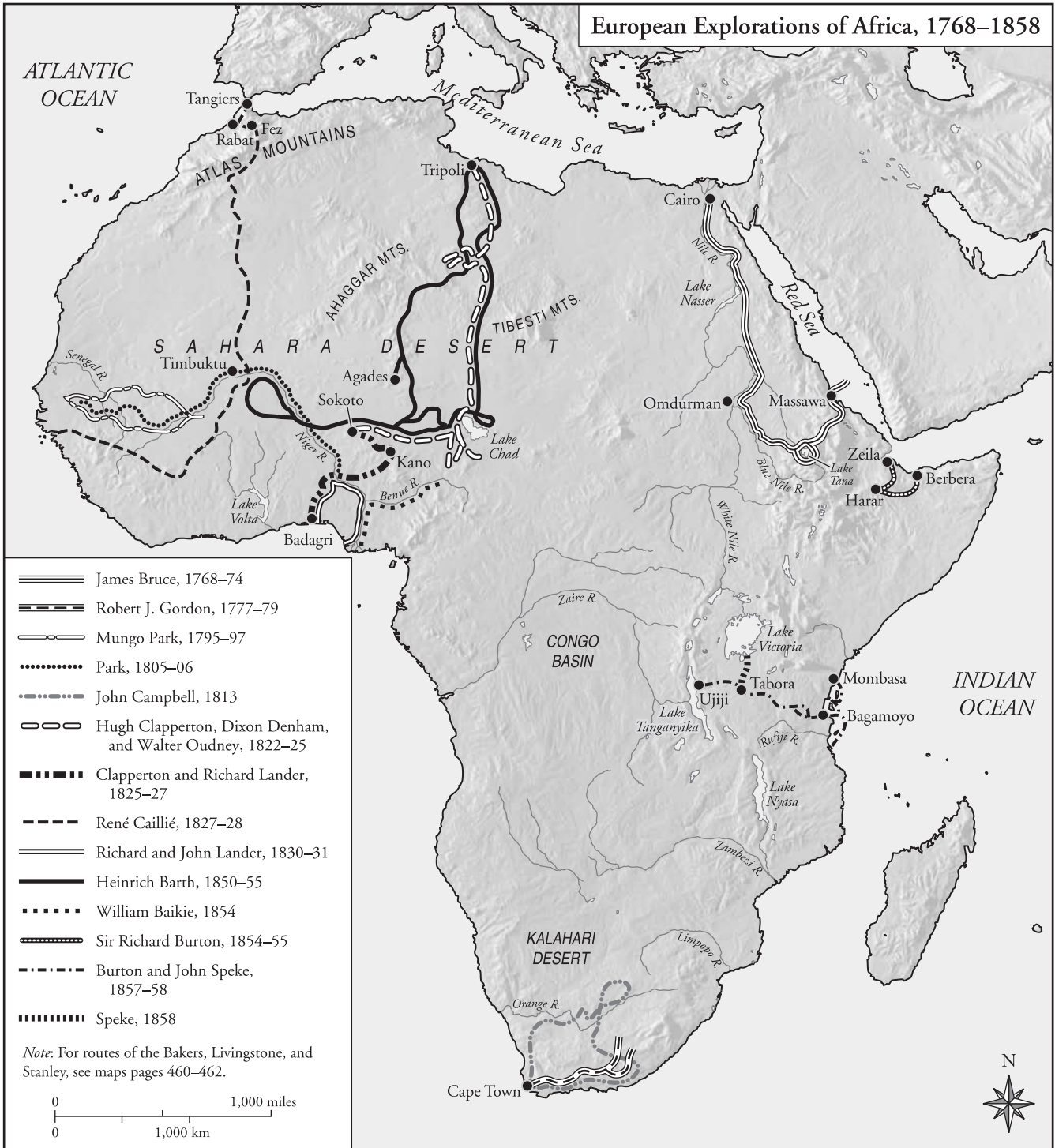






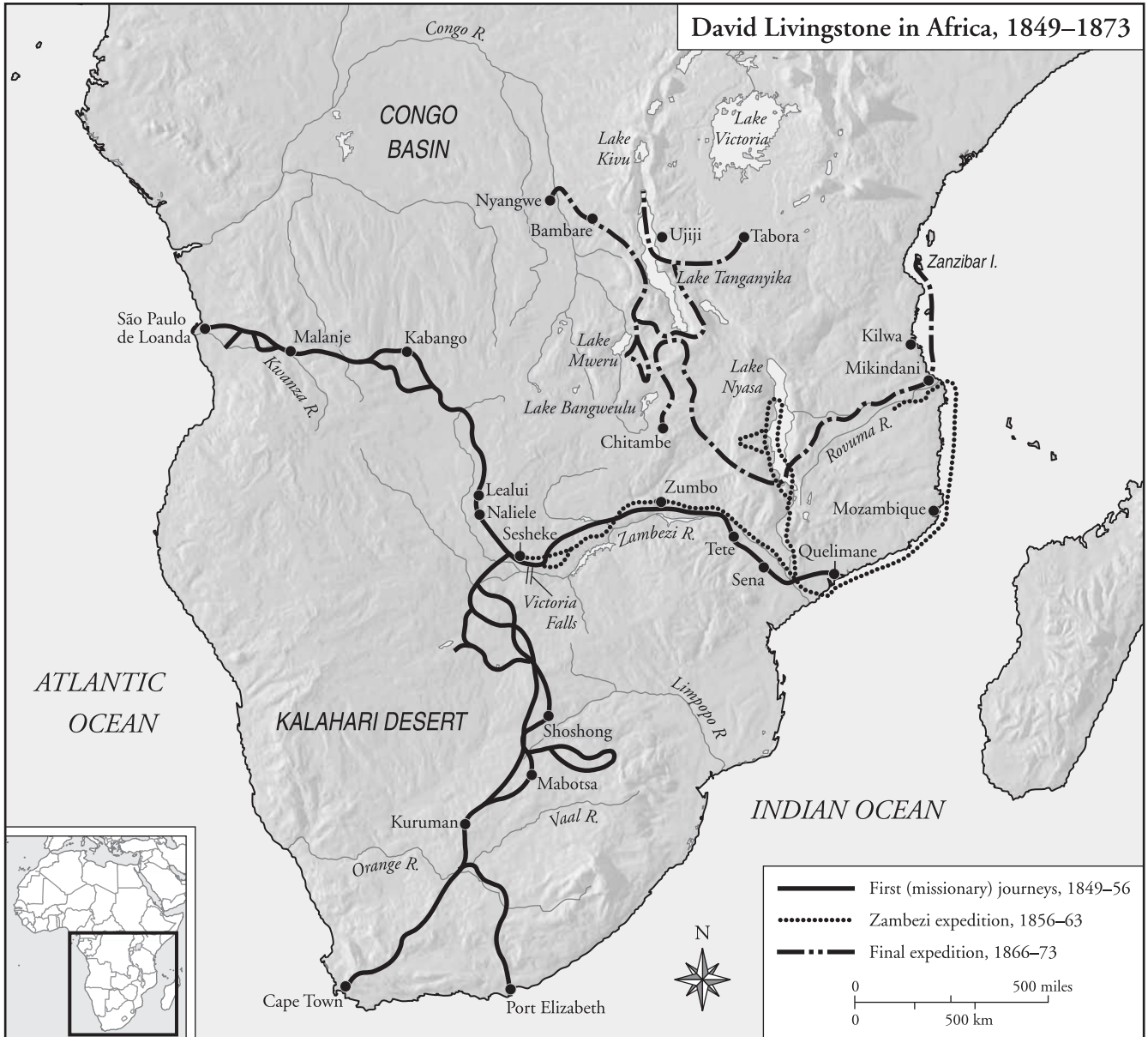
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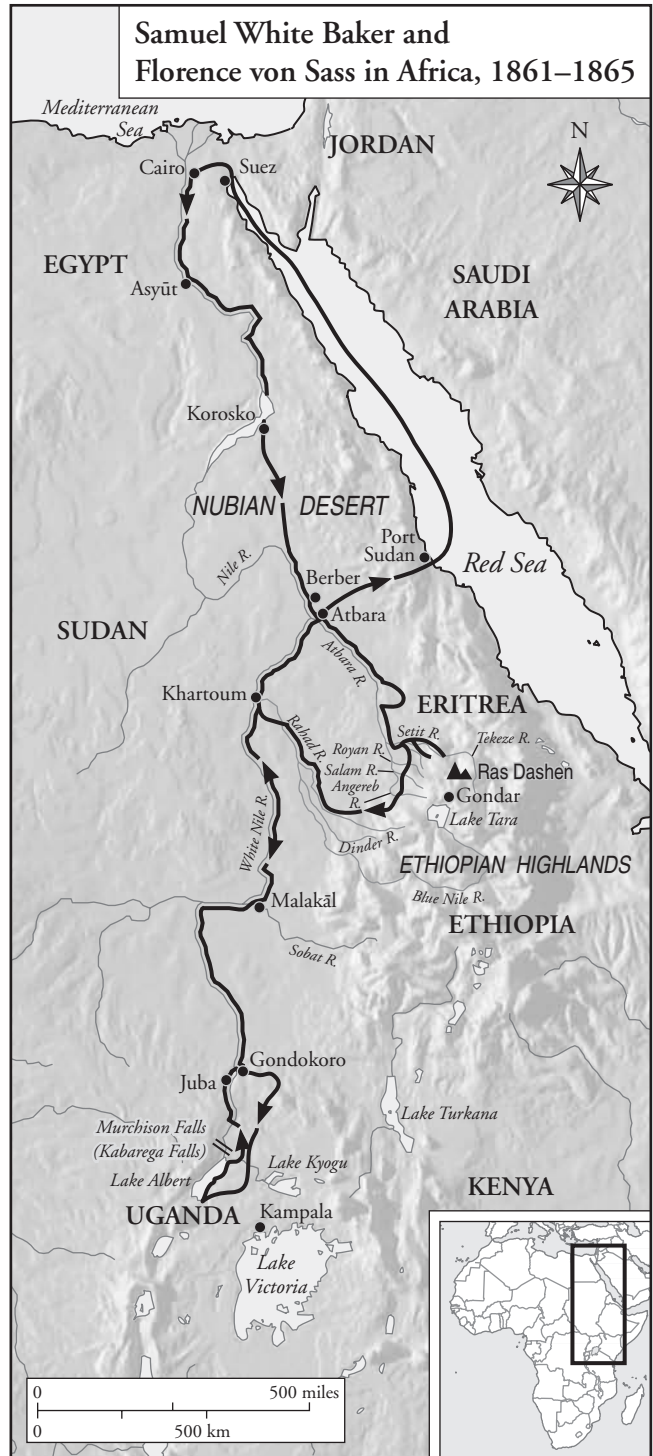
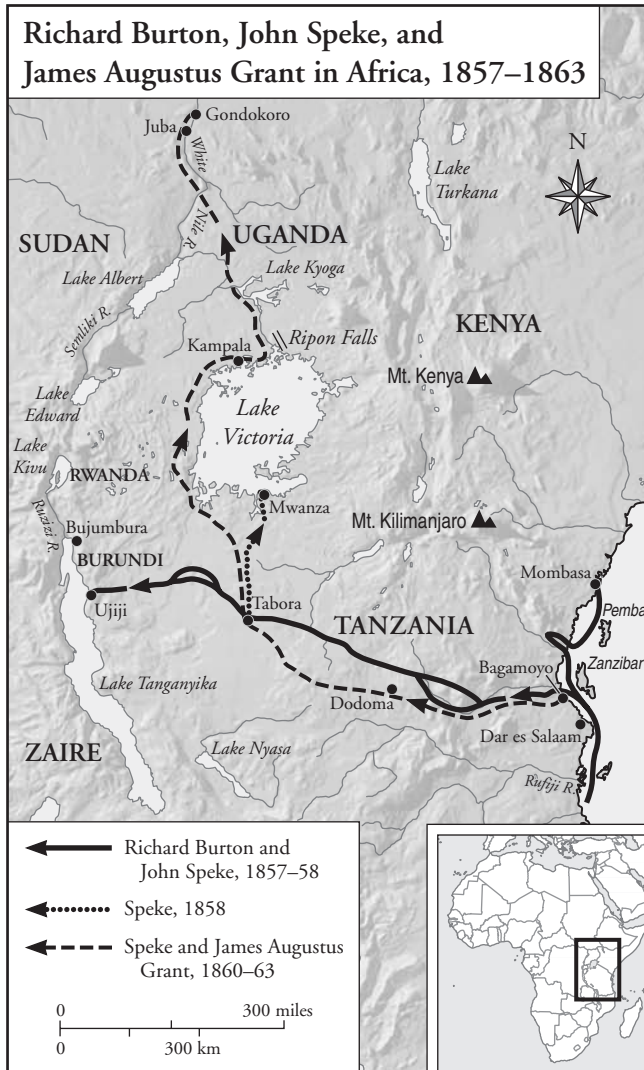
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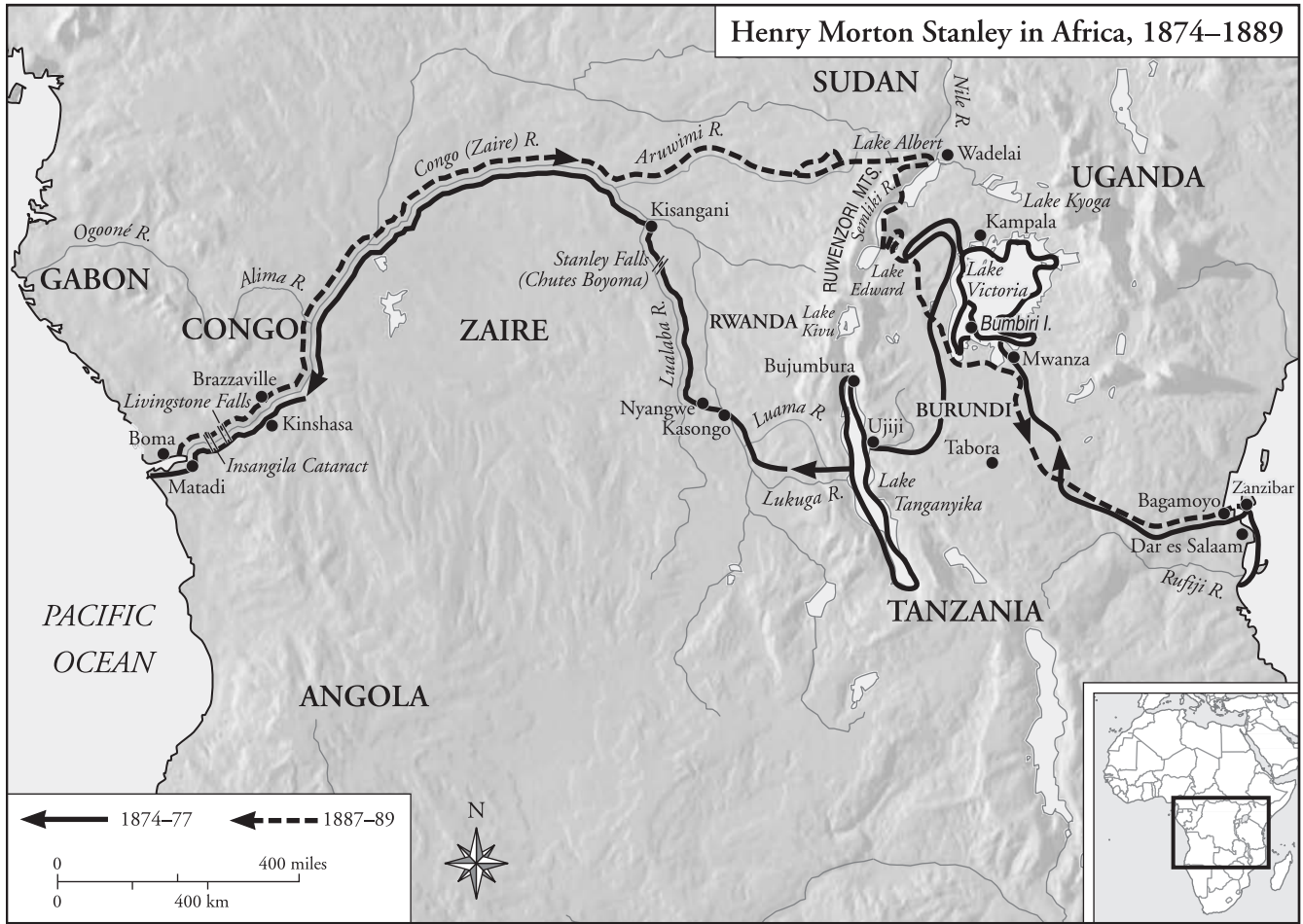


Mungo Park in Africa, 1795–1806



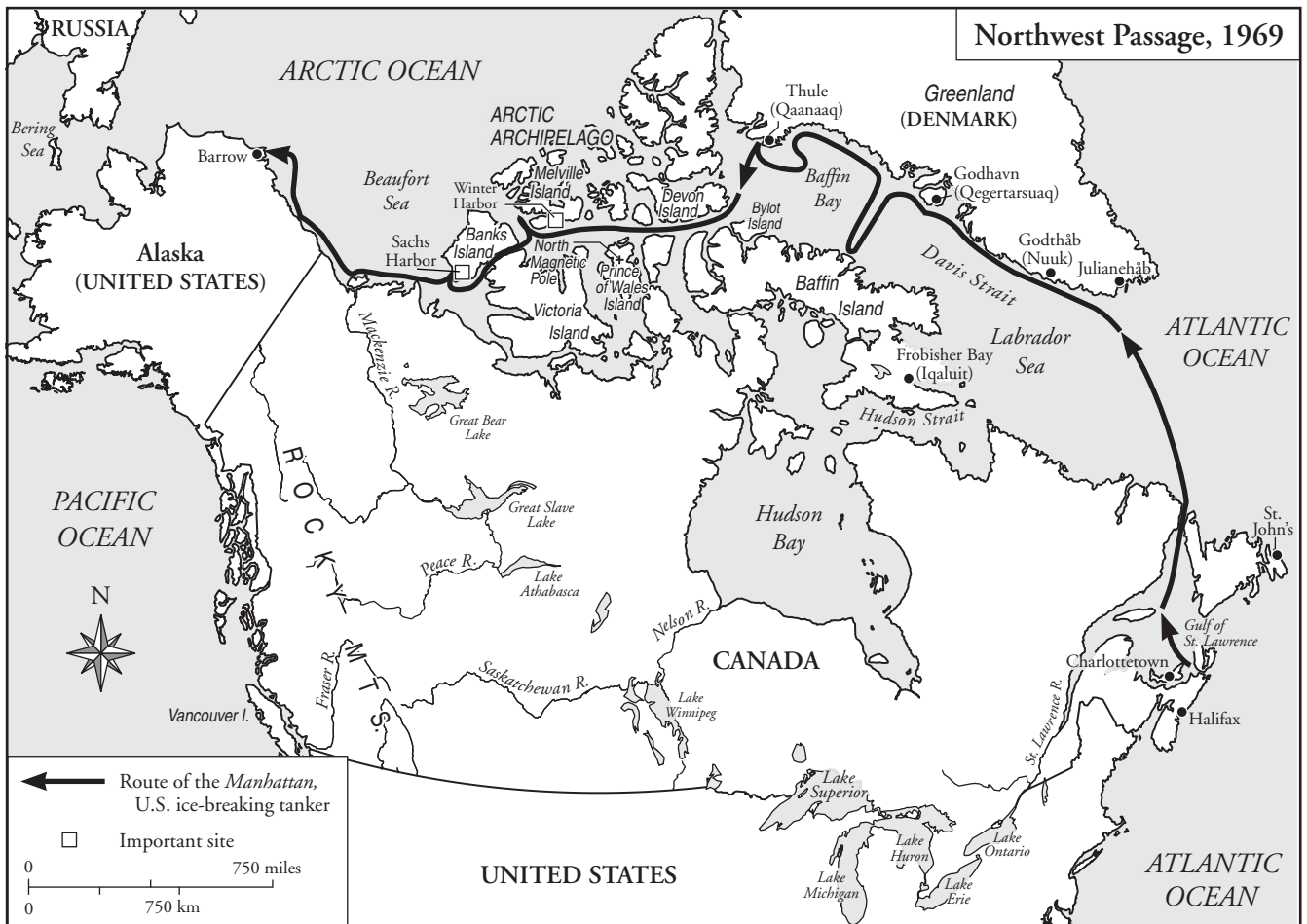
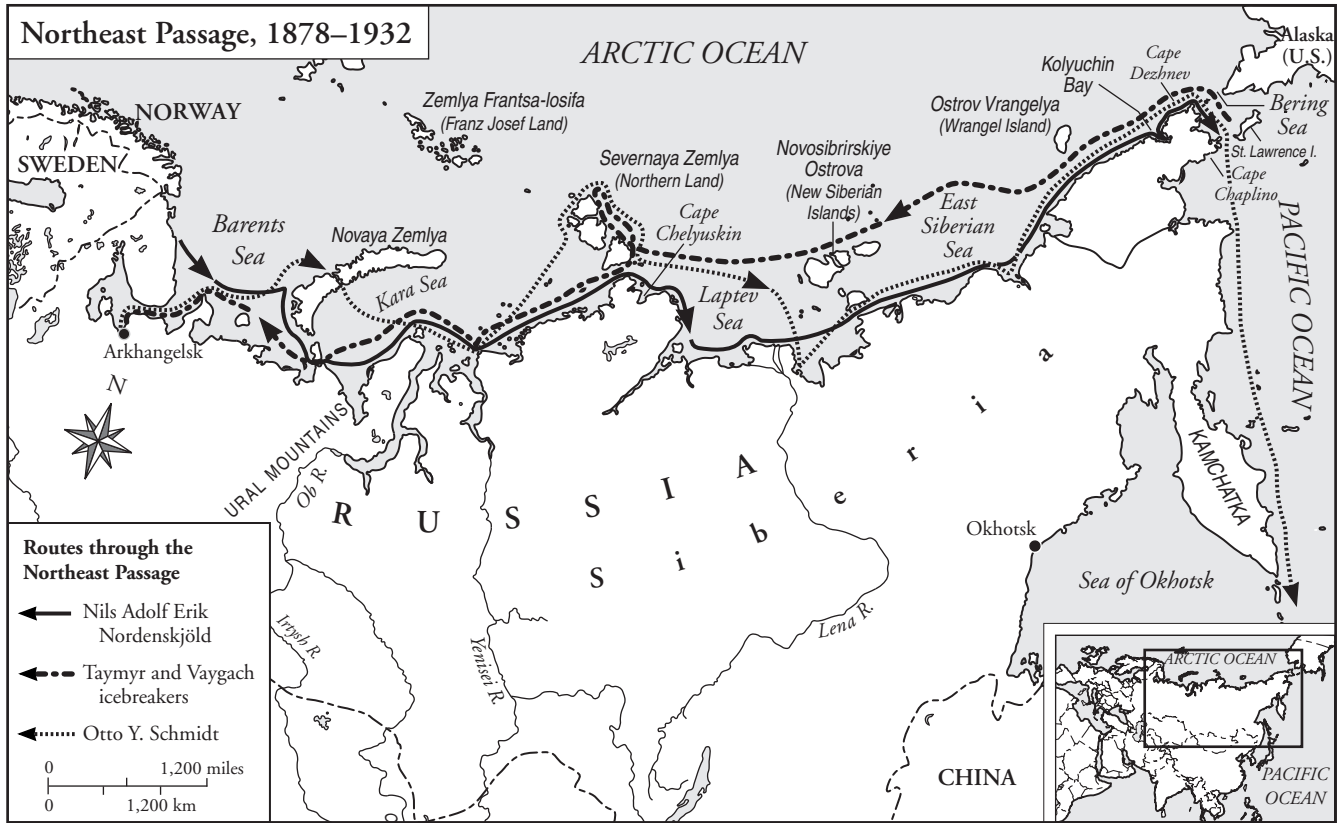


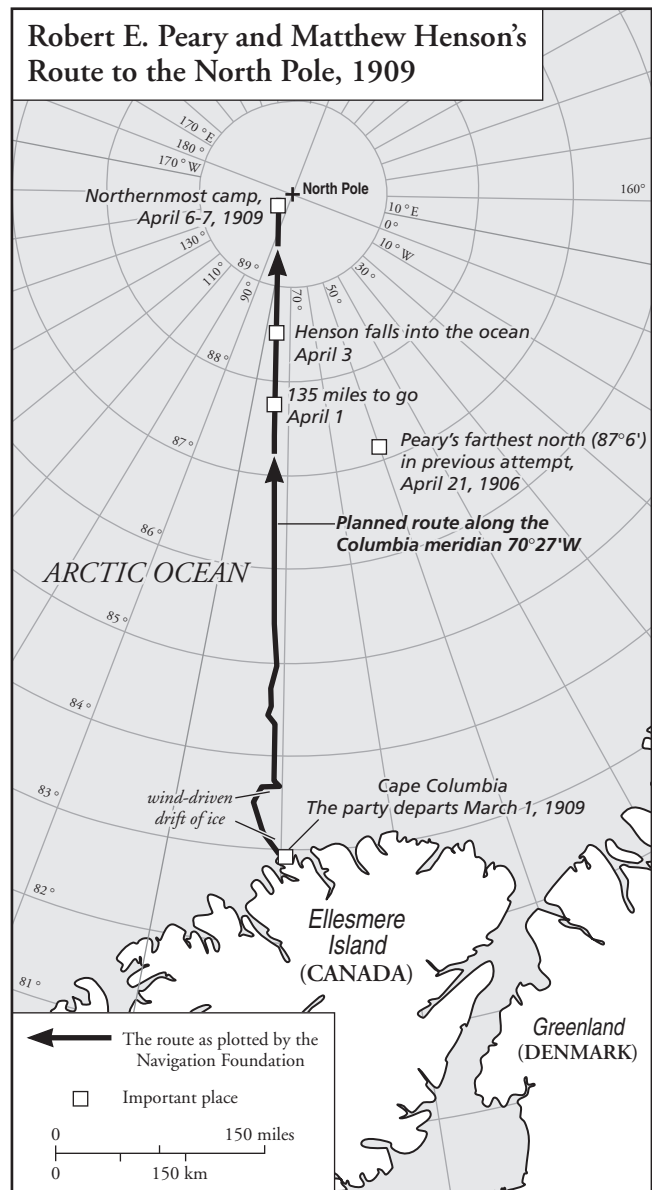
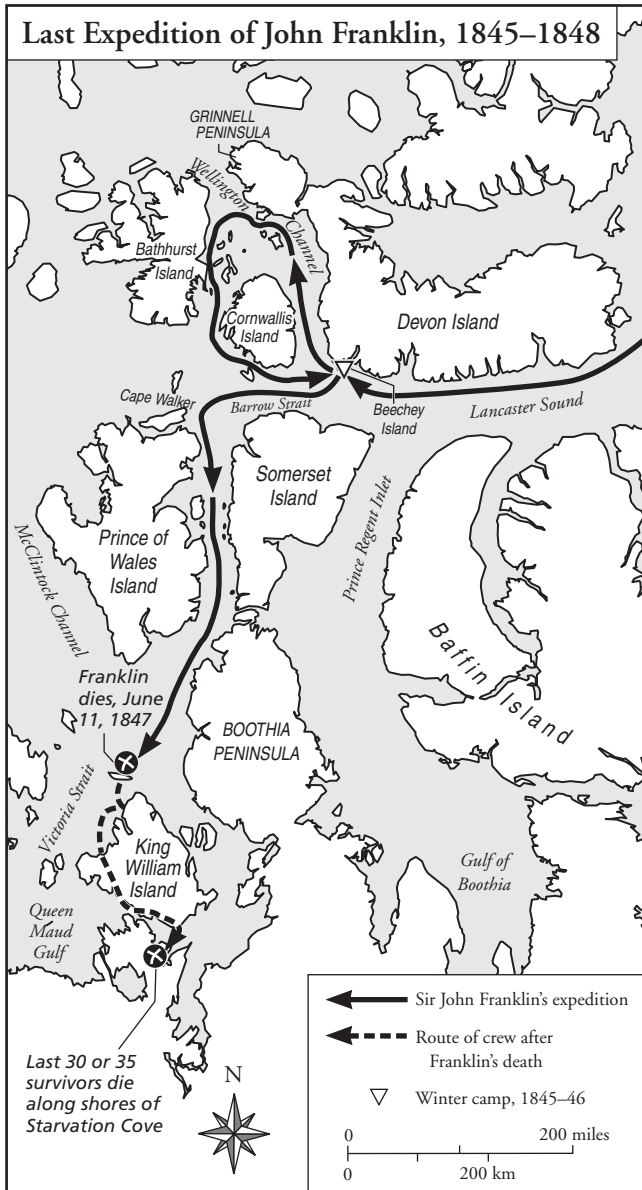




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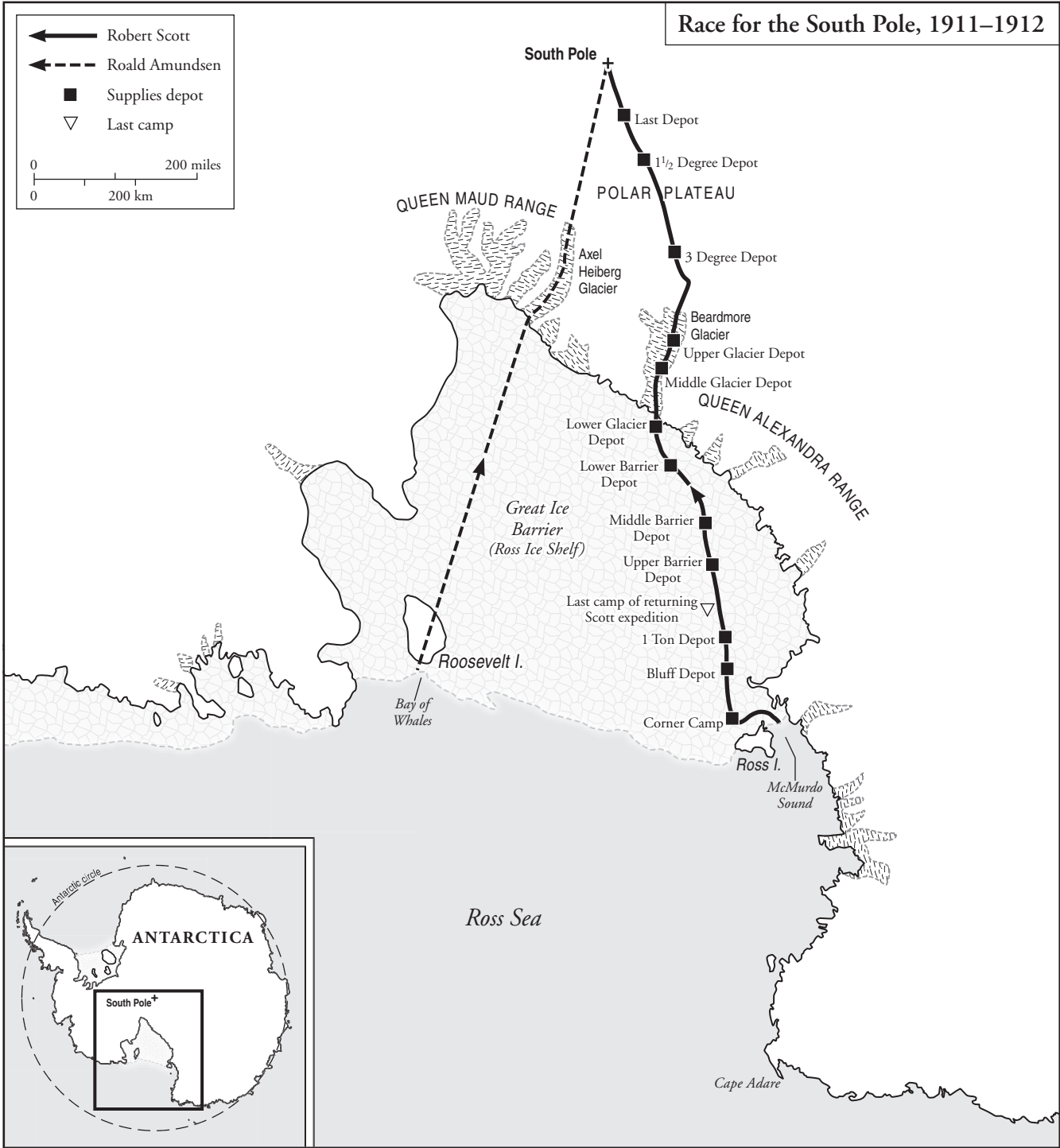
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Explorations of Antarctica, 1772–1916



1. **January 30, 1774:** James Cook's farthest south— $71^{\circ}10'S$, $106^{\circ}54'W$; dense ice prevents him from continuing.
2. **January 28, 1820:** Fabian Gottlieb von Bellingshausen makes the first sighting of the Antarctic continent.
3. **January 1841:** James Ross becomes the first to force a passage through the Antarctic pack ice; he discovers the Ross Sea, Victoria Land, and the Ross Ice Shelf.
4. **1899:** Carsten Egeberg Borchgrevink becomes the first to winter on Antarctica.
5. **December 30, 1902:** Robert Scott's farthest south— $82^{\circ}17'S$.
6. **December 1908:** Ernest Henry Shackleton discovers the huge Beardmore Glacier and climbs it to reach the 10,000-foot-high Antarctic Plateau.
7. **January 9, 1909:** Shackleton's farthest south— $88^{\circ}07'S$; 97 miles from the Pole.
8. **November 17, 1911:** Roald Amundsen discovers the Axel Heiberg Glacier.

9. **December 14, 1911:** Amundsen is the first to reach the South Pole.
10. **January 17, 1912:** Scott reaches the South Pole.
11. **February 17, 1912:** Death of Edgar Evans, the first of Scott's party to die.
12. **March 21, 1912:** Scott's last camp; Scott, Wilson, and Bowers die here; Oates dies nearby on March 17; the camp is just 11 miles from a large food depot, about $79^{\circ}39'S$.
13. **1913:** Douglas Mawson reaches George V Land
14. **January 18, 1915:** Shackleton's ship *Endurance* becomes icebound.
15. **November 21, 1915:** *Endurance* sinks.
16. **April 15, 1916:** Shackleton's party reaches Elephant Island; Shackleton leaves by boat for South Georgia Island on April 24.
17. **May 9, 1916:** Shackleton reaches South Georgia Island and returns to Elephant Island to rescue his men on August 30.



Chronology of Exploration



The following chronology of world exploration includes events relating directly to exploration, giving at least one date for the individuals listed in Volume I and other important dates from Volume II. Many general historical events, such as migrations of peoples and the establishment of nations, although important as a frame of reference to the subject matter, are not provided. To the left of certain entries is indicated the general geographic regions of exploration. The parenthetical place-names refer to modern-day nations, states, and provinces are further used to describe locations.



ca. 2450 B.C.

AFRICA/ASIA

- Egyptian HANNU sails into the RED SEA along the African coastline and Arabian Peninsula.

ca. 2340–2305

ASIA/EUROPE

- SARGON, the ruler of Akkad in Mesopotamia, establishes trade contacts with peoples of the Indus Valley, Arabian Peninsula, and eastern MEDITERRANEAN SEA. He launches naval campaigns in the Persian Gulf and possibly in the Mediterranean.

ca. 2270

AFRICA

- Egyptian provincial governor HERKHUF heads a trading expedition from the upper NILE RIVER southward to the interior of central East Africa.

ca. 1492

AFRICA

- Egyptian queen HATSHEPSUT sends a maritime trading expedition into the RED SEA to territory south of the Gulf of Aden in East Africa.

ca. 600

- Greek philosopher Thales of Miletus establishes natural science principles. On 585 B.C., he accurately predicts an eclipse of the Sun.

ca. 600–597

AFRICA

- Egyptian king NECHO II commissions a Phoenician maritime expedition into the RED SEA and Indian Ocean, which perhaps circumnavigates Africa.

ca. 575

- Greek philosopher Anaximander drafts the first known map to represent a concept of the world.

ca. 520–494

ASIA/AFRICA

- Greek historian HECATAEUS OF MILETUS travels in Asia Minor and Egypt and ascends the NILE RIVER.

510–507

ASIA

- Greek mariner SCYLAX descends the Indus River for Persian emperor Darius I and sails from the Arabian Sea to the RED SEA.

ca. 475

- Greek philosopher Parmenides hypothesizes that Earth is round.

ca. 470

AFRICA

- HANNO heads a Carthaginian maritime expedition from the MEDITERRANEAN SEA through the Strait of Gibraltar (see GIBRALTAR, STRAIT OF) along Africa's Atlantic coast.

ca. 457–443

ASIA/AFRICA/EUROPE

- Greek historian HERODOTUS travels in the Mediterranean region and ascends the NILE RIVER.

ca. 450

EUROPE

- HIMILCO heads a Carthaginian maritime expedition from the MEDITERRANEAN SEA through the Strait of Gibraltar (see GIBRALTAR, STRAIT OF) along Europe's Atlantic coast.

ca. 420–400

ASIA

- Greek physician CTESIAS OF CNIDUS travels in Persia (Iran) and India.

401**ASIA**

- Greek soldier XENOPHON leads mercenaries from Persia (Iran) through Iraq, Turkey, Armenia, and Georgia to Greece.

350

- Greek philosopher Plato writes of the lost continent of ATLANTIS in his dialogues *Timaeus* and *Critias*.

334–323**ASIA**

- Macedonian leader ALEXANDER THE GREAT conquers territory from the eastern Mediterranean to the Indus Valley of Pakistan and India.

ca. 325**EUROPE**

- Greek philosopher Aristotle determines scientific principles relating to navigation, among them that, in traveling from north to south, new constellations become visible while others disappear.
- Greek scholar PYTHEAS heads a maritime expedition along the coasts of Spain, France, and Britain, exploring the North Sea and Baltic Sea.

325–324**ASIA**

- Greek soldier NEARCHUS, under ALEXANDER THE GREAT, explores the coasts of Pakistan and Iran from the INDUS RIVER delta to the head of the Persian Gulf.

300–290**ASIA**

- Greek diplomat MEGASTHENES travels from Syria to northern India, reaching the GANGES RIVER.

240–195

- Greek scholar ERATOSTHENES heads a library at Alexandria and writes the first systematic treatise of geography.

ca. 170–120

- Greek scholar HIPPARCHUS makes astronomical and geographic observations.

ca. 150

- Greek geographer Crates of Mallus constructs the first known GLOBE.

ca. 138–109**ASIA**

- CH'ANG-CH'IEN heads two Chinese diplomatic missions to western lands, during which he ex-

plores the Altai Mountains of central Asia and Afghanistan and visits Sinkiang in western China. The route he travels develops into the SILK ROAD, a trade route between East and West.

120–115

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|---------------------|---|
| INDIA/AFRICA | <ul style="list-style-type: none"> ▪ Greek navigator EUDOXUS, in service to Egypt, makes two trips across the Arabian Sea to India. On the second, he lands on East Africa's coast and later unsuccessfully attempts to circumnavigate Africa. |
|---------------------|---|

58

- | | |
|---------------|--|
| EUROPE | <ul style="list-style-type: none"> ▪ GAIUS JULIUS CAESAR commands a Roman military expedition to Gaul (France). |
|---------------|--|

55–54

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|---------------|--|
| EUROPE | <ul style="list-style-type: none"> ▪ GAIUS JULIUS CAESAR commands a Roman military expedition to Britain. |
|---------------|--|

ca. 25 B.C.

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| ASIA | <ul style="list-style-type: none"> ▪ GAIUS AELIUS GALLUS commands a Roman military expedition to the Arabian Peninsula. |
|-------------|--|

ca. A.D. 18

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| | <ul style="list-style-type: none"> ▪ Greek geographer STRABO publishes <i>Geography</i> in Rome. |
|--|---|

42

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|---------------|---|
| AFRICA | <ul style="list-style-type: none"> ▪ SUETONIUS PAULINUS commands a Roman military expedition from North Africa's coast southward across the Atlas Mountains to the northern edge of the SAHARA DESERT. |
|---------------|---|

45

- | | |
|-------------|--|
| ASIA | <ul style="list-style-type: none"> ▪ Greek HIPPALUS, in service to Egypt, navigates a direct sea route across the Arabian Sea between Africa and India. |
|-------------|--|

ca. 50

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|---------------|---|
| AFRICA | <ul style="list-style-type: none"> ▪ JULIUS MATERNUS commands a Roman military expedition from Africa's north coast across the SAHARA DESERT and possibly reaches Lake Chad. |
|---------------|---|

50

- | | |
|---------------|---|
| AFRICA | <ul style="list-style-type: none"> ▪ Greek merchant DIOGENES explores inland in East Africa, possibly as far as Lake Victoria and Lake Albert. |
|---------------|---|

59–61**EUROPE**

- SUETONIUS PAULINUS heads a Roman military expedition in Britain.

77

- Roman PLINY THE ELDER publishes *Historia Naturalis* with geographic accounts of Europe, Asia, and Africa. He coins the name ULTIMA THULE for the northernmost land, based on the fourth-century B.C. travels of the Greek PYTHEAS.

77–84**EUROPE**

- GNAEUS JULIUS AGRICOLA commands a Roman naval exploration of the Orkney Islands and possibly circumnavigates Britain; he explores Scotland.

97**ASIA**

- Chinese diplomat KAN YING travels to central Asia and the Middle East.

100

- The *Periplus of the Erythraean Sea*, a surviving PERIPLUS, provides information about East Africa, including commercial activities in the region.

127–147

- Greek-Egyptian geographer PTOLEMY publishes *Geographia*.

ca. 190**ASIA**

- A Chinese woman, WEN-CHI, is abducted by the Hsiung-nu (Huns) and lives as a nomad on Mongolian steppes. She later writes *Eighteen Songs of a Nomad Flute* about her experiences.

399–414**ASIA**

- Chinese Buddhist monk FA-HSIEN travels west and south across China. He crosses the Takla Makan desert, Pamirs, and HIMALAYAS into Afghanistan and northern India, then sails to CEYLON (Sri Lanka).

ca. 548

- Egyptian merchant COSMAS INDICOPLEUSTES publishes *Topographia Christiana*, a Christian interpretation of geography.

ca. 566–573**ATLANTIC OCEAN**

- According to legend, Irish monk SAINT BRENDAN sails westward from Ireland into open wa-

ters of the Atlantic and reaches SAINT BRENDAN'S ISLE.

629–645

ASIA

- Chinese Buddhist monk HSÜAN-TSANG travels across the GOBI DESERT into western China and the Kirghiz region of central Asia, then crosses the Hindu Kush mountain range into Afghanistan. He explores Pakistan and India and returns to eastern China by way of the Takla Makan desert and the Tarim River.

671–695

ASIA

- Chinese Buddhist monk I-CHING travels to Indonesia and India.

ca. 680

ASIA

- Frankish pilgrim ARCULF travels to the Middle East.

ca. 700

- The Arabs reinvent the ASTROLABE (first used by ancient Greeks in the third or second century B.C.), a navigational tool.

776

- Spanish cartographer BEATUS OF VALCAVADO produces a map focusing on Jerusalem.

ca. 850–851

ASIA

- Arab merchant SOLEYMAN travels from the Persian Gulf by sea to India and China, visiting the Maldivic Islands, Laccadive Islands, CEYLON (Sri Lanka), and the Andaman Islands.

ca. 860

ICELAND

- Viking NADDOD, blown off course on the way from Norway to the Faeroe Islands, reaches ICELAND.

ca. 860–861

ICELAND

- Viking GARDAR SVARSSON circumnavigates ICELAND.

ca. 900–925

EUROPE/ASIA

- Muslim merchant ABU ALI AHMAD IBN RUSTA travels throughout the lower Volga region of eastern Europe and to Malay in Asia.

ca. 914–934

- ASIA/AFRICA/EUROPE** ▪ Arab historian ABU AL-HASAN ALI AL-MASUDI visits every country in the Islamic world.

921–922

- EUROPE** ▪ Muslim scholar AHMAD IBN FADLAN travels from Baghdad into the Volga region of European Russia.

943–973

- AFRICA/EUROPE/ASIA** ▪ Arab merchant and scholar ABU AL-QASIM IBN ALI AL-NASIBI IBN HAWQAL visits Islamic lands of the Middle East, Europe, and North Africa, then travels across the SAHARA DESERT.

ca. 950

- PACIFIC OCEAN** ▪ Polynesian chieftain KUPE reaches NEW ZEALAND.

ca. 982–986

- GREENLAND** ▪ Viking ERIC THE RED sails westward from ICELAND, reaching GREENLAND; he explores the west coast as far as Disko Island. In about 986, he founds a settlement on the southwest coast.

ca. 985–986

- NORTH AMERICA** ▪ Viking BJARNI HERJULFSSON possibly sights North America's northeast coast.

ca. 1001–02

- NORTH AMERICA** ▪ Viking LEIF ERICSSON heads a maritime expedition to VINLAND, probably at L'Anse aux Meadows in Newfoundland, or in Labrador or Quebec.

ca. 1005–07

- NORTH AMERICA** ▪ Viking THORVALD ERICSSON heads a colonizing expedition to North America's east coast.

ca. 1010–13

- NORTH AMERICA** ▪ Viking THORFINN KARLSEFNI heads a colonizing expedition to North America's east coast.

ca. 1014–15

- NORTH AMERICA** ▪ Viking woman FREYDIS EIRÍKSDOTTIR heads a colonizing expedition to North America's east coast.

ca. 1017

- ASIA** ▪ Arab scholar ABU AR-RAYHAN MUHAMMAD IBN AHMAD AL-BIRUNI travels to India from Afghan-

istan and writes a book, *India*, on Indian customs and geography.

1095

ASIA

- Pope Urban II calls for the liberation of the Holy Land (Palestine); in 1096–99, the First Crusade is undertaken, culminating in the capture of Jerusalem from the Seljuk Turks; other CRUSADES follow, the last in 1228–29.

1145–54

- Arab author and cartographer ABU ABD ALLAH MUHAMMAD ASH-SHARIF AL-IDRISI revolutionizes mapmaking in *The Book of Roger*, with accurate geographic information based on travels and use of the grid system.

ca. 1150–1200

- The HANSEATIC LEAGUE, a commercial union of German cities and towns and their merchants, becomes active.

1158

- Otto von Freisingen, bishop of Freising (Otto of Freising), publishes *Historia de Duabus Civitatibus*, in which is found the earliest known reference to the legendary Christian ruler PRESTER JOHN.

1159–73

ASIA

- Spanish rabbi BENJAMIN OF TUDELA travels from Spain to the Middle East and central Asia, possibly as far as China, and visits India and CEYLON (Sri Lanka).

ca. 1180–87

EUROPE/ASIA

- German PETHAHIA OF REGENSBURG travels in eastern Europe and the Middle East.

1182–85

ASIA/AFRICA/EUROPE

- Muslim official and scholar ABU AL-HASAN MUHAMMAD IBN JUBAYR journeys from Spain to Arabia, exploring the lands of the Mediterranean region.

1215–27

ASIA

- Mongol emperor GENGHIS KHAN leads armies westward from China to the Caspian Sea.

1221–22

ASIA

- Chinese sage CH'ANG-CH'UN travels from China through central Asia and reports to GENGHIS KHAN in Afghanistan.

1228–29

- Greek-born Muslim SHIHAB AL-DIN ABU ABD ALLAH YAQUT AL-RUMI publishes *Muʿjam al Buldan* (Dictionary of countries), a gazetteer-type geographic study.

1230

- English mathematician JOHN HOLYWOOD publishes *Treatise on the Sphere*, presenting the idea that Earth might be spherical.

1245–47

ASIA

- Italian GIOVANNI DA PIAN DEL CARPINI heads a papal mission to the court of the Great Khan of the Mongol Empire, traveling from Lyon in France, across eastern Europe and central Asia, to northern Mongolia and lands east of the Volga River.

1253–55

ASIA

- Flemish missionary WILLIAM OF RUBROUCK travels from Constantinople (Istanbul) across central Asia to Mongolia. He visits the Mongol capital at Karakorum.

1260–69

ASIA

- Italian merchants MAFFEO POLO and NICCOLÒ POLO travel the SILK ROAD across central Asia to the court of Kublai Khan in China.

1271–75

ASIA

- Italian merchants MAFFEO POLO, NICCOLÒ POLO, and MARCO POLO travel across central Asia to the court of Kublai Khan in China.

1275–92

ASIA

- Italian merchant MARCO POLO, in service to Kublai Khan, travels widely throughout the Mongol Empire, exploring China, Tibet, Southeast Asia, Indonesia, Mongolia, and possibly SIBERIA. The account of his experiences, *The Travels of Marco Polo*, inspires later explorers to locate CIPANGU, the Strait of Anian (ANIAN, STRAIT OF), and other places he references.

1280–1313

ASIA/EUROPE

- Turkish monk RABBAN BAR SAUMA travels from China to the Middle East and Europe.

ca. 1290

- The Hereford map, an early *MAPPA MUNDI*, is drafted in England.

1291

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- ATLANTIC OCEAN** ■ Italian mariner UGOLINO VIVALDI attempts to reach India across the Atlantic but fails.

1291–94

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- ASIA** ■ Italian missionary JOHN OF MONTECORVINO travels to India and China.

1292–95

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- ASIA** ■ Italian merchants MAFFEO POLO, NICCOLÒ POLO, and MARCO POLO sail from China to Persia by way of the Strait of Malacca and the Indian Ocean and return to Italy by way of the Black Sea and Constantinople (Istanbul).

ca. 1300

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- The mariner's COMPASS is developed in Amalfi, Italy.
 - The Italian cartographer Petrus Vesconte drafts the Pisan Chart, the oldest existing PORTOLAN CHART, representing coastlines and ports of the MEDITERRANEAN SEA.

1311–20

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- Chinese cartographer CHU SSU-PEN produces a world map with accurate information about Africa.

ca. 1318–22

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- ASIA** ■ Italian missionary ODORIC OF PORDENONE travels throughout much of Asia, including Persia (Iran), India, China, and Tibet.

1325–52

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- ASIA/AFRICA/EUROPE** ■ Arab scholar ABU ABD ALLAH MUHAMMAD IBN BATTUTAH travels throughout Egypt, Arabia, central Asia, Spain, and Africa. He explores the SAHARA DESERT.

1339–53

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- ASIA** ■ Italian missionary GIOVANNI DE MARIGNOLLI travels to China, India, and Indonesia.

ca. 1365

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- An account of travel in Africa and Asia known as *Mandeville's Travels*, supposedly written by SIR JOHN MANDEVILLE, probably a pseudonymous name, is published in England.

ca. 1375

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- Spanish cartographer ABRAHAM CRESQUES produces the *Catalan Atlas*, a world map based on

geographic information obtained from travelers such as MARCO POLO.

ca. 1400

- The CROSS-STAFF, a navigational tool, is developed in the Low Countries.

1403–06

ASIA

- RUY GONZÁLEZ DE CLAVIJO heads a Spanish diplomatic mission to Samarkand in central Asia.

1405–34

INDIAN OCEAN

- CHENG HO heads seven Chinese maritime expeditions, sailing from China to the Indian Ocean, reaching East Africa.

1416

- Portuguese prince HENRY THE NAVIGATOR establishes a base for explorations and eventually a naval depot, a school of navigation, and an observatory at Sagres in Spain, where his shipmakers develop the CARAVEL.

1418–60

AFRICA

- Portuguese prince HENRY THE NAVIGATOR sponsors voyages of exploration along Africa's west coast.

1419–44

ASIA

- Italian NICCOLÒ DI CONTI travels from Venice to Damascus in Syria, then across India to Burma (Myanmar) and Indonesia, returning to Europe by way of Southeast Asia, CEYLON (Sri Lanka), India's Malabar Coast, Arabia, and Egypt.

1432–34

ATLANTIC OCEAN

- GONÇALO VELHO CABRAL heads a Portuguese maritime expedition to the AZORES.

1433–35

AFRICA

- GIL EANNES heads three Portuguese maritime expeditions to Cape Bojador and beyond.

1436

AFRICA

- AFONSO GONÇALVES BALDAYA heads a Portuguese maritime expedition along Africa's west coast as far south as the TROPIC OF CANCER.

1441–43**AFRICA**

- NUNO TRISTÃO heads three Portuguese maritime expeditions along Africa's west coast, exploring Cape Blanco, Arguin Island, and the Senegal River delta. A fort he establishes on Arguin Island in 1482 becomes a center of the early African SLAVE TRADE.

1444–45**AFRICA**

- DINÍS DIAS heads a Portuguese maritime expedition along Africa's west coast, reaching Cape Verde, Africa's westernmost point.

1445–47**AFRICA**

- ÁLVARO FERNANDES heads two Portuguese maritime expeditions along Africa's west coast, south of Cape Verde. He explores the Gambia River and reaches just north of Sierra Leone.

ca. 1450

- German inventor Johannes Gutenberg develops printing with movable type, helping make texts available to a wider audience.

1455–56**AFRICA**

- ALVISE DA CADAMOSTO heads two Portuguese maritime expeditions along Africa's west coast, exploring the lower Senegal and Gambia Rivers and the Cape Verde Islands.

1458–62**AFRICA**

- DIOGO GOMES heads two Portuguese maritime expeditions along Africa's west coast, exploring Cape Palmas and the Gambia River and reaching the Cape Verde Islands.

1469–75**AFRICA**

- Portuguese merchant FERNÃO GOMES trades along Africa's west coast as far as the Gulf of Guinea and the island of Fernando Po.

1482–86**AFRICA**

- DIOGO CÃO heads two Portuguese maritime expeditions along Africa's west coast, exploring the lower CONGO RIVER (Zaire River). He travels as far south as Namibia, almost reaching the TROPIC OF CAPRICORN.

1487–88**AFRICA**

- Portuguese **BARTOLOMEU DIAS** heads a Portuguese maritime expedition around Africa's southern tip, reaching the **CAPE OF GOOD HOPE**.

1487–93**AFRICA/ASIA**

- Portuguese diplomat **PERO DA COVILHÃ** heads a mission to India and North Africa, reaching as far south as Sofala, opposite the island of Madagascar. He remains in Ethiopia.

1488**AFRICA**

- **DUARTE PACHECO** heads a Portuguese maritime expedition to Africa's southwest coast. He is shipwrecked on Principe Island in the Gulf of Guinea.

1492

- German cartographer **MARTIN BEHAIM** develops a **GLOBE** of the world depicting a large island west of the **AZORES**, perhaps indicating European knowledge of South America before subsequent voyages.

1492–93**CARIBBEAN**

- Italian **CHRISTOPHER COLUMBUS** heads a Spanish maritime expedition seeking a westward route across the Atlantic. He reaches the Bahamas, Cuba, and Hispaniola (Haiti and Dominican Republic) of the **WEST INDIES**; Arawak (Taino) Indian **GUANCANAGARI** provides help.

1493–96**CARIBBEAN**

- Italian **CHRISTOPHER COLUMBUS** heads a Spanish maritime expedition to the **WEST INDIES**. He explores coasts of the Lesser Antilles, Puerto Rico, Cuba, and Jamaica.

1497**NORTH AMERICA**

- Italian **AMERIGO VESPUCCI** heads a Spanish maritime expedition to the **WEST INDIES** and possibly North America's east coast as far north as Cape Hatteras, North Carolina.

1497–98**NORTH AMERICA**

- Italian **JOHN CABOT** heads two English maritime expeditions to North America. He reaches Newfoundland and the east coast of Labrador and travels southward along the Atlantic coast, possibly to Chesapeake Bay.

1497–99

- AFRICA/ASIA** ▪ VASCO DA GAMA heads a Portuguese maritime expedition from Europe around Africa to India.

1498–1500

- SOUTH AMERICA** ▪ Italian CHRISTOPHER COLUMBUS heads a maritime expedition from the Cape Verde Islands to the southern Caribbean Sea. He reaches Trinidad and the mainland of South America, then explores the Gulf of Pará, the coast of Venezuela, and the Orinoco Delta.

1499–1500

- SOUTH AMERICA** ▪ VICENTE YÁÑEZ PINZÓN, FRANCISCO MARTÍN PINZÓN, and ARIAS MARTÍN PINZÓN head a Spanish maritime expedition to South America's east coast. They reach the mouth of the AMAZON RIVER.

- SOUTH AMERICA** ▪ ALONSO DE OJEDA heads a Spanish maritime expedition along the coast of Venezuela.

ca. 1500

- Leonardo da Vinci researches human and avian flight.

1500

- ARCTIC/GREENLAND** ▪ GASPAR CÔRTE-REAL heads a Portuguese maritime expedition to North America, reaching GREENLAND's west coast and possibly the ARCTIC CIRCLE.

- GREENLAND** ▪ JOÃO FERNANDES heads a Portuguese maritime expedition to North America, reaching at least as far as GREENLAND.

1500–01

- SOUTH AMERICA/ASIA** ▪ PEDRO ÁLVARS CABRAL heads a Portuguese maritime expedition to India by way of the CAPE OF GOOD HOPE. Driven westward by unfavorable winds, he claims Brazil for Portugal.

1501

- NORTH AMERICA** ▪ GASPAR CÔRTE-REAL and MIGUEL CÔRTE-REAL head a Portuguese maritime expedition to Labrador and Newfoundland.

- SOUTH AMERICA/
MIDDLE AMERICA** ▪ RODRIGO DE BASTIDAS heads a Spanish maritime expedition to South America's northeast coast. He explores the Caribbean coast of Venezuela, Colombia, and Panama, exploring the Magdalena River, Cartagena Bay, and the Gulf of Darien.

1501–02**SOUTH AMERICA**

- Italian AMERIGO VESPUCCI heads a Portuguese maritime expedition to the coast of Brazil. He explores the harbor at Rio de Janeiro, then sails southward along South America's coast, possibly as far as South Georgia Island.

1502–04**MIDDLE AMERICA**

- Italian CHRISTOPHER COLUMBUS heads a Spanish maritime expedition to Central America, from Honduras southward to Panama.

1502–08**AFRICA/ASIA**

- Italian LUDOVICO DI VARTHEMA travels in Egypt, the Middle East, India, and Southeast Asia, returning to Europe by sailing around Africa. It is thought he was the first European to reach the SPICE ISLANDS (the Moluccas) in the EAST INDIES.

1503

- The Indies Bureau of Trade, a government office, is founded in Spain to regulate Spanish commerce in the Americas.

1503–05**AFRICA/ASIA**

- FRANCISCO DE ALMEIDA heads two Portuguese naval expeditions around Africa's CAPE OF GOOD HOPE to India. His son, LOURENÇO DE ALMEIDA, serves under him.

1504**SOUTH AMERICA**

- JUAN DE LA COSA heads a Spanish maritime expedition to the Gulf of Uraba in Colombia.
- French mariner Binot Palmière de Gonneville claims to have visited a paradise across the Atlantic Ocean; GONNEVILLE'S LAND becomes associated with the GREAT SOUTHERN CONTINENT.

1506–07**AFRICA/ASIA**

- Portuguese AFONSO DE ALBUQUERQUE commands a naval expedition to the Indian Ocean. He explores Africa's east coast and establishes a Portuguese outpost in Asia at Hormuz in the Persian Gulf.

CARIBBEAN

- VICENTE YÁÑEZ PINZÓN and JUAN DÍAZ DE SOLÍS head a Spanish maritime expedition to the Caribbean Sea. They circumnavigate Cuba and reach the Yucatán Peninsula and Bay of Campeche.

1507

- German cartographer MARTIN WALDSEEMÜLLER publishes the first world map depicting South America as a distinct continent, calling it “America,” taken from AMERIGO VESPUCCI’s name.

1507–18**AFRICA/ASIA**

- Moroccan diplomat LEO AFRICANUS travels in North Africa, the Middle East, and central Asia.

1508–09**SOUTH AMERICA**

- VICENTE YÁÑEZ PINZÓN and JUAN DÍAZ DE SOLÍS head a Spanish maritime expedition along the east coast of South America, reaching as far south as the mouth of Río Negro in Argentina.

CARIBBEAN

- JUAN PONCE DE LEÓN heads a Spanish maritime expedition to Puerto Rico.

ASIA

- DIEGO LÓPEZ DE SEQUIRA heads a Portuguese maritime expedition to Malacca on the Malay Peninsula and circumnavigates Sumatra.

1509**NORTH AMERICA/
ARCTIC**

- Italian SEBASTIAN CABOT heads an English maritime expedition to North America’s east coast, seeking the NORTHWEST PASSAGE. He sights Newfoundland, Nova Scotia, and Long Island.

1509–11**MIDDLE AMERICA**

- DIEGO DE NICUESA heads a Spanish colonizing expedition to Panama.

1511–13**ASIA**

- Portuguese FRANCISCO SERRANO heads a Portuguese maritime expedition to the SPICE ISLANDS (the Moluccas) in the EAST INDIES and explores northern Java.

1511–14**CARIBBEAN**

- DIEGO VELÁSQUEZ commands the Spanish conquest of Cuba.

1513**NORTH AMERICA**

- JUAN PONCE DE LEÓN heads a Spanish maritime expedition from Puerto Rico to Florida. He explores from St. Augustine on Florida’s Atlantic coast to Pensacola Bay on the Gulf of Mexico, in search of the FOUNTAIN OF YOUTH.

MIDDLE AMERICA

- VASCO NUÑEZ DE BALBOA heads a Spanish expedition across the Isthmus of Panama, reaching the Pacific Ocean.

1515–16

- SOUTH AMERICA**
- JUAN DÍAZ DE SOLÍS heads a Spanish maritime expedition along South America's east coast. He reaches Río de la Plata south of Uruguay.

1517

- MIDDLE AMERICA**
- FRANCISCO FERNÁNDEZ DE CÓRDOBA heads a Spanish maritime expedition to the Bahamas. When blown off course to Mexico's Yucatán Peninsula, he explores westward to the Bay of Campeche.
- ASIA**
- Portuguese envoy TOMÉ PIRES travels by ship from India to China.

1518

- MIDDLE AMERICA**
- JUAN DE GRIJALVA heads a Spanish maritime expedition from Cuba to the Yucatán Peninsula, from the Bay of Campeche and the Panuco River.

1518–19

- NORTH AMERICA**
- ALONSO ÁLVAREZ DE PINEDA heads a Spanish maritime expedition in the Gulf of Mexico, from Florida to Tampico.

1519

- MIDDLE AMERICA**
- PEDRO ARIAS DE ÁVILA founds Panama City for the Spanish.

1519–21

- MIDDLE AMERICA**
- HERNÁN CORTÉS commands a Spanish expedition from Cuba to Mexico and conquers the Aztec; BERNAL DÍAZ DEL CASTILLO serves under Cortés and later writes a history of the conquest. MALINCHE, an Aztec woman, serves as Cortés's interpreter.

1519–22

- WORLD**
- Portuguese FERDINAND MAGELLAN heads a Spanish maritime expedition seeking a westward route to the Far East; he reaches the Strait of Magellan (see MAGELLAN, STRAIT OF) at the tip of South America and crosses the Pacific to the Mariana Islands and the Philippines. On Magellan's death in the Philippines in 1521, JUAN SEBASTIÁN DEL CANO assumes command and completes the first CIRCUMNAVIGATION OF THE WORLD. FRANCESCO ANTONIO PIGAFETTA, as Magellan's private secretary, keeps a journal, which is later published as *Primo Viaggio Intorno al Mondo* (First journey around the terrestrial globe).

1520

- NORTH AMERICA** ▪ LUCAS VÁSQUEZ DE AYLLÓN heads a Spanish maritime expedition from Santo Domingo on the island of Hispaniola (Haiti and Dominican Republic) to the coast of South Carolina.

1520–27

- AFRICA** ▪ Portuguese FRANCISCO ÁLVARES travels in Ethiopia. In 1540, he publishes an account of his experiences, *The Prester John of the Indies*.

1522

- SOUTH AMERICA** ▪ PASCUAL DE ANDAGOYA heads a Spanish maritime expedition to South America's west coast below Panama as far south as Colombia.
- MIDDLE AMERICA** ▪ ANDRÉS NIÑO heads a Spanish maritime expedition along the Pacific coast of Panama, Costa Rica, Nicaragua, and Honduras as far north as Mexico. He explores the interior of Nicaragua and reaches Lake Nicaragua.

1522–24

- MIDDLE AMERICA** ▪ FRANCISCO FERNÁNDEZ DE CÓRDOBA heads a Spanish expedition from Panama into Nicaragua, exploring and colonizing the region around Lake Managua and Lake Nicaragua.

1522–26

- SOUTH AMERICA** ▪ Portuguese castaway ALEJO GARCÍA explores inland from the Brazilian coast to the ANDES MOUNTAINS in Bolivia seeking Indian riches. Reports of his travels contribute to the legend of the wealthy kingdom of LOS CÉSARES.

1523–26

- MIDDLE AMERICA** ▪ PEDRO DE ALVARADO heads a Spanish expedition from Mexico to Guatemala and El Salvador.

1524

- NORTH AMERICA** ▪ GIOVANNI DA VERRAZANO heads a French maritime expedition to North America's east coast from South Carolina to Newfoundland.

1524–25

- NORTH AMERICA** ▪ ESTEVÃO GOMES heads a Spanish maritime expedition along North America's east coast, seeking the NORTHWEST PASSAGE.

1524–28

- SOUTH AMERICA** ▪ FRANCISCO PIZARRO heads a Spanish maritime expedition southward from Panama along the Pa-

cific coast of Colombia, Ecuador, and northern Peru.

1525

- MIDDLE AMERICA** ■ HERNÁN CORTÉS heads a Spanish expedition of CONQUISTADORES from Mexico to Honduras.

1526

- MIDDLE AMERICA** ■ PEDRO ARIAS DE ÁVILA commands a Spanish military expedition in the conquest of Indian tribes of Nicaragua.

1526–27

- NORTH AMERICA** ■ LUCAS VÁSQUEZ DE AYLÓN heads a Spanish colonizing expedition from Santo Domingo on the island of Hispaniola (Haiti and Dominican Republic) to the Santee River in South Carolina. He explores southward to the Savannah River in Georgia.

1526–30

- SOUTH AMERICA** ■ Italian SEBASTIAN CABOT heads an English maritime expedition to the Río de la Plata and explores inland waterways of Brazil, Uruguay, Paraguay, and Argentina.

1527

- NORTH AMERICA** ■ JOHN RUT heads an English maritime expedition to Newfoundland.

1527–29

- PACIFIC OCEAN** ■ ÁLVARO DE SAAVEDRA CÉRON heads a Spanish maritime expedition from South America to Guam, the Philippines, and the SPICE ISLANDS (Moluccas). In an unsuccessful eastward return passage, he reaches Ponape Island in the Carolines and Eniwetok Island in the Marshalls.

1528–35

- MIDDLE AMERICA** ■ FRANCISCO DE MONTEJO commands a Spanish military expedition against the Maya of the Yucatán Peninsula. His son, FRANCISCO DE MONTEJO Y LEÓN, campaigns in 1537–46.

1528–36

- NORTH AMERICA** ■ PÁNFILO DE NÁRVAEZ heads a Spanish expedition to Florida; after the disappearance of Nárvaez at sea, four survivors, including ALVAR NÚÑEZ CABEZA DE VACA and former slave ESTEVANICO, wander from the coast of Texas into the American Southwest and northern Mexico as far west as the Gulf of California.

1529–33

- MIDDLE AMERICA** ▪ NUÑO BELTRÁN DE GUZMÁN commands the Spanish conquest of Indian tribes in western Mexico.

1530–31

- SOUTH AMERICA** ▪ Diego de Ordaz heads a Spanish maritime expedition to the mouth of the AMAZON RIVER, exploring the Orinoco and Meta Rivers.

1530–36

- SOUTH AMERICA** ▪ German NIKOLAUS FEDERMANN heads two expeditions to the interior of Venezuela, seeking the fabled land of EL DORADO. On the second, he explores the plains of eastern Colombia and makes the first east-to-west crossing of the ANDES MOUNTAINS.

1531

- Italian physicist Guglielmo de Lorena constructs a large barrel used to walk along the bottom of a body of water, a primitive DIVING BELL.

1531–33

- SOUTH AMERICA** ▪ FRANCISCO PIZARRO commands the Spanish conquest of the Inca in Ecuador and Peru. His half brothers, GONZALO PIZARRO and HERNANDO PIZARRO, serve under him.

- SOUTH AMERICA** ▪ German AMBROSIUS ALFINGER explores the interior of Venezuela, seeking the fabled land of EL DORADO, and reaches Rio Magdalena.

1534

- NORTH AMERICA** ▪ JACQUES CARTIER heads a French maritime expedition to northeastern Canada; he explores Newfoundland, the Gaspé Peninsula, Labrador's south coast, the Gulf of St. Lawrence and islands in the Bay of Fundy. Huron Indian DONNACONNA provides help. Cartier searches for the legendary land of SAGUENAY.

1534–35

- SOUTH AMERICA** ▪ SEBASTIÁN DE BENALCÁZAR commands the Spanish conquest of Ecuador.

1535

- NORTH AMERICA** ▪ HERNÁN CORTÉS heads a Spanish maritime expedition from Mexico to the Gulf of California.
- GONZALO FERNÁNDEZ DE OVIEDO Y VALDEZ publishes the first volume of *Historia general y*

natural de las Indias Occidentales (General and natural history of the West Indies), a history of Spanish activity in the WEST INDIES.

1535–36

- NORTH AMERICA**
- JACQUES CARTIER heads a French maritime expedition to northeastern Canada. He explores the St. Lawrence River as far as Montreal and determines that Newfoundland is an island.

1535–37

- SOUTH AMERICA**
- DIEGO DE ALMAGRO heads a Spanish expedition south from Cuzco, Peru, through the ANDES MOUNTAINS of Bolivia and Argentina, into Chile as far south as Concepción, and back across the Atacama Desert.
- SOUTH AMERICA**
- PEDRO DE MENDOZA heads a Spanish colonizing expedition to the lower Río de la Plata region of Argentina and founds a settlement on the site of Buenos Aires.
- SOUTH AMERICA**
- JUAN DE AYOLAS heads a Spanish expedition from Buenos Aires, Argentina, along the Río de la Plata, to the Paraná and Paraguay Rivers.

1535–38

- SOUTH AMERICA**
- German GEORG HOHERMUTH VON SPEYER explores Río Meta and its tributaries and Río Ariari in Colombia, seeking the fabled land of EL DORADO.

1536–39

- SOUTH AMERICA**
- GONZALO JIMÉNEZ DE QUESADA heads a Spanish expedition to the upper Magdalena River in Colombia, seeking the fabled land of EL DORADO.
- SOUTH AMERICA**
- SEBASTIÁN DE BENALCÁZAR heads a Spanish expedition to the interior of Colombia, seeking the fabled land of EL DORADO.

1539

- NORTH AMERICA**
- MARCOS DE NIZA and ESTEVANICO head a Spanish expedition from Mexico to the American Southeast, organized by ANTONIO DE MENDOZA. They explore Arizona and New Mexico as far north as the Zuni Indian pueblos.

1539–40

- NORTH AMERICA**
- FRANCISCO DE ULLOA heads a Spanish maritime expedition, which explores the Gulf of California, the mouth of the COLORADO RIVER, and the Pacific coast of Baja California.

1539–43

NORTH AMERICA

- HERNANDO DE SOTO heads a Spanish expedition through the American Southeast. After landing on Florida's west coast, he explores the northern panhandle. He heads northward into Georgia and the Carolinas, westward across the APPALACHIAN MOUNTAINS, southward into Alabama, then westward into Mississippi, locating the MISSISSIPPI RIVER. He crosses the Mississippi into Arkansas and eastern Oklahoma. De Soto dies in 1542 on the Mississippi River, and LUIS DE MOSCOSO takes command. Moscoso explores Texas as far as the Trinity River before descending the Mississippi to the Gulf of Mexico.

1540–41

SOUTH AMERICA

- PEDRO DE VALDIVIA heads a Spanish expedition from Peru into Chile, crossing the Atacama Desert, and founds Santiago.

1540–42

NORTH AMERICA

- FRANCISCO VÁSQUEZ DE CORONADO heads a Spanish expedition from Mexico into the American Southwest in search of the seven cities of CIBOLA, as organized by ANTONIO DE MENDOZA. He explores Arizona and New Mexico. He also explores the southern plains of the Texas Panhandle, Oklahoma, and Kansas in search of the legendary kingdom of QUIVIRA, as guided by the TURK, a Plains Indian. HERNANDO DE ALVARADO, under Coronado, explores the upper Rio Grande, the Canadian River, and the Pecos River. PEDRO DE TOVAR and JUAN DE PADILLA explore northeastern Arizona. GARCÍA LOPEZ DE CÁRDENAS explores northern Arizona as far as the Grand Canyon. MELCHOR DÍAZ explores southern Arizona and northern Baja California. In 1540–41, HERNANDO DE ALARCÓN heads a Spanish maritime expedition to the Gulf of California and the lower COLORADO RIVER, the seaward portion of Coronado's expedition, as organized by Mendoza.

1541–42

NORTH AMERICA

- JACQUES CARTIER heads a French maritime expedition to northeastern Canada. He explores the St. Lawrence River and the Saguenay River.

SOUTH AMERICA

- ÁLVAR NÚÑEZ CABEZA DE VACA explores the Río de la Plata as well as the Paraná, Iguazú, and Paraguay Rivers of Argentina and Paraguay for Spain.

- SOUTH AMERICA** ▪ FRANCISCO DE ORELLANA heads a Spanish expedition down the AMAZON RIVER, from the Napo River to the Atlantic coast.
- ASIA** ▪ Portuguese FERNÃO MENDES PINTO travels from China to the Mekong Delta in Vietnam and Japan.

1541–46

- SOUTH AMERICA** ▪ German PHILIP VON HUTTEN explores Río Meta and its tributaries plus Río Ariari in Colombia.

1541–51

- ASIA** ▪ Spanish missionary FRANCIS XAVIER travels to India, Indonesia, and Japan.

1542–43

- NORTH AMERICA** ▪ JEAN-FRANÇOIS DE LA ROQUE DE ROBERVAL heads a French colonizing expedition, which establishes a short-lived settlement on the St. Lawrence River near Quebec City.
- NORTH AMERICA** ▪ JUAN RODRÍGUEZ CABRILLO and BARTOLOMÉ FERRELO command a Spanish maritime expedition along North America's west coast, as organized by ANTONIO DE MENDOZA, from Mexico to the Oregon-California border.
- SOUTH AMERICA** ▪ ÁLVAR NÚÑEZ CABEZA DE VACA heads a Spanish expedition to the Paraguay River north of Asunción in Paraguay.

1542–46

- SOUTH AMERICA** ▪ DOMINGO MARTINEZ DE IRALA heads two Spanish expeditions to the upper Paraguay River. In the second, he reaches the eastern slopes of the ANDES MOUNTAINS.

1543

- Polish astronomer Nicolaus Copernicus publishes *De revolutionibus orbium coelestium*, describing the Sun as the center of a solar system, with the planets in orbit around it.

1551

- The MUSCOVY COMPANY, a joint-stock trading company, is founded in England to locate a NORTHEAST PASSAGE.

1553–54

- EUROPE/ARCTIC** ▪ HUGH WILLOUGHBY, RICHARD CHANCELLOR, and STEPHEN BOROUGH head an English maritime expedition to northern Russia, seeking the NORTH-

EAST PASSAGE. They sight Novaya Zemlya before Willoughby perishes; Chancellor and Borough travel overland to Moscow.

1554–62

- NORTH AMERICA**
- FRANCISCO DE IBARRA heads a Spanish expedition to north-central Mexico as far north as the Sonora Valley.

1556–57

- EUROPE/ARCTIC**
- Englishman STEPHEN BOROUGH heads an English maritime expedition seeking the NORTHEAST PASSAGE. He sails as far east as Novaya Zemlya, reaching the entrance to the Kara Sea. He explores the Arctic coast of European Russia.

1557–64

- EUROPE/ASIA**
- English trader ANTHONY JENKINSON undertakes two expeditions to Russia and central Asia. He becomes the first Englishman to visit Bukhara in Uzbekistan.

1559–61

- SOUTH AMERICA**
- PEDRO DE URSÚA heads a Spanish expedition from Lima, Peru, across the ANDES MOUNTAINS, and into the Amazon Basin. LOPE DE AGUIRRE mutinies and takes over the expedition, following the ORINOCO RIVER to its mouth in Venezuela.

1562

- NORTH AMERICA**
- JEAN RIBAUT heads a French colonizing expedition to Florida and South Carolina. He founds a short-lived Huguenot colony at Port Royal Sound in South Carolina.
 - Spanish cartographer DIEGO GUTIÉRREZ produces the first map of South America detailing the inland river systems.

1562–69

- AFRICA/
CARIBBEAN**
- Englishman JOHN HAWKINS establishes the transatlantic SLAVE TRADE between England, Africa, and the Americas.

1564–65

- NORTH AMERICA**
- Frenchman RENÉ GOULAIN DE LAUDONNIÈRE founds a short-lived Huguenot colony on the St. Johns River in Florida. Artist JACQUES LE MOYNE DE MORGUES is one of the colonists.
- PACIFIC OCEAN**
- MIGUEL LÓPEZ DE LEGAZPI heads a Spanish maritime expedition from Mexico to the western Pa-

cific. He explores the Mariana Islands and the Marshall Islands and founds the first permanent Spanish settlement in the Philippines.

1565

PACIFIC OCEAN

- ANDRÉS DE URDANETA heads a Spanish maritime expedition eastward across the Pacific from the Philippines to Mexico, via the Japan Current.

1565–67

NORTH AMERICA

- PEDRO MENÉNDEZ DE AVILÉS heads a Spanish colonizing expedition to coastal regions of the American Southeast. He founds St. Augustine, Florida, the first permanent European settlement on the North American mainland north of Mexico, and sends expeditions inland.

1567–69

PACIFIC OCEAN

- ÁLVARO DE MENDAÑA and PEDRO SARMIENTO DE GAMBOA head a Spanish maritime expedition from Peru westward, seeking the fabled GREAT SOUTHERN CONTINENT, and reach the Solomon Islands and Marshall Islands. Mendaña names the Solomon Islands after King Solomon from the Bible, believing he has reached the legendary land of OPHIR and King Solomon's mines.

1569

- Flemish cartographer GERARDUS MERCATOR produces a MERCATOR PROJECTION world map.

1569–72

SOUTH AMERICA

- GONZALO JIMÉNEZ DE QUESADA heads a Spanish expedition to eastern Colombia, from Bogotá to the confluence of the ORINOCO RIVER and the Guaviare River.

1570–98

- Flemish cartographer ABRAHAM ORTELIUS produces an annual world atlas.

1576

- English geographer HUMPHREY GILBERT publishes *A Discourse of a Discoverie for a Passage to Cataia*, furthering the idea of a NORTHWEST PASSAGE through North America to Cathay (China).

1576–78

ARCTIC

- MARTIN FROBISHER heads three English maritime expeditions to the Canadian Arctic, seeking the

NORTHWEST PASSAGE, the second two backed by the CATHAY COMPANY. He reaches Frobisher Bay on southeastern Baffin Island.

1577–80

WORLD

- FRANCIS DRAKE heads the first English CIRCUM-NAVIGATION OF THE WORLD. He navigates Drake Passage south of CAPE HORN in South America and explores North America's west coast as far north as Vancouver Island.

1579

ASIA

- English missionary THOMAS STEVENS travels to India on a Portuguese ship, becoming the first known Englishman in India.

1579–80

SOUTH AMERICA

- PEDRO SARMIENTO DE GAMBOA heads a Spanish expedition surveying the Strait of Magellan (see MAGELLAN, STRAIT OF).

1580

SOUTH AMERICA

- JUAN DE GARAY reestablishes the Spanish settlement of Buenos Aires, Argentina, formerly occupied in 1536–41.

1581

- The LEVANT COMPANY, a company to develop trade with the LEVANT, is founded in London.

1581–82

ASIA

- Russian Cossack YERMAK commands a military campaign across the Ural Mountains, initiating Russian expansion into SIBERIA.

1582–83

NORTH AMERICA

- ANTONIO ESTEVAN DE ESPEJO heads a Spanish expedition to western New Mexico and eastern Arizona, exploring the upper Rio Grande, the Sangre de Cristo Mountains, the Little Colorado River, and the upper Pecos River.

1582–89

- English geographer RICHARD HAKLUYT publishes three influential books on exploration and geography: *Diverse Voyages Touching the Discovery of America and the Islands Adjacent*; *A Discourse Concerning Western Planting*; and *The Principal Navigations, Voyages, and Discoveries of the English Nation*.

1583

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- NORTH AMERICA** ■ English geographer HUMPHREY GILBERT heads a colonizing expedition to Newfoundland.

1583–84

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- Pamphlets are published making the claim that England had a prior claim to the Americas based on the supposed travels of MADOC, a legendary 12th-century Welsh prince.

1583–85

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- ASIA** ■ Merchant JOHN NEWBERRY escorts an English trade and diplomatic mission to India.

1583–91

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- ASIA** ■ English merchant RALPH FITCH heads a trading expedition to India by way of Syria; he visits Burma (Myanmar) and Southeast Asia.

1584–85

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- EUROPE/ARCTIC** ■ OLIVIER BRUNEL heads two Dutch expeditions seeking the NORTHEAST PASSAGE, reaching Novaya Zemlya.
- SOUTH AMERICA** ■ ANTONIO DE BERRÍO heads a Spanish expedition to the ORINOCO RIVER and the Guiana region, seeking the fabled land of EL DORADO.

1584–87

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- NORTH AMERICA** ■ Englishman WALTER RALEIGH sponsors three Roanoke voyages to the Outer Banks region of North Carolina that explore the Carolina coast. RICHARD GRENVILLE commands the fleet transporting colonists in the second voyage and a failed attempt at a colony, with THOMAS HARRIOT serving as naturalist and JOHN WHITE as artist. A second colonizing attempt under John White also fails, becoming known as the LOST COLONY.

1585–87

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- ARCTIC** ■ JOHN DAVIS heads three English maritime expeditions to the Canadian Arctic, seeking the NORTHWEST PASSAGE. He reaches as far north as 73 degrees north latitude in the Davis Strait and explores the eastern entrance of the Hudson Strait.

1585–94

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- Flemish cartographer GERARDUS MERCATOR produces a comprehensive world atlas.

1590

- Spanish missionary JOSÉ DE ACOSTA, after serving in Peru and Mexico, publishes an account of the natural science of the Americas, *The Natural and Moral History of the Indies*.

1592

- NORTH AMERICA**
- Greek mariner JUAN DE FUCA reportedly explores the Pacific coast of California, Oregon, and Washington.

1594–95

- Geographer JAN HUYGHEN VAN LINSCHOTEN heads two Dutch expeditions in search of the NORTHEAST PASSAGE, reaching Novaya Zemlya.

ca. 1595

- The English mariner JOHN DAVIS invents the Davis QUADRANT, a navigational tool.

1595

- SOUTH AMERICA**
- WALTER RALEIGH heads an English expedition to the ORINOCO RIVER, seeking the fabled land of EL DORADO.
- PACIFIC OCEAN**
- ÁLVARO DE MENDAÑA heads a Spanish colonizing expedition to the South Pacific; he reaches the Marquesas Islands and Santa Cruz Islands.
- NORTH AMERICA**
- SEBASTIÁN MELÉNDEZ RODRÍGUEZ CERMENHO heads a Spanish maritime expedition to the California coast, reaching Monterey Bay.

1595–97

- ASIA**
- CORNELIUS HOUTMAN heads a Dutch maritime expedition to the EAST INDIES.

1596–97

- ARCTIC**
- WILLEM BARENTS heads a Dutch maritime expedition seeking the NORTHEAST PASSAGE, reaching Bear Island and Spitsbergen (Svalbard).

1598

- NORTH AMERICA**
- JUAN DE OÑATE heads the first Spanish colonizing expedition into New Mexico. In subsequent years, he explores much of the American Southwest.
 - MARTIN LLEWELLYN publishes the first English atlas showing the sea routes to the Far East.

1598–1600

- ASIA**
- Englishman ANTHONY SHERLEY travels to Persia. He heads diplomatic missions to Moscow,

Prague, and Rome on behalf of the Persian shah.

1598–1601

WORLD

- OLIVER VAN NOORT heads the first Dutch CIRCUMNAVIGATION OF THE WORLD. He explores coastal South America.

1599–1600

ASIA

- Englishman WILLIAM ADAMS serves as the pilot for a Dutch trade fleet, which reaches Japan by way of the Strait of Magellan (see MAGELLAN, STRAIT OF) and Chile.

1600

- The British East India Company, a joint-stock trading company, is founded in London.

1601–03

ASIA

- JAMES LANCASTER heads the first maritime trading voyage of the BRITISH EAST INDIA COMPANY to the EAST INDIES.

1601–07

ASIA

- Italian missionary MATTEO RICCI travels in China from a mission in Peking (Beijing).

1602

NORTH AMERICA

- BARTHOLOMEW GOSNOLD heads an English maritime expedition to New England. He explores Cape Cod, Martha's Vineyard, Buzzards Bay, and Naragansett Bay.
- The DUTCH EAST INDIA COMPANY, a joint-stock trading company, is founded in the Netherlands.

1602–03

NORTH AMERICA

- SEBASTIÁN VISCAÍNO heads a Spanish maritime expedition along the California coast. He explores Monterey Bay and surveys beyond Cape Mendocino as far north as southern Oregon.

1603

NORTH AMERICA

- SAMUEL DE CHAMPLAIN heads a French fur-trading expedition to eastern Canada. He explores the Gulf of St. Lawrence, the Saguenay River, and the St. Lawrence River as far as the Lachine Rapids.

NORTH AMERICA

- MARTIN PRING heads an English trading expedition along the New England coast, from Maine to the Long Island Sound.

1603–07

- ASIA**
- Portuguese missionary BENTO DE GÓES travels from India through Afghanistan and makes an eastward crossing of China as far as Suchow.

1603–20

- SOUTH AMERICA**
- Spanish woman CATALINA DE ERAUSO, disguised as a man, fights as a soldier and works in mining camps in Argentina and Chile.

1604–05

- NORTH AMERICA**
- SAMUEL DE CHAMPLAIN heads a French colonizing expedition to eastern Canada; he explores the Bay of Fundy and establishes Acadia on the St. Croix River, eventually moving the colony to Port Royal in southeastern Nova Scotia.

1604–08

- SOUTH AMERICA**
- HERNANDO ARIAS DE SAAVEDRA heads Spanish expeditions inland from Buenos Aires, Argentina.

1605

- NORTH AMERICA**
- GEORGE WEYMOUTH heads an English maritime expedition along the coast of Maine to establish trade contacts with Native Americans.
- AUSTRALIA**
- WILLEM JANSZ heads a Dutch maritime exploration of the south coast of New Guinea. He sights the Australian mainland.

1605–06

- PACIFIC OCEAN**
- Portuguese PEDRO FERNÁNDEZ DE QUIRÓS heads a Portuguese maritime expedition from Peru to the southwestern Pacific, seeking the fabled GREAT SOUTHERN CONTINENT. He explores island groups, including parts of Samoa, the Cook Islands, and New Hebrides. LUIS VÁEZ DE TORRES explores New Guinea's eastern end and reaches Louisiade Archipelago and the Torres Strait.
- ARCTIC/GREENLAND**
- Englishman JAMES HALL heads two Dutch maritime expeditions to GREENLAND's west coast.

1605–07

- NORTH AMERICA**
- SAMUEL DE CHAMPLAIN heads a French maritime expedition to coastal regions of northeastern North America, including Cape Breton Island, New Brunswick, Maine, and Massachusetts.

1606

- NORTH AMERICA**
- JOHN KNIGHT heads an English maritime expedition to the north coast of Labrador, seeking the

NORTHWEST PASSAGE. He disappears with a surveying party.

- The Virginia Company of London and the Virginia Company of Plymouth are founded to reassert English sovereignty over North America and colonize it; they both are referred to as the VIRGINIA COMPANY.

1607–08

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| ARCTIC/GREENLAND | ▪ HENRY HUDSON heads two English maritime expeditions seeking the NORTHEAST PASSAGE. He explores GREENLAND's east coast and the European Arctic coast. |
| NORTH AMERICA | ▪ GEORGE POPHAM founds Fort St. George, a short-lived English settlement on Monhegan Island off Maine. |

1607–09

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| NORTH AMERICA | ▪ CHRISTOPHER NEWPORT and JOHN SMITH found the first permanent English settlement in the Americas at Jamestown, Virginia. Newport explores inland beyond the falls of James River in Virginia and possibly reaches the mouth of the Rappahannock River. Smith explores the Chesapeake Bay and the Potomac, Rappahannock, and Chickahominy Rivers. |
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1608

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| NORTH AMERICA | ▪ SAMUEL DE CHAMPLAIN founds the first permanent French settlement in the Americas at Quebec City. |
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1608–17

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| ASIA | ▪ English trader JOHN JOURDAIN travels to India, Sumatra, Java, and the EAST INDIES. |
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1609

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| NORTH AMERICA | ▪ SAMUEL DE CHAMPLAIN heads a French expedition southward from the St. Lawrence River along the Richelieu River, reaching Lake Champlain. |
| NORTH AMERICA | ▪ Englishman HENRY HUDSON heads a Dutch maritime exploration of New York Bay and the Hudson River, seeking the NORTHWEST PASSAGE. |
| ATLANTIC OCEAN | ▪ SILVESTER JOURDAIN's shipwreck leads to an English claim on Bermuda. |
| | ▪ German astronomer Johannes Kepler establishes that the orbits of planets are elliptical, not circular. |

1610

- Italian scientist Galileo constructs the first complete astronomical telescope and begins viewing

features on the Moon and eventually the moons of Jupiter.

1610–11

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| NORTH AMERICA | ▪ HENRY HUDSON heads an English maritime expedition to the Hudson Strait, HUDSON BAY, and James Bay, seeking the NORTHWEST PASSAGE. |
| SOUTH AMERICA | ▪ THOMAS ROE heads an English maritime expedition to coastal South America; he explores from the mouth of the AMAZON RIVER to the ORINOCO RIVER delta. |

1611–12

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| NORTH AMERICA | ▪ ÉTIENNE BRÛLÉ, under SAMUEL DE CHAMPLAIN, heads a French expedition to Lake Huron and Lake Ontario. |
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1612

- The COMPANY OF MERCHANTS OF LONDON DISCOVERERS OF THE NORTHWEST PASSAGE is chartered in England.

1612–13

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| ARCTIC | ▪ THOMAS BUTTON heads an English maritime expedition to HUDSON BAY, seeking the NORTHWEST PASSAGE. He explores the mouth of the Nelson River and the coast of the Southampton Island. |
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1613

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| NORTH AMERICA | ▪ SAMUEL DE CHAMPLAIN heads a French expedition to the Ottawa River as far as Allumette Island. |
| AFRICA | ▪ Spanish missionary PEDRO PÁEZ explores Lake Tana and the nearby Springs of Geesh, determining them as the principal source of the Blue Nile. |

1613–14

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| ASIA | ▪ JOHN SARIS heads an English maritime expedition to Japan. |
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1614

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| NORTH AMERICA | ▪ JOHN SMITH heads an English maritime expedition from Cape Cod to Penobscot Bay. He names the region New England. |
| NORTH AMERICA | ▪ ADRIAEN BLOCK heads a Dutch maritime expedition to the East River, in modern-day New York. He enters Long Island Sound from the west through the narrow channel known as Hell Gate. He explores the New England coastline, reaching the Housatonic and Connecticut Rivers as well as Block Island. |

1615

- ARCTIC**
- Englishmen WILLIAM BAFFIN and ROBERT BYLOT head an English maritime expedition to HUDSON BAY's northwest coast and the Foxe Basin, determining that Hudson Bay provides no navigable outlet westward to the Pacific.

1615–16

- NORTH AMERICA**
- SAMUEL DE CHAMPLAIN and ÉTIENNE BRÛLÉ head a French expedition from Montreal along the Ottawa River and Lake Nipissing to the French River and the Georgian Bay on the northeast shore of Lake Huron. They proceed southward along the eastern end of Lake Ontario to upstate New York. Étienne Brûlé explores the Susquehanna River from New York to Chesapeake Bay in Maryland.
- ATLANTIC OCEAN/
PACIFIC OCEAN**
- JAKOB LE MAIRE and WILLEM CORNELIS SCHOUTEN head a Dutch maritime expedition around South America's CAPE HORN; they locate the Juan Fernandez Islands and determine the eastern extent of New Guinea.

1615–19

- ASIA**
- THOMAS ROE heads an English diplomatic mission to the Mogul (Mughal) Empire in northern India.

1616

- ARCTIC/GREENLAND**
- WILLIAM BAFFIN and ROBERT BYLOT head an English maritime expedition to the west coast of GREENLAND, as well as Baffin Bay, Baffin Island, and Lancaster Sound.
- AUSTRALIA**
- DIRK HARTOG heads a Dutch maritime expedition to the EAST INDIES. He reaches Dirk Hartogs Island and explores Australia's west coast.

1619

- AUSTRALIA**
- FREDERIK HOUTMAN heads a Dutch maritime expedition to the EAST INDIES. He sights Australia's west coast.

1619–20

- NORTH AMERICA**
- JENS ERIKSEN MUNK heads a Danish maritime expedition to HUDSON BAY, seeking the NORTHWEST PASSAGE. He explores the Churchill River region.

1620

- NORTH AMERICA**
- Englishman EDWARD WINSLOW sails with the PILGRIMS to Massachusetts and helps found Plymouth colony.

1621

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- NORTH AMERICA**
- ÉTIENNE BRÛLÉ heads a French expedition to the western Great Lakes, reaching Lake Superior.
 - The DUTCH WEST INDIA COMPANY, a joint-stock trading company, is founded in the Netherlands.

1621–22

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- NORTH AMERICA**
- Wampanoag Indian SQUANTO aids the PILGRIMS in the exploration of coastal Massachusetts.

1622–30

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- NORTH AMERICA**
- Spaniard ALONZO DE BENAVIDES serves as missionary to the American Indians of the Gila River Valley, Rio Grande, and the Pecos River Valley.

1624–25

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- ASIA**
- Portuguese (or possibly Spanish) missionary ANTONIO DE ANDRADE travels from northern India across the HIMALAYAS, where he reaches a source of the GANGES RIVER, and continues into Tibet.

1626

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- ASIA**
- Portuguese missionaries JOÃO CABRAL and ESTEVÃO CACELLA travel from India to Tibet.

1627

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- AUSTRALIA**
- FRANÇOIS THYSSEN heads a Dutch maritime expedition eastward across the southern Indian Ocean to southwestern Australia and explores the Great Australian Bight.

1627–29

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- ASIA**
- English writer THOMAS HERBERT explores Persia (Iran).

1628

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- AFRICA**
- Portuguese missionary JERONIMO LOBO explores the Lake Tana region in Ethiopia. He reaches the source of the Blue Nile River and Tisisat Falls.

1631

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- NORTH AMERICA/
ARCTIC**
- LUKE FOXE heads an English maritime expedition to western and northern HUDSON BAY, seeking the NORTHWEST PASSAGE.

1631–32

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- NORTH AMERICA/
ARCTIC**
- THOMAS JAMES heads an English maritime expedition to HUDSON BAY and James Bay, seeking the NORTHWEST PASSAGE.

1631–33

- ASIA**
- Russian Cossack PYOTR BEKETOV expands the Russian dominion to the Yenisey, Lena, and Aldan Rivers of central SIBERIA.

1631–35

- ASIA**
- Portuguese (or Spanish) missionary FRANCISCO DE AZEVADO crosses the HIMALAYAS from India into Tibet.

1634

- NORTH AMERICA**
- French missionary JEAN NICOLET explores Lake Michigan and Green Bay.
 - Dutch cartographer WILLEM JANZON BLAEU publishes a comprehensive atlas detailing recent explorations.

1637–38

- SOUTH AMERICA**
- Portuguese PEDRO DE TEIXEIRA heads an expedition up the AMAZON RIVER. He reaches Río Negro and Quito by way of the Napo River and the ANDES MOUNTAINS. On the return journey in 1639, he is accompanied by Jesuit missionary CRISTÓBAL DE ACUÑA.

1640–49

- NORTH AMERICA**
- French missionary JEAN DE BRÉBEUF explores the eastern Great Lakes. He is joined by GABRIEL LALEMENT at Georgian Bay in 1648.

1640–80

- EUROPE/ASIA/AFRICA**
- Turkish writer ÇELEBI EVLIYA travels in eastern Europe, the Balkans, the Middle East, and North Africa.

1641

- NORTH AMERICA**
- French missionary ISAAC JOGUES explores Lake Superior and Lake Michigan.

1641–44

- ASIA**
- Russian Cossack MIKHAIL STADUKHIN explores the Arctic coast of SIBERIA, reaching the Kolyma River.

1642–43

- PACIFIC OCEAN**
- ABEL JANSZON TASMAN heads a Dutch maritime expedition from Indonesia, seeking the fabled GREAT SOUTHERN CONTINENT. He explores TASMANIA, NEW ZEALAND, and the Fiji Islands.

1643–46**ASIA**

- Russian Cossack VASILY DANILOVICH POYARKOV commands a Russian military expedition down the Amur River to the Sakhalin Gulf and the Sea of Okhotsk.

1644**AUSTRALIA**

- ABEL JANSZON TASMAN heads a Dutch maritime expedition from Indonesia to the South Pacific. He explores New Guinea's south coast and Australia's north and west coasts.

1644–48**NORTH AMERICA**

- Italian missionary FRANCESCO-GIOSEPPE BRESANI explores the eastern Lake Huron region of Ontario.

1646**NORTH AMERICA**

- French missionary ISAAC JOGUES explores Lake George in New York and Vermont.

1648**ASIA**

- Russian Cossack SEMYON IVANOVICH DEZHNEV heads an expedition from the mouth of Kolyma River eastward along the Arctic coast of SIBERIA. He rounds Cape Dezhnev and sights the BERING STRAIT.

1649–52**ASIA**

- YEROFEY PAVLOVICH KHABAROV heads two Russian expeditions to the Amur River region in southeastern SIBERIA.

1652–60**ASIA**

- Russian Cossack PYOTR BEKETOV expands Russian dominion to the Amur River of eastern SIBERIA.

1654**NORTH AMERICA**

- French missionary SIMON LE MOYNE explores Onondaga Lake in New York.

1654–56**NORTH AMERICA**

- French fur trader MÉDARD CHOUART DES GROSEILLIERS, one of the COUREURS DE BOIS, explores Illinois, Michigan, and Wisconsin, including the Fox and Wisconsin Rivers. He also explores the upper reaches of the MISSISSIPPI RIVER in Minnesota.

1659–60

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| NORTH AMERICA | ▪ French COUREURS DE BOIS MÉDARD CHOUART DES GROSEILLIERS and PIERRE-ESPRIT RADISSON explore from Lake Superior to Chequamegon Bay. |
| NORTH AMERICA | ▪ French missionary RENÉ MÉNARD founds a mission at Keweenaw Bay on Lake Superior. |

1660

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- The ROYAL SOCIETY (Royal Society of London for Improving Natural Knowledge) is founded in London.

1661–62

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| ASIA | ▪ Jesuit missionaries JOHANN GRUEBER and ALBERT D'ORVILLE travel from Peking (Beijing) across western China to Tibet, becoming the first Europeans to visit LHASA. They cross the HIMALAYAS into India. |
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1664

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- The FRENCH EAST INDIA COMPANY, a joint-stock trading company, is founded in France.

1665

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| SOUTH AMERICA | ▪ CHARLES-EDOUARD DE LA NOUÉ heads a French expedition to Tierra del Fuego and Patagonia. |
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1665–69

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| NORTH AMERICA | ▪ French missionary CLAUDE-JEAN ALLOUEZ explores the south shore of Lake Superior and the Fox and Wisconsin Rivers. |
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1666–67

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| SOUTH AMERICA | ▪ AGOSTINHO VIALE heads a Portuguese expedition from São Paulo, Brazil, to the Mato Grosso region south of the AMAZON RIVER. |
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1667

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| NORTH AMERICA | ▪ French missionary JACQUES BRUYAS travels from Quebec to upstate New York. |
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1667–71

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| NORTH AMERICA | ▪ French fur trader NICOLAS PERROT explores the western Great Lakes. |
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1668–69

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| NORTH AMERICA | ▪ Frenchman MÉDARD CHOUART DES GROSEILLIERS, backed by a British group of merchants, carries out a fur-trading expedition by sea from |
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England to HUDSON BAY. PIERRE-ESPRIT RADISSON, in a separate ship, is forced to turn back.

1669–70

- NORTH AMERICA ▪ German physician JOHN LEDERER explores the Piedmont and Blue Ridge of Virginia and North Carolina for the British colony of Virginia.
- NORTH AMERICA ▪ French missionaries RENÉ DE BRÉHANT DE GALINÉE and FRANÇOIS DOLLIER DE CASSON explore Niagara River, Lake Erie, and Lake Huron.

1670

- The HUDSON’S BAY COMPANY is founded in London to develop the FUR TRADE in North America. PIERRE-ESPRIT RADISSON reaches HUDSON BAY.

1671–72

- NORTH AMERICA ▪ French missionary CHARLES ALBANEL travels from the St. Lawrence River to HUDSON BAY.

1671–73

- NORTH AMERICA ▪ Englishman ABRAHAM WOOD sponsors Virginia colonial expeditions to the Appalachian frontier of Virginia and North Carolina. THOMAS BATTS and ROBERT FALLAM cross the Blue Ridge into West Virginia. GABRIEL ARTHUR and JAMES NEEDHAM reach Tennessee.

1673

- NORTH AMERICA ▪ French fur trader and missionary LOUIS JOLLIET and JACQUES MARQUETTE explore the Fox River, the Wisconsin River, and the MISSISSIPPI RIVER to the mouth of the Arkansas River. On the return journey, they explore the Illinois River.

1675–77

- SOUTH AMERICA ▪ German SIGISMUND NIEBUHR heads a Dutch maritime expedition to the southern tip of South America; he explores Le Maire Strait, CAPE HORN, and Tierra del Fuego.

1679

- The first EPHEMERIS, *Connaissance de Temps*, a table of astronomical data for purposes of navigation, is published in France.

1679–80

- NORTH AMERICA ▪ French fur trader DANIEL GREYSOLON DULUTH explores the headwaters of the MISSISSIPPI RIVER in Wisconsin and Minnesota.

- NORTH AMERICA**
- HENRI DE TONTI heads a French expedition to the north shore of Lake Erie and the south shore of Lake Michigan.

1680

- NORTH AMERICA**
- LOUIS HENNEPIN and MICHEL ACO head a French expedition to the Minnesota River and the Falls of St. Anthony.

1682

- NORTH AMERICA**
- RENÉ-ROBERT CAVELIER DE LA SALLE heads a French expedition along the MISSISSIPPI RIVER to the Gulf of Mexico.

1683–92

- ASIA**
- German ENGELBRECHT KAEMPFER travels on behalf of Sweden to Persia, Sri Lanka (CEYLON), Java, Thailand, and Japan.

1685

- NORTH AMERICA**
- Dutchman JOSEPH DE LA PENHA explores the interior of Labrador.
- NORTH AMERICA**
- English physician HENRY WOODWARD explores from Charleston, South Carolina, to beyond the Savannah River into Georgia.

1685–1717

- EUROPE**
- Englishwoman CELIA FIENNES begins traveling throughout England, writing a journal, later published as *Through England on a Side-Saddle*.

1686–1713

- SOUTH AMERICA**
- Bohemian missionary SAMUEL FRITZ explores the AMAZON RIVER and its tributaries in Ecuador, Peru, and Brazil.

1687–88

- NORTH AMERICA**
- Frenchman HENRI JOUTEL, an aide to RENÉ-ROBERT CAVELIER DE LA SALLE, explores eastern Texas and western Arkansas.

1688–89

- NORTH AMERICA**
- French soldier Baron LOUIS-ARMAND DE LOM D'ARCE DE LAHONTAN explores Lake Michigan and perhaps reaches the MISSISSIPPI RIVER.

1689

- NORTH AMERICA**
- ALONSO DE LEÓN heads a Spanish expedition from Coahuila in Mexico across the Rio Grande to the Gulf Coast of Texas.

- French physicist Denis Papin designs a DIVING BELL with fresh air from the surface pumped through a tube.

1690–92

- NORTH AMERICA**
- English fur trader HENRY KELSEY explores the Assiniboine and Saskatchewan Rivers for the HUDSON'S BAY COMPANY, reaching the Canadian prairies.

1696–1700

- ASIA**
- Russian Cossacks VLADIMIR VASILYEVICH ATLASOV and LUKA MOROZKO command the exploration and conquest of Kamchatka Peninsula.

1698–99

- NORTH AMERICA**
- JEAN-BAPTISTE LE MOYNE and PIERRE LE MOYNE head a French colonizing expedition to the mouth of the MISSISSIPPI RIVER and about 100 miles upriver.
- NORTH AMERICA**
- French missionary ALBERT DAVION explores the lower MISSISSIPPI RIVER and the Yazoo River in Mississippi.

1698–1706

- NORTH AMERICA**
- Italian missionary EUSEBIO FRANCISCO KINO explores the Gila River and the COLORADO RIVER in Arizona. He reaches the Gulf of California.

1699–1701

- PACIFIC OCEAN/
AUSTRALIA**
- WILLIAM DAMPIER heads an English scientific expedition to the Pacific and explores Australia's west coast, reaching the Dampier Archipelago. He explores New Guinea and New Britain Island.

1700–01

- NORTH AMERICA**
- French trader PIERRE-CHARLES LE SUEUR ascends the MISSISSIPPI RIVER, from the Gulf of Mexico to the Minnesota River.

1701

- NORTH AMERICA**
- ANTOINE LAUMET DE LA MOTHE founds the French post of Detroit on the Detroit River.

1701–08

- NORTH AMERICA**
- Englishman JOHN LAWSON explores the interior of the Carolinas northwestward from Charleston.

1704–09**PACIFIC OCEAN**

- Scottish mariner ALEXANDER SELKIRK is marooned in the Juan Fernández Islands. His story is adapted by Daniel Defoe in the 1719 novel *Robinson Crusoe*.

1706–08**MEDITERRANEAN**

- Italian count LUIGI FERDINANDO MARSILI engages in the first underwater exploration, investigating the MEDITERRANEAN SEA.

1712–17**NORTH AMERICA**

- Frenchman ÉTIENNE-VENIARD DE BOURGMONT explores the central MISSOURI RIVER region, possibly as far north as the mouth of the Platte River in eastern Nebraska.

1712–26**NORTH AMERICA**

- English naturalist MARK CATESBY studies wildlife in Virginia, the Carolinas, Bermuda, and the Bahamas.

1713–14**NORTH AMERICA**

- French-Canadian LOUIS JUCHEREAU DE ST. DENIS establishes a trading post at Natchitoches on the Red River. He crosses Texas to San Juan Bautista on the Rio Grande.

ASIA

- Russian Cossack fur trader SEMYON ANABARA explores eastern SIBERIA, from Yakutz on the Lena River to the southeast shore of the Sea of Okhotsk. He reaches the Shantar Islands.

1714–16**ASIA**

- Italian missionary IPPOLITO DESIDERI travels from Delhi in India northward through Kashmir and the HIMALAYAS to LHASA in Tibet.

1715–16**ASIA**

- Russian IVAN DMITRYEVICH BUKHGOLTS commands a military expedition southward from Tobolsk, descending the Irtysh River to the Om River.

1715–17**ASIA**

- Russian navigator and military leader ALEKSANDR BEKOVICH-CHERKASSKY explores the rivers feeding the Caspian Sea.

1716

- NORTH AMERICA** ■ British colonial governor ALEXANDER SPOTSWOOD heads an expedition into Virginia's Shenandoah Valley and Blue Ridge.

1719

- NORTH AMERICA** ■ Frenchman JEAN-BAPTISTE BÉNARD DE LA HARPE heads a trading expedition from Louisiana through Texas to Santa Fe, New Mexico.

1719–21

- NORTH AMERICA/
ARCTIC** ■ British fur trader JAMES KNIGHT explores northwestern HUDSON BAY for the HUDSON'S BAY COMPANY. After being shipwrecked on Marble Island, the entire crew perishes.
- NORTH AMERICA/
ARCTIC** ■ British fur trader HENRY KELSEY explores the Marble Island region of HUDSON BAY for the HUDSON'S BAY COMPANY.

1719–27

- ASIA** ■ DANIEL GOTTLIEB MESSERSCHMIDT heads a Russian scientific expedition to central SIBERIA, from the Lena and Yenisey Rivers in the north to Lake Baikal and the Amur River in the south.

1720

- NORTH AMERICA** ■ French historian PIERRE-FRANÇOIS-XAVIER DE CHARLEVOIX explores the Great Lakes, the Illinois River, and the MISSISSIPPI RIVER.

1721

- ARCTIC/GREENLAND** ■ Norwegian HANS EGEDE founds the first permanent settlement in GREENLAND.

1721–22

- PACIFIC OCEAN** ■ JAKOB ROGGEVEEN heads a Dutch maritime expedition seeking the fabled GREAT SOUTHERN CONTINENT; he explores South America's west coast and explores Easter Island and the Samoa Islands in the South Pacific.

1724

- NORTH AMERICA** ■ ÉTIENNE-VENIARD DE BOURGMONT heads a French expedition into western Kansas, the deepest French penetration to date into the territory west of the MISSISSIPPI RIVER.

1724–28

- NORTH AMERICA** ■ PEDRO DE RIVERA Y VILLALÓN heads a Spanish expedition inspecting and mapping northern New

Spain, including parts of Mexico, New Mexico, and Texas.

1725–30

ASIA

- VITUS JONASSEN BERING and ALEKSEY ILYICH CHIRIKOV command First Kamchatka Expedition for the Russian navy to SIBERIA's Pacific coast.

1726–33

ASIA

- Russian Cossack EMELYAN BASOV heads expeditions along SIBERIA's Lena River, seeking a seaward route to the Pacific.

1731–37

NORTH AMERICA

- CONRAD WEISER, a colonial American interpreter to the Indians, explores western Pennsylvania.

1731–43

NORTH AMERICA

- French fur trader PIERRE GAULTIER DE VARENNES DE LA VÉRENDRYE explores the northern plains as far west as the Bighorn Mountains in Wyoming. His sons, including LOUIS-JOSEPH GAULTIER DE LA VÉRENDRYE, work with him.

1733–40

ASIA/ARCTIC

- VITUS JONASSEN BERING and ALEKSEY ILYICH CHIRIKOV command the Great Northern Expedition (including the Second Kamchatka Expedition) for the Russian navy to the Arctic and Pacific coasts of SIBERIA, Kuril Islands, and inland areas of eastern Siberia. JOHANN GEORG GMELIN, STEPAN PETROVICH KRASHENINNIKOV, and GEORG WILHELM STELLER serve as naturalists.

1735

- French cartographer JEAN-BAPTISTE BOURGUIGNON D'ANVILLE produces the first accurate map of China.
- English carpenter John Harrison designs a practical CHRONOMETER to help measure longitude for purposes of navigation.

1738–39

ATLANTIC OCEAN

- Frenchman JEAN-BAPTISTE-CHARLES BOUVET DE LOZIER locates Bouvet Island in the South Atlantic near the ANTARCTIC CIRCLE.

1739–40

NORTH AMERICA

- French-Canadian fur traders PIERRE-ANTOINE MALLET and younger brother Paul Mallet explore

the central plains, including the Niobrara, Platte, Republican, Smoky Hill, Arkansas, and Canadian Rivers.

1740–41

- NORTH AMERICA** ■ VITUS JONASSEN BERING and ALEKSEY ILYICH CHIRIKOV head a Russian maritime expedition to BERING STRAIT, the Gulf of Alaska, Kodiak Island, the Aleutian Islands, and the Commander Islands.

1740–44

- WORLD** ■ GEORGE ANSON commands a British military fleet in warfare with Spain. In the course of a CIRCUM-NAVIGATION OF THE WORLD, he explores islands off Chile.

1740–75

- NORTH AMERICA** ■ British trader JAMES ADAIR explores the South Carolina frontier.

1741

- NORTH AMERICA/
ARCTIC** ■ CHRISTOPHER MIDDLETON heads a British maritime expedition to HUDSON BAY, seeking the NORTHWEST PASSAGE. He reaches Wager Bay and Repulse Bay.

1742–43

- ARCTIC** ■ SIMEON CHELYUSKIN heads a Russian maritime expedition to the Arctic coast of Russia from the White Sea to the Leptev Sea. He rounds Cape Chelyuskin.

1743

- SOUTH AMERICA** ■ Frenchman CHARLES-MARIE DE LA CONDAMINE heads a scientific expedition down the AMAZON RIVER, from northern Peru to the coast of Brazil.

1746–47

- NORTH AMERICA/
ARCTIC** ■ WILLIAM MOOR heads a British maritime expedition to HUDSON BAY, seeking the NORTHWEST PASSAGE. He explores Chesterfield Inlet and Wager Bay.

1748–50

- NORTH AMERICA** ■ JOSÉ DE ESCANDÓN heads a Spanish colonizing expedition from Mexico to the lower Rio Grande in southeastern Texas.

1750

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- NORTH AMERICA** ■ Colonial American THOMAS WALKER crosses through the CUMBERLAND GAP of Virginia's Blue Ridge into eastern Kentucky.

1750–51

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- NORTH AMERICA** ■ Colonial American traders CHRISTOPHER GIST and GEORGE CROGHAN explore trans-Appalachian regions of western Pennsylvania, southern Ohio, eastern Kentucky, and West Virginia.

1752

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- NORTH AMERICA** ■ Irish-American trader JOHN FINLEY visits the blue-grass country of Kentucky.
- AFRICA** ■ Dutch pioneer AUGUST BEUTLER leads colonists eastward from Cape Town along Africa's south coast into the Transkei region.

ca. 1753

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- NORTH AMERICA** ■ Colonial American trader THOMAS CRESAP and Lenni Lenape (Delaware) Indian Nemacolen explore the Redstone and Monongahela Rivers in western Pennsylvania.

1753

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- Scottish naval doctor James Lind successfully publicizes a cure for SCURVY, citrus fruit, in *A Treatise On Scurvy*.

1753–58

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- NORTH AMERICA** ■ Russian fur trader PYOTR BASHMAKOV explores the Aleutian Islands.

1754–55

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- NORTH AMERICA** ■ British fur trader ANTHONY HENDAY explores the Canadian plains for HUDSON'S BAY COMPANY, within 40 miles of the ROCKY MOUNTAINS.

1756

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- Frenchman CHARLES DE BROSSES publishes *Histoire de la navigation aux terres australes (History of Navigation to Southern Lands)* furthering the idea of a large landmass in southern latitudes, a GREAT SOUTHERN CONTINENT.

1760

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- ASIA** ■ Russian NIKOLAY DAURKIN heads an expedition north and east of the Anadyr River into the Chukchi Peninsula.

1760–62

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- ARCTIC/ASIA** ■ IVAN BAKHOV heads a Russian maritime expedition to the Arctic coast of northern SIBERIA, from the Lena River eastward to the mouth of the Kolyma River.

1761–63

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- ASIA** ■ German CARSTEN NIEBUHR heads a Danish expedition to the southwestern Arabian Peninsula.

1763

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- ARCTIC/ASIA** ■ STEPAN ANDREYEV heads a Russian military expedition from Fort Anadyr on the Bering Sea to the Arctic coast of SIBERIA. From the Bear Islands, he sights New Siberia Island.

1763–64

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- NORTH AMERICA** ■ French fur traders PIERRE LIGESTE LACLEDE and RENÉ AUGUSTE CHOUTEAU found St. Louis on the MISSISSIPPI RIVER.

1764–66

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- WORLD** ■ JOHN BYRON heads a British CIRCUMNAVIGATION OF THE WORLD. He claims Falkland Islands in the South Atlantic for Great Britain and explores South Pacific island groups.

1765

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- ATLANTIC OCEAN/
PACIFIC OCEAN** ■ PIERRE-NICOLAS DUCLOS-GUYOT heads a French naval expedition from the Falkland Islands to South America's Pacific coast. He reaches South Georgia Island in the South Atlantic.

1765–66

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- NORTH AMERICA** ■ Colonial American naturalists JOHN BARTRAM and WILLIAM BARTRAM explore eastern Florida and Georgia.

1766

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- NORTH AMERICA** ■ Colonial American frontiersman JAMES SMITH explores west of the CUMBERLAND GAP into eastern Kentucky.

1766–68

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- NORTH AMERICA** ■ ROBERT ROGERS and JONATHAN CARVER head a British expedition to Wisconsin and Minnesota, seeking the NORTHWEST PASSAGE.
- WORLD** ■ SAMUEL WALLIS and PHILIP CARTERET command a British naval expedition to the South Pacific.

Wallis reaches Tahiti and Wallis Archipelago. Carteret explores Pitcairn Island and the Admiralty, Santa Cruz, and Solomon Islands.

1766–69

WORLD

- LOUIS-ANTOINE DE BOUGAINVILLE heads the first French CIRCUMNAVIGATION OF THE WORLD; he explores the western Pacific and charts the Solomons and other island groups. On the trip JOSEPH-PHILIBERT COMMERSON serves as naturalist and JEANNE BARET becomes the first woman known to sail around the world.

1767

- The British Royal Observatory at Greenwich begins publishing the *Nautical Almanac and Astronomical Ephemeris* (or the *Nautical Almanac*), an early EPHEMERIS.

1768–70

NORTH AMERICA

- PYOTR KUZMICH KRENITSYN heads a Russian maritime expedition charting the Aleutian Islands and the western end of the Alaska Peninsula.

1768–71

PACIFIC OCEAN

- JAMES COOK heads a British naval expedition to the South Pacific. He explores Tahiti and the Society Islands and charts the coasts of NEW ZEALAND and eastern Australia. JOSEPH BANKS and DANIEL CARL SOLANDER serve as naturalists.

1768–74

AFRICA

- Scotsman JAMES BRUCE seeks the source of the NILE RIVER, traveling from Alexandria, Egypt, to Gondar, Ethiopia, by way of the RED SEA and Arabia. He visits Lake Tana and Tisisat Falls and mistakenly describes the Blue Nile as the main branch of the Nile rather than the White Nile.

1768–80

NORTH AMERICA

- French-Canadian missionary PIERRE GIBALT works among Native Americans in French settlements in Illinois and Indiana.

1769

- Scottish engineer James Watt patents the steam engine.

1769–70

- NORTH AMERICA** ▪ GASPAR DE PORTOLÁ and JUNÍPERO SERRA head a Spanish colonizing and missionary expedition to the coast of California, including San Diego Bay, Monterey Bay, and San Francisco Bay.
- SOUTH AMERICA** ▪ Ecuadoran ISABELA GODIN DES ODANAIS becomes the first known woman to descend the entire AMAZON RIVER, from central Peru to French Guiana.

1769–71

- NORTH AMERICA** ▪ Frontier hunter DANIEL BOONE explores the CUMBERLAND GAP of southwestern Virginia and Warriors' Trace into Kentucky, reaching the Falls of the Ohio.

1770–72

- NORTH AMERICA** ▪ SAMUEL HEARNE and Chipewyan Indian MATON-ABBEE head an expedition for the HUDSON'S BAY COMPANY from HUDSON BAY overland to the Arctic Ocean, seeking the NORTHWEST PASSAGE. They reach the Great Slave Lake.

1771–73

- NORTH AMERICA** ▪ Colonial American SIMON KENTON explores the upper Ohio River region in Kentucky.

1772

- PACIFIC OCEAN** ▪ YVES-JOSEPH DE KERGUÉLEN-TRÉMAREC heads two French maritime expeditions seeking the fabled GREAT SOUTHERN CONTINENT; he reaches the Kerguelen Islands.

1772–75

- PACIFIC OCEAN/
ATLANTIC OCEAN** ▪ JAMES COOK heads a British naval expedition to the South Pacific, during which he visits the Polynesian and Melanesian islands. He undertakes the first recorded crossing of the ANTARCTIC CIRCLE and circumnavigates the Antarctic continent, and he explores South Georgia Island and the South Sandwich Islands in the South Atlantic. During the expedition, TOBIAS FURNEAUX reaches Adventure Bay in TASMANIA. JAMES BURNEY serves as lieutenant and JOHANN GEORG ADAM FORSTER, JOHANN REINHOLD FORSTER, and ANDERS SPARSMAN serve as naturalists.
- NORTH AMERICA** ▪ British trader MATTHEW COCKING explores from southern HUDSON BAY to western Saskatchewan for the HUDSON'S BAY COMPANY.
- AFRICA** ▪ Swedish naturalist CARL PETER THUNBERG, in service to the Dutch, carries out three botanical expeditions north of Cape Town.

1773

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- ARCTIC** ▪ CONSTANTINE JOHN PHIPPS heads a British naval expedition in an attempt to reach the NORTH POLE by water; passage is blocked by ice east of GREENLAND.

1774

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- NORTH AMERICA** ▪ JUAN JOSEF PÉREZ HERNÁNDEZ heads a Spanish naval expedition to the Queen Charlotte Islands and Nootka Sound. He sites Mount Olympus.
- NORTH AMERICA** ▪ JUAN BAUTISTA DE ANZA heads a Spanish expedition from Tubac, Arizona, to San Gabriel Arcangel, California.
- ASIA** ▪ GEORGE BOGLE heads a British diplomatic expedition from Calcutta, India, across the HIMALAYAS into Tibet.

1775

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- NORTH AMERICA** ▪ BRUNO HECETA heads a Spanish naval expedition along the northwest coast, seeking the outlet of the NORTHWEST PASSAGE; he reaches Grays Harbor in coastal Washington.

1775–76

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- NORTH AMERICA** ▪ Spanish missionary FRANCISCO TOMÁS HERMENEGILDO GARCÉS explores the COLORADO RIVER and the Grand Canyon.
- NORTH AMERICA** ▪ Colonial American fur trader ALEXANDER HENRY (the elder) explores northwestern Saskatchewan.

1776–77

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- NORTH AMERICA** ▪ Spanish missionaries FRANCISCO SILVESTRE VÉLEZ DE ESCALANTE and FRANCISCO ATANASIO DOMÍNGUEZ explore central Utah.

1776–80

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- PACIFIC OCEAN** ▪ JAMES COOK heads a British naval expedition seeking the NORTHWEST PASSAGE, during which he visits the HAWAIIAN ISLANDS. He explores North America's west coast from Oregon to the Gulf of Alaska and Unalaska Island in the Aleutians, and he reaches northeastern SIBERIA's Chukchi Peninsula. After Cook's death in the HAWAIIAN ISLANDS in 1779, CHARLES CLERKE assumes command. On Clerke's death that same year, JOHN GORE assumes command. JAMES BURNEY and JAMES KING serve as lieutenants, JOHN LEDYARD serves as a marine, and JOHN WEBBER serves as artist.

1777–79

- AFRICA** ▪ Scotsman ROBERT GORDON explores South Africa's interior.

1778–82

- NORTH AMERICA** ▪ American trader PETER POND explores and charts northwestern Canada, from the Saskatchewan River to Lake Athabasca.

1779

- The NORTH WEST COMPANY is founded in Montreal to develop the FUR TRADE in North America.

1779–80

- NORTH AMERICA** ▪ American frontiersman JAMES ROBERTSON heads an expedition of settlers into Tennessee's Cumberland River region.

1781–1801

- SOUTH AMERICA** ▪ Spanish official FÉLIX DE AZARA explores and surveys the Río de la Plata and the Paraná and Paraguay Rivers of South America.
- ASIA** ▪ British diplomat SAMUEL TURNER heads a mission from India to Tibet.

1783

- French brothers Jacques Étienne Montgolfier and Joseph Michel Montgolfier launch the first BALLOON.

1783–86

- NORTH AMERICA** ▪ Russian trader GRIGORY IVANOVICH SHELIKOV directs the explorations of the Gulf of Alaska.

1783–92

- SOUTH AMERICA** ▪ Brazilian naturalist ALEXANDRE RODRIGUES FERREIRA conducts studies along the AMAZON RIVER and its tributaries.

1784

- NORTH AMERICA** ▪ Haitian French fur trader JEAN BAPTIST POINT SABLE settles on the site of present-day Chicago.

1785–88

- PACIFIC OCEAN** ▪ JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse, heads a French maritime expedition to the Pacific; he explores the Gulf of Alaska and the coast of

Asia. PAUL-ANTOINE-MARIE FLEURIOT DE LANGLE commands the expedition's second ship. JEAN-BAPTISTE-BARTHÉLEMY DE LESSEPS serves as interpreter. Both ships disappear.

- NORTH AMERICA**
- French-Canadian trader JULIEN DUBUQUE explores the region west of Prairie du Chien on the upper MISSISSIPPI RIVER.

1785–93

- ARCTIC**
- JOSEPH BILLINGS, ANTON BATAKOV, and GAVRIIL ANDREYEVICH SARYCHEV command the Russian naval Northeastern Secret Geographical and Astronomical Expedition, seeking the NORTHEAST PASSAGE, from SIBERIA's northeast coast into BERING STRAIT. They explore the Aleutian Islands and the Gulf of Alaska.

1786

- ASIA**
- Russian fur trader GAVRILO LOGINOVICH PRIBILOV explores the Pribilof Islands in the Bering Sea.
- EUROPE**
- Frenchmen JACQUES BALMAT and Michel Paccard make the first ascent of MONT BLANC (see BLANC, MONT) in the Alps.

1786–87

- NORTH AMERICA**
- Frenchman PEDRO VIAL pioneers a route for the Spanish from San Antonio, Texas, to Santa Fe, New Mexico.

1787–89

- PACIFIC OCEAN**
- WILLIAM BLIGH heads a British naval expedition to Tahiti, which ends in mutiny. With 18 others, he sails in a small, open boat 4,000 miles across the western Pacific to Timor in Indonesia.

1787–90

- WORLD**
- American captain and trader ROBERT GRAY sails from Boston to British Columbia, then to China and back to Boston, in the first CIRCUMNAVIGATION OF THE WORLD by a U.S. flagship.

1788

- AFRICA**
- JOSEPH BANKS founds the AFRICAN ASSOCIATION, a society to encourage the exploration of Africa, in England.
- AUSTRALIA**
- ARTHUR PHILLIP founds a British penal colony at present-day Sydney, the first permanent European settlement in Australia.

1789

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- NORTH AMERICA** ■ Scottish fur trader ALEXANDER MACKENZIE explores from the Great Slave Lake along the Mackenzie River to the Arctic Ocean for the NORTH WEST COMPANY.

1789–94

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- WORLD** ■ ALESSANDRO MALASPINA heads a Spanish naval scientific CIRCUMNAVIGATION OF THE WORLD, during which he explores the east and west coasts of South America. He charts North America's west coast and searches for an outlet of the NORTH-WEST PASSAGE in southeastern Alaska; and he visits Australia and NEW ZEALAND.

1789–97

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- NORTH AMERICA** ■ Russian navigator GERASIM ALEKSEYEVICH IZ-MAILOV explores the coastal regions of southern Alaska.

1790–91

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- AFRICA** ■ Englishman DANIEL HOUGHTON explores up the Gambia River in West Africa, seeking the NIGER RIVER.

1791

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- NORTH AMERICA** ■ Russian fur trader DMITRY IVANOVICH BOCHAROV locates a passage through the eastern end of the Alaska Peninsula, connecting Bristol Bay and the Gulf of Alaska.

1791–93

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- NORTH AMERICA** ■ Russian fur trader ALEKSANDR ANDREYEVICH BARANOV explores Alaska's Kodiak Island, Cook Inlet, and Prince William Sound.

1791–94

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- PACIFIC OCEAN** ■ ANTOINE-RAYMOND-JOSEPH DE BRUNI, chevalier d'Entrecasteaux, heads a French naval expedition in search of JEAN-FRANÇOIS DE GALAUP, comte de La Pérouse. He explores the south coast of TASMANIA and the Great Australian Bight and reaches the Solomon Islands. JEAN-MICHEL HUON DE KERMADEC reaches Esperance Bay in western Australia. On the death of d'Entrecasteaux in 1793, ALEXANDRE HESMIVY D'AURIBEAU assumes command. ELISABETH-PAUL-EDOUARD DE ROSSEL is one of the naval officers. CHARLES-FRANÇOIS BEAUTEMPS-BEAUPRÉ serves as cartographer, and

JACQUES-JULIEN HOUTOU DE LA BILLARDIÈRE and CLAUDE-ANTOINE-GASPARD RICHE serve as naturalists.

1791–95

WORLD

- GEORGE VANCOUVER and WILLIAM ROBERT BROUGHTON head a British naval CIRCUMNAVIGATION OF THE WORLD. They sail around the CAPE OF GOOD HOPE to Australia, NEW ZEALAND, and the HAWAIIAN ISLANDS, and survey North America's Pacific coast, from the Gulf of Alaska to southern California. Vancouver and Broughton explore the Strait of Juan de Fuca and Puget Sound. In 1792, Broughton explores the mouth of the COLUMBIA RIVER.

1791–1814

NORTH AMERICA

- American fur trader ALEXANDER HENRY (the younger) establishes and manages NORTH WEST COMPANY posts from Lake Superior to the Oregon coast.

1792

NORTH AMERICA

- American captain and trader ROBERT GRAY explores the Northwest Coast, including the mouth of the COLUMBIA RIVER and Grays Harbor.

1792–93

NORTH AMERICA

- Scottish-Canadian fur trader ALEXANDER MACKENZIE, exploring for the NORTH WEST COMPANY, travels the Peace and Smoky Rivers. He follows the Parsnip River into the ROCKY MOUNTAINS. After reaching the Fraser River, he descends the Bella Coola River to the Pacific, completing the first overland journey across North America north of Rio Grande.

NORTH AMERICA

- JUAN FRANCISCO DE LA BODEGA Y QUADRA heads a Spanish naval expedition to the coasts of British Columbia and southeastern Alaska, seeking an outlet of the NORTHWEST PASSAGE.

1793–1811

NORTH AMERICA

- British fur trader DAVID THOMPSON maps the Canadian West and northern parts of the American West for the HUDSON'S BAY COMPANY, then for the NORTH WEST COMPANY.

1794–95

NORTH AMERICA

- French-Canadian fur trader JEAN-BAPTISTE TRUTEAU travels up the MISSOURI RIVER, from St. Louis to the Dakotas and Black Hills.

1795

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- NORTH AMERICA** ▪ Russian fur trader ALEKSANDR ANDREYEVICH BARANOV explores the Gulf of Alaska around Sitka and Yakutat Bay.

1795–96

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- AUSTRALIA** ▪ Englishmen GEORGE BASS and MATTHEW FLINDERS explore Australia's Botany Bay, Georges River, and the east coast south of Sidney.

1795–97

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- AFRICA** ▪ Scottish surgeon MUNGO PARK reaches the NIGER RIVER in West Africa.

1798

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- PACIFIC OCEAN** ▪ American sea captain EDMUND FANNING explores Fanning's Islands in the South Pacific.
- AFRICA** ▪ Portuguese colonial official FRANCISCO DE LACERDA attempts to cross Central Africa, exploring the ZAMBEZI RIVER and Luangwe River.

1798–99

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- AUSTRALIA** ▪ Englishmen GEORGE BASS and MATTHEW FLINDERS circumnavigate TASMANIA.

1798–1801

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- AFRICA** ▪ German FRIEDRICH CONRAD HORNEMANN heads a British scientific expedition across the SAHARA DESERT, seeking the source of the NIGER RIVER.

1799

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- The RUSSIAN-AMERICAN COMPANY is founded to promote the Russian FUR TRADE in North America.

1799–1800

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- SOUTH AMERICA** ▪ German naturalist and geographer ALEXANDER VON HUMBOLDT explores the upper ORINOCO RIVER in Venezuela and determines it is connected to the AMAZON RIVER by the Casiquiare River.

1800–04

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- AUSTRALIA** ▪ THOMAS-NICOLAS BAUDIN heads a French scientific expedition to the coast of TASMANIA and Australia; FRANÇOIS PÉRON and CHARLES-ALEXANDRE LESUEUR serve as naturalists.

1801

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- SOUTH AMERICA** ▪ German naturalist and geographer ALEXANDER VON HUMBOLDT explores the ANDES MOUNTAINS in Ecuador and Peru.

1801–03

AUSTRALIA

- MATTHEW FLINDERS heads a British maritime expedition to Australia's south, east, and west coasts. He reaches the Spencer Gulf, Kangaroo Island, and Gulf St. Vincent and circumnavigates Australia. FERDINAND LUCAS BAUER, ROBERT BROWN, and WILLIAM WESTALL serve as artists and naturalists.

1802

NORTH AMERICA

- FRANÇOIS-MARIE PERRIN DU LAC heads a French expedition up the MISSOURI RIVER, from St. Louis to the White River in South Dakota.

1802–11

AFRICA

- Portuguese PEDRO JOÃO BAPTISTA heads an expedition from Angola to Mozambique and back, the first known crossing of the African continent.

1803–06

WORLD

- ADAM IVAN RITTER VON KRUSENSTERN and YURY FYODOROVICH LISIANSKY head the first Russian CIRCUMNAVIGATION OF THE WORLD. They explore uncharted islands and reefs of the HAWAIIAN ISLANDS.

1804

NORTH AMERICA

- The BRITISH EAST INDIA COMPANY organizes the Great Trigonometrical Survey of the Indian subcontinent. The British government later directs it and, starting in the 1860s, hires native surveyors, known as PUNDITS.
- Scottish surveyor WILLIAM DUNBAR heads a U.S. government exploration to southern Louisiana Territory.

1804–05

NORTH AMERICA

- Russian fur trader ALEKSANDR ANDREYEVICH BARANOV explores North America's west coast, from the Gulf of Alaska to San Francisco Bay.

1804–06

NORTH AMERICA

- MERIWETHER LEWIS and WILLIAM CLARK head a U.S. expedition from St. Louis up the MISSOURI RIVER, across the ROCKY MOUNTAINS, to the mouth of the COLUMBIA RIVER on the Pacific and back. Shoshone Indian woman SACAJAWEA and her husband TOUSSAINT CHARBONNEAU and infant son JEAN-BAPTISTE CHARBONNEAU partici-

pate, as do JOHN COLTER, GEORGE DROUILLARD, PIERRE DORION, SR., PIERRE DORION, JR., and RENÉ JUSSEAUME.

1805–06

- AFRICA**

- Scotsman MUNGO PARK heads a British expedition from the Gambia River to the NIGER RIVER, possibly reaching Bussa in northern Nigeria. He identifies the southern limit of the SAHARA DESERT.
- NORTH AMERICA**

- GAVRIIL IVANOVICH DAVYDOV heads a Russian naval expedition to Alaska and Sitka.

1805–07

- NORTH AMERICA**

- ZEBULON MONTGOMERY PIKE heads two U.S. military expeditions to the upper MISSISSIPPI RIVER and the eastern ROCKY MOUNTAINS.

1805–08

- NORTH AMERICA**

- American fur trader SIMON FRASER explores west of the Canadian ROCKY MOUNTAINS for the NORTH WEST COMPANY; he follows the Fraser River to its Pacific outlet in British Columbia.

1806

- NORTH AMERICA**

- THOMAS FREEMAN heads a U.S. expedition along the Red River, from southwestern Mississippi to Texas.

1806–22

- ARCTIC/GREENLAND**

- British whaler WILLIAM SCORESBY, SR., and his scientist son WILLIAM SCORESBY, JR., explore the Arctic regions of GREENLAND, pioneering Arctic navigation and scientific studies.

1807

- NORTH AMERICA**

- American fur trader JOHN COLTER explores the Wind River and Teton Mountains in Wyoming.

1807–11

- WORLD**

- VASILY MIKHAILOVICH GOLOVNIN heads a Russian naval expedition from Europe, rounding Africa rather than the intended South America. He explores coastal Alaska, then reaches the Kamchatka Peninsula of Asia. He also explores the Kuril Islands of Japan.
- ASIA**

- British diplomat HARFORD JONES BRYDGES heads an expedition from Bombay in India to Persia (Iran). He visits Baluchistan on the Arabia Sea, Afghanistan, and the Caucasus Mountains.

1808

- NORTH AMERICA**
- American JOHN JACOB ASTOR founds the AMERICAN FUR COMPANY to develop the western FUR TRADE.
 - The AMERICAN GEOGRAPHICAL SOCIETY is founded in New York City.

1809

- NORTH AMERICA**
- American fur traders MANUEL LISA, ANDREW HENRY, ANTOINE PIERRE MENARD, WILLIAM CLARK, and brothers AUGUSTE PIERRE CHOUTEAU, JEAN PIERRE CHOUTEAU, PIERRE CHOUTEAU, and RENÉ AUGUSTE CHOUTEAU found the ST. LOUIS MISSOURI FUR COMPANY to develop the western fur trade.

1810–11

- NORTH AMERICA**
- American JOHN JACOB ASTOR sponsors a maritime trading expedition from New York to the Oregon coast under ROBERT STUART and GABRIEL FRANCHÈRE. They found the post of Astoria on the COLUMBIA RIVER.

1810–12

- ASIA**
- Englishmen CHARLES CHRISTIE and HENRY POTTINGER command an expedition to the interior of Pakistan into Afghanistan, and to the Persian Gulf.

1810–13

- ASIA**
- Englishwoman Lady HESTER LUCY STANHOPE travels in Israel, Lebanon, and Syria. She lives among the Bedouin in the Syrian Desert.

1810–15

- AFRICA**
- British naturalist WILLIAM JOHN BURCHELL explores the interior of South Africa west and north of Cape Town.

1811

- NORTH AMERICA**
- American writer HENRY MARIE BRACKENRIDGE and Scottish naturalist JOHN BRADBURY travel up the MISSOURI RIVER with fur traders.

1811–12

- NORTH AMERICA**
- American fur trader JOHN JACOB ASTOR sponsors the Astorians under WILSON PRICE HUNT in an overland journey from St. Louis to Astoria on the Oregon coast. Ioway Indian woman MARIE DORION and her husband PIERRE DORION, JR., serve as guides.

ASIA

- Englishman THOMAS MANNING travels from Calcutta, India, through Bhutan to LHASA in Tibet.

1812**ASIA**

- HYDER JUNG HEARSEY and WILLIAM MOORCROFT head a British expedition from India across the HIMALAYAS to Tibet.

1812–13**NORTH AMERICA**

- Scottish fur trader ROBERT STUART, working for JOHN JACOB ASTOR, travels from Astoria in Oregon eastward through the SOUTH PASS of the ROCKY MOUNTAINS. He descends the Platte River and MISSOURI RIVER to St. Louis.

1812–14**AFRICA**

- Englishman JOHN CAMPBELL explores the interior of South Africa, from Algoa Bay northward to the southern edge of Kalahari Desert, reaching the Vaal River. He returns to the Atlantic coast by way of the Orange River.

1812–15**AFRICA**

- JOHANN LUDWIG BURCKHARDT heads a British expedition to the NIGER RIVER from North Africa. Although failing to reach the Niger, Burckhardt explores parts of Egypt, Sudan, and Arabia.

1813**AUSTRALIA**

- Australian colonists GREGORY BLAXLAND and WILLIAM CHARLES WENTWORTH cross the BLUE MOUNTAINS west of Sydney and view the Bathurst Plains.

1814**NEW ZEALAND**

- Englishman SAMUEL MARSDEN establishes an Anglican mission at the Bay of Islands on North Island, New Zealand.

1815–18**WORLD**

- Otto von Kotzebue heads a Russian naval expedition searching for outlets of the NORTHEAST PASSAGE or the NORTHWEST PASSAGE in the North Pacific. He names Kotzebue Sound and explores island groups in the South Pacific, including the Marshalls and Gilberts. LOUIS-CHARLES-ADÉLAÏDE CHAMISSO DE BONCOURT and JOHANN FRIEDRICH ESCHSCHOLTZ serve as naturalists. LOUIS CHORIS serves as draftsman.

1816–19

- NORTH AMERICA**
- Scottish-Canadian fur trader DONALD MACKENZIE sends out fur-trapping brigades throughout the Pacific Northwest and the northern ROCKY MOUNTAINS for the NORTH WEST COMPANY.

1817–18

- AUSTRALIA**
- British-born surveyor general JOHN JOSEPH WILLIAM MOLESWORTH OXLEY heads two Australian expeditions to the Lachlan River and the Macquarie River. He reaches the Arbuthnot Range and Liverpool Plains.

1817–20

- WORLD**
- LOUIS-CLAUDE DE SAULCES DE FREYCINET heads a French naval CIRCUMNAVIGATION OF THE WORLD. He explores western Australia, Timor, the Moluccas (SPICE ISLANDS), Samoa, and the HAWAIIAN ISLANDS. CHARLES GAUDICHARD-BEAUPRÉ, JEAN-RENÉ-CONSTANT QUOY, and JOSEPH-PAUL GAIMARD serve as naturalists. JACQUES ARAGO serves as artist and writer.
- SOUTH AMERICA**
- German botanist CARL FRIEDRICH PHILLIPP VON MARTIUS explores eastern Brazil and the upper Amazon Basin.

1817–22

- AUSTRALIA**
- PHILIP PARKER KING heads a British coastal survey of northern Australia and TASMANIA.

1818

- ARCTIC**
- DAVID BUCHAN heads a British naval expedition attempting a seaward passage across the Arctic Ocean to the Pacific, passing as close as possible to the NORTH POLE.
- ARCTIC**
- JOHN ROSS heads a British naval expedition to Baffin Bay in the Canadian Arctic, seeking the NORTHWEST PASSAGE. He explores Lancaster Sound.

1818–19

- MIDDLE EAST**
- JOSEPH RITCHIE and GEORGE FRANCIS LYON command a British expedition southward across the SAHARA DESERT, from Tripoli to the NIGER RIVER region of West Africa.

1818–20

- NORTH AMERICA**
- British naturalist THOMAS NUTTALL explores the Arkansas River and Red River in Louisiana, Arkansas, and Oklahoma.

1819

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- NORTH AMERICA** ▪ HENRY ATKINSON heads the U.S. military's first Yellowstone Expedition up the MISSOURI RIVER into Nebraska.
 - ASIA** ▪ British diplomat GEORGE FOSTER SADLIER becomes the first European to cross the Arabian Peninsula, from Quatif on the Persian Gulf to Yenbo on the RED SEA.
 - AUSTRALIA** ▪ JOHN JOSEPH WILLIAM MOLESWORTH OXLEY and HAMILTON HUME head an Australian maritime expedition to Jervis Bay.
 - German inventor Augustus Siebe develops the first efficient DIVING SUIT, consisting of a copper helmet attached to a watertight canvas and leather jacket with weights attached around the chest.

1819–21

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- ANTARCTIC** ▪ Baron FABIAN GOTTLIEB BENJAMIN VON BELLINGSHAUSEN heads a Russian naval expedition, which makes an early sighting of Antarctica. He explores the Fiji Islands and Tuamotu Archipelago in the South Pacific. On returning to Antarctica, he sights Peter I and Alexander I Islands.
 - AFRICA** ▪ Englishman JOHN CAMPBELL reaches the source of the Limpopo River in South Africa.

1819–22

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- NORTH AMERICA/
ARCTIC** ▪ JOHN FRANKLIN heads a British naval overland expedition eastward along the Arctic coast of Canada, from the mouth of the Coppermine River, along the Coronation Gulf, to the Kent Peninsula. ROBERT HOOD and GEORGE BACK serve as midshipmen. JOHN RICHARDSON serves as naturalist.

1819–25

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- ARCTIC** ▪ WILLIAM EDWARD PARRY heads three British naval expeditions to the Canadian Arctic, seeking the NORTHWEST PASSAGE. He reaches Barrow Strait and as far west as Melville Island. He explores HUDSON BAY, Foxe Basin, and Fury and Hecla Straits as well as Prince Regent Inlet and the Gulf of Boothia.

1819–26

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- ASIA** ▪ GRIGORY GAVRILOVICH BASARGIN heads a Russian naval expedition to the Caspian Sea.

1820

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- NORTH AMERICA** ▪ STEPHEN HARRIMAN LONG heads a U.S. military expedition to the central plains and eastern ROCKY MOUNTAINS.

- ANTARCTIC**
- British naval officer EDWARD BRANSFIELD charts the South Shetland Islands and sights the Antarctic Peninsula.

1820–21

- ANTARCTIC**
- American sealer NATHANIEL BROWN PALMER reaches the Palmer Archipelago and South Orkney Islands and sights the Antarctic Peninsula.

1821

- NORTH AMERICA**
- The HUDSON'S BAY COMPANY and the NORTH WEST COMPANY merge under the name of the former.
 - Swedish-Finnish naval officer ARVID ADOLF ETHOLÉN conducts a Russian maritime exploration of the coast of Alaska north of the Alaskan Peninsula as far as the Kuskokwim River.

1821–22

- NORTH AMERICA**
- American traders JACOB FOWLER and Hugh Glenn pioneer a route known as the Old Taos Trail through the Sangre de Cristo Mountains of southern Colorado into New Mexico.

1821–23

- ATLANTIC OCEAN**
- Scottish sealer JAMES WEDDELL explores the South Orkney Islands in the South Atlantic. He reaches the Weddell Sea east of the Antarctic Peninsula.

1821–25

- AFRICA**
- WALTER OUDNEY, HUGH CLAPPERTON, and DIXON DENHAM lead the British-backed Bornu Mission from Libya across the SAHARA DESERT into West Africa. They reach Lake Chad and the Chari River and seek the NIGER RIVER.
- AFRICA**
- British missionaries ROBERT MOFFAT and MARY MOFFAT found missions near the Kalahari Desert in South Africa; they explore the region in years to come.

1822

- NORTH AMERICA**
- American trader WILLIAM BECKNELL pioneers a wagon route from Missouri via the Cimarron Cut-off of the Santa Fe Trail.

1822–25

- WORLD**
- LOUIS-ISADORE DUPERREY heads a French naval CIRCUMNAVIGATION OF THE WORLD. He explores coastal South America and visits island

- groups in the Pacific. RENÉ-PRIMEVÈRE LESSON serves as zoologist.
- WORLD**
- MIKHAIL PETROVICH LAZAREV heads a Russian naval CIRCUMNAVIGATION OF THE WORLD.

1822–26

- NORTH AMERICA**
- Americans WILLIAM HENRY ASHLEY and ANDREW HENRY found the ROCKY MOUNTAIN FUR COMPANY in 1822. Over the next years, Ashley sponsors trading expeditions to the northern ROCKY MOUNTAINS and the Great Basin. MOUNTAIN MEN working for Ashley include JAMES PIERSON BECKWOURTH, JAMES BRIDGER, ROBERT CAMPBELL, JAMES CLYMAN, THOMAS FITZPATRICK, HENRY FRAEB, HUGH GLASS, CALEB GREENWOOD, DAVID E. JACKSON, ÉTIENNE PROVOST EDWARD ROSE, JEDEDIAH STRONG SMITH, WILLIAM LEWIS SUBLETTE, WILLIAM HENRY VANDERBURGH, LOUIS VASQUEZ, and JOHN H. WEBER, many of whom continue trapping, trading, and guiding in the subsequent years. Ashley and others undertake the first known successful navigation of the Uinta River and explore the Green River and the Great Salt Lake region of Utah.

1823

- AUSTRALIA**
- British-born surveyor general JOHN JOSEPH WILLIAM MOLESWORTH OXLEY heads an Australian expedition to Moreton Bay. He reaches the Brisbane River.
- AUSTRALIA**
- British naturalist ALLAN CUNNINGHAM explores a route from Bathurst through Pandora's Pass to the Liverpool Plains north of Sydney.
- NORTH AMERICA**
- Italian GIACOMO COSTANTINO BELTRAMI explores the MISSISSIPPI RIVER and Minnesota River.

1823–26

- PACIFIC OCEAN**
- OTTO VON KOTZEBUE heads a Russian naval expedition to the South Pacific, exploring the Tuamotu, Society, and Marshall island groups.

1823–43

- ASIA**
- GEORGE EVEREST heads Britain's Great Trigonometrical Survey of India.

1824

- NORTH AMERICA**
- Scottish-Canadian fur trader ALEXANDER ROSS explores the Snake River, from Montana to the mouth of the Boise River in Idaho, for the HUDSON'S BAY COMPANY.

- AUSTRALIA**
- Englishmen WILLIAM HILTON HOVELL and HAMILTON HUME explore southeastern Australia, from Lake George to Geelong, reaching the Australian Alps.

1824–26

- WORLD**
- HYACINTHE-YVES-PHILLIPE POTENTIEU DE BOUGAINVILLE heads a French CIRCUMNAVIGATION OF THE WORLD.

1824–30

- NORTH AMERICA**
- Canadian fur trader PETER SKENE OGDEN explores the Pacific Northwest and the Great Basin for JOHN MCLOUGHLIN and the HUDSON'S BAY COMPANY.

1825

- NORTH AMERICA**
- HENRY ATKINSON heads the U.S. military's second Yellowstone Expedition to eastern Montana.

1825–26

- AFRICA**
- ALEXANDER GORDON LAING heads a British expedition seeking the source of the NIGER RIVER. He reaches the city of TIMBUKTU in Mali.

1825–27

- NORTH AMERICA**
- JOHN FRANKLIN heads a British expedition westward from the mouth of the Mackenzie River to Prudhoe Bay on Alaska's North Slope.

1825–28

- AFRICA**
- HUGH CLAPPERTON and RICHARD LEMON LANDER head a British expedition into the interior of Nigeria. They reach the NIGER RIVER, where Clapperton dies. WILLIAM PASCOE of the Hausa tribe serves as guide.
- PACIFIC OCEAN**
- FREDERICK WILLIAM BEECHEY heads a British naval expedition to the Pacific, exploring South America's west coast, the Gambier Islands in central Polynesia, the BERING STRAIT and Alaska's west coast, and the islands off southern Japan.

1825–29

- SOUTH AMERICA**
- GEORG HEINRICH RITTER VON LANGSDORFF heads a Russian scientific expedition to the Amazon Basin.

1825–32

- AUSTRALIA**
- Danish mariner JÖRGEN JÖRGENSEN explores TASMANIA.

1826–27

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- NORTH AMERICA** ▪ American fur trader EWING YOUNG heads a trapping expedition from Taos in New Mexico into southern Arizona.
 - NORTH AMERICA** ▪ American fur trader JAMES OHIO PATTIE establishes an overland route from New Mexico to California.

1826–29

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- PACIFIC OCEAN** ▪ JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE heads a French maritime expedition to coastal Australia and NEW ZEALAND and the islands of the western Pacific. He finds relics of the JEAN-FRANÇOIS DE GALAUB, comte de La Pérouse, expedition.
 - WORLD** ▪ FYODOR PETROVICH LITKE heads a Russian naval CIRCUMNAVIGATION OF THE WORLD. He explores the Carolines in the South Pacific. He charts islands in the Bering Sea and explores SIBERIA's Kamchatka and Chukchi Peninsulas. KARL HEINRICH MERTENS serves as naturalist.
 - NORTH AMERICA** ▪ American fur trader JEDEDIAH STRONG SMITH leads expeditions from the Great Salt Lake to California. He makes the first eastward crossing of the Sierra Nevada and Great Salt Lake and explores northern California and Oregon.

1826–34

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- SOUTH AMERICA** ▪ French naturalist ALCIDE-CHARLES-VICTOR DES-SALINES D'ORBIGNY conducts studies throughout South America.

1827

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- ARCTIC** ▪ WILLIAM EDWARD PARRY heads a British naval attempt on the NORTH POLE from Spitsbergen (Svalbard), setting the northernmost record at the time.
 - French physicist Joseph Nicéphore Niépce creates the first known photograph.

1827–28

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- AFRICA** ▪ Frenchman RENÉ-AUGUSTE CAILLIÉ crosses Guinea to the upper NIGER RIVER and descends it to TIMBUKTU, then crosses the SAHARA DESERT from south to north.
 - AUSTRALIA** ▪ British naturalist ALLAN CUNNINGHAM develops a route from Darling Downs through the GREAT DIVIDING RANGE to the Pacific coast.
 - NORTH AMERICA** ▪ French naturalist JEAN-LOUIS BERLANDIER explores the interior of Texas.

1827–30

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- NORTH AMERICA** ■ American fur trader JOSHUA PILCHER heads an expedition from St. Louis, along the Platte River and through the ROCKY MOUNTAINS, to the COLUMBIA RIVER.

1828

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- NORTH AMERICA** ■ Scottish official GEORGE SIMPSON of the HUDSON'S BAY COMPANY travels across Canada to British Columbia via the Thompson and Fraser Rivers.
- NORTH AMERICA** ■ French-Canadian ANTOINE ROBIDOUX extends the fur trade to Taos in New Mexico and northward into Colorado.

1828–29

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- AUSTRALIA** ■ Englishman CHARLES STURT explores the Macquarie and Darling Rivers in southeastern Australia.

1829–33

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- ARCTIC** ■ Englishmen JOHN ROSS and his nephew JAMES CLARK ROSS explore the Canadian Arctic, including the Boothia Peninsula. They travel from Prince Regent Inlet to Lancaster Sound. In 1831, James Clark Ross reaches the NORTH MAGNETIC POLE.
- NORTH AMERICA** ■ Scottish-Canadian fur trader KENNETH MCKENZIE sends out expeditions to the northern ROCKY MOUNTAINS and northern plains for the AMERICAN FUR COMPANY.

1829–35

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- NORTH AMERICA** ■ American fur trader WARREN ANGUS FERRIS explores the upper MISSOURI RIVER and the northern ROCKY MOUNTAINS.

ca. 1830

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- The SEXTANT is invented independently in England and America in response to a challenge by the ROYAL SOCIETY and the British parliament to solve the problem of how to measure longitude accurately.

1830

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- NORTH AMERICA** ■ JOHN BARROW founds Great Britain's ROYAL GEOGRAPHICAL SOCIETY.
- NORTH AMERICA** ■ Irish fur trader JOHN WORK explores in the Snake River region of eastern Washington, western Idaho, northern Nevada, and central Oregon for the HUDSON'S BAY COMPANY.

1830–31

- AFRICA**

- RICHARD LEMON LANDER heads a British expedition, which traces the course of the NIGER RIVER to the Gulf of Guinea.
- NORTH AMERICA**

- American fur traders WILLIAM WOLFSKILL and GEORGE CONCEPCION YOUNT pioneer the Old Spanish Trail from Taos, New Mexico, through Utah and Arizona, to Los Angeles, California, as a trade route.

1830–36

- NORTH AMERICA**

- American GEORGE CATLIN paints Native Americans in the American West and Southeast.

1830–39

- NORTH AMERICA**

- American LUCIEN FONTENELLE develops the fur trade in Nebraska.

1831

- The ROYAL GEOGRAPHICAL SOCIETY and AFRICAN ASSOCIATION merge under the name of the former.

1831–32

- ANTARCTIC**

- JOHN BISCOE heads a British seal-hunting expedition, which circumnavigates Antarctica. He reaches Enderby Land and Biscoe Island.

1831–36

- SOUTH AMERICA/
PACIFIC OCEAN**

- ROBERT FITZROY and CHARLES ROBERT DARWIN conduct a British naval scientific expedition to coastal South America and the Galapagos Islands aboard the *Beagle*.
- AUSTRALIA**

- Scottish surveyor THOMAS LIVINGSTONE MITCHELL heads three expeditions west of Sydney to chart the continent's river system. He explores the Darling and Murray Rivers and their tributaries.

1831–39

- NORTH AMERICA**

- American artist and naturalist JOHN JAMES AUDUBON paints North American wildlife.

1831–44

- SOUTH AMERICA**

- German naturalist ROBERT HERMANN SCHOMBURGK heads a British expedition to the rivers of Guyana.

1832

- NORTH AMERICA**

- American geologist and ethnologist HENRY ROWE SCHOOLCRAFT determines that Lake

Itasca in Minnesota is the source of the MISSISSIPPI RIVER.

1832–33

- NORTH AMERICA**
- Spanish-born fur trader MANUEL ÁLVAREZ explores the region of Yellowstone National Park in northeastern Wyoming.

1832–35

- NORTH AMERICA**
- Former U.S. army officer BENJAMIN LOUIS EULALIE DE BONNEVILLE heads a fur-trading expedition across the ROCKY MOUNTAINS, including SOUTH PASS, to Utah and later explores Oregon. In 1833, he dispatches MOUNTAIN MEN JOSEPH REDDEFORD WALKER, ZENAS LEONARD, and JOSEPH L. MEEK across the Great Basin and Sierra Nevada to California, where they explore Yosemite Valley. Their route becomes the California Trail.
- ASIA**
- ALEXANDER BURNES heads a British military expedition across central Asia from Peshawar, Pakistan, through Afghanistan, to the Caspian Sea, Tehran, and the Persian Gulf.

1832–36

- NORTH AMERICA**
- American fur trader NATHANIEL JARVIS WYETH heads two expeditions to the Pacific Northwest. Fellow fur trader OSBORNE RUSSELL accompanies him in 1834.

1832–42

- NORTH AMERICA**
- American trapper and guide CHRISTOPHER HOUTON CARSON (Kit Carson) explores the ROCKY MOUNTAINS.
- NORTH AMERICA**
- Russian-Aleut ALEKSANDR FILIPPOVICH KASHEVAROV heads a Russian expedition to Alaska's west coast, from Norton Sound to Point Barrow.

1833

- NORTH AMERICA**
- American fur traders CHARLES BENT, WILLIAM BENT, and CÉRAN DE HAULT DE LASSUS DE ST. VRAIN found Bent's Fort, a trading post on the Arkansas River in southeastern Colorado.
- NORTH AMERICA**
- American writer JOHN TREAT IRVING explores the plains of Kansas and Nebraska.

1833–34

- NORTH AMERICA**
- German naturalist Prince ALEXANDER PHILIPP MAXIMILIAN and Swiss artist KARL BODMER travel up the MISSOURI RIVER, from St. Louis to central

Montana. Bodmer paints the Mandan and other Native Americans.

1833–35

- NORTH AMERICA** ▪ GEORGE BACK heads a British naval overland expedition north and east of the Great Slave Lake, reaching the Great Fish (Back) River.

1834

- NORTH AMERICA** ▪ HENRY LEAVENWORTH and HENRY DODGE command a U.S. military expedition to the southern plains. They explore the Arkansas and Red Rivers. BLACK BEAVER and JESSE CHISHOLM serve as guides.

1834–35

- NORTH AMERICA** ▪ Russian fur trader ANDREY GLAZUNOV explores the Yukon and Kuskokwim Rivers of western Alaska.

1834–36

- ASIA** ▪ JAMES WELLSTED heads a British expedition surveying the south coast of the Arabian Peninsula. He explores Oman and sights the Rub' al-Khali desert (EMPTY QUARTER).

1835

- NORTH AMERICA** ▪ HENRY DODGE heads a U.S. military expedition from Oklahoma to the ROCKY MOUNTAINS and the Oregon Trail, returning along the Santa Fe Trail.

1836

- NORTH AMERICA** ▪ American missionaries MARCUS WHITMAN and HENRY HARMON SPALDING pioneer the Oregon Trail west of Fort Hall, Idaho, as a wagon route.

1836–37

- ASIA** ▪ WILLIAM C. MCLEOD heads a British military expedition to northern Burma (Myanmar).

1836–39

- WORLD** ▪ ABEL-AUBERT DUPETIT-THOUARS heads a French naval CIRCUMNAVIGATION OF THE WORLD. He explores South America's west coast and the South Pacific.

1837

- NORTH AMERICA** ▪ American ALFRED JACOB MILLER paints landscapes and Native Americans along the Oregon Trail.

1837–39

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| ARCTIC/
NORTH AMERICA | ▪ Scotsman THOMAS SIMPSON and Canadian PETER WARREN DEASE explore the Arctic coastline of Alaska and Canada for the HUDSON'S BAY COMPANY. |
| AUSTRALIA | ▪ GEORGE GREY heads a British expedition to western Australia. He reaches the Gascoyne River and the upper Swan River. |

1837–40

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| ANTARCTIC | ▪ JULES-SÉBASTIEN-CÉSAR DUMONT D'URVILLE heads a French naval expedition south of the ANTARCTIC CIRCLE. He reaches Adélie Land and the approximate position of the SOUTH MAGNETIC POLE. CHARLES-HECTOR JACQUINOT commands the second ship. |
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1837–42

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| NORTH AMERICA | ▪ EDWARD BELCHER heads a British naval expedition to the Pacific coast of the Americas. |
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1838–39

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| NORTH AMERICA | ▪ JOSEPH NICOLAS NICOLLET heads two U.S. surveying expeditions to the lands between the upper MISSISSIPPI RIVER and the MISSOURI RIVER. |
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1838–40

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| NORTH AMERICA | ▪ American fur trader RICHENS LACY WOOTTON travels throughout the American West out of Bent's Fort, Colorado. |
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1838–42

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| PACIFIC OCEAN/
NORTH AMERICA | ▪ CHARLES WILKES and GEORGE FOSTER EMMONS head the U.S. South Sea Surveying and Exploring Expedition, which completes the first U.S. government CIRCUMNAVIGATION OF THE WORLD. They explore South America, Antarctica, and Pacific island groups. They direct extensive inland penetration of Oregon and northern California. JAMES DWIGHT DANA serves as naturalist. |
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1838–52

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| SOUTH AMERICA | ▪ Swiss naturalist JOHANN JAKOB VON TSCHUDI travels throughout the Peruvian Andes. |
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1839

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| NEW ZEALAND | ▪ Englishman WILLIAM WILLIAMS makes a south-to-north crossing of North Island, NEW ZEALAND. |
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1839–41

- AUSTRALIA** ▪ British sheep farmer EDWARD JOHN EYRE explores the Flinders Range north of Adelaide and Lake Torrens. He travels across Eyre Peninsula to Streaky Bay. He explores north and west of Adelaide and sights Lake Eyre. He heads westward from Fowlers Bay along the coast of the Great Australian Bight to Albany and back to Fremantle, completing the first east-to-west crossing of Australia.
- NORTH AMERICA** ▪ American fur trader ROBERT NEWELL drives the first wagons along the entire length of the Oregon Trail.

1839–43

- ANTARCTIC** ▪ JAMES CLARK ROSS heads a British naval expedition to Antarctica. He reaches the Ross Sea, Victoria Land, Prince Albert Range, McMurdo Sound, and the Ross Ice Shelf. He explores Graham Land on the Antarctic Peninsula. JOSEPH DALTON HOOKER serves as botanist.
- AUSTRALIA** ▪ Polish geologist PAUL EDMUND DE STRZELECKI explores southeastern Australia and TASMANIA.

1840

- NORTH AMERICA** ▪ Scottish trader ROBERT CAMPBELL reaches the source of the Pelly River in the Yukon Territory for the HUDSON'S BAY COMPANY.

1841

- NORTH AMERICA** ▪ Belgian missionary PIERRE-JEAN DE SMET heads the first large-scale wagon train migration on the Oregon Trail. THOMAS FITZPATRICK serves as guide.
- NORTH AMERICA** ▪ JAMES SINCLAIR, a Métis, pioneers a wagon route through the Canadian ROCKY MOUNTAINS for the HUDSON'S BAY COMPANY.

1841–42

- MEDITERRANEAN** ▪ Scottish naturalist EDWARD FORBES studies a deep seabed in the MEDITERRANEAN SEA.

1841–47

- NEW ZEALAND** ▪ Englishman WILLIAM COLENSO carries out three expeditions to NEW ZEALAND'S North Island.

1841–59

- NORTH AMERICA** ▪ American fur trader JAMES BAKER traps in northern Utah and southern Wyoming.

1842

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- NORTH AMERICA** ■ JOHN CHARLES FRÉMONT heads a U.S. military expedition to the Great Plains, exploring the Platte River and SOUTH PASS through the ROCKY MOUNTAINS.

1842–44

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- NORTH AMERICA** ■ Russian naval officer LAVRENTY ALEKSEYEVICH ZAGOSKIN explores the Yukon and Kuskokwim plus other rivers of Alaska's interior.

1842–45

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- NORTH AMERICA** ■ American fur traders WILLIAM SHERLEY WILLIAMS and WILLIAM THOMAS HAMILTON explore the Green River and the North Platte River in southern Wyoming and northern Utah.

1843

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- NORTH AMERICA** ■ Canadian-born fur trader NORMAN WOLFRED KITTSON promotes JOHN JACOB ASTOR's AMERICAN FUR COMPANY in the Red River of the North region of Minnesota and North Dakota.

1843–44

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- NORTH AMERICA** ■ JOHN CHARLES FRÉMONT heads a U.S. military expedition to the ROCKY MOUNTAINS, the Great Basin, Great Salt Lake, the eastern Cascade Mountains, and California.

1843–47

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- SOUTH AMERICA** ■ FRANÇOIS DE LA PORTE, comte de Castelnau, heads two French expeditions to the AMAZON RIVER. He explores the watershed between the Río de la Plata and the Amazon River and reaches the source of the Paraguay River. He completes the west-to-east crossing of the continent by way of Peru and Brazil.

1843–48

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- NEW ZEALAND** ■ Englishman THOMAS BRUNNER explores the interior of NEW ZEALAND's South Island, from Tasman Bay to Mount Cook. He travels around Lake Rotorua and descends the Buller River to the Tasman Sea. He explores the Grey River and the Southern Alps, reaching Lake Brunner.

1844–45

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- AUSTRALIA** ■ German FRIEDRICH WILHELM LUDWIG LEICHHARDT makes the first successful crossing of northeastern Australia, from Moreton Bay to the

Gulf of Carpentaria, then through Arnhem Land to Port Essington.

1845

- NORTH AMERICA**
- STEPHEN WATTS KEARNY heads a U.S. military expedition to the Platte and Arkansas Rivers and the eastern ROCKY MOUNTAINS, including the SOUTH PASS. JAMES WILLIAM ABERT leads a party to western Oklahoma and western Texas.
 - French chemist and physicist, Henri-Victor Regnault, develops a practical HYPSONETER.

1845–46

- AUSTRALIA**
- Scottish-born surveyor general THOMAS LIVINGSTONE MITCHELL attempts a northwestward crossing of the continent from Darling Downs to the north coast. He explores the central region of Queensland.
- NORTH AMERICA**
- MERVIN VAVASOUR and HENRY JAMES WARRE carry out British military reconnaissance in Oregon.
- ASIA**
- French missionary ÉVARISTE-RÉGIS HUC travels from Mongolia across the Ordos Desert to LHASA in Tibet.

1845–47

- NORTH AMERICA**
- JOHN CHARLES FRÉMONT heads a U.S. military expedition to the Great Basin, the Sierra Nevada, northern California, and southern Oregon.

1845–48

- NORTH AMERICA**
- JOHN FRANKLIN commands a British naval expedition to the Canadian Arctic in an attempt to navigate the NORTHWEST PASSAGE. The ship is icebound in the Victoria Strait. On Franklin's death in 1847, FRANCIS RAWDON MOIRA CROZIER assumes command. All expedition members eventually perish.

1846

- NORTH AMERICA**
- WILLIAM HEMSLEY EMORY heads a U.S. military topographic expedition to the American Southwest and creates the first scientific map of the region.
- NORTH AMERICA**
- American HENRI CHATILLON leads historian Francis Parkman's expedition onto the Great Plains.
 - The HAKLUYT SOCIETY, a charity furthering knowledge of exploration, is founded in London.

1846–47

- ARCTIC**
- Scottish physician JOHN RAE explores the northern extent of the Boothia Peninsula in the

- Canadian Arctic for the HUDSON'S BAY COMPANY.
- NORTH AMERICA**
- American pioneer JESSE APPLGATE explores the Humboldt River and the Black Rock Desert of northern Nevada. He establishes the Applegate Trail as a new and shorter southern route from Fort Hall, Idaho, to the Willamette Valley in Oregon. He explores the Umpqua Valley of west-central Oregon.

1846–48

- NORTH AMERICA**
- Canadian painter PAUL KANE explores western Canada, from Toronto to Vancouver.

1847

- NORTH AMERICA**
- American BRIGHAM YOUNG leads the Mormons from Winter Quarters on the MISSOURI RIVER to the Great Salt Lake Valley, establishing the Mormon Trail.
- AUSTRALIA**
- Australian EDMUND KENNEDY explores the interior of Queensland and the Barcoo River.

1847–49

- ARCTIC**
- JOHN RICHARDSON and JOHN RAE head a British expedition in search of JOHN FRANKLIN; they explore Canada's Arctic coastline eastward from the Mackenzie River to Dolphin and Union Strait. In 1849–50, Rae continues the search on his own, reaching Victoria Island.

1847–52

- NORTH AMERICA**
- Swiss painter RUDOLPH FRIEDERICH KURZ explores the MISSOURI RIVER and western plains.

1847–55

- WORLD**
- Austrian woman IDA REYER PFEIFFER travels twice around the world, west to east and east to west, and writes books, *A Woman's Journey Round the World* and *A Woman's Second Journey Round the World*.

1848

- AFRICA**
- German missionary JOHANN REBMANN explores the interior of East Africa from Mombasa and reaches MOUNT KILIMANJARO.

1848–49

- NORTH AMERICA**
- American JOHN CHARLES FRÉMONT seeks a route from the Great Plains to upper Rio Grande through Sangre de Cristo and the San Juan Mountains of northern New Mexico. Brothers BEN-

- JAMIN JORDAN KERN, EDWARD MEYER KERN, and RICHARD HOVENDON KERN serve as naturalists, topographers, and artists.
- ARCTIC**
- JAMES CLARK ROSS heads a British naval expedition to the Canadian Arctic in search of JOHN FRANKLIN. He travels through Lancaster Sound as far as Barrow Strait and southward from Somerset Island into Peel Strait.

1848–52

- SOUTH AMERICA**
- British naturalists HENRY WALTER BATES and ALFRED RUSSEL WALLACE explore the Amazon Basin. Bates continues his explorations until 1859.

1848–53

- ASIA**
- British couple THOMAS WITTLAM ATKINSON and LUCY ATKINSON travel in SIBERIA, Mongolia, and central Asia.

1849

- NORTH AMERICA**
- RANDOLPH BARNES MARCY and JAMES HERVEY SIMPSON head a U.S. military topographic survey of a wagon route between Fort Smith, Arkansas, and Santa Fe, New Mexico. Simpson locates Native American ruins at Chaco Canyon in New Mexico and Canyon de Chelly in Arizona.
- AFRICA**
- German missionary JOHANN LUDWIG KRAPF explores the interior of East Africa westward from Mombasa and sights Mount Kenya.

1849–50

- NORTH AMERICA**
- HOWARD STANSBURY heads a U.S. military topographic expedition to Utah. He surveys Great Salt Lake's west shore, Utah Lake, and River Jordan.

1849–55

- ASIA**
- GENNADY IVANOVICH NEVELSKOY heads two Russian naval expeditions to the Amur River and Tatar Strait. He determines that Sakhalin is an island, not a peninsula.

1849–63

- AFRICA**
- Scottish missionary DAVID LIVINGSTONE carries out three expeditions in central Africa, two of them accompanied by his wife MARY MOFFAT LIVINGSTONE. He crosses the Kalahari Desert and reaches Lake Ngami. He explores the ZAMBEZI RIVER and the Ruvuma River. He also reaches Victoria Falls on the Zambezi and Lake Nyasa (Lake Malawi). Artist THOMAS BAINES accompanies him on the Zambezi expedition.

1849–64

SOUTH AMERICA

- British botanist RICHARD SPRUCE conducts research along the AMAZON RIVER and Río Negro and other rivers in northern South America.

1850–51

ARCTIC

- EDWIN JESSE DE HAVEN heads a maritime expedition to the Canadian Arctic backed by shipping magnate Henry Grinnell in search of JOHN FRANKLIN. He is trapped in ice north of the Baffin Island and the Lancaster Sound; he reaches Grinnell Land on Devon Island.

ARCTIC

- JOHN ROSS heads a British maritime expedition in search of JOHN FRANKLIN; he winters in Barrow Strait.

1850–52

AFRICA

- British scientist FRANCIS GALTON conducts research in Damaraland and Ovamboland in southwestern Africa.

1850–54

ARCTIC

- ROBERT JOHN LE MESURIER McCLURE heads a British naval expedition to the Canadian Arctic in search of JOHN FRANKLIN. He reaches Prince of Wales Strait between Banks Island and Victoria Island. He completes the first transcontinental crossing of North America above the ARCTIC CIRCLE.

1850–55

AFRICA

- HEINRICH BARTH, ADOLF OVERWEG, and JAMES RICHARDSON head a British expedition into West Africa; they cross the SAHARA DESERT from north to south and explore the Lake Chad region. Barth explores the Benue River, the upper NIGER RIVER, and TIMBUKTU.

ARCTIC

- RICHARD COLLINSON heads a British naval expedition in search of JOHN FRANKLIN; he explores the Arctic coasts of Alaska and Canada as far east as Victoria Island.

1851

NORTH AMERICA

- LORENZO SITGREAVES heads a U.S. military topographic expedition from Santa Fe, New Mexico, to the Zuni and Little Colorado Rivers in Arizona. Mojave Indian IRATEBA serves as guide.
- The AMERICAN GEOGRAPHICAL SOCIETY is founded in New York City.

1852

- NORTH AMERICA**
- RANDOLPH BARNES MARCY heads a U.S. military topographic expedition, which reaches the source of the Red River near present-day Amarillo, Texas.
 - French engineer Henri Gifford makes the first successful AIRSHIP flight.
 - French physicist Jean-Bernard-Léon Foucault develops the modern version of the GYROSCOPE.
 - The U.S. Naval Observatory begins publishing the *American Ephemeris and Nautical Almanac*, an early EPHEMERIS.

1852–54

- ARCTIC**
- EDWARD BELCHER heads a British naval expedition in search of JOHN FRANKLIN; he explores the Canadian Arctic west of Lancaster Sound. FRANCIS LEOPOLD McCLINTOCK, part of the expedition, reaches Eglington Island and Prince Patrick Island on the edge of the Beaufort Sea.

1853

- NORTH AMERICA**
- American JOHN CHARLES FRÉMONT explores the Wasatch Mountains and Sierra Nevada for a proposed railroad through Utah.
- NORTH AMERICA**
- JOHN WILLIAMS GUNNISON heads a U.S. military topographic expedition from Kansas across the plains and the Wasatch Mountains to northwestern Utah.

1853–54

- ARCTIC**
- JOHN RAE heads a British expedition in search of JOHN FRANKLIN. On the Boothia Peninsula, he recovers relics of the Franklin expedition. He reaches Rae Strait, establishing that King William Island is not connected to the mainland.
- AFRICA**
- Portuguese trader ANTONIO FRANCISCO DA SILVA PORTO explores the upper ZAMBEZI RIVER; he makes a west-to-east crossing of central Africa.

1853–55

- ARCTIC/GREENLAND**
- American ELISHA KENT KANE heads a second expedition backed by shipping magnate Henry Grinnell in search of JOHN FRANKLIN. Some expedition members explore GREENLAND's Humboldt Glacier; others explore Ellesmere Island.

1853–56

- NORTH AMERICA**
- AMIEL WEEKS WHIPPLE heads a U.S. military topographic expedition from Albuquerque, New Mexico, to San Bernardino, California. Mojave Indian IRATEBA serves as guide.

1854

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| AFRICA | <ul style="list-style-type: none"> ▪ WILLIAM BALFOUR BAIKIE heads a British maritime expedition to West Africa in search of HEINRICH BARTH, exploring the NIGER RIVER and Benue River. |
| NORTH AMERICA | <ul style="list-style-type: none"> ▪ EDWARD GRIFFIN BECKWITH heads a U.S. military topographic expedition from Fort Bridger, Wyoming, to Sacramento Valley, California, locating passes in the Sierra Nevada. |
| NORTH AMERICA | <ul style="list-style-type: none"> ▪ JOHN GRUBB PARKE heads a U.S. military railroad surveying expedition to the Gila River in Arizona and the Rio Grande in Texas. |

1854–55

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| NORTH AMERICA | <ul style="list-style-type: none"> ▪ JOHN B. POPE heads a U.S. military railroad surveying expedition in Texas, from the Rio Grande to the Red River. |
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1854–57

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| ASIA | <ul style="list-style-type: none"> ▪ German brothers ROBERT VON SCHLAGINTWEIT, ADOLF VON SCHLAGINTWEIT, and HERMANN VON SCHLAGINTWEIT explore India, Tibet, and China's Sinkiang Province. |
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1854–99

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| NORTH AMERICA/
PACIFIC OCEAN/
ASIA | <ul style="list-style-type: none"> ▪ British woman ISABELLA BIRD BISHOP travels in North America, the Pacific islands, and Asia, writing about her experiences. |
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1855

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| NORTH AMERICA | <ul style="list-style-type: none"> ▪ HENRY LARCOM ABBOTT heads a U.S. military railroad surveying expedition in California, Oregon, and Washington, exploring the Cascade Mountains. ▪ German AUGUST HEINRICH PETERMANN publishes the first edition of a geographic journal, <i>Petermann's Geographische Mitteilungen</i>. ▪ American naval officer MATTHEW FONTAINE MAURY publishes <i>The Physical Geography of the Sea</i>, the first textbook on oceanography. |
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1855–58

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| AUSTRALIA | <ul style="list-style-type: none"> ▪ British surveyor AUGUSTUS CHARLES GREGORY undertakes two expeditions of Australia's interior. He completes a west-to-east crossing and a north-east-to-south crossing. |
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1855–59

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| AFRICA | <ul style="list-style-type: none"> ▪ French-American PAUL BELLONI DU CHAILLU explores the Gabon and Okowe Rivers of west-central Africa. |
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1857–58

- AFRICA**
 - RICHARD FRANCIS BURTON and JOHN HANNING SPEKE command a British expedition seeking the source of the NILE RIVER. They explore the interior of East Africa and reach Lake Tanganyika. Speke reaches Lake Victoria. SIDI BOMBAY of the Yao tribe serves as guide.
- ASIA**
 - Russian scientist PYOTR PETROVICH SEMYONOV makes the first European crossing of the Tien Shan mountains between Russia and China. He explores the Dzungaria region and the Altai Mountains of China.
- NORTH AMERICA**
 - JOSEPH CHRISTMAS IVES heads a U.S. military topographic expedition along the COLORADO RIVER. Mojave Indian IRATEBA serves as guide, and JOHN STRONG NEWBERRY serves as geologist.
- NORTH AMERICA**
 - EDWARD FITZGERALD BEALE heads a U.S. wagon road-building project from Camp Verde in western Texas to Fort Tejon, California, using camels as draft animals.

1857–59

- AFRICA**
 - WILLIAM BALFOUR BAIKIE heads a British expedition up West Africa's NIGER RIVER by steamboat, establishing a trading settlement at Lokoja at the confluence of the Niger and Benue Rivers.
- ARCTIC**
 - British naval officer FRANCIS LEOPOLD McCLINTOCK heads an expedition in search of JOHN FRANKLIN in the Canadian Arctic, commissioned by JANE FRANKLIN. He explores southward from the Lancaster Sound. He circumnavigates King William Island. He recovers relics of the Franklin expedition.
- NORTH AMERICA**
 - JOHN PALLISER heads a British scientific expedition to western Canada. He surveys the 49th Parallel from Lake Superior to the Pacific. He explores passes in the Canadian ROCKY MOUNTAINS. Meanwhile, in 1857–58, Englishman HENRY YOULE HIND explores the river systems of Manitoba and Saskatchewan.

1857–61

- AFRICA**
 - Frenchman HENRI DUVEYRIER explores the SAHARA DESERT.
- AUSTRALIA**
 - British surveyor FRANCIS THOMAS GREGORY charts the river systems of western Australia.

1858

- The Alpine Club, a society to promote MOUNTAIN-CLIMBING, is founded in London.

1858–61

- ASIA** ▪ French naturalist HENRI MOUHOT explores Southeast Asia; he reaches the ruins at Angkor in Cambodia.

1859

- NORTH AMERICA** ▪ JOHN N. MACOMB commands a U.S. military topographic expedition from Santa Fe, New Mexico, to southern Utah and southern Colorado. He locates Anasazi ruins at Mesa Verde and explores the upper COLORADO RIVER. JOHN STRONG NEWBERRY serves as geologist.

1859–60

- NORTH AMERICA** ▪ WILLIAM FRANKLIN RAYNOLDS heads a U.S. topographic expedition from Fort Pierre, South Dakota, to Wyoming and Montana.

1860–61

- AUSTRALIA** ▪ Irishman ROBERT O'HARA BURKE and Englishman WILLIAM JOHN WILLS attempt to cross Australia south to north, from Melbourne nearly to the Gulf of Carpentaria. Both die of starvation.
- ARCTIC/GREENLAND** ▪ American physician ISAAC ISRAEL HAYES explores the GREENLAND ice cap and Ellesmere Island. He fails to reach the NORTH POLE.
- NORTH AMERICA** ▪ American fur traders HENRY A. BOLLER and CHARLES LARPENTEUR work the Yellowstone River region.

1860–62

- ARCTIC** ▪ American journalist CHARLES FRANCIS HALL explores Frobisher Bay in the Canadian Arctic.

1860–63

- AFRICA** ▪ JOHN HANNING SPEKE and JAMES AUGUSTUS GRANT command a British expedition to Lake Victoria. He reaches Ripon Falls and follows the NILE RIVER from Uganda into Sudan.

1861–62

- AUSTRALIA** ▪ Scottish surveyor JOHN MCDOUALL STUART completes the first south-to-north crossing of Australia, from Adelaide to Van Diemen Gulf.
- AUSTRALIA** ▪ Scotsman WILLIAM LANDBOROUGH completes a north-to-south crossing of Australia, from the Gulf of Carpentaria to Melbourne.

1861–64**ASIA**

- Hungarian linguist ARMIN VAMBÉRY travels in Armenia, Persia (Iran), and Turkestan. He visits the cities of Bukhara and Samarkand.

1861–65**AFRICA**

- Englishman SAMUEL WHITE BAKER and his Hungarian-born wife, FLORENCE BAKER, seek the source of the NILE RIVER in southern Sudan and Uganda, reaching Lake Albert and Murchison Falls.

1862**AFRICA**

- Dutch woman ALEXANDRINE PETRONELLA FRANCINA TINNÉ sails up the NILE RIVER as far as Gondokoro in southern Sudan. She travels into the Mongalla Mountains and the upper White Nile River region of northeastern Zaire.

1862–63**ASIA**

- British missionary WILLIAM GIFFORD PALGRAVE makes the first known west-to-east crossing of the Arabian Peninsula, from Ma'an in southern Jordan to Quatif on the Persian Gulf.

NORTH AMERICA

- Englishmen WALTER BUTLER CHEADLE and WILLIAM-WENTWORTH FITZWILLIAM MILTON cross the Canadian ROCKY MOUNTAINS through Yellowhead Pass and reach the Pacific by way of the North Thompson and Fraser Rivers.

1863**NORTH AMERICA**

- American pioneer JOHN MERIN BOZEMAN establishes the Bozeman Trail, a wagon route from Colorado to Montana, along the east side of the Bighorn Mountains and through the Bozeman Pass of the Belt Mountains.

1863–73**AUSTRALIA**

- German woman naturalist KONCORDIE AMALIE NELLE DIETRICH collects specimens in Queensland.

1864–66**ASIA**

- Indian NAIN SINGH crosses the eastern HIMALAYAS to Tibet. He explores the upper Brahmaputra River for Great Britain's Great Trigonometrical Survey.

1864–69

- ARCTIC**
- American journalist CHARLES FRANCIS HALL explores King William Island and Boothia Peninsula. He finds evidence of the JOHN FRANKLIN expedition.

1865

- AFRICA**
- German FRIEDRICH GERHARD ROHLFS, a soldier in the French Foreign Legion, crosses West Africa from Tripoli through the SAHARA DESERT by way of Lake Chad and the Benue River and NIGER RIVER to the Gulf of Guinea.
- NORTH AMERICA**
- Cherokee Indian trader JESSE CHISHOLM blazes the Chisholm Trail from Texas to Wichita.
- EUROPE**
- Englishman EDWARD WHYMPER climbs the Matterhorn in the Alps.

1866–68

- ASIA**
- ERNEST-MARC-LOUIS DE GONZAGUE DOUDART DE LAGRÉE and MARIE-JOSEPH-FRANÇOIS GARNIER head the French naval Mekong Expedition along the Mekong River, from the coast of Vietnam to southeastern China.

1866–69

- AFRICA**
- Scottish missionary DAVID LIVINGSTONE carries out three expeditions in central Africa. He searches for the source of the NILE RIVER. He reaches Lake Mweru and the Lualaba River.
- SOUTH AMERICA**
- Englishman HENRY ALEXANDER WICKHAM explores the ORINOCO RIVER and its tributaries, the Atabapo River and Río Negro. He establishes a rubber plantation on the AMAZON RIVER near Santarem, Brazil.

1868

- ARCTIC**
- NILS ADOLF ERIK NORDENSKJÖLD heads the First Swedish North Polar Expedition, failing to reach the NORTH POLE.
- ASIA**
- Englishman THOMAS THORNVILLE COOPER travels westward from Shanghai across China.

1868–70

- ARCTIC/GREENLAND**
- KARL CHRISTIAN KOLDEWEY heads two German maritime expeditions to Spitsbergen (Svalbard) and GREENLAND's east coast.

1868–71

- AFRICA**
- German naturalist GEORG AUGUST SCHWEINFURTH explores the watershed between the White

- Nile River and the upper CONGO RIVER (Zaire River). He reaches the Uele River.
- ASIA**
- Russians ALEKSEY PAVLOVICH FEDCHENKO and OLGA FEDCHENKO command a scientific expedition into the Pamir region of south-central Asia. They reach the Trans-Alai Mountains.

1868–72

- ASIA**
- German geologist FERDINAND PAUL WILHELM VON RICHTHOFEN explores China.

1868–74

- AFRICA**
- German physician GUSTAV NACHTIGAL travels southward across the SAHARA DESERT from Tripoli to Bornu in Nigeria. He explores Lake Chad and the Chari River. He makes a southeastward crossing of the Sahara to the White Nile River.
- NORTH AMERICA**
- American naturalist JOHN MUIR explores Yosemite Valley and the Sierra Nevada in California.

1869

- NORTH AMERICA**
- American geologist and ethnologist JOHN WESLEY POWELL explores the COLORADO RIVER and the Grand Canyon.

1869–70

- SOUTH AMERICA**
- Englishman GEORGE CHAWORTH MUSTERS makes a south-to-north crossing of Patagonia, from the Strait of Magellan (see MAGELLAN, STRAIT OF) to Río Negro in central Argentina.

1869–76

- NORTH AMERICA**
- FERDINAND VANDEVEER HAYDEN heads a U.S. geological and geographic study of the Great Plains and the ROCKY MOUNTAINS.

1870

- NORTH AMERICA**
- NATHANIEL PITT LANGFORD heads a U.S. expedition to the Yellowstone Park region of Idaho, Montana, and Wyoming.

1870–85

- ASIA**
- Russian NIKOLAY MIKHAILOVICH PRZHEVALSKY makes four scientific expeditions to central Asia, reporting on geography and wildlife.

1871

- AFRICA**
- British-American journalist HENRY MORTON STANLEY journeys from Zanzibar to Ujiji on Lake

Tanganyika and locates Scottish missionary DAVID LIVINGSTONE. Stanley also explores the lake's northern end.

1871–73

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| ASIA | ▪ French trader JEAN DUPUIS explores the Red River, seeking a navigable water route between China's Yunnan Province and the coast of Southeast Asia. |
| ARCTIC | ▪ CHARLES FRANCIS HALL heads a U.S. expedition, which attempts to reach the NORTH POLE from northeastern Ellesmere Island. He reaches the Lincoln Sea. |
| EUROPE/ASIA | ▪ Russian geographer PETER KROPOTKIN undertakes scientific expeditions to northern Finland, SIBERIA, and Manchuria. |

1871–74

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| ARCTIC | ▪ JULIUS VON PAYER and KARL WEYPRECHT head the Austro-Hungarian Arctic expedition, reaching Franz Josef Land. |
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1871–79

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| NORTH AMERICA | ▪ GEORGE MONTAGUE WHEELER heads U.S. military surveys of the American West. |
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1872

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| ASIA | ▪ Englishwoman ELIZABETH SARAH MAZUCHELLI travels 600 miles through the eastern HIMALAYAS. |
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1872–73

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| ARCTIC | ▪ NILS ADOLF ERIK NORDENSKJÖLD heads the Second Swedish North Polar Expedition. He explores Spitsbergen (Svalbard). |
| ASIA | ▪ Englishman NEY ELIAS travels from China across the GOBI DESERT, the Altai Mountains, SIBERIA, and the Ural Mountains to Europe. |

1872–76

- | | |
|----------------------------------|---|
| ATLANTIC OCEAN/
PACIFIC OCEAN | ▪ GEORGE STRONG NARES and CHARLES WYVILLE THOMSON head a British oceanographic research expedition aboard the <i>Challenger</i> . |
|----------------------------------|---|

1873

- | | |
|---------------|---|
| NORTH AMERICA | ▪ DAVID SLOAN STANLEY heads a U.S. military Yellowstone Expedition from the Dakotas into Montana and Wyoming. |
| AUSTRALIA | ▪ Englishman PETER EGERTON WARBURTON completes the first east-to-west crossing of western Australia, from Alice Springs to Roebourne on the Indian Ocean. |

- AUSTRALIA** ▪ Australian WILLIAM CHRISTIE GOSSE heads an unsuccessful attempt at an east-to-west crossing of the continent. He reaches Ayers Rock.
- ANTARCTIC** ▪ EDUARD DALLMAN heads a German whaling expedition to the Antarctic Peninsula.

1873–75

- AFRICA** ▪ VERNEY LOVETT CAMERON heads a British expedition to relieve DAVID LIVINGSTONE. He explores Lake Tanganyika and the Lukuga River. He travels from the Lualaba River to Angola's Atlantic coast.

1874

- AUSTRALIA** ▪ The brothers JOHN FORREST and ALEXANDER FORREST head an Australian surveying expedition and complete the first west-to-east crossing of western Australia.

1874–75

- AFRICA** ▪ American CHARLES CHAILLÉ-LONG, in service to Egypt, explores the upper White Nile in Uganda. He reaches the Kioga River in East Africa. He heads a military expedition from southern Sudan west into the great divide between the NILE RIVER and CONGO RIVER (Zaire River); he explores the Giuba River in Somalia.

1874–77

- AFRICA** ▪ British-American journalist HENRY MORTON STANLEY circumnavigates Lake Victoria and Lake Tanganyika. He reaches Lake Edward. He descends the Lualaba River and the CONGO RIVER (Zaire River) to the Atlantic, completing an east-to-west crossing of central Africa.

1875–76

- AUSTRALIA** ▪ Englishman ERNEST GILES heads a commercial expedition through the GREAT VICTORIA DESERT; he completes the first successful inland crossing of Australia, then returns through the Gibson Desert.
- ARCTIC** ▪ GEORGE STRONG NARES heads the British Arctic Expedition, which explores northern Ellesmere Island and makes an unsuccessful attempt on the NORTH POLE.

1876–77

- SOUTH AMERICA** ▪ Argentine naturalist FRANCISCO MORENO explores the southern region of the ANDES MOUNTAINS; he reaches Lake San Martin.

1876–78

- ASIA**
- Englishman CHARLES MONTAGU DOUGHTY travels southward from Syria across Arabia; he visits the Najd Desert.

1876–79

- SOUTH AMERICA**
- Frenchman JULES-NICOLAS CREVAUX explores the northern tributaries of the AMAZON RIVER and crosses the Tumuc-Humuc Mountains in French Guiana.

1876–83

- AFRICA**
- German WILHELM JOHANN JUNKER explores the upper tributaries of the CONGO RIVER (Zaire River) and the NILE RIVER in North and East Africa.

1878–79

- ARCTIC**
- Swedish geologist NILS ADOLF ERIK NORDENSKJÖLD heads the Vega Expedition, making the first successful navigation of the NORTHEAST PASSAGE from Norway along Asia's Arctic coast to the BERING STRAIT. In 1880, he returns to Europe by way of the Suez Canal, completing the first circumnavigation of Europe and Asia.
- ASIA**
- British couple WILFRED SCAWEN BLUNT and Lady ANNE ISABELLA BLUNT explore the Arabian Peninsula and Iraq.

1878–80

- ARCTIC**
- American FREDERICK SCHWATKA heads a private expedition in search of JOHN FRANKLIN. He explores from northwestern HUDSON BAY to King William Island, exploring the Hayes River.

1878–82

- ASIA**
- KISHEN SINGH of India travels from northeastern India into western China as far as the GOBI DESERT for Great Britain's Great Trigonometrical Survey.

1878–83

- AFRICA**
- German physician MEHMED EMIN PASHA, as an Anglo-Egyptian governor, explores the watershed between the NILE RIVER and CONGO RIVER (Zaire River) in Sudan and in East Africa.

1879

- AUSTRALIA**
- Australian ALEXANDER FORREST explores northwestern Australia, including Dampier Land, Fitzroy River, and Daly River.

- AFRICA**
- JOSEPH THOMSON heads a British expedition from East Africa's coast to northern Lake Nyasa (Lake Malawi). He explores Lake Rukwa, southern Lake Tanganyika, and the Lukuga River.

1879–81

- ARCTIC**
- GEORGE WASHINGTON DE LONG heads a U.S. expedition into the Arctic Ocean by way of the BERING STRAIT. He fails to reach the NORTH POLE when the ship is trapped in the ice north of Wrangel Island, then drifts westward. Expedition members set out for the Siberian mainland over the frozen sea, visiting some of the New Siberian Islands. Some of them perish in the Lena River delta.
- NORTH AMERICA**
- American geologist CLARENCE KING organizes the U.S. Geological Survey.

1879–82

- AFRICA**
- Italian PIERRE-PAUL-FRANÇOIS-CAMILLE SAVORNAN DE BRAZZA explores and develops the CONGO RIVER (Zaire River) region for France in West Africa.

1879–84

- AFRICA**
- British-American journalist HENRY MORTON STANLEY ascends the CONGO RIVER (Zaire River) on behalf of Belgium. He explores the interior of Zaire and reaches Lake Tumba and Lake Leopold II.
- ASIA**
- KINTUP of India explores Tibet for Great Britain's Great Trigonometrical Survey. He determines that Tibet's Tsangpo River is the same as India's Brahmaputra River.

1880

- SOUTH AMERICA**
- Englishman EDWARD WHYMPER climbs Chimborazo in the ANDES MOUNTAINS.

1880–81

- AFRICA**
- PAUL-XAVIER FLATTERS heads two French surveying expeditions from the Mediterranean coast of Algeria into the SAHARA DESERT, reaching the Ahaggar region.

1881–84

- ARCTIC/GREENLAND**
- ADOLPHUS WASHINGTON GREELY heads a U.S. military expedition to Ellesmere Island. Expedition member OCTAVE PAVY explores northern Ellesmere Island. Other expedition members explore GREENLAND's northwest coast.

1883–84

- AFRICA**
- JOSEPH THOMSON heads a British expedition from Mombasa on the Indian Ocean across central Kenya's Masailand and along the Great Rift Valley to Lake Victoria. He reaches Lake Baringo and the Abedare Range.

1883–85

- AFRICA**
- German HERMANN VON WISSMANN, in service to Belgium, explores the Kasai River system in Zaire, reaching the Sankuru tributary.

1884

- AFRICA**
- HARRY HAMILTON JOHNSTON heads the British Kilimanjaro Expedition, exploring the region around Mount Kilimanjaro (see KILIMANJARO, MOUNT), Africa's highest peak.
 - The Washington Meridian Conference establishes Greenwich, England, as the location of the PRIME MERIDIAN.

1884–87

- AFRICA**
- British missionary GEORGE GRENFELL surveys the CONGO RIVER (Zaire River).

1885

- NORTH AMERICA**
- HENRY TUREMAN ALLEN heads a U.S. military expedition to the Yukon, Koyukuk, and Copper Rivers in eastern Alaska.

1885–87

- AFRICA**
- German geologist OSKAR LENZ ascends the CONGO RIVER (Zaire River). He crosses Africa by way of the Lualaba River, Lake Tanganyika, and Lake Nyasa (Lake Malawi).

1886

- The *Gymnote*, this first modern SUBMARINE, is built in France.

1886–87

- ASIA**
- British army officer FRANCIS EDWARD YOUNG-HUSBAND travels east to west across China from Manchuria, through the GOBI DESERT, to Kashgar and Yarkand. He reaches the Mustagh Pass in the Karakoram Mountains.

1886–89

- AFRICA**
- Hungarians LUDWIG VON HOEHNEL and SAMUEL TELEKI explore Lake Rudolf, the Omo River, and

Lake Stefanie in northern Kenya and southern Ethiopia.

1886–1900

- ARCTIC/GREENLAND** ▪ American ROBERT EDWIN PEARY carries out five expeditions to the Arctic regions of GREENLAND and Ellesmere Island.

1887–89

- AFRICA** ▪ British-American journalist HENRY MORTON STANLEY travels up the CONGO RIVER (Zaire River) and across central Africa to relieve MEHMED EMIN PASHA. He reaches the Semliki River and Ruwenzori Mountains. He completes a west-to-east crossing of central Africa.
- AFRICA** ▪ LOUIS-GUSTAVE BINGER heads a French expedition into West Africa from Senegal. He explores the NIGER RIVER, the Volta River, and the Comoe River.

1888

- ARCTIC/GREENLAND** ▪ Norwegian FRIDTJOF NANSEN explores GREENLAND's interior.

1888–1911

- EUROPE/
SOUTH AMERICA** ▪ American woman ANNIE SMITH PECK climbs in the Alps and the ANDES MOUNTAINS.

1888–1912

- ASIA/AFRICA** ▪ American woman FANNY BULLOCK WORKMAN travels throughout Europe, North Africa, and the Far East. She climbs in the HIMALAYAS and other mountain ranges in central Asia.

1889

- AFRICA** ▪ HANS MEYER climbs Mount Kilimanjaro (see KILIMANJARO, MOUNT) in East Africa.

1891

- AFRICA** ▪ American woman publisher MAY FRENCH SHELDON travels from Mombasa on Africa's east coast to Mount Kilimanjaro (see KILIMANJARO, MOUNT). She explores Lake Chala.
- German engineer Otto Lilienthal makes the first successful glider flight.

1891–95

- ASIA** ▪ AUGUSTE-JEAN-MARIE PAVIE conducts the Pavie Mission surveys of Southeast Asia.

1892–93

- AFRICA** ■ OSKAR BAUMANN heads a German expedition to Lake Victoria and the Kagera River, its principal source.
- ASIA** ■ British missionary ANNIE ROYLE TAYLOR visits China.

1892–94

- ARCTIC** ■ EDUARD VON TOLL heads a Russian expedition to the Siberian Arctic by way of Cape Chelyuskin; he explores the deltas of the Yana, Indigirka, and Kolyma Rivers.

1893–95

- AFRICA** ■ British woman author MARY HENRIETTA KINGSLY travels in West and central Africa.

1893–96

- ARCTIC** ■ Norwegian FRIDTJOF NANSEN attempts to approach the NORTH POLE by having an ice-bound ship drift northward from the New Siberian Islands. The crew leaves the ship, continuing on kayaks and sledges, reaching Franz Josef Land.

1893–97

- ASIA** ■ Swede SVEN ANDERS HEDIN heads two scientific expeditions to the Tarim Basin, the Takla Makan desert, and Lop Nor Lake in western China. He explores the Tibetan Plateau and maps the HIMALAYAS.
- ASIA** ■ British archaeologist JAMES THEODORE BENT explores the Arabian Peninsula.

1893–98

- ASIA** ■ British surveyor and diplomat PERCY MOLESWORTH SYKES explores Persia (Iran).

1893–1900

- ASIA** ■ Frenchman CHARLES BONIN travels in Southeast and central Asia and charts the YANGTZE RIVER (Chang) and the YELLOW RIVER (Huanghe).

1894–95

- ANTARCTIC** ■ CARSTEN EGEBERG BORCHGREVINK heads a Norwegian whaling expedition and makes the first known landing on the Antarctic continent.

1894–97

- ARCTIC**
- FREDERICK GEORGE JACKSON heads the British Jackson-Harmsworth Arctic Expedition to Franz Josef Land.

1897

- ARCTIC**
- Swedish SALOMON AUGUST ANDRÉE attempts to reach the NORTH POLE by BALLOON. He is forced down and eventually perishes on White Island.
- NORTH AMERICA**
- Italian LUIGI AMEDEO DI SAVOIA D'ABRUZZI makes the first successful ascent of Alaska's Mount Saint Elias.
- SOUTH AMERICA**
- Italian MATTHIAS ZURBRIGGEN makes the first successful ascent of Anaconda in the ANDES MOUNTAINS.

1897–99

- ANTARCTIC**
- ADRIEN-VICTOR-JOSEPH DE GERLACHE DE GOMERY heads a Belgian expedition to Antarctica; icebound, he winters off the Antarctic Peninsula.

1897–1904

- AFRICA**
- Swiss-born Russian-German woman writer ISABELLE EBERHARDT travels throughout North Africa.

1898–99

- AFRICA**
- JEAN-BAPTISTE MARCHAND heads a French military expedition from the mouth of the CONGO RIVER (Zaire River) to the upper White Nile region of southern Sudan.

1898–1902

- ARCTIC**
- OTTO NEUMANN SVERDRUP heads a Norwegian expedition to the Canadian Arctic. He explores the west coast of Ellesmere Island and the Sverdrup Islands.

1899–1900

- ARCTIC**
- LUIGI AMEDEO DI SAVOIA D'ABRUZZI heads an Italian expedition in an attempt to reach the NORTH POLE from Franz Josef Land, setting the northernmost record at the time.
- ANTARCTIC**
- CARSTEN EGEBERG BORCHGREVINK heads a Norwegian expedition and winters in Antarctica, exploring parts of the interior.

1900–02

- ASIA**
- Russian scholar GOMBOZHAB TSYBIKOV heads a political mission to Tibet for Russia.

1900–10

- ASIA**
- British archaeologist GERTRUDE MARGARET LOW-THIAN BELL travels throughout the Middle East.

1901–03

- ANTARCTIC**
- ERICH DAGOBERT VON DRYGALSKI heads a German Antarctic Expedition to the Antarctic coast in the Indian Ocean. He reaches and names Kaiser Wilhelm II Land and Mount Gauss.
- ANTARCTIC**
- NILS OTTO GUSTAF NORDENSKJÖLD heads a Swedish expedition to Antarctica. He explores the South Shetland Islands, Graham Land, and Mount Haddington on the Weddell Sea.

1901–04

- ANTARCTIC**
- ROBERT FALCON SCOTT heads the British National Antarctic Expedition. He explores Victoria Land and the Ross Ice Shelf and reaches Edward VII Land, setting the southernmost record at the time. ERNEST HENRY SHACKLETON and EDWARD ADRIAN WILSON are part of his team.

1902

- ARCTIC**
- American ROBERT EDWIN PEARY attempts unsuccessfully to reach the NORTH POLE from Cape Hecla on the northern Ellesmere Island, but he sets the northernmost record at the time.

1902–04

- ANTARCTIC**
- WILLIAM SPIERS BRUCE heads the Scottish National Antarctic Expedition. He explores the Weddell Sea and charts Coats Land.
- ARCTIC/GREENLAND**
- LUDWIG MYLIUS-ERICHSEN heads the Danish Greenland Expedition to Melville Bay. He reaches as far north as Cape York.

1903

- American brothers Orville Wright and Wilbur Wright make the first successful airplane flights.

1903–05

- ANTARCTIC**
- JEAN-BAPTISTE-ÉTIENNE-AUGUSTE CHARCOT heads a French expedition, which maps the Antarctic Peninsula, the Loubet Coast, and Adelaide Land.

1903–06

- ARCTIC**
- ROALD ENGELBREGT GRAVNING AMUNDSEN heads a Norwegian expedition, which locates the NORTH MAGNETIC POLE and makes the

- first successful navigation of the NORTHWEST PASSAGE.
- SOUTH AMERICA**
- American woman HARRIET CHALMERS ADAMS tours South America, crossing the ANDES MOUNTAINS four times.

1904–11

- ARCTIC**
- JOSEPH ELZÉAR BERNIER heads a series of Canadian expeditions, claiming and charting islands in the Arctic Ocean north of the Canadian mainland.

1905–06

- ARCTIC**
- American ROBERT EDWIN PEARY attempts unsuccessfully to reach the NORTH POLE by way of the Robeson Channel, but he sets the northernmost record at the time.

1905–08

- ASIA**
- Swede SVEN ANDERS HEDIN reaches the sources of the INDUS RIVER, Brahmaputra River, and Sutlej River in the Transhimalaya Mountains of Tibet.

1905–11

- AFRICA**
- Americans CARL ETHAN AKELEY and DELIA JULIA DENNING AKELEY head two expeditions to East and central Africa for the Field Museum in Chicago and the Museum of Natural History in New York.

1906

- AFRICA**
- Italian LUIGI AMEDEO DI SAVOIA D'ABRUZZI makes the first ascent of peaks in East Africa's Ruwenzori Mountains.

1906–07

- ARCTIC/GREENLAND**
- LUDWIG MYLIUS-ERICHSEN heads a Danish expedition to northeastern GREENLAND, reaching the Northeast Foreland.

1906–08

- ASIA**
- Hungarian archaeologist MARC AUREL STEIN follows the ancient SILK ROAD into western China. He locates the Caves of the Thousand Buddhas at Tunhuang.

1906–12

- ARCTIC/GREENLAND**
- Danish-Inuit ethnologist KNUD JOHAN VICTOR RASMUSSEN explores northern GREENLAND. He determines that Peary Land is part of Greenland.

1906–14

- SOUTH AMERICA**
- British surveyor PERCY HARRISON FAWCETT explores the Amazon Basin and the central ANDES MOUNTAINS.

1907–09

- ANTARCTIC**
- ERNEST HENRY SHACKLETON heads a British Antarctic expedition, which reaches the Beardmore Glacier and the Polar Plateau within 97 miles of the SOUTH POLE. In 1909, expedition members including DOUGLAS MAWSON ascend Mount Erebus and reach the SOUTH MAGNETIC POLE.

1907–25

- SOUTH AMERICA**
- American ALEXANDER HAMILTON RICE surveys the rivers draining into the northwestern Amazon Basin. In 1924–25, he makes the first use of an aircraft to explore South America.

1908

- ARCTIC**
- American FREDERICK ALBERT COOK possibly reaches the NORTH POLE from northern GREENLAND and the Ellesmere Island, but his claim is disputed.
- ARCTIC**
- Russian mariner and fur trader NIKIFOR ALEKSEYEVICH BEGICHEV determines that Bolshoy Begichev is an island and not part of a peninsula on the Arctic coast of central SIBERIA.

1908–10

- ANTARCTIC**
- JEAN-BAPTISTE-ÉTIENNE-AUGUSTE CHARCOT heads a French expedition and surveys Palmer Archipelago. He reaches the Fallières Coast.

1909

- ARCTIC**
- Americans ROBERT EDWIN PEARY and MATTHEW ALEXANDER HENSON successfully reach the NORTH POLE by sledge from Cape Columbia on the north coast of Ellesmere Island.
- ASIA**
- Italian LUIGI AMEDEO DI SAVOIA D'ABRUZZI attempts the ascent of K2 in the HIMALAYAS, setting the altitude record at the time.

1910–12

- ANTARCTIC**
- ROALD ENGELBREGT GRAVNING AMUNDSEN heads a Norwegian expedition, which completes the first successful expedition to the SOUTH POLE, from the Bay of Whales by way of the Axel Heiberg Glacier (Antarctic).

- ANTARCTIC**
- ROBERT FALCON SCOTT heads a British expedition, which reaches the SOUTH POLE from McMurdo Sound by way of the Beardmore Glacier. All the expedition members, including the physician and zoologist EDWARD ADRIAN WILSON, perish on the return trip.

- ANTARCTIC**
- WILHELM FILCHNER heads the Second German Antarctic Expedition. He reaches the Filchner Ice Shelf on the Weddell Sea and Luitpold Land.

1911

- SOUTH AMERICA**
- American historian HIRAM BINGHAM reaches the Inca ruins at Machu Picchu.

1911–14

- ANTARCTIC**
- DOUGLAS MAWSON heads an Australian expedition to Antarctica, exploring George V Land.

1912

- ANTARCTIC**
- NOBU SHIRASE heads a Japanese expedition to Antarctica. He explores the Ross Ice Shelf and King Edward VII Land.

1912–15

- AFRICA**
- American military attaché CHARLES DENTON YOUNG charts the interior of Liberia.

1913

- NORTH AMERICA**
- Anglo-American HUDSON STUCK makes the first ascent of Mount McKinley (see MCKINLEY, MOUNT) in Alaska.

1913–18

- ARCTIC**
- VILHJALMUR STEFANSSON heads a Canadian Arctic expedition to the Beaufort Sea; he reaches uncharted islands in the Canadian Arctic Archipelago north of Prince Patrick Island.

1914–16

- ANTARCTIC**
- ERNEST HENRY SHACKLETON heads a British Imperial Trans-Antarctic expedition and attempts to cross the Antarctic continent from the Weddell Sea to the Ross Sea. After his ship sinks in the Weddell Sea, the crew takes refuge on Elephant Island. Shackleton and five others make the open boat voyage to South Georgia Island and cross the island overland to the inhabited side. Shackleton mounts a successful rescue of the crew still on Elephant Island.

1916–18

- ASIA**
- Englishman THOMAS EDWARD LAWRENCE (Lawrence of Arabia) explores the Hejaz region of the Arabian Peninsula while leading an Arab revolt against Turkey.

1917

- ASIA**
- Englishman HARRY ST. JOHN BRIDGER PHILBY makes an east-to-west crossing of the Arabian Peninsula from Qatar to Jidda.

1921–24

- ARCTIC**
- Danish-Inuit KNUD JOHAN VICTOR RASMUSSEN travels from western GREENLAND across the Canadian Arctic to the BERING STRAIT.

1923–24

- ASIA**
- Frenchwoman ALEXANDRA DAVID-NÉEL travels from China through the Dokar Pass of the Kharpo Mountains to LHASA in Tibet.

1924

- ASIA**
- Englishman GEORGE HERBERT LEIGH MALLORY and Andrew “Sandy” Irvine die while climbing Mount Everest (see EVEREST, MOUNT) in the HIMALAYAS.

1924–25

- ARCTIC/GREENLAND**
- American RICHARD EVELYN BYRD makes the first flights over the GREENLAND ice cap by airplane.

1924–28

- ASIA**
- Russian painter NIKOLAY KONSTANTINOVICH ROERICH explores in the HIMALAYAS and central Asia.

1926

- ARCTIC**
- American RICHARD EVELYN BYRD makes the first flight over the NORTH POLE by airplane.

- ARCTIC**
- ROALD ENGELBREGT GRAVNING AMUNDSEN, LINCOLN ELLSWORTH, and UMBERTO NOBILE fly over the NORTH POLE by AIRSHIP, completing the first flight from Europe to North America.

- AFRICA**
- Americans CARL ETHAN AKELEY and MARY LEONORE JOBE AKELEY collect specimens in the Belgian Congo for the American Museum of Natural History.

1927

- American aviator Charles Lindberg makes the first successful nonstop solo flight across the Atlantic Ocean.

1928

ARCTIC

- UMBERTO NOBILE heads an Italian expedition over the NORTH POLE by AIRSHIP.

ARCTIC

- Australian GEORGE HUBERT WILKINS makes an airplane flight over the Arctic from North America to Europe.
- American aviator Amelia Earhart becomes the first woman to fly solo across the Atlantic Ocean.

1928–33

ARCTIC/GREENLAND

- American woman LOUISE ARNER BOYD heads three scientific expeditions to the Arctic region of eastern GREENLAND.

1929–30

ANTARCTIC

- RICHARD EVELYN BYRD heads the First Byrd Antarctic Expedition; he makes the first flight over the SOUTH POLE.

ARCTIC/GREENLAND

- German ALFRED LOTHAR WEGENER heads the Greenland Expedition, which establishes the first permanent weather stations on the GREENLAND ice cap.

1929–31

ANTARCTIC

- DOUGLAS MAWSON heads Australian, NEW ZEALAND, and British aerial surveys of Antarctica. He explores the MacRobertson Coast and Enderby Land.

1930–31

ASIA

- Englishman BERTRAM SYDNEY THOMAS crosses the southeastern Arabian Peninsula's Rub' al-Khali desert (EMPTY QUARTER).

1930–32

ARCTIC/GREENLAND

- HENRY GEORGE WATKINS heads the British Arctic Air Route Expedition to GREENLAND. He explores the Greenland ice cap and surveys the southeast and southwest coasts. Expedition member AUGUSTINE COURTAULD spends the 1930–31 winter alone on the ice cap.

1931

- Belgian/Swiss physicist AUGUSTE PICCARD penetrates the stratosphere in a high-altitude BALLOON.

- ARCTIC**
- Australian GEORGE HUBERT WILKINS attempts to reach the NORTH POLE from Spitsbergen (Svalbard) by SUBMARINE.

1932

- ARCTIC**
- OTTO Y. SCHMIDT commands a USSR icebreaker completing the first crossing of the NORTHEAST PASSAGE in a single season.

1933–35

- ANTARCTIC**
- RICHARD EVELYN BYRD heads the Second Byrd Antarctic Expedition. He winters alone about 1,000 miles inland. He charts Marie Byrd Land and the Edsel Ford Mountains.

1934

- American CHARLES WILLIAM BEEBE sets the record for an ocean dive in the BATHYSPHERE with Otis Barton.

1935

- ANTARCTIC**
- American LINCOLN ELLSWORTH completes the first flight across the Antarctic continent.
- ASIA**
- Englishwoman FREYA MADELINE STARK visits the Hadramawt region of the southern Arabian Peninsula.

1937

- ARCTIC**
- OTTO Y. SCHMIDT establishes a manned scientific post on the frozen Arctic Ocean near the NORTH POLE for the USSR.
 - The *Hindenburg*, a German-built AIRSHIP, crashes in New Jersey, killing 36 people.
 - American aviator Amelia Earhart disappears as she attempts to become the first woman to fly an airplane around the world.

1937–38

- ARCTIC**
- American woman LOUISE ARNER BOYD heads two scientific expeditions to the Arctic Ocean northeast of Norway, between Bear Island and Jan Mayen Island.

1939–41

- ANTARCTIC**
- RICHARD EVELYN BYRD heads the U.S. Antarctic Service Expedition, establishing new bases.

1941

- ARCTIC**
- American woman LOUISE ARNER BOYD heads a U.S. scientific expedition studying the Arctic magnetic phenomenon.

1942**SPACE**

- During World War II, German engineer Wernher von Braun conducts the first successful launch of the A-4 (later called the V-2) ROCKET, a long-range guided missile propelled by liquid fuel. In 1945, he moves to the United States and participates in American SPACE EXPLORATION.

1943

- Frenchman JACQUES-YVES COUSTEAU helps develop the Aqua Lung.

1946–48**ASIA**

- Englishman WILFRED PATRICK THESIGER undertakes two journeys into the southeastern Arabian Peninsula's Rub' al-Khali (the EMPTY QUARTER).

1947**PACIFIC OCEAN**

- Norwegian THOR HEYERDAHL travels from South America to Polynesia in the balsa RAFT *Kon-Tiki* to prove the theory of eastward transoceanic migrations of native peoples.

1947–48**ANTARCTIC**

- RICHARD EVELYN BYRD heads U.S. Operation High Jump, an aerial reconnaissance of Antarctica.

1953**ASIA**

- EDMUND PERCIVAL HILLARY and TENZING NORGAY head the British Mount Everest Expedition, reaching the top of Mount Everest (see EVEREST, MOUNT) in the HIMALAYAS.

1955**ARCTIC**

- American LOUISE ARNER BOYD makes the first flight over the NORTH POLE by a woman.

1956–88**SOUTH AMERICA**

- British botanical painter MARGARET URSULA MEE travels in the Brazilian rain forest.

1957**SPACE**

- The USSR launches the first artificial SATELLITE, *Sputnik 1*.

SPACE

- The USSR launches the first animal into space, the dog Laika, aboard the SATELLITE *Sputnik 2*.

1957–58

- ANTARCTIC**
- Englishman VIVIAN ERNEST FUCHS and New Zealander EDMUND PERCIVAL HILLARY head the Commonwealth Trans-Antarctic Expedition, which completes the first crossing of the Antarctic continent.
 - Thirty-seven nations participate in the INTERNATIONAL GEOPHYSICAL YEAR, a period of cooperative study of Earth's geophysics.

1958

- SPACE**
- The United States launches its first artificial SATELLITE, *Explorer 1*, and its first SPACE PROBE, *Pioneer*.
- SPACE**
- The U.S. government establishes the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA). In 1959, it selects its first ASTRONAUTS.
- ARCTIC**
- The *Nautilus*, the first nuclear SUBMARINE, makes an undersea transit of the NORTH POLE.

1959

- SPACE**
- The USSR launches *Luna 1*, a SPACE PROBE; it becomes the first human-made object to escape Earth's orbit. *Luna 2* becomes the first artificial object to hit the Moon. *Luna 3* sends back the first photographs of the dark side of the Moon.

1960

- PACIFIC OCEAN**
- JACQUES ERNEST-JEAN PICCARD heads a U.S. Navy BATHYSCAPH dive to the bottom of the Challenger Deep in the Pacific's MARIANAS TRENCH, the deepest point on Earth.

1961

- SPACE**
- YURI ALEKSEYEVICH GAGARIN, in a USSR Vostok mission, becomes the first human in space and to orbit Earth.
- SPACE**
- ALAN BARTLETT SHEPARD, JR., in a U.S. Mercury mission, becomes the first American in space.
- SPACE**
- The Apollo program is organized by the United States to launch a person to the Moon.

1962

- SPACE**
- JOHN HERSCHELL GLENN, JR., in a U.S. Mercury mission, becomes the first American to orbit Earth.

1963

- SPACE**
 - VALENTINA VLADIMIROVNA TERESHKOVA becomes the first woman in space in a USSR Vostok mission.
- SPACE**
 - ALEXEI ARKHIPOVICH LEONOV, in a USSR Voskhod mission, becomes the first human to walk in space.
- SPACE**
 - EDWARD HIGGINS WHITE II, in a U.S. Gemini mission, becomes the first American to walk in space.

1964

- WORLD**
 - American aviator Geraldine Mock becomes the first woman to fly solo around the world.

1965

- The Union Internationale de Spéléologie, the international body for SPELEOLOGY and caving, is founded with a central office in the Czech Republic.

1967

- WORLD**
 - British yachtsman Sir Francis Charles Chichester completes the first solo maritime journey around the world.

1969

- SPACE**
 - NEIL ALDEN ARMSTRONG, in an Apollo mission, becomes the first human to walk on the Moon. Edwin “Buzz” Aldrin also explores the lunar surface. Michael Collins, the third member of the expedition, orbits the Moon.

1970

- ATLANTIC OCEAN**
 - Norwegian THOR HEYERDAHL travels from North Africa to South America in the papyrus boat *Ra* to prove that ancients could have made the journey.

1971

- SPACE**
 - The USSR launches the first SPACE STATION, *Salyut 1*.

1973

- SPACE**
 - The United States launches its first SPACE STATION, *Skylab*.
- SPACE**
 - GPS, formally known as the Navstar Global Positioning System, a SATELLITE system, is initiated to aid in navigation.
- SPACE**
 - The U.S. *Pioneer 10* SPACE PROBE passes through the asteroid belt and becomes the first artificial object to escape the solar system.

1975

ASIA

- The European Space Agency is founded, with headquarters in Paris.
- Junko Tabei of Japan becomes the first woman to summit MOUNT EVEREST.

1975–76

SPACE

- U.S. *Viking 2* SPACE PROBE lands on Mars and successfully transmits data.

1977

ARCTIC

- The USSR icebreaker *Arktika* reaches the NORTH POLE.

1981

SPACE

- The United States launches the first SPACE SHUTTLE, the *Columbia*.

ARCTIC/ANTARCTIC

- British explorers Sir Ranulph Fiennes and Charles Burton reach the NORTH POLE, having traveled there from the SOUTH POLE, becoming the first men to circle Earth Pole to Pole.

1983

SPACE

- SALLY KRISTEN RIDE, in a U.S. SPACE SHUTTLE mission, becomes the first American woman in space.

1986

SPACE

- The *Challenger* SPACE SHUTTLE breaks up during liftoff, killing all seven crew members.

SPACE

- The USSR launches the first permanently manned space station, *Mir*; six other modules are added through 1996.

1990

SPACE

- The United States launches the Hubble Space Telescope, a research SATELLITE.

1997

SPACE

- The U.S. SPACE PROBE *Pathfinder* returns images from the surface of Mars and carries out 15 chemical analyses.

SPACE

- The *Global Surveyor*, a U.S. SPACE PROBE in orbit around Mars, photographs and maps the planet.

1998

SPACE

- The first module of the International Space Station is launched.

- SPACE**
- The U.S. SPACE PROBE *Voyager 1* passes *Pioneer 10* to become the most distant human-made object in space.
-
- 1999**
- WORLD**
- Bertrand Piccard, AUGUSTE PICCARD's grandson, and Brian Jones, a British pilot, complete the first nonstop circumnavigation of Earth by BALLOON.
-
- 2000**
- SPACE**
- The first crew, two Russians and one American, arrive on the International Space Station.
-
- 2003**
- SPACE**
- The *Columbia* SPACE SHUTTLE breaks up on reentry, killing all seven crew members.
- SPACE**
- With the planet Mars closer to Earth than it has been in 7,300 years, numerous nations send SPACE PROBE missions to study it.
-
- 2004**
- SPACE**
- The United States, in two SPACE PROBE missions, retrieves data from two Mars exploration rovers: Mars Rover-A, or *Spirit*, and Mars Rover-B, or *Opportunity*. *Opportunity* finds evidence of water having formerly existed on Mars.

Further Reading for the Set



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Spice Route
spice trade
voyageurs

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Arctic Circle
equator
geography and cartography
globe
hypsometer
International Date Line
latitude and longitude
Mercator projection
maps and charts
mappa mundi
Northeast Passage
North Magnetic Pole
North Pole
Northwest Passage
padrão
periplus
planisphere

portolan chart
 prime meridian
 South Magnetic Pole
 South Pole
 tropic of Cancer
 tropic of Capricorn
 Vinland Map

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 Cibola
 Cipangu
 El Dorado
 fool's gold
 Fountain of Youth
 Gonneville's Land
 Great Southern Continent
 legends and exploration
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 Madoc
 Mandeville, Sir John
 Mountains of the Moon
 Ophir
 Prester John
 Quivira
 Saguenay
 St. Brendan's Isle
 Ultima Thule
 Vinland

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(see also individual mountains
 under PLACES)

mountain climbing
 Sherpas

NATURAL PHENOMENA

doldrums
 drift ice
 Gulf Stream
 North Star
 ocean currents
 land bridge
 pack ice
 scurvy
 trade winds

NAVIGATION

alidade
 astrolabe

chronometer
 compass
 cross-staff
 dead reckoning
 drift voyage
 ephemeris
 gnomon
 gyrocompass
 navigation and exploration
 quadrant
 sextant
 traverse board

OCEANOGRAPHY AND EXPLORATION

bathyscaph
 bathysphere
 diving bell
 diving suit
 hydrography
 oceanography and exploration
 submarine
 submersible

ORGANIZATIONS

African Association
 American Fur Company
 American Geographical Society
 British East India Company
 Cathay Company
 Company of Merchants of
 London Discoverers of the
 Northwest Passage
 Dutch East India Company
 Dutch West India Company
 European Space Agency
 French East India Company
 Hakluyt Society
 Hanseatic League
 Hudson's Bay Company
 Levant Company
 Muscovy Company
 National Aeronautics and Space
 Administration
 North West Company
 Rocky Mountain Fur Company
 Royal Geographical Society
 Royal Society
 Russian-American Company
 St. Louis Missouri Fur
 Company
 Virginia Company

PLACES

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 Canary Islands
 Cape of Good Hope
 Congo River
 Kilimanjaro, Mount
 Niger River
 Nile River
 Punt
 Sahara Desert
 Timbuktu
 Zambezi River
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 Arctic, exploration of the
 Greenland
 Asia, exploration of
 Ceylon
 East Indies
 Empty Quarter
 Everest, Mount
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 Gobi Desert
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 Indus River
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 Lhasa
 Siberia
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 Atlantic Ocean, exploration of
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 Australia, exploration of
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 Great Dividing Range
 Great Victoria Desert
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 Central America, exploration of
 Europe, exploration of
 Blanc, Mont
 Indian Ocean, exploration of the
 Red Sea
 Mediterranean Sea
 Gibraltar, Strait of
 North America, exploration of
 Appalachian Mountains
 Colorado River
 Columbia River
 Cumberland Gap

McKinley, Mount
 Mississippi River
 Missouri River
 Rocky Mountains
 South Pass
 Pacific Ocean, exploration of the
 Bering Strait
 Hawaiian Islands
 Marianas Trench
 New Zealand
 Oceania
 South America, exploration of
 Aconcagua
 Amazon River
 Andes Mountains
 Cape Horn
 Magellan, Strait of
 Orinoco River
 Spanish Main

SHIPBUILDING AND EXPLORATION

canoe
 caravel
 carrack
 cog
 coracle
 dhow
 galleon
 galley
 junk
 keelboat
 lateen rig
 longship
 merchant ship
 outrigger
 pinnace
 pirogue
 raft

roundship
 shipbuilding and exploration

SPACE EXPLORATION

(see also ORGANIZATIONS)

Apollo program
 astronauts
 Gemini program
 Mercury program
 rocket
 satellite
 Soyuz program
 space probe
 space shuttle
 space station
 Voskhod program
 Vostok program

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