Chapter 7

Purposes of Linnaean travel: a preliminary research report

Lisbet Koerner

In 1750, the outlines of Europe were younger than her global travels. Ten generations had passed since Ferdinand Magellan first circumnavigated the globe in 1522. The European discovery of the New World was almost 300 years old, and it was more than a 100 years ago that Japan had expelled her Europeans in 1639. But the last descent of the Ottoman Turks on Vienna in 1683 was within living memory. Still waiting to be discovered in 1750 were taigas and tundras, deserts, polar ices, and rain forests. Otherwise, only islands remained, seductive but minuscule flecks in the Pacific Ocean – apart from the last, and by 1750 oft-sighted, continent, Australia.

Cradling a globe between your hands in 1750, you held an aged universe, crisscrossed for centuries by European traders, soldiers, and missionaries. The globe, a fifteenth-century invention, was old, like the earth it represented. But it was also young. The world it depicted as yet had no "neo-Europes": the grain-growing, cattle-raising lands that in the nineteenth century would house teeming immigrant populations.[1] In the mid-eighteenth century, the grass of these prairies, pampas, and chernozems, which plows would soon turn to dust bowls, still rippled in virgin winds. Belonging to the same unknown future, too, were the Victorian colonial empires, where, aided by guns and steamships, handfuls of Europeans would rule continents of natives. In 1750, Europeans venturing outside their ancestral lands (so long as they did not voyage to the Americas) huddled in forts, stations, "European" city quarters, or offshore islands – or else they stayed on their ships, emerging by day to trade, to be shooed back at night by imperial officials or by envoys of local rulers. Eighteenth-century European travelers carried passes issued by extra-European powers; paid them tolls, customs, and taxes; and were cheated, harassed, or imprisoned by them.

The years around 1750 were thus a peculiar moment in the history of European imperialism. The globe had already been named, but not yet conquered, by Europeans. The great discoveries were centuries old; the great empires, excepting the Americas, still unknown. But long-established trade routes had already made European consumers dependent on global trade. They craved coffees and teas, poured into translucent, enticingly fragile,

china cups. Dressed in muslins and silks, wigs dusted with potato flour, they sat around lacquered tables melting sugar crystals into those steaming stimulants as they colored the air blue with tobacco smoke and ate confectioneries flavored with almonds, cinnamon, or oranges. No matter what the hour, they calmly sipped their coffee. The opium pills they carried in enamel boxes promised the sleep that cotton bed linens had already eased. Trade took Europeans beyond their time-honored woolen clothing, ale served in pewter mugs or clumsy brown ceramics, herring soaked in brine, turnips half-rotted from winter storage. It took them beyond the dull staples that sunless northern Europe herself produced, those staples around which there always seemed to cling a faint smell of boiled cabbage.

This assessment of Europe's indigenous products was shared not only by Europeans, however, but also by the Asians who produced the novelties Europe so desired. In 1750, Europeans had not yet developed the military means to colonize these producers of non-European goods. Nor did they have technological means to manufacture goods attractive enough to offer in exchange. Only one option remained: to pay in specie. True, exceptions already existed. The Dutch, for example, had control of Asian spices like nutmeg and pepper. In the triangular Atlantic trade, enslaved Africans were sold for European manufactures and then labored for American cash-crop exports. But more commonly, European–Asian trade meant exchanging specie for goods. At the Spanish port of Cadiz, East India ships en route to Canton (Guangzhou) sold grains, salted fish, and woolens for Spanish silver, which then paid for Asian teas, spices, silks, and porcelains.

In modern eyes, this global trade benefited Europe. After all, the cost of mining the New World silver was lower than its Asian market value. Silver had its uses as a metal. But its main utility was as a global currency base, incidentally purchasing consumer goods cheaply for Europe. Why would it matter if silver was shipped to Asia, via Spain, and by 1750 often directly from Acapulco to Manila? People in the mid-eighteenth century, however, argued that the export of specie meant that less specie circulated domestically. Domestic prices would then fall and deflation result. This in turn would encourage currency hoarding, eventually bringing the economy to a halt. The 1750 cure, a positive trade balance, was a solution that applied to, and was conceived in terms of, the single nation-state. This age-old mercantilist reasoning was thus an expression of economic nationalism, profoundly embedded in a zero-sum understanding of the international economy.[2]

To justify long-distance trade, the English East India Company director, Thomas Mun, had argued in an influential tract, *England's Treasure by Forraign Trade* (1664), that reselling Oriental goods on the Continent netted England more specie than her original outlay in Asia.[3] German theorists duly

noted that England's gain was the Continent's loss. After 1648, as Continental states struggled to reconstruct their war-shattered economies, civil servants and government advisors developed their own version of mercantilism, cameralism.[4] The cameralist strategy encompassed numerous policing measures to encourage a prosperous, populous, and unified national economy, as well as a series of trade regulations, like sumptuary laws, import tariffs, export bans on specie, and the granting of monopolies to trading companies. But rules that had seemed sufficient to govern international commerce around 1650 were not enough by 1750. No matter how beneficial its ruling bureaucrats deemed such a policy, bans could no longer keep foreign goods out of any one nation.

In this essay, I argue that in the decades around 1750, the Swedish naturalist Carl Linnaeus (1707–78, ennobled von Linné in 1762) developed a second-phase cameralist strategy in which his natural science underwrote his political economy. Investigating, in particular, his view of the relation between his physico-theological concept of nature and his cameralist theory of the nation, I show that Linnaeus believed he had identified a *scientific* solution to the *political* problem of a negative trade balance.

Before returning to this argument, let us briefly recall the standard scholarly interpretations of Linnaeus. Historians agree that Linnaeus was crucial to Enlightenment natural history. From the 1750s, most European botanists were conversant with his classificatory schemes, first outlined in *Systema naturae* (1735) and *Fundamenta botanica* (1736). He was the hero of Jean-Jacques Rousseau and Johann Wolfgang von Goethe. And his tracts sold briskly alongside Georges-Louis Leclerc de Buffon's *Histoire naturelle* (1749–1804). Linnaeus, the Swedish parson's son, detested Buffon, the French nobleman. "He isn't particularly learned, but as he is rather eloquent, that seems to count for something."[5] As Linnaeus himself noted (if not entirely correctly) in a *vita* dated 1774, his old archenemy "Buffon, who lived in the Botanic Garden in Paris, as an Inspector, and always wrote against Linnaeus, now must arrange the plants after his System, *nolens volens*, since they have been so arranged by the Kings of France and England and in most Gardens in Europe."[6] In a letter from the same year, Linnaeus – who did not read French, or indeed any modern languages besides his Swedish mother tongue – dismissed the famous *Histoire naturelle* as a work "in French, without pretty figures, [with] wordy descriptions ... few observations, beautiful ornate French ... without any method."[7]

Linnaeus's contemporaries recognized that his classifications enabled a common language – and hence a public sphere – of science. To choose one typical comment of the time, in 1751 Anders Johan von Höpken, a Swedish councillor and marshal of the court, reflected that botany, which once "seemed to demand more than a human memory" had been brought to

"System, to order and clarity" by Linnaeus.[8] Postwar historians of science, such as James L. Larson, Frans A. Stafleu, and William T. Stearn, as well as nineteenth- and twentieth-century Scandinavian scholars, agree that Linnaeus "set forth a body of procedures which . . . allow naturalists to establish in a controlled and practical way likenesses and differences in plant specimens."[9] At the same time, Linnaeus is also fundamental to structuralist histories of science. Michel Foucault's treatise on eighteenth-century mental structures, *The Order of Things* (1970, originally published in French in 1966), has one chapter, "Classifying," on natural history.[10] One third of its references are to a contemporary French translation of Linnaeus's 1751 *Philosophia botanica*;[11] and of the remaining references, a quarter are to the *Systema naturae*.[12] Older Linnaeus scholarship explains by effect, analyzing Linnaeus's natural history in terms of its influence on later science. Foucault's alternative is a belated *Geistesgeschichte*, in which Linnaeus epitomizes his epoch's epistemological givens. Recent social historians, Londa Schiebinger for example, also explain by exemplarity, albeit Schiebinger regards Linnaeus as typifying age-old gender inequalities rather than randomly generated organizing impulses.[13] Positivist, structuralist, *and* feminist analyses of Linnaeus thus all focus on issues inaccessible to eighteenth-century people themselves. The Whig one is based on their future (our present); the Foucauldian and the gender-oriented, on a historicized horizon of the mind, centered around arbitrary taxonomical proclivities or antediluvian male machinations.

In this essay, I examine instead Linnaeus's *own stated* reasons for studying natural history. In doing so, I continue an older tradition of Linnaeus scholarship, initiated by Oscar Levertin (1908), Martin Lamm (1918), and Karl Warburg and Henrik Schück (1911–12). Continued by Elis Malmeström (1926 and 1932) but then dormant, this tradition has lately been revived by Gunnar Broberg (1975).[14] Reacting against the patriotic bombast of the 1907 Linnaean bicentennial[15] (made the more provincial by Julius Sachs's 1875 dismissal of Linnaeus's scientific significance),[16] these scholars typically studied Linnaeus's larger thought-world, and especially his piety and anthropology. In this essay I address another theme, first suggested in a 1941 lecture by Eli F. Heckscher: the interplay in Linnaeus's thought between nature and nation, or, from the viewpoint of the present, between pre-evolutionary natural history and preclassical economics.[17] My immediate aspiration is to add, by addressing this one issue, to the present interpretations of Linnaeus. My larger objective is to propose a more intricate reading of the history of Eurasian trade relations and early modern political economy.

Linnaeus's relating of nature and nation is nicely expressed in his double understanding of the word *economy*, as meaning both an eternal natural order and a new-fangled form of knowledge. Let us first consider Linnaeus's concept of a divine "economy of nature," which he derived from seventeenth-

century British natural theologians like Robert Boyle, William Derham, and, especially, John Ray. (When in 1748 Linnaeus's student Pehr Kalm was invited to the home of the then eighty-eight-year-old Sir Hans Sloane, Kalm wrote to his teacher that Sloane – and this counted for more than his natural history collections – was "now the only one who is still alive of the friends of the great Ray.")[18] In 1739, Linnaeus's first lecture in the newly founded Swedish Academy of Science was on the economy of nature, illustrated by "curiosities among insects."[19] Thirty-three years later, in 1772, on resigning as rector of Uppsala University, Linnaeus returned to the topic in his oration *Deliciae naturae*.[20] In the meantime, he wrote other speeches and dissertations on the subject, such as *Oeconomia naturae* (1750), *Cui bono* (1752), *De politia naturae* (1760), and *Oratio de fine Creatoris ex opere naturae* (1763),[21] as well as briefer statements,[22] and he devoted to it the preface to the Swedish king's vanity print *Museum Regis Adolphi Friderici* (1754).[23]

By economy of nature, Linnaeus meant, effectively, that nature exists in a self-regulating state of homeostasis. Traveling through provincial Sweden in 1747, he noted that people used churchyard soil for their cabbage patches. Human heads, he mused in his *Wästgöta* travel diary, turn into cabbage heads, which, in turn, turn into human heads, and so on. "In this way we come to eat our dead, and it is good for us."[24] Linnaeus also grasped the significance of food chains, writing in 1750: "There are some viviparous *flies*, which bring forth 2,000 young. These in a little time would fill the air, and like clouds intercept the rays of the sun, if they were not devoured by birds, spiders, and many other animals."[25] He also hoped that people would cooperate with, rather than battle, nature. "Until now," he lectured his students, "no one has thought about exterminating Insects with Insects. Almost every Insect has its Lion, which persecutes and exterminates it; these Predatory Insects ought to be tamed and be taken care of, so that they can purge [domestic] plants [of insects]." He especially desired to find the foes of bedbugs, "because nowadays they infect almost every house."[26] But in contrast to modern ecologists, Linnaeus believed that human activities improved the environment. Like his English precursor John Evelyn, Linnaeus did ponder northern Europe's deforestation. His Swedish travel diaries narrate villagers' battles with heather moors and sand dunes. But he understood such problems as the temporary effects of human blunders, not as harbingers of permanent annihilation. A preromantic, he fancied bucolic culturescapes over pristine nature: his choice Swedish province was thickly peopled, rich-soiled Scania, with its balmy climate, southern location, and fertile farms. For, as a vernacular poem introducing one of Linnaeus's Uppsala dissertations, *Horticultura academica* (1754), explains, nature was created for humankind: "It is as if all [plants] have sworn to be faithful to Adam's grandsons, / and to remain by their homes, under their supervision."[27]

Linnaeus thought that nature's complexity, variety, and interdependence

proved that God had created the earth as a "theater"[28] for people to contemplate: "With your rationality, your wisdom, and the witness of your senses, you consider the world so that from this work you shall come to know the almighty Creator, the all-knowing, all-powerful, and eternal God."[29] He also held that the human being was "the miracle of nature and the lord of the animals for whom Nature has created all other things."[30] By definition, then, domesticating the wilderness meant restoring it to an Edenic state. But precisely because Linnaeus so admired God's creation, nature, he was haunted by people's contribution, society. He always endeavored to formulate a theodicy that would incorporate the added complication of his physico-theology: that creation is perfect. As Gunnar Broberg has noted, Linnaeus repeatedly contrasted humanity's condition to nature's consummation. "Pathologically, you are a swollen bubble till you burst, dangling from a single strand of hair in one brief moment of fleeting time. . . . Nothing is more frail than human life, nothing so vulnerable to so many diseases, so many troubles, so many dangers. . . . Theologically, you are the final goal of creation. You are the Almighty's masterpiece, placed on this globe."[31] What, Linnaeus worried, did this contrast tell us about the character of God? An undated fragment in his hand despairs: "Oh what kind of marvelous animals are we, for whom everything else in the world is created. We are created out of a foaming drop of lust in a disgusting place. / We are born in a canal between shit and piss. / . . . / Our daily task is to prepare from our food disgusting shit and stinking piss. / In the end we must become the most stinking corpses."[32]

The parson's son rejected the conventional Lutheran doctrine of original sin, and its attendant doctrine of salvation by faith. Instead he developed three distinct theodicies, to which he subscribed concurrently. The first he worked out in his secret testimonial to "my only son," the vernacular manuscript *Nemesis divina* (authored between circa 1747 and circa 1765).[33] *Nemesis divina* lists some 200 accounts of villainy, sickness, and other tribulations among Linnaeus's acquaintances. To their collector, these accounts confirmed that although people are free to sin, each vice is punished in this world. Each death, disease, and injury, Linnaeus traced to the sufferer's transgressions. If the victim seemed innocent, he speculated about the secret wickedness revealed by the penance – which, displacing sixteenth-century natural history onto eighteenth-century society, he read as a form of signature. Operating through human and natural agents, Linnaeus's goddess of retribution thus reigned over a self-contained moral economy of evil and affliction.

Linnaeus's second theodicy held that while generic man is the master of the cosmos in an abstract sense, individual humans are subordinate parts of a harmonious whole. In *De politia naturae*, for example, Linnaeus asserted that nature retains its balance by wars, which cull surplus people. He also

doubted that humans differed from other animals, comprehending us all as mortal components of an immortal entirety. In an oft-quoted 1747 epistle to J. G. Gmelin, he asked whether he should "call man ape or vice versa."[34] As has been shown by Gunnar Broberg in his important work on Linnaeus's anthropology – and I am following his argument in this paragraph – Linnaeus classified us as primates.[35] His designation *Homo sapiens* is a trivial name, not a definition, and in any case he hesitated between that term and *Homo diurnus*. *Homo diurnus* had the advantage of a counterpart, *Homo nocturnus*, whom Linnaeus also termed *Homo troglodytes* and associated with albino Africans, in those days often exhibited as freaks. Relying on second-hand reports, he judged that they were a separate species.[36] In his Uppsala zoology lectures, Linnaeus also claimed that exotic apes shaded into humans (playing chess, worshipping God) and exotic humans shaded into apes (growing tails, crawling on all fours).[37] In private seminars, he described a *Simia sapiens* that played backgammon.[38] And in the 1760 dissertation *Antropomorpha*, he stressed that "I hardly know one single mark with which man can be separated from apes, if not that the canine teeth are different from the other teeth on all apes."[39] Conversely, Linnaeus cherished his guenon monkey, Diana. Even in the classificatory description, she kept her name, and hence her claim to personhood.[40] As Gunnar Broberg has again pointed out, Linnaeus's classification of man was original. M. J. Brisson's *La règne animale divisé en IX classes* (1756) and Thomas Pennant's *Synopsis of Quadrupeds* (1771) avoided the species question, while Buffon's fourth volume of *Histoire naturelle* (1753) takes a nominalist position on humans.[41] But Linnaeus's opinions may have been widespread nonetheless, as a 1735 diary by a young Uppsala student, Johan Browallius, indicates. It records a dinner conversation with the governor of the Swedish province of Dalecarlia, during which Browallius claimed that "apes are also a race of humans, rather intelligent, like certain people . . . if they had been brought up as humans to begin with, there wouldn't have been any difference between these animals." The governor agreed: "Also there are people in North America that are furry all over their body with their hair. What difference is there between them and apes?"[42]

Linnaeus also assumed that people possess eternal life only in the displaced sense that they have blood-descendants. They are soulless, except for their participation in an apersonal world soul, which he likened to an eternal fire. Writing to his mother-in-law, he elaborated: "If [only] the navel-string remained, [all] the children would hang together, like a tapeworm, and then it would be more obvious that they are one. Brother Petrus and the other [children] are, then, nothing other than [you] Mrs. Mother yourself and Father-in-law of blessed memory." To illustrate, he drew in the letter's margin a long thin tapeworm.[43] Alternatively, Linnaeus, who loved animals

more than people, maintained that beasts, too, had souls. "Theologians legislate that man has a soul, and that animals are only *automata mechanica*, but I think they would be better advised that animals have souls, differing only in degree of nobleness."[44]

Linnaeus's first two theodicies, then, were of small comfort to him, since they maintained that human suffering was a matter of indifference (or, worse, revenge) to a God intent only on seeing the complexity of his creation mirrored in the knowing eyes of his most complex creation. Nature, Linnaeus pondered, was certainly not designed for people's immediate material benefit. If it had been, "the Wisdom [God], who does nothing without reason, and everything in the shortest way, [would then] without fail [have] created the globe as a [uniform] mass, wherein we would have eaten and slept like the worm in the cheese."[45] Years later, the aging professor wrote, with an inky, ill-cut goose feather, an anguished private note on the relation between man and God:

> We are, then, like electric candles, with which God has illuminated this his theater.
> We stand here like the ocean in quick illumination, like snow crystals . . . we glitter in the sun.
> We have the honor to be candles in God's palace . . .
> We thus reflect the creator's shining Majesty, *duplicat luce*.
> When we have burnt down, when he doesn't want to keep us, we are removed.
> [He] let others be put in our place.
> Thus nature dooms us, contra Theology.[46]

If Linnaeus's two comfortless theodicies failed to console him, he found a form of secular salvation in his third. To put it in modern terms, he intuited that human suffering need not be explained by divine revenge or ecological inevitability. It might equally be caused by technological underdevelopment. To teach people to husband nature was, then, the task of the new science of *economy*. This was the *second* way that Linnaeus used the term. Linnaeus's economics derived from seventeenth-century British mercantilists, like Josiah Child and Thomas Mun, and more closely from seventeenth-century German cameralists, like Philipp Wilhelm von Hörnigk and Johann Joachim Becher. As he summarized his secondhand views, nations should "investigate what they themselves have and don't need to rely on the foreigner for . . . as this [self-reliance] is the grounds for [a good] Economy."[47] Importantly, Linnaeus's prelapsarian and anthropocentric "economy of nature" was the basis for this expected autarky of material plenty.[48] Thus Linnaeus's theology structured his belief in secular progress just as it induced the spiritual anguish that made him turn to that earthly creed in the first place. It also shaped his self-fashioning as "the second Adam,"[49] nicely illustrated in the frontispiece

to the 1760 Lange edition of *Systema naturae*, where, collapsing time, he at once names the animals and writes the *Systema*.

To Linnaeus, then, economics did not mean the study of the allocation of scarce resources. Rather, he regarded it as a knowledge of the ways in which natural history can guarantee national self-sufficiency. It denoted a principled search for advances in agriculture, mining, and manufactures, and thus most closely resembles, in modern eyes, a conglomerate, applied form of the earth and life sciences. This was a common conception of *economy* in mid-eighteenth-century Sweden. When in 1739 Linnaeus helped establish the Swedish Academy of Science, its founders first named it the Swedish Economic Academy of Science. Its goals were "to cultivate and improve all gifts Nature has given us in abundance," and "ceaselessly to think as Swedes, for the Swedish welfare."[50] In 1763, addressing his students, Linnaeus elaborated: "Nature's economy shall be the base for our own, for it is immutable, but ours secondary. An economist without knowledge about nature is therefore like a physicist without knowledge of mathematics."[51] "Our own economy," he underscored another time, "is nothing else but Knowledge about nature adapted to man's needs."[52] To know economics, in this sense, became a useful merit for Linnaean naturalists. In 1759 Daniel Solander asked Linnaeus for a "certificate about his progress in those parts of Natural History that lay the grounds for economics."[53] Another student acknowledged in 1748: "I do know that *Historia Naturalis* is the base for all Economics, Commerce, Manufactures . . . because to want to progress far in Economics without mature or sufficient insight into Natural History is to want to act as a dancing master with only one leg."[54]

Hence, also, Linnaeus's extravagance when he lectured on natural history to the Swedish House of Nobility in 1739 and promised his listeners more profit than from logic, metaphysics, history, poetry, rhetoric, Greek, or Hebrew. His student Pehr Kalm shared this view when he described from Philadelphia in 1750 the founding of the University of Pennsylvania: "*His. Nat.* and useful sciences are hardly mentioned; Latin, Greek, Logic, Rhetoric etc. get first place, and those Professors the highest salaries: never has the English nation embarrassed itself as much as in this; . . . I think your stomach would ache, Sir, if you read [the university bylaws]."[55] And indeed it might have. In 1746, Linnaeus had helped compose a memorial submitted to the Estates by the chancellor of justice, which aimed to compel Swedish university students to study natural history – including the care of Spanish sheep and silkworms.[56]

For in Linnaeus's view, natural history guarded the nation against both foreign dominance and indigenous barbarism. In 1759, he greeted the Swedish royal family as they visited Uppsala University with a speech elaborating this view: "Our lesser knowledge of science still causes our / Forests

to disappear, without Trees being planted, and Hedges; / our Meadows to be miserable, without getting adequate care; / our Medicinal herbs still to be bought from foreigners; / Tea, Quinine, Cochineal to be bought yearly for a great amount of money, / which just as easily could be planted in Europe as Rhubarb. / . . . / Without the sciences, our Herring would still be fished by foreigners, / our Mines mined by aliens, / and our Libraries would totter under the works of foreigners." And Linnaeus boomed on: "Yes, without the sciences, our economy would be run by charlatans. / . . . / yes, Demons of the forest would hide in every bush, / Specters [would] haunt every dark corner. Imps, Gnomes, River Spirits, and the others in Lucifer's gang / would live with us as if gray cats, / and Superstition, Witchcraft, Black Magic, swarm around us like Mosquitoes."[57]

Battling the double threat of foreigners and forest demons, the economic naturalist's victory was certain because of nature's prearranged harmony. As Linnaeus's preface to Adolphus Frederick's 1754 museum catalogue notes, "the earth, then, is nothing other than a natural history cabinet of the all-wise Creator's masterpieces, divided into three chambers."[58] Conversely, Linnaeus's own natural history cabinet was a miniaturized world which he at once created and inhabited. The ceilings were covered with bird skins; the walls, with mineral cabinets and insect chests-of-drawers. Room corners disappeared behind tangled tree branches, where some thirty species of birds nested. The windowsills were crowded with potted plants; herbaria piled up on desks, on chairs, even on the sanded floor.[59] After Linnaeus became an Uppsala professor in 1741, his collections and gardens grew larger and more multifarious. The same year Uppsala University's first professor in cameralism, Anders Berch, founded a *Theatrum oeconomico-mechanicum* – at once a library, a collection of production samples, and a series of models of agricultural and manufacturing tools.[60] The natural and the artificial were thus equally represented at the little university, with its encyclopedic design to catalogue all that people might grow, mine, or manufacture.

Berch's professorship, embracing "*Historia naturalis*, chemistry, mechanics, and *Oeconomia privata*,"[61] was modeled on the first European chairs in cameralism, at Halle (1727), Frankfurt an der Oder (1729), and Rinteln, in Hessen (1730).[62] Though professor of medicine, Linnaeus also attempted to combine natural history and national economics.[63] When he was elected in 1775 to Sweden's first physiocratic club, the Royal Patriotic Society, he composed a selective merit list of his works, subtitled "to apply nature to economics and vice versa." The list ignores his Latin taxonomic works. Instead, it enumerates his vernacular travel journals, including those of his voyages to Lapland (1732), Dalecarlia (1734), Öland and Gotland (1741), West Gotland (1746), and Scania (1749). It also inventories many of Linnaeus's economic pamphlets, for example, *Stationes plantarum* (on soil

conditions); *Frutetum Svecicum* (on native Swedish hedges); *Flora alpina* (on planting Lapland's mountains); *Flora oeconomica* ("how our wild plants may be used"); *Plantae officinales* ('medicinal herbs that grow wild and that could be grown within the nation"); *Plantae tinctoriae* ("which domestic plants can be used for dye factories"); and *Plantae esculentae* ("which plants serve as food in times of famine"). At the end of the register, Linnaeus appended that he had been the first to procure "rhubarb [in Sweden]" and – obviously groping for a number – "600 [other plants]."[64]

On Linnaeus's instigation, further Swedish professorships were endowed, not in cameralism (he never liked Anders Berch), but in what he styled "practical economics," combining cameralist theory, mining, manufacturing, agriculture, and natural history. With the exception of Greifswald, each Swedish university received one: Åbo in 1747, Uppsala in 1759, and Lund in 1760. Romanticizing the utilitarian, the Uppsala donation letter even stipulated that the professor live on an experimental farm, after spending his first three years on voyages of discovery.[65] For, based on a physico-theological concept of nature's perfection, Linnaeus's science of economics judged voyages of discovery to be imperative. Indeed, Linnaeus's own first lecture as a professor was "on the utility of scientific journeys within the fatherland,"[66] and his career began with such a voyage, the 1732 Lapland travels, which were sponsored by the Uppsala Royal Society for Science and emulated the youthful travels of his Gothicist Uppsala teacher, Olof Rudbeck the Younger.[67] Before Linnaeus left, he tabulated the traveling naturalist's ideal attributes, registering first "that he be an inborn Swede, so that *exteri* can't take what others have paid for."[68] Because of their economic applications, Linnaeus here maintained, natural finds are national secrets. He even related his collections to the Society orally, from cryptic notes. Minerals were followed by plants, animals, and local technologies and ethnography. In each category, the "economical" was pivotal.

Apart from his voyages through the Swedish provinces and the one journey of his youth – to Holland, France, and England – Linnaeus never traveled, passing up offers to explore at the Cape, in North America, and in Surinam.[69] He did, however, arrange for his students to travel. Between 1745 and 1792, some twenty embarked on long-distance voyages of discovery (see fig. 7.1).[70] Their patrons were often foreign, but Linnaeus felt that their data and specimens belonged also to the Swedish nation. Hence he was profoundly upset that "the ungrateful [Daniel] Solander," who worked as Joseph Banks's botanist and traveled with him on Captain Cook's first circumnavigation of the globe (1768–71), yet "doesn't send a single plant or insect of all of those he had collected in *Insulis australibus novis*."[71] Solander, who had lodged in Linnaeus's house, tutored his son, and been informally engaged to one of his daughters, wrote to Linnaeus only once after 1762. The letter, from Rio

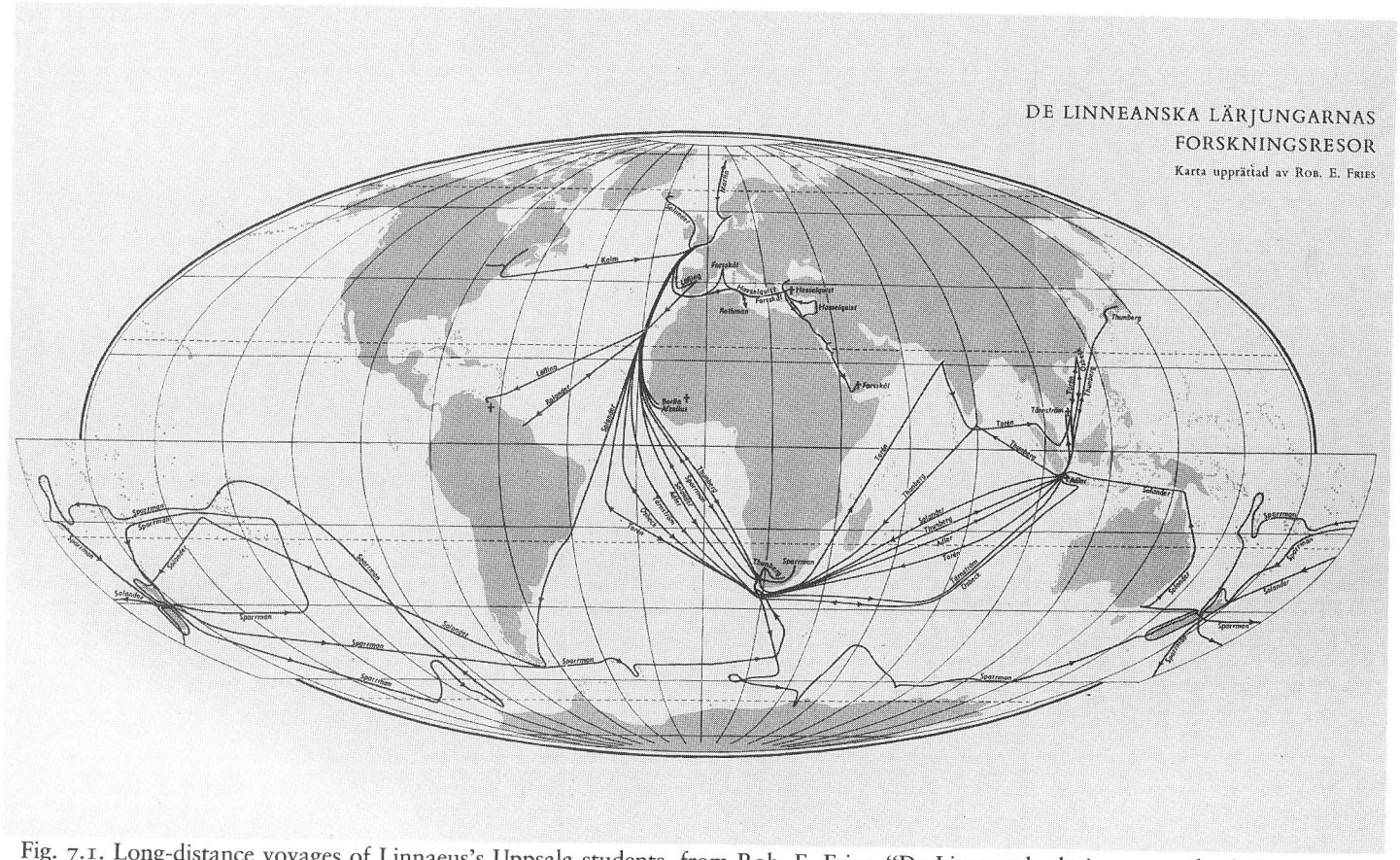

Fig. 7.1. Long-distance voyages of Linnaeus's Uppsala students, from Rob. E. Fries, "De Linneanska lärjungarnas forskningsresor. Commentarer till en karta," in *Svenska Linnésällskapets Årsskrift* 33–34 (1950–51): 31–40.

de Janeiro in 1768, promised that on returning to Europe he and Banks would travel to Uppsala, "humbly to ask you, Sir, to be the Master Inspector of our recruits [specimens]."[72] In a gossipy aside, Solander portrayed Banks as an affluent amateur who spent £8,000 to £10,000 yearly on science but left his studies in natural history unfinished. But Linnaeus was only advised of Banks's and Solander's reappearance in London by a mutual acquaintance, John Ellis. The two explorers never voyaged to Sweden, despite Linnaeus's ingratiating reference to the newfound fifth continent as "Banksia." Only in May 1772 did Banks write to Linnaeus, proposing that he and Solander sojourn to Uppsala, bringing along Australian and Pacific plant specimens. In a final letter, written in July 1772, Banks disclosed his and Solander's new plans of touring Iceland and, even if he now left plans of visiting Uppsala vague, pledged to send plant specimens. None arrived at Uppsala.[73]

Linnaeus's hopes that Banks's and Solander's voyage would at least profit natural history, if not his homeland, were also repeatedly dashed. His student Andreas Murray wrote from Göttingen in October 1771 that "Misters Solander and Banks negotiate with a Göttingen publisher to publish their Observations, issued with many paintings. Mister Solander has asked me to supervise [the publishing]." This scheme also came to nil.[74] As late as 1778, Linnaeus the Younger (who was bequeathed his father's chair at Uppsala) reflected:

> I know that Banks doesn't want to tell me anything before he has completed his work; but if only we could speak face to face, we would soon agree, since our purposes are different: mine is only to continue the system, only to determine the plants' genera and species and thereby preserve the already started central book [*Systema naturae*] in the science [of natural history]; without . . . such [a book], with this plenitude, one will soon be confused; but Banks, who has money, wants to illustrate these [plants] with descriptions and figures.[75]

Linnaeus the Younger complained about his compatriots Daniel Solander and Jonas Dryander, now in Banks's employ: "If Banks didn't work with two Swedes, this [cooperation between Banks and Linnaeus the Younger] would probably happen, too."[76]

But if Linnaeus and his son came to consider Solander a moral fiasco, since he preferred Banks's fleshpots over his fatherland, other students did rally to the patriotic cause. In doing so, they modeled their foreign travels on Linnaeus's domestic voyages, which assumed that the scientific exploration of nature was necessary for the economic reform of society. Natural history would guide the domestic production of previously imported victuals and manufactures. Such cameralist plans for self-sufficiency, common in early modern continental Europe, Linnaeus invested with great enthusiasm. For example, in 1755, contemplating the prospect of cultivating tea in Sweden, Linnaeus gushed as he mentally substituted increased productivity for

Fig. 7.1. Long-distance voyages of Linnaeus's Uppsala students, from Rob. E. Fries, "De Linneanska lärjungarnas forskningsresor. Commentarer till en karta," in *Svenska Linnésällskapets Årsskrift* 33–34 (1950–51): 31–40.

territorial conquest: "Imagine then what great provinces are not added through this to our land."[77]

Peering at nature through a physico-theological looking glass, educated Scandinavians shared the sanguine conviction – whose prime guarantor Linnaeus had made himself – that achieving economic self-sufficiency was only a matter of researching what was at present merely this policy's undiscovered means. Thus the Swedish Estates' Commerce Committee simply told Linnaeus to find gypsum, "which now yearly costs the realm almost a barrel of gold and also flint stones of the better kind, which yearly draw out [of the country] around 12,000 copper *daler*."[78] Just as artlessly, the Manufacturing Bureau put in an order for Baltic porcelain clays and medicinal herbs. "Hitherto it has been usual to import [them] from abroad."[79] Linnaeus's students were similarly exhorted, as they ventured outside Europe, to identify transplantable natural products, technologies, and even societal models. For while contemporary proponents of international trade charged that the uneven scatter of natural resources signified God's desire for transborder commerce, Scandinavian civil servants were sure that the Lord had granted the Baltic peoples the potential satisfaction of all needs and desires within their frosty nations' borders. Pleasingly, if quixotically, they thus reduced natural history to an Easter-egg hunt.

Despite high hopes, Linnaeus's traveling students failed to effect a Baltic policy of import substitution.[80] But it was not for want of trying. During his 1768–74 journey through the Russian Empire, for example, Johan Petter Falck carefully noted that Tara Tartars colored cloth yellow with *Iris sibirica*'s flowers; that Votyaks, Mordvins, and Kalmyks derived red dye from *Galium spec.*; and that Kazakhs ground the roots of *Onosma echiodies* for rouge. Tartars and Russians rated black currants as medicine; Bokharans employed *Actorus calamus* for chest diseases; Bashkirs and Ostyaks wove nettles into cloth; while Cossacks instead used *Cannabis sativa*, which they also smoked and brewed as tea. Falck's observations, which are typical for first-generation Linnaean naturalists, nicely exemplify the way their study of nature was mediated through local people, who acted as guides, interpreters, collectors, and teachers. But the flora, fauna, and technologies that Linnaeus's students, thus aided, managed to ship to Uppsala, or to identify for home use, found only minor economic applications. Partly, this was because they were muddled as to which plants might take on genuine significance. Only one eighteenth-century plant introduction in Sweden acquired momentous importance: the potato. Yet far from applauding the useful starch, Linnaeus conjectured that this member of the nightshade family was poisonous. He took pride, instead, in supplying a Finnish army orphanage with an Asian rhubarb seed, which sprouted into seventy plants.[81]

Partly, too, the Linnaeans' travels were beset with disasters. Before the

invention in the 1830s of the Wardian case – an enclosed glass box which stabilizes humidity and temperature – live plants rarely survived sea journeys. Also, the voyagers themselves often died during their travels. Christopher Tärnström expired from fevers off the coast of present-day Cambodia. Fredrik Hasselquist and Olof Torén both succumbed to tuberculosis – Hasselquist in Smyrna, Torén shortly after his return from Canton. Fevers claimed Pehr Löfling in a South American mission, Pehr Forsskål in Yemen, and Anders Berlin on the coast of eastern Africa. Johan Petter Falck, by then an opium addict, killed himself in Kazan. Göran Rothman died two years after his return from Tripoli, never having recuperated from his voyage. Also, the survivors' labor found little application. Lars Montin's collections, compiled during travels in Lapland and other parts of Scandinavia, were large but never put to use, and Montin retired as a provincial doctor. Pehr Kalm returned from Northeast America with vast plant hoards to a professorship in Åbo, but his subsequent naturalization experiments, unsurprisingly in that harsh climate, came to little. Daniel Rolander panicked in tropical, insect-ridden Guiana and scrambled home, deranged and empty-handed, on the next available ship. Anton Rolandsson Martin's Arctic Sea gatherings were paltry, and he became a destitute one-legged tutor. Pehr Osbeck returned from Canton to withdraw to an obscure country parsonage. As a London man-about-town and member of Captain Cook's first voyage, Daniel Solander, as we saw, never dispatched a single plant or observation to Uppsala. Anders Sparrman's labors from Captain Cook's second voyage largely belonged to his employers – the Forsters, for whom he worked as a botanist – and though he returned to Sweden in 1775, he didn't finish publishing his *Voyages* until 1818. Carl Peter Thunberg lost all his Japanese plants in an autumn storm outside Holland, and his unfeeling compatriots greeted his ponderous travel account as an object of mirth rather than as an economic handbook. Adam Afzelius never published his diaries from abroad, and his Sierra Leone collections gathered dust in Uppsala University, where he, too, dusted over as a provincial professor.

But setting aside human failings and natural disasters, the Linnaeans' import substitution project would nonetheless have failed, since it anticipated Baltic plantations of naturalized tropical and subtropical cash crops. In 1745, Linnaeus suggested opium poppies, maintaining that they flourished in Scandinavia. "Teach [the apothecary] to make opium; he gets it by us as good as in Turkey I should think. An area as big as my house [plot] in Uppsala could, in two years time, yield [a harvest] of 3,000 *plåtar Marum verum* [Swedish copper coins]."[82] The following year, Linnaeus struggled to grow cotton. When he failed, he blamed the unripe seeds, not the northern climate.[83] Another year passed, and he hoped to breed llamas or the "Peruvian goat [that] ... never gnawed at, or peeled the forest."[84] In 1748, Kalm

promised American ginseng, witch hazel, magnolia, and mulberry trees.[85] Perhaps, wondered Hasselquist, traveling through the Holy Land in 1750, almonds and olives could grow in Scandinavia?[86] The same year, Linnaeus solicited mulberry seedlings from the Swedish court physician. "It would be pleasant to get them, namely to see if they tolerate the winter better than ours [in the Uppsala botanic garden]."[87] Two years later, in 1752, a student promised yams: "I have planted a piece in a clay pot; if it succeeds, I shall humbly report. If this plant wants to grow here, it promises advantages to the nation."[88] Linnaeus also yearned to cultivate Asian medicinal herbs.[89] And in 1756, together with the Swedish consul at Tripoli, he imported a species of North African beetle. "I have performed on them," the consul wrote, "several experiments and have already come so far that, after a certain manner of killing and drying them, they give an admirable Ink in water, hardly worse than the best cochineal."[90] Linnaeus also advocated Baltic quinine groves and tea plantations. "If someone could get Tea or the China bark alive and growing to Europe or Sweden, would he not be worthy of a reward, about which parliament's Commission for Manufacture should be reminded, as these two things draw so much money [out of Sweden] and surely can grow here, at least in [the southern province of] Scania."[91] In the 1760s he expected, too, to breed "Chinese [angora] goats, which have finer, curlier, and softer wool than any sheep."[92] A navy officer and country gentleman from Finland sent a typically optimistic letter to the famous professor in 1763 advocating Baltic rice paddies.[93] Linnaeus, of course, agreed. Their rice fields a chimera, in 1768 Linnaeus and his officer friend began experimenting instead with domestic hay grasses.[94] But, as his students knew, Linnaeus's fancy remained exotics. In 1750, Hasselquist had promised Mediterranean tortoises "to decorate your Paradise; they are rather easy to send home alive, and I shall arrange it; it is particularly pleasant to see how they make love."[95] A few years later, in 1759, Linnaeus could delight in two goldfish, shipped from London to Uppsala – feeding, during the sea journey, "on sugared biscuits and flies."[96] In his Uppsala botanic garden, "my Rhodos . . . my Elysium,"[97] pineapples, watermelons, apricots, and peaches were hardened against the cold.[98] Even as they withered, their tormentor cried out for more victims: "Should coconuts come apropos into my hands, it would be as if fried birds of paradise flew into my throat."[99]

Baltic state capitalists and rent seekers typically favored a domestic textile industry. But Linnaeus's own dearest hope was Scandinavian tea.[100] In the eighteenth century, tea would change the Eurasian sea trade. Previously, Europe's East India companies had developed complicated ways of assembling return consignments. In the process they had become another presence in the Indian Ocean trade. But for tea cargoes, the companies voyaged – laden with Spanish silver – directly to Canton. The Chinese, intent on hindering a tea monopsony, admitted all nations, including those that the

older companies termed "interlopers." The Swedish East India Company, founded in 1731 by English and Dutch traders wanting a flag of convenience, was one such "interloper." As a result of the direct trade, north European ports like Ostende, Hamburg, Copenhagen, and Gothenburg grew into important centers for the commerce in tea. The European tea trade grew exponentially. The British East India Company's official tea imports into Britain alone went from two pounds two ounces in 1664 to fifteen million pounds in 1785 – and by that later date, probably as much tea again was smuggled into Britain.[101] "And so," as a standard work in economic history summarizes, "the company form of mercantile enterprise was undermined."[102] This denoted the involuntary forfeiture of a state-managed foreign trade, and consequently of a key cameralist strategy. Hence Linnaeus's panic as he contemplated the swap of silver for tea which, he was persuaded, was bankrupting Europe. Of course the Eurasian trade remained more than such a simple swap because Europeans conducted considerable trade in kind within the Asian region. Apart from Chinese tea, they purchased Chinese silks, porcelains, and medicines, and paid in lead, tin, Malay Straits rattan, pepper, saltpeter, and Javanese rice.[103] Yet, as Louis Dermigny concludes in his definitive treatise on the eighteenth-century Canton trade, silver flowed to Asia in "a chronic hemorrhage."[104] Around 20 percent of Mexico's silver and 20 percent of Europe's silver stock ended up in China.[105] At the same time, a sizable portion of Europe's gold stock found its way to southern India, in return for spices, muslins, and precious stones. Thus the eighteenth-century tea trade hastened a long-term trend: for almost 2,000 years, Europe had collected specie "only to lose it all to India, China, and the East Indies. The great discoveries may have revolutionized routes and prices, but they did not alter this fundamental situation."[106]

No wonder that Linnaeus, as he put it in a *vita*, considered "nothing more important than to close that gate through which all the silver of Europe disappears."[107] In the 1741 proceedings of the Swedish Academy of Science, he offered his solution: the naturalization of tea in Europe.

> That tea should be able to grow in Europe and in Scania just as well as in China and Japan, there is no doubt any more. But it has never arrived in Europe because its oily large seeds grow rancid, and its trunk, which can't tolerate heat, dries out when it is transported by the sea route and twice has to pass the [equatorial] line. If the seed could be gotten over Russia from China to Sweden it would grow without fail.[108]

In 1755, he elaborated: "I do not doubt that [tea] can tolerate our winters because in Pecking [*sic*], where it grows, the winters are colder than ours even if it is more to the south, as we see from our *Mathematicorum* journals. Poor Chinese, they will lose yearly through this more than 100 barrels of gold."[109]

To bring live tea plants to Sweden, Linnaeus sent four students to Canton

with the Swedish East India Company between 1745 and 1751. One died on the voyage out. A second, Olof Torén, although helped by the then nineteen-year-old William Chambers (who later designed the botanic gardens at Kew), failed to buy tea plants. So did the third. And although the last student, Pehr Osbeck, did get hold of two plants, one was thrown overboard by mistake in Canton harbor and the other was destroyed by frost off the Cape of Good Hope. Linnaeus's 1745 appeal to the explorer of Russia J. G. Gmelin to bring tea seeds by the Siberian land route was also without result. Then, in 1757, a director of the Swedish East India Company sent Linnaeus two tea plants. They traveled the last leg of their journey, Gothenburg to Stockholm, with a Danzig herring consignment. Planted in the Uppsala botanic garden, it was "when the plants first bloomed that the treachery of the Chinese was revealed": they were camellias.[110] Yet Linnaeus persevered. In 1760 John Ellis mailed him eight tea seeds from London,[111] and Solander two. "I now," Solander wrote to his mentor, "hope to be the first to send home to Sweden fresh Tea seeds . . . but I couldn't get more than these two because all the others were to be sent to the English Colonies in North America."[112] In his next letter, in February 1761, he enviously added: "Here is such an unnatural bragging over the successes of their weapons, that one hears nothing but that the English can conquer the whole world if they wanted to."[113]

Smaller, weaker European nations, with no such military expectations, had to hope instead for the naturalization of tropical produce. It was not, however, an easy task, as Linnaeus's tea-growing experiments show. Neither Ellis's nor Solander's seeds sprouted, and the very next year brought a fresh disappointment. The Swedish East India Company again reported to Linnaeus that an employee had brought a live tea plant from Gothenburg. But, the account continued laconically, "the sailors hurried after a long sea journey heedlessly into the city, leaving the tea plant on the table in the captain's room, whereupon it was so eaten by the ship's rats that it died shortly thereafter."[114] Two years later, in 1763, the Company again wrote to Linnaeus that live tea plants had arrived from Canton. Mixing hope with anticipation of fresh disasters, Linnaeus scribbled a note to the East India captain: "But live Tea trees? Is it possible? Are they really Tea trees? Truly if they are Tea, I shall make your name, Mister Captain, more eternal than Alexander the Great. . . . I am old, but if I were sure they were real Tea trees, I would dare to walk to Gothenburg and carry them myself in my arms to Uppsala. If they are true tea trees, I beg you, Mister Captain, for God's sake, for the love of your Fatherland, for natural science, and for all that is holy and famous in the world, treat them with the most tender care. I fear it is *Cassine*, whose leaves are similar to Tea and are said, in Dutch Botanic Gardens, to be tea trees." He added, as if he sensed Nemesis divina hovering nearby,

"my dear, do not tell anyone about this, *ne audiat Nemesis.*"[115] The first batch arrived in Uppsala dead. "I saw from these earlier dead plants and from their wilted leaves," Linnaeus wailed, "that it was the correct plant, so I can't doubt anymore, but am now wholly sure and convinced, and that so surely as two times two is four."[116] A second lot (held back as a secret reserve) was then dispatched. "I am so afraid," exclaimed Linnaeus, "that these [new] plants will be destroyed that I dream about it every night."[117] Traveling in a covered wagon, they rode the entire way on the lap of the East India captain's wife, to arrive alive. Linnaeus straightaway wrote to his patrons "curious observations about the planting of tea here in Sweden."[118] But they never throve, even if two specimens lingered for a few years. Pathetically, one of Linnaeus's *vitae* records that they "flowered in 1765 in Uppsala."[119] The same year his dissertation *Potus theae*, published just before these last tea plants expired, still avowed that tea could be naturalized in Scandinavia.[120] "Now Sir," a student wrote from Paris in 1768 to comfort Linnaeus about his now dead tea plants, "you will get a great revenge on that lie, that Tea was first introduced in Europe in Trianon, which was said in the papers once."[121] Linnaeus indeed pronounced the Trianon plant fraudulent, as he had the teas cultivated in Dutch botanic gardens.[122] But it little comforted him, as the realization of his own plantations receded both in time and place. In 1772, the sixty-four-year-old, putting on a brave face, summarized his life effort: "Tea was first seen away from China in the Uppsala [botanic] Garden; others have learned from this to take care of it in such a way that within a Century Tea will be common in the fields of Southern Europe."[123]

Apart from growing Baltic tea, Linnaeus also expected to cultivate Lapland. In 1733 he was queried by the governor of West Bothnia, in northernmost Sweden, whether the province could "be seeded and bear fruits and be of use."[124] Linnaeus advised that lyme grass, which he regarded as a productive grain, be grown, "earn[ing] the fatherland a couple of barrels of gold." He even authored a manuscript on the topic, entitled *Ceres Lapponica*.[125] In 1747, he counseled the directorate of the Lapland Ecclesiastical Bureau (the agency responsible for the Christianization of the Sami) that its parsons ought to "serve *publicum* and their Lapland [by observing] . . . what nature's Master so wonderfully has placed in front of their eyes."[126] When Linnaeus grumbled that only two *Studiosos Lapponicos* attended his Uppsala University lectures, the directorate resolved to order all prospective Lapland parsons to study natural history.[127] In the meantime, Linnaeus's other students contributed ideas. Himself from a north Swedish parson's family, Solander predicted Lapp grain fields and hay meadows. Kalm contributed Canadian plants; Osbeck, Chinese; Falck, Siberian. In 1756 Linnaeus even won a prize from the Swedish Academy of Science for his Lapland

agricultural schemes.[128] Today, that vast tundra is still a pristine wilderness, and, as Europe's largest national park, is so perpetually designated.

In the 1740s Linnaeus presumed that plants were latitudinally transplantable – an assumption that had formed the basis for his envisioned temperate-zone autarkies that would produce tropical and subtropical stimulants and foods.[129] Hasselquist reported from Smyrna on plants "that I find to be both Anatolia's and Sweden's guests."[130] Kalm observed from Philadelphia that "certain trees stop at a certain degree towards the North, and don't go further by themselves, although they anyhow are not damaged by the cold if they are moved by human hand further north."[131] In 1748, Kalm had also suggested that plants be "fooled" to tolerate cold climates:

> Here [in London] a hideously large bunch of plants stand outside all winter, which when they are moved to Uppsala, freeze during cold winters because they have made too long a jump north in one go: Scania is much milder in winters than [the province of] Uppland [around Uppsala], and perhaps, not much colder than England; in Lund there is an Academy; if one moved the plants from here to there first, I almost dare to swear, that they would not be particularly damaged by the cold during winter; through this one could fool them, little by little, into getting used to the Swedish Climate; from there they could be moved to Uppsala, and so further north.[132]

As I have also discussed elsewhere, Linnaeus's cameralist project of import substitution thus failed, not only because of accidental setbacks, but also because Linnaeus imperfectly grasped the relationship of plants to climate.[133] Already by 1749, he naively theorized that on equatorial trees and bushes "the little leaves are born completely naked like little dogs; therefore it is never possible that they will get used to our climate."[134] In later life, Linnaeus acknowledged that plant communities are native to specific climates, and was pleased when presented with "many seeds from *Peregrinatores botanicos Siberae*, with which he starts on his farm a special *Hortum Sibericum*, to get to Sweden plants that tolerate our gardens and our climate."[135] In the 1757 Scandinavian farmers' almanac *Calendarium florae* Linnaeus stressed that "southern" or "Indian" plants must be housed in winter,[136] and he divided months by seasonal events rather than Christian conventions. But the dramatic year's end to Linnaeus's Baltic floral year, when "the rivers freeze over with thick ice" and "the earth is covered with snow," also implicitly admitted that tea, pineapples, and mulberries might not thrive in his northern abode.[137]

And over time, Linnaeus's expectations that natural history would enable Europe to domesticate tropical produce indeed waned. "About *Coccionella* I do not wish to speak, never wish to think or remember," he lamented in 1756.[138] Not only were his North African beetles worthless, but also, as he reminisced in a later *vita*, "Rolander, on coming home from Surinam [in 1754] sends a potted Cactus with Cochineal. But Linnaeus presides [at a dissertation] and the Gardener receives the plant, removes all dirt, *per*

consequens also the worms . . . and accordingly all hope disappeared to get those [insects] that he thought could be cultivated with profit in Orangeries. This moved him so, that he got Migraine."[139] By the later eighteenth century, educated Scandinavians generally began to question the economic utility of natural history. Despite their theoretical ingenuity, the Linnaeans had repeatedly failed to naturalize non-European plants and animals. By the 1780s, their acclimatizationism was parodied in newspapers, comic novels, and magazines. One easy target was Thunberg, the voyager to Japan, who now held Linnaeus's old chair at Uppsala.[140] Others were Osbeck and Torén, the China travelers, mocked by another East India Company ship's chaplain, Jacob Wallenberg, who also noted in his travel diary (a 1781 bestseller): "I must kneel for his majesty of the kingdom of plants, duke over crocodiles and mermaids etc. and lord of quadrupeds, birds, and insects, our great knight Linnaeus, asking most humbly to be freed from these stony excursions."[141] More importantly, and introducing for the first time in political economy a rigorous understanding of production costs, Adam Smith raised a theoretic tombstone in the *Wealth of Nations* (1776): "By means of glasses, hot-beds, and hot-walls very good grapes can be raised in Scotland, and very good wines too can be made of them at about thirty times the expense for which at least equally good can be brought from foreign countries."[142]

Plant transplants were not, however, the only means for national autarky. The Linnaeans also schemed to employ native substitutes for tropical imports. To Linnaeus, ersatz tea was especially important. In 1740, he presented dried leaves of *Linnaea borealis* "to a high-born lady in Stockholm, under the name of Lapp Tea, with which she entertained other Ladies, who [all] admired it." In the long run, exoticism was a poor substitute for caffeine. But thirty years later, Linnaeus still expected that his namesake, a frail flower some three inches high, would domesticate into a surrogate tea.[143]

In 1754 the Swedish Academy of Science was sent "samples of a sort of Tea, which is the most commonly used among the public in China and is called Bat-schia," and was said to grow "heartily" in Finland – unsurprisingly, since it was Arctic dwarf willow. This explains the reaction of the academicians, who "tasted Tea-water prepared with this [willow] and found it unpleasant enough."[144] Linnaeus, whose opinion was sought, stated contemptuously: "the tea bush is as distinguished from Arctic Dwarf Willow, as the peacock from the crow."[145] The next year Linnaeus was again mailed a "tea" plant. "All and sundry claim to have seen it in Amsterdam and other gardens." It was again "little *Salix palustris* [willow], which grows in many places and mostly around Åbo."[146] In fact, many eighteenth-century tea substitutes were simply consumer frauds. As Linnaeus remembered in 1755, "eight years ago there was a merchant in Stockholm who said that he had gotten a wonderful Tea from China and for a good price. He gave it to me

to test. A large Chinese piece of paper with letters of black magic was wrapped around it; among the leaves were buds and flowers of true tea; but when I wetted the leaves, [I discovered that] they were Blackthorn."[147]

In the 1740s, the Swedish State Commission for Frugality recommended speedwell as a tea substitute. For olive oil, it advocated beechnut oil; for coffee, burnt grains; and for chocolate, burnt wheat flour mixed with egg yolks.[148] Linnaeus's 1749 *Flora oeconomica*'s "index of uses" encouraged Scandinavians to use native plants. One repelled fleas; another, lice; a third, mosquitoes; and a fourth, moles. Others fattened pigs, cage birds, or beavers; spiced aquavit, beer, or wine; powdered wigs; or colored hair.[149] In 1757, Linnaeus also authored a short vernacular "narrative about native plants that can be used to make bread and other foods if grains are wanting."[150] Linnaeus and his students recommended, too, nettles and marsh cotton grasses for cotton;[151] wild lucerne for imported clover;[152] swamp dogwood, sloe, and bearberries for tobacco;[153] cannabis for aquavit;[154] black grouse for hens;[155] and moose for horses.[156] Continuing his father's efforts, Linnaeus the Younger wrote to a family friend in 1778: "I am trying to tame native animals; to begin with I now have a moose that is as tame as a dog."[157] Linnaeus's most popular physico-theological tract, reprinted three times in Swedish and translated into Dutch, Latin, German, and English, pointed instead to insects. "Here [among the insects] there are surely [substances] sweeter than honey, tougher than silk, redder than Cochineal."[158] Such substitutes appealed to Linnaeus's Gothicist moralism. But Baltic autarkies never materialized. The public preferred smuggling coffees and silks to roasting grains and carding nettles.

To summarize the argument of this essay, Linnaeus understood voyages of discovery as the necessary precondition for a cameralist policy of import substitution, the success of which was guaranteed because of the way God had constituted nature. But Linnaeus overrated plants' transplantability between climates, and his cameralist strategy faltered. By the mid-nineteenth century, even the attempt had been largely forgotten: the 1907 publications marking Linnaeus's bicentennial, which remain standard historiography, do not address the issue. Yet it deserves to be recalled, for through it we may interpret anew European imperialism, construing Continental, non-Atlantic states' nineteenth-century colonial ambitions as a makeshift, belated response to the earlier failure of cameralist import substitution. If tropical crops cannot thrive in northern Europe, if no local replacement plants are found, and if import bans fail, then a cameralist economy can only be retained by means of a tropical tributary. In this exegesis, imperialism is as much an afterthought as a master plan – a policy shift aiming to retain a more fundamental ideology, cameralism.

Since cameralism at once promotes and is promoted by economic back-

wardness, it remained a dominant economic philosophy in Scandinavia and much of German-speaking Europe until the later nineteenth century. Strong family resemblances, as well as a close-knit genealogy, link cameralists of the seventeenth century (Johann Joachim Becher, Philipp Wilhelm von Hörnigk, Friedrich Wilhelm von Schrötter) to those of the nineteenth (Johann Gottlieb Fichte, Friedrich List) and even to cameralism's first historian (Gustav Friedrich von Schmoller).[159] But from its late-seventeenth-century beginnings as a rational reform policy, Continental cameralism over time took on a self-consciously conservative form. By 1841, List could accuse the father of classical economics, Adam Smith, of "boundless cosmopolitanism," "dead materialism," and "disorganizing particularism and individualism."[160] Indeed, in the Continent's most backward polity, Russia, cameralism remained state policy until 1991. To return to the crossover of Linnaeus's afterlife and imperialism's prehistory, in the 1790s the cameralist Swedish state elite, confronting the triple failure of transplants, substitutes, and import bans, did turn to the fourth alternative: mercantile imperialism. When in 1792 Linnaeus's last student, Adam Afzelius, left for Sierra Leone, he was instructed to search out lands for the Swedish flag. Costs here were of less importance than setting up a self-contained imperial economy. After all, as Adam Smith had already noted in 1776, consumers (the one group whose interests mercantilists and cameralists steadily ignored) could always be "burdened with the whole expense of maintaining and defending that empire."[161]

NOTES

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1 Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (Cambridge: Cambridge University Press, 1986).

2 The standard work on mercantilism, including a discussion of how to date the doctrine, remains Eli F. Heckscher, *Merkantilismen. Ett led i den ekonomiska politikens historia*, 2 vols. (Stockholm: Norstedt, 1931); translated by Mendel Shapiro as *Mercantilism*, ed. E. F. Söderlund, rev. ed., 2 vols. (New York: Macmillan, 1955). See also D. C. Coleman, ed., *Revisions in Mercantilism* (London: Methuen, 1969). On France, see Charles Woolsey Cole, *Colbert and a Century of French Mercantilism*, 2 vols. (New York: Columbia University Press, 1939); and *French Mercantilism, 1683–*