Chapter 2

Science, planetary consciousness, interiors

> [He may] make a tour of the world in books, he may make himself master of the geography of the universe in the maps, allasses and measurements of our mathematicians. He may travell by land with the historians, by sea with the navigators. He may go round the globe with Dampier and Rogers, and kno' a thousand times more doing it than all those illiterate sailors.
>
> (Daniel Defoe, *The Compleat English Gentleman* (1730))

> Verses are hardly fashionable any longer. Everybody has begun to play at being the geometer and the physicist. Sentiment, imagination, and the graces have been banished…. Literature is perishing before our very eyes.
>
> (Voltaire, Letter to Cideville, 16 April 1735[1])

The European part of this story starts in the European year 1735. At least that is where the narration is going to begin—the story takes another twenty or thirty years to really get underway. In that year 1735, two rather new and deeply European events took place. One was the publication of Carl Linné's *Systema Naturae (The System of Nature),* in which the Swedish naturalist laid out a classificatory system designed to categorize all plant forms on the planet, known or unknown to Europeans. The other was the launching of Europe's first major international scientific expedition, a joint effort intended to determine once and for all the exact shape of the earth. As I propose to argue, these two events, and their coincidence, suggest important dimensions of change in European elites' understandings of themselves and their relations to the rest of the globe. This chapter is about the emergence of a new version of what I like to call Europe's "planetary consciousness," a version marked by an orientation toward interior exploration and the construction of global-scale meaning through the descriptive apparatuses of natural history. This new planetary consciousness, I will suggest, is a basic element constructing modern Eurocentrism, that hegemonic reflex that troubles westerners even as it continues to be second nature to them.

Under French leadership, the international scientific expedition of 1735 set out to resolve a burning empirical question: Was the earth a sphere, as

Cartesian (French) geography said, or was it, as (English) Newton had hypothesized, a spheroid flat at the poles? It was a question highly charged by the political rivalry between France and England. One team of scientists and geographers, led by the French physicist Maupertuis, was sent north to Lapland to measure a longitudinal degree at the Meridian. Another headed for South America to take the same measurement at the Equator near Quito. Nominally led by the mathematician Louis Godin, this expedition has gone down in history under the name of one of its few survivors, the geographer Charles de la Condamine.

The La Condamine expedition was a particular diplomatic triumph for the European scientific community. Spain's American territories were strictly closed to official travel by foreigners of any kind, and had been for more than two centuries. The Spanish court's obsession with sealing its colonies off from foreign influence and foreign espionage was legendary. After losing control over the slave trade to Britain in 1713, Spain had become more fearful than ever of inroads into its economic and cultural monopolies. The more the international contacts of the creole elites in its colonies broadened, the more fearful Spain became. "The policy of the Spaniards," wrote the British pirate Betagh in the 1720s, "consists chiefly in endeavoring, by all ways and means possible, to restrain the vast riches of those extensive dominions from passing into other hands."[2] Knowledge of those riches, said Betagh, and of "the great demand for European manufactures among the Americans has excited almost every nation in Europe." Military installations in Spanish American ports and mining operations in the interior were the two colonial constructions most carefully shielded from outside eyes, as they were the most assiduously sought out by Spain's rivals. In 1712, for instance, the King of France hired a young engineer named Frézier to travel the coasts of Chile and Peru posing as a trader, "the better to insinuate himself with the Spanish Governors, and to have all the opportunities of learning their strength."[3] Obsessed with mines, Frézier never managed to lay eyes on one. Yet even the hearsay he reported was avidly devoured by readers in France and England. In the absence of new writings on South America, the compiler of Churchill's collection of voyages in 1745 translated an account of Chile written a century earlier by the Spanish Jesuit Alonso de Ovalle.[4] As regards the interior of Spanish America, even such dated accounts were more to be relied upon than contemporary conjectures, like Betagh's report of an earthquake in the interior that had "lifted up whole fields and carried them several miles off."[5]

In the case of the La Condamine expedition, the Spanish crown set aside its legendary protectionism. Eager to build its prestige and live down the "black legend" of Spanish cruelty, Philip V seized the opportunity to act as an enlightened continental monarch. Conditions on the expedition's scope were agreed on, and two Spanish captains, Antonio de Ulloa and Jorge Juan, were sent along to ensure scientific inquiry did not give way to espionage—

which it promptly did. Just about everything else went wrong, too. So trying an enterprise was the La Condamine expedition that over sixty years would pass before anything like it was attempted again.[6] Rivalries within the French contingent rapidly overcame collaborative bonds. International cooperation gave way to endless bickering with local colonial authorities over what could or could not be seen, measured, drawn, or sampled. At one point, the entire expedition was held up in Quito for eight months, accused of plotting to plunder Inca treasures. The foreigners, with their odd-looking instruments, their obsessive measurings—of gravity, the speed of sound, heights and distances, courses of rivers, altitudes, barometric pressures, eclipses, refractions, trajectories of stars—were the object of continual suspicion. In 1739 the group's surgeon was murdered after getting caught up in a dispute between two powerful families at Cuenca in Ecuador; La Condamine barely escaped the same fate. A court battle was fought for more than a year over whether the French *fleur de lys* could be placed on the expedition's triangulation pyramids (the *fleur de lys* lost). Interior exploration was proving to be an even greater political nightmare than its maritime antecedent.

The logistical nightmares of interior exploration were also new, and the La Condamine expedition was spared none of them. The rigors of Andean climate and overland travel produced continual sickness, damaged instruments, lost specimens, wet notebooks, agonizing frustration and delay. In the end, the French group disintegrated completely, each person left to find his own way home or remain stranded in South America. Though the South American expedition had set out a year before its Arctic counterpart, nearly a decade passed before the first survivors began straggling back to Europe. The question of the earth's outlines had long since been put to rest (Newton won).

In addition to information on other subjects, what the South American group brought home were discomfiting lessons in the politics and (anti-) heroics of science. Mathematician Pierre Bouguer returned first and won the glory of reporting to the French Academy of Science. La Condamine arrived in 1744 via the Amazon and won acclaim for his unprecedented Amazon journey. Through an aggressive campaign against Bouguer, La Condamine managed to make himself the chief spokesperson for the expedition all over Europe. Meanwhile, Louis Godin, the nominal leader, was slowly working his way home. Arriving in Spain in 1751, he was denied a passport to France through the machinations of Bouguer and La Condamine. The naturalist Joseph de Jussieu continued his research in New Spain till 1771, when he was sent back from Quito, completely insane. The young technician Godin des Odonnais made his way to Cayenne, where he waited eighteen years for his Peruvian wife to join him, returning to France at last in 1773. (More on her story below.) Others were never heard of again.

Spain's cooperation with the La Condamine expedition was striking

evidence of the power of Science to raise Europeans above even the most intense national rivalries. La Condamine himself celebrated this continental impulse in the preface to his travel account, where he congratulated Louis XV for supporting scientific cooperation with his fellow nations even while simultaneously at war with them: "Whilst his Majesty's armies flew from one end of Europe to the other," said La Condamine, "his mathematicians, dispersed over the surface of the earth, were at work under the Torrid and Frigid Zones, for the improvement of the sciences, and the common benefit of all nations."[7] One cannot help noticing the conspicuously nationalist ring of La Condamine's sentiment here, however: the French scientist proudly congratulates his own king on his enlightened cosmopolitanism. In a similarly double-edged spirit, both the British Royal Society and the French Academy of Science rewarded the Spaniards Juan and Ulloa with honorary memberships—transnational gestures not unrelated to the intense national rivalries between Britain and France and their competing interests in Spanish America. Such gestures sum up the ambiguous interplay of national and continental aspirations that had been a constant in European expansion, and was to remain so in the age of science. On the one hand, dominant ideologies made a clear distinction between the (interested) pursuit of wealth and the (disinterested) pursuit of knowledge; on the other hand, competition among nations continued to be the fuel for European expansion abroad.

There is one respect in which the La Condamine expedition was a real success, namely, as writing. The tales and texts it occasioned circulated round and round Europe for decades, on oral circuits and written. Indeed, the body of texts that resulted from the La Condamine expedition suggests rather well the range and variety of writing produced by travel in the mid-eighteenth century, writing that in turn produced other parts of the world for the imaginations of Europeans. A brief catalogue of writings from the La Condamine expedition may help suggest what it means to talk about travel, writing, and contact zones at this moment in history.

The mathematician Bouguer, the first to return, expanded his report to the French Academy of Sciences in 1744 into an *Abridged Relation of a Voyage to Peru*. Initially in this account the voice of the scientist predominates, structuring the discourse around measurements, climactic phenomena, and so forth. As his travels turn inland, however, Bouguer's scientific narrative becomes interwoven with a story of suffering and hardship that even today makes for stirring reading. As the expedition camps out atop the frigid Andean cordillera to do its triangulations, anecdotes of bleeding chilblains and Amerindian slaves dying of cold are interspersed with physiological speculations on the retention of body heat. Of mines, Bouguer reports only hearsay, noting that "the impenetrable nature of the country" makes new ones hard to find, and also that "the Indians are wise enough not to be very aiding in these sort of researches," for "should they succeed, they would be opening a career of labour painful

4 The La Condamine expedition taking measurements. From Charles de la Condamine, *Mesure des trois premiers degrés du Méridien dans l'Hémisphère Austral (Measurement of the Three First Degrees of the Meridian in the Southern Hemisphere),* Paris, Imprimerie Royal, 1751.

to excess, which themselves alone would bear the weight, and with but little portion of the profits."[8] Bouguer also produced a technical book on the expedition called *La Figure de la terre*.

La Condamine also published his report to the French Academy as *Brief Narrative of Travels through the Interior of South America* (1745). It was read and translated widely. Perhaps because Bouguer had already spoken for the Andean part of the mission, La Condamine's account relates mainly his extraordinary return journey down the Amazon and his attempts to map its course and its tributaries. The account is written mainly not as a scientific report, but in the popular genre of survival literature. Alongside navigation, survival literature's two great themes are hardship and danger on the one hand, and marvels and curiosities on the other. In La Condamine's narrative the drama of sixteenth-century expeditions in the region—Orellana, Raleigh, Aguirre—is replayed with all its mythic associations. Entering the jungle, La Condamine finds himself "in a new world, far from all human commerce, upon a sea of fresh water…. I met there with new plants, new animals, and new men."[9] He speculates, as had all his predecessors, on the location of El Dorado and the existence of the Amazons, who, though they may well have existed, most probably "have now laid aside their ancient customs."[10] The jungle remains a world of fascination and danger.[11]

While the 1745 *Brief Narrative* is certainly the best known of La Condamine's writings, he published copiously in other genres as well, all based on his American travels. His "Letter on the Popular Uprising at Cuenca" appeared in 1746, followed by a *History of the Pyramids of Quito* (1751), and a report on the *Measurement of the First Three Degrees of the Meridian* (1751). For the rest of his life he engaged in research and polemics on a range of America-related scientific issues, including the effects of quinine, smallpox vaccination (widely used by Spanish missionaries), the existence of the Amazons, the geography of the Orinoco and the Rio Negro. He wrote about rubber, which he introduced to European scientists, curare poison and its antidotes, and the need for common European standards of measurement. La Condamine's specialized scientific writings suggest the extent to which science came to articulate Europe's contacts with the imperial frontier, and to be articulated by them.

It was the two Spanish captains Juan and Ulloa who produced the one full-length account of the expedition. Authored by Ulloa at the request of the King of Spain, their *Voyage to South America* appeared in Madrid in 1747, and its English translation by John Adams went through five editions. Neither science nor survival literature, Ulloa and Juan's account is written in a mode I like to call "civic description." Virtually devoid of anecdote, the book is an enormous compendium of information on many aspects of Spanish colonial geography and of Spanish colonial life—except, of course, mines, military installations, and other strategic information. It is a "statistical" work, in the earliest sense of the term, in which statistics meant

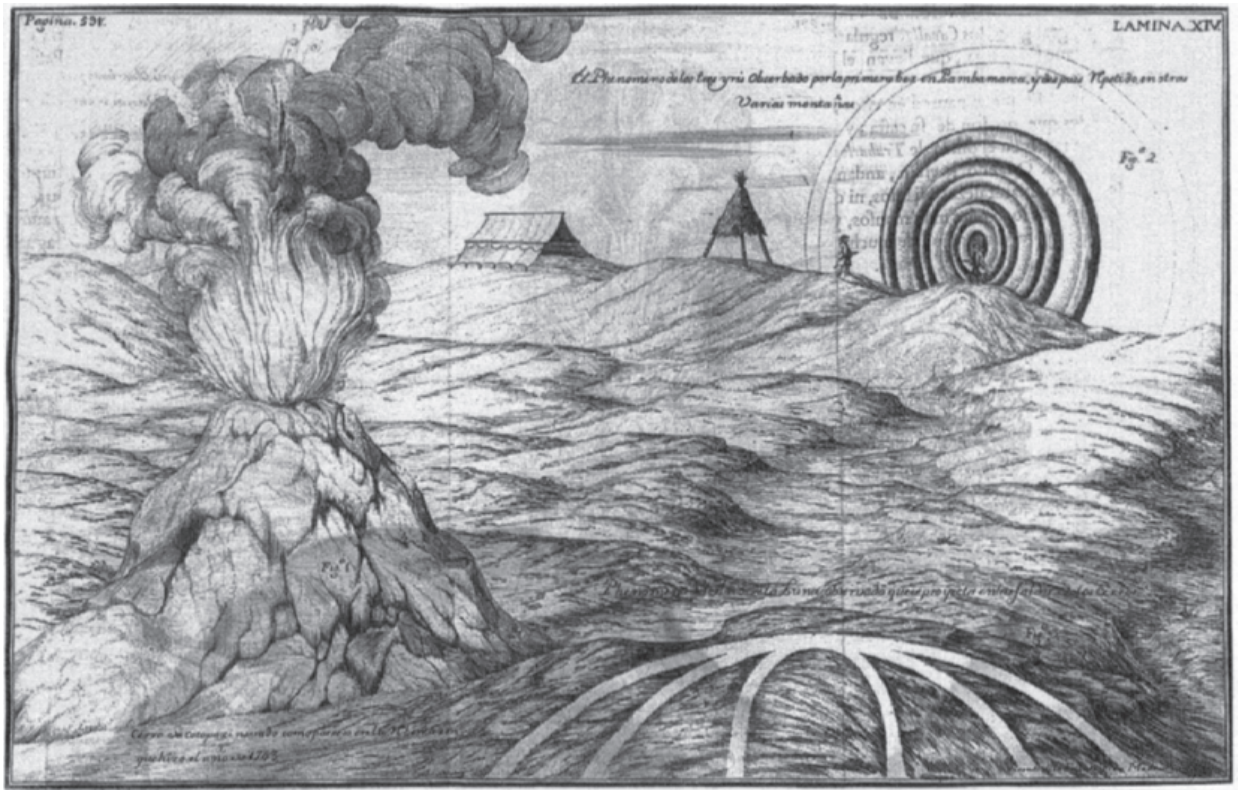
"an inquiry into the state of a country" *(Oxford English Dictionary)*. Adams praised the account for its reliability in contrast with the "pompous describers of wonderful curiosities,"[12] an allusion to survival literature in general, and probably to La Condamine in particular.

Juan and Ulloa also addressed to their king a second, clandestine volume titled *Noticias secretas de América (Secret News of America),* which reported critically on many aspects of Spanish colonial rule and, as one commentator puts it, explained "much left unsaid in the works of the French Academicians."[13] Not till the first years of the nineteenth century, when the Spanish Empire was in its final collapse, did this work fall into the hands of the English and become public.

Alongside the catalogue of texts that got written from the La Condamine expedition, there is a catalogue of texts that did not. It includes, for example, the work of Joseph de Jussieu, the naturalist who remained behind in South America, where he continued to exercise his profession for another twenty years. When he eventually lost his mind and had to be sent back to France from Quito, the friends who packed him off seem simply to have lost track of the trunk containing his lifetime of research. Only one study, on the effects of quinine, did get published—under La Condamine's name! The rest may still turn up one day in Quito.

The most riveting and enduring story that arose from the La Condamine expedition was an oral one that made it into print only vestigially. It is a survival story whose hero is not a European man of science, but a Euroamerican woman, Isabela Godin des Odonais, an upper-class Peruvian who married a member of the La Condamine expedition, with whom she bore four children. After the break-up of the scientific party, her husband made his way to Cayenne, where he spent eighteen years trying to arrange passports and passage to France for himself and his family. After the heartbreaking death of her fourth and last child, Mme. Godin, now in her forties, made a daring decision. Accompanied by a party that included her brothers, nephew, and numerous servants, she set out to join her spouse by traveling over the Andes and down the Amazon by the same route that made La Condamine a hero. Disaster ensued. Threatened by smallpox, so the story goes, her indigenous guides deserted the party, and all, including her brothers, nephew, and servants, died of exposure after languishing for days in the jungle. Mme. Godin, wandering deliriously, gradually made her way alone back to the river, where she was rescued by indigenous canoeists who took her to a Spanish missionary outpost. Haggard, her hair turned white, the story continues, she emerged on the Guyanese coast to be taken off to Europe by her ever-devoted spouse.

Mme. Godin's romantic and spine-chilling story was written down in 1773—not by her, but by her husband, at the request of La Condamine, who appended it to editions of his own narrative.[14] Even today, the tale is thoroughly compelling, its complexities irresistible, as they often seem to be



5 Natural phenomena of South America, as seen by the La Condamine expedition. At bottom left stands the volcano Cotopaxi, snow-covered and erupting; bottom right depicts the “phenomenon of the arc of the moon” projected on the mountainsides; upper right depicts the “phenomenon of the triple rainbow, seen for the first time in Pambamarca and later in various other mountains.” From Jorge Juan and Antonio de Ulloa, *Relatión histórias del viaje a la América meridional,* Madrid, Antonio Marín, 1748.

wherever women protagonists appear in the lore of the colonial frontier. Mme. Godin's story is a replay of the great Amazon quest, carried out by the female Amazon herself—or a near thing to it. Love, loss, and jungle transform the creole woman from a white aristocrat into the combative woman warrior that Europeans had created to symbolize America to themselves. At the same time, it destroys her as a sex object: Mme. Godin emerges as a real-life version of Candide's ruined princess Cunégonde. Symbolic reversals abound in the story. The exchange of gold reverses direction, for example. At one point, Mme. Godin gives two of her gold chains to the two Indians who had saved her life in the jungle, turning the paradigm of conquest back on itself. To her fury, the gifts are immediately taken away by the resident priest and substituted with the quintessential colonizing commodity, cloth. With such delicious ironies, it is no wonder Mme. Godin's Amazon descent lived and thrived all over Europe for more than fifty years. Her husband's twenty-page letter represents a meager trace of a vital existence in oral culture.

THE CARPET BEYOND THE SELVAGE

Oral texts, written texts, lost texts, secret texts, texts appropriated, abridged, translated, anthologized, and plagiarized; letters, reports, survival tales, civic description, navigational narrative, monsters and marvels, medicinal treatises, academic polemics, old myths replayed and reversed—the La Condamine corpus illustrates the varied profile of travel-related writing on the frontiers of European expansion at mid-eighteenth century. The expedition itself is of interest here as an early, and notoriously unsuccessful, instance of what was shortly to become one of Europe's proudest and most conspicuous instruments of expansion, the international scientific expedition. In the second half of the eighteenth century, scientific exploration was to become a magnet for the energies and resources of intricate alliances of intellectual and commercial elites all over Europe. Equally important, scientific exploration was to become a focus of intense public interest, and a source of some of the most powerful ideational and ideological apparatuses through which European citizenries related themselves to other parts of the world. These apparatuses, and particularly travel writing, are the subject of what follows.

For the purposes of this study, the La Condamine expedition has a more specific significance as well. It is an early instance of a new orientation toward exploring and documenting continental interiors, in contrast with the maritime paradigm that had held center stage for three hundred years. By the last years of the eighteenth century, interior exploration had become the major object of expansionist energies and imaginings. This shift had significant consequences for travel writing, demanding and giving rise to new forms of European knowledge and self-knowledge, new models for European contact

beyond its borders, new ways of encoding Europe's imperial ambitions. In 1715 the French spy Frézier deemed interior exploration in Peru impossible because "Travelers must carry so much as their very Beds, unless they will comply to lie like Natives on the Ground, upon Sheeps Skins, with the Sky for their Canopy."[15] For the English prefacer to Ulloa's account thirty years later, interior exploration is the essential next step: "What idea can we form of a Turkey carpet," he asks, "if we look only at the border, or it may be, at the selvage?"[16] By 1792 the French traveler Saugnier saw it as a matter of global fairness: the interiors of Africa "deserve the honor" of European visitation as much as the coasts.[17] In 1822, Alexander von Humboldt affirmed, "It is not by sailing along a coast that we can discover the direction of chains of mountains and their geological constitution, the climate of each zone, and its influence on the forms and habits of organized beings." For his English translator the issue was an aesthetic one: "In general, sea-expeditions have a certain monotony which arises from the necessity of continually speaking of navigation in a technical language.... The history of journies by land in distant regions is far more calculated to encite general interest."[18]

As travel, then, the La Condamine expedition marks the onset of an era of scientific travel and interior exploration that in turn suggests shifts in Europe's conception of itself and its global relations. In its calamitous failures, the expedition stands as a precursor. As writing, it exemplifies configurations of travel writing which, as bourgeois forms of authority gained momentum, would be thoroughly reorganized. (The next chapter will examine these transformations in travel writing on southern Africa.) In the second half of the eighteenth century, many traveler-writers would dissociate themselves from such traditions as survival literature, civic description, or navigational narrative, for they were to be engaged by the new knowledge-building project of natural history. The emergence of that project is marked by the second event of 1735 that I promised to discuss, the publication of Linnaeus' *System of Nature*.

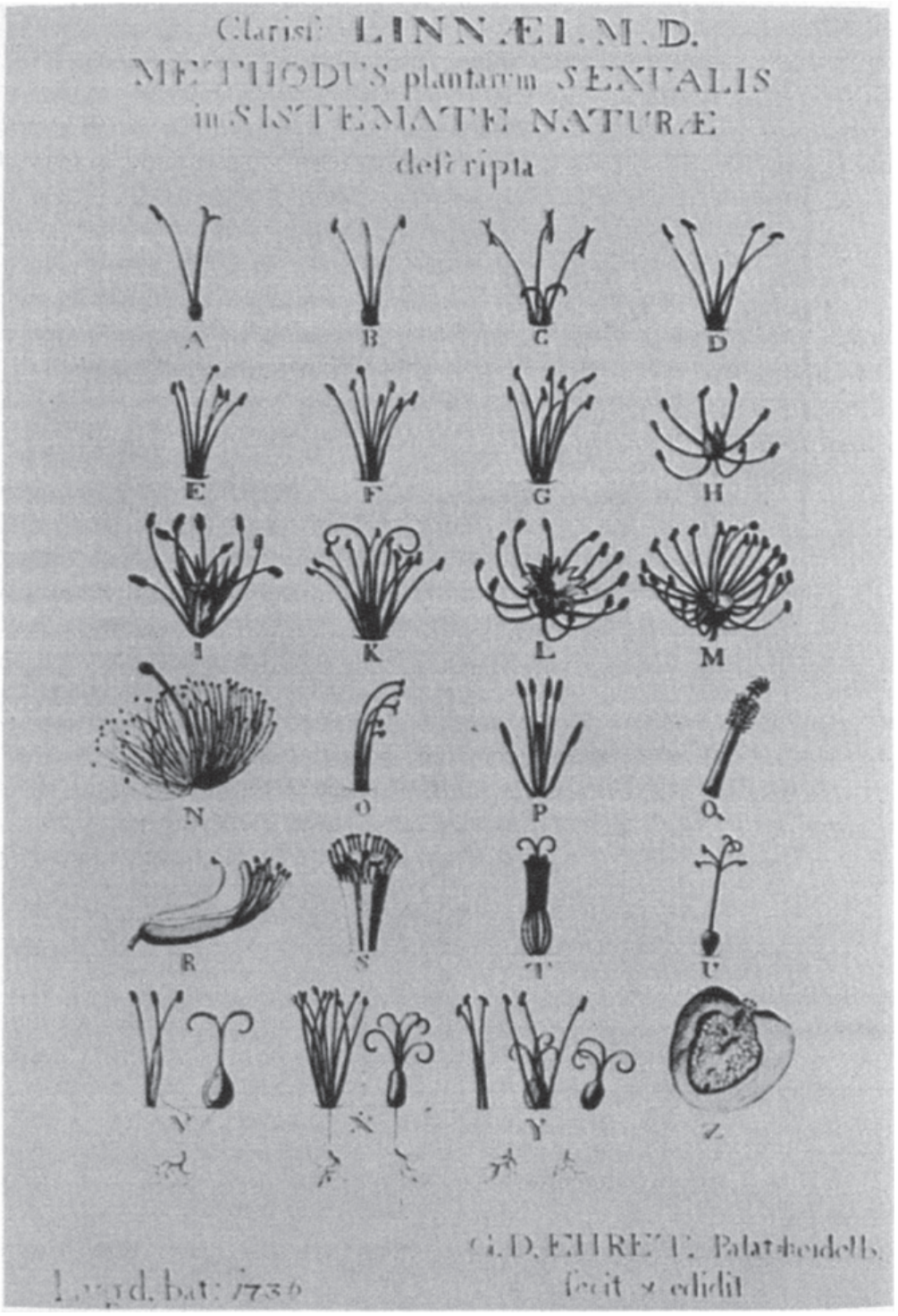
THE SYSTEM OF NATURE

While the La Condamine expedition was making its way across the Atlantic in the name of science, a 28-year-old Swedish naturalist was ushering into print his first major contribution to knowledge. The naturalist was named Carl Linné or, in Latin, Linnaeus, and the book was called *Systema Naturae (The System of Nature)*. Here was an extraordinary creation that would have a deep and lasting impact not just on travel and travel writing, but on the overall ways European citizenries made, and made sense of, their place on the planet. To a contemporary reader *The System of Nature* seems a modest and in fact rather quaint achievement. It was a descriptive system designed to classify all the plants on the earth, known and unknown, according to the characteristics of their reproductive parts.[19] Twenty-four (and later twenty-six) basic configurations of stamens, pistils, and so forth

were identified and laid out according to the letters of the alphabet (see plate 6). Four added visual parameters completed the taxonomy: number, form, position, and relative size. All the plants on the earth, Linnaeus claimed, could be incorporated into this single system of distinctions, including any as yet unknown to Europeans. Born out of earlier classificatory efforts by Roy, Tournefort, and others, Linnaeus' approach had a simplicity and elegance unapproached by his predecessors. To combine the ideal of a unified classificatory system for all plants with a concrete, practical suggestion of how to construct it constituted a tremendous breakthrough. His schema was perceived, even by its critics, as making order out of chaos—both the chaos of nature, and the chaos of earlier botany. "The Ariadne thread in botany," said Linnaeus, "is classification, without which there is chaos."[20]

As it turned out, the 1735 *System* was only a first run. While La Condamine fought his way around South America, Linnaeus fine-tuned his system, giving it its final shape in his two definitive works, the *Philosopbia Botanica* (1751) and the *Species Plantarum* (1753). It is to these works that European science owes the standard botanical nomenclature which assigns plants the name of their genus followed by their species, followed by any other differentiae essential to distinguish them from adjacent types. Parallel systems were also proposed for animals and minerals.

The Linnaean system epitomized the continental, transnational aspirations of European science discussed earlier in connection with the La Condamine expedition. Linnaeus deliberately revived Latin for his nomenclature precisely because it was nobody's national language. The fact that he himself was from Sweden, a relatively minor player in global economic and imperial competition, undoubtedly increased continent-wide receptivity to his system. Competing paradigms, produced in particular by the French, were equally continentalist in scope and design. Linnaeus' system alone launched a European knowledge-building enterprise of unprecedented scale and appeal. His pages of Latin lists might look static and abstract, but what they did, and were conceived to do, was to set in motion a project to be realized in the world in the most concrete possible terms. As his taxonomy took hold throughout Europe in the second half of the century, his "disciples" (for so they called themselves) fanned out by the dozens across the globe, by sea and by foot, executing what Daniel Boorstin has called a "messianic strategy."[21] Arrangements with the overseas trading companies, especially the Swedish East India Company, gave free passage to Linnaeus' students, who began turning up everywhere collecting plants and insects, measuring, annotating, preserving, making drawings, and trying desperately to get it all home intact. The information was written up into books; the specimens, if dead, were mounted into natural history collections which became serious hobbies for people of means all over the continent; if alive, they were planted in the botanical gardens that likewise began springing up in cities and private estates all over the continent. Linnaeus' pupil Kalm went



6 Linnaeus' system for identifying plants by their reproductive parts. This illustration by Georg D.Ehret first appeared in the 1736 Leiden edition of his *Species Plantarum*.

to North America in 1747, Osbeck to China in 1750, Lofling to South America in 1754, Forsskal to the Near East in 1761, while Solander joined Cook's first voyage in 1768, Sparrman his second in 1772 (see chapter 3 below), and so on. Linnaeus' own words to a colleague in 1771 convey the energy, excitement, and global character of the enterprise:

> My pupil Sparrman has just sailed for the Cape of Good Hope, and another of my pupils, Thunberg, is to accompany a Dutch embassy to Japan; both of them are competent naturalists. The younger Gmelin is still in Persia, and my friend Falck is in Tartary. Mutis is making splendid botanical discoveries in Mexico. Koenig has found a lot of new things in Tranquebar. Professor Friis Rottboll of Copenhagen is publishing the plants found in Surinam by Rolander. The Arabian discoveries of Forsskal will soon be sent to press in Copenhagen.[22]

It is as if he were speaking of ambassadors and empire. What I want to argue is, of course, that in quite a significant way, he was. As Christianity had set in motion a global labor of religious conversion that asserted itself at every point of contact with other societies, so natural history set in motion a secular, global labor that, among other things, made contact zones a site of intellectual as well as manual labor, and installed there the distinction between the two. At the same time, the Linnaean systematizing project had a markedly democratic dimension, popularizing scientific inquiry as it had never been popularized before. "Linnaeus," as one present-day commentator puts it, "was above all a man for the non-professional." His dream was that "with his method it would be possible for anyone who had learned the system to place any plant anywhere in the world in its right class and order, if not in its right genus, whether the plant was previously known to science or not."[23]

Travel and travel writing would never be the same again. In the second half of the eighteenth century, whether or not an expedition was primarily scientific, or the traveler a scientist, natural history played a part in it. Specimen gathering, the building up of collections, the naming of new species, the recognition of known ones, became standard themes in travel and travel books. Alongside the frontier figures of the seafarer, the conqueror, the captive, the diplomat, there began to appear everywhere the benign, decidedly literate figure of the "herborizer," armed with nothing more than a collector's bag, a notebook, and some specimen bottles, desiring nothing more than a few peaceful hours alone with the bugs and flowers. Travel narratives of all kinds began to develop leisurely pauses filled with gentlemanly "naturalizing." Descriptions of flora and fauna were not in themselves new to travel writing. On the contrary, they had been conventional components of travel books since at least the sixteenth century. However, they were typically structured as appendices or formal digressions from the narrative. With the founding of the global classificatory project, on

the other hand, the observing and cataloguing of nature itself became narratable. It could constitute a sequence of events, or even produce a plot. It could form the main storyline of an entire account. From one angle, what is told is a story of urbanizing, industrializing Europeans fanning out in search of non-exploitive relations to nature, even as they were destroying such relations in their own centers of power. As I will try to show in the next chapter, what is also told is a narrative of "anti-conquest," in which the naturalist naturalizes the bourgeois European's own global presence and authority. This naturalist's narrative was to continue to hold enormous ideological force throughout the nineteenth century, and remains very much with us today.

Linnaeus' system is only one instance of the totalizing classificatory schemas that coalesced in the mid-eighteenth century into the discipline of "natural history." The definitive version of Linnaeus' system appeared alongside equally ambitious undertakings like Buffon's *Histoire naturelle,* which began to appear in 1749, or Adanson's *Familles des plantes* (1763). While these writers proposed competing systems that differed from Linnaeus' in substantive ways, the debates among them remained grounded within the totalizing, classificatory project that distinguishes this period. The schemas constituted, as Gunnar Eriksson puts it, "alternative strategies for realizing a project common to all eighteenth-century natural history, the faithful representation of nature's own plan."[24] In his classic analysis of eighteenth-century thought, *The Order of Things* (1970), Michel Foucault describes the project thus: "By virtue of structure, the great proliferation of beings occupying the surface of the globe is able to enter both into the sequence of a descriptive language and into the field of a mathesis that would also be a general science of order."[25] Speaking of natural history as undertaking "a description of the visible," Foucault's analysis stresses the verbal character of the enterprise, which, as he puts it,

> has as a condition of its possibility the common affinity of things and language with representation; but it exists as a task only in so far as things and language happen to be separate. It must therefore reduce this distance between them so as to bring language as close as possible to the observing gaze, and the things observed as close as possible to words.[26]

An exercise not only in correlation but also in reduction, natural history

> reduces the whole area of the visible to a system of variables all of whose values can be designated, if not by a quantity, at least by a perfectly clear and always finite description. It is therefore possible to establish the system of identities and the order of differences existing between natural entities.[27]

Though natural historians often thought of themselves as engaged in discovering something that was already there (nature's plan, for example),

from a contemporary standpoint it is rather a question of "a new field of visibility being constituted in all its density."[28]

While natural history was unquestionably constituted in and through language, it was an undertaking that was realized in many aspects of social and material life as well. Europe's growing technological capacities were challenged by the demand for better means of preserving, transporting, displaying, and documenting specimens; artistic specializations in botanical and zoological drawing developed; printers were challenged to improve reproduction of visuals; watchmakers were in demand to invent and maintain instruments; jobs came into being for scientists on commercial expeditions and colonial outposts; patronage networks funded scientific travels and subsequent writing; amateur and professional societies of all kinds sprung up locally, nationally, and internationally; natural history collections acquired commercial as well as prestige value; botanical gardens became large-scale public spectacles, and the job of supervising them a naturalist's dream. (Buffon became keeper of the King's garden in France, while Linnaeus devoted his life to his own.) No more vivid example could be found of the way that knowledges exist not as static accumulations of facts, bits, or bytes, but as human activities, tangles of verbal and non-verbal practices.

Of course the scientific enterprise involved all manner of linguistic apparatuses. Many forms of writing, publishing, speaking, and reading brought the knowledge into being in the public sphere, and created and sustained its value. The authority of science was invested most directly in specialized descriptive texts, like the countless botanical treatises organized around the various nomenclatures and taxonomies. Journalism and narrative travel accounts, however, were essential mediators between the scientific network and a larger European public. They were central agents in legitimating scientific authority and its global project alongside Europe's other ways of knowing the world, and being in it. In the second half of the century scientific travelers would work out discursive paradigms that sharply distinguished themselves from the ones La Condamine inherited in the first half of the century.

The systematizing of nature, I am suggesting, is a European project of a new kind, a new form of what one might call planetary consciousness among Europeans. For three centuries European knowledge-making apparatuses had been construing the planet above all in navigational terms. These terms gave rise to two totalizing or planetary projects. One was circumnavigation, a double deed that consists of sailing round the world then writing an account of it (the term "circumnavigation" refers either to the voyage or the book). Europeans have been repeating this double deed almost continually since it was first accomplished by Magellan in the 1520s. The second planetary project, equally dependent on ink and paper, was the mapping of the world's coastlines, a collective task that was still underway in the

eighteenth century, but known to be completable. In 1704 it was possible to speak, in the words of one editor of travel books, of the "Empire of Europe" as extending "to the utmost bounds of the earth, where several of its nations have conquests and colonies."[29] Circumnavigation and mapmaking, then, had already given rise to what one might call a European global or planetary subject. Its profile is sketched with ease and familiarity by Daniel Defoe in the passage providing the first epigraph to this chapter. As Defoe's terms make clear, this world historical subject is European, male,[30] secular, and lettered; his planetary consciousness is the product of his contact with print culture and infinitely more "compleat" than the lived experiences of sailors.

The systematizing of nature in the second half of the century was to assert even more powerfully the authority of print, and thus of the class which controlled it. It seems to crystallize global imaginings of a sort rather different from the older navigational ones. Natural history maps out not the thin track of a route taken, nor the lines where land and water meet, but the internal "contents" of those land and water masses whose spread made up the surface of the planet. These vast contents would be known not through slender lines on blank paper, but through verbal representations in turn summed up in nomenclatures, or through labeled grids into which entities would be placed. The finite totality of these representations or categories constituted a "mapping" not just of coastlines or rivers, but of every visible square, or even cubic, inch of the earth's surface. "Natural history," wrote Buffon in 1749,

> taken in its full extent, is an immense History, embracing all the objects that the Universe presents to us. This prodigious multitude of Quadrupeds, Birds, Fish, Insects, Plants, Minerals, etc., offers a vast spectacle to the curiosity of the human spirit; its totality is so great that it seems, and actually is, inexhaustible in all its details.[31]

Alongside this totalizing embrace, how timid seems the old navigational custom of filling in the blank spaces of maps with iconic drawings of regional curiosities and dangers—Amazons in the Amazon, cannibals in the Caribbean, camels in the Sahara, elephants in India, and so on.

Like the rise of interior exploration, the systematic surface mapping of the globe correlates with an expanding search for commercially exploitable resources, markets, and lands to colonize, just as navigational mapping is linked with the search for trade routes. Unlike navigational mapping, however, natural history conceived of the world as a chaos out of which the scientist *produced* an order. It is not, then, simply a question of depicting the planet as it was. For Adanson (1763), the natural world without the scientist's ordering eye is

> a confused mingling of beings that seem to have been brought together by chance: here, gold is mixed with another metal, with stone, with earth;

> there, the violet grows side by side with an oak. Among these plants, too, wander the quadruped, the reptile, and the insect; the fishes are confused, one might say, with the aqueous element in which they swim, and with the plants grow in the depths of the waters.... This mixture is indeed so general and so multifarious that it appears to be one of nature's laws.[32]

Such a perspective may seem odd to late twentieth-century western imaginations trained to see nature as self-balancing ecosystems which human interventions throw into chaos. Natural history called upon human intervention (intellectual, mainly) to compose an order. The eighteenth-century classificatory systems created the task of locating every species on the planet, extracting it from its particular, arbitrary surroundings (the chaos), and placing it in its appropriate spot in the system (the order—book, collection, or garden) with its new written, secular European name. Linnaeus himself took credit for adding 8,000 new items to the corpus during his lifetime.

Analyses of natural history, such as Foucault's, do not always underscore the transformative, appropriative dimensions of its conception. One by one the planet's life forms were to be drawn out of the tangled threads of their life surroundings and rewoven into European-based patterns of global unity and order. The (lettered, male, European) eye that held the system could familiarize ("naturalize") new sites/sights immediately upon contact, by incorporating them into the language of the system. The differences of distance factored themselves out of the picture: with respect to mimosas, Greece could be the same as Venezuela, West Africa, or Japan; the label "granitic peaks" can apply identically to Eastern Europe, the Andes, or the American West. Barbara Stafford mentions probably one of the most extreme instances of this global resemanticizing, a 1789 treatise by German Samuel Witte claiming that all the pyramids of the world, from Egypt to the Americas, are really "basalt eruptions."[33] The example is a telling one, for it suggests the system's potential to subsume culture and history into nature. Natural history extracted specimens not only from their organic or ecological relations with each other, but also from their places in other peoples' economies, histories, social and symbolic systems. For La Condamine in the 1740s, before the classificatory project had taken over, the naturalists' knowledge existed in parallel with even more valuable local knowledges. Noting prophetically that "the diversity of plants and trees" on the Amazon "would find ample employment for many years, for the most laborious botanist; as it would also for more than one designer," he goes on to add a thought that by the end of the century would, in scientific contexts, have become nearly unthinkable:

> I speak here only of the labour it would require, to make an exact description of these plants, and to reduce them into classes, and range each under its proper genus and species. *What would it be, if we comprehend herewith, an examination into the virtues ascribed to them*

> *by the natives of the country? An examination, which is undoubtedly the most attractive of our attentions, of any branch of this study.*[34]

Natural history as a way of thinking interrupted existing networks of historical and material relations among people, plants, and animals wherever it applied itself. The European observer himself has no place in the description. Often the Linnaean project is figured in the image of Adam in the Garden of Eden. For Linnaeus, says Daniel Boorstin, "nature was an immense collection of natural objects which he himself walked around as superintendent, sticking on labels. He had a forerunner in this arduous task: Adam in Paradise."[35] While invoking the image of primordial innocence, Boorstin, like many other commentators, does not question it.[36] Questioning it, one can see why from the very beginning, human beings, especially European ones, posed a problem to the systematizers: could Adam name and classify himself? If so, was the naturalist supplanting God? Linnaeus early in the game seems to have answered yes—he is once supposed to have said that God had "suffered him to peep into His secret cabinet."[37] To the acute discomfort of many, including the Pope, he eventually included people in his classification of animals (the label *homo sapiens* is his). Their descriptions, however, are rather different from those of other creatures. Initially, Linnaeus posited among the quadrupeds a single category *homo* (described only by the phrase "Know thyself") and drew a single distinction between *homo sapiens* and *homo monstrosus*. By 1758, *homo sapiens* had been divided into six varieties, whose main features are summarized below:

> a. Wild Man. Four-footed, mute, hairy.
> b. American. Copper-colored, choleric, erect. Hair black, straight, thick; nostrils wide; face harsh; beard scanty; obstinate, content, free. Paints himself with fine red lines. Regulated by customs.
> c. European. Fair, sanguine, brawny; hair yellow, brown, flowing; eyes blue; gentle, acute, inventive. Covered with close vestments. Governed by laws.
> d. Asiatic. Sooty, melancholy, rigid. Hair black; eyes dark; severe, haughty, covetous. Covered with loose garments. Governed by opinions.
> e. African. Black, phlegmatic, relaxed. Hair black, frizzled; skin silky; nose flat, lips tumid; crafty, indolent, negligent. Anoints himself with grease. Governed by caprice.[38]

A final category of the "monster" included dwarfs and giants (the giants of Patagonia were still a firm reality), as well as man-made "monsters" like eunuchs. The categorization of humans, you will notice, is explicitly comparative. One could hardly ask for a more explicit attempt to "naturalize" the myth of European superiority. Except for the monsters and wild men, the classification exists barely modified in some of today's schoolbooks.

7 Linnaeus' four types of anthropomorpha, from left to right the troglodyte, the tailed man, the satyr, and the pygmy. Originally appeared in Linnaeus-Hoppius, *Anthropomorpha* (1760).

Navigational mapping exerted the power of naming as well, of course. Indeed, it was in naming that the religious and geographical projects came together, as emissaries claimed the world by baptizing landmarks and geographical formations with Euro-Christian names. But again, natural history's naming is more directly transformative. It extracts all the things of the world and redeploys them into a new knowledge formation whose value lies precisely in its difference from the chaotic original. Here the naming, the representing, and the claiming are all one; the naming brings the reality of order into being.

From another perspective, however, natural history is not transformative in the least. That is, as it understands itself, it undertakes to do virtually nothing in or to the world. The "conversion" of raw nature into the *systema naturae* is a strangely abstract, unheroic gesture, with very little at stake—certainly not souls. In comparison with the navigator or the conquistador, the naturalist-collector is a benign, often homely figure, whose transformative powers do their work in the domestic contexts of the garden or the collection room. As I will be illustrating further in the next chapter, the naturalist figure often has a certain androgyny about it; its production of knowledge has some decidedly non-phallic aspects, perhaps alluded to by Linnaeus' own image of Ariadne following her thread out of the labyrinth of the Minotaur.

Here is to be found a Utopian image of a European bourgeois subject simultaneously innocent and imperial, asserting a harmless hegemonic vision

that installs no apparatus of domination. At most naturalists were seen as handmaidens to Europe's expansive commercial aspirations. Practically speaking, in exchange for free rides with trading companies and so forth, they produced commercially exploitable knowledge. "It is chiefly from the natural history," said one writer in a 1759 preface, "that we collect the value and importance of any country, because from thence we learn its produce of every kind."[39] Introducing a new compendium of travels in 1756, De Brosse praised the new capacity "to augment the earth with a new world, to enrich the old world with all the natural production and serviceable customs of the New."[40] In 1766 the reviewer of a book of travels by one of Linnaeus' students declared the travels of "men of science" as superior to those of "men of fortune" on both literary and commercial grounds:

> The researches of the naturalist, in particular, are productive of no less advantage to others, than delight himself; especially those of the BOTANIST, whose discoveries and acquisitions are often of the utmost consequence to the trading and commercial interest of his country. Nay, the celebrated Linnaeus has even ventured to assert, that the knowledge of plants is the very foundation of the whole public economy; since it is that which feeds and clothes a nation.[41]

At the same time, the interests of science and commerce were carefully held distinct. Expeditions mounted in the name of science, like Cook's to the South Seas in the 1760s and 1770s, often went under secret orders to look out for commercial opportunities and threats. That the orders were there, yet were secret, suggests the ideological dialectic between scientific and commercial enterprises. On the one hand commerce was understood as at odds with the disinterestedness of science. On the other, the two were believed to mirror and legitimate each other's aspirations. "A well regulated commerce," said Linnaeus' pupil Anders Sparrman, "as well as navigation in general has its foundation in science…while this, in return derives support from, and owes its extension to the former."[42]

Commercial prospects placed science arguably within the general public interest, though in fact the benefits of mercantile expansion and imperialism accrued overwhelmingly to small elites. Yet, at the level of ideology, science—"the exact description of everything," as Buffon put it—created global imaginings above and beyond commerce. It operated as a rich and multifaceted mirror onto which all Europe could project itself as an expanding "planetary process" minus the competition, exploitation, and violence being carried out by commercial and political expansion and colonial domination.

Indeed, when it came to plants, animals, and minerals, though not to people, the systems applied themselves identically to Europe as to Asia, Africa, and the Americas. The systematizing of nature represents not only a European discourse about non-European worlds, as I have been discussing,

but an urban discourse about non-urban worlds, and a lettered, bourgeois discourse about non-lettered, peasant worlds. The systems of nature were projected within European borders as well as beyond them. The herborizers were as happy in the countryside of Scotland or southern France as they were in the Amazon or southern Africa. Within Europe, the systematizing of nature came at a time when relations between urban centers and the countryside were changing rapidly. Urban bourgeoisies began to intervene on a new scale in agricultural production, seeking to rationalize production, increase surpluses, intensify exploitation of peasant labor, and administer the food production on which the urban centers utterly depended. The enclosure movement was one of the more conspicuous interventions, which threw many peasants off the land and into cities or squatter communities. Attempts to improve breeding in domestic animals and crops scientifically began at this time.[43] Subsistence societies of any kind appeared backward with respect to surplus-oriented modes, and as in need of "improvement." In 1750 the French commentator Duclos in his *Considerations on the Customs of This Century* found that "those who live a hundred miles from the capital, are a century away from it in their modes of thinking and acting," a view today enlightenment scholars often unquestioningly reproduce.[44]

As differences between urban and rural lifeways widened, European peasantry came to appear only somewhat less primitive than the inhabitants of the Amazon. Likewise the system of nature overwrote local and peasant ways of knowing within Europe just as it did local indigenous ones abroad. Sten Lindroth associates Linnaeus' documentary, totalizing approach with forms of state bureaucracy that were particularly highly developed in Sweden, notably record-keeping apparatuses which elaborately documented and classified individual citizens. By the mid-eighteenth century, says Lindroth, "no other nation in Europe had a more thorough knowledge of its population than the Swedes; the one and a half million Swedish citizens were all annotated in the proper statistical columns as born, dead, married, sick, and so on."[45] Indeed, the Linnaean genus and species labels look remarkably like the given and family names required of citizens—Linnaeus referred to generic names as "the official currency of our botanical republic."[46] Although the systematizing of nature preceded the onset of the Industrial Revolution, Lindroth observes "striking similarities between [Linnaeus'] way of writing and the principles which emerged in manufacturing."[47] Standardization and serial manufacturing, for instance, had already made their way into production, notably in the making of interchangeable parts for firearms. Other analogies emerge from the area of military organization, which at precisely this period began standardizing uniforms, exercises, discipline, and so forth.

Such analogies become even more suggestive when one recalls that bureaucracy and militarization are the central instruments of empire, and control over firearms the single most decisive factor in Europe's subjection of

others, right down to the present day. (As I wrote this chapter, and perhaps still as you read it, in Soweto and on the West Bank of the Jordan, stones were being thrown at armored cars by subjugated peoples with no weapons.) Academic scholarship on the Enlightenment, resolutely Eurocentered, has often neglected Europe's aggressive colonial and imperial ventures as models, inspirations, and testing grounds for modes of social discipline which, imported back into Europe in the eighteenth century, were adapted to construct the bourgeois order. The systematization of nature coincides with the height of the slave trade, the plantation system, colonial genocide in North America and South Africa, slave rebellions in the Andes, the Caribbean, North America, and elsewhere. It is possible to reverse the direction of the Linnaean gaze, or that of Defoe's armchair traveler, to look out at Europe from the imperial frontier. Other genealogies for Enlightenment processes of standardization, bureaucracy, and normalization then come into view. For what were the slave trade and the plantation system if not massive experiments in social engineering and discipline, serial production, the systematization of human life, the standardizing of persons? Experiments that proved profitable beyond any European's wildest dreams. (The wealth that fomented the French Revolution was created in Santo Domingo, which by the 1760s was the most productive place the earth had ever seen.) Plantation agriculture stands out clearly as a crucial setting for the Industrial Revolution and the mechanization of production. Similarly, even by the early seventeenth century, there were no bureaucracies like colonial bureaucracies, for which Spain had set an elaborate example.

Economic historians sometimes call the years 1500–1800 the period of "primitive accumulation," in which through slavery and state-protected monopolies, European bourgeoisies were able to accumulate the capital that launched the Industrial Revolution. One wonders indeed what was so primitive about this accumulation (as one wonders what is so advanced about advanced capitalism), but accumulation it was. In the sphere of culture the many forms of collection that were practiced during this period developed in part as the image of that accumulation, and as its legitimation. The systematizing of nature carries this image of accumulation to a totalized extreme, and at the same time models the extractive, transformative character of industrial capitalism, and the ordering mechanisms that were beginning to shape urban mass society in Europe under bourgeois hegemony. As an ideological construct, it makes a picture of the planet appropriated and redeployed from a unified, European perspective.

In Europe, as on the frontiers of expansion outside it, this production of knowledge does not express connections with changing relations of labor or property, or with aspirations of territoriality. It is a configuration commented on indirectly, however, in contemporary theorizing about the structure of the modern state. The state, argues Nicos Poulantzas, always

portrays itself "in a topological image of exteriority," as separate from the economy: "As an epistemological object, the State is conceived as having immutable boundaries fixed through its exclusion from the atemporal domain of the economy."[48] As the momentum of European expansion turns inland toward the "opening up" of interiors, such conceptions come into play within Europe and on the frontiers of its expansion. The chapters to follow will suggest more fully how they are deployed and challenged in the literature of travel and exploration.