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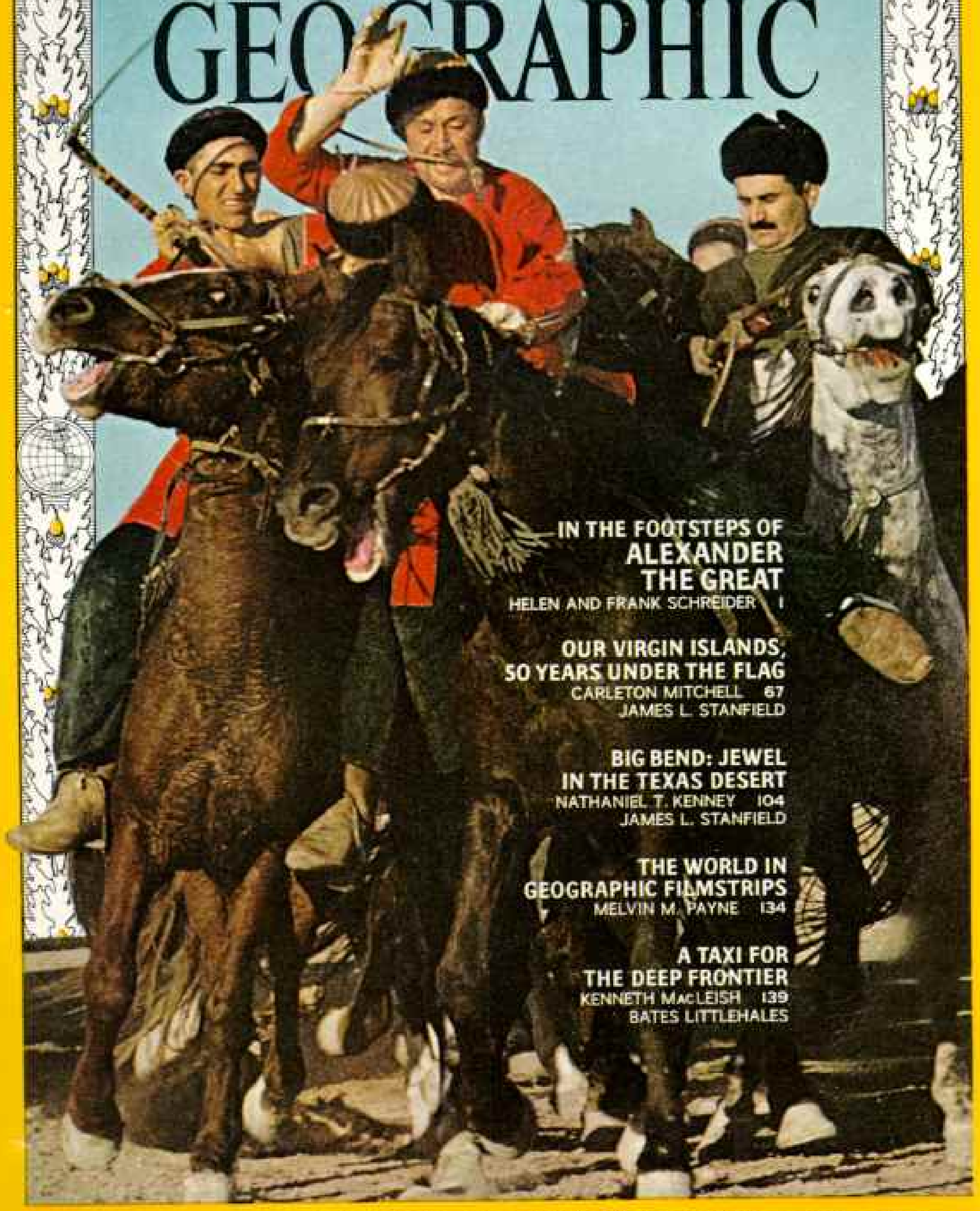

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NATIONAL GEOGRAPHIC

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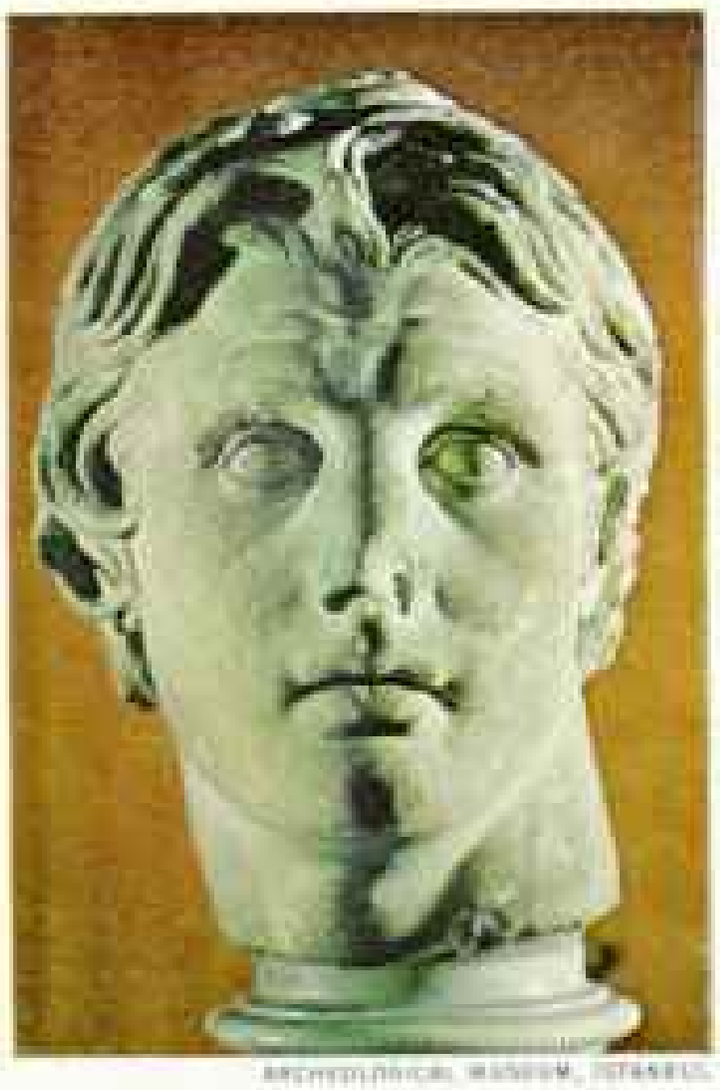
In the Footsteps of Alexander the Great

ASIAN AND AFRICAN LANDS conquered by a long-haired blond young man 2,300 years ago would stretch from Los Angeles to Bermuda. Today we know better ways to win immortality than through conquest. But in that simpler, less civilized time, no wonder they called Alexander "the Great"! When he died at 32, he had extended his sway from Macedonia and Greece to include all or part of present-day Turkey, Lebanon, Israel, Jordan, Egypt, Libya, Cyprus, Syria, Iraq, Iran, Afghanistan, Soviet Central Asia, Pakistan, and India. Marks of his passing endure to this day in remote Asian valleys. To retrace his steps, Helen and Frank Schreider traveled 25,000 miles by Land-Rover, foot, and horse—and marveled as much at his conquest of stubborn geography as at his unbroken string of victories over the kings of his time.—EDITOR

DUSK DROPS swiftly over Delphi in springtime. The sun slants across the Greek valley, highlighting the ruins of the ancient treasuries and the theater, throwing fingers of shadow from the tall columns of the Temple of Apollo.

Helen and I waited until the last tourist had departed, then slipped into the sacred enclosure. Darkness fell, and moonlight filtered through wind-riffled pines. A field mouse explored the remains of a picnic lunch, and an owl, swift as shadow, launched the eternal conflict of night.

We had come to follow Alexander the Great, and in 336 B.C. the stones around us had witnessed a scene which gave a measure of his character. Settling back, we let history, the night, and our imaginations re-



ARCHEOLOGICAL MUSEUM, ISTANBUL

Marble immortalizes the young Alexander, who won his world in 13 turbulent years. The second-century B.C. head may have been based on a contemporary portrait.

create the drama of Alexander's confrontation with the Delphic Oracle so long ago.

The Oracle was famous across the Greek world for accurate predictions. No one of importance would consider starting any vital enterprise without first coming here. The enterprise Alexander planned was nothing less than an invasion of Persia, greatest empire the world had yet seen.

Twenty-year-old Alexander, a new king on a shaky throne vacated by his assassinated father Philip, well knew the psychological advantage that a strongly favorable prediction would give him.

Arriving unannounced, he brushed aside the outraged priests and demanded a prophecy of the seeress. She refused, and he dragged her into the temple. Plutarch

Article and photographs by HELEN and FRANK SCHREIDER

National Geographic Foreign Staff

Across a vast and desolate emptiness where Alexander trod, sunset's parting glory signals the approach of night. Along a desert trade route in northern Iran—already old when Alexander passed this way in 330 B.C.—authors Helen and Frank Schreider speed toward Meshed on one lap of a 25,000-mile adventure. Although they had been the first ever to traverse the full length of the Americas—by amphibious jeep—and have slogged over some of the world's worst terrain, from Indonesia to the Great Rift Valley, the Schreiders found this their most difficult and exhausting assignment. Here a dust cloud and blazing lights mark their Land-Rover, a self-contained home

on wheels. Behind them, other vehicles kick up plumes of dust. Months earlier, with old histories and classical maps as guides, the couple set out from Greece on the trail of the indomitable Macedonian king, who, with unceasing war, conquered the sprawling Persian Empire, greatest power of its day. Alexander led an entourage that sometimes swelled to 120,000. He brought Greek engineers to build battle equipment, architects to lay out new cities, geographers and surveyors to map captured domains, and archivists to keep daily records. Amid the host trudged camp followers: traders, opportunists, and women and children of his men—all pinning their hopes on a rising star.

writes: "As if conquered by his violence, she said, 'My son, thou art invincible.' "

"That is all the answer I desire," Alexander replied. And in the next 13 years he made that inadvertent prophecy come true.

Hero's Trail Links Three Continents

What kind of man was this Alexander, who so boldly defied the sacred conventions of his time?

Blond, big-eyed, boyishly beardless, he was small by our standards. Yet he cast a giant's shadow. A hero-worshiper, he was himself a hero on a grander scale than even Homer conceived. Eager for glory, he won it superbly and often embellished it with compassion.

He combined in his incandescent spirit unequaled leadership, courage to confound every adversary, and an occasional brutality to puzzle historians from his time to ours.

The single decade that brought Alexander from youth to death took him beyond the known boundaries of civilization. Though his epic empire broke up in less time than it had taken him to win it, in death he achieved the ultimate ambition of his hectic life: He joined the demigods in the realm of legend.

Here was our quarry, a figure both of his-

Folk dancing awakens a memory of Alexander, whose name lives in the legends of every land he crossed. Framed by wild flowers, the Dora Stratou troupe of Athens sways to the stately rhythms of a Macedonian song. Women of Macedonia, myth says, rushed into a wavering battle to help their men; as a reward for valor, Alexander allowed them to adopt this helmet-shaped headdress.

tory and of legend: a young man who assumed the role of a deity and acted it brilliantly, venturing farther and winning more than any conqueror before him.

We would follow the course of his conquests across that part of the world he made his own, from the mountains of Macedonia to the deserts of Egypt, from the snowy Hindu Kush and the steppes of Soviet Central Asia to the wastes of Baluchistan. His vanished track would lead us through 12 countries (maps, pages 10-12).

In 334 B.C., Alexander, King of Macedonia and master of Greece, turned eastward to challenge Persia, a vast empire stretching north into what is now the U.S.S.R., south into Egypt, and east to India.

A century and a half earlier, Persia had attacked Greece and Macedonia and burned Athens. Though the Greeks drove the Persians back across the Dardanelles, Greek orators still preached vengeance, and Greek-educated Philip planned a war of conquest against Persia. When Philip was assassinated —possibly with Persian connivance—Alexander made his father's dream his own.

Unique Education Created a Conqueror

Conditioned for conquest by his father, schooled in logic by the great Aristotle himself, inclined toward recklessness by his violent and passionate mother Olympias, he was prepared, as perhaps no man has ever been, to dominate his world.

With his army of 35,000, one of history's most aggressive fighting forces, he conquered Asia Minor, circled the eastern Mediterranean, seized its maritime provinces, and thus neutralized the Persian fleet. In a series of brilliant battles he destroyed the power of Darius III, the Persian king, and took his lands and titles for himself.

He might have stopped then, rich in glory and plunder. But his thirst for fame and his questing spirit drove him on. For seven more years he fought his way from mountain to mountain, from city to city, from the steppes of Russia to the valley of the Indus, as his troops turned sullen and mutinous. In time he brought them back to Babylon, which saw his death and the breakup of his subjugated but unreconstructed empire.

He had conquered all and unified nothing, but the tumult of his passage had stirred together separate segments of civilization. He had mapped unknown territory, built cities, opened trade routes, and stimulated the exchange of ideas between East and West. From the Mediterranean to the Hindu Kush, Greek became the lingua franca of the educated.

But Alexander's true greatness lay in an idea. He envisioned an empire, wrote the

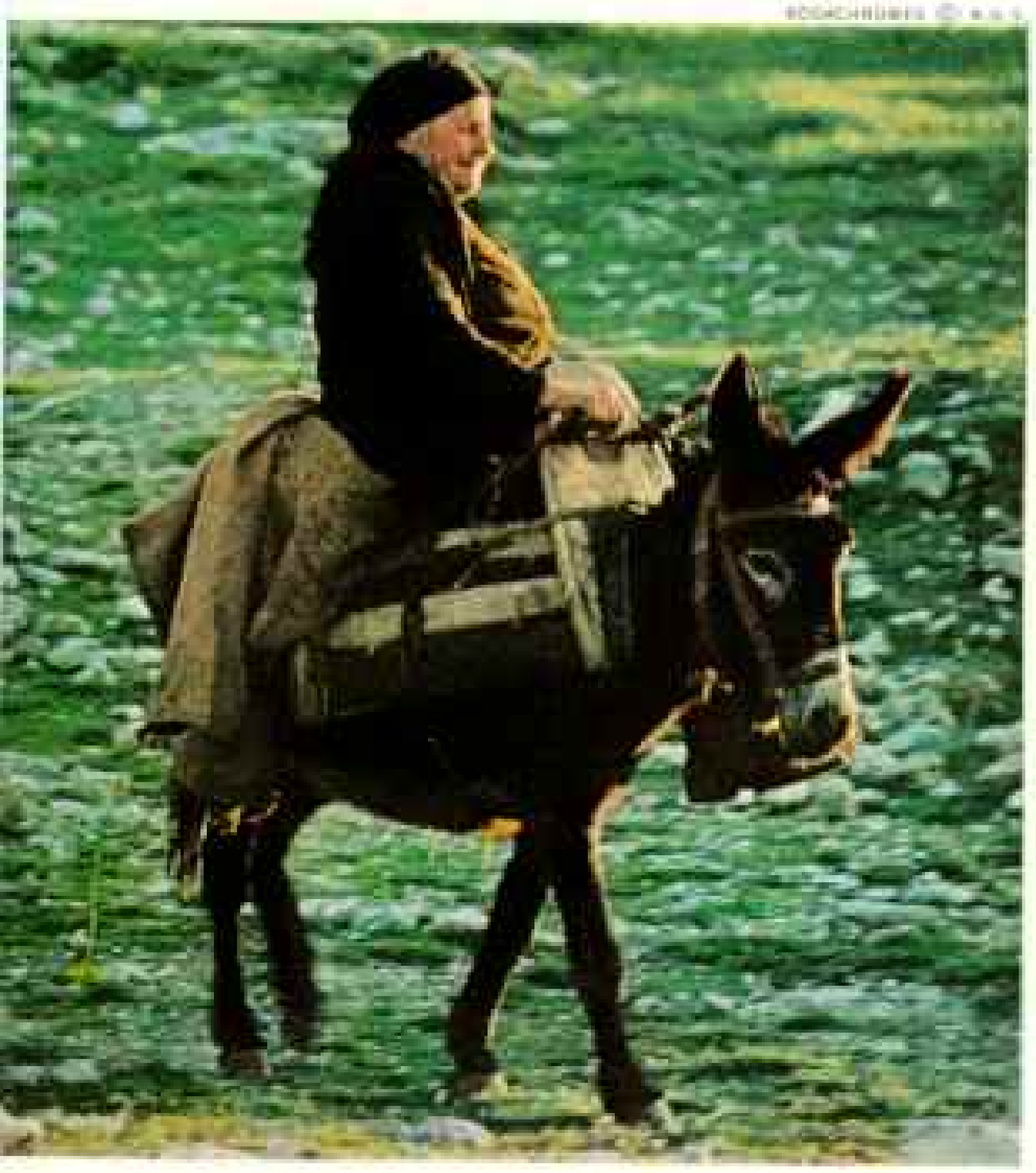
Greek historian Arrian, where victors and vanquished might live together in fellowship and harmony.

Just 23 centuries after Alexander rode east, Helen and I took up his trail at Delphi in a bright blue Land-Rover named Bucephalus after his favorite horse. We headed for Pella, where Alexander spent much of his youth.

Nea (New) Pella crowns the slope where the ancient city stood. In fields of wheat, cotton, and tobacco, excavations have revealed columned palaces, stone floors, and brilliant mosaics (pages 8-9). Created with the wealth Alexander won, they reflect the life he lived. In one, Alexander in cape and field cap fights a lion. In others, a charioteer quells wild-eyed horses, and hunters attack a stag. Mr. Photios

Haunting silence invests with mystery the ruins of ancient Delphi, where a priestess once spoke as Oracle to the whole Greek world. Wanting to know the fate of his planned invasion of Persia, Alexander came to the Greek city, but on a forbidden day. When the seeress refused to speak, he dragged her into the Temple of Apollo, right. Overwhelmed by his determination, she proclaimed, "My son, thou art invincible." Alexander took the hasty statement as a prediction, and launched his long trek into history.

Woman of Delphi wends her way home at sundown across the rocky soil she tills.



Petsas, Supervisor of Antiquities, showed us around the site.

"These may be the palaces of Alexander's generals, built soon after his death," he said. "We expect to find Philip's palace on the west side of the present village."

At the school, we watched children carrying bright balloons as they ran a relay race; many were blond and fair-skinned, as Alexander was. Nearby a boy galloped his horse through the green spring wheat. He rode bareback, as Alexander did, and the horse had a white blaze on his forehead, as did Bucephalus.

We thought of that day when Alexander, barely in his teens, tamed the fiery stallion. The horse had been offered for sale to Philip, but when trainer after trainer failed to mount the wild, nervous creature, Philip despaired of him.

"I can manage this horse," said Alexander. He turned Bucephalus toward the sun. The horse, no longer aware of his own frightening shadow, calmed immediately. The prince mounted and mastered him.

With tears in his eyes, Philip cried out: "O my son, look thee out a kingdom worthy of thyself, for Macedonia is too little."

Philip did all he could to prepare his son to follow that admonition. Superbly trained, the boy excelled in everything he did. And

Pebble portrait of Alexander appears in a mosaic showing him as a youth hunting lions in Asia. It graced a building in Pella, ancient capital of Macedonia.

he dreamed of glory. Whenever he heard of another of Philip's victories, he lamented, "Will my father leave me nothing to do?"

When Philip was stabbed to death in 336 B.C., the young prince ascended the throne and quickly put down anti-Macedonian revolts that had flared in lands as far north as the Danube and to the south in Grecian Thebes. Then he set out to fulfill his father's dream of invading Persia.

Alexander left Pella on a bright spring day in 334 B.C., leading his 30,000 foot soldiers and 5,000 cavalry across fields ablaze with yellow mustard and blood-red poppies. Supplies followed, and with them botanists, geographers, and professional "steppers" to measure distances, for Alexander went forth not only to conquer but to study, survey, and understand the new world he was entering. He reached the Axios River and plunged across

Grand design of a bygone suburb comes to light as archeologists dig near Pella; most of the old capital lies under the modern village beyond. Streets laid out on a grid, an elaborate clay-pipe water system, plastered walls, and mosaic floors bespeak a high level of refinement, though early Greeks regarded Macedonians as crude and uncouth.

At Pella, young Alexander, "eager and vehement," as Plutarch wrote, learned religion from his mother and warfare from his father, King Philip. From his tutor, the great philosopher Aristotle, he absorbed politics, morals, medicine, and how "to live well." Greek culture and language dominated the court; Alexander spread them throughout the new world he conquered.

Muscles rippling after more than twenty centuries, hunters and a dog bring down a stag in a Pella floor mosaic, fashioned of naturally colored pebbles and signed "Gnosis made it."

ALEXANDER THE GREAT

HIS EMPIRE — HIS MARCH

Intermittent lakes · Dry salt lakes · Swamps

Town sites · Major battles · Elevations in feet

Ancient names of cities occupied by Alexander shown in red.
Modern roads in brown.

STATUTE MILES

Alexander mounts a war of vengeance against the Persian Empire, 334 B.C.

Siege of Tyre, 332 B.C.

Adriatic Sea

Ionian Sea

Mediterranean Sea

Black Sea

Red Sea

YUGOSLAVIA · RUMANIA · U.S.S.R. · ALBANIA · BULGARIA · ITALY · GREECE · TURKEY · LIBYA · UNITED ARAB REPUBLIC (EGYPT) · LEBANON · ISRAEL · JORDAN · CYPRUS

BELGRADE · SARAJEVO · BRASOV · BRAILA · SULINA · CRIMEA · SIMFEROPOL · SEVASTOPOL · YALTA · ODESSA · SUCHAREST · CONSTANTA · SOFIYA · VARNA · TIRANE · SKOPJE · PLOVDIV · BARI · TARANTO · MESSINA · REGGIO · MARCH BEGINS · ISTANBUL · Amphipolis · Dardanelles (Hellespont) · BIGA · R. GRANICUS · ANKARA · ANATOLIAN PLATEAU · CORINTH · ATHENS · SPARTA · IZMIR · SARDIS · AFYON · GORDIUM · CILICIAN GATES · ADANA · BODRUM · HALICARNASSUS · TURKEY · GREECE · RHODES · CRETE · NICOSIA · BERNA · BENGHAZI · TOBRUK · MATRUH · ALEXANDRIA · EL ALAMEIN · NILE DELTA · CAIRO · MEMPHIS · SIWA · AMMON · Damanhur · WESTERN DESERT · SINAI · Suez Canal · BEIRUT · SIDON · TYRE · DAMASCUS · JERUSALEM · GAZA · AMMAN · Dead Sea · PETRA · ASSUT · THEBES · LUXOR · ASWAN · HIGH DAM · Lake Nasser

During his ten-year campaign against Persia, Alexander made plans as he moved. He invaded Asia Minor—modern Turkey—and freed its Greek cities from Persian rule. Circling the eastern Mediterranean to Egypt, he occupied bases of the Persian fleet. Everywhere he sought the fidelity of local peoples by worshiping at their shrines, giving power to their leaders, and treating with honor any who surrendered peacefully. He shattered Persia's greatest army at Gaugamela and occupied the royal cities of Babylon, Susa, and Persepolis. Onward he pressed to India. But at the Beas River, his own war-weary troops refused to go on, and he turned back. In Babylon, death from a fever overtook Alexander—not yet 33 years old.

Alexander dies in Babylon, 323 B.C.

Persia's greatest army falls at Gaugamela, 331 B.C.

Battle of the Jhelum, 326 B.C.

Alexander's fleet sails for home, 325 B.C.

DRAWN BY JOHN W. LOTHERS AND LEE J. KRAMER
COMPILED BY DOROTHY A. NICHOLSON
GEOGRAPHIC ART DIVISION
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it with the exuberance of youth and the confidence of a god. He never returned.

We, too, crossed the Axios—a one-lane bridge spans it now—and followed Alexander's route to Thessaloniki, where St. Paul once preached (map, page 10). The court of the eighth-century Church of Saint Sophia glowed in the early darkness with the candles of Easter Mass. Like a living icon, the bearded, bejeweled bishop intoned prayers, and incense clouded the air. We mingled with the crowd. An old woman offered Helen a red-dyed hard-boiled egg, showing her how to cradle it in a tripod of three fingers.

"Now we will knock our eggs together and make a wish," she said. "It is an old custom." Helen's egg remained whole; the other cracked. Hospitably pleased, the woman exclaimed, "There! Your wish will come true."

Mission to Troy for a Sacred Shield

Alexander covered the 300 miles from Pella to the Dardanelles in 20 days and bivouacked at Sestos on the western shore. From a ridge above Sestos we looked across into Asian Turkey. Below us olive groves shelved steeply down to these straits, known to Alexander as the Hellespont. A tanker flying the hammer and sickle churned north under the momentary scrutiny of a Turkish jet fighter.

Beyond these straits, when Alexander stared eastward from Sestos, lay the Persian Empire. Its far-flung lands were guarded by well-financed, well-disciplined fighting forces, strengthened by Greek mercenaries comparable to his own soldiers. As Alexander's troops boarded the galleys that would carry them to the eastern shore, the Persians were hastily assembling an army at the Granicus River, two days' march inland.

Alexander left the ferrying of his troops to his general, Parmenion. Taking the helm of a galley himself, he steered south to Troy.

Alexander's most treasured possession was a copy of Homer's *Iliad*, given him by Aristotle. Its theme was the Trojan War, Greece's

Eastward to empire: The Hellespont behind him, 22-year-old Alexander splashes ashore onto Asian soil. In a prelude to conquest, he makes a pilgrimage to Troy to pay homage at the tomb of Achilles, Greek hero of the Trojan War. Exchanging some of his armor for a sacred shield from the Temple of Athena, he carried it throughout his campaigns. He used as a guide the *Iliad*, Homer's tale of the feats of Achilles. PAINTING © N.G.S.

first recorded invasion of Asia, nearly a thousand years earlier, and the exploits of Alexander's hero, Achilles. Alexander deemed the *Iliad* the "perfect portable treasure of all military virtue and knowledge," and slept with it beside his dagger under his pillow.

For Alexander, then, the journey to Troy became a plea for favor from the demigod of his dreams and a way to obtain a potent symbol of good luck. Sacred armor from the Trojan War, legend tells us, lay in Troy's Temple of Athena. Exchanging pieces of his own armor for the shield that eight years later was to save his life near the Indus, Alexander marched north to face the Persians.

Today's Trickle Was Yesterday's Torrent

The River Granicus, today the Kocabaş, waters a region of rich, rolling farmland. In lowland fields baggy-trousered women stoop to plant seedling rice. On the hills, green spring wheat gleams like wind-rippled silk, and fat cattle graze in lush pasture.

Alexander found the Persian army spread along the Granicus near the present town of Biga. From a hilltop we looked down at the river. Drained by diversion for irrigation, the Granicus was only a brown trickle.

Not so in Alexander's time; then, a torrent surged down the riverbed. Parmenion, the aging general whose wisdom Philip had trusted implicitly, urged caution.

"I should disgrace the Hellespont should I fear the Granicus," Alexander declared.

Shouting for his men to follow, he spurred his horse into the river. Persian arrows and spears pelted them, but the speed and fury of the assault carried the Macedonians across the river. The Persians broke in disorder.

Alexander ordered the Macedonian dead buried with honors, and their families exempted from taxes and military conscription. He chatted with the wounded, encouraging each to brag of his deeds, further strengthening the growing loyalty of his men.

Victory at the Granicus gave Alexander a firm foothold in Asia. The main body of the Persian army, still more than 1,000 miles to the east, posed no immediate threat. But the Persian fleet, numerically superior to the Greek navy, controlled the seas. Alexander determined to break Persian sea power by overrunning its maritime provinces. He turned south toward the Turkish coast.

Centuries earlier, Greek immigrants had established in this area cities as grand as any in Greece. But the Persians had conquered them. When Alexander arrived, he found many cities ripe for revolt.

At Ephesus the people stoned the Persian officials and welcomed the Macedonians. Alexander spread word that he came as a liberator, not as a conqueror. City after city opened its gates to him. He restored democratic government and remitted taxes. When asked why he did not reap more tribute from so rich an empire, Alexander replied, "I hate the gardener who cuts to the root the vegetables of which he ought to cull the leaves."

With hardly a skirmish, he marched swiftly toward Miletus and Halicarnassus, where large Persian garrisons held out. The Macedonians stormed the towns. Within seven months Alexander controlled the coast.

A road now follows the rugged shore where Alexander marched. It passes through İzmir, where the fragrance of roasting lamb pervades vine-garlanded streets and the swoosh of NATO jets counterpoints the gentle clip-clop of horse-drawn carriages at sunset. South of İzmir the road winds past rock coves where fishing villages drowse in the sun and sponge divers spread their pungent harvest to dry.

Turkish Performers Keep Past Alive

All through southern Turkey the past forms a backdrop for the present. We camped beneath cliffs honeycombed with tombs, in pine forests beside streams flowing past ancient walls. We slept in the shadow of cities Alexander knew (next page).

At Ephesus we sat on a fallen Corinthian column and watched Turkish wrestlers, slick with olive oil, heave and grunt in the old marketplace (pages 18-19). Near an ancient Greek theater at Kaş we listened to a *saz* player twang old melodies on his two-stringed instrument. At Aspendus Turkish actors in a Roman theater performed Sophocles' masterpiece, *Oedipus Rex*.

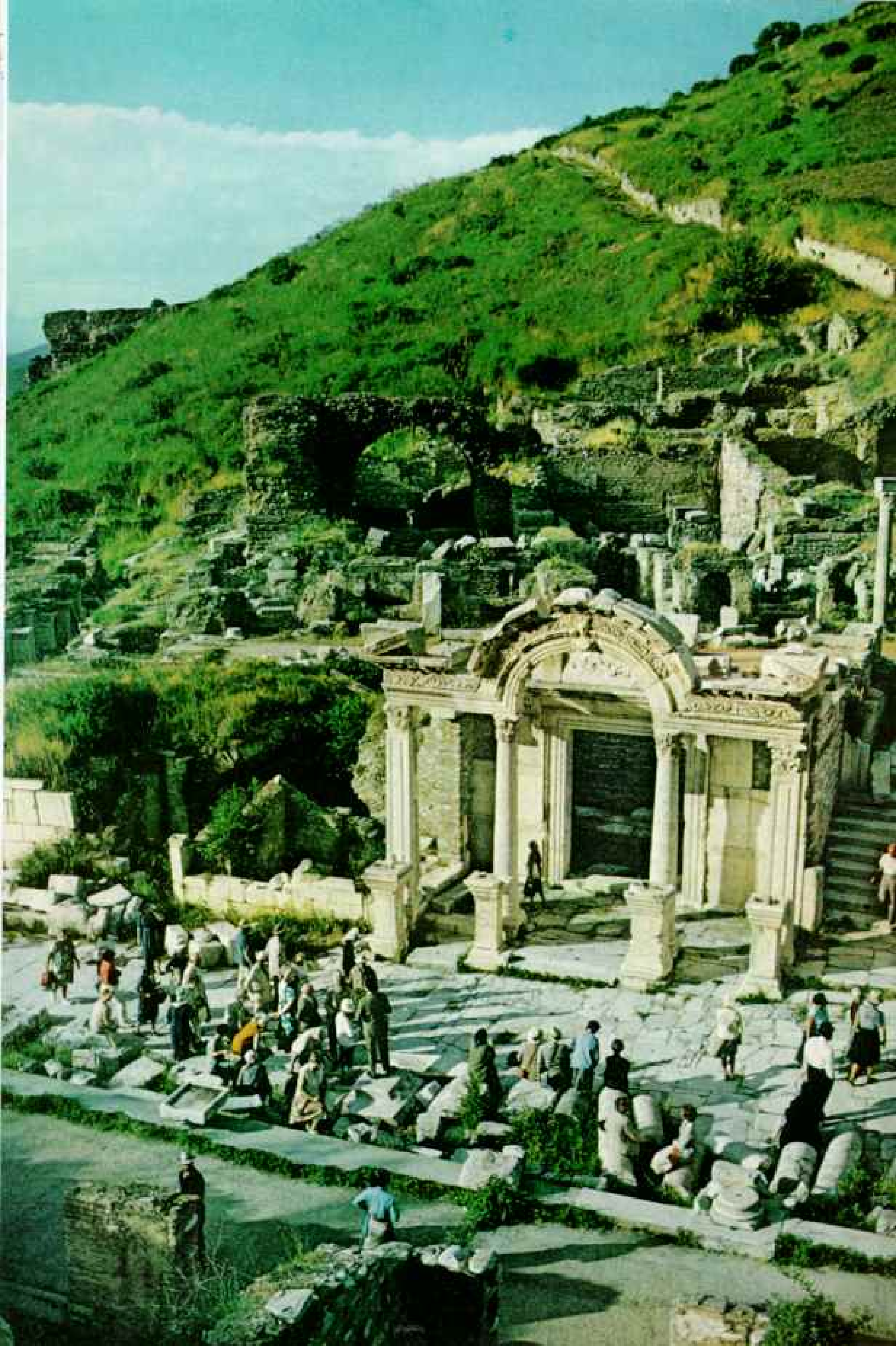
Near Phaselis, where Alexander rested his troops, a boy hitched a ride with us. "I am studying English," he offered hesitantly.

"Perhaps you can help us," I said. "Is there a market nearby where we can buy food?"

"You can get some at my village."

Soon he signaled me to a stop, and I followed him along a path between stone-walled compounds. We entered a courtyard where a girl milked a cow under an apricot tree and a woman stooped over a round earthen oven.

"My home," the boy said.



"But I thought we were going to a market."

"Please. Wait." He vanished into the wooden house. Soon he was back with eggs, tomatoes, peppers, and green onions. His mother brought a hot disk of whole-wheat bread and a bowl of yogurt. I reached for my wallet.

"No," the boy said, "you are my guest."

My young friend helped me carry the food back to the Land-Rover. We found it surrounded by villagers. A rugged mustachioed soldier opened a path for us through the crowd. As we drove off, he handed Helen a rose.

Sword Solves a Puzzle at Gordium

Spring found Alexander marching to Gordium. We climbed from the coast and followed his route across the high Anatolian plateau, where today thousands of acres of poppies make Turkey one of the leading producers of medicinal opium.

Women moved among the shoulder-high plants, harvesting the drug (below). They slit the waxy green pods and scraped the dried juice from older slits into wooden trays. One of the women broke open a pod filled with tiny white seeds and offered it to Helen.

"No, thank you," Helen said, stepping back.

Amused, the woman opened her kerchief-wrapped lunch and pulled out a loaf of bread. It was sprinkled with black.

"*Aynı*—the same," she laughed. When dried, the white specks become the black poppy seeds of the baker.

At Gordium a few mounds and crumbled walls mark the site where fabled King Midas once held court. Here—so goes the old story—Alexander "solved" the puzzle of the famous Gordian knot by severing it with one stroke of his sword. Since legend held that whoever undid the knot would be lord of Asia, Alexander had yet another omen in his favor.

From Ancyra—today's Ankara, capital of Turkey—the young conqueror's route led us southeast across Cappadocia's bizarre cone-studded terrain (pages 20-21) to a pass in the Taurus Mountains called the Cilician Gates. So narrow was this defile in his day that two loaded camels could not travel it abreast.

Properly defended, the pass could have kept Alexander from reaching the coastal plains along the northeast corner of the Mediterranean. But he stormed it in a night attack and marched on south and east to Issus and his first encounter with Darius

Sumptuous prize on the path of conquest, the Greek city of Ephesus in Asia Minor endured Persian rule off and on for two centuries. In 334 B.C., Alexander liberated the port and restored democratic government. Centuries later, Romans built this temple for their Emperor Hadrian, and Christians raised churches where Paul had preached.

Gentle hands harvest a potent drug from poppies near Afyon, on one of Turkey's government-supervised opium farms. From pods slashed the day before, young women scrape dried juice into wooden trays; worker at right wears the finery of her recent wedding day. Alexander must have known of opium, for Homer spoke of a narcotic that had the power of "banishing all painful memories."

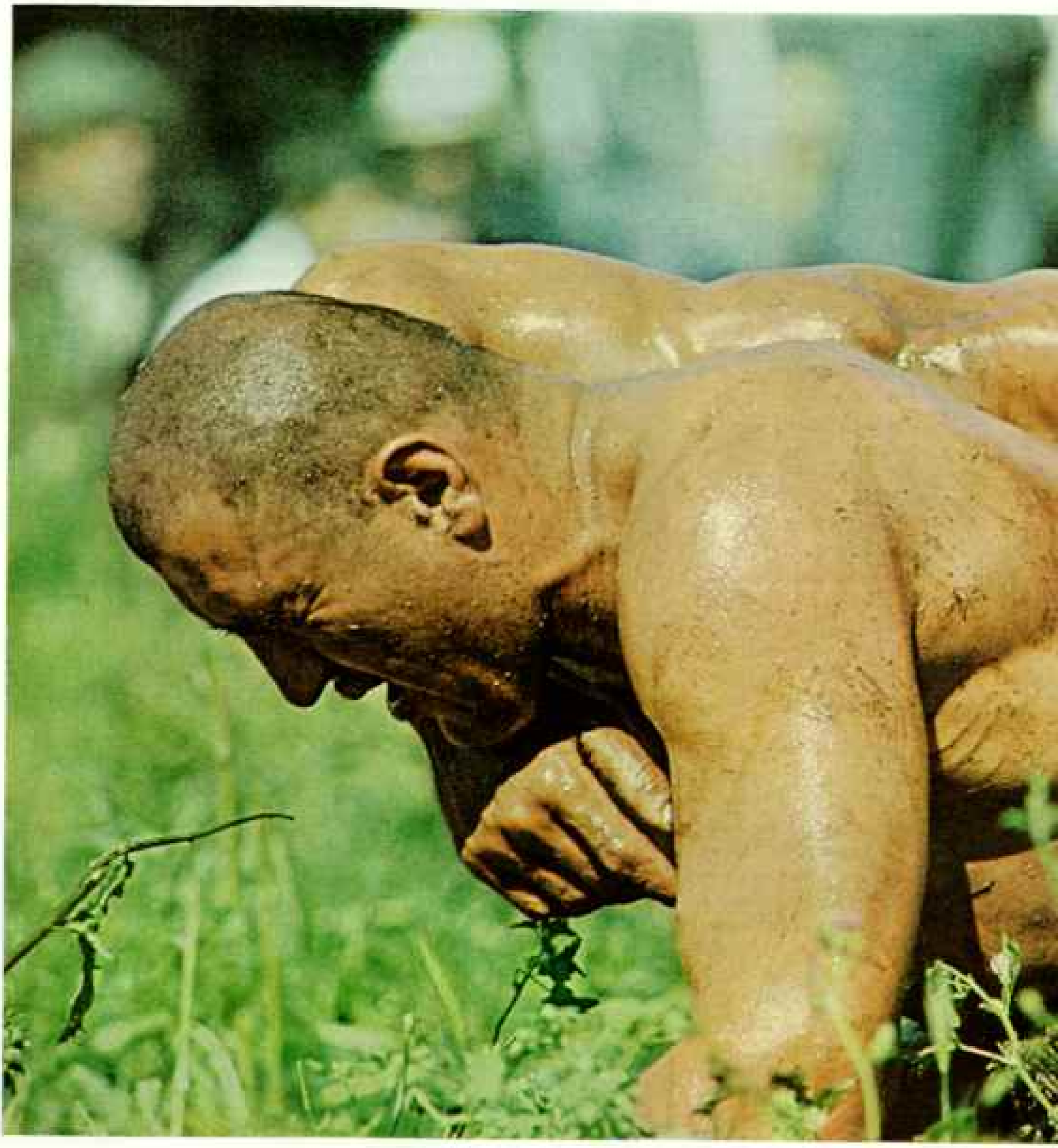
Today, buses and trucks shatter the silence with their horns as they try to pass three abreast on the new two-lane road that threads the Cilician Gates. The cab of one bore the prudent phrase, "*Inşallah*—God Willing."

In a United States Air Force helicopter from nearby İncirlik Air Base, Helen and I hovered over the battlefield of Issus, where Alexander confronted Darius in the fall of 333 B.C. (pages 22-3). There, on a narrow plain beside the sea, the smaller Greek force outmaneuvered the larger Persian army.

Bristling with spears, the Macedonian infantry drove forward. Alexander and the elite cavalry called the Companions charged at the Persian horsemen. The enemy front collapsed, and Alexander raced toward Darius himself. The Persian king turned and fled. Only darkness saved him from capture.

That night, as Alexander dined in the opulence of Darius's tent, he remarked, "This, it seems, is royalty." But of the spoils he had taken, he kept for himself only a jeweled casket in which to carry his treasured *Iliad*.

Alexander continued south between mountains and Mediterranean to Tyre in Lebanon.



a key naval base and the commercial center of the Middle East. He found Tyre a proud, high-walled city on an island. He left it in humble ruins on a peninsula.

Half-mile Causeway Topples Proud Tyre

When the Tyrians refused him entry, Alexander ordered a 200-foot-wide mole built to the island half a mile from shore.

For seven months the Macedonians labored on the causeway, under a rain of stones and arrows. At last Alexander's catapults rolled within range of the east wall. Shipborne battering rams breached the south wall (pages 26-7). Tyre fell, and the Persian fleet, left without a port, became his own.

Drifting sand has widened Alexander's mole, and an asphalt road leads across it to the harbor where Tyrian galleys once anchored. Small boats puff black diesel fumes into the still air. Fishermen mend blue nylon nets on the quay or sip coffee and smoke water pipes, while they listen to Radio Cairo.

While Alexander was still at Tyre, he received a message from Darius, suing for peace. Darius offered Alexander his daughter in marriage, 10,000 talents (a weight of gold worth 300 million dollars today), and all the territory west of the Euphrates, one-third of his empire. Alexander consulted his staff.

"Were I Alexander," Parmenion advised, "I would accept."

"So would I, were I Parmenion," Alexander replied. The young king was now determined to take all Darius's empire. Refusing to negotiate, he continued down the coast to Egypt, where he found the Egyptians ready to accept him and crown him Pharaoh.

For us no such direct route was possible. Travelers are not permitted to move from Lebanon to Egypt through Israel. We stored the Land-Rover and flew to Cairo.

There Fauzy Abd El Hamid, a jovial Egyptian journalist, joined us for the duration of our stay in his country. We rented a car and took the delta road to Alexandria. The Nile Delta, the richest land in Egypt, spread on both sides, green with wheat, millet, cabbages, alfalfa, and cotton. Then, across a salt lake, we saw the tall buildings of the greatest and most enduring of the many cities Alexander founded.

For more than a thousand years, through Greek, Roman, Christian, and Moslem occupation, Alexandria's universities, libraries, and museums drew scholars from every country in the East. Until 15 years ago, Alexandria served as Egypt's summer capital, one of the gayest spots on the Mediterranean.

Though the city is still a favorite resort for Egyptians, its old international flavor is no more. As one Alexandria businessman told us:

Strength against strength, wrestlers strain for an advantage at a village festival amid the ruins of Ephesus. Olive oil smears their bodies. Though Alexander cared little for wrestling, he often held races and dramatic entertainments for his troops.

Nature on a spree chiseled towering cones from volcanic debris in Turkey's Göreme Valley, part of ancient Cappadocia. Man carved out the interiors, making comfortable homes, some of them six stories high, fitted with stone divans, chairs, and stoves. Refuges for early

"Now Cairo is the hub of Egypt. Alexandria is like an empty stage. All the actors are gone—the aristocracy, the landowners, the foreign elements—everyone that gave the city life."

Arrian relates that "an overmastering desire came upon Alexander," while he was laying out Alexandria, to pay a visit to Ammon, the famous Oracle at Siwa Oasis, some 300 miles southwest. With considerable difficulty, we located an intrepid taxi driver willing to tackle the trip across the desert. Meter clicking, the Mercedes taxi started for Siwa.

Alexander took weeks to reach the oasis. We made better time on an asphalt road between the yellow desert and the blue-green sea. At El Alamein a few rusty half-tracks, tanks, and guns recall the crucial World War II battle between Rommel and Montgomery. Three monuments honor the thousands of British, German, and Italian dead.

Siwa Maidens Display Trousseaus

Soon we turned south away from the coast, following a line of telephone poles across the flat, hard gravel desert. Our driver's sigh of relief was audible, even over the motor, when the date palms, ponds, and green fields of Siwa blossomed from behind a butte.

Christians, the cones now harbor farmers of the Moslem faith, as the minaret of a mosque attests.

Saints and sages, painted by 11th-century Christians, adorn a Cappadocian rock chapel. On the arch, a resplendent Solomon preaches from a scroll.

We found Siwa overflowing with Egyptian engineers and social workers bent on instilling national consciousness in the long-isolated desert people. Plants for packaging dates and pressing olive oil were being built; a clinic was in operation. Teachers had even persuaded a few fathers to send their daughters to school.

Blue-shrouded matrons fled from our cameras into mud-walled alleys. But the maidens were more cooperative. Most of them were under twelve; girls marry young at Siwa (page 28). They were happy to show us the jewelry and trousseaus they had been collecting for their weddings since they were five or six. Each girl wore a silver charm on a chain around her neck as a symbol of virginity.

We found one group of little girls sitting in the shade of a date palm. They were singing, and we asked Fauzy to translate.

He grinned. "It's a calypso, Siwa style. Few taxis ever come here. The girls think it's great." They were singing:

We won't marry the boy with a camel.
Nor even the one with two donkeys.
We're going to marry the boy who comes
To take us away in a Mercedes.

When Alexander arrived at Siwa, he was greeted by the chief priest of Ammon, an

Egyptian deity whom the Greeks equated with Zeus. The priest addressed Alexander as the "Son of Ammon" and led him to the Oracle. The king received, according to Arrian, "the answer his soul desired." Though he never disclosed that answer, word spread that he had been told he would rule all lands.*

Alexander returned to Tyre, rested his troops, and then marched swiftly northeast to where Darius awaited him with a reinforced army. We, too, left Egypt and, once again in our Land-Rover, took up his trail.

The Macedonian moved across the rich, rolling wheatland that today makes Syria one of the few Arab countries capable of feeding themselves. It was a fertile land then, too. But Alexander found it burned black by the Persians in an unsuccessful effort to delay his troops.

The Iraqi Army was more successful in delaying us. Barely inside Iraq, near Mosul, we were stopped by a roadblock. Soldiers swarmed around us, guns ready, and began to search the Land-Rover. Suddenly everyone snapped to attention as an officer drove up.

"My men have orders to search every car for arms," he explained. "This is Kurdish country, restricted territory. Mind you, there's no problem any more. We've promised the Kurds new schools, better representation in government. Still, we have to be careful."

He escorted us to Mosul, where we were given a pass and—to assure that we would have no trouble with the "pacified" Kurds—an armed escort to Faysh Khabur, where Alexander crossed the Tigris to face Darius (map, page 11).

Simple Trick Foils a Fearsome Weapon

Darius's hope of stopping the seemingly irresistible Macedonian infantry lay in his scythed chariots. To give them every chance, he had leveled the plain near Gaugamela, east of Mosul. But when they attacked, curved blades flashing on their wheels, Alexander ordered his ranks to part. The chariots, unable to turn quickly, raced through, and the Macedonians dragged horses and drivers to the ground.

Quickly forming the Companions into a wedge, Alexander charged directly at Darius. The Persian king, abandoning his chariot and weapons, escaped on horseback.

Elsewhere, the battle was going badly for the Macedonians. Outflanking some units, overrunning others, the Persians seemed to be winning the day—until they learned that Darius had deserted them. As at Issus, Persian resistance collapsed.

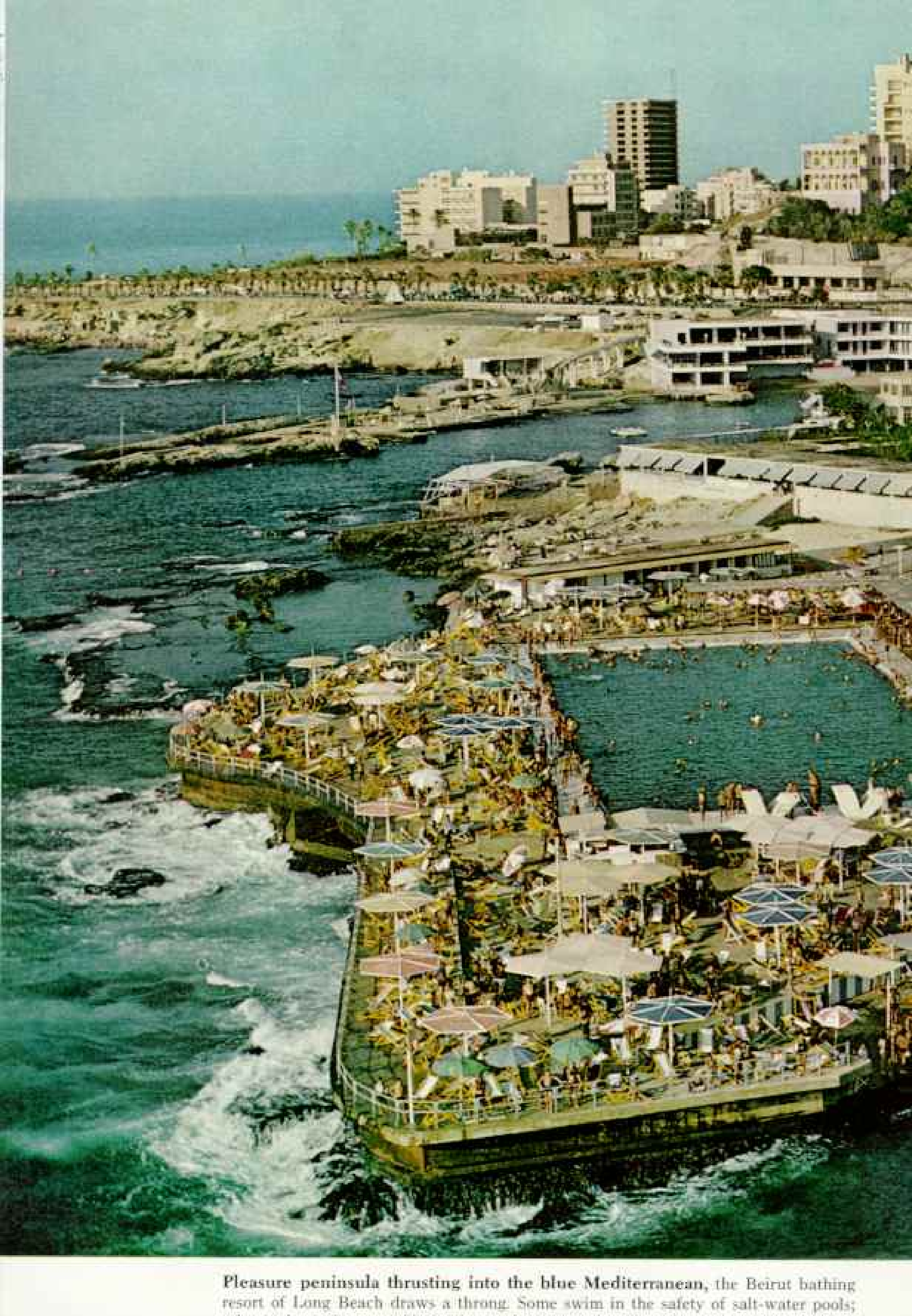
(Continued on page 27)

*See "Fresh Treasures from Egypt's Ancient Sands," by Jefferson Caffery, NATIONAL GEOGRAPHIC, November, 1955.

Braving enemy javelins, Alexander, left, gallops toward Darius III on the Plain of Issus in his first encounter with the Persian king. Darius panics and flees in his chariot, abandoning family, harem, and treasures. His troops follow, retreating east to Gaugamela, where Darius prepared for a final battle with the Westerners. The rout at Issus in 333 B.C. so impressed a later Roman that he decorated his Pompeii home with this mosaic.

Strategic route, now followed by a Turkish highway and railway, led to the battle on the distant Plain of Issus beside the sea. Darius's forces poured south through this gap to cut off Alexander from the rear; defeated, the Persians fled by the same opening. United States Air Force F-100's, patrolling out of Incirlik Air Base, fly over a hilltop fortress where 12th-century Armenians guarded the gateway to the plain.

MUSEO NAZIONALE, NAPLES, EKTACHROME COURTESY AMERICAN HERITAGE; KODACHROME BY HELEN AND FRANK SCHREIDER © N.G.S.



Pleasure peninsula thrusting into the blue Mediterranean, the Beirut bathing resort of Long Beach draws a throng. Some swim in the safety of salt-water pools; others take to the sea. A Phoenician trade center when Alexander marched by, wealthy Beirut is today capital of Lebanon, a republic where tradition requires the President

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to be a Christian, the Prime Minister to be a Moslem. Similarly, Alexander divided rule in his conquered cities, following Aristotle's precept that a king must hold an even balance between parties. Often leaving a Persian as satrap, or governor, the conqueror appointed Greeks and Macedonians to administer finances and military affairs.

Storming defiant Tyre, Macedonian warriors charge through a breach in the island-city's high walls in July, *332* B.C. Seven months earlier, Tyre looked impregnable. To reach it from the Phoenician shore, half a mile away, Alexander constructed a broad mole guarded by towers, left background. But as the causeway neared the island, Tyrians bombarded the workers with stones and arrows, forcing Alexander to adopt a new plan. On ships collected from other Phoenician cities, his engineers mounted siege machines—catapults and iron-headed battering rams. The ships pounded the wall until a weak spot collapsed. Here, shielded from a rain of burning arrows by a hide tent, the Macedonians reach shore and drop a long gangplank to carry them over the rubble. After desperate hand-to-hand combat, Tyre fell and Alexander closed this main base of the Persian fleet, winning control of the eastern Mediterranean after the longest battle of his life. The Macedonians massacred 8,000 Tyrians and sold 30,000 into slavery.

Alexander's mole, widened by sand drifts of two millenniums, makes Tyre part of today's mainland. Some 14,000 Lebanese live in the fishing port.

Volleyed from catapults, these stone balls may have battered Tyre's defenders, believes Emir Maurice Chehab, Director of the Lebanese Department of Antiquities, right. The author tests the weight of a projectile.

PAINTING BY TOM LOVELL; WOODCARVERS BY HELEN AND FRANK SCHERSCHEL

The battle was won, but if Alexander's weary troops thought the war was over, they were mistaken. As long as Darius remained free, Alexander meant to pursue him. For the moment, however, he was content to wait. He marched to Babylon, whose people surrendered almost eagerly, and rested his troops for a month.

We found it difficult to evoke the glory of Babylon from what remains of it today. Walls that Herodotus described as more than 300 feet high, and so wide that two chariots abreast could race atop them, have vanished. The glazed tiles that adorned its buildings glisten in museums across the world. The Hanging Gardens are now mud-brick platforms devoid of a single blade of grass. But in the reduced-scale, beautifully reconstructed Ishtar Gate, a semblance of past grandeur lives on.

While in Babylonia, Alexander appointed a Persian as governor, the first step in his plan to unite victors and vanquished in a stable empire. Then, eager to collect the treasure that waited in the coffers of central Persia, he set out toward what is today Iran.

The terrain we crossed in his pursuit could have changed little since he passed. Squat villages of sun-baked brick trembled in perspective-distorting heat waves. Clumps of grass loomed large as trees. Camels, floating above pool-like mirages, walked on wavering legs (page 30).

Braided eight-year-old, destined soon to be a bride, stitches her trousseau at Siwa Oasis in Egypt, near the Libyan border. Remote Siwa, which Alexander reached after once losing his way, sheltered the Oracle of the great god Ammon. Priests greeted the Macedonian as the deity's son and gave him a favorable prophecy.

Horned Alexander, on a Thracian coin of the third century B.C., reflects belief in his kinship to Ammon, ram-horned Egyptian god.

Tea break in the fields: One *fellah* pours as another villager spins camel hair near Memphis. Behind them rises a pyramid of Dahshur, already 2,300 years old when Alexander entered Egypt. The people embraced him as a liberator from Persian rule and crowned him Pharaoh.

For a while we paralleled a Bedouin wedding procession. The black-masked bride peered from a swaying shelter on her camel (page 31). When we stopped, the caravan leader galloped toward us. I slammed the Land-Rover into gear: Arabs are touchy when strangers look at their women, even from afar. But all he wanted was water.

We shared what we had. The caravan moved on. We followed, while I photographed from atop the moving Land-Rover. Suddenly the sheik unslung his rifle—and posed!

Alexander hurried on to Persepolis, along the way collecting booty recorded by historians as 180,000 talents in coin and bullion, gold and silver vessels, jewels, and rich furnishings. But a greater treasure lay undiscovered beneath the land he plundered. Today, drill rigs sprout from the eroded brown landscape. They pump more than two million barrels of crude oil a day, making Iran the third largest producer in the Middle East, after Saudi Arabia and Kuwait.*

*See "Old-New Iran, Next Door to Russia," by Edward J. Linehan, NATIONAL GEOGRAPHIC, January, 1961.

Wealth accumulated by Persia was vast, and it was lavished on Persepolis. Cedar brought from Lebanon was carved and inlaid with silver and gold. Tapestries covered the walls; fluted columns topped with bulls and griffins supported lofty ceilings. There were palaces, treasuries, storehouses, and stables.

Alexander, encouraged by his drunken colleagues, burned the palaces of Xerxes in revenge against that Persian king, who had fired Athens 150 years before (pages 34-5).

In spite of this epic act of vandalism, Persepolis impressed us as retaining more of its original splendor than any other city on Alexander's route (pages 36-7). The exquisite bas-reliefs are as crisp today as when they were first chiseled in stone. Soldiers march across the walls in precise formation. Bulls and lions fight in stylized fury. And on the grand staircase of the Apadana, or audience hall, the people of the ancient Persian provinces bring their offerings in silent tribute.

Surely Alexander studied these reliefs with as much interest as we did. Half the peoples represented were already subjugated. Two distant regions—Ethiopia and Somalia—he would never see. But more lay ahead. To win all Persia, he would have to conquer each one. His greatest efforts were still to come.

Alexander Stalks the King of Kings

In the spring of 330 Alexander marched north to Hamadan. His object: the capture of Darius himself. But the Persian king fled eastward through the Caspian Gates, a pass over the Elburz Mountains (map, page 11). The Macedonian pursued him, averaging an extraordinary 36 miles a day. When he caught up with the straggling Persian baggage train, he found Darius dead, murdered by his own disillusioned generals. King of Persia at last, Alexander marched to Zadracarta, now Gorgan, to assume not only the title but the pomp of an Oriental monarch.

From Gorgan we plunged into the vast Turkoman steppe, stretching east of the Caspian Sea and north of the Elburz Mountains. The nomads' wicker-and-felt *yurts*, like halved tennis balls, studded the gray undulating plain. Sheep grazed in wheat stubble, and occasionally, through the perpetual blanket of dust, we glimpsed a ghostly horseman clad in flapping sheepskin, the living image of the nomads who had once fought Alexander.

In the fourth century A.D. some unknown king built a 100-mile-long barrier to keep those nomads out. Medieval Persian poets and painters attributed the wall to Alexander; remains of it exist today, and the Turkomans still call it Alexander's Wall. To learn what we could about it, we searched out American anthropologist William Irons in a remote Turkoman settlement.

We found him in a yurt, and were invited in by his host. Tea was brought, and the rest of the family straggled in: married daughters and their children; the father with wispy beard and sheepskin hat like an inverted bowl; the mother in bright blouse, silk scarf, and billowy skirt. Shoeless, we sat on felt mats around a fire; smoke filtered through a hole overhead. Outside, flames from an oven dug in the ground lit the faces of two daughters as they baked thick, flat bread.

After a supper of rice, lamb, onions, and hot bread, Bill Irons translated as the father spoke. The old man's eyes reflected the red embers of the fire. We felt that we were listening to an itinerant storyteller of long ago.

"You know, Alexander had two horns—like a ram's horns—growing from the sides of his head. But he didn't want anyone to know about them, so he wore his hair long. Only his barber knew, and he was sworn to secrecy.

"But the barber just had to tell. He whispered his secret into a well. Soon reeds grew from the well, but whenever anyone made a flute from them, no music came out, only the words, 'Alexander has two horns.'"

"What about the wall?" we prompted.

"Well, Alexander had two sons. He divided his kingdom between them. But they were always arguing about the boundary, so Alexander built the wall to separate them."

Murderer Proclaims Himself King

Though only the Turkomans told the story of the wall, we heard the legend of Alexander's horns many times. It probably resulted from his visit to Siwa, where he was called "Son of Ammon," the ram-headed god. Coins minted after Alexander's death show him with horns (page 28), and throughout the Moslem world he is known today as Iskander Dhulcarnein—Alexander the Two-horned.

As Alexander marched east from Gorgan, he learned that Bessus, the Persian general who had plotted Darius's murder, had fled to Balkh in what is now northern Afghanistan. Proclaiming himself King of Persia, Bessus was raising another army. Alexander saw this as rebellion, and set out to nip it.

Driving over Alexander's route, which later became the old Silk Road between China and Arabia, we measured our progress by the caravansaries. These fortified hostels were spaced about every 17 miles, the average distance a camel train could travel in a day. Brown mud ruins in a dusty brown sea, they lie deserted now. Trucks roaring past spew black diesel fumes and choking dust clouds, and grind the old Silk Road into a torturous washboard that left us quivering for hours after we camped each night.

Near the Iranian-Afghan border, Alexander learned of a revolt in a province to the south. He postponed his pursuit of Bessus. Speed, mobility, and surprise, three aces in his deck of military tricks, quickly settled the uprising. The conqueror left a garrison to hold control, ordering his men to found another Alexandria; we know it as Herat.

Today many of the sounds, smells, and sights are the same as when Herat served as a trade center for merchants from China, India, Arabia, and Africa (pages 42-3). Camels plod by, grumbling under heavy loads. Silk merchants skein thread in dim little stalls. Nightingales sing in wooden cages. Turbaned men string peppers into crimson chains or hawk vegetables in loud, clear voices. Women in veils and tentlike maxiskirts move from stall to stall, pinching a tomato here, an orange there, and haggling vigorously before buying.

While Alexander was at Herat, he heard of more uprisings and continued southward.

Honeymoon palanquin hides a Bedouin bride, who peeks out through a black mask. The authors won the trust of the caravaneers (below) by sharing precious water with them (page 28).

Distorted by a mirage, a caravan wobbles on liquid legs east of Babylon, Iraq. The heat waves mirror the bellies of the lead camels.

Following his route through southwest Afghanistan, we drove for a while over a newly built road, then along a track twisting between jagged, reddish mountains.

Near Qala-i-Kang, Alexander halted to quell an uprising of a different sort, the first of many within his own ranks. For some time he had been drifting away from his Macedonians. To them the conquered Persians were no better than slaves. But Alexander, continuing his efforts to win their friendship, appointed Persians to high office and himself wore Persian dress.

At the same time he grew distrustful of his old friends. Hearing rumors of a plot against his life, he ordered that Philotas, one of his ablest generals, be tried by the army. On the flimsiest of evidence, unpopular Philotas was convicted and executed. Macedonian custom decreed that all kinsmen of a convicted traitor be killed also. Though Alexander spared other kinsmen of Philotas, he ordered the murder of his father, loyal old Parmenion.

Most of the summer and fall of 330 Alexander campaigned in southern Afghanistan, in the area now called Dasht-i-Margo—the Desert of Death (map, page 12). To follow Alexander, we would have to cross that desert, but no trail broke the blank white space on our map. At Qala-i-Kang, we called on Rsul

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Like fire-doomed temple columns, Iranian oil-field towers reflect flaming natural gas, separated here from crude oil before it enters pipelines. For the authors, the eerie scene at Gach Saran evoked images of the Macedonian holocaust that consumed nearby Persepolis (pages 34-5). During his conquest, Alexander saw black fluid bubbling from the ground, and thus became one of the first known Westerners to lay eyes on petroleum.

Mist-veiled heartland of Iran: Such unchanging fastnesses of bleak mountains and mud-hut villages lay between Alexander and treasure-rich Persepolis. Sweeping across the Middle East, the Macedonians dealt the Persians a crushing defeat at Gaugamela and marched into opulent Babylon. From there they sped east, to be stopped abruptly here in the Zagros Mountains, where the enemy held a narrow pass called the Persian Gates. After bold flanking maneuvers, Alexander routed Darius's men with such ferocity, the historian Arrian relates, that terrified Persians "threw themselves over the cliffs." Ahead, almost undefended, lay Persepolis.

Pashtoon, vice governor of the province. He sketched a route across the Dasht-i-Margo.

"This wasn't always a desert," he told us. "When Alexander came through, it was probably one of the more fertile regions of Afghanistan. There were canals everywhere. Then came Genghis Khan, 15 centuries later. His Mongols ravaged the area, filled in the canals, massacred the population, and the sand took over. You'll see dozens of ruined cities along your way."

Those ruined cities were our signposts across the Dasht-i-Margo. The first of them appeared about midafternoon, shimmering in the heat haze. From a distance the city looked intact, gates open as if to welcome a caravan. But as we approached, the grand walls became a weather-seamed mass of mud bricks.

We camped beside the walls, but in this profound stillness sleep would not come. Sleep can be elusive when you camp among the ghosts of Genghis Khan's victims.

Mountains Block Pursuit of Bessus

Reaching Afghanistan's Kabul Valley in December, Alexander found his pursuit of the usurper Bessus blocked by snow-mantled mountains higher than any he had ever seen. He decided to await spring before crossing the 11,650-foot Khawak Pass.

Victors' revelry sets Persepolis aflame. Racing through the terraced capital of Persia, torch-bearing men and women spread the conflagration to the wooden beams of the luxurious palaces of the king, his harem, and the royal treasury. Half-mad with wine, looters brave the flames to drag

PAINTING BY TOM LOVELL © N.G.S.

silver- and goldware down the carved staircase of a royal residence, while others rip silver rings from heavy draperies. Though he later regretted it, Alexander approved the rampage, according to Arrian, "to punish the Persians . . . for what they had done in their invasion of Greece."

Bearded "Immortal," as Persians called a warrior of their 10,000-man elite corps, still guards a Persepolis wall.

We too arrived in mountain-girt Kabul in December, but we could not wait for spring. We set about arranging a trek over the pass. It was Ramadan, however, the month of fasting when no Moslem may eat, drink, or smoke from sunup to sundown. We could find no one to guide us, until Bob MacMakin, an American resident of Kabul who speaks the local language, came to our rescue.

That evening we huddled over maps and lists with Bob and his wife Mary in their Kabul home. Next day they took us through the Afghan capital's bazaars to buy what we needed. We parked near a group of new office buildings and dodged a few camels that were dodging limousines. At the Green Door Bazaar—all the shops have green doors—we found sheepskin jackets and hats. A veiled woman strode briskly by, wearing what looked like a pleated tent. The tent parted; underneath she wore high heels, nylon stockings, and a miniskirt.

We left our Land-Rover and hired one with a driver to take us as close to the pass as

Whitened bones of Persepolis sprawl in the shadow of the Zagros range; goats graze a treeless gully. Restoring the ancient capital, archeologists find stones and statuary still charred from the Macedonian torch.

possible. Next morning we and the MacMakins headed north for the snowy barrier of the Hindu Kush—meaning "Killer of Hindus." At Dasht-i-Rewat, 100 miles from Kabul, Bob found four men with pack horses to take us over the Khawak Pass. A mile beyond the village we set up our two small tents and crawled into sleeping bags. The men and horses joined us next morning.

"All the Evils That Could Be Suffered"

Describing Alexander's crossing of the Hindu Kush, the Roman historian Quintus Curtius Rufus wrote: "The army . . . in this absence of all human civilization, endured all the evils that could be suffered, want, cold, fatigue, despair." As we emerged before dawn into a cold, blue, wind-whipped world, we began to understand the Macedonians' plight.

Soon after we started up the foot-wide trail, Helen and I realized that a year of following Alexander by car had not conditioned us for following him on foot over a mountain in midwinter. Mary and Bob, accustomed to high altitude, strode along briskly, but at 8,000 feet Helen and I gasped for breath.

By noon we reached the snow line. The trail became icy and treacherous. Before dark we came upon a crude stone hut with a flat mud-covered roof. We waited at a respectful distance while Ghulam Zubair, our chief packer, spoke to the man of the house. Without hesitation he offered the shelter of a small storeroom and stable.

Morning found us stiff, but hot tea, eggs, and bread improved our outlook. We resumed the trail, now along the icebound Khawak River. At one ford my horse stumbled in hip-deep water. Desperately trying to stay on the horse, I grabbed a cinch rope, but I could feel it giving, feel myself sliding into that icy water. I saw a flash of red-striped robe and a whiskered face under a turban knocked awry as my horse wrangler, Mohammad Mirza, dashed into the stream, grabbed the bridle, and swiveled the horse into shallow water.

It took only seconds to lead horse, load, and thoroughly unnerved rider to shore, but

Mohammad Mirza was already crusted with ice. When I thanked him, he grinned and shrugged.

"It doesn't matter," he said. "I am used to this. Besides, I am an Afghan."

That day we made only three miles instead of the expected ten, stopping at a village where the aged chief welcomed us. We gave our quarters in the village guesthouse a four-star rating. We had an oil-drum stove, dung patties for fuel, and felt pads on the floor. Warm and dry and full of spaghetti, we sprawled on the floor and studied the map. With any luck, we should make the 11,650-foot summit the next day.

Writing of the Khawak, Curtius says, "The unusual cold of the snow caused the death of many. . . . It was especially harmful to those who were fatigued. . . ."

Fatigue was our constant companion that next day. We were above 10,000 feet and climbing steeply; the thin air was so cold it seemed to sear our lungs. Ghulam Zubair repacked the horses, loading one lightly. We took turns riding it, and grabbed other horses' tails to help us along when we were afoot.

Ever so slowly we neared the summit. And then the horse Helen was riding stepped into a drift-concealed hollow, throwing her into deep snow (page 45).

"... When they struggled to rise again, they could not do so. But they were roused from their torpor by their fellow soldiers, for there was no other cure than to ... go on."

The Afghans were already at Helen's side when I reached her. Gently they helped her up and brushed away the snow. They urged her to mount again, but she knew she must walk, and walk quickly, to keep from freezing.

At the summit I paused and looked back down the trail. I imagined Alexander's army, stretched out in single file, a continuous ant-like stream on the white snow, each soldier weary, wondering where he would sleep.

No village guesthouse awaited us that night. At dusk we stopped at the first trailside shelter and blessed the old Afghan amir, Abdur Rahman, who almost a century before had built these dome-shaped huts to protect travelers on the Khawak Pass.

Two days later we reached Deh Saleh, a village on the far side of the Hindu Kush. We had covered 47 miles in five days—and gained a new appreciation of what it must have been like to climb through this mountain country in Alexander's day.

Rough Riders Score With a Dead Calf

After returning by truck and bus to Kabul, Helen and I recrossed the Hindu Kush in Bucephalus. Again we picked up Alexander's route and followed it north and west to Balkh, where he had gone in search of Bessus. We found the once-great caravan center a mere village surrounded by mud-walled ruins.

Bessus had fled Balkh as Alexander approached, but the Macedonian made it his headquarters for two years while he pursued the pretender and subdued the wild tribesmen who roamed both sides of the Oxus River, now named the Amu Darya. The hard-riding nomads were the toughest adversaries he had yet faced. We saw a sample of how tough they might have been at nearby Mazar-i-Sharif, present capital of Balkh Province.

Today, as in Alexander's time, northern Afghanistan breeds horses famed for their power and speed. They need both to compete at *buz kashi*, the Afghan national sport, surely one of the roughest in the world.

With Mohammad Entezam of the Afghan Information Office, we watched some 30 horses and riders warm up in a field. The horses were handsomely caparisoned with leather and bright brass, the men in velvet jackets, red for one team, green for the other.

Greeting Iran's King of Kings, uniformed schoolgirls abloom with pompons await a birthday appearance of Mohammad Reza Shah Pahlavi in Teheran. Heir to the ancient Persian title, the Iranian monarch rules an arid but oil-rich land that steadily improves the lot of its nearly 26 million people.

"Buz kashi literally means 'goat drag,'" Mr. Entezam explained. "But now they use a calf—a dead one, of course."

He pointed to two circles chalked on the field. "Those are the goals, one for each team. The object is to snatch the calf from the ground, race around those posts at the end of the field, and drop the calf back here in the proper circle."

At the referee's whistle, the headless carcass was dropped in the middle of the milling and snorting group of horses. One man from the Red team broke through, reached down swiftly, grabbed a leg and lifted the 120-pound carcass with one hand. He raced around the quarter-mile course with both teams in pursuit. A Green rider grabbed another leg of the carcass. Red and Green rode across the field, lashing each other. The Red swerved his horse, broke Green's hold, and slid the calf into the circle.

For two hours the buz kashi continued (page 46 and cover photograph). Horses grew sudsy with sweat, the men bloody. The rewards for such torture must be great, I remarked.

"Not really," said Mr. Entezam. "Prestige is the reward. Families will spend half their savings to buy a good buz kashi horse. These men play to win, just for the honor."

When Alexander crossed the Oxus in search of Bessus, he had his men make rafts of tents stuffed with straw. On these the army crossed the river in five days. We took considerably longer. No foreigners may cross the Amu Darya, the border between Afghanistan and the Soviet Union. The only way we could get to the other side was to fly from Kabul to Tashkent, capital of the Uzbek S.S.R.

Fortress Falls to "Flying Soldiers"

The Tashkent director of Intourist, the Soviet tourist agency, questioned our itinerary, which included Samarkand and Leninabad, both places important to Alexander.

"Samarkand is on the tourist list," he said. "But why do you want to go to Leninabad?"

"Alexander founded a city near there," I replied. "He called it Alexandria Eschate—Alexandria the Farthest."

"Leninabad," he replied firmly, "is not on the tourist list."

So, with an Intourist guide and a driver, we set off by hired car for the 200-mile trip to Samarkand. West of Leninabad, we picked up Alexander's trail again.

Soon after the Macedonians crossed the Oxus, Bessus had been captured without a struggle, betrayed by his own lieutenants.

Riverside rug cleaners lift a day's work from a hot spring to dry at Rai—ancient Rhagae—near Teheran. Alexander, pursuing Darius to Rhagae, learned that his quarry had fled through the Caspian Gates into eastern Persia. Macedonian cavalry finally overtook the fugitive king—only to find him dying in a mule cart, stabbed to death by his own generals. Now Alexander became King of Kings. But Bessus, instigator of the assassination, lived on to plague him as pretender to the Persian throne.

Craftsman out of the past, an Afghan cobbler shapes shoes with upturned toes; each custom-made *baboosh* fits either foot. His stall borders the village street of Istalif. Near here Alexander may have camped during his exhausting campaigns across the crumpled terrain of Afghanistan (pages 50-51).

Alexander ordered him tortured, mutilated, and executed. But new leaders arose in his place. Alexander took Samarkand, then moved northeast, capturing five cities in two days.

Somewhere in here—no one knows precisely where—Alexander captured Sogdiana Rock, an apparently impregnable mountain peak. When Alexander demanded its surrender, the defenders laughed: "Find soldiers with wings. No one else can touch us."

By night, 300 Macedonians scaled the peak with pitons and ropes. At dawn Alexander called, "Come see my flying soldiers."

The Sogdians surrendered. Among the captives was Roxane, daughter of a Sogdian nobleman who had been with Bessus. As a prize of war she already belonged to Alexander, but his customary gallantry toward women prevailed and he married her.

Nomads Settle Down Near Soviet Samarkand

The steppe nomads were more formidable opponents. With their dashing hit-and-run tactics, they harassed the invaders for two summers.

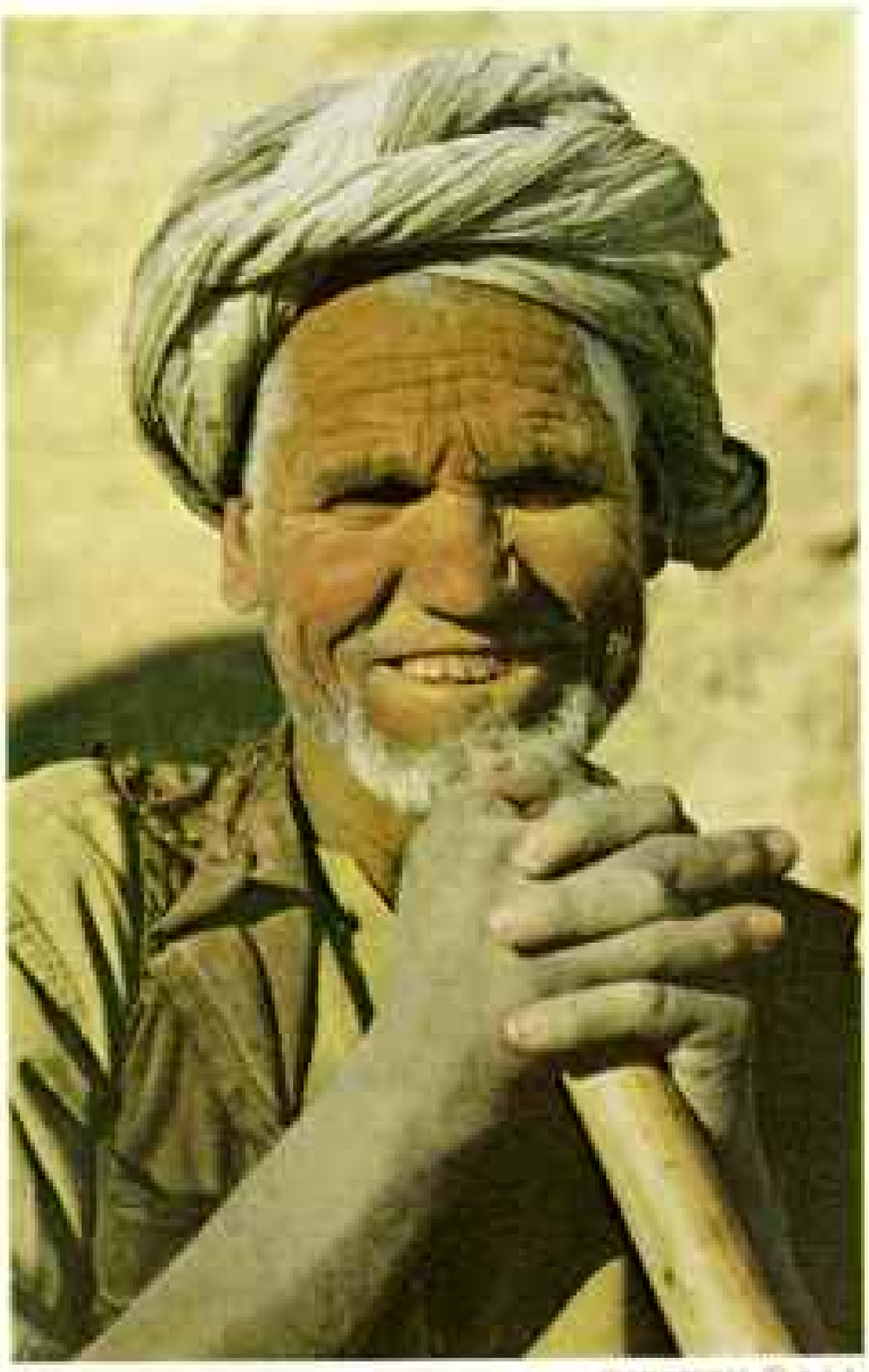
We had seen the descendants of these nomads in northern Afghanistan and Iran, still roaming freely. We had expected to see their tents and livestock in Uzbekistan, where the people spring from similar stock. Instead we found the steppes checkered with farms.

"The nomads have been settled on state-run farms," our guide explained. He pointed to mounds of unprocessed cotton graying in the wintry air. "This year we had a record crop."

He left us in Samarkand, turning us over to our new Intourist guide, a pretty Uzbek girl named Maja Muminova.

Although Alexander occupied Samarkand, no sign of his presence remains. Instead, the city reflects the taste of its 14th-century conqueror, Tamerlane, who brought artisans from every Moslem country to make the city the most beautiful in the world. The ruins of blue-tiled mosques and tombs still speak of the glory that moved Arab writers to call

Grim walls crumbling with age, the citadel at Herat, Afghanistan, recalls a violent past when this crossroads of central Asia tempted invading Arabs, Turks, and Mongols. Pausing in his pursuit of Bessus, Alexander founded the city in 330 B.C. as part of his subjugation of the region. Between Herat, which he called Alexandria Areion, and the Hindu Kush, the Macedonian established three more Alexandrias.



Grin breaks through dust encrusting an Afghan peasant's face at Juwain. He gathers earth to construct his house of mud, central Asia's time-honored building material.

Samarkand "the Jewel of Islam" (pages 48-9).

I asked Maja if any trace of Islam remained.

"But of course," she exclaimed. "We have freedom of religion here. Come, we'll go to the mosque."

We drove to a termite-riddled wooden mosque on the outskirts. On faded carpets a few hundred Uzbeks and Turkomans knelt in prayer. With their long, quilted robes, skullcaps, and heavy-lidded eyes, they might have stepped out of Tamerlane's court.

"You see," said Maja. "But of course, only the old people believe in this now." She indicated a group of giggling youths slouching nearby. "The young people come only to amuse themselves."

Maja took us through crowded streets, the government department store, the produce market. "Look around," she said proudly. "Do you see a single veil? No! You see women in short skirts and nice clothes. Not even the old women hide behind those black shrouds they still wear in Moslem countries."

Hospitality—a Duel With Vodka

Near the end of our stay in Samarkand, Maja took us to visit an Uzbek family in their tidy little house in the old quarter. She introduced us to Mr. Akhmedov, our host. I commented on the name—the "Akhmed" part was Uzbek; the "ov" was Russian.

"Many people here have Russianized their names," Maja explained.

We removed our shoes and entered the living room. Plastic and porcelain bric-a-brac crowded the shelves along the walls. A television screen gleamed in one corner, a shiny radio in another.

But if the walls spoke of the West, the floor proclaimed the East. We sat cross-legged on carpets around a low table. Mr. Akhmedov bowed and spoke in Uzbek. Maja translated:

"He welcomes you and hopes his humble food will satisfy you."

I glanced at the table laden with grilled fish, bowls of thick soup, and plates heaped with chocolates.

Three more men joined us: a sturdy Uzbek theater projectionist, a round-faced Turkoman manager of a state store, a slender Uzbek engineering student, all in dark suits.

"Do you own your own car in America, or does it belong to the government?" asked our Intourist driver.

I replied that we owned a car, as did most Americans.

"Ah, but you have to pay for education and medical care," said the student.

I explained that education is free through high school, that state universities are relatively inexpensive. As for medical care, we had a government program for the elderly, and others could subscribe to voluntary health insurance.

The Turkoman proposed a toast. Maja's black eyes flashed a warning at our driver.

"He's working," she said.

I eyed the tumbler of vodka. At least three ounces, I estimated.

"I'm working too."

"Come, you are our guest. It would be rude to refuse to toast. It is our custom."

He raised his glass. "To health," he said in Russian. "*Za zdorovie*. I drink to America," and downed the vodka in one swallow.

KATSCHINSKI © N.G.S.

Every step an effort, the Schreider party slogs across the top of the Khawak Pass in Afghanistan's Hindu Kush. Thin air and subzero temperatures at 11,650 feet make horsepower a necessity. American Bob MacMakin, a Kabul resident who helped the Schreiders follow Alexander's trail over the pass, grabs a tail to steady himself as he plows through the deep snow. Helen Schreider takes her turn riding. Seeking to outflank Bessus, Alexander crossed the pass rather than take the easier route around the mountains, counting on the element of surprise to capture the evasive Persian. But Bessus fled before him across the Oxus River.

Rising from a drift, Helen Schreider recovers after a tumble from her horse. Thereafter she decided to walk.

"Za zdorovie—to health. I thank you." I sipped.

"No, no!" said the projectionist. "With one swallow. That's how we toast here."

I emptied my glass, wiped my eyes, and waited for the invitation to eat.

"Now it's your turn," said the student as he refilled the glass.

I knew what was expected of me: *"Za zdorovie.* I drink to the Soviet Union." Everybody beamed. I looked at the empty bottle and beamed too. Now, surely we would eat.

"Za zdorovie," said the Turkoman, producing another bottle. "I drink to peace."

"Za zdorovie, I too drink to peace."

By this time I was feeling very peaceful. At last we ate. The Turkoman raised his glass.

"Za zdorovie," he began, but I was already thanking our host and heading for the door.

From Samarkand Helen and I flew back to Kabul to pick up Alexander's trail on the next leg of his march of conquest. In early summer of 327 B.C. he returned to the Kabul Valley and headed east into what is now West Pakistan. His goal was daring indeed—he intended to add India to his empire.

The entourage Alexander headed was larger by far than the one he had led east from Macedonia seven years before. To his infantry and cavalry he had added thousands of Persian horsemen. Including camp followers, his retinue totaled 120,000 people.

Alexander himself had changed. He drank more, was subject to frequent and violent bursts of temper—in one of which he murdered Black Cleitus, a friend who had saved his life at the Granicus. He was ruthless in dealing with those who opposed him. Yet in spite of this, he retained the loyalty of his men.

Somewhere on the edge of India, Alexander

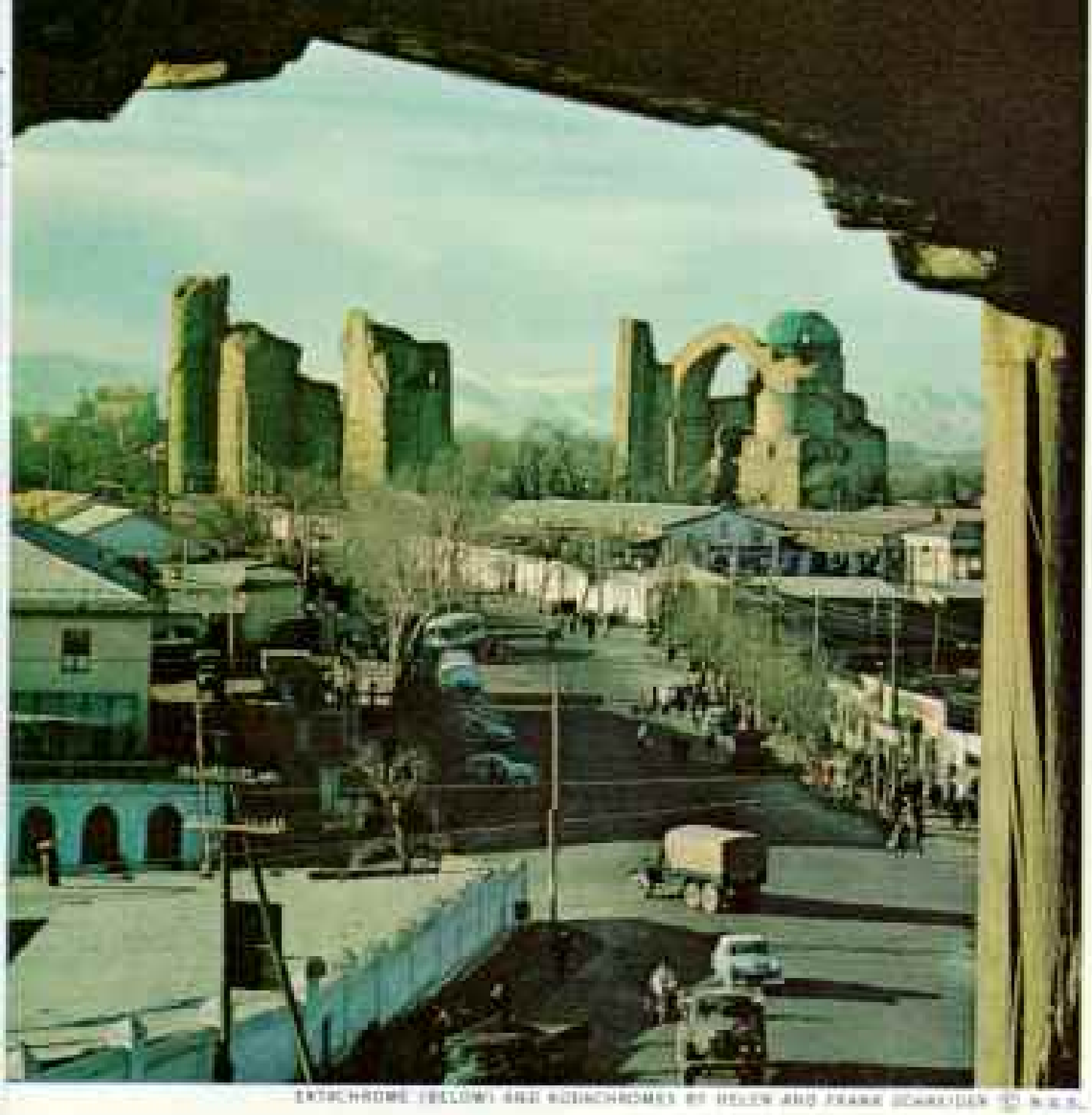
PHOTOGRAPHED © NATIONAL GEOGRAPHIC SOCIETY

Dead calf serves as a ball in Afghanistan's free-for-all version of polo, *buz kashi*—a centuries-old game of unknown origin. Descendants of the superb horsemen who fought Alexander in Bactria clash on a field at Mazar-i-Sharif. To score a point, the team must carry the calf around a pole and then drop it in one of the field's two goal circles.

Snowy pigeons fill the square of the Blue Mosque at Mazar-i-Sharif. If a bird of another color lands here, says a Moslem legend, it immediately turns white.

encountered a strange people. They claimed descent from Dionysus, the Greek god of wine. Their form of government resembled that of the Greeks. Possibly they did have Greek origins. The Persians had sometimes exiled Greeks from Asia Minor to the eastern part of the empire.

Descendants of these people, legends say, are the pagan Kafirs, who still live in the mountains between Afghanistan and West Pakistan. Helen and I set out to find them.



EKTACHROME (BELOW) AND KODACHROMES BY HELEN AND FRANK SCHREIDER © N.G.S.

Fabled city of Tamerlane, Samarkand thrusts the wreckage of its vanished glory above the Soviet horizon. Archway of the crumbling Bibi Khanum Mosque, reportedly built by a Chinese wife of the 14th-century conqueror Tamerlane, carries the inscription, "Only the sky compares in beauty."

Bundled-up cherub concentrates on a cup of ice cream, an expensive treat in faraway Samarkand.

Faces a blend of East and West, Turkoman and Uzbek workmen gather in a Samarkand teahouse for the noon meal. Massive portrait of Lenin watches over the customers. Russians call the city's first known conqueror "Alexander Makedonsky."

The Macedonians occupied Maracanda—today's Samarkand—after finally capturing Bessus north of the Oxus River. It took Alexander two years to subdue the surrounding regions of Sogdiana and Bactria.

We followed the Kunar River (next pages) toward Kamdesh, once a Kafir village. Now converted to Islam, the people shun Kafir customs. But, they said, in Chitral, on the Pakistan side, we might still find other Kafirs —the Kalash—who made wine and carved images to adorn their wooden graves.

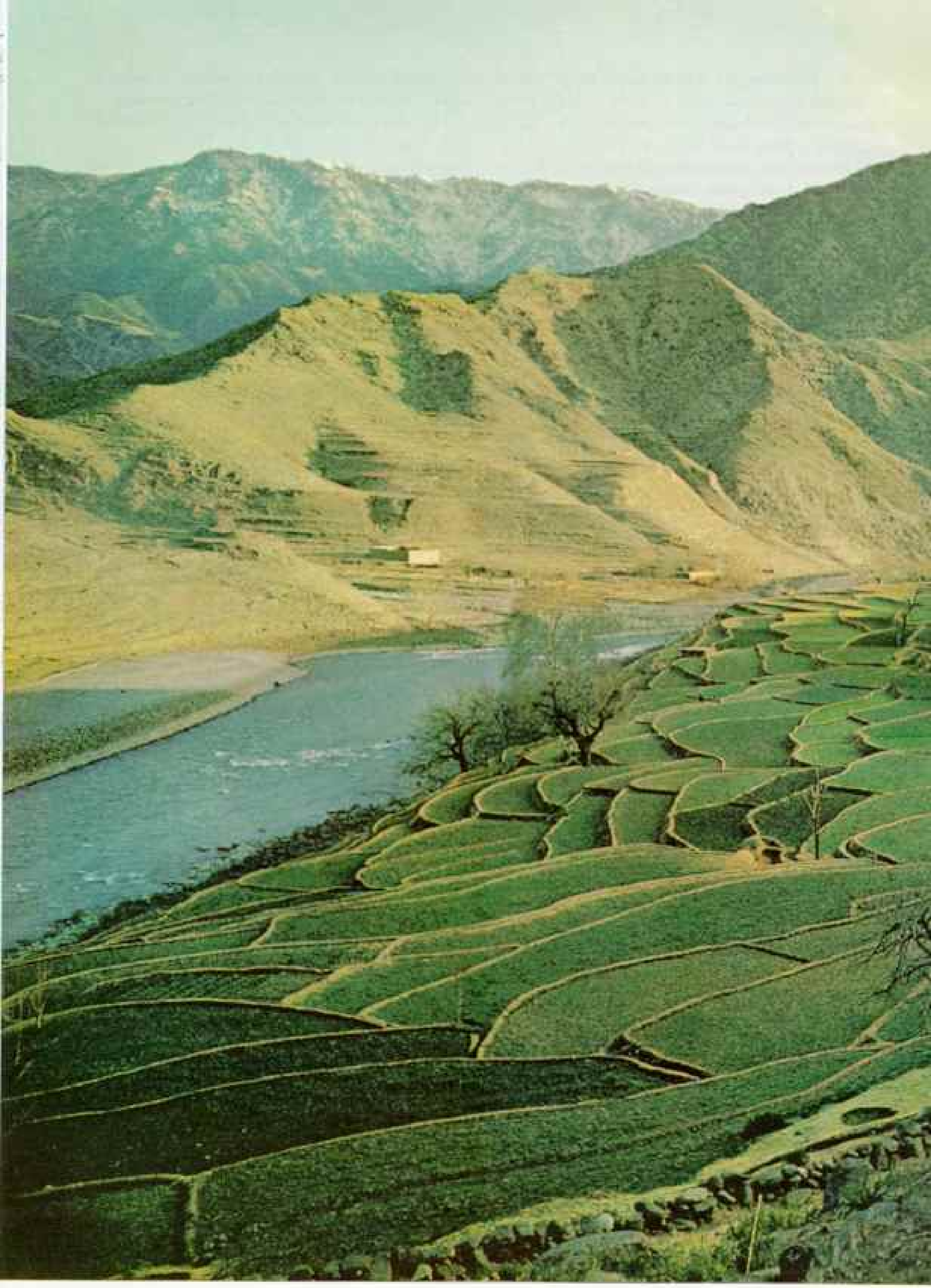
Sepulchers Hint at Ancient Ties

Helen and I exchanged excited glances. Curtius mentions wooden sepulchers and wine. Was it possible that in the sea of Islam that had engulfed Alexander's empire, there remained a tiny island harboring traces of Greek culture even older than Alexander?

The Macedonians crossed from Afghanistan into Pakistan via the Nawa Pass, entering what is now the Mohmand Agency, a tribal district administered by Pakistan. Today, as in Alexander's time, the tribal inhabitants of the region resist foreign intrusion. We entered northern Pakistan through the Khyber Pass.*

At Peshawar we learned that the road to Chitral State was closed by snow. In good

*See "Pakistan: Problems of a Two-part Land," by Bern Keating, NATIONAL GEOGRAPHIC, January, 1967.



Stairsteps of plenty, terraced fields of wheat descend to the rushing Kunar River in Afghanistan. A farmer's covered rifle speaks of the region's long heritage of violence. Through these mountains marched Alexander, fighting and ultimately

conquering the fierce, independent tribesmen who blocked his way. Thus he protected the flank of his army's main force, which he had sent along a southern route with instructions to bridge the Indus River and open the way to India.

weather, however, there was a thrice-weekly flight to the town of Chitral, where we could hire a jeep to Ayun. From there we would have to walk 36 miles round-trip through the snow to reach the Kalash villages in the Brumboret and Rumbur Valleys.

Like a jagged wound, the Brumboret Valley slashes into the flanks of the Hindu Kush. No road penetrates it, and the path that threads its boulder-strewn sides is too steep even for mules. Here, and in the nearby Rumbur Valley, live the Kalash Kafirs.

With two porters, a policeman, and our guide-interpreter, Abdul Samad, we crawled along icy ledges and crossed the green Brumboret River countless times on trembling bridges. Then the valley broadened; cedar and mulberry trees covered its slopes. Wooden houses, their fronts carved in geometric designs, stood on the hillsides.

Kafir Headdresses Hint of Greece

We heard a musical tinkle and saw three Kalash women with bells hung from their belts. Their faces and hands were lightly tattooed; they wore heavy black robes and tufted

black headdresses covered with cowrie shells. We stared at those headdresses; we had seen similar ones in Greece (pages 4-5).

Farther up the path stood a crudely carved figure with a pointed helmet. We had seen helmets like that on the walls of Persepolis. We passed a graveyard. Wooden coffins, mere planks pegged together, lay in a grove of trees; Curtius had written of wooden graves.

When we met with the Brumboret village elders, we sat on small chairs. Nowhere east of Turkey had we found village people using chairs, except here and at Kamdesh. The elders' beretlike hats resembled those seen in mosaics at Alexander's capital in Pella and on coins minted in Alexander's time.

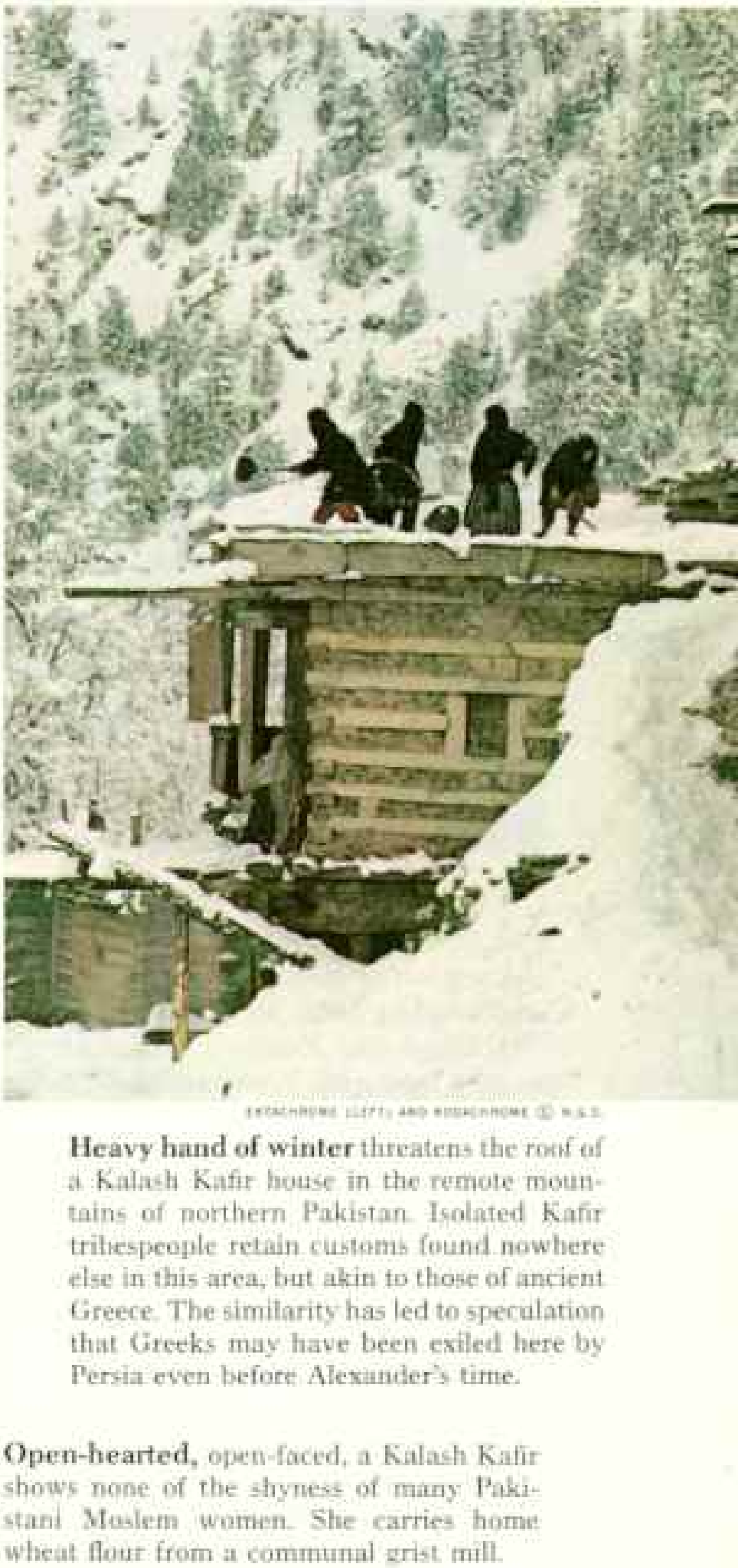
Abdul translated as we asked question after question. Where did the Kalash people live before they came to Brumboret?

"In a place far to the north, beyond the great snowy mountains," an old man replied.

Did they know of Alexander?

They did not.

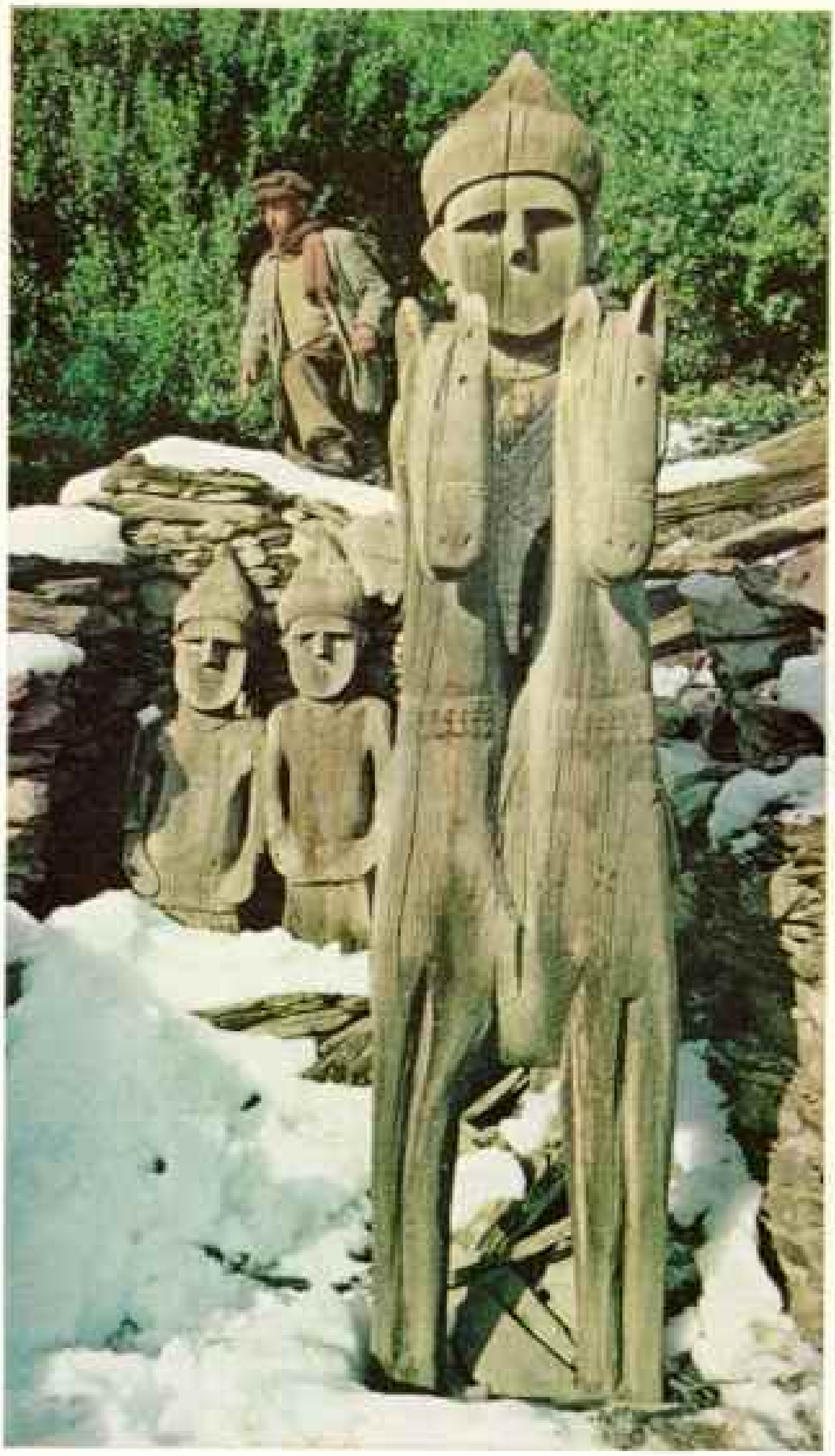
Yet they made wine, and women danced at night around the fire, as early Greeks had done, and as Moslem peoples around them do not.



EKTACHROME (LEFT) AND KODACHROME © N.G.S.

Heavy hand of winter threatens the roof of a Kalash Kafir house in the remote mountains of northern Pakistan. Isolated Kafir tribespeople retain customs found nowhere else in this area, but akin to those of ancient Greece. The similarity has led to speculation that Greeks may have been exiled here by Persia even before Alexander's time.

Open-hearted, open-faced, a Kalash Kafir shows none of the shyness of many Pakistani Moslem women. She carries home wheat flour from a communal grist mill.



Two-horsed warrior honors the memory of a rich Kafir. Relatives raised the statue a year after his burial. Only the Kalash Kafirs make effigies in this region, their Moslem neighbors frown on the carving of images. The art has all but vanished in recent years with the conversion of many tribesmen to Islam.

Helmets of cowrie shells topped with tufts—resembling those of Greek dancers (pages 4-5)—adorn Kafir women circling a fire in one of their age-old rites. Reed pipe and small drum provide the music as they slip sedately to the right and then to the left.

A flute trilled in the still air. A drum beat out a rhythm, the women clapped their hands and began to dance, sidestepping in a circle, their arms swaying above their heads. The Greek-like elements of Kalash culture, coincidental as they may have been, combined into a picture that suggested antiquity, isolation, and, conceivably, kinship with the strange folk Alexander visited.

One other Kalash custom was reminiscent of the ancient Greeks: the making of statues to honor the dead. In Rumbur Valley we found life-size wooden men standing like sentinels under a cedar. Their hands were held on their abdomens; each wore a pointed helmet.

Nearby was another statue. Carved from a single log, it stood fully eight feet tall. It represented a helmeted man with an oversize head sitting astride two horses harnessed together (above). He carried a whip in his hand and a shield across his back.

"To put up a statue like this," Abdul said, "custom

demands that the family sacrifice 40 goats and give a feast for the village. No one can afford that any more. Soon people will forget these old customs."

Porters Make Room for Guests

We arrived back in Chitral on a balmy Himalayan day, ready to fly to Peshawar. But heavy snows had put Chitral's dirt runway out of service. The agent could not tell us when we might get out.

Rather than wait, we decided to climb over the Lawarai Pass toward Dir, where we could get a ride back to Peshawar. Within the hour we and Abdul were in a battered jeep jouncing over a winter-scarred trail through the Chitral Valley. By dusk we had reached Ashret, at the snow line. The jeep could go no farther. Abdul hired porters, and we hiked three hours to a resthouse, only to find it covered with snow and closed for the winter.

A lantern's gleam led us to a teahouse, crowded with porters waiting to carry loads over the pass. We said we'd sleep on the floor. Somehow, Abdul persuaded the porters to sleep in one room, leaving the other to us.

At dawn we set out along a snow-covered trail, climbing an almost vertical ravine. The porters wore thong-wrapped hides on their feet; they seldom slipped. But our rock-climbing shoes skidded on the icy trail, and progress was slow.

Abdul, usually patient and cheerful, began to fret. "We must hurry," he urged. "We must reach the top before the sun makes the snow heavy. Two years ago 80 people died here in an avalanche."

Descending, we came to a village-lined

valley in Pakistan's Dir State. Every man we met carried a gun.

"Mr. Frank," Abdul cautioned, "please lower your eyes when we pass a woman on the trail.

"Mrs. Helen, don't take pictures of women."

At each village he called ahead to warn the people that strangers were approaching. "Remember," Abdul said, "this is the land of blood feuds. Men have been killed for smaller things than looking at another man's wife or daughter."

"Well, the men don't seem to worry about looking at me," Helen said. "I don't think I've ever been stared at so hard."

Abdul smiled. "That's different."

At last we came to a road, and, to our surprise, a waiting jeep. The driver told Abdul he had been sent for us by the political agent in Dir. Later we asked the PA how he knew we were coming.

"It's my job to know who's in my territory," he replied.

Conqueror's Weary Army Reaches India

The annals of Alexander in the mountains and forests of northern Pakistan read like a modern war communiqué. He took town after town, overcoming fierce defenders who contested every hill. He had subdued all Asia Minor in a year and a half; it took him nearly a year to capture an area in Pakistan smaller than Connecticut. The weariness of war was beginning to tell.

In early spring of 326 B.C. Alexander crossed the Indus on a bridge of boats constructed by his engineers. A bridge of boats still spans the Indus at nearly the same spot (opposite), and we followed Alexander over it to Taxila, the first real city the Macedonians had seen since leaving Persepolis.

The King of Taxila welcomed him, and Alexander refitted his forces for the invasion of India and a pitched battle against the Indian King Porus, at the Jhelum River.

We hurried on to the Jhelum. A mere trickle now, its water is diverted and impounded by the colossal Mangla Dam, part of the largest irrigation scheme in the world.

The Jhelum that Alexander faced was no trickle. Swollen by spring rains, it was not even fordable. Alexander ordered boats brought overland from the Indus. King Porus had 35,000 infantry and cavalry, plus 200 elephants, to repel the invader.

After a series of feints, Alexander ferried his cavalry and infantry across the Jhelum under cover of a night thunderstorm. The battle that followed was furious and bloody (pages 58-9). After hours of savage conflict, Porus's elephants bolted. The Indians retreated in wild confusion.

When Porus surrendered, Alexander asked him how he would like to be treated. "Like a king," Porus replied. In admiration of a gallant foe, Alexander restored Porus to his throne and enlarged his territory.

At the Beas River, just inside present India, Alexander faced a real mutiny for the first time. His homesick men, tired and unnerved by the fierce fighting against Porus, concerned by reports of even greater armies ahead, refused to go on.

Alexander summoned his officers and tried to rally them to further efforts. There was silence after he spoke. Then Coenus, a general who had served Alexander loyally, rose and removed his helmet.

"O King, I speak not for those officers present," he said, "but for the men. . . . Those that survive yearn to return to their families, to enjoy while they yet live the riches you have won for them. Lead us back now. . . . A noble thing, O King, is to know when to stop. . . ."

Angered and disappointed by Coenus's speech, Alexander sulked in his tent for three days. When he bowed to the will of his men, they rejoiced. "Alexander," they said, "has allowed us, but no other, to defeat him."

He led his men back to the Jhelum to begin the long journey home. In the fall of 326 B.C. the huge entourage started downriver, part of the army marching on each bank, the rest embarking in a fleet of nearly 2,000 vessels.

"It was very remarkable," said Arrian, "to hear . . . the noise of the rowers, when all together they raised their rowers' chanties. . . . Those Indians . . . to whom the clamor of

Floating road on wooden boats crosses the Indus River near Attock, Pakistan. Alexander's army built a similar bridge across the Indus 2,300 years ago. Even trucks can travel on the roadway of transverse timbers padded with earth and straw. Assembled for the sluggish winter flow of the river, the span is disassembled in spring when flooding threatens. A permanent bridge upstream will shortly replace this unusual structure.

the oarsmen and the beat of the oars reached, came also running down to the bank and followed, singing their own wild songs."

The trip along the Jhelum, Chenab, and Indus Rivers took nine months, as the army fought its way from city to city. During one siege, Alexander became impatient at the halfhearted efforts of his men. With only three of his bodyguards, he entered the town and battled the defenders. When his army breached the walls, they found the bodyguards hovering over their fallen king. Protected by the same sacred shield that he had carried away from Troy eight years before, Alexander lay with an arrow in his lung.

For days after the arrowhead was removed, Alexander was only semiconscious. When he could be moved, he was carried by boat to the main camp. The men thought they were seeing his dead body. But he raised his arm in greeting, and so that more of the army would know he was alive, he demanded to be carried ashore. He was helped onto his horse, and shouts of joy rose from the men.

Desert Poses a Final Challenge

At the Arabian Sea, Alexander divided his forces. Part he sent by ship along the coast. Leading the rest himself, he headed west across the Baluchistan desert.

Helen and I gave long, hard thought to this part of the journey. Would we return by sea, or follow Alexander overland? Our maps showed few roads along his route; even these, for the most part, were identified as mere camel tracks. We would have to cross 1,100 miles of almost uninhabited wasteland.

But we had followed Alexander too long to give up now. In Karachi, West Pakistan, we stocked up on food and water and increased our Land-Rover's gasoline capacity to 70 gallons. On a windy March morning we headed west, out across the desert (map, page 12).

Arrian writes that the suffering of the army on this march was so extreme that discipline fell to an all-time low. Soldiers broke open the royal stores; they butchered the transport animals for food and burned the baggage

Last great battle: Alexander's infantry and cavalry overwhelm the Indian army of King Porus at the Jhelum River. "Maddened by the disaster," the king's elephants "kept colliding with friends and foes alike," according to Arrian. Soon after this victory, Alexander's men, weary and homesick, demanded that he turn back. PAINTING © N.G.S.

wagons for fuel. They even abandoned most of their booty.

Traveling in March, we found the heat bearable, and we had plenty of water and food. But the terrain was just as forbidding as in Alexander's time—bleached, wind-swept earth and salt-encrusted mud flats, glistening silver in the pale, dust-filtered sunlight.

Our map optimistically showed a track in this area, but we found no tire prints to guide us. There were occasional foot-high markers of earth leading roughly west, soon even these disappeared.

Army Harried by Floods and Thirst

Often we plowed through deep silt in four-wheel drive and gas-gulping lower gears. The wind pelted the Land-Rover with sand; it obliterated all tracks. To protect the engine from the abrasive clouds, we sometimes stopped to let sandstorms pass. We traveled for hours without seeing a living thing, neither tree nor bird nor animal nor man. Each night we camped wherever the darkness found us, with only the wind for company.

Throughout this terrible march Alexander remained the peerless leader. Arrian writes that Alexander, "much distressed by thirst . . . led the way on foot so that . . . troops should bear their toils more easily when all are sharing alike."

When his scouts found a little water, enough for only one man, they brought it to their king. Alexander thanked them and "poured it out in the sight of all . . . the army was so much heartened that [it seemed] every man had drunk . . ." (opposite).

But on one occasion, too much water caused as much grief as too little. Caught in a flash flood, most of the camp followers drowned; the troops barely escaped with their weapons.

More fortunate than Alexander's men, we saw the rains coming, saw the sky turn purple and heavy with clouds. Thunder roared down the narrow canyon that confined us. We heard the rumble of water and raced to reach open ground, but the trail was already a coffee-colored torrent. Water rose over the wheels. I geared down to a crawl, revving the engine to keep it from dying. We reached high ground

"**Noblest achievement of Alexander,**" Arrian judged, was sharing with his men 60 days of misery on the Baluchistan desert. Offered a helmetful of precious water, the king poured it out, showing that he would suffer with his troops. Homeward bound, Alexander had hoped to set up supply depots for his fleet, sailing along the coast. But guides lost their way. Pack animals sank in the sand. Men perished of thirst.

"**Can we make it?**" The Schreiders decide "yes," after Frank checks gas level against map (left). From Bampur to Persepolis, Alexander traveled a fine royal road. The authors found only this rocky wasteland.

Wheel-deep in a sudden deluge, Frank maneuvers to high ground on the Baluchistan desert. In 325 B.C., a similar flash flood drowned most of the women and children who followed Alexander's army.

and looked back; boulders higher than the Land-Rover were already submerged.

We camped that night and headed next day for Bampur, where Alexander found food and water for his men. Well provisioned again, he took a Persian royal road from there to Persepolis. Today that road lies buried and forgotten beneath desert sand and rocks. For us, Bampur marked the beginning of the most trying part of the journey.

An hour after leaving Bampur we were slithering through clinging mud along the Bampur River. We twisted between wind-tortured tamarisk groves and rain-slashed ravines, across desert where soft sand held the wheels and clumps of spiny grass caught on the chassis. For two days we wandered vaguely westward, navigating more by the feel of the land than by compass.

We came to a village, the largest of several along our way. Perhaps a hundred huts stood in an oasis of date palms. All around were fields of green wheat, the only color in a monotonous world of grays and browns.

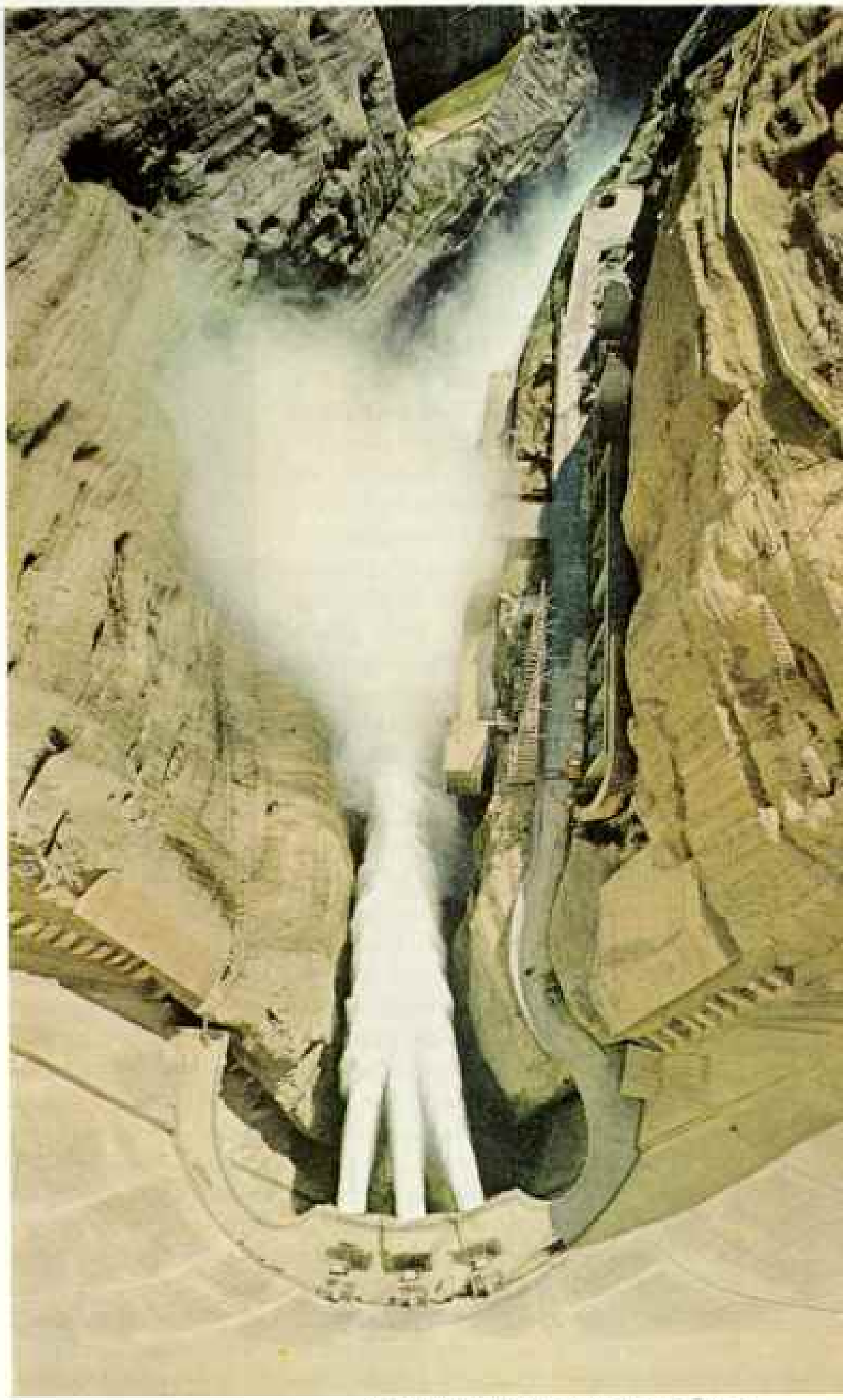
We knew a few phrases of Farsi, Iran's national language. With these and gestures, we persuaded a young man to guide us 20 miles to Gumbaz, the next village on our map.

After an hour of plowing through deep sand, we realized our guide was following no track but a beeline course, and enjoying it thoroughly. We asked about a camel trail shown on our map.

"Car better than camel," he grinned. "Camel go easy way. Car go over everything."

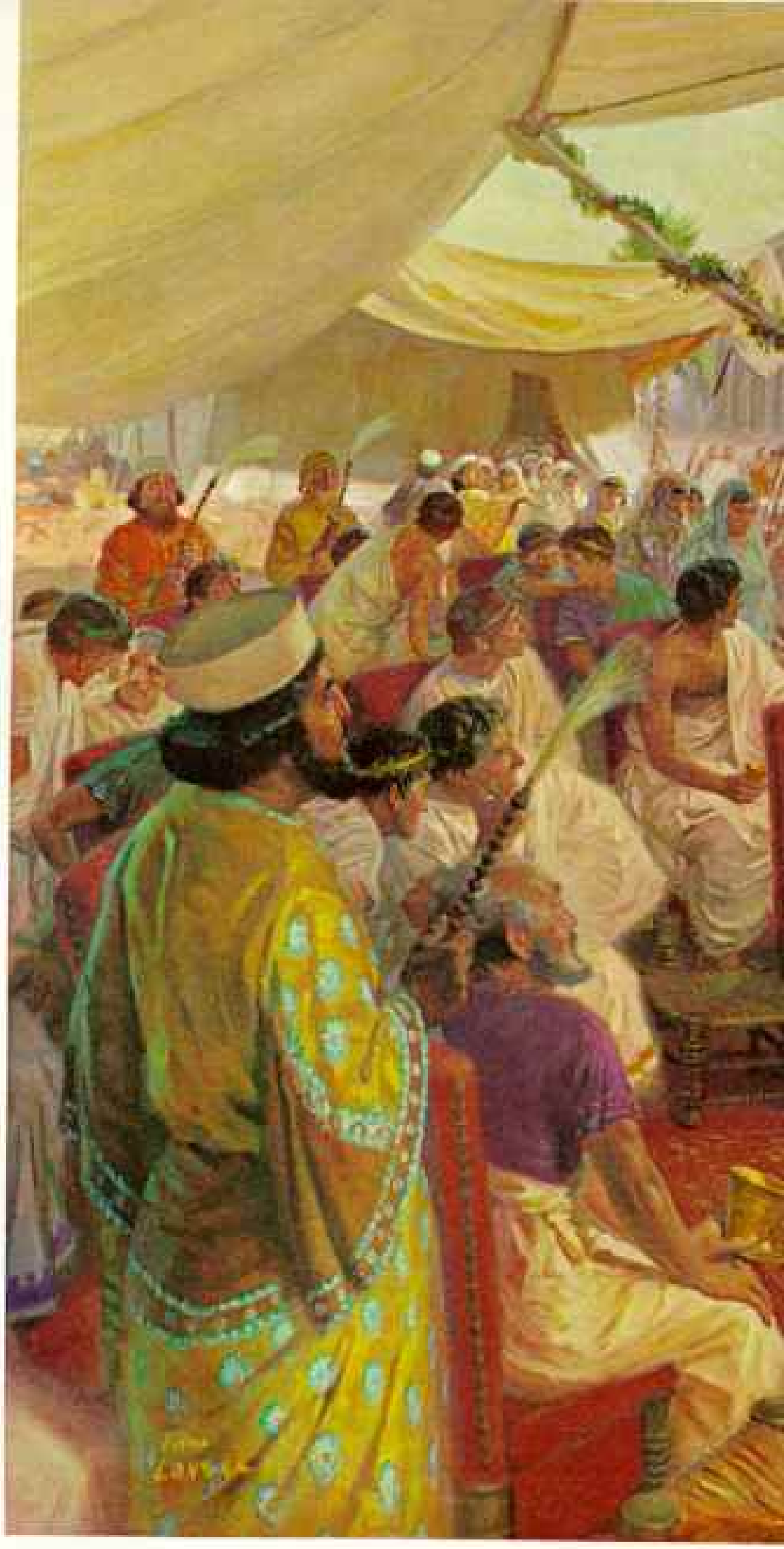
After bogging down in the sand a few times, we convinced him of his error, and made better time over the camel track.

At Gumbaz our guide left us. No one else would lead us from there. We decided to try again on our own. Within 10 miles we were



Ladling life-giving water from a shallow well, Iranian peasants empty goatskin buckets to irrigate wheat in the Baluchistan desert. Like Alexander's heat-crazed troops, the authors found relief in this lushness along the Bampur River.

Harnessed torrent spews from Iran's Mohammad Reza Shah Pahlavi Dam, seen here from its rim 647 feet above the bed of the Dez River. The project's vast irrigation network unlocks once-parched lands so incredibly fertile that they yield seven crops of alfalfa a year.



Wedding of two worlds: Determined to fuse the peoples of his empire "as in a loving cup," Alexander celebrates a mass marriage at Susa in the spring of 324 B.C. Here the king, in Persian dress, takes the hand of his bride Barsine, a daughter of Darius, while 80 Macedonian officers wait to wed Persian noblewomen; 10,000 troops beyond marry Asian women. Alexander's death the following year robbed the world of his dream—different peoples dwelling in peace in a single empire. But for a century Greek colonists migrated to the lands he conquered, keeping open the door to the East.

stopped by boulder-studded desert. Lowering pressure in the tires, we shifted to the lowest gear and tried to crawl over the rocks, but we knew that even our faithful Land-Rover could not take such terrain. We began to despair. For the first time since leaving Greece, we talked of turning back.

Searching for an easier way, we followed a dry wash. The boulders became smaller; the wash opened into black-gravel desert. Elated, we headed west again. Three days later, the eleventh since leaving Karachi, we reached a road and, climbing from the desert, turned toward Persepolis.

When Alexander reached Persepolis, he found his empire in disorder. Many of his governors, both Macedonian and Persian, had exploited their positions, overtaxing the people and embezzling funds. Quickly and ruthlessly, he executed the offenders.

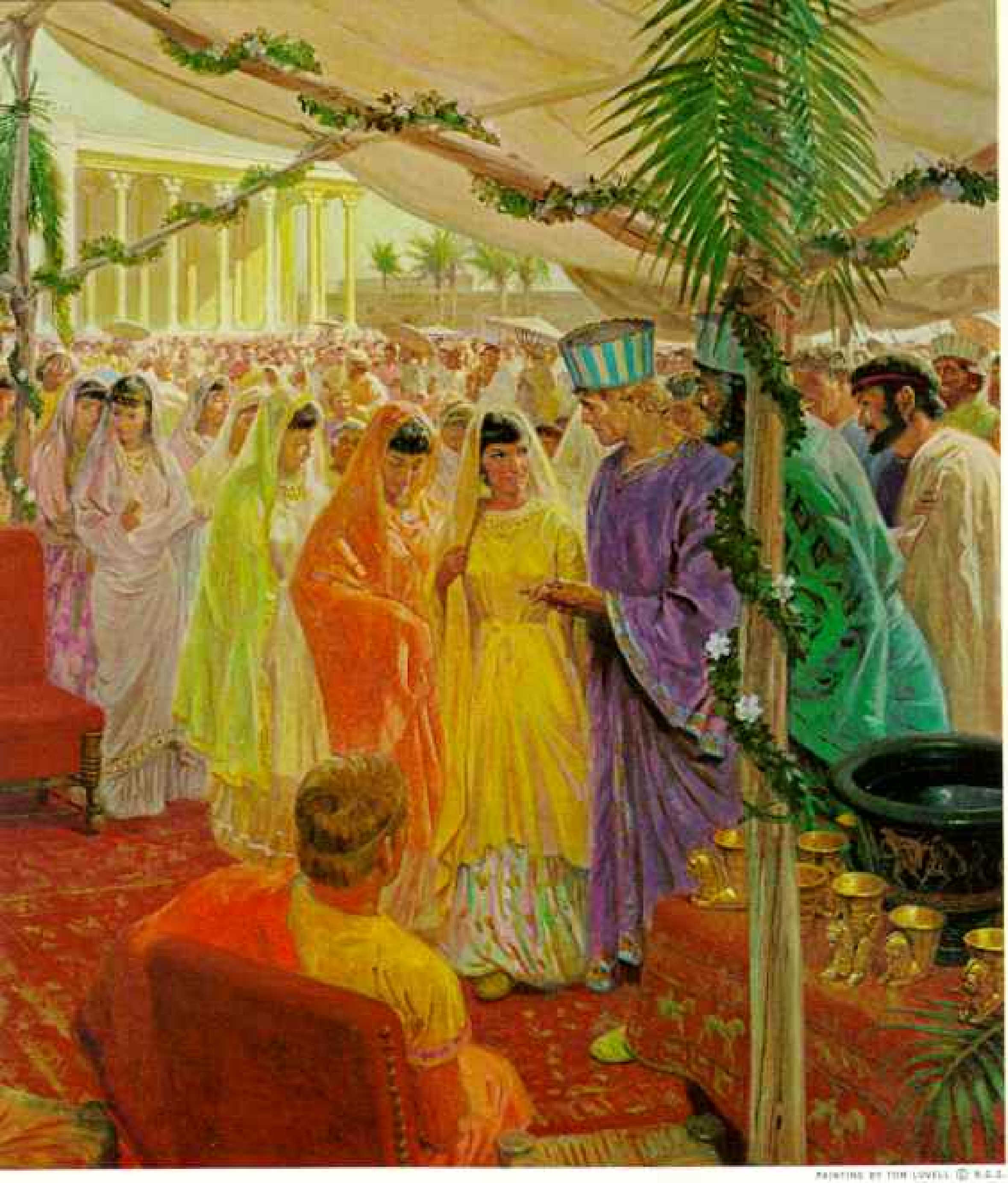
At Susa, Alexander carried his union of East and West a step further with a ceremony in which 10,000 of the troops formalized their marriages to Persian women and 80 of his officers married daughters of Persian nobles. He gave them all handsome dowries, and he himself, already married to Roxane, took Barsine, a daughter of Darius, as a second wife (opposite).

At Susa occurred also a prophecy of Alexander's death. Calanus, a fakir the Macedonian had brought from India, bade all the officers goodbye just before he died. But to Alexander he said, "We shall meet again in Babylon."

Alexander did not proceed directly to Babylon. His active mind was full of new projects, new conquests. He ordered a fleet built to explore the coasts of Saudi Arabia and Africa. He explored the marshes between Iraq and Iran, and sailed up the Tigris to Opis.

Here the long-smoldering resentment of the troops against what they called Alexander's Persian ways flamed into open rebellion. When he reorganized his army, incorporating Persian units and giving them Macedonian names, his men shouted, "Send us all home. You can campaign with your father Ammon." They thought that Alexander believed himself a god; they may have been right.

Alexander entered Babylon for the last time in the spring of 323 B.C. Worn out by wounds, hardship, and overdrinking, he fell ill of a fever. Soon he could neither move nor speak. The army demanded to see him; he was propped up, and one by one each officer



PAINTING BY TOM LOVELL © N.G.S.

and soldier filed past his couch. The procession took hours, but he remained in the same position, acknowledging each man with his eyes or a slight movement of his head.

Within two days, Alexander died. He was not yet 33 years old.

"Far Beyond for Something Unknown"

The empire Alexander had won covered more than one and a half million square miles. It survived intact for only a few years. We can only guess at what might have happened had he lived longer.

As Arrian wrote, "Alexander had no small or mean conceptions, nor would ever have remained contented with any of his possessions so far, not even if he had added Europe to Asia, and the Britannic islands to Europe; but would always have searched far beyond for something unknown, being always the rival, if of no other, yet of himself."

Perhaps it was that very rivalry with himself that made Alexander great. His own words to his army, as recorded by Arrian, might be a worthy epitaph:

"I set no limits of labors to a man of spirit, save only that the labors themselves . . . lead on to noble enterprises. . . . It is a lovely thing to live with courage; and to die, leaving behind an everlasting renown." THE END

Azure arms of the Caribbean enfold cloud-dappled St. John, one of the three main U. S. Virgin Islands. Beyond Coral Harbor, in the foreground, lies Hurricane Hole, where Spanish galleons once hid from storms and pirates. Tortola Island, in the British Virgins, rims the horizon above Sir Francis Drake Channel. Warmed by the tropic sun and fanned by trade winds, the Virgins tempt visitors to scorn the clock as they loll in hammocks, build sand castles, race under sail, or tap toes to the beat of calypso troubadours.

Our Virgin Islands

50 YEARS UNDER THE FLAG

By CARLETON MITCHELL

Illustrations by National Geographic photographer JAMES L. STANFIELD

WHILE I WAITED in a government office in Charlotte Amalie, capital of the United States Virgin Islands, a mimeographed sheet caught my eye. Entitled "Holidays on Virgin Island Calendar in 1967," it seemed to me to epitomize the islands' dedication to relaxation—an appeal that brought 650,000 tourist escapists to the U. S. Virgins last year.

I counted 24 holidays, including such exotics as Three Kings' Day (marking the end of the two-week-long Christmas Festival), Whitmonday, Carnival, Liberty Day, and Transfer Day. As a sailor, I particularly appreciated Supplication Day, July 25, when residents pray they may be spared the dreadful visitations of tropical storms, and Hurricane Thanksgiving Day, October 25, after the danger has passed. This does not supplant the usual turkey-day Thanksgiving, of course, when the islands' 60,000 inhabitants are happy to observe with mainlanders the gratitude of the Pilgrim Fathers.

Relaxation As a Way of Life

Despite the bustle of tourists on St. Thomas and burgeoning industry on St. Croix, the islands' spirit of relaxation remains invincible. Certainly nature continues to abet it. Only three and a half hours from New York by jet, the islands offer a get-away-from-it-all formula of white sand beaches, dazzling sunshine, crystal-clear water, and nature's finest year-round air-conditioning system—the trade winds blowing across 1,500 miles of open ocean (map, pages 72-3). Temperatures average a balmy 78° F.*

Today modernization is remaking the faces of St. Thomas and St. Croix. Only for St. John has time stood still. When I first visited the U. S. Virgins in 1939, the upper slopes of these three main islands were almost

*See "Virgin Islands: Tropical Playland, U.S.A.," by John Scofield, NATIONAL GEOGRAPHIC, February, 1956.

Unbridled joy erupts as residents of St. Croix march through Christiansted on Transfer Day, March 31. Last year it marked the 50th anniversary of U.S. purchase of the islands from Denmark during World War I, a step taken to protect sea lanes to the Panama Canal.

untouched. This time, as I crossed Pillsbury Sound on my way to St. John, I looked back toward St. Thomas and saw a dramatic change. Houses were scattered everywhere on the hillsides. Subdivision projects patterned the promontories with roads, and the ranch-style dwellings that are the stamp of 20th-century America were mushrooming into suburban communities.

By contrast, as I looked over the bow of *Sea Saga*, a diesel cruiser I had chartered, St. John arose green and unspoiled. There is a small town at Cruz Bay, a typical West Indian village around a snug harbor protected by a toy fortress, but elsewhere St. John, with a mere 1,500 inhabitants, remains much as it existed centuries ago.

I climbed a hill that looks down on the multicolored shallows of Maho Bay. Across a blue channel the peaks of St. Thomas turned faintly purple in the sunset. Around me the wooded island seemed never to have known the print of a human foot.

But suddenly a lady with a hibiscus blossom in her hair appeared on the path below me, followed by a peacock in full plumage. I had come to visit Island Fancy, the home of "Grandma" McCully, but for a moment I thought I had wandered into the Garden of Eden.

Soon I was sitting in an airy gallery, learning the story of Mrs. Ethel Walbridge McCully.

"It was a case of love at first sight," she said. "I came down from New York for a vacation. In St. Thomas I bought a ticket on a native boat going to Tortola. When we passed this bay, I didn't want to go any farther. I asked the captain to put me ashore, but he said his clearance papers didn't permit him to touch American soil again. So I said, 'Let me off on that rock and I'll swim.' "

That is just what Grandma did. She was able to buy land on St. John, because the national park there was not yet established. After four years of travail with an unskilled architect (herself) and even more unskilled labor, she built her dream house, Island Fancy. Construction was delayed by such problems as a donkey eating the blueprints. The experience proved so frustrating but amusing that it inspired her to write a book, which she dedicated to her seventh grandchild.*

As we watched the extravaganza of sunset from her gallery, Grandma showed me a tile inscribed with her philosophy of life: "How beautiful it is to do nothing, and after doing nothing, to rest." Although this might not be a fitting motto for St. Croix or bustling St.

**Grandma Raised the Roof*, by Ethel Walbridge McCully. Thomas Y. Crowell Co., 1954.

Quiet pride marks the faces of old-timers as the capital, Charlotte Amalie on St. Thomas, celebrates Transfer Day. Bearded Austin Brewer wears a ribbon denoting residence since Danish times. When the islands changed hands in 1917, he became the first U. S. customs officer.

Thomas, it certainly is appropriate for St. John and its people.

Of the three major islands, St. John alone is untouched by the pace of modern life. And the best thing about St. John is that it will remain very much as it is today, because of the foresight and generosity of one individual.

In 1952 Laurance S. Rockefeller came to St. John for a visit, and realized that this idyllic tropical island was in danger of being swallowed by civilization. Through funds made available by Mr. Rockefeller and his family, Jackson Hole Preserve, Inc., a nonprofit organization headquartered in Wyoming, began acquiring land.

In 1956 more than 5,000 acres were offered to the people of the United States and were accepted on August 2 of that year, when Congress authorized establishment of Virgin Islands National Park. Additions have brought total park land on St. John to 9,485 acres, 74 percent of the island's area. Here, on campgrounds within sound of the waves, lovers of the outdoors can rent tents and equipment from the park and get close to nature (page 81).

Two Nations Share Cruising Wonderland

I anchored *Sea Saga* for the night off Caneel Bay Plantation, a hotel owned by Jackson Hole Preserve. In the morning Mr. Rockefeller and his wife Mary came aboard bearing picnic baskets for a cruise.

It was a sparkling day, the sea tipped into a million glittering points by a mild breeze. Before anchoring for lunch in the lee of a nearby cay, we cruised through the Windward Passage, to the west of the Sir Francis Drake Channel, which we could see as a lane of indigo winding between wooded islets—one of the loveliest passages in the world. It takes its name from the Elizabethan freebooter who sailed through in 1585 to plunder Spanish ships. Pirates called it the Virgins' Gangway.

Our course took us across the invisible boundary between the British and U. S. Virgin Islands, off the eastern and northern coasts of St. John. Although vessels may cross for fishing or sightseeing, the boundary has the effect of putting a barrier of red tape between the best cruising grounds, lying in British waters, and the logical means of access, which is from the U. S. islands. Yachtsmen from either island group who wish to land in the other must first obtain entry papers at one of the few legal ports of entry, sometimes inconvenient to use.

"Geographically, culturally, and economically, the two groups of islands are closely interrelated," said Mr. Rockefeller. "The people

Guiding *Sea Saga*, his chartered diesel cruiser, through the Windward Passage, the author steers a course across waters he has sailed on many another voyage. His shipboard guest, conservationist Laurance S. Rockefeller, made possible the creation on St. John of a national park that encompasses three-fourths of the island.

trade back and forth and travel to find work. Both use the U. S. dollar as currency. Yachts and planes are constantly shuttling tourists—despite all the bother of 'going foreign' each time anyone uses a port of entry. The British and American Virgins are the greatest resort combination in the world, and I hope a way can be found to make their ties even closer in the future."

We anchored off a deserted little cay, and I ferried the Rockefellers ashore in a dinghy. Beyond gleaming sand we picked our way through tropic undergrowth. As we walked and talked, I found the key to Laurance Rockefeller's interest in preserving unspoiled natural beauty. He appreciates it himself.

Mains'l snugged, swimming ladder rigged, the yacht *Dawnlight* swings off the palm-fringed beach of Caneel Bay Plantation, a hotel on St.

He had me kneeling to sight the contour of a section of beach sculptured by waves. On a hillock, he swung his arm in a circle. "Look!" he exclaimed as enthusiastically as a child finding an unexpected wonder under the Christmas tree. "From here you can see islands through 300 degrees of the compass, and the open Atlantic through the other 60!"

Slave Revolt Changes History's Course

St. John is as rich in history as in the charms of nature. When the Danes arrived in the mid-17th century, looking for some choice West Indian real estate for agriculture, they found St. Thomas and St. John uninhabited. Shortly after establishing a colony on St. Thomas, they attempted to settle the neighboring island, but the British on Tortola drove them off. In 1716 the Danes came back to St. John and this time were not molested. On the island's rich soil the colony thrived.

By 1733, St. John had 109 estates planted in cotton and cane, and 1,295 inhabitants, slaves outnumbering the planters about five to one. With its own magnificent harbor in Coral Bay (pages 66-7), which many have called the finest in the Lesser Antilles, St. John seemed to have a bright future.

Then, after a summer of drought, a plague of insects, and a hurricane, the slaves revolted. Entering the fort of Fredericksvaern with bundles of firewood, the leaders whipped out hidden cane knives, massacred the soldiers, and fired two shots, the signal for the slaughter of the planters and burning of the mills and great houses.

John. Formerly a sugar estate, the resort is a popular port of call for sailboats cruising the Virgins' inviting waters.

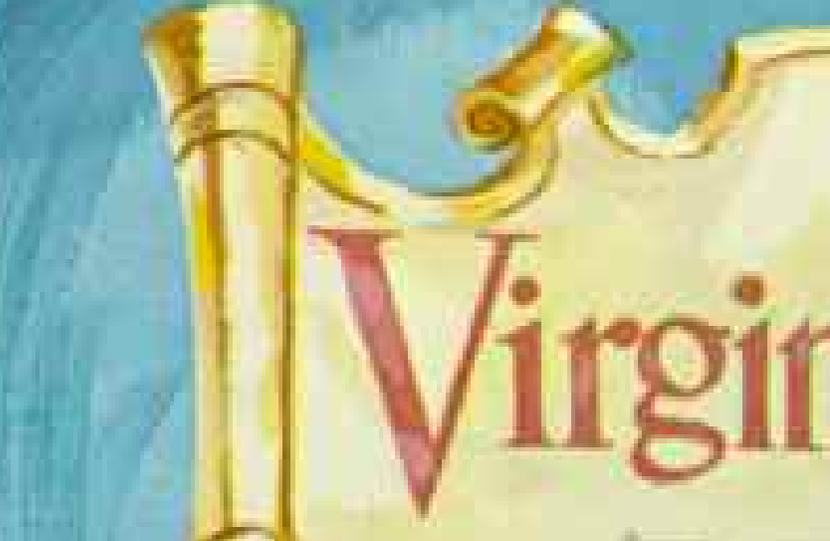
Stenciled to their sail by the December sun, vacationers at Caneel Bay plan an evening voyage. Gentle tides and ever-present breezes combine for a sailor's paradise.

Virgin Islands

STATUTE MILES

Elevations and soundings in feet

SUN-BLESSED SUMMITS OF DROWNED MOUNTAINS, the Virgin Islands sprinkle blue Caribbean waters like rough-cut emeralds. The United States and Great Britain share the hundred-odd isles and cays whose land area equals no more than a sixth of Rhode Island. Under the U. S. flag, residents of St. Croix, St. Thomas, and St. John enjoy local autonomy with a governor appointed by the President. A bill permitting them to elect their own governor is now pending before the 90th Congress. Under the Union Jack, an Administrator appointed by Queen Elizabeth II governs from Roadtown on Tortola, called the "vegetable garden of the Virgin Islands."



SHOPS OF CHARLOTTE AMALIE

FOR THE BARGAIN HUNTER, a free port's bounty; for the laughter seeker, a week-long carnival—Charlotte Amalie lures both. They come by jet, by sail, or by sea-creaming cruise ship. "Mocko Jumbi," a still-legged monarch, reigns on the last day of the April carnival.

ATLANTIC OCEAN

CORAL FANGS of Horse Shoe Reef, between Britain's Anegada and Virgin Gorda, snagged many a Spanish galleon, homeward bound with gold and silver. Now divers probe the bones of ships for treasure.

TRIPED MARLIN

CONCH SHELL

Anegada

Horse Shoe Reef

Necker Island

Guana Island

Great Camanoe

Virgin Gorda

Spanish Town

Jost van Dyke Island

Tobago Island

Sandy Cay

Great Thatch Island

Tortola

Roadtown

Sir Francis Drake Channel

Ginger Island

Cooper Island

Salt Island

Peter Island

Norman Island

St. Thomas

Charlotte Amalie

St. John

Cruz Bay

Caneel Bay Plantation

Coral Harbor

Coral Bay

Drunk Bay

Buck Island

GENERAL ELECTRIC UNDERWATER TEST CENTER

Frenchcap Cay

UNITED KINGDOM

UNITED STATES

CAMELOT IN CLIMATE, the Virgins enjoy temperatures that seldom vary more than 7 degrees from a year-round average of 78° F. Constant northeast trade winds insure low humidity. Thus all year is camping time on St. John and fishing time on Tortola.

SEEKING FRESH WATER. St. Thomas paves her hillsides with concrete rain catchments; water barged in from Puerto Rico by the U.S. Navy supplements the supply.

CHARLOTTE AMALIE HARBOR

YACHT

FRIGATEBIRD

CARIBBEAN SEA

EYEBALL TO EYEBALL WITH FISH, swimmers explore Buck Island Reef National Monument, a garden of coral where finned hosts in rainbow garb swarm to welcome—and inspect—their guests.

HARVESTING SUGAR CANE

VOYAGE OF DISCOVERY. Columbus sailed into St. Croix's Salt River Bay in 1493. During the 18th century, British and Danish planters made fortunes in sugar cane, a crop no longer cultivated.

BUCK ISLAND REEF NAT. MONUMENT

Mt. Eagle 1,088

Blue Mtn. 1,006

SCENIC ROAD

FOUNTAIN VALLEY GOLF COURSE

Upper Love

Christiansted

East Point

Peters Rest

ALEXANDER HAMILTON AIRPORT

Frederiksted

Whim

Tarville

HAPPY HILL

ALLENDALE

St. Croix

RUINS OF STONE-TOWERED SUGAR MILLS give the landscape of St. Croix a look of antiquity; sites of once-sumptuous plantation mansions haunt the island. Rare stands of mahogany near Frederiksted still supply cabinet makers.

Those planter families that escaped retired to Caneel Bay, then the estate of a planter named Peter Duerloo. Ruins of buildings in which they made their stand can still be seen near Caneel Bay Plantation. There the men manned two cannons and fended off the attack, while their women and children were put in boats for St. Thomas. Later the planters had to abandon the island, and for six months the slaves held it. It took French soldiers from Martinique to quell the uprising.

Local legends fail to agree on the final tragic ending. One version holds that the surviving slave leaders sat in a circle on Mary Point, near Annaberg Sugar Mill, which had been their last stronghold, and each shot the man next to him. Another legend says they leaped to their deaths on the rocks below.

Although many of the estates were rebuilt, the island never fully recovered. Then, after Denmark abolished slavery in 1848, fields and great houses were gradually abandoned and the tropic jungle crept back over all.

How time and understanding can heal the scars that are a heritage of slavery I learned from a native St. Johnian, Noble Samuel. We were on our way from Caneel Bay to Annaberg, bouncing along in a jeep over a road still formed in part by stones laid in slave days. We spoke of slavery and then of present-day race relations in a territory where more than half the population is Negro. Noble gave me the simple reason for his own serenity about the problem. "Everything adds up to a four-letter word—love," he said.

Former Dropout Now Leads Others

To judge by his successful career, the philosophy works for him. Noble had been a seventh-grade school dropout. After working as a laborer, he became a lifeguard at Trunk Bay. Unable to answer children's questions about shells, he went to night school, finally taking courses in marine biology. Today he is a National Park Service guide.

We explored Annaberg and the ruins of its old sugar mill. Now part of the national park, the hilltop site overlooks Leinster Bay, and as

Puzzled sixth grader queries his teacher at St. Dunstan's Episcopal School in Christiansted. Students seeking higher education traditionally go to universities on the U. S. mainland. The College of the Virgin Islands, a two-year school on St. Thomas, hopes eventually to offer a four-year curriculum.

Deft fingers of John Dyer (top) assemble a timepiece in the St. Croix plant of a Bulova Watch Company subsidiary. Last year the island shipped nearly 4,000,000 watches to the United States, its sole market.

Stage star turned handyman, Victor Borge tunes the piano in his villa at Christiansted. Practically a commuter, the Danish-born entertainer regularly escapes the pressures of mainland living by jetting nonstop from New York City to his St. Croix retreat.

Unfettered imagination wedded to tropical hues identifies the custom fabrics of English-born silk-screen artist Jim Tillett; he hand-prints some 20,000 yards a year in his workshop at Tutu, a village on St. Thomas. His painting depicts New York skyscrapers toppling under atomic attack.

ANACHRONISMS © NATIONAL GEOGRAPHIC SOCIETY

we admired the majestic, uncluttered view, Noble told me of the delight expressed by many of the park's 100,000 visitors a year. In his words, "People have gone so high up, now they're reaching back for the ground."

The people most likely to be happy on St. John are those with a craving for space and repose, walks in the woods, and deserted beaches. The atmosphere is in sharp contrast to the other two major American islands, which also differ markedly from each other.

Lying cheek to cheek on a bank of soundings that runs from the Anegada Passage on the east to the Mona Passage, west of Puerto Rico, St. Thomas and St. John are alike, geologically speaking, but in almost no other way. St. Croix is not even part of the same island group, being separated by 40 miles of frequently turbulent sea that plunges to depths of almost three miles (map, pages 72-3).

St. Croix Remains a "Sunday Island"

The day I boarded a plane to fly from St. Thomas to St. Croix, Charlotte Amalie was packed. Automobiles crawled bumper to bumper the length of Main Street, and cruise-ship visitors crowded into stores. Next day in St. Croix's Christiansted, I entered the colonial past. I strolled sidewalks of cut stone or brick, my steps echoing in arcades formed by arched pillars supporting balconies above.

So perfectly preserved is the heart of the old Danish capital that much of it has been designated a national historic site. I seemed alone with the ghostly sentries who had once paced the walls of Fort Christiansvaern, which looked more like a confection fashioned out of sugar than a fortification to ward off pirates and the king's enemies.

Suddenly I exclaimed to myself, "It's Sunday!" as a way of explaining the quiet. But the next morning it was almost the same, and so it remained. St. Croix, despite its relatively large population of 29,000, is a Sunday island.

"Even our merchants don't have the St. Thomian attitude about business," commented Lee Morris, who came to live here because his wife and he wanted to spearfish in their time off from teaching school. "Not long back, a cruise ship came in on a Thursday, when shops normally close for the afternoon. I passed a merchant friend barring his door and asked if he wasn't going to stay open with so

Poinsettias' fiery pinwheels star the garden of retired exporter William Callahan on Peter Peak, St. John. Orchids and other tropical plants grow wild in the Virgins' lofty rain forests, but in lower, more arid sections, gardens demand constant watering and cultivation. Patio of the Callahan home looks down on the blue infinity of Cinnamon Bay.

many visitors in town. He just said, 'I'm going fishing,' and snapped the padlock shut."

In Christiansted I enjoyed a morning with a Danish-American who finds St. Croix the perfect balance to his busy life. As I climbed the steps of a stately house, rippling piano chords flowed through jalousied windows. The music seemed such a complement to the beauty of the day that I knocked almost reluctantly.

The last time I had seen Victor Borge, he had been wearing white tie and tails as he sat down at a piano on a Broadway stage. Now he relaxed in sandals, shorts, and an open sport shirt (page 75). Below his terrace were the green and blue shallows of the harbor and surf creaming on the off-lying coral reef.

"Jets make it possible for me to have lunch in New York, then fly to Christiansted in time for an early dinner with friends," he told me. "Here I am in a different world, able to work or loaf as I please."

I reflected there is something about the tropics that breeds tranquillity. Mr. Borge put it better: "You feel you are living longer because every day you seem to be doing what you like to do, instead of just now and then."

Please Don't Pet the Eels

East of Christiansted, about two miles off the north shore of St. Croix, lies tiny Buck Island, almost surrounded by a barrier reef. Diving into warm limpid water, I discovered a national park different from any other I had visited. Brain coral grew in huge convoluted yellow clumps, some towering like top-heavy mushrooms from the sandy bottom almost to the surface, while gaily colored fish flitted through the branches of antler coral.

Signs pointed the way along an underwater

Ducking under booms and stepping over coiled lines, shoppers search for bargains aboard *Baby Mack*, a floating market in Cruz Bay, St. John.

The schooner sails west to Puerto Rico each week, returning with a cargo of fresh produce—bananas, pineapples, and tomatoes—to supplement local crops of avocados, papayas, limes, mangoes, and soursops. As on all the Virgins, eroded soil and shortage of water make it difficult to grow sufficient food. But the Holy Cross Hydroponic Experimental Farm on St. Croix works to develop techniques of farming suited to the islands. Its goal: to restore to St. Croix its onetime title, "Garden of the West Indies." Virgin Islanders bolster their diet with wild plants called "papalolo," "whitey Mary," and "bata bata." Cooked with fish and meat, the vegetables make a gooey stew known as "kalaloo."

trail, some—the equivalent of "Don't pick the flowers" or "Don't feed the bears"—warning swimmers not to gather sea fans or poke at the moray eels (page 87). For most of the 22,000 annual visitors to Buck Island Reef National Monument, a snorkeling trip over the trail is an introduction to the fantasy below the surface (map, page 73).

After I had followed the markers to the end, David L. Lane, the Park Service ranger, suggested that we swim over to a small coral head, where the fish are accustomed to occasional handouts from park visitors.

When I swam down to the coral head with a handful of cooked beans, the fish must have heard the dinner bell. Yellowtail snappers, squirrelfish, bluehead wrasses, common grunts, rock hinds, and sergeant majors swarmed toward my outstretched hand. Most insistent of all was a brown-and-white barred Nassau grouper, which nuzzled my palm to capture the last morsel, then swam closer to peer into my face mask as if asking for seconds.

Natives of St. Croix also have a rather unorthodox method of getting a free meal. I learned of it from Sylvester, a very dark little boy with a wide, white smile, whom I met over on the other end of the island.

In my rented car I had followed the Scenic Road, twisting along the central spine of highlands until I came to the plain sloping toward Frederiksted, a town of about 5,000 and chief port of the island. A spreading tree offered a pool of cool shade, and I stopped to watch stilt-legged white egrets feeding among humpbacked cattle.

Sylvester appeared unexpectedly on the other side of the road. He crossed over, leaned against the front fender of my car, and took a banana from inside his shirt. From the

KODACHROME BY JAMES L. STANFIELD © N.G.S.

bulge I could see he had quite a few more hidden away.

"Hello," I said. "What's your name?"

"Sylvester."

"What's the rest?"

"Ain't no rest. Jes' Sylvester."

"Where do you live?"

He made a gesture of beyond the next hill: "Ova dere."

"And where did you get the bananas?"

He waved toward a clump of trees in a different direction. "Ah been progging."

"You mean stealing?"

"No, sah! Progging, that's something you takes 'cause you got use for it. Stealing, that's if you sells what you takes!"

Sylvester was a native-born Crucian—or Cruzan (pronounced cru-ZAN)—and spoke a local dialect that was almost a patois. But often I felt during my stay in the Virgin Islands that people born there were as rare as true New Yorkers in Manhattan.

A visitor will hear every accent of the Caribbean. Hotel maids from Tortola in the British Virgins cleaned my room; waiters from St. Kitts served my meals. I met welders from

Stilled wings folded, yachts doze like gulls in Trunk Bay, St. John. Whether visiting sailors come to picnic on the bone-white sands or snorkel above coral gardens, they find here the perfect antidote for city living.

Tenting only six short strides from the Atlantic, campers prepare supper beneath sea-grape trees at Cinnamon Bay on St. John. This campground in Virgin Islands National Park lies farther south than any other operated by the United States.

EKTACHROME (ABOVE) AND KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Trinidad, mechanics from Barbados, and oil refinery technicians from Aruba. So many Puerto Ricans have moved to St. Croix that Spanish is almost a second language.

Outsiders today virtually equal the number of natives in the labor force. The immigration laws have had to be relaxed to provide services and skills vital to the current boom, and now as many as 13,000 of the total force of 26,800 are outsiders.

Newcomers soon develop a pride in being Virgin Islanders; it finds expression in a caste system based on length of residence. At the top are families that go back to the days when sugar was king and each plantation a ducal fief. Next come other settlers under Danish rule, then the earlier Americans.

Now, with the current influx, the system is telescoping. At a cocktail party I heard one gentleman refer to another as a "continental." As the speaker bore the look of an old tropic hand, I assumed his ancestors had been among the shipload of Danish colonists who in 1672 waded ashore on St. Thomas from the *Fero*, the local equivalent of the *Mayflower*. Later I found that this particular early settler

got off an airplane five years ago—against two for the man he was talking about!

I was lucky to find a genuine native Crucian, Jean Larsen, to show me the amazing geographic diversity of St. Croix. We drove along the flat plain of the southern coast, ideal for farming; then, moving northwest, we climbed the upper slopes of Mount Eagle and Blue Mountain, each lifting abruptly to above 1,000 feet. Leaving the car, we walked through rain forests, under primeval trees bearded by moss and festooned by airplants and vines thick as a man's leg.

Yet, ten miles away, the eastern end of St. Croix was a virtual desert. Cactus shapes and thorny acacias stood stark against a hard blue sky, while bosun birds rode the hot updrafts high above. Reaching the final rocky point that cleaves the trade-wind swells like a ship's bow, I stood at the easternmost territorial extremity of the United States.

"You can say now that you have the whole country behind you," laughed Jean.

I could not resist replying, "What a place for a presidential candidate to build a house!"

East Point has another distinction: It was the first part of the Virgin Islands to be sighted by Christopher Columbus. On the morning of November 14, 1493, during his second voyage, he passed the island called Ayay by the Indians. The admiral called it Santa Cruz—Holy Cross—but the name that stuck was St. Croix, bestowed during French occupancy in the 17th century.

Islands' Name Honors St. Ursula

As Columbus sailed northward from Santa Cruz, he saw a multitude of peaks lifting over the horizon. They were so numerous that he was reminded of the legend of St. Ursula and her 11,000 virgins. A popular version holds that Ursula was a British princess who besought her father to allow her to go on a cruise before marrying a pagan king. So many other maidens asked to be included that 11 ships were needed to transport them. After three years of wandering, they arrived in Cologne as it was being sacked by the Huns. Ursula and her companions were slain, but their memory lives on in the paradise Columbus named Las Virgenes in their honor.

The early Spaniards never tried to settle St. Croix or the other Virgins, but they returned on systematic raids to capture Indians for work in the gold mines of Hispaniola. Later arrivals found no Indians.

The Dutch and English moved onto St. Croix around 1625, but the latter soon crowded out the former, only to be ousted themselves by the Spanish. The French took possession

Airborne successors to inter-island vessels, amphibian planes ferry passengers practically from doorstep to doorstep in the Virgins. Here, beside the new Caravelle Hotel in Christiansted, St. Croix, an Antilles Air Boats ground crewman hoses sea salt from a Grumman Goose at the end of its day's work—seven round trips to St. Thomas.

in 1650, abandoned the island in 1695, but fought when the English planned a settlement. Then in 1733 the Danish West India and Guinea Company bought St. Croix from the French Crown to supplement the colonies already established on St. Thomas and St. John.

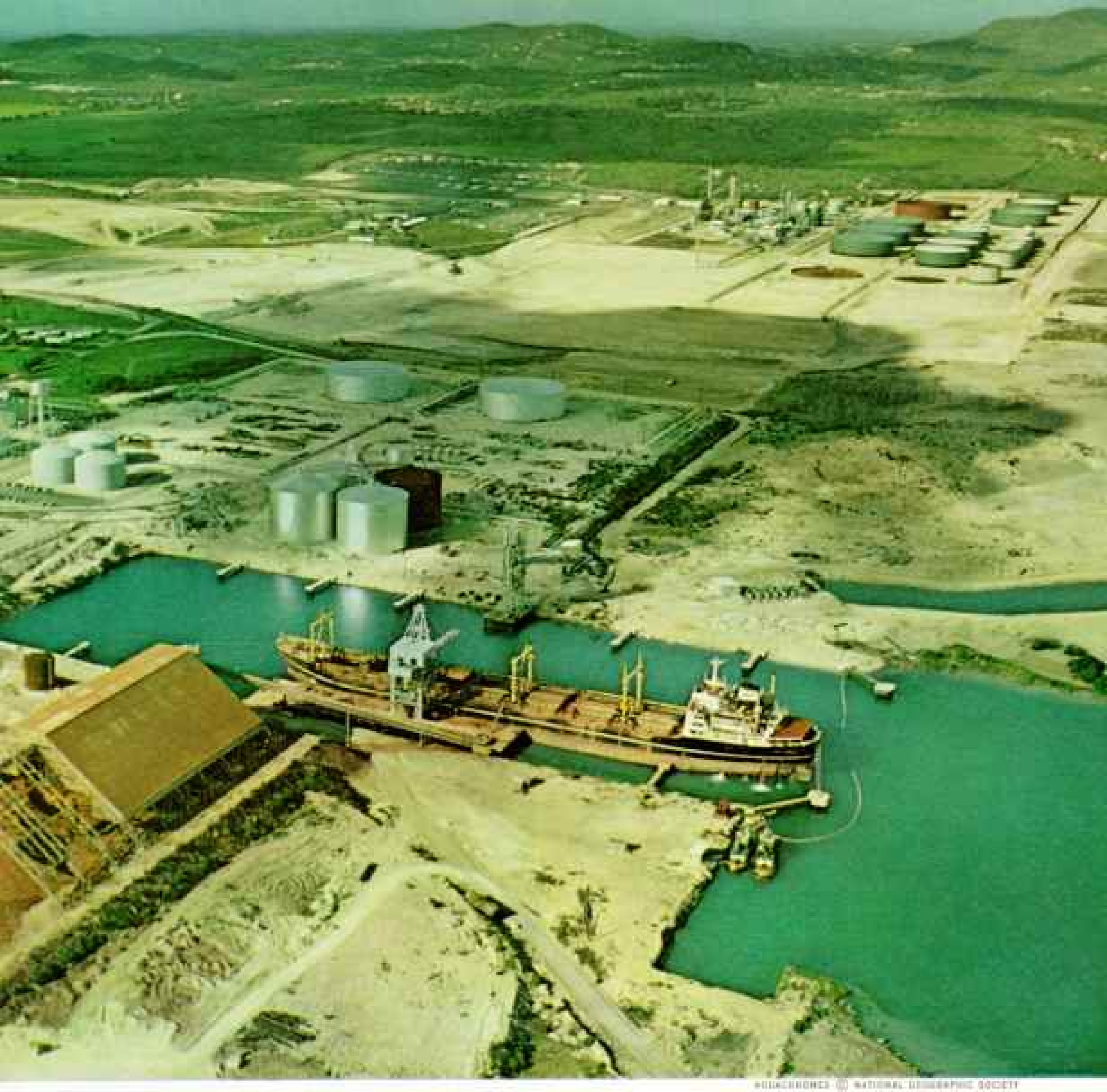
The Stars and Stripes has flown over the three islands only since March 31, 1917, when the United States acquired the Danish West Indies for strategic reasons. But the islands had a long history of friendship and commerce with their new motherland.

St. Croix played its part in the well-known "Triangle Trade." New England ships carried rum to Africa to trade for slaves, sold their human cargo in the West Indies, and stocked up on molasses to carry home to make more rum to buy more slaves. But the cooperation went much deeper, as the record of a letter I came across indicates.

In the fall of 1776, a Mr. Kelly on St. Croix watched gunpowder being loaded aboard a schooner for shipment to the forces

Two industrial giants sprawl across St. Croix's southern plain. Harvey Aluminum converts bauxite from Africa into alumina for shipment to the United States and Norway. Hess Oil, beyond the ore carrier, refines Venezuelan crude oil. To diversify their economy, the Virgins entice industry with low taxes and choice seaside sites.

From the white heat of a kiln, a Harvey technician extracts a sample of alumina. Each pound of the powder yields half a pound of raw aluminum.



of George Washington. Indignantly he wrote a dispatch on October 27 to Vice Admiral Young of His Britannic Majesty's Navy: "The Vessel went out under American Colours, saluted the Fort and had the compliment returned the same as if she had been an English or Danish ship!"

Thus the Danes of St. Croix were the first foreigners to honor the flag of the young American republic, though a more dramatic recognition of the United States three weeks later has somewhat obscured the Danes' credit. The first salute to a flag flown by the Continental Navy took place on November 16, when Fort Oranje on the Dutch Leeward island of St. Eustatius returned the cannon salute of the brigantine *Andrew Doria*.*

The United States bought the Virgin Islands mainly to prevent Germany from establishing a submarine nest in the Caribbean during World War I, and to secure the magnificent harbor of Charlotte Amalie as a naval base controlling the sea approaches to the Panama Canal. The acquisition included St. Thomas, St. Croix, St. John, and a scattering of small offshore cays (map, pages 72-3).

Land Value Multiplies 3,300 Times

The purchase price of $25,000,000 was the highest sum ever paid by the United States for territory, while the land area gained—132 square miles—was the smallest. The cost worked out at $295 an acre; in comparison to the bargain price of 2 cents an acre for Alaska.

*See "A Fresh Breeze Stirs the Leewards," by Carleton Mitchell, NATIONAL GEOGRAPHIC, October, 1966.

Now, with regular jet service and the new concept of leisure, real estate values have soared. Choice residential land on St. Thomas brings as much as $30,000 an acre, and recently a site for a hotel on St. Croix sold for more than three times that figure. But Richard Ellington, who has built a cottage colony across from Cruz Bay, told me of a case that topped them all.

"In 1948 my wife accompanied a lady to buy a piece of waterfront property on St. John," he said. "She stood by while the lady counted out fifty crisp one-dollar bills in payment for a little more than two acres of beachfront property. She later sold it for $1,200. Now I hear that it has changed hands again —for $165,000."

Rare Level Area Attracts Industry

Even land without a beach or ocean view is valuable on St. Croix. The level area on the south coast became the logical site in 1962 for the first airport in the Virgins capable of handling major jets. The same region is well adapted to industrial development and is today dotted with plants, including an oil refinery and a bauxite processing complex (preceding pages).

From Centerline Road, I could see a gas flare burning in the tall refinery stack. Ralph M. Paiewonsky, Governor of the islands, referred to it in his dedication speech as "the torch of economic freedom," reflecting his belief that the Virgins must develop beyond sole dependence on tourist income.

Walking through a labyrinth of pipes and fractionators constructed in seven months by Hess Oil Virgin Islands Corporation, I saw a port created behind a breakwater 5,000 feet long. The refinery will eventually process 120,000 barrels of Venezuelan crude oil a day, providing about 500 jobs.

Next door, also with its own harbor, stands the computerized plant of Harvey Aluminum of California. With Arthur J. Tielens, the general manager, I stood atop enormous vat-like precipitators used in converting bauxite into alumina, the white powder from which aluminum is made.

Mr. Tielens' remarks underlined the international aspects of the industry: "We bring in ore from mines in Africa, and we ship alumina to Norway or through the Panama Canal to Oregon."

Tariff regulations make this world-wide shuttling feasible. If an island manufacturer can turn out a product worth at least twice as much as the imported raw materials it contains, he may ship it duty-free to the States.

Many Virgin Islanders worry about the growth of large manufacturing plants. As Laurance Rockefeller explained, "There is always the danger that if the character of a place is changed, people will go elsewhere." And that could be disastrous, for despite the budding industry, prosperity is based on a continuing boom in tourism, the islands' leading income producer. Government economists estimate that visitors leave approximately $65,000,000 in local pockets each year.

One of the charms of St. Croix for visiting sportsmen is Fountain Valley Golf Course, a rare luxury in an area where water is scarce. Constructed by Laurance and David

PHOTOGRAPHS (ABOVE) AND EXTACHROME BY JAMES L. STANFIELD © N.G.S.

Strolling through the sea, snorkelers explore one of the world's most unusual nature trails. In Buck Island Reef National Monument, a calm and shallow lagoon off St. Croix, swimmers glide above branchlike arms of living elkhorn coral. So clear is the Caribbean that they see a hundred feet ahead in waters teeming with many-hued tropical fish.

Submerged signs on the reef trail introduce the dazzling world of marine life to visitors. Seaweed obscured this sea-fan marker; Park Ranger David Lane, left, and the author swim down to scrape it clean. Giant brain coral in background rises almost to the surface.

Rockefeller, it is a green gem of championship length and quality, landscaped with palms and tropic blossoms, open to all who wish to play.

Indians to Cane to Cattle to Golfers

"We're lucky," said Ronald P. Chandler, the manager. "We have a heavy clay soil that holds moisture trickling down from the mountains. Our 'water holes' were drinking ponds when Fountain Valley was a cattle range. Caribs to cane to cattle to golfers—there's a thumbnail sketch of island progress."

Elsewhere on the islands, the water problem is severe. Long ago, the cutting down of trees to make way for plantations lessened the ability of denuded hillsides to coax and hold rain from passing clouds. Drilling wells has failed to disclose any great subterranean stores. In 1965 the drought was so intense that President Johnson proclaimed the islands a disaster area.

Thus I was interested to meet a man who proposed to do something about the weather. During breakfast in a sunlit patio, Robert B. Smith told me about Project Rainstart, for which he was doing advance planning.

"Rainstart is being sponsored by the National Science Foundation and Fairleigh Dickinson University of Rutherford, New Jersey," he said. "We'll begin with a task force that will include two airplanes, a radar-control station, and a network of automatically recording rain gauges.

"We are going to apply a technique that has shown promise in Puerto Rico. Airplanes will fly below cumulus clouds and release finely ground salt. The minuscule particles will rise into the clouds on the updrafts, growing as they absorb moisture until they attain enough weight to fall. On the way down they'll collide with other cloud particles. As they do, we hope they'll gain sufficient size to fall as rain."

While he spoke, I squinted at the blue sky above, perfect for sunbathing and all the

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Great houses with fanciful names evoke an era on St. Croix when sugar was king and island cane barons lived like royalty. A third-grade class from Christiansted tours Whim, 172-year-old mansion preserved by the Landmarks Society. Emancipation of the slaves in 1848 and a disastrous drop in sugar prices spelled death for the industry and ruin for such opulent estates as Fanny's Fancy, Upper Love, Peter's Rest, Paradise, and Contentment.

Reminders of yesteryears: Whim's brick-floored museum displays rum casks, a portable bathtub, and a cart. Lock and keys (lower left) were forged by hand.

other things visitors seek in the islands. I could not help reflecting that if Project Rainstart is successful, the scientists might have complaints from irate tourists!

One thing the weather can't change is the delightful colonial atmosphere of St. Croix. The island reached the peak of its opulence about 1796, when 114 windmills and 144 mule- or ox-powered treadmills ground the cane that was the basis of prosperity.

Steadily rising production costs finally ended the making of sugar. During my visit, the last steam mill was being dismantled for shipment to Venezuela. Yet nowhere in my voyaging among the Caribbean islands have I encountered so many reminders of the West Indies that was.

On both sides of Centerline Road, the main thoroughfare of St. Croix, windmill towers still stand, close to the remains of great houses. Not only are St. Croix's ruins being protected but several are being remade into charming residences. I could easily picture life as it must have been during the 18th century. Then a waving green sea of sugar stalks ran down to melt into the blue of the Caribbean, and many families enjoyed a life comparable to that of Europe's aristocracy.

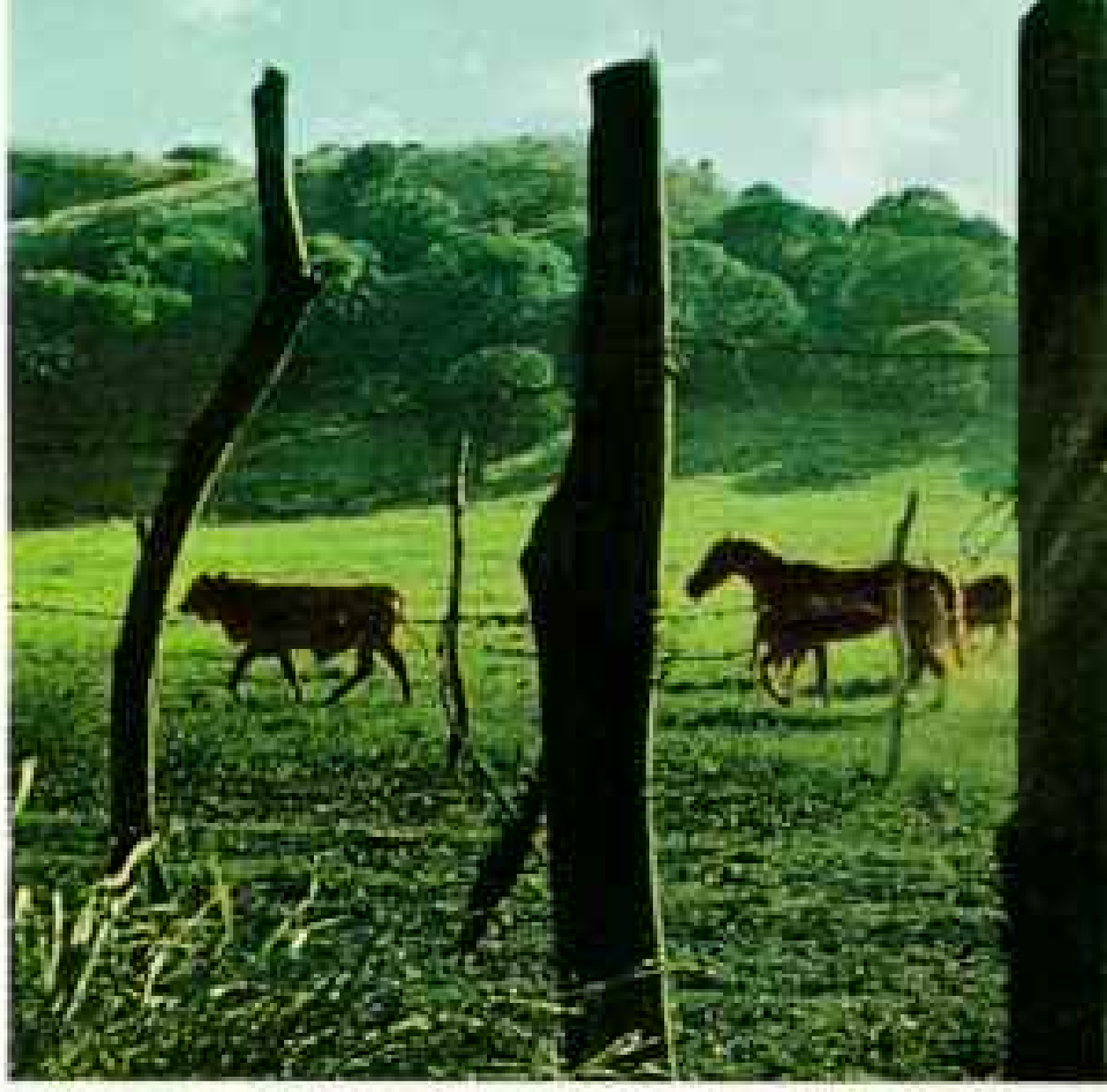
Old prints show teams of six oxen pulling huge, high-wheeled wagons loaded with hogsheads of muscovado—raw sugar still smelling of molasses—to sailing ships waiting off King's Wharf in Christiansted. Carriages bore ladies along the road in the shade of palms, while planters and overseers on prancing horses reined in to exchange greetings.

Past Lives On in Restored Mansion

I came to the end of my stay in St. Croix feeling that it was a fascinating balance between the old West Indies of planter days and modern America. On my last night, I sat on the terrace of a great house that had been restored by Lee Platt. Lee is an old sailing friend from New England who "swallowed the anchor" when he discovered St. Croix.

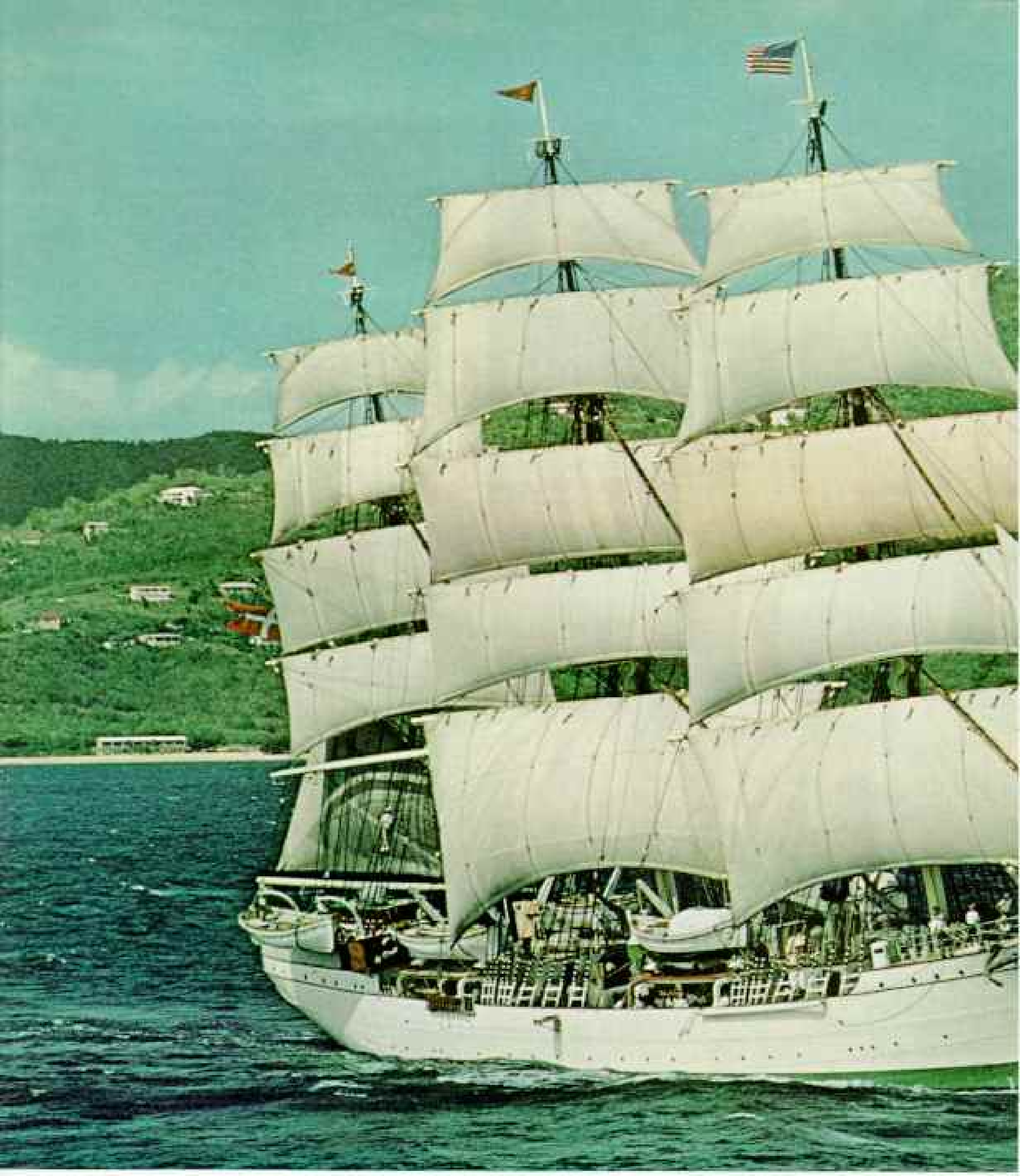
While I sipped a fragrant cocktail of locally distilled rum and juices of fruit grown on the island, Lee showed me pictures of the house before he came on it—a shell of stone fashioned by skilled slave masons, but little else. The roof had fallen in; floors and other woodwork had rotted away. Through Lee's loving care, it had blossomed anew into a design for living, as it had once been for a long-departed planter family.

Curious, I asked Lee why he had chosen to make St. Croix his home. He made an eloquent



Deep-piled pastures fatten livestock on a St. Croix ranch. The island, unlike St. John and St. Thomas, is endowed with flatlands suitable for raising cattle. Farms flourish and industrial complexes rise where sugar plantations once thrived.

Casual elegance flavors the spacious home of Mr. and Mrs. Wendy Hilty, which rose from an abandoned St. Croix sugar mill. The Hiltys' pet macaw, perched on a chair back at right, roams the house untethered.



Topgallants stretched taut by northeast trades, the Danish training ship *Danmark* beats past St. Thomas. She called at the islands last year to help celebrate Transfer Day.

gesture, encompassing his house and all the varied topography of the island, plus the surrounding sea.

"Here is continuity," he said, "a feeling of belonging some place that has stayed the same for a long time. St. Croix is a family island. Those of us who have settled here want to keep it that way."

St. Thomas offers a complete change of pace. As I skimmed over Charlotte Amalie's harbor in an amphibious plane, I looked down on four cruise ships that had converged on this crossroads of the Caribbean. Surprisingly to me, one, the *Alexander Pushkin*, flew the Soviet flag. Ashore, crowded sidewalks spilled visitors into the streets, where jammed-up taxis hooted them back.

The capital, named for a Danish princess

Hands across the ocean: *Denmark's* skipper, Capt. Vilhelm Hansen, left, welcomes Rear Adm. Frederick J. Harlfinger II, commander of the U. S. Navy's South Atlantic Force. Others, left to right: Danish Ambassador Torben Roenne, Virgin Islands Governor Ralph M. Paiewonsky, and Secretary of the Interior Stewart L. Udall

during a more leisured epoch, has taken on a sense of urban urgency, with shops stocked with every temptation known to man—and, especially, woman. As I walked the capital's streets, I was jostled by ladies making sure they missed no free-port bargains. It seemed to me that shopping should be classified as a dangerous compulsion.

With its steel bands, nightclubs, French restaurants, and its bounty of bikinis, St. Thomas is the "swinger" of the three sister islands. This rollicking atmosphere is a heritage of the days when Denmark, as a neutral nation in the ever-recurring wars of Europe, threw its chief West Indian port open to all—including privateers and pirates.

The city fathers of Charlotte Amalie, in its early days, asked no questions about the source of goods that arrived to fill their warehouses. "A privateer can use the harbor as long as he likes, but a pirate may not lie there more than 24 hours," wrote planter Johan Carstens in the 1740's, adding an explanation of the difference: "A pirate is one who robs both ship and crew, and then kills the men; the privateer takes ship and cargo,

Astronaut of "inner space," an Aqua-Lung diver experiments with weightlessness in General Electric's underwater test center off St. Thomas. Ballasted suit neutralizing his buoyancy, a diver needs only one hand to move a simulated instrument console inside a mock-up of a rocket fuel tank. His ability to function gives engineers clues as to how well astronauts will be able to work in the weightlessness of space. Hurricane Beulah wrecked this elaborate model last September, and it was abandoned. Fortunately, scientists had completed their basic research.

and robs the men, but spares their lives."

But such niceties rarely troubled the authorities. An early brigand, Jean Hamlin, used Charlotte Amalie as a base for *La Trompeuse*, as piratical a vessel as ever hoisted skull and crossbones. Hamlin was a crony of Governor Adolf Esmit, and rumor had it that His Excellency took an occasional turn at freebooting. Scores of the "Brethren of the Coast" looked in on Charlotte Amalie: Bluebeard, Blackbeard, even Captain Kidd.

The Virgin Islands continued their nautical orientation after coming under the Stars and Stripes. Acquired primarily as a base, they were administered by the United States Navy. Rear Adm. James Harrison Oliver was the first governor, and seven more naval officers followed in office until 1931, when President Herbert Hoover appointed a civilian. As an unincorporated territory, the islands became wards of the Department of the Interior.

The present Governor, Ralph Paiewonsky, was born on St. Thomas. His parents emigrated from Lithuania in 1884. After early schooling in Charlotte Amalie, he attended New York University, returned to work in the family business of distilling rum, and later entered local politics. He has served longer than any other governor of these islands—six years and ten months to date.

Picking Governor a Presidential Duty

"A document called the Revised Organic Act, passed by Congress in 1954, is our Magna Carta," the Governor said as we had lunch in the century-old executive mansion in Charlotte Amalie. He explained that the act begins by reaffirming the Bill of Rights, and provides for three branches of government, including a unicameral legislature voted for in local elections. Residents have no voice in national affairs, however. They cannot vote for President or Congressional representatives.

"Virgin Islanders do not even choose their governor," Mr. Paiewonsky said, "but efforts to make the office elective have continued through several sessions of Congress. I was appointed by President Kennedy. Although we do not have representation, we pay income taxes at the same rates as other U. S. citizens, but the money remains here for local use."

To buoy the economy, Washington deals gently with the islands on the matter of tariffs.

"St. Thomas was known as a free port under the Danes," Mr. Paiewonsky explained, "with only a flat 6 percent levy on foreign goods. When the islands became American, Congress

made U. S. goods duty free, and kept the old 6 percent import tariff, which is far less on the average than mainland rates."

As a result, the U. S. Virgins are treated like alien territory in one respect. Homeward-bound Americans must pass through customs and declare free-port purchases, just as if they had been acquired in a foreign country. They may, however, bring home $200 worth duty free, twice what they are allowed from a foreign land.

Leaving the Governor, I walked, or rather climbed, around the capital (pages 98-9).

Charlotte Amalie, the Virgins' largest city, with 18,000 inhabitants, rises on three hills, shown as Government, Berg, and French on modern maps, but called Mizzentop, Maintop, and Foretop in windjammer days. Some streets are so steep they turn into flights of steps. Since much of St. Thomas is as hilly as the capital, the island has been handicapped ever since its settlement by a lack of flat land for industry or agriculture. One of the reasons the Danes pushed on to the other islands was to seek more easily tilled fields.

St. Thomians are still in quest of flat land.

To accommodate even the smaller jets at the existing airport, a hillside was sliced away at one end of the only runway and dumped into the sea at the other. Local boosters worry that St. Croix, with its flat industrial sites and a new airport that can handle the largest jets, may outstrip St. Thomas. But relief is in sight. The Federal Aviation Agency is studying proposals to give St. Thomas a jetport capable of handling present and future giants by leveling a 200-foot-high ridge.

One level area has already become available for development into an industrial park because of the recent deactivation of the U. S. Navy's submarine base. Governor Paiewonsky hopes manufacturers will be attracted by a combination of climate and tax-incentive schemes—factors which sparked the economic upsurge in neighboring Puerto Rico.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Bold Patterns Born in an Old Cow Barn

Civic planners will inevitably bring in bigger industries, but I doubt that any will be more picturesque than the one-man industry I came across on a former dairy farm. English-born Jim Tillett lives with his family next to his workshop, where he produces and sells articles not only beautiful but useful (page 75).

"I apprenticed myself to my father, who was a silk-screen printer," he said as he hand-printed a 25-yard length of cloth pinned to a table in an old cow barn. The design he had created stemmed from mysterious petroglyphs on St. John. When he finished I would get a cutting, from which his wife Rhoda would make me a shirt.

Color has been Jim Tillett's lifetime preoccupation. A search for brilliant sunshine and bold natural patterns took him from the fog of his native London to Tahiti and Mexico, before he settled in St. Thomas's Tutu village.

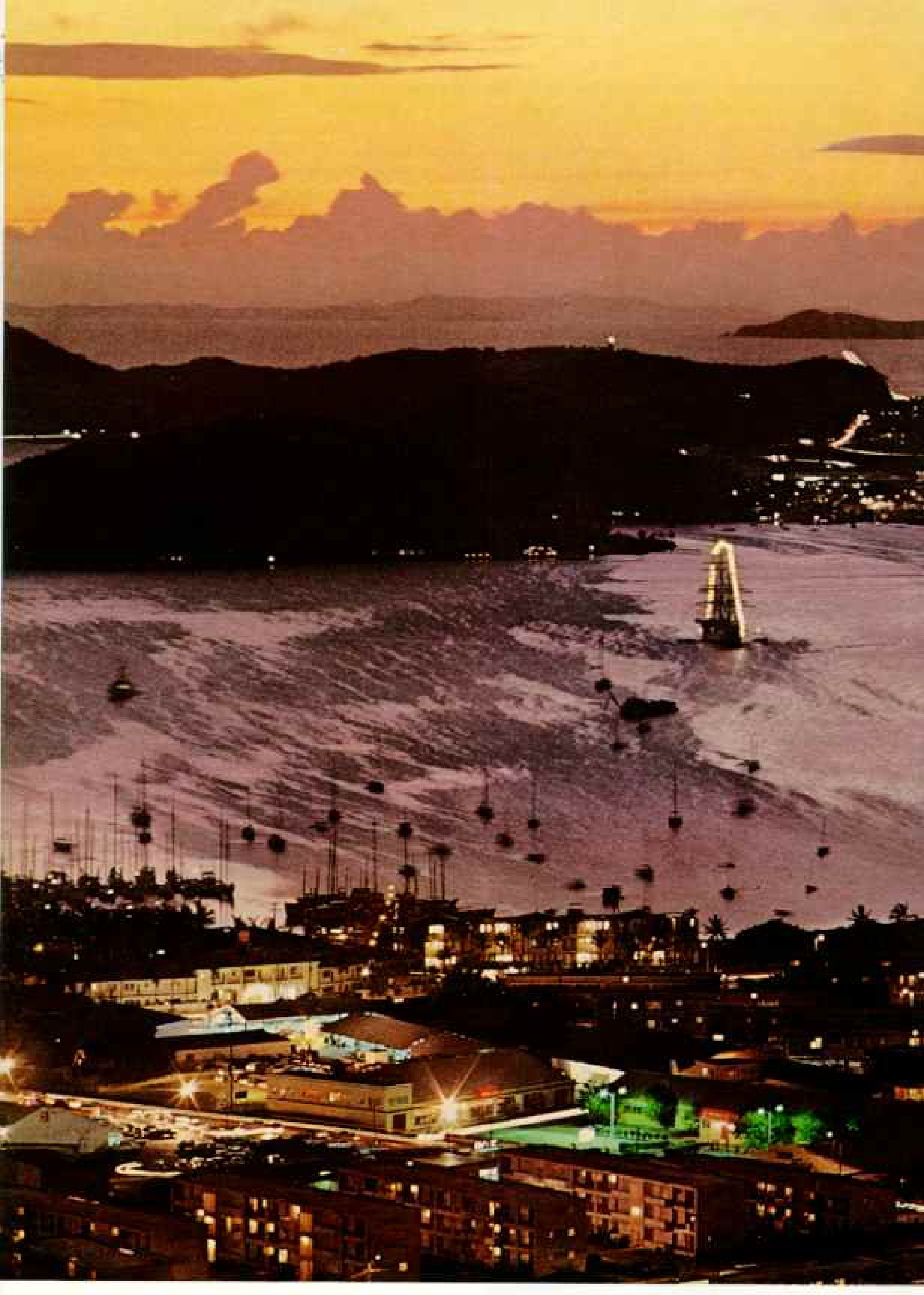
While he worked, I asked him to explain his paintings, which hung all about the studio.

He pointed to one. "'No man is an island,'" he said, quoting 17th-century poet John Donne, "and even here when 'the bell tolls, it tolls for thee.' In that picture of New York being destroyed by an atomic bomb, you see the blast reflected in my eyes. Those waves of fire passing through me mean that I'm not just looking from afar—I'm in it."

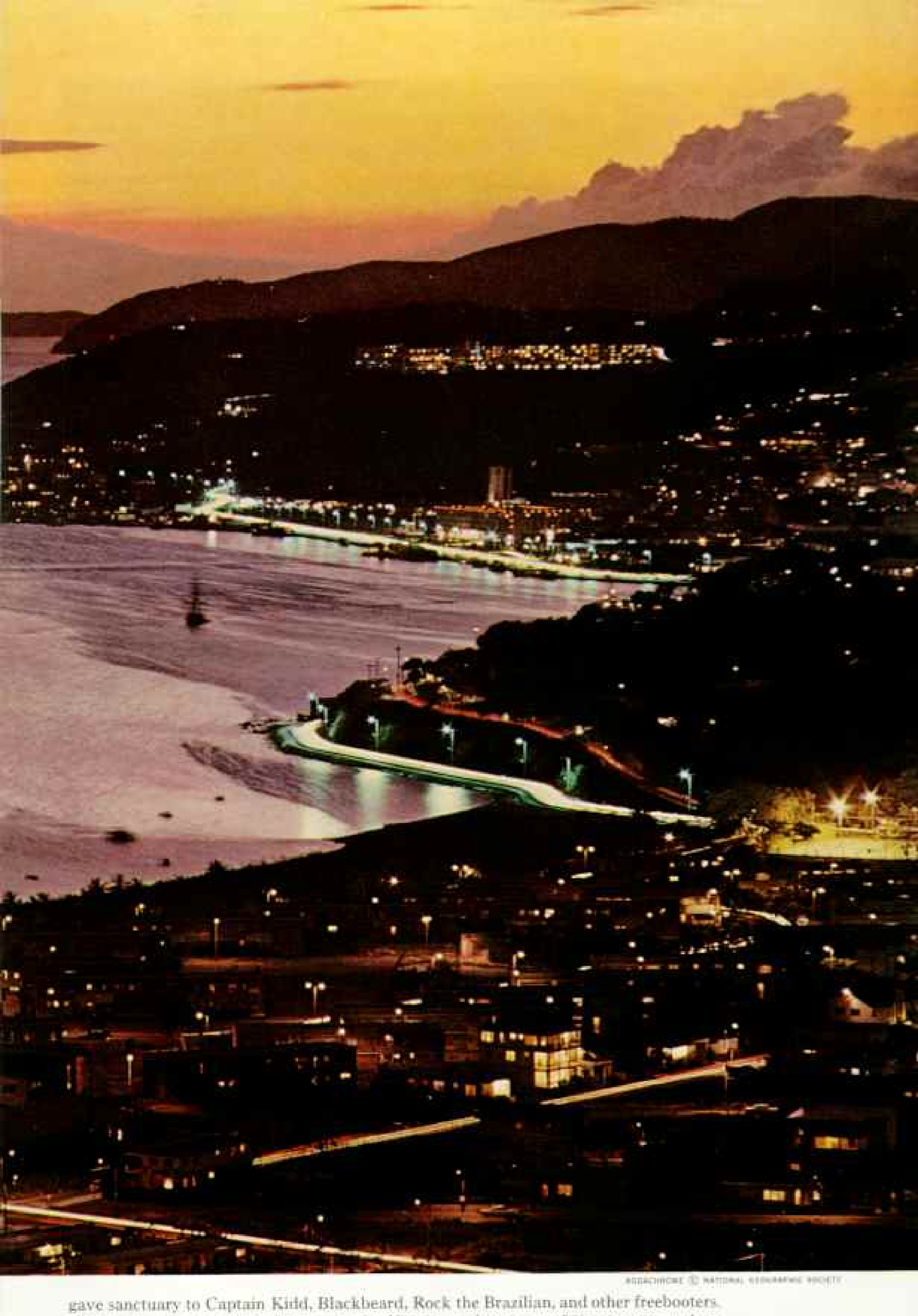
Jim Tillett is not lulled by tropic languor. He hand-prints 20,000 yards of fabric a year, paints, makes precisely detailed maps on cloth, and teaches. As I watched him work, I was reminded of a Renaissance artist-craftsman who had stepped out of an old portrait, pausing only to change from brocaded velvet to paint-smeared cotton.

Although the rugged contours of St. Thomas present a problem to commercial development, they are ideal for home-seekers, and today it is the U. S. Virgins' most populous island,

Sands of tradition floor Charlotte Amalie's synagogue. For cleanliness, Jews once carpeted their places of worship with the easily disposable substance, and the practice continues here today. European Jews came to St. Thomas with the first settlers in 1665, a year before Denmark claimed the island.



Spangled by the first lights of evening, Charlotte Amalie anticipates the dusk-to-dawn revelry that ushers in Transfer Day. In gala salute, *Danmark* dresses ship with lamps strung from her mastheads. Named for a Danish princess, Charlotte Amalie



gave sanctuary to Captain Kidd, Blackbeard, Rock the Brazilian, and other freebooters. Today the city of 18,000, largest in the Virgins, welcomes modern treasure seekers —hordes of tourists eager to snap up luxury goods at bargain prices in the free port.

with almost 50,000 inhabitants. Roads twisting up mountainsides offer a new vista at every turn, and houses perched like ospreys' nests command breath-stopping panoramas. The waters around the island, seen from the heights, are magical.

Always on St. Thomas a visitor is aware of the sea, the broad highway of history and adventure that bore the flow of life from the Old World to the New. Now that same ancient bridge may help man on his way to the planets. At a small island lying a few miles off Charlotte Amalie harbor, I donned scuba gear to visit an underwater structure built by General Electric Company's Missile and Space Division.

My companion, project diver Tom Carlin, was assigned to an experiment in weightlessness (pages 94-5). Tom wore a suit balanced with weights that neutralized his buoyancy, so that under water he hung suspended like a man in space. The exercise was aimed to test how well future astronauts could learn to work with the bulky equipment involved in the next generation of manned spacecraft.

Fascinated, I watched Tom enter an underwater mock-up of a rocket-booster fuel tank. In the future, a genuine fuel tank will be used as an orbiting space platform after its hydrogen propellant has burned. Astronauts will rendezvous from a smaller capsule and install equipment for living aboard. The tank then will become a base for the exploration of our solar system.

With a mighty windup, a sailor on shore leave from the cruiser U.S.S. *Newport News* hurls a ball at weighted bottles. Balloon-blowing belle will score his hits. In holiday mood, throngs jam Carnival Village in Charlotte Amalie on the 50th anniversary of Transfer Day.

"Jump in the middle o' the line, wiggle when the steel band chime." Truck-borne drummers beat out the calypso tune in the Transfer Day parade. Merrymakers jammed shoulder to shoulder on the sidewalk enjoy the river of color and noise flowing down the capital's Main Street. [illegible] WORDS AND MUSIC BY BILL LA MOTTE © 1964 WESTERN MUSIC CO.

As Tom worked to attach a control console, the slightest twist of his hands made his feet float straight up. He often looked like an acrobat frozen in the middle of a cartwheel.

After surfacing to strap on a fresh tank of air, I found how it might feel to walk on the moon. Thirty feet below the surface stretches a simulated Lunar Path.

"It's weird," said Alvin White, chief safety diver, before I went down.

Unlike the floor of most tropic lagoons, this one was formed of bone-white rock, smooth in some places, jagged in others. No lush reef growths, no colors. Copying Al, I lifted a loose stone from the bottom and cradled it in my arms. It formed sufficient ballast to keep me from floating upward, but not much more, and the effect was to simulate gravity conditions on the moon—one-sixth that of earth.

"Lunar Stroll" Gives Nightmare Feeling

I had a hard time getting traction and maintaining balance. If I stepped off a ledge, I floated down slowly. Following Al across the dead and silent seascape, I was reminded of a grotesque nightmare, of being chased while all I could do was move in slow motion.

Since my visit, the fuel-tank mock-up has fallen victim to a hazard of "inner space." Hurricane Beulah sideswiped the Virgins last September, and underwater turbulence heavily damaged the model. Repair was out of the question, but luckily the initial research program had been completed and the data turned over to the National Aeronautics and Space Administration.

Back in Charlotte Amalie, I came across quite a different aspect of St. Thomas's association with the sea. The flavor of a past when all ships were wind-driven lingers at Yacht Haven, where some 130 small vessels moor snugly near the northeast side of the harbor, the weather shore in this land of northeasterly trades.

At Yacht Haven a visitor can become a captain for a day, or a week, or longer if he wishes. Fifty yachts complete with crews are available for charter, plus another ten on a "bareboat" basis, the nautical equivalent of a drive-it-yourself automobile rental. From Yacht Haven little ships roam through the archipelago, beating upwind and scudding down, dropping anchor in coves that may have sheltered pirates.

The leading charterer, who makes the dream of vagabonding through the islands come true for non-boatowners, is Frank Burke. He put in at Charlotte Amalie as a way-port on a round-the-world cruise one day in 1962, after abandoning a New York career that had included being a sales manager of one

Marbled surf tumbles cobbles at Drunk Bay on the southern tip of St. John as an islander searches for shellfish. Bound by solitude, this tranquil shore belies spreading industrialization in the Virgins and the swift rise of tourism.

manufacturing firm and president of another. No sooner had Frank arrived at St. Thomas than his schooner burned.

"There I was on the beach in my underwear," he recalls. "I had to find something to do, so with a friend I started Island Yachts."

"How do you dare turn strangers loose on a bareboat charter?" I asked.

"We begin with a questionnaire that requires listing of all sailing experience, yacht club affiliations, and the rest. If it looks good, we promise a boat. When the charterer arrives, we check over everything with him, then go out for a sail. If he handles the boat okay, he's on his own. If he flunks, we insist he take along a crewman that we provide—at $100 extra for a week."

While I didn't ask Frank to check me out, I'm going back. For if the whole West Indies could be considered a heaven-on-earth established by a beneficent providence for sun-seekers and small-boat sailors, the Virgin Islands would have to be a special preserve for the more deserving angels. But fortunately, as even the pirates proved, one doesn't have to be an angel to enjoy them. THE END

BIG BEND
Jewel in the Texas Desert

By NATHANIEL T. KENNEY

Photographs by JAMES L. STANFIELD

Both National Geographic Staff

AMONG THE HIGH CHISOS peaks it snowed wetly at dawn, so that we rode down the mountainside soaked and chilled, each in his own cloud of horse-perfumed fog.

The same afternoon on the desert below, the sun over Texas did its best to broil our brains.

The earth as well as the heavens sought to bar our way through Big Bend National Park. Boulders and deep sands, an arroyo, a wash too steep to cross doubled the length of our journey.

Ocotillo and prickly-pear cactus reached for us with fierce claws. Underfoot the terrible lechuguilla, the

squat agave of the steel-strong needles, waited to wound the unwary horse that stepped on it.

We saw no other human beings, for we did not ride the good roads the vacationists use in this bit of Chihuahuan desert strayed north from Mexico. Humans had passed by down the years, of course, and we saw their signs: the crumbled adobe walls of a goatherder's house, a rancher's rusted windmill, flint chips in the ashes of Indian campfires long cold.

We saw where some stay forever, under wooden crosses that wind-blown sand has scoured clean of carved names. Each rested alone, for they buried a man where he died in the old days here, and a pioneer wife too.

C. M. (Buck) Newsome—a cowpuncher in his youth, then a Rio Grande Border Patrolman for 18 years, and now operator of the park's string of riding horses—heaved his Texas-size frame around in the saddle.

"Tough country," he said, as if reading my mind. "Big country. Lonesome. So tough, so big, and so lonesome nobody lived in it long enough to change it much.

"Feller once said something I first thought was corny: 'It's the one bit of the old Southwest that remains to us, the last frontier.' But he was right."

In a land of yesterday, a solitary rider on the South Rim of the Chisos Mountains scans the lonely immensity of Big Bend National Park, a wilderness that man has challenged but never changed. Beyond crumpled peaks lies the Texas-Mexico border, where the Rio Grande makes the great U-turn that gives the park its name.

And so he was, and this aspect of Big Bend, one of our newer and wilder national parks, fascinates me more with each visit I pay it. This is one man's view, of course, and there is a great deal more than history in the park. As a matter of fact, it was established primarily to preserve a fragile desert wilderness that was in grave danger of being destroyed by overgrazing and overhunting.

The nucleus of the federal preserve is the former Texas Canyons State Park, established by a farseeing Texas Legislature in 1933. Shortly afterward, a Texas Member of Congress, R. E. Thomason, introduced legislation to create a national park in this "Big Bend" of the Rio Grande.

Of all the citizens of Texas who supported the proposal with enthusiasm and money, two were outstanding in zeal. One was the late Representative E. E. Townsend, a former Texas Ranger, and the other the late newspaper publisher Amon G. Carter, whose *Fort Worth Star-Telegram* sponsored a public campaign to raise $1,000,000 for buying land.

In 1941 the Texas Legislature appropriated $1,500,000 for the same purpose. Three years later deeds to all the land acquired were presented to the Federal Government, and the park was established. It consists now of 708,221 acres of desert, mountains, and Rio Grande country (map, page 113) visited each year by more than 165,000 people, many of them retired couples who come to enjoy the warm winter sunshine.

Confounding those who think desert is all flat monotony, Big Bend is infinitely varied. Once as I drove along one of the park's lesser roads, perhaps an old ranch lane, I saw a man silhouetted against the sky on a miniature mesa. When I reached him I recognized Perry Brown, the park's superintendent at the time. He was studying—of all things to find in the desert!—the imprint of a huge oyster shell in the rock.

"This is one of the best specimens I've seen," he said, with the gleam of the ardent rockhound in his eyes. "It was entombed eighty million years ago, when the desert around us was the floor of a vast sea."

After the sea receded, the Big Bend became swamp, and dinosaurs, 30-foot crocodiles, and early mammals, including one of the terrier-size ancestors of the horse, lived there. Scientists have found the bones of all of these in the park.

For the hiker, the pine-clad Chisos Mountains at the park's center offer 21 miles of trails (preceding pages). From the upper slopes of their almost 8,000-foot-high peaks one can look deep into Mexico under a sunset the color of desert poppies.

Lost Mine Peak has a trail almost every visitor takes. I huffed and puffed to the summit myself one day, and thought I had performed a great feat of strength until a herd of Cub Scouts and a party of folks averaging perhaps 65 years old came to join me, not one of them even out of breath.

In the desert surrounding the mountains, one does not blithely go afoot, but in recompense the low country has hundreds of miles of good, safe roads, although many are unpaved. I know of few national parks as easily explored by automobile.

Each year the Park Service provides new scenic overlooks, new signs marking points of interest—fossils uncovered by archeological parties, for example, or a pioneer ranch nestling in a valley, or adobe buildings erected by a farmer who once made a precarious living from the stony Rio Grande flood plains.

Everywhere, after rains, grow desert plants; botanists have counted more than 850 different kinds that bear flowers, from spectacular giant daggers and Torrey yuccas to lovely blue lupines. Ranger-naturalists describe them in campfire talks in The Basin of the Chisos and in Rio Grande Village Campground, and lead parties on field trips to see them close at hand.

Desert bouquet, strawberry cactus blooming on Dagger Flat will shortly bear luscious red fruit with a flavor "even better than strawberries," many Big Bend folk insist.

From the armored cactus of the desert to the Douglas fir of the mountaintops, more than 1,000 varieties of plants and trees thrive in this spectacular botanists' paradise.

Campfire glows in a night-domed theater as visitors learn about the park from Ranger Frank A. Judd. In decades past, Big Bend country saw Indians and bandits, rustlers and rebels—all escaping the long arm of civilization. Still a refuge, the park each year lures more than 165,000 vacationists, drawn by a longing for solitude and love of nature. On summer

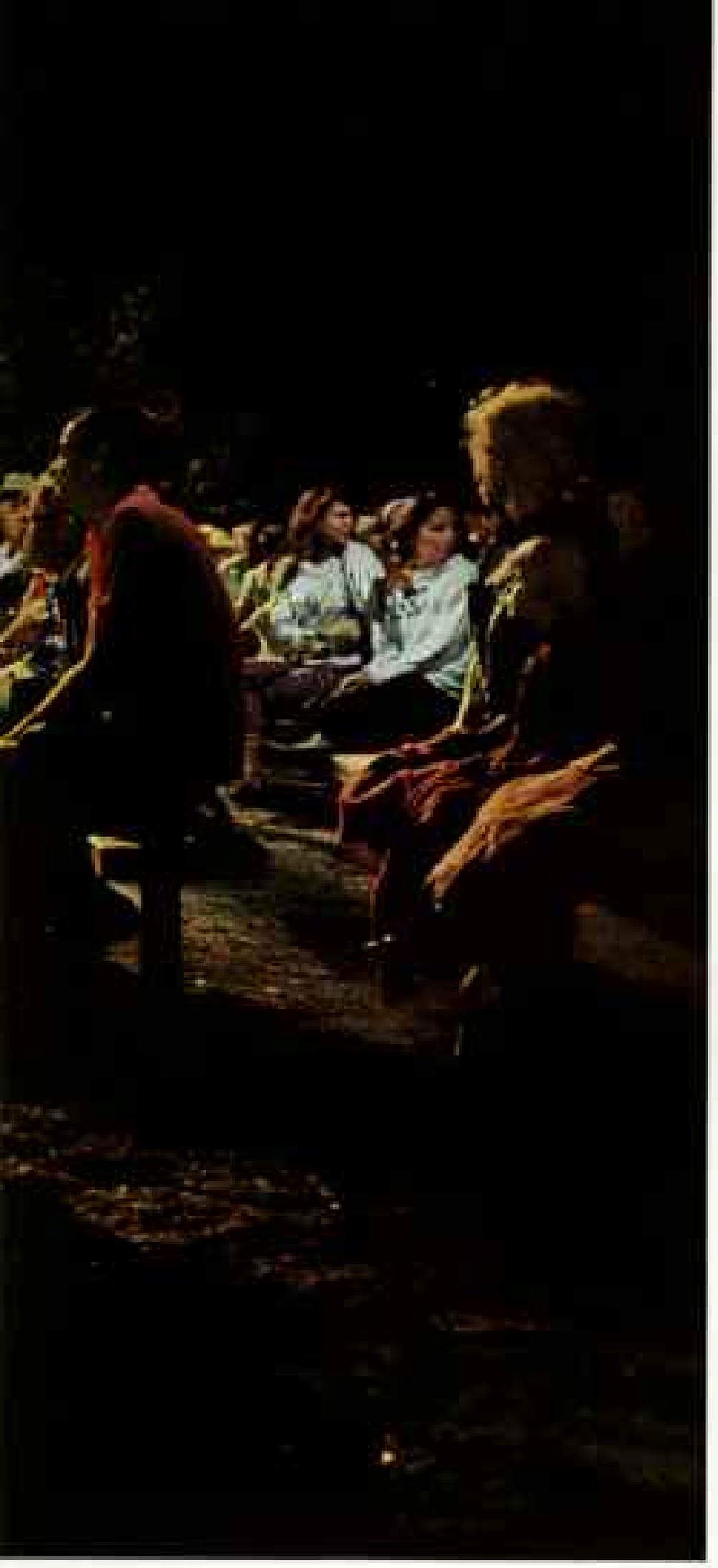
Park's Rare Species Lure Bird Watchers

Most visitors stay in cabins in The Basin, a natural amphitheater nesting amid the peaks (pages 110-11). In fact, the only other overnight accommodations in the park are campgrounds.

The Basin is a paradise for bird watchers. The Mexican jay, which lives in few other places north of the Rio Grande, eats crumbs from cabin doorsills. A lucky watcher might see a Colima warbler, a species first discovered north of the border only in 1928.

Until recently, even park officials had no idea of the number of Colimas that summer in the Chisos. Then Chief Park Naturalist Roland Wauer decided to attempt a census and last spring led a group of ornithologists into the high country, where the warblers had most often been seen. This field party found the birds nesting and counted 92 individuals.

One day I sat in the willows near a spring and essayed a few blasts on a "wild call" lent me by a friend. It was supposed to sound, the friend said, like a jack rabbit in distress. In short order I was visited by a coyote, a small fox with large ears, and an entire curious herd of tooth-clacking javelinas (page 118).



nights as many as 400 gather for slide-illustrated talks on "Life Along the River," "Feathers Over the Desert," and "Plants From Plains to Peaktops."

KODACHROMES BY THE BOSSALSKI FLOWER RIGHT AND JAMES L. STANFIELD © N.G.S.

Stick man and crude arrowhead point to the past, when Indians claimed Big Bend. A Cave Dweller of prehistoric days decorated the boulder (above). The projectile point may also have been fashioned by these vanished tribesmen.

"With a little bad luck," said Buck Newsome, "you might have called up a panther. I've seen the tracks of a mighty big one down there. He lives off the mule deer and wild burros that come to the spring for water."

The Texas "panther" is the mountain lion, or cougar. He is king of the animals in the Big Bend. Visitors have reported seeing one on the Lost Mine Trail.

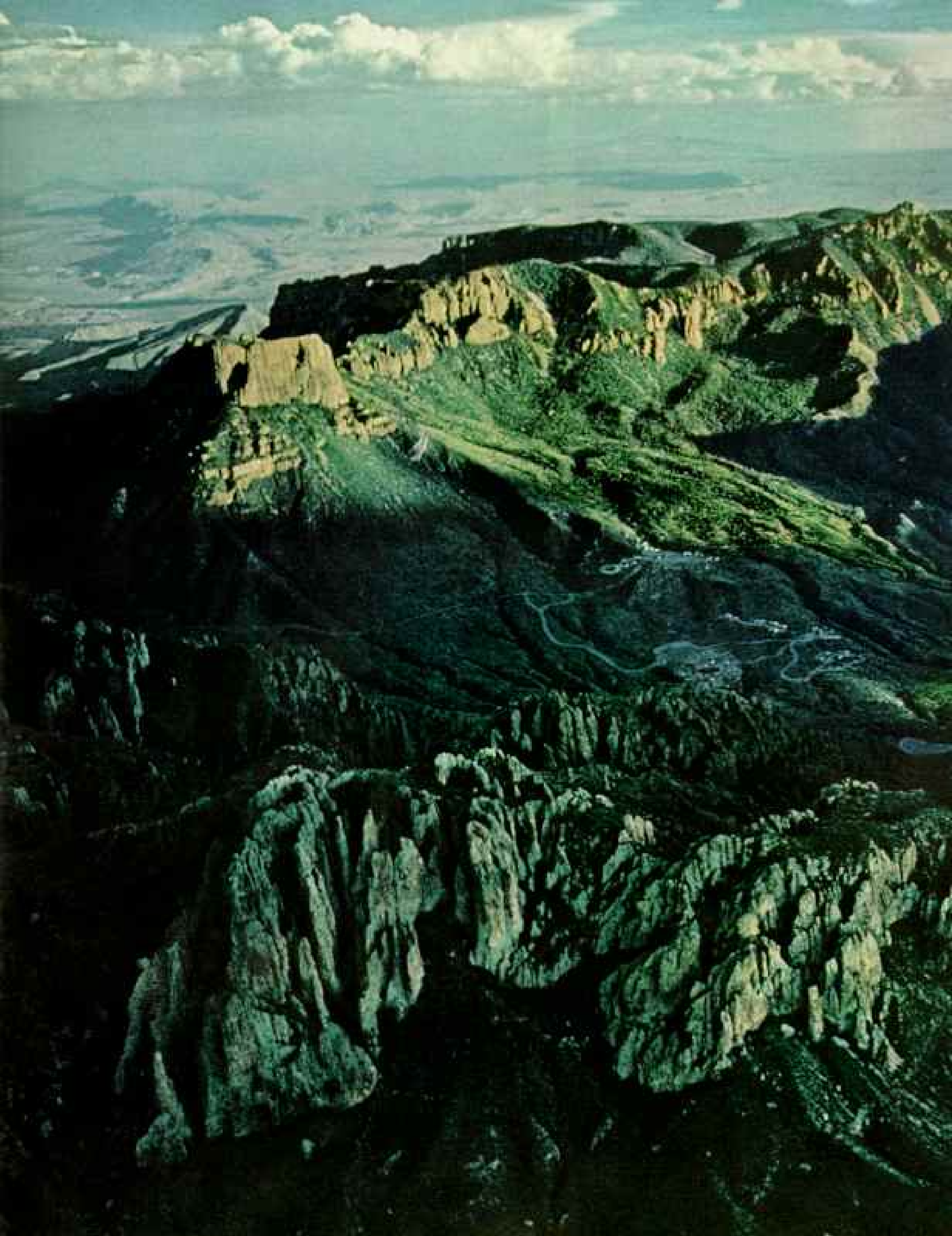
But to me the Big Bend is primarily a museum of the Western pioneer saga, no replica or freshly carpentered reproduction, but an actual stage on which the characters in a great American drama played their parts.

Here went cattle thieves and train robbers, fast men with a gun, and prospectors and ranchers and longhorn cattle. Here rode and still ride the lean Mexican caballeros of the Chihuahua and Coahuila wastes, to whom the Rio Grande is a shallow river and no international boundary at all.

And here, above all, rode the Plains Indians, possibly the greatest light cavalry of all history, who held back settlement of the Southwest for a century and a half.

Raids Grew Bolder as Buffalo Vanished

Again in my opinion, the most fascinating of these Indians were the Comanches, the "Lords of the Plains." And if you come to the park from the north, as most visitors do, out of the ranch town of Marathon on the Southern Pacific railroad, you will be following the last-to-be-closed Comanche war-and-plunder trail into old Mexico (map inset, page 113). A highway overlies the hoof-compacted earth



Hidden sanctuary guarded by jagged peaks of the Chisos, a lofty bowl called The Basin grows dark and cool with shadows. Setting sun spotlights 7,300-foot Casa Grande, left. Squiggle of road on The Basin's floor leads to a campground, grocery store, cabins, and lodge (page 114) for overnight visitors. Some historians contend the name Chisos

KODACHROME BY JAMES L. STANFIELD © N.G.S.

comes from the Spanish *hechizos*—enchantments. Others believe the word derives from an Indian term for ghosts and spirits, a meaning fearfully recalled in the 1880's when Mexican cowboys reported seeing a vision of Alsate, last chief of the Chisos Apaches, haunting the mountain reaches with his squaw.

these days, but the way is very much the same: Indians and highway engineers alike sought the easiest route.

From about 1700 the Comanches lived in a vast oval of buffalo country. It dipped from what is now Kansas in the north almost to the Mexican border east of the Pecos, and touched the range of the Apaches in New Mexico on the west. Out of this huge *Comancheria* braves raided into Mexico as far as the State of Zacatecas, some 300 miles south of Big Bend.

At first these buffalo-hunting nomads plundered mainly for horses. It is easy to forget that no North American Indian had ever seen a horse until the Spaniards brought them to the continent in the 16th century.

Had the white hunters not exterminated their buffalo, the Comanches might simply have taken what horses they needed, then left the ranchos south of the Rio Grande in peace. As the buffalo vanished, however, the Indians perforce stole cattle and sheep, and often they took scalps and slaves.

As surely as late-summer thunder and ripe corn, they rode south with their Kiowa allies every September for a hundred years or more. In passing, they harried the Texas settlements east of the Pecos, until the Texans, by 1880, drove the last one out of the state.

The Comanche Trail passed through Fort Stockton—known in Indian times as Comanche Springs—because it was a sure place to find water and good grass. For the same reason several important covered-wagon trails also went by Comanche Springs.

Riding south from the water holes, the war parties detoured east or west around the Chisos, a mountain island in a bowl of desert. On the easterly trail they entered what is now Big Bend National Park through Persimmon Gap in the Santiago Mountains. Crossing the Rio Grande, they scattered into Mexico as wolves scatter once they are in the sheep fold.

Mountains Guided Indian Riders

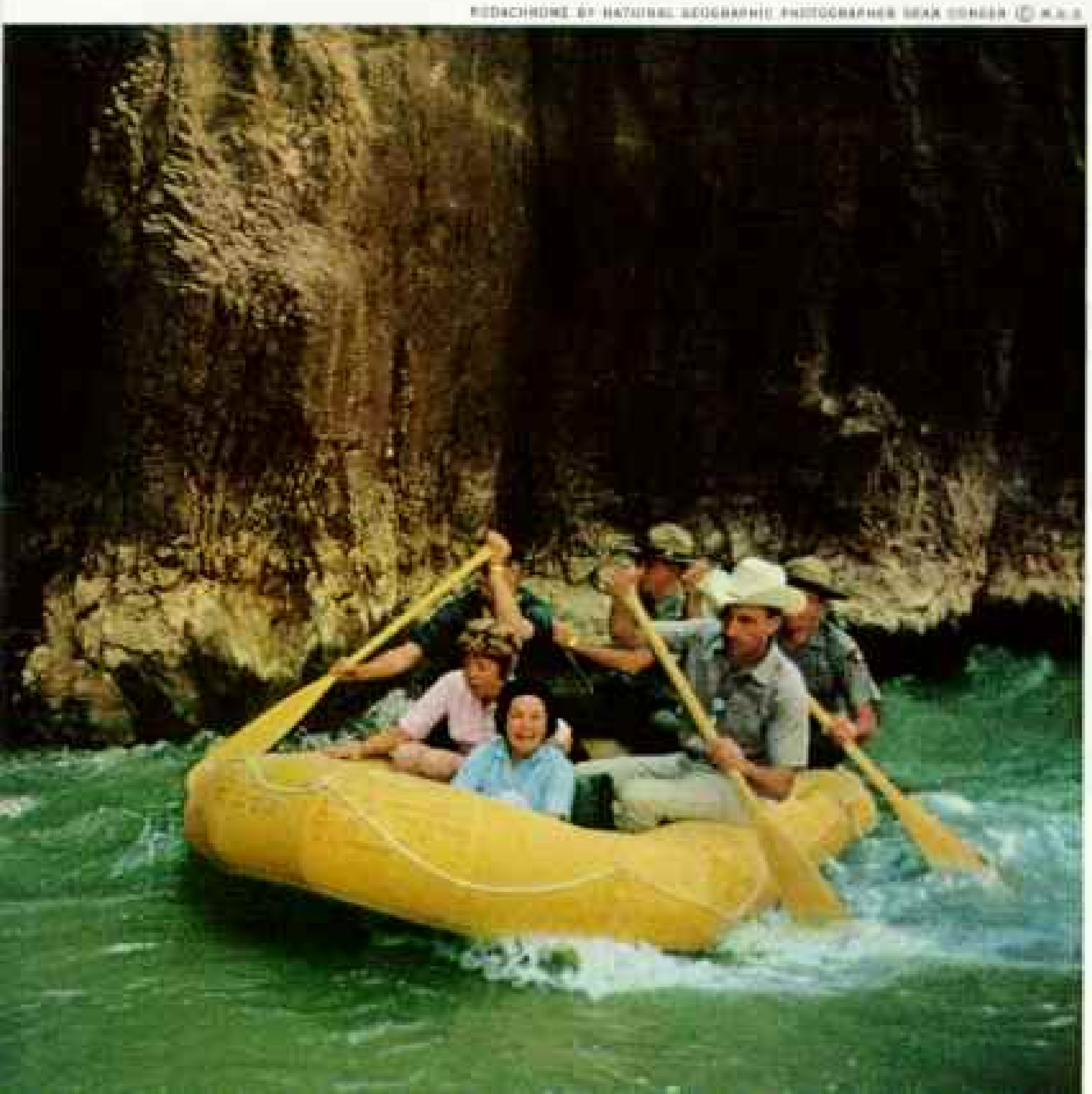
South of the gap the Comanche Trail is now lost in the desert.

"We'd very much like to define and mark it," said Chief Ranger John Mullady, who took over as acting superintendent when Perry Brown retired last year. "It would be a difficult job, though.

"In the first place, I doubt there was a single narrow trail, except at places like Persimmon Gap or the Rio fords. The Indians probably spread widely across the flat country. Again, early white ranchers traveled this country on horses and then Model-T Fords, undoubtedly wiping out Indian traces.

"Still, it isn't a hopeless proposition. Tell

KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER BRAD DANIELS (C) N.G.S.

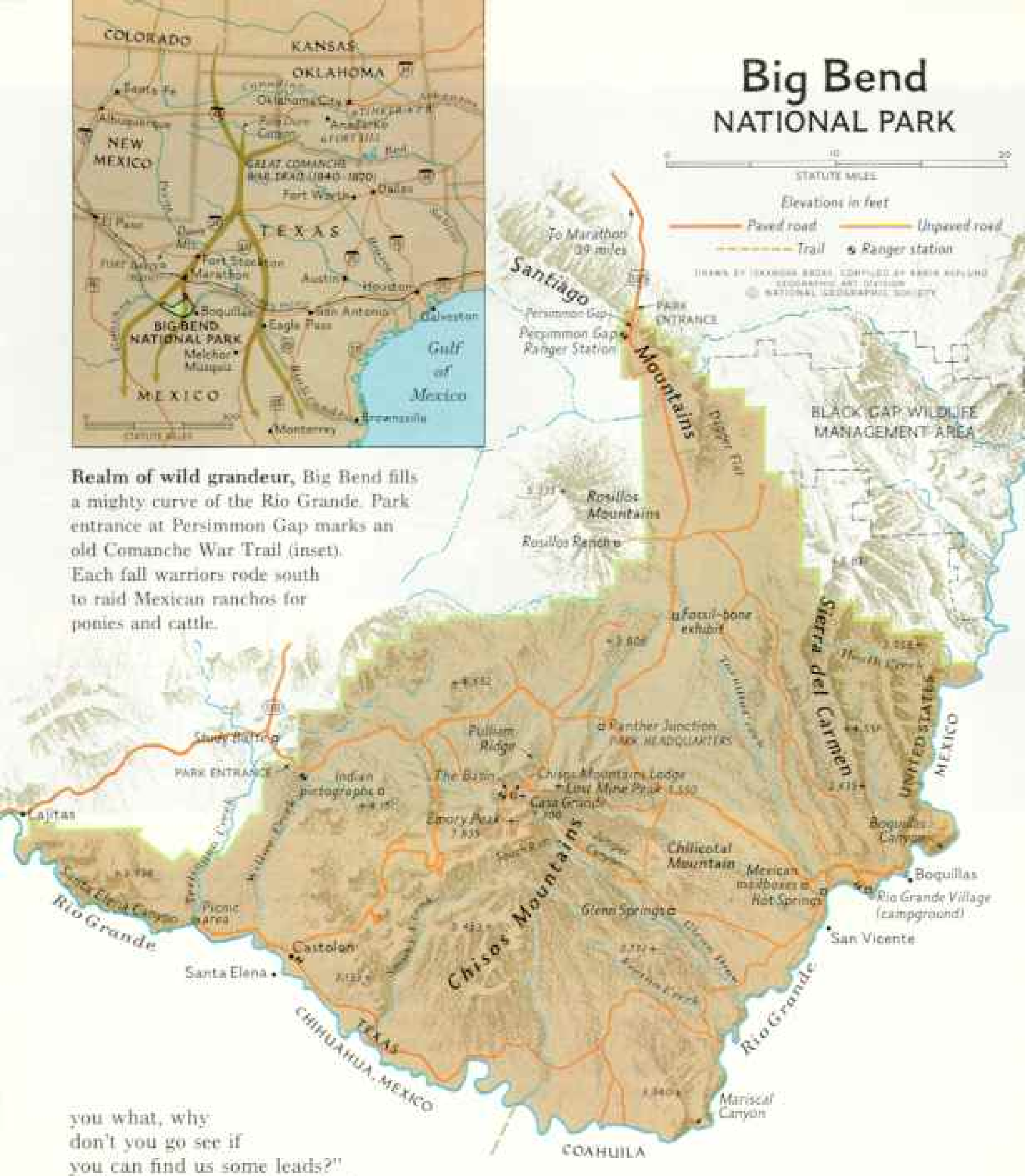


Mingling laughter with the splash of water, Mrs. Lyndon B. Johnson skims down the Rio Grande on a rubber raft. This five-mile trip through Mariscal Canyon climaxed the First Lady's 1966 visit to Big Bend with Secretary of the Interior and Mrs. Stewart L. Udall (both riding just behind her).

"What a treat to see wild country completely untouched," exclaimed Mrs. Johnson. "It's just the way the Indians and Spaniards and our own ancestors found it."

Enchanted by the music of canyon wrens, whose voices echo off the high walls, she described Mariscal as "a concert hall" for the little brown birds.

Realm of wild grandeur, Big Bend fills a mighty curve of the Rio Grande. Park entrance at Persimmon Gap marks an old Comanche War Trail (inset). Each fall warriors rode south to raid Mexican ranches for ponies and cattle.



you what, why
don't you go see if
you can find us some leads?"

I parked my car at the Persimmon Gap Ranger Station and climbed onto the Santiago spine. From a ledge whitened by centuries of perching hawks and golden eagles, I looked over the desert and tried to think as a Comanche leader might have thought. Where would I take my painted warriors from here?

Well, even were this a first trip, the band would have known a little something about the country; back in their village on the Arkansas River in Kansas, the old men would have given them advice.

"You must ride for the mountains the white eyes call Chisos," might have said one from whose war shield fluttered many Mexican scalps taken in the springtime of his years.

I raised my field glasses. At the bottom of the pass the paved park road jinked left, but from my vantage point I distinctly saw the dim slash of an old trail across the desert, heading for the mountains.

Returning to the car, I drove to the bend in the park road, left the macadam, and bounced straight ahead through the mesquite.

I came to a deep arroyo. There was a crossing; wide ramps sloped down both banks. Running waters had gullied them so the car could not pass. I scrambled across afoot. Beside the trail something white gleamed. I picked up the point half of a stone arrowhead.

A mile farther along I found a piece of shell, no fossil, but part of the shell of a large freshwater mussel such as you might still find in the Rio Grande and once might have dug from the sands of Comanche Springs. From the place where the shell lay, it is 35 miles to the Rio and 100 to Fort Stockton. Comanche warriors, one of their descendants later told me, mixed their war paint in such shells.

Curving gently right, the trail passed beneath a ridge that ended in a jumble of great boulders. Among them endured the sure signs of an Indian camp—the deep holes in flat rocks worn by women pounding mesquite beans into flour with manos, or stone pestles, smoke-dark fire shelters, chips scattered by men making stone weapons and tools.

Passing war parties, of course, could hardly have built the camp, for it takes years to pound holes into solid rock. But from one more bit of evidence I stumbled across, I like to think the Comanches at least occasionally used the site.

Among the stone chips littering the ground, all but one surely came from the red-and-white cliffs in the park. The exception was a piece of black obsidian. There is nothing like this in or near Big Bend. A traveling Indian brought it in, spoiled the artifact he sought to make out of it in a long-ago evening, and cast it aside. Why not a Comanche warrior?

Ravens Lead to Panther's Kill

I told Buck Newsome of my modest bit of detective work.

"Before the park," he said, "there was a road where you said. Goatherders, soldiers, ranchers all used it. But I don't doubt it started with the old war trail. After all, it's the quickest way through mighty hard country.

"Speaking of Indian camps, how'd you like to see my own pet one? It has pictures."

It was in search of Buck's pictographs that we rode out of the mountains the rare day it snowed, and now jogged over the blazing desert west of the Chisos.

Like a ship at sea, the glass-walled Chisos Mountains Lodge floats in the night beneath brooding Casa Grande (page 110). A restaurant in the newly constructed building must truck in supplies from towns 100 miles away.

Streak picks his partner—the pretty one with pockets full of hay—at Chisos Remuda in The Basin. Experienced guides lead trail parties to the South Rim, an all-day, 14-mile circuit that winds through forests green with conifers, and across meadows ablaze with wildflowers. The reward: a heart-stopping, summit-top vista where, an awed viewer once exclaimed, "You can see the day after tomorrow" (pages 104-106).

ROADRUNNER (THESE AND FOLLOWING PHOTOS) BY JAMES L. STANFIELD © N.G.S.

The flat plain looked unbroken, but it was not. Arroyos and even steep canyons, some of them frighteningly deep, slashed the sands. From their shady depths leaped mule deer, which bounded stiff-legged to safety.

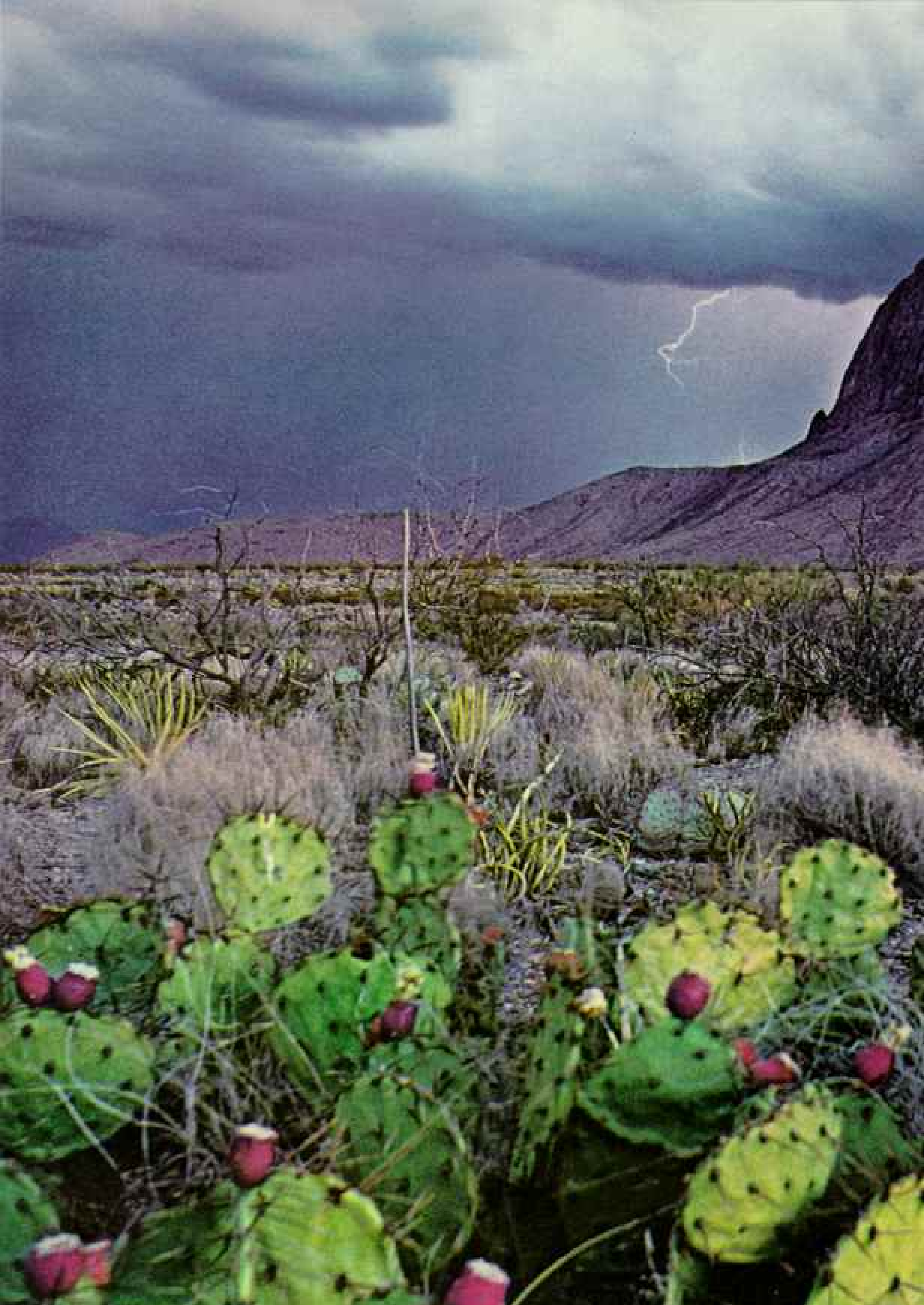
An unusual gathering of ravens led us to a dead ten-point buck. From tracks, we could conjecture what had happened. A panther had pounced upon him from a ledge perhaps a week before, and, with help from coyotes, consumed all but the magnificent head.

Buck's camp nestled against a cliff of white stone near a good spring. The pictographs were done in red paint made of cinnabar, or mercury ore, with which the Big Bend abounds. They were not fancy; the artists had merely drawn deer footprints and a few geometric symbols.

"I think this cliff was a message board," said Buck. "The deer prints told the next party along what game there was in the country. The other things must be directions nobody can understand any more."

Comanche raiding parties may well have passed this site, for it lies on a logical route around the Chisos. In these mountains dwelt

Formidable fortress, Pulliam Ridge in the Chisos Mountains probes the storm-roiled heavens. Gusts of wind shake plants on the desert floor, tossing grama grass and creosote bushes, slapping the fat hands of the prickly pear, and rattling the naked stalk of the lechuguilla, an agave that dies once it blooms. Here the elements alone have their way with the land. As a cowboy once said of Big Bend, "It's not close to nowhere, so people ain't had a chance to ruin it."



hostile Apaches, who sometimes came screaming out of their fastnesses to give battle to the passing warriors. I have seen a fascinating map, owned by the Oklahoma Historical Society, showing the Comanche Trail splitting around both sides of the mountains.

In the late 1870's the U. S. Army at last learned how to beat the Comanches. It captured or killed not the Indians, but the horses that gave them mobility. Quanah Parker, the last great Comanche war chief (page 120), surrendered. The Comanche Trail was closed forever.

A few years later the soldiers at Fort Davis, north of Big Bend, harried the last Apache out of the Davis Mountains. Geronimo toured the country as a hero of sorts and died peacefully in his old age. White outlaws capably took over the Indians' work of making the Big Bend unsafe for settlement. Not until this century did they too ride into the sunset—and immortality in Hollywood. Then the ranchers at last settled down and strung their barbed-wire fences.

To serve them and their Mexican vaqueros, a trader opened a store at Glenn Springs, inside the present park boundaries south of Chilicotal Mountain. An adobe town came into being around the store. It is a ghost town now, with only the remains of a corral and mounds of tired adobe that once were houses to show it ever existed.

I took a little-used desert road to Glenn Springs. Beside what looked like a foxhole on a ridge overlooking the ruins lay an empty, corroded rifle shell.

"It's an Army 30-06 rifle cartridge, made in 1909," said a gun-expert friend to whom I showed it. "Don't you know what happened at Glenn Springs?"

I didn't.

"Well," said my friend, "in 1916, during the

Feathered favorite of the Southwest, a perky roadrunner perches on a fallen tree. A multitude of these cuckoos, also known as chaparral cocks and paisanos, live in the park. Movie fans delight in the cartoon character which races down the highway with a raucous "beep-beep," forever pursued by a frustrated coyote. Park motorists also attest that it runs fast—sometimes in apparent contests with their cars.

Big Bend harbors some 300 species of birds, including the rare Colima warbler, which nests on slopes of the Chisos, its only known breeding site.

Secure in her domain, a Carmen Mountains white-tailed deer prances through The Basin campgrounds. This member of the white-tailed family roams only the Chisos and nearby ranges in Mexico.

Sniffing out danger, a javelina, or collared peccary, halts beside a park road. So shortsighted as to be virtually blind, the wild hog relies on its sense of smell to avoid enemies. Javelinas travel in bands, usually from 5 to 15 but sometimes as many as 30, led by the biggest boar or sow. They forage in early morning and late afternoon, and sleep during the heat of the day.

"Watch for Wildlife" signs in Big Bend Park protect a host of other animals, including cougars, bobcats, coyotes, ringtails, foxes, and raccoons.

Pancho Villa troubles in Mexico, several hundred hungry bandits crossed the border and sacked the town. They killed a boy and looted the store.

"The U. S. garrison made a fight, but had to retreat into the barracks. Unfortunately it had a brush roof. The Mexicans fired it, and when the soldiers ran out, three were killed."

Standing in the lonely ruins of Glenn Springs, a covey of scaled quail the only other living things in sight, I found it difficult to believe that an armed raid on the United States could have occurred in this poor place. But in those days a can of beans and a blanket represented tempting wealth to a ragged outlaw.

A Golden Legacy: Old-timers' Tales

When I first visited Big Bend, a few old-timers who remembered the Glenn Springs raid and other stirring events of the past still lived on the edges of the park. Nearly all have died or moved away now, but the tall Texas tales they told—always with a nugget of truth buried inside the layers of embellishment—remain in my memory as magnificent bits of the country's atmosphere.

One of these old-timers was Maggie Smith, storekeeper in the ghost town of Study Butte, a Big Bender from babyhood, a lady from dusty boots to sombrero, and a friend of mine from the minute I met her until her death several years ago.

We went to see Maggie because, better than anyone else, she knew the thriving local wax-smuggling business. She had been a wax smuggler herself.

Clandestine wax? Yes, it's a curious and unique aspect of life in the Big Bend.

On the mesas on both sides of the Rio grows the candelilla, which looks a bit like asparagus. To conserve moisture, as a desert plant must, it coats its long stalks with wax.

Candelilla wax is used in the manufacture of shoe polish, chewing gum, and floor wax, among other things. Because of the value of the wax, the Government of Mexico exercises a marketing monopoly over it. Only the federally owned National Foreign Trade Bank can issue permits for gathering candelilla in Mexico, and the gatherer must sell the wax to the bank at a fixed price.

The gatherer, or waxer, as he is called locally, must go to a lot of trouble and expense before he has something to sell. He must pull the plants, boil them in water laced with sulphuric acid, and skim the wax off the top.

After all his hard work, he wants the best price—and that is paid in the United States. There is not even a U. S. duty. The rub comes when he tries to take the wax out of Mexico. The Mexican police, the *federales*, will stop him if they can.

"Many's the night," said Maggie, "I've hid in a thicket waitin' to cross the Rio. Try and keep a string of a dozen burros"—she pronounced it "boorohs"—"quiet while bobcats are screamin' a hundred feet away and the federales cussin' in the cactus up the draw."

Maggie didn't make wax but bought it from the scattered clandestine wax camps. The federales never caught her, and no U. S. border officers ever troubled her.

Proud chief of the Comanche tribe, Quanah Parker inherited the features of his Indian father, Nokoni; his white mother, Cynthia Ann Parker, was captured as a child in a raid on a Texas settlement. Quanah may have led war parties through the Big Bend into Mexico.

War whoops and pounding hoofs send a wagon train into a protective circle in "Emigrants Attacked by Comanches," by Capt. Seth Eastman, stationed in Texas in the mid-1800's. The Indians fiercely attacked wagon trains, knowing that white settlement meant extermination of their buffalo. As this water color illustrates, the horse gave the Comanches mobility for long treks, lightning attacks, and instant escape. Many tribal bands signed peace treaties with the United States only after the Army captured or killed most of their ponies in conflicts north of the Big Bend.

It was and still is a bit different for smugglers who are Mexican citizens. While their primary business is perfectly legal on our side of the river, they often manage in passing to violate some U. S. law or other and are in consequence so roundly harried they choose to do their traveling in the dark of night.

Cost of Annual Bath Goes Up

Along the Rio Grande near where Tornillo Creek joins the main river, warm waters bubble out of the earth. The park's hot springs were highly regarded by Indians and pioneers for their healing powers, although laboratory analysis reveals the water barren of miraculous minerals.

Maggie once sold baths in Hot Springs and ran a general store beside them. It was a store, I imagine, much like the one she kept at Study Butte in the closing years of her life. Boxes of Indian arrowheads lay on the shelves; rusty branding irons lined the walls. A rancher or Mexican villager could buy a cavalry saddle, Mexican horse gear, a cast-iron stove, or a pair of high button shoes.

"A man named J. O. Langford homesteaded near Hot Springs and built the stone bathhouses," Maggie told me. "His price for a bath was only ten cents.

"When I bought him out, I raised the price to two bits. After all, most of the customers only got the one bath a year."

A flood in 1966 silted the springs. The Park Service elected not to reopen them. For one thing, Texas health authorities said the temperature of the water had all along been ideal for harmful bacteria.

For another—well, here is what happened one winter day, before the flood, when I started along the trail that passes by the pools. A man with arms folded and a determined look in his eyes stood athwart the path.

"You can't use this trail until my wife has finished her bath," he stated.

I am told that serious hikers sometimes disputed husbands' rights to protect their wives' privacy. Rangers occasionally had to be summoned to restore the peace.

I was quite happy to sit and chat with husband while wife finished scrubbing. Suddenly a scream drowned the sounds of splashing. Forgetting the proprieties, husband and I rushed to the pool.

There stood wife, wearing only a towel, staring into the spring. Now alone in the water, a big green frog stared back.

Not many years ago a bear might have given the lady sounder reason for fright. Bears probably don't live in the park now, although an occasional stray may wander in

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from Mexico. Neither does an even more unexpected former inhabitant of the Big Bend.

"Seems a feller picked up a strange-looking animal skull," said Buck Newsome. "He took it to a museum. I saw him next day.

"'The museum people are crazy,' he said. 'Told me it was the skull of a camel.'

"But the museum was right. The Army tried camels as pack animals in the Big Bend before the Civil War.

"What do you suppose an Indian thought the first time he saw one of those things watching him over a greasewood bush?"

Desert Bighorns Make a Comeback

The Park Service doesn't plan to experiment with camels again, but it would like to re-establish desert bighorn sheep. Northeast of the park, in the Black Gap Wildlife Management Area, the Texas Parks and Wildlife Department holds a herd of bighorns behind an electrified fence to guard it from panthers and bobcats.

"We started with a few animals from the Kofa Game Range, northeast of Yuma, Arizona," said the project manager.

"We have 37 healthy ones now on 400 acres. When the herd gets too big for the enclosure, we'll turn the surplus loose to stock the management area."

Park officials hope the animals may drift as far south as the Sierra del Carmen and bring a once-plentiful species back to Big Bend.

An earlier effort to establish in Big Bend a herd of another western game animal, the pronghorn, only partially succeeded.

"Most of the herd drifted north out of the park," Chief Naturalist Wauer told me. "A dozen or so stayed in wilder areas where visitors rarely see them, and one very old buck with an unmistakable twisted horn lives, apparently happily, with the mule deer in the vicinity of park headquarters.

"We're not quite sure why the majority of the animals moved away. Personally, I think the area we chose for them hadn't recovered sufficiently from past overgrazing by cattle and goats to support them. Again, they may never have lived in this area in the old days."

Upriver from Hot Springs the Rio pours through Mariscal Canyon, wildest of the three magnificent gorges in the stream's passage along the park's southern boundary.

Good roads lead to the lower end of Santa Elena Canyon at the western park boundary (opposite), and to the upper end of Boquillas at the eastern; hiking trails will then take you part way into each canyon.

But no roads at all go to Mariscal, midway between the two other gorges, and if you want to reach it overland, you must have a good horse or resign yourself to a long hike.

All three canyons have rock walls as high as 1,500 feet in places, so sheer that when viewed from the river the tops seem to lean toward each other. Dangerous rapids tumble in their depths, but when the water is neither too high nor too fast, you can run them all in a shallow rubber boat.

If you do, you may face occasional danger. Once while I was in the park, two young men started down Santa Elena. Next morning their boat drifted out, punctured and overturned.

Rangers had barely organized a search when the youths turned up safely. They had hiked to a road and thumbed a ride.

They were lucky. Since the park opened, one man foolishly left his stranded automobile and died in the desert. A flash flood may explain the disappearance of another visitor, whose car was found smashed and empty after a summer thunderstorm.

Cruise Almost Ends at Outset

Rangers invited me on a raft voyage through Mariscal. In the party were two women and six children. Noticing my surprise, Bob Walker, ranger-captain of my boat, explained that the river was at its seasonal low and there was little danger.

We shoved off into the cool, echoing gloom. Immediately our pneumatic raft hung on a boulder, water poured over the stern, and we escaped disaster only by leaping into Mexico five feet away and manhandling the boat around the rock.

"Nothing like an easy trip," I grumbled, emptying my sodden boots.

"The way you handle the bow paddle," retorted one of the children, "you'd sink us in a bathtub. Here, give me the paddle."

A 10-year-old boy's expertise took us the

Rippling border between neighbors—Mexico on the right and the United States on the left—the 50-foot-wide Rio Grande glides beneath 1,500-foot-high limestone cliffs in Santa Elena Canyon. On a two-day float trip through the gorge, this party will spend the night on a sand bar fringed with acacias and melodic with the sounds of canyon wrens and white-throated swifts.

Vigilant ***forestales*** of Mexico's Forest Service raid a wax smugglers' camp across the Rio Grande from Big Bend Park and set fire to bundles of candelilla—a plant processed for a fine wax used in many products, from chewing gum to shoe polish. Because the Mexican Government sponsors the industry and sets a ceiling price, bootleggers find it

remaining 20 miles without incident. In places the river ran but little wider than the boat, and for the fun of it we leaped back and forth between the U. S. and Mexico. We picnicked pleasantly on a sandbank.

Unseen canyon wrens filled the gorge with music to match that of nightingales. Once, far above us, we heard the soft tonk-tonk of a goat bell on the Mexican side.

"Oye, chico!" I called, and the echoes multiplied the words into a veritable barrage.

"Buenos dias, compadre!" a boy's voice replied from the top of the cliff. We saw a small goatherd peering over.

"Boy, could he bomb us with rocks!" remarked our bow paddler. About a year later, reading that Mrs. Lyndon B. Johnson made the Mariscal Canyon run, I wondered if the same thought had occurred to the Secret Service! The First Lady's trip, however, seems to have gone off as easily as my own (page 112).

The Comanches, when using the easterly detour around the Chisos, crossed the Rio Grande some 15 miles downstream from Mariscal. Each Wednesday afternoon at two, a party of Mexican horsemen still splashes through what must be that same shallow ford.

On the United States side, one and a half miles from the river, two large mailboxes stand beside a desert road. One is marked San Vicente, the other Boquillas; these are sun-baked villages on the Mexican side of the Rio.

U. S. Mail Serves Mexican Hamlets

On Wednesday the park mailman's truck comes to the boxes from the north, the Mexican horses from the south. The men form a circle, sort letters and packages, and make stamp transactions in dollars and pesos.

For years, the postman said, the United States Post Office has been handling the mails for the people of San Vicente and Boquillas, Mexico (pages 126-7).

"Only the sorriest trails come north through Mexico to these villages," he explained. "The Mexican service may take months. We can give them quick weekly deliveries, and we're glad to do it."

profitable to boil off the wax and sell it north of the border. Big Bend rangers have nabbed some of them slipping across the river to pick candelilla in the park, and others trying to lead pack trains through the preserve. Mexican ranger (below) manipulates a wooden monkey, perhaps carved by a waxer who left it behind when he fled from the law.

The lack of roads explains why Mexico has not yet established its own long-planned national park across the river from Big Bend, a counterpart of the Waterton-Glacier International Peace Park on the United States-Canada border.* However, a gravel road from Melchor Múzquiz in Mexico, 125 miles south of the border, to Boquillas was finished last summer. When paved, it will complete a highway from Boquillas to Múzquiz to Eagle Pass, Texas, then to Big Bend National Park (map, page 113).

"With such a road," a Mexican official told me, "our people could easily reach their park across from Big Bend. Interest in establishing the Mexican park thus is now very high."

I followed the caballeros with the village mails back to San Vicente, crossing the river aboard a burro offered by a small Mexican boy. He charged 25 cents.

The return trip, I was to discover, costs 50 cents—payable in advance.

*See "Many-splendored Glacierland," by George W. Long, NATIONAL GEOGRAPHIC, May, 1956.

Kaleidoscope of rock issues from a fluorspar mine at Boquillas, Mexico, across the Rio Grande from Big Bend Park. The translucent mineral, used as a flux in making steel, provides the hamlet's sole industry. Men who mine it receive an average 10 pesos a day, about 80 cents. Women and children wash brightly colored fragments and sell them to visitors.

Awaiting a storm's invasion, Boquillas basks in the fading glow of a setting sun. The now sleepy village knew prosperity briefly at the turn of the century, when high-grade silver ore poured from mines in the nearby Sierra del Carmen.

PHOTOGRAPHED BY TED RUSSMAN (ABOVE) AND JAMES L. STANFIELD © N.G.S.

"Bandit," I remonstrated in Spanish.

"*No bandido, señor.* Good businessman. I have you over the barrel, *si?*"

In San Vicente and Boquillas you find what you would expect—dust and peace, burros and goats and good small horses, a few battered automobiles, children selling bits of bright stone and "Indian" arrowheads they have made themselves, corn green in small fields when the gasoline-driven irrigation pumps have chosen to run.

Near San Vicente is a very old Spanish presidio, or fort, long melted into a shapeless mound of clay. The Comanches were responsible for its decay.

"The great Comanche war trail," wrote Gen. Hugh L. Scott, Plains Indian fighter in the '80's and '90's, "crossed the Rio Grande at the Presidio of San Vicente, which was abandoned in 1800 on account of these Indians."

"If the soldiers ran away," an old villager told me, "I do not blame them. Indians are fierce and terrible.

"Of course," he continued, laughing, "I am myself almost *puro indio*. But not Comanche. My ancestors were the old people of this countryside, who did not make war."

Some of the "old people" lived in the Big Bend in prehistoric times. Archeologists call them simply Cave Dwellers, but little is known about them.

For one thing, the later Apaches and Comanches confused the trail by using the Chisos camps and caves of these people. At one long-used campsite, petroglyphs—drawings chipped into stone—reveal ancient occupation by the old people; black obsidian chips hint at the Comanches; and peyote cactus nearby would have attracted the Apaches, for these Indians were the first to eat the somewhat scarce narcotic peyote to induce hallucinations and a feeling of well-being.

Explorers have found a few Cave Dweller burial sites in the mountains, and more undoubtedly exist. There may be one at the head of Juniper Canyon. Juniper drives deep into the southeast face of the Chisos. It is a beautiful secluded place, with big trees, a fine spring, and the remains of an old log cabin. Here, says the typical Big Bend legend, once lived a man who fattened stolen cattle.

High in a cliff near the head of Juniper, three tall caves pierce the rock side by side. Above the entrance to one the stone is blackened, as if by smoke. But thick brush at the foot of the cliff kept me from getting near enough to find out for sure.

So I looked up a friend who knows virtually every foot of Juniper Canyon. I am going to call him the Artist. He has a genuine passion for anonymity and solitude, and I respect it.

Plaything today, this steam engine once pumped Rio Grande water to irrigate farms near Castolon.

A car is shiny but a burro is sure. When the Rio Grande runs low, as it often does in fall and winter, automobiles cross its rocky bed between the park and Boquillas—but run the hazard of drowned-out engines. Such motorized traffic cuts in on the business of enterprising Mexican boys who charge 75 cents round trip for a burro ride across the river. They sometimes neglect to tell customers that a dusty half-mile ride then lies ahead to Boquillas, and costs an additional 75 cents.

International trade—the customers come from Mexico—occupies Magdaleno Garcia, who runs the general store at Castolon on the park's southwest rim. Most of his patrons live in Santa Elena and must cross the Rio Grande on a crude ferry before walking or riding horseback a mile to the market. The old coffee grinder still works, but Mr. Garcia carries only the pre-ground product.

Merely finding him in the park wilds, where he winters, takes some doing. When he turns off a road in his ancient jeep with its homemade sleeping cabin, he brushes out his tire tracks so nobody will follow them. The best way to find his camp is to look for an unusual number of ravens and jays gathered to share his flapjacks, and this is how I located him near the middle of Juniper after a morning's patient search.

"Yes," he said. "I think somebody once used that cave. I've been close enough to see what appear to be steps cut into the stone. It would be a dangerous climb, and I haven't tried it."

Neither did I. Instead, I went next day to Oklahoma, for if there still lived a venerable Comanche who had ridden the great war trail through the Big Bend, he would live in the onetime Indian Territory to which his tribe was banished.

Comanches Fought in Both World Wars

"First," I asked Robert L. Meshaw, the Indian Bureau's field representative in Anadarko, "are there any Comanches left of whatever age?"

"Turn around and meet my assistant, Lewis Tahmahkera, who just walked in the door behind you," said Bob. "He's a Comanche—grandson of Quanah Parker, to be exact."

"There are 3,000 of us still listed on federal rolls," said Lewis, chunky and barrel-chested like most of his tribe. "Plenty of others have melted into the non-Indian civilizations of both the United States and Mexico.

"These days we're mechanics, truck drivers, office workers, occasionally farmers, rarely cattlemen. In two World Wars we've been good American soldiers, sailors, and Marines.

"I doubt that many of us are still pure Comanche. In our veins runs blood of captive Mexicans, of white Americans, and of many other Indian tribes.

"I'm afraid you're too late to meet any old warriors. They have all passed on."

We nevertheless looked up the oldest known Comanche, Frank Tooahimpah, whose name means "little boy." Well over 90 then, he has since gone to join his ancestors. Little Boy was one of the few Indians who still wore their hair in long wrapped braids, and he spoke only Comanche. Lewis Tahmahkera translated the impassioned torrent of speech he unleashed upon me.

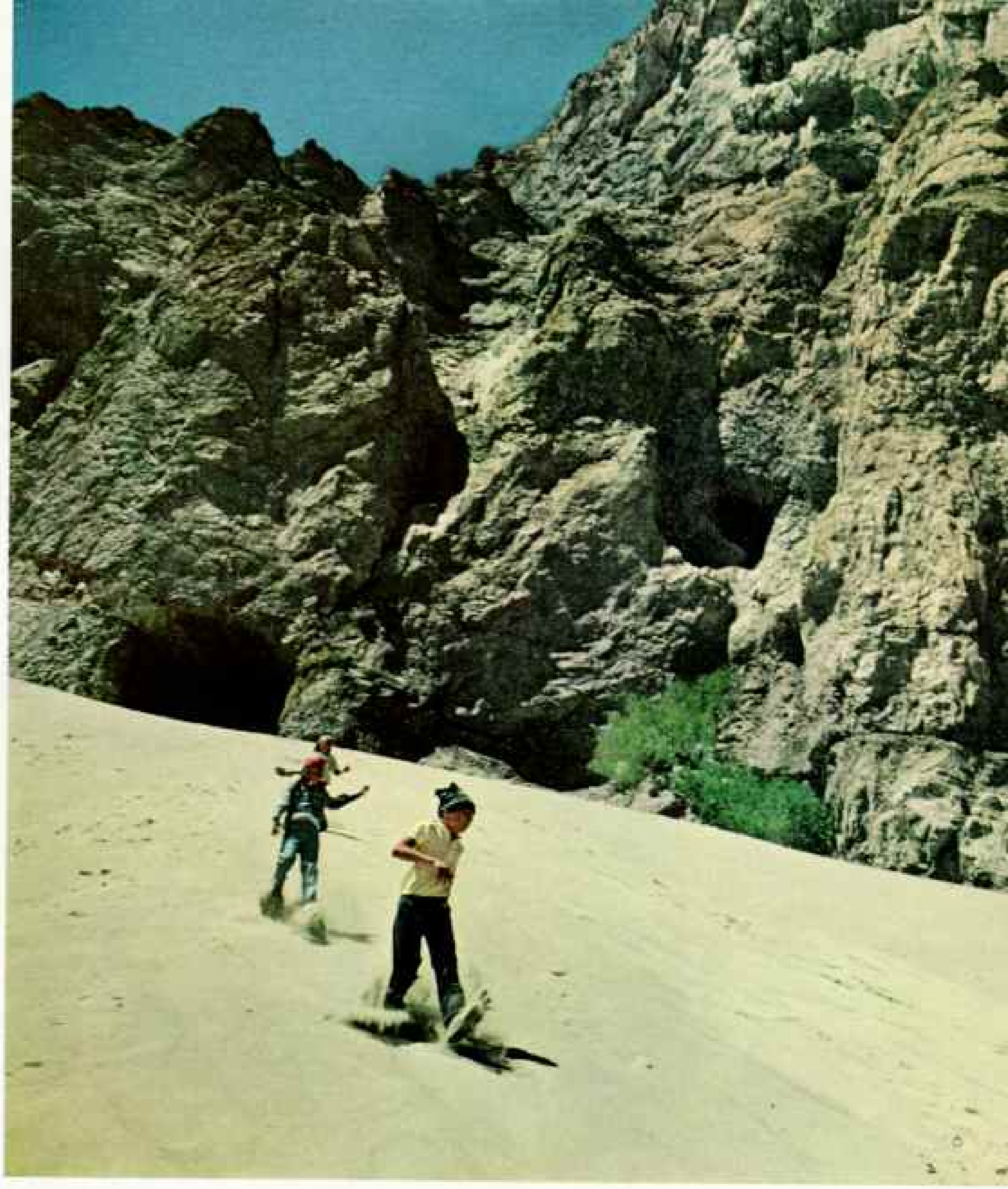
"The years begin to run together for Little Boy," Lewis said gently. "He is complaining about the Army's slaughter of the Indian ponies at Palo Duro Canyon, and afterwards at Fort Sill when the tribe surrendered.

"But he says he is not a liar. He says that while he knows it would please you if he told you he rode through Big Bend, he will not do

Liquid lady who has trouble making up her mind, the Rio Grande changes directions a dozen times in a serpentine passage along the westernmost tip of the park. To

KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER JAMES L. STANFIELD © N.G.S.

the right of the river in this southward view, a companion park of comparable area —the Gran Comba, Spanish for Big Bend—may someday be established in Mexico.



so, for he was never west of the Pecos River."

Otis Chappabitty, only a few years younger than Little Boy, could not identify my broken Texas arrowhead as Comanche. Neither can the experts tell Comanche points from those of other Plains Indians, I might add. Otis Chappabitty (whose name is freely translated as "One who enters the fight and pulls them off their horses") had a simple explanation:

"Not all Comanche bands made weapons," he said. "Some bought them from other tribes, and a story goes that the points were made by a slave tribe of 'little people.'"

Lewis said he did not know whether his grandfather mixed war paints in mussel shells. "But the aunt who raised me ground those shells into a medicinal powder," he added, "so the Comanche war parties might have carried them."

Flying home to Washington, D. C., I stopped in Oklahoma City to visit with Joe Attocknie (Lone Lodge), a civilian guard at Tinker Air Force Base. Joe is a Comanche and an assiduous tribal historian.

I wish I had space for some of the tales with which Joe kept me spellbound through most of a night. He told, for instance, of a returned war party which accurately described alligators in the Rio Grande—and that could only have been very near the river's mouth.

No skis needed for a slippery slide down a sand slope in Boquillas Canyon. And a girl requires no swim suit to splash in the shallows of the Rio Grande (below), here taffy colored after recent rains. Most park pastimes require little more than energy to explore and eyes to see.

So it was in 1895 when William Ferguson, a United States Treasury agent, arrived in the Big Bend country to set up a port of entry.

"Nowhere else have I found such a wildly weird country . . ." he later wrote. "A man grows watchful—awe-struck by Nature in her lofty moods. . . . Never have I beheld such a display of glory. . . ."

Again, he gave me the rather pathetic Comanche account of a battle against Mexican soldiers armed with the first cannon the Indians had ever seen.

But only one of the fascinating tales had to do with the Big Bend.

"One of my grandfathers," Joe said, "told me of a ride he made into Mexico. I am sure, from his descriptions of rivers and mountains, that he went through Big Bend.

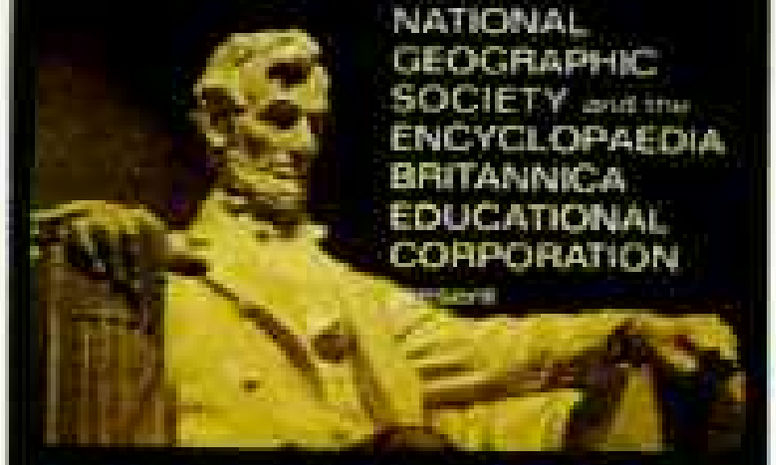
"I'd like to try one day to retrace his journey and perhaps, before it is too late, make a map with the Indian place names," Attocknie told me.

I hope he does. Indian names, so colorful and descriptive and evocative, have a way of capturing the special magic of a place.

But even the Indians' gift for poetry in their speech could hardly improve upon a description of Big Bend given me by my friend Dr. Joe Frantz, professor of history at the University of Texas. Joe attributes it to an old cowboy, his name forgotten, and it goes like this:

"You go south from Fort Davis until you come to the place where rainbows wait for rain, and the big river is kept in a stone box, and water runs uphill. And the mountains float in the air, except at night when they go away to play with other mountains."

THE END



The World in

"I HAVE JUST SPENT the better part of three days destroying many of my copies of NATIONAL GEOGRAPHIC," a teacher wrote to us not long ago. "I have been cutting out photographs to use as parts of geography lessons. The pictures are excellent, but too small to be seen by an entire class. . . ."

"For years," another teacher wrote, "I have been holding up NATIONAL GEOGRAPHIC pictures in my classes, reading out loud. . . . If only they were made into filmstrips. . . ."

Intent eyes follow *Washington, D.C.*, one of six sets of filmstrips that launch a new adventure in learning offered by the National Geographic Society and the Encyclopaedia Britannica Educational Corporation. Fourth graders get a preview, complete with recorded narrative, at Walnut Hill Elementary School in Fairfax County, Virginia.

Windows on the world open wide for filmstrip viewers. The Great Emancipator broods at the Lincoln Memorial in the series presenting *Washington, D.C.* Thai fishermen haul their nets in *Southeast Asia;* horses churn a Portuguese stream in *Spain, Portugal, and Gibraltar.* The Peace Tower of Parliament soars above a ceremonial guard in *Canada;* American egrets strain aloft in *Birds.* In *Ancient Times,* Egypt's Step Pyramid reaches skyward.

By MELVIN M. PAYNE, Sc.D. President, National Geographic Society

Geographic Filmstrips

Appeals like this have poured into my office in recent years, and I am happy now to be able to answer them. Beginning February 1, the National Geographic Society, in collaboration with the Encyclopaedia Britannica Educational Corporation, will make available comprehensive filmstrip essays to bring sights and sounds from around the world within easy reach of every classroom.

The filmstrip, a modern visual aid to education, is familiar to most teachers. It consists of a set of transparencies arranged in a strip or roll—rather like a movie film. These are shown on a screen through specially designed projectors, now standard equipment in most schools.

All Geographic filmstrips will be presented in color and accompanied by 33⅓-rpm phonograph records cued

KODACHROME (BELOW) BY NATIONAL GEOGRAPHIC PHOTOGRAPHER JAMES E. RUSSELL © N.G.S.

World's largest library of color transparencies stands behind the new program. School Service Chief Ralph Gray, center, reviews *Birds* with Society President Payne, right, and Vice President Gilbert M. Grosvenor.

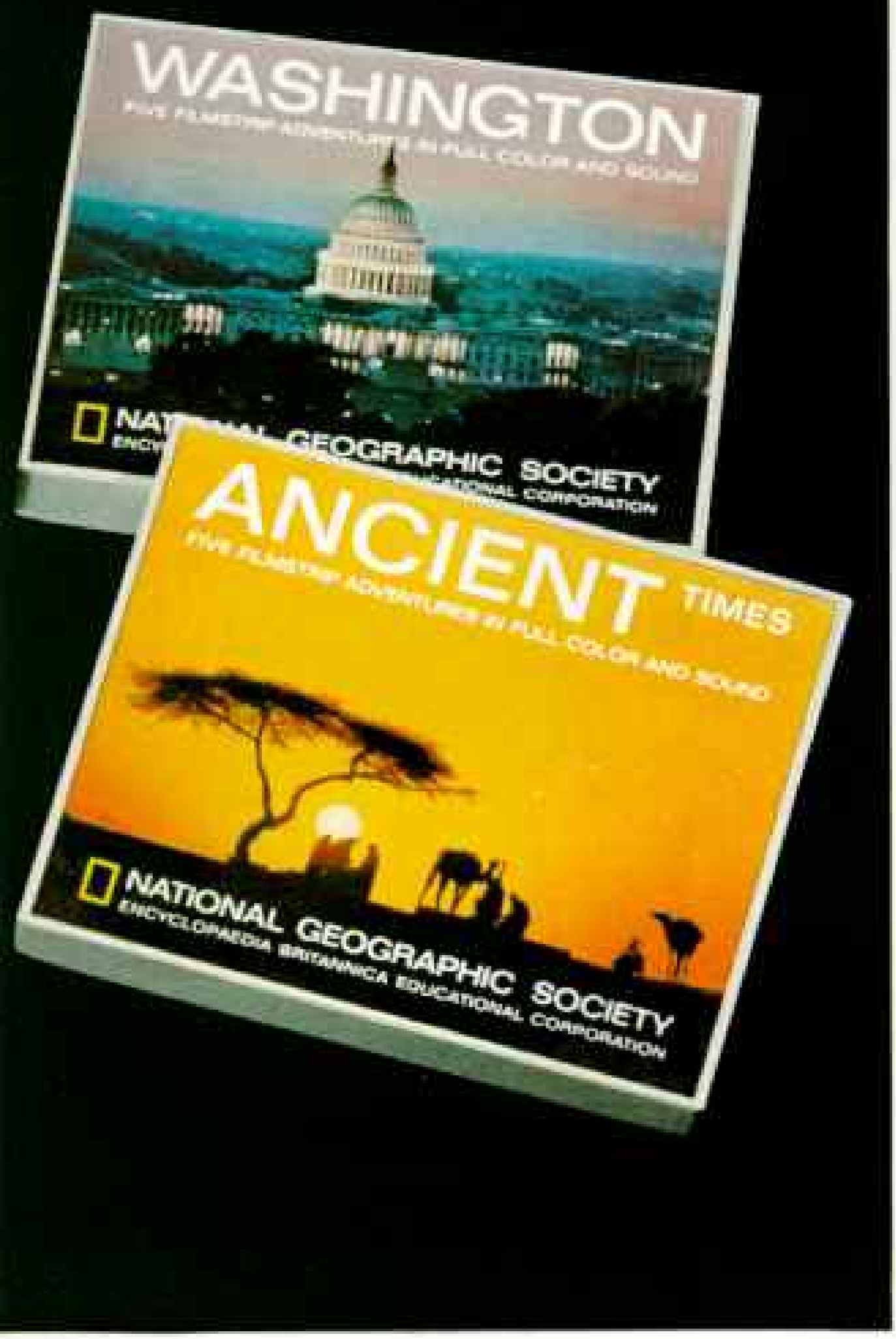
PHOTOGRAPHS BY JAMES P. BLAIR © N.G.S.

for use with either automatic or manually operated projectors. In addition, the narrative script is printed on each record jacket.

More than two years' work went into producing the first six sets of the Geographic-Britannica filmstrips. Each contains four or more sequences of related subject matter. *Washington, D. C.*, for example, offers five strips, each lasting 12 to 15 minutes. The first, "The City Freedom Built," is a general history of the Capital. Others concentrate on the White House, Capitol, Supreme Court, and shrines and monuments.

Two factors affected the decision to produce filmstrips. One was the growing demand from teachers themselves. The other was our friendly association in recent years with Encyclopaedia Britannica as a sponsor of the Society's television programs. What could be more natural than to work together on this educational project?

Production—at the rate of six sets a year—



Far-ranging photographers like Winfield Parks, here giving Malaysian youngsters in Malacca a peek through his lens, provide round-the-world coverage for filmstrip editors. Often cameramen carry recorders, capturing authentic sounds for the classroom.

Handsome first arrivals, the filmstrip sets fill illustrated boxes, 13 by 16 inches each. The open *Southeast Asia* series reveals seven film cartridges and corresponding $33\frac{1}{3}$-rpm records, cued on one side for automatic projectors, on the other for manual machines.

is under the direction of Ralph Gray, Chief of the Society's School Service and editor of its weekly *School Bulletin*. Subject matter will range from world geography and history through science, natural history, and space exploration.

Twelve-inch records accompanying the films carry both narrative and background sound—and here, as in the strips themselves, authenticity is the keynote. In the *Ancient Times* series, for example, several illustrations show an ancient Egyptian instrument called a sistrum—a kind of bronze rattle used in religious ceremonies 3,000 years ago.

But what does a sistrum sound like? None of us knew; so, armed with careful documentation as to size, shape, and material, the editors turned to craftsmen in the Geographic's own metalworking shop. Could they make a sistrum? They could, and as you view this filmstrip you will hear it jingling in the background. THE END

HOW TO ORDER GEOGRAPHIC-BRITANNICA FILMSTRIPS

THESE EXCITING new filmstrip-and-record teaching aids are available only through the Encyclopaedia Britannica Educational Corporation, Dept. 10A, 425 North Michigan Avenue, Chicago, Illinois 60611.

Ready on February 1: ***Washington, D. C.*** (five filmstrips, $57.50); ***Southeast Asia*** (seven strips, $80.50); and ***Spain, Portugal, and Gibraltar*** (six strips, $69.00).

Available soon: ***Birds*** (four filmstrips, $46.00); ***Ancient Times*** (five strips, $57.50); and ***Canada*** (six strips, $69.00).

Filmstrip sets may be purchased by individual Society members. For school use, they, as well as all other National Geographic educational materials, are available for purchase under provisions of the National Defense Education Act and the Elementary and Secondary Education Act, provided that prior approval has been obtained from your state education agency.

A Taxi for the Deep Frontier

PROJECT MAN-IN-SEA GOES MOBILE

By KENNETH MACLEISH, Assistant Editor

Illustrations by National Geographic photographer ***BATES LITTLEHALES***

THE STUBBY little sub rolled like a hog in a wallow, yellow hull awash and gleaming wetly in the Bahamian sun. Inside, four men destined for the depths peered down through ports that glowed coldly in the interior dimness.

Pilot Roger Cook checked his controls and instruments. Satisfied, he picked up his microphone to call the mother ship, Edwin A. Link's famous research vessel, *Sea Diver.*

"*Sea Diver, Sea Diver,* this is *Deep Diver.* All systems O.K. Request permission to dive."

"Go ahead, *Deep Diver.* Report on bottom."

Air bubbled from the ballast tanks. A hydraulic pump whined. Half a dozen motors whirred and whispered at their tasks. The last bright flash

UNIQUE UNDERSEA RUNABOUT, Deep Diver *unloads two passengers in shallow Bahamian waters. Slipping out of a hatch behind the black battery pod, Dennison Breese and author MacLeish rehearse a feat they later performed at 420 feet—deepest exit ever made from a submarine. Breese, strung with breathing and communication lines, photographs MacLeish, wearing only a face mask. Aqua-Lungers observe the test.*

of sunlight glittered in the topmost port, then vanished in a swirl of froth.

Deep Diver started down. Her destination: a silent slope more than 400 feet below. Her mission: to prove her special capabilities by "locking-out" two crewmen into a twilight sea world far beyond the reach of surface divers.

Unique among subs, *Deep Diver* alone can carry aquanauts wherever they want to go, let them out to do whatever they want to do, then bring them swiftly and safely home. Undersea houses and other containers lowered from the surface can put divers out to work*; small observation submarines can carry men on deep search and exploration missions. Only *Deep Diver* does both.

"Ready for the big jump, gentlemen?" asked Dr. Joseph MacInnis from the forward compartment. Like the rest of *Deep Diver's* regular crew, Joe works for Ocean Systems, Inc., an impressive company of undersea

*See in the GEOGRAPHIC: "The Deepest Days," by Robert Stenuit, April, 1965, and "Working for Weeks on the Sea Floor," by Capt. Jacques-Yves Cousteau, April, 1966.

Fisheye-lens view of *Deep Diver*'s forward compartment: Sunlight pouring through the open conning tower splashes the 25-year-old pilot, Roger Cook, as the sub sits on the deck of the mother ship, *Sea Diver*. He makes a final communications check before buttoning up for descent. During the dive, he occupies the stool on which his left arm now rests, puts hands on the wheel—it moves back and forth like an airplane's—and feet on the rudder pedals. Bank of panels at left controls all electronic gear aboard.

Testing oxygen masks, Breese and MacLeish, right, give pre-dive approval to a new breathing system to be used in the last stage of decompression. On the sea floor they close the hatch in foreground before pressurizing the compartment and then exit through the bottom hatch. Re-entering the craft, they begin decompression immediately.

Ready for the deep dive, the author awaits his turn to climb into the sub. He wears the top of a rubber wet suit, not for warmth in the relatively warm depths, but for insulation during pressurization when temperatures soar to 110° F. in the divers' compartment.

KODACHROMES BY BATES LITTLEHALES © N.G.S.

entrepreneurs which had just bought *Deep Diver* from its designers, Edwin A. Link and John H. Perry, Jr.

Now Joe, wearing red shorts, a Scottish tam, a stop watch, and a serious expression, stood by to direct the two divers. This pair sat in the six-by-four-foot after-compartment, sweating.

"Let's go and do that dirty deed!" said pilot Cook hippily. "Groovy!"

"Sure," said Dennison Breese, the lead diver. "We're just taking it easy back here, keeping our cool. Right, Ken?"

"Right!" I said (quite convincingly, I felt), and mopped my brow.

I pondered the question of what in the deep blue sea I, an aging writer and downright elderly diver, was doing in the hind end of a bottomward-bound diving machine with the face and figure of an astounded and pregnant guppy, about to be spawned like a fishlet into a fish's world.

But the answer was as evident as my own involvement was inevitable. The story of a dive derives from the diving. And here was a dive worth writing about, partly as an adventure but mainly as a demonstration of a new potential for explorers of the depths. With *Deep Diver*, Man-in-Sea has gone mobile.

An earlier encounter with Ed Link in a motel room near Washington, D. C., had placed me squarely in my present privileged predicament.

"*Deep Diver* is more than a sub," he had told me then. "It's a system. It includes a special hydraulic crane that can launch or retrieve her even in rough weather. What good is a sub that can be launched only in a flat calm?"

We sat at ease, old friends with shared memories of distant places and deep dives.

"Look. We've got flexibility here. We can launch *Deep Diver* without dropping anchor. Even inexperienced divers can work out of this little sub. We park her on the bottom and build up the gas pressure in the divers' compartment until it equals the pressure outside; the hatch drops open, and out they go.

"When they get back in, they simply close their hatch to lock the pressure in with them, and come on up. We hoist her aboard and sail away, while a doctor decompresses the divers slowly, so that the gases they've absorbed won't form bubbles in their bodies and give them the bends. *Deep Diver* can put men on several different targets in a day—and there's no other way in the world you can do that. You'd better come on down and see for yourself."

Scientists Spend a Night in the Depths

An amphibian put me alongside *Sea Diver* as she lay off Great Stirrup Cay, 63 miles northwest of Nassau. Half an hour later I was at 90 feet, wearing an Aqua-Lung, patting a tame grouper, and getting my first look at *Deep Diver*. She had just spent the night on the bottom. Her two divers, marine biologists Richard Waller and Robert Wicklund of the Department of the Interior, had moved in and out of the

1 NIGHT DIVING BEACON
2 RADIO ANTENNA
3 360° ROTATING BOW THRUSTER, THREE HORSEPOWER
4 BOW PLANES
5 UNDERWATER LIGHT
6 MAIN BATTERY POD (DROPPABLE)
7 OBSERVER
8 BALLAST TANK
9 CONNING TOWER
10 PILOT
11 FORWARD COMPARTMENT
12 AUXILIARY BATTERY COMPARTMENT
13 AIR CYLINDER ON EACH SIDE
14 INTERCOMPARTMENTAL HATCH
15 LIFTING BLOCK
16 MEDICAL AND SUPPLY LOCK FOR USE DURING DECOMPRESSION
17 REMOTE COMPASS HOUSING
18 DIVERS' COMPARTMENT
19 INSIDE PRESSURE HATCH
20 OUTSIDE PRESSURE HATCH
21 UNDERWATER TELEPHONE TRANSDUCER
22 OXYGEN STORAGE CYLINDERS
23 HELIUM-OXYGEN (HELIOX) STORAGE SPHERE
24 VERTICAL STERN THRUSTERS, THREE HORSEPOWER
25 SWIVELING MAIN PROPULSION UNIT, TEN HORSEPOWER

DIAGRAM (OPPOSITE) BY WILLIAM H. BOND; ROUNDHOUSES BY BATES LITTLEHALES © N.G.S.

Plucking the sub from the sea, a hydraulic crane prepares to deposit it in a stern cradle on *Sea Diver*'s deck. "It lifted us so gently that we felt only the slightest motion," reports the author. The crane holds the craft firmly and prevents swinging, thus making possible off-loading and recoveries even in rough water.

Versatile submersible with the maneuverability of a helicopter, *Deep Diver* can move in any direction—up, down, forward, backward, and sideways. And it is the world's only sub designed for "locking-out" divers—letting them get out and come in again on the bottom. Battery-powered, the craft cruises at three knots. Observer sits by the pilot's knees; two divers occupy the aft compartment.

Pioneer of two frontiers—air and sea—Edwin A. Link operates the crane he perfected to lift the revolutionary submarine he designed. Inventor of aviation's Link Trainer, the retired industrialist initiated the Man-in-Sea project six years ago. Its aim: to enable man to work on the ocean floor at the greatest depths he can tolerate for as long as he desires.

Midnight on the ocean floor finds the marine world awake and active: Big-eyed scad hover above mating squid. Attracted by *Deep Diver's* 1,000-watt lamp, they pay no heed to photographers invading their domain off Great Stirrup Cay.

"Fantastic sight," recalls marine biologist Richard Waller, who witnessed the mating and spawning of the squid. "We confirmed that females of *Dorytenthis plei* differ from other squid in laying their eggs," he reports. "They do not attach the egg clusters to hard objects on the bottom; instead, they dig tiny holes and plant one end of each egg strand."

Waller and fellow scientist Robert Wicklund earlier spent 25 hours in *Deep Diver*, mostly at a depth of 120 feet, leaving the sub at will to observe and collect specimens. The craft, they believe, will speed man's march toward fuller understanding of the undersea world.

ship at will in the longest lock-out dive—25 hours—ever made from a submarine, watching the little-known life of sea creatures (above and right).

I peered with fishy curiosity through a port into the forward compartment, where a pilot and an observer sat sealed off at normal atmospheric pressure (diagram, page 142). They nodded a silent greeting. I solemnly shook the hand of a helmeted figure who emerged from the after-chamber.

That evening the sub rested snugly in its cradle across *Sea Diver*'s stern, her two divers still under pressure inside. At a console amidships, Dr. MacInnis controlled the slow return to their normal environment.

I came back later to talk to him. Weariness shadowed his eyes, but his voice betrayed none as he checked his charges by intercom.

"Keep moving around, guys. Don't lie too long in one position. How is it in there?"

"Terrible. Temperature 95, humidity 100."

Lightning glimmered to the south, pulsing in the turbid heart of a squall. Cold stars swung to the ship's slow rolling. A breaking wave spilled forward with a sigh.

Joe glanced up from his glowing dials.

"I love these nights. They're. . . ."

He leaned suddenly toward the intercom, from which came strange banging sounds.

"What in Hades are you people doing in there?" he hollered, half alarmed.

A voice answered coldly, haughtily.

"For your information, doctor, we are building a little tiny submarine in a bottle."

Joe straightened, shaking his head.

"I don't know which is more important in this business: guts or a sense of humor."

Crew Prepares for the Deep One

The climax of *Deep Diver*'s sea trials was to be a deep lock-out. "Deep" would imply more than 300 feet, a depth to which Aqua-Lungers can (but should not) descend. Depth and crew were still to be chosen.

Dr. Joe went over me carefully.

"If I could find anything wrong, I would wash you out," he said. "But I can't."

Ed Link and Joe picked the rest of the crew. Joe would go as controller, up front with Roger Cook, the pilot. Denny Breese would be aft with me as dive master.

"You're going down with the 'varsity,'" Ed told me, "and I wish I were going too."

Now came the question of depth. *Deep Diver* could take the pressure of 1,300 feet. Her crew could not. Only one man, Hannes Keller of Switzerland, has ever made a 1,000-foot dive. It nearly cost him his life, and did kill his co-diver, Peter Small of England. The deepest wholly successful dive was also Keller's, with myself as his companion. In 1961 we were lowered to 728 feet in Lake Maggiore, on the Italian-Swiss border, and came right back up.

Since then many deep, long dives have been carried out, though none from a submersible.

We would have liked to go to the greatest depth for which decompression tables have been worked out—say, about 600 feet. But the deeper we went, the longer would be our decompression. This is the sacrifice the sea demands of those who invade it.

In future, *Deep Diver*'s personnel will be transferred to large decompression chambers on deck, and serve their sea-ordained sentences in a cool, dry atmosphere. But *Sea Diver*

Holding his breath at 420 feet, the author emerges from *Deep Diver*. He slips a safety rope onto his wrist, linking him to lines that lead to helmeted diver Breese, 15 feet away. With the tether, MacLeish cannot roam too far from the sub, or float upward—disastrous at this depth. The short outside time allotted the divers—less than two minutes—made breathing equipment unnecessary; Breese used an air line as a safety measure.

had no room for such a chamber. We would have to decompress in the sub itself, an experience comparable to a lengthy sojourn in a sealed, seatless, and steam-filled Volkswagen.

Joe picked 420 feet as a practical depth. It would require only three hours of decompression—*if* we could manage to pressurize, open up, get out, get back in, button up, and start decompression in 15 minutes flat. If we exceeded our time limit, we would draw seven hours in the belly of the iron fish.

So we practiced. For three days the varsity and I went through our paces at 50 feet. Since it was not practicable to send out simultaneously two helmeted divers, each trailing a gas line, I went out with no air supply whatever (page 138). This, I discovered, was a stirring experience, and one that wanted getting used to.

I learned to stay outside about one minute, then head for the sanctuary of *Deep Diver*'s yellow belly like a gopher for its hole.

Denny worked out ways of opening and closing the sharp-edged hatches to shorten the time involved without shortening our feet through the amputation of toes. Roger discovered that if he blew all his water ballast, *Deep Diver* would shoot up with splendid speed, yet without going completely out of control. Joe watched from within, stop watch in hand, and found that we were cutting seconds off our performance with each rehearsal.

"You people look good," he said at last. "We'll do this thing tomorrow."

While we slept, *Sea Diver*'s crew worked on the sub, filling her oxygen and helium tanks, charging her two tons of batteries,

AND BELOW) AND KENNETH MACLEISH © N.G.S.

Decompression "fog"—caused by the condensation of moisture as the temperature drops—grows so thick in the diving compartment that Denny Breese fades to a ghostly image in these close-ups taken by the author. Though *Deep Diver* is now aboard the mother ship, the men are still at a pressure depth of 180 feet. They will return to surface pressure after three hours of decompression, during which they will breathe first heliox, then bottled air, and finally pure oxygen.

Deep-diving doctor, Joseph MacInnis—one of the few specialists in underwater medicine—squeezes in beside pilot Cook as the sub descends. With decompression table on a clipboard, stop watch hung about his neck, and pressure gauge at eye level, he will supervise pressurization and decompression in the divers' chamber when the hatch between fore and aft compartments is closed.

checking her complex hydraulic and electrical systems. She was ready when we were; readier than I felt.

I skinned through the sub's underside opening and took my place in the stern. The hatch came up, and we dogged it. Roger lowered and locked the conning tower cover. Then *Sea Diver*'s crane, steady as a giant's arm, placed us in the sea.

So it was that the varsity and I set off for our deep destination. As the blaze of day dimmed above us, cooled by the sea's green filter, dark features on the bottom came into sight, clear and sharp even at a distance of 150 feet. We made for the sea floor and followed it as it fell away to greater depths. We knew from our previous explorations down to the 1,000-foot level that our lock-out spot would fall somewhere on a 60-degree slope.

Few submersibles could settle on such a surface, let alone hold position there. But *Deep Diver*, with three propellers in different axes, has unique helicopter-like maneuverability.

There began now a strange play involving one scene, two worlds, three acts, and four actors. These last would play their parts within or beside *Deep Diver*, the only constant element in the drama. Yet two of them would be converted into creatures of the depths, while the other two remained creatures of the earth's surface. The two pairs would still be able to see each other, speak to each other, come within inches of each other; but neither could abruptly enter the other's world without suffering instant death.

I will let these actors, whom you now know, speak their own lines.

ACT ONE: (Deep Diver *is cruising close to the sloping bottom. Inside, the intercompartment hatch is open. The interior is at atmospheric pressure. The four passengers stare out the ports into the darkening water.)*

DENNY: Look at those caves! Really groovy! Fish all around.

KEN: Must be fish in there that weigh a thousand pounds.

DENNY: Yeah. You swim over, look in, you see a round thing about two feet in diameter—and it's a flamin' eye!

ROGER: Coming up on 300.

DENNY *(to* KEN*)*: Let's really cool it, you know? Let's figure we're just lyin' on a beach in Southern Cal. . . .

(The bow propeller whines, swinging the sub hard left. Gauges show 415 feet. Roger is trying for a landing on the slope. Deep Diver *touches down, pointing uphill.)*

DENNY: Looks good, Roj. Plenty of space under the hatch so we can get out.

(Roger lets water into a pair of tanks to compensate for the loss of the divers' weight when they leave the sub.)

ROGER *(calling the ship): Sea Diver, Sea Diver,* this is *Deep Diver.* We're on this ledge; we've got the battery pod shoved right into a little cave. Looks real good. *(Then to the others.)* It's going to be hairy, getting out of here.

DENNY: O.K., our fins are on, and we undog this hatch.

JOE: Not going to fall open, is it?

KEN: I don't *think* so. *(All laugh. Tons of pressure outside will keep the hatch closed until the compartment is pressurized. The joke is small, but useful.)*

JOE *(excitedly):* Oh, look at that! Hey, gang, look what just took off! They . . . are . . . gigantic . . . shar . . . grouper. I thought they *were* shark at first.

(Roger turns on the outside floodlight. The fish are attracted to it.)

ROGER: Oh, man, fish are coming from all over. Looks like a line all the way to the surface, all the fish troopin' in.

DENNY: O.K., gentlemen, we're ready to button up.

JOE: Count down to five before you turn on the heliox. Take a number of deep breaths while you're counting, to get the CO_2 out of your lungs.

ROGER *(to ship): Sea Diver, Sea Diver, Deep Diver.* Aftertanks are flooded. We're closing the intercompartment hatch.

DENNY *(to* KEN*)*: We know we can do this fast. Let's just be sure we do it right.

ROGER: We're on a real steep slope, so be cool. If this thing slides—

Blowing all tanks for a rapid ascent, *Deep Diver* appears to shoot surfaceward like a rocket. Actually, the sub, seen here from directly below, planes up at a 60-degree angle, trailing a cloud of bubbles beyond the exhalations of the diver-photographer.

DENNY: If this thing slides, we'll beat feet back so fast you won't ever believe it. Now, I'd like to button up.

JOE: Right. *(He helps push the intercompartment hatch closed.)*

ACT TWO: *(The divers are now sealed in the lock-out chamber.)*

DENNY: Thank you, doctor. How about a communications check, Roger? You read? *(With the hatch closed, they must now speak to each other by intercom.)*

ROGER: Loud and clear.

JOE: Good luck, kids. Get everything ready before you pressurize. Take your time, really be cool.

DENNY: We are, uh, ready. Doctor, shall I start counting?

JOE: O.K., Denny, go ahead.

DENNY: Five, four, three, two, one, GO!

(Gas rushes, screaming, into the compartment. Both divers hold their noses, blowing frequently to counterbalance the growing pressure on their ear drums. The heat of compression stings their bare skin. The inside pressure gauge shows 200 feet. DENNY *cuts off the heliox. The divers take deep breaths.)*

DENNY *(in a Donald Duck voice made squeaky by helium):* Doctor, may we go on?

JOE: Say again? Oh, affirmative, go, GO!

(Gas screeches again for another minute and seven seconds. Then, two minutes and 45 seconds after the pressurization began, the outer hatch drops down and a disk of cool water appears at the divers' feet. The water holds its level. DENNY *shuts off the gas.)*

DENNY *(quacking):* "A" hatch is open.

JOE: Roger, good. No problem, huh?

(DENNY *slips into the water with a grimace of relief.* KEN *hands him his helmet, helps him adjust it.* DENNY *nods.* KEN *counts down from five, the words unintelligible, but the cadence giving the doctor an exact time check on* DENNY'S *exit.)*

(DENNY *goes out.* KEN *feeds out* DENNY'S *line, then follows* [page 146]. *He emerges into a still, cold world, lit as by an invisible moon. A constellation of small fish hangs in the mouth of the cave. Large dark shapes hover outside the circle of* Deep Diver's *floodlight.*

But, amazingly, he has no sense of water. Since water is everywhere, there are no limits to it, no boundaries. There is no surface to make an end to water; no drip, no splash to reveal its liquid heaviness. Since he is holding his breath, there are not even bubbles to proclaim this foreign atmosphere a fluid. The fish do not swim, but fly, as does he, over barren terrain from which dust rises slowly at a touch. He might be an astronaut coasting above an almost gravityless asteroid.

A minute passes, a few more seconds, and he re-enters the sub. He retrieves DENNY'S *gas line, with* DENNY *himself at the end of it. The two signal their return, close their hatch and, as the sub soars from the seabed, begin to bleed off pressure.)*

ACT THREE: *(This is both crucial and anticlimactic, as is the final act of any deep dive. In it the divers return slowly, uncomfortably, and—if all goes well—uninterestingly to the pressure of their native world, giggling inanely in high helium voices.)*

Success Opens a New Diving Era

Our trip back was triumphantly uneventful. *Deep Diver* surfaced two and a half minutes after leaving the bottom and was aboard *Sea Diver* in 35, while her divers were still at a pressure depth of more than 200 feet. We had kept within our allotted 15 minutes of compression time. Our sentence, therefore, stood at three hours of decompression.

Joe controlled our "ascent," bringing us to 180 feet on heliox, to 50 on air, to the surface on pure oxygen, using a decompression table that represented two years of work by Ocean Systems mathematicians. He made a log entry:

"A 420-foot lock-out dive was carried out from *Deep Diver*. This dive is deeper than any previously made from a submersible."

The record is unimportant. *Deep Diver's* own crew will break it before long. Yet it provides a measure of satisfaction to all concerned: to Ed Link, because his admirable brain child did what it was supposed to do; to Roger, because he had surely racked up some sort of a first in undersea piloting; to Denny, because he had run off a fine lock-out and kept that priceless cool; to me, because I was an old diver and still alive; to Joe, because he had kept me that way.

At dinner, after the dive, I noticed several of the old *Sea Diver* hands wearing salty-looking blue shirts with the ship's name in white across the chest.

"I've wanted one ever since I first worked aboard this ship eight years ago," I told Ed. "What do I have to do to get one?"

"You just did it," said Ed.

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COVER: Wild-riding horsemen, heirs of those who fought Alexander the Great in his conquest of Asia, tangle in Afghanistan's version of polo (page 46).

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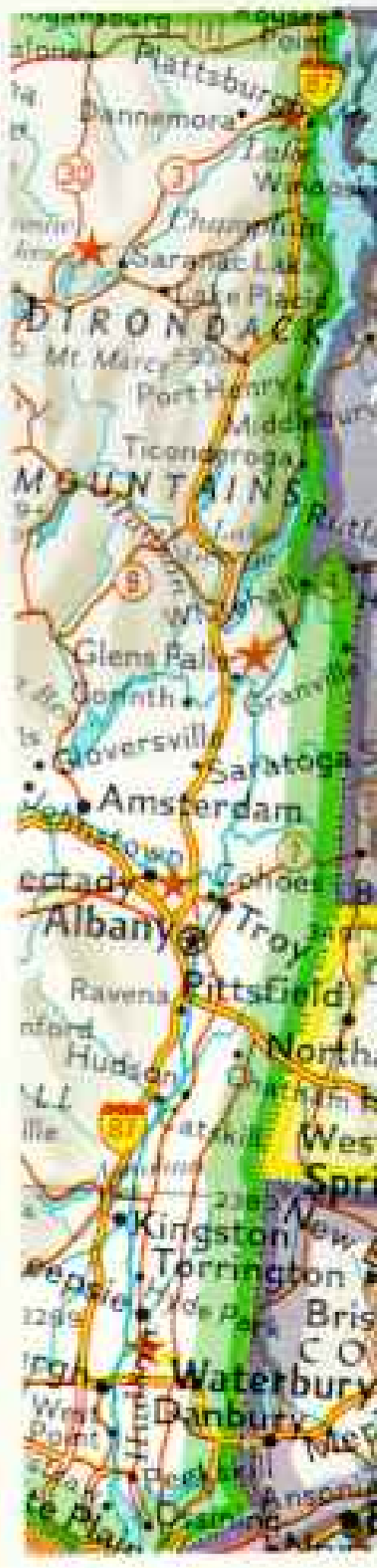
Poring over a proof of the new United States wall map, Miss Evelyn Fox, in charge of staff travel arrangements, notes airport symbols and the double red lines of new expressways. Graceful as sculpture (right), New York's Interstate 87 winds through the Adirondacks toward Canada.

February's GEOGRAPHIC will tell the full story of our growing Interstate Highway System, biggest public-works project in history. The same issue will take you from Czechoslovakia to Ecuador, and into the perilous realm of sharks, wolves of the sea.

Renew now, lest you miss this and other absorbing issues being planned for 1968—and do a friend a favor by filling in the nomination blank below.



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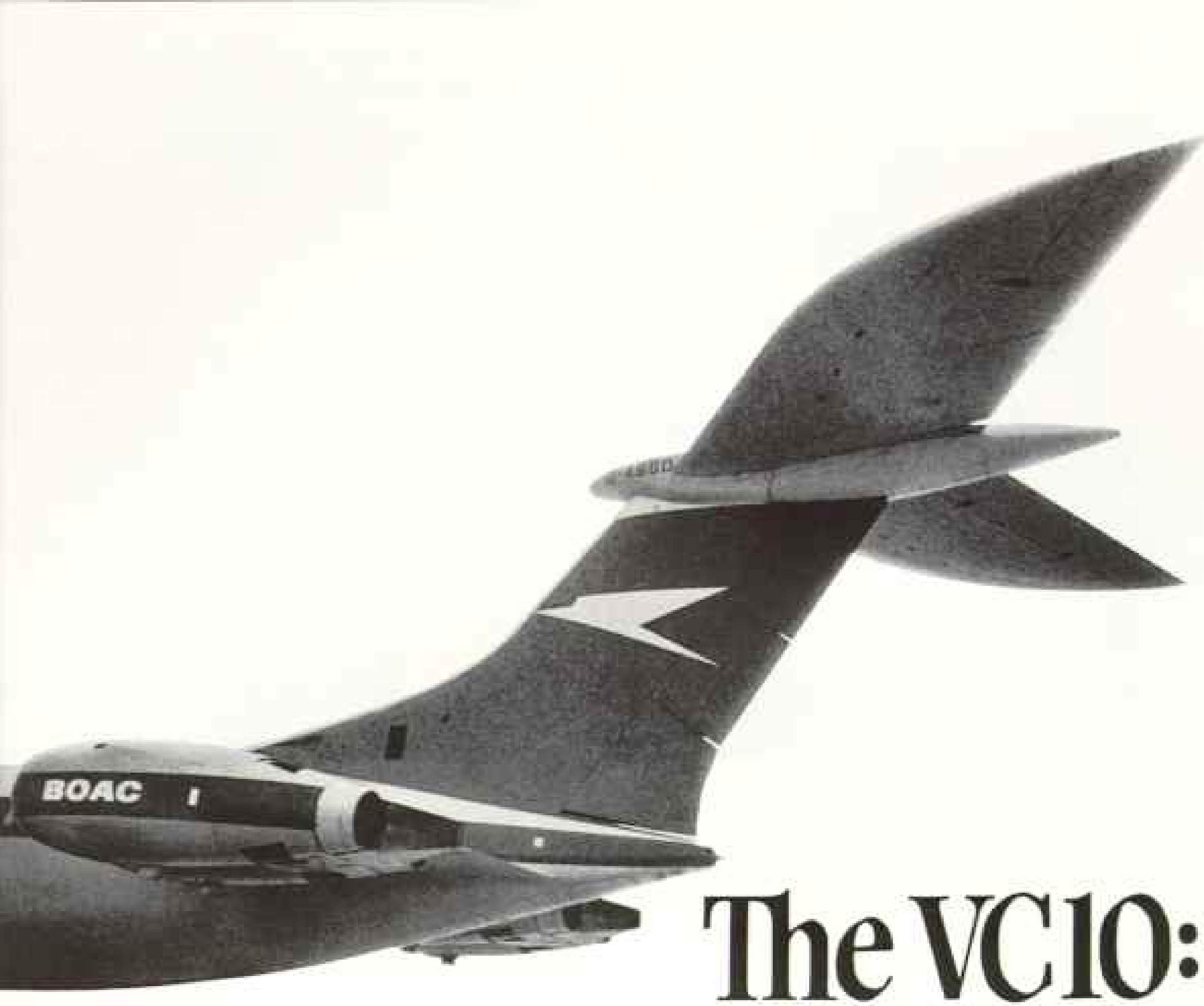

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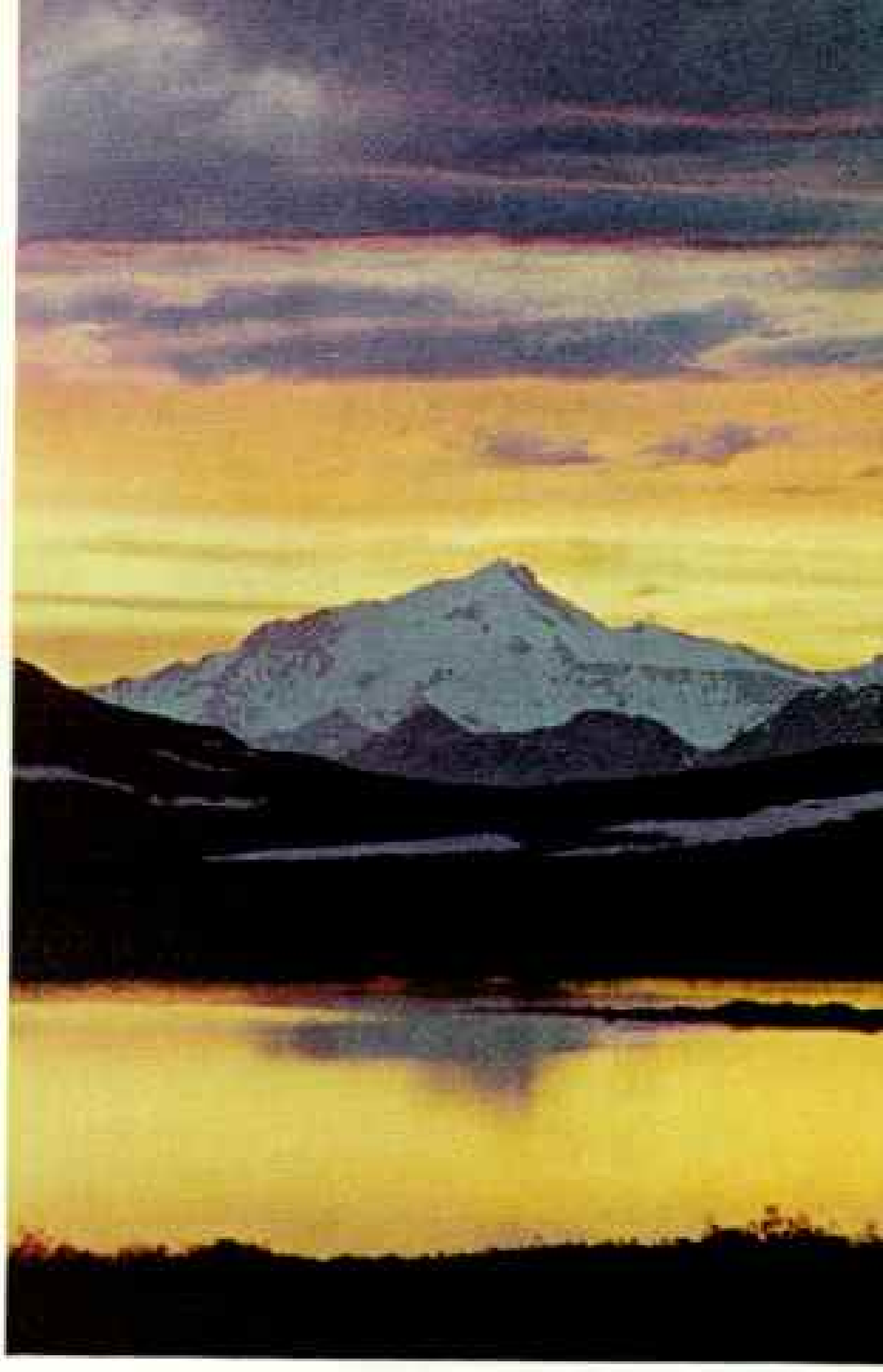

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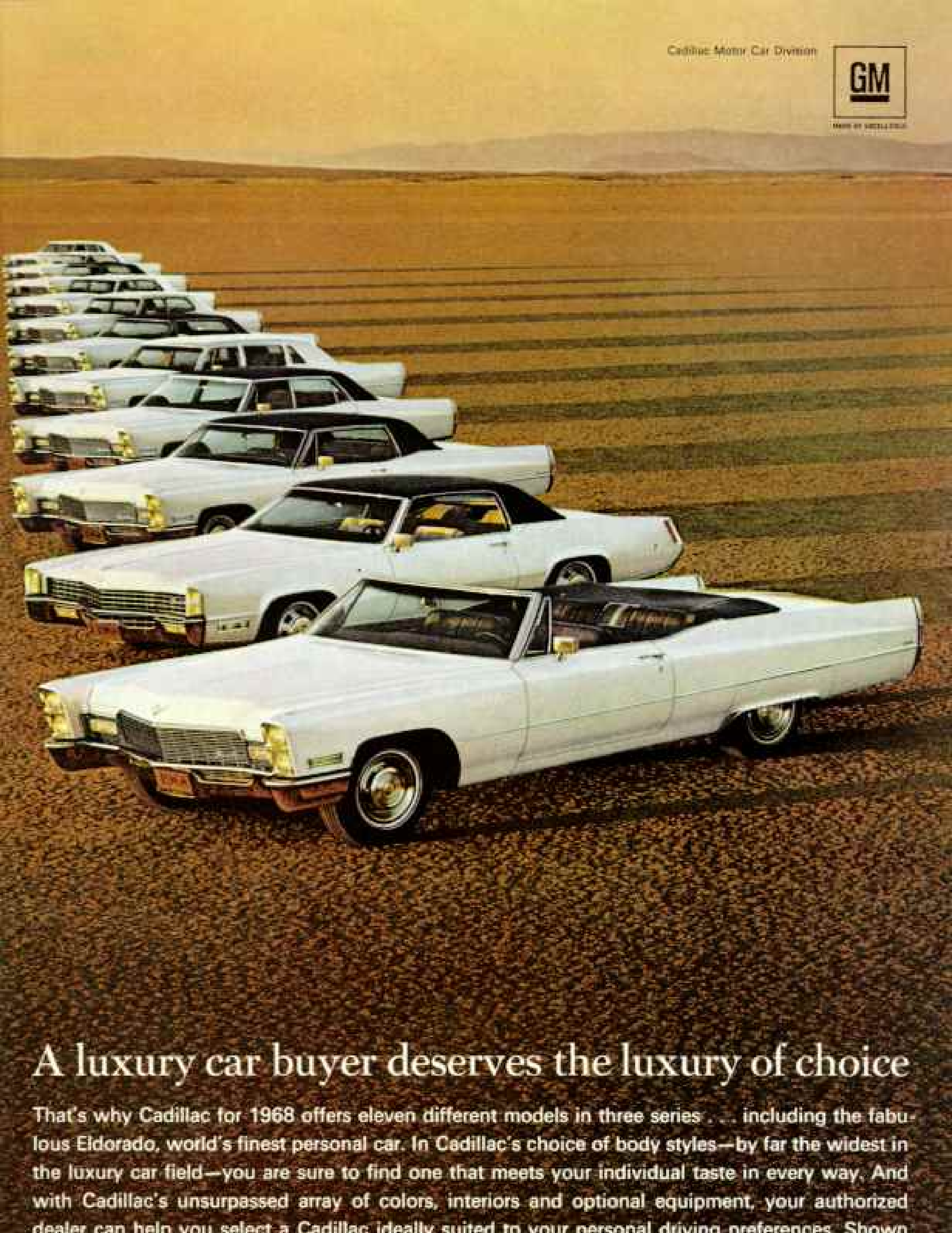

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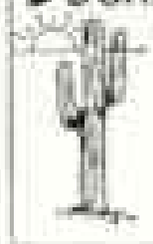

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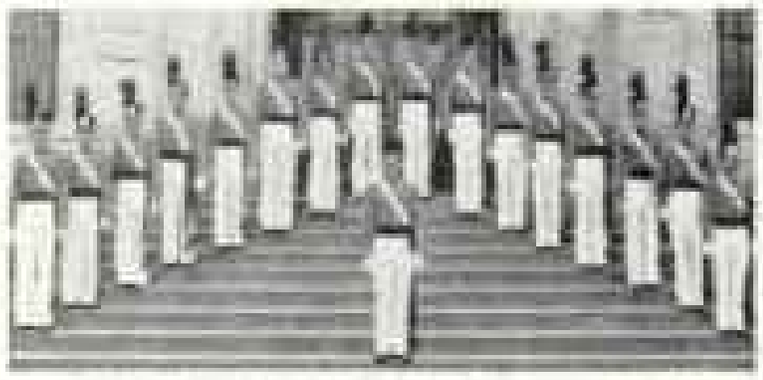

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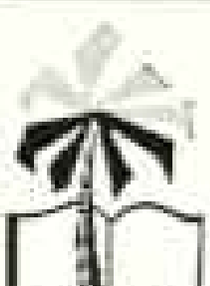

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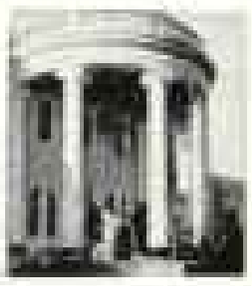

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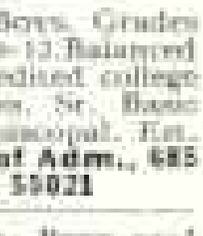

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