

Chapter 3: The Economic Culture of Drugs

Today the word "drugs" refers to outlaw commodities, socially harmful and criminal goods that dwell in the underworld of the black market. They are not considered part of the gross national product. Indeed, they are thought to subtract from the total of goods and services produced because drug use prevents consumers from contributing through hard work or by the consumption of legal, wholesome products. Drugs are viewed as an embarrassment to capitalism, a throwback to primitive times before bourgeois ethics and consumption patterns took hold. Drug company CEOs are called "barons" or "lords" as if they were medieval princes and their organizations "clans." Free trade, which is said to bring great advantages to everyone involved by increasing profits to the most efficient producers and costs to consumers, does not apply to the world of drugs. This is the rare area in which government surveillance and control is demanded to *reduce* commerce and profits. Drug control is done not through market mechanisms, but through "wars" waged by drug "czars." But are drugs really such exceptions? Are they economic outcasts with different rules?

The fact is that historically, goods considered drugs, that is, products ingested, smoked, sniffed, or drunk to produce an altered state of being, have been central to exchange and consumption. What has changed is not the commercial and social value of these goods, but the definition of "drug." New foods introduced from what seem to be exotic lands have historically passed through different phases in their social lives. They often started as drugs that caused pleasant pharmacological effects. As drugs they were seen as both medicines and sacraments of religious rites. That is, they were thought to have both spiritual and physiological effects. They both transported consumers into spiritual states of bodilessness or, conversely, heightened sensuality by serving as aphrodisiacs. They either heightened or dulled senses; but in either case they transported users away from the drudgery of the work-a-day world. (A surprising array of foods were thought to arouse sexual ardor, from the plain potato to the succulent tomato--called the "love apple.") Although the introduction of new foods no doubt had these social uses for millennia, only the transportation revolution of the sixteenth century caused these foods to occupy an important place in international trade. As the world economy made them valuable, they were transformed from spiritual or sensual balms into the foundations of vast, secular fortunes.

In the seventeenth century affluent people all over the world began to drink, smoke, and eat exotic plants that came from long distances. Coffee, tea, cocoa, tobacco, and sugar all became popular at roughly the same time. Both European and Asian consumers became addicted to these American, Asian, and African products. For three centuries they constituted the most valuable agricultural goods in world trade. Although today advocates of free trade exempt drugs from the free circulation of goods, in fact the plants that gave birth to the modern world economy were considered drugs. Sometimes, as with coffee and tobacco, they were initially outlawed in consuming countries. But their appeal became so strong that government after government decided that it was better to tax consumers of these delicacies and accept their use, even cultivate it, than to spend large amounts to prevent drug addiction.

However, producers attempted to maintain their natural monopolies since most drug foods were indigenous to a specific place: Arabica coffee to Ethiopia then domesticated in Yemen, cacao to Mexico, coca to the Andes, tea to China, tobacco to the Americas. Non-European originators of these exports such as the Chinese, Ottoman, Aztecs, and Incas attempted to control the trade and to prevent the export of seed or seedlings. They failed when Europeans used the persuasion of trade and the force of warfare to open ports (see reading 3.8). Before long, most of the drug foods were being produced in new, distant parts of the world that Europeans had colonized. Botanical gardens that nurtured exotic seedlings became the advance guard of empire. Colonial empires were built on the foundation of drug trades. So were many domestic bureaucracies and armies. Tariffs on tea, sugar, and tobacco accounted for a significant part of the revenue of numerous seventeenth- and eighteenth-century states. In fact, reliance on taxes on drugs is still one of the main sources of public revenues today. Known as "sin taxes," charges on tobacco products and alcohol fund our schools and public health programs.

The popularization of drug foods by Europeans often transformed their meanings, uses, and location of production. Tea and coffee gained initial favor in China and the Middle East because their caffeine contributed to the wakefulness necessary for religious rites. Muslim Sufi holy men and Buddhist priests popularized the drinks, which long were closely associated with religious observances (readings 3.2, 3.3). Cacao drinking was restricted to the Aztec theocracy and aristocracy in Mexico (reading 3.1). In Europe, all three beverages became tied to secular uses. Over time their class appeal changed: they began as

aristocratic privilege, diffused to bourgeois pleasures, and eventually became mass delights and finally common necessities (reading 3.4). The drugs that began as nourishment for spiritual contemplation became the sustenance of industrial workers. Along that path the way they were consumed also changed. From hot drinks with no sweeteners (the Aztecs added chili to cacao, the Arabs sometimes nutmeg or cardamom to coffee), so many additives were included that the original beverage was hardly discernible.

Once they gained acceptance and began creating fortunes for merchants and state treasuries, most of the drugs became respectable. In areas marginal to world trade, they sometimes served as money. Cacao beans in Central America, tobacco in West Africa, opium in Southwest China, and tea bricks in Siberian Russia were currency. But usually the goal was to transmute them into gold or silver. At first they were foundations of mercantilist empires. The Spanish doted on chocolate because of their dominion over most of Latin America, which had a natural monopoly on cacao until traders later moved it to Africa. The British, who were the first Europeans to become coffee crazed, found tea more to the advantage of their trade plans in China and India (reading 3.9). The French and Americans, oriented to Latin America, became coffee addicts.

These exotic drugs emerged from the outlaw underground to become central parts of the nascent bourgeois life-style in Europe. They went from the stuff of community, such as the tobacco smoked by Native Americans in council meetings or by West Africans in religious ceremonies, to the fuel of individualism. Coffeehouses (which served other drinks as well) served as centers for trade and politicking in Europe. The first newspapers, men's clubs, and political parties were organized, and revolutions plotted, around tables serving coffee and tea (reading 3.4). Smoking brought together men who created civil society amid the acrid clouds of tobacco (reading 3.7). Indeed, the coffeehouse was the world economy in miniature; it was an international emporium, joining coffee from Java, Yemen, or the Americas, tea from China, sugar and rum from Africa's Atlantic islands or the Caribbean, and tobacco from North America or Brazil.

The nineteenth century would popularize these goods so much that they lost their revolutionary appeal and their sense of social distinction. Tobacco descended from elegant snuff and fine cigars to vulgar chewing tobacco. Dandy Parisian aristocrats at Versailles who delicately took snuff would not have recognized that this was the same substance that United States baseball players later called "chaw" and spit out on the sidelines or teenagers smoked furtively in school restrooms. Sugar was debased from extravagant culinary dessert masterpieces to a huge source of working-class calories in beverages to an industrial additive in something so prosaic as, say, ketchup; coffee and tea descended from the elegant salons to become popularized with instant coffee and iced tea in military rations and in cafeterias.

As the drug foods became more popular and respectable, they lost their original histories. Instead of distinguishing the land of their origin, they became central to the cultures of the consuming countries. As agents of the consuming nations transplanted the drug crops around the world, the native countries lost their birthright. When coffee could come from anyone of a hundred countries around the globe, what did it have to do with Yemen, where it was first domesticated? Indeed, Yemen's principal port, Mocca, became associated with *chocolate* rather than coffee.

In the consuming countries of the north, drugs created *culture*, social practices. Who could imagine the British without their spot of tea, the French without their *cafe au lait*, the Italians without their espresso, or the Americans without their coffee break? The drugs not only helped create national identities in the consuming nations, they also distinguished different sectors of them. Chocolate was considered the drink of women and children while coffee and tobacco were associated with men. Snuff and later cigars were for the elite, chewing tobacco for the commoner. The rich drank their tea poured from Mexican silver teapots into Chinese porcelain cups in an elegant salon; the commoner sipped from a dirty, crude mug lent by a street vendor.

At the same time, in the producing countries the drugs born with so many religious and communitarian meanings became mere commodities. Rather than symbolizing identities, they became a means to make money in order to buy something else or to create capital. As the first international drugs became mass products, new drugs entered the world market. First gaining international demand in the nineteenth century, coca (transformed into cocaine) and opium were initially acceptable mass products. In fact, coca had been chewed for hundreds if not thousands of years in the Andes to dampen hunger and cold and to give energy to workers, much as American workers drank coffee or British laborers tea. The Inca had overseen the coca trade. It was also used in religious rituals. When cocaine was developed in the nineteenth century it was first a pain killer and later an additive in the popular drink Coca-Cola (reading 3.10). Opium, on the other hand, was forbidden by the Chinese emperors after 1729 in an attempt to protect their subjects. It became wildly popular only after British gunboats forced open China's ports so that the British would have something to sell in China in exchange for all of the Chinese tea the English

addiction demanded (reading 3.8). Opium was an engine of growth for the world economy in the nineteenth century as it allowed the British to capitalize Western Europe with Chinese and Indian bullion, much of which had originated in the Americas (reading 3.9).

Only in the twentieth century with the rising tide of prohibition of alcohol consumption did opium and cocaine revert to the outlaw category. The inebriation they created was considered to be more harmful than the virtue of sales. For the first time, a morality campaign defeated the possibility of profit. But this might be another brief interlude--as we have seen in the past--before the lure of profit outweighs concerns about the social consequences of drug consumption. After all, we are witnessing today struggles between those who would legalize marijuana, as in the Netherlands, restrict it for medical purposes, as a California law did, and those who want to continue criminalization. In the opposite vein, efforts are being made to include tobacco as a drug under Federal Drug Administration authority, rather than an unregulated food as it is today.

In the past, moral scruples were ignored when fortunes were at stake. Catholics were willing to drink a heretic beverage such as Muslim coffee (though they quickly began producing it in supposedly Christian European colonies). French revolutionaries saw no contradiction in drafting the high-minded Rights of Man while consuming sweetened coffee and smoking pipes of tobacco produced by New World slaves. British traders in China sold opium off one side of their ships to feed addictions and gave out Bibles off the other to deliver salvation, confirming both Marx's dictum that religion was the opium of the masses and the twentieth-century wit who countered that opium had become the religion of the masses.

European and North American consumers were not bothered by the fact that these food drugs that contributed so much to leisure and pleasure in northern consuming countries caused exploitation, landlessness, and impoverishment of the producing class in the South and East. In every case they were produced in poor countries for use in rich lands and enriched the rich disproportionately. Drug foods had very different effects in the countries where they were produced than in those where they were consumed. While stimulating fortunes, monetarization, and wage labor in Europe and North America, they spread slavery in the producing countries (reading 3.6). Coerced labor often was needed to cultivate these drugs. States usually oversaw the coercion as, for example, the African slave trade, and organized the production of drugs. In other cases, such as in Southwest China in the nineteenth century and Burma and Colombia today, production of criminal contraband led to increased violence and criminal influence in the producing areas. Drugs have been both the foundations and the bane of states.

Thus, foods that were first consumed for the earthly pleasures they bestowed, the "taste of paradise," became commodities that many producers found satanic. But they must be recognized as a foundation of the world economy, not an aberration.

3.1 Chocolate: From Coin to Commodity

When Christopher Columbus encountered a large Maya trading canoe in 1502 he knew he had stumbled upon something of value. Some of the Maya traders dropped almond-like objects and began to furiously scramble to pick them up "as if their eyes had fallen out of their heads." These curious beans were known in Mayan as *ka-ka-wa*, which the Aztecs changed to *cacao* and the Spanish eventually corrupted into *chocolate*.

The cacao bean had been prized in Mesoamerica since before the time of Christ. The Olmecs, the Americas' first civilization, used cacao and in turn passed on the custom to the Maya. Grown only in the tropical lowlands, cacao was traded to the highland civilizations of Teotihuacan and later the Aztecs. It was as much coveted for its pharmacological effects and rarity as for its taste.

Cacao was considered to be a stimulant, intoxicant, hallucinogen, and aphrodisiac. Warriors would count on cacao's caffeine to steel them in battle. Others would drink fermented chocolate and feel intoxicated by the beans, especially if they were still green (and when consumed in conjunction with the psilocybin mushroom as in some religious festivities). And men such as the Emperor Montezuma would imbibe the potion before going to make love with their many wives. The drink also served as a cure for anxiety, fever, and coughs.

Taste was also important. They added many spices, some of which we today might not appreciate. Usually made into a beverage by adding water, chocolate was commonly drunk with chili peppers, flowers that resembled black pepper, the seeds of the pizle--which gave a bitter almond taste--or lime water. Maize was used to thicken it. Only when the Maya or Aztecs added honey and vanilla does the

drink sound familiar.

Chocolate occupied a unique position in the Aztec marketplace. It was greatly desired, but rare. Natural stands of cacao trees grew in the tropical lowlands but the Maya peoples who lived in these areas were largely self-sufficient peasants. Although we now know there were large Mayan cities, no evidence of marketplaces in them has yet been unearthed. Tribute served to bring surplus to the aristocrats. There was some long-distance trade of precious goods, but there is no evidence of an important merchant class among the Maya. Hence, despite substantial demand for cacao in the Mexican highlands, production was small.

Indeed, cacao beans were so precious and rare that they were used as money. Since the Aztec economy was mostly on the basis of face-to-face barter, cacao represented an important opening to monetarization. That cacao really was thought of as a form of money was demonstrated by the fact that cacao beans were sometimes counterfeited! Empty cacao shells were filled with clay, which, according to the first Spanish viceroy, looked "exactly the same, some grains better some worse."

It might seem absurd to have money growing on trees. But in fact the Spanish continued this tradition in central Mexico for decades and in parts of Central America for centuries. In Costa Rica, the governor was still making his purchases with cacao beans in the eighteenth century. Some Catholic friars, who played a large part in introducing cacao to Europe, suggested that the beans be used as money in Spain as well. No doubt the idea of money rotting away appealed to these critics of capitalism and usury.

Ascetic priests were the first to popularize chocolate in Spain and neighboring countries. Chocolate was considered a Catholic drink just as coffee was first a Muslim drink and then a Protestant beverage. The Jesuits in particular were so taken by chocolate that they became involved in cacao production. Indeed, they were denounced by some secular competitors for trying to monopolize the trade.

Although introduced into Spain as a spiritual drink of abstinence, it soon became, as in Mexico, the aristocracy's drink of leisure, luxury, and distinction. In early sixteenth-century Spain, chocolate was mixed with water, sugar, cinnamon, and vanilla. Two centuries later, hot chocolate was finally made with milk. The first stimulant to gain favor in Europe, cacao became Spanish America's primary export agricultural good.

European imperialists, unlike pre-Columbian imperialists such as the Aztecs, were able to control production as well as distribution. Driven by the capitalist world economy, production now moved away from Mexico's wild stands to plantation agriculture. Cacao trees were cultivated in Venezuela and Central America and then transplanted to the Philippines and Indonesia, Brazil, and finally Africa. The cacao bean became a commodity rather than a coin. A colonial crop until the eighteenth century, its production only became really large once the colonial aristocracy ceased being the principal customers. Chocolate became domesticated as women and children drank cocoa (invented in 1828 by the Dutchman Van Houten) and ate the many sweets that were made after milk chocolate was developed in the second half of the nineteenth century.

Chocolate today is a sweet treat, a small indulgence. But let us not forget its heroic days when it was the beverage of princes and warriors, the days when money grew on trees.

3.2 Brewing Up a Storm

In the 300 years between Columbus's voyages and the industrial revolution, three kinds of trans-continental trade boomed. One was the slave trade from Africa to the New World. Another was the export of huge amounts of gold and silver from the American mines to both Europe and Asia. The third--and the only kind to last well into the industrial age--was a boom in what have been called the "drug foods": coffee, tea, sugar, chocolate, tobacco, and later opium.

Most of these mildly addictive little luxuries went to Europe; and most became cheap enough for the masses because (regardless of where they originated) they began to be grown on vast New World plantations, combining plentiful cheap land and cheap slave labor.

Only tea production never shifted to the New World, remaining an Asian peasant crop that eluded direct Western control for 400 years. Yet tea also became the national drink of England, an industrial and colonial superpower that spared no effort to control production of its other necessary raw materials. What made tea so important, and so different from its "drug food" cousins?

Tea was known in China as least as far back as 600 A.D. and spread to Japan and Korea not long afterward. The earliest exporters of the new beverage were Buddhist monks, who went to Chinese temples seeking enlightenment--and brought back stimulation, too. (The two may not have been unconnected: legend has it that monks became big consumers of tea when they realized it would keep them awake as

they struggled to prepare for ordination exams.) The drink was not cheap, and never won universal acceptance, even in China; poor people in the North generally drank boiled water instead. Yet enough people wanted it that it soon covered many South China hillsides (the only places it would grow), and helped fuel medieval China's commercial revolution. The drink also became widely associated with Chinese civilization, hospitality, and discussions among the cultured elite, and so acquired a prestige that made it a valuable export to the rest of East, Southeast, and Central Asia. (In a backhanded tribute to the symbolic association of tea and sociability, poor North Chinese often drank their boiled water with the same rituals that accompanied tea drinking in the South, and sometimes even called their beverage "tea.")

In fact, tea found such a welcome abroad that it soon became a strategic good in which the Chinese state took an interest. The nomadic and semi-nomadic peoples of Central Asia-Mongols, Eleuths, Turks, and others--so coveted tea that it soon became the principal item sold them in exchange for the war horses they raised--the world's best. As a result, the Chinese government tried at times to organize a state monopoly to produce and transport tea, making sure that enough was available for this trade at a price they could afford. (After a hard-pressed government set tea procurement prices too low and wrecked some centers of production in the 1100s, later regimes turned to a more successful policy of regulating the trade rather than running it.)

And from Central Asia, the tea habit reached other new markets: Russia, India, and the Middle East, where sweetened tea (something not found in East Asia) provided a welcome substitute for wine, which was either forbidden (as in the Islamic world) or impossible to grow (as in Russia).

But in part because of tea's strategic function, its cultivation spread far more slowly than its use. It was a crime to take tea plants out of China, and until the mid-nineteenth century that country remained the source for most of the world's production. (Japan was more or less self-sufficient, but not a source of exports.) And while most of Asia was content to rely on China for much of its tea supply, the Europeans--who began to import the beverage in the 1600s--were, in the long run, less willing to accept this monopoly arrangement.

The Portuguese found Chinese tea for sale when they ventured into Southeast Asia in the 1500s. But it was mostly the lower-quality variety, which survived the long trip from China better than the best tea. And while tea is noted in England, France, and Holland in the 1600s, it did not find a wide market. Indeed, Western Europeans seemed primarily interested in using tea as a medicine rather than as an everyday drink. In 1693, even the English probably imported less than one-tenth of an ounce of tea per person.

The story changed completely in the eighteenth century. By 1793, the English imported over a pound of tea per person; the country's total imports of tea had risen perhaps 40,000 percent. Although the reasons for this sudden shift in taste are not clear, the sudden availability of a cheap sweetener was certainly a factor. It was in the late seventeenth and eighteenth centuries that slave plantations in the New World first made sugar affordable for the European masses. And changes in social life no doubt mattered, too. More and more artisans came to labor in workshops (or in some cases, early factories) separate from their homes; work hours became more regimented, and going home at mid-day for a long lunch less likely. In such a setting, short breaks that provided a shot of caffeine and sugar became an important part of work routines. And even if these early stirrings of industrialization did not quite cause the taste for tea, they certainly benefited from it. Tea, after all, replaced gin and beer as the national drinks in England--early factories were dangerous enough as it was without stupefied workers fumbling about their duties. Had tea and sugar not replaced alcohol as the country's principal cheap drink (and source of supplementary calories), the situation could have been far grimmer yet.

Dependence on tea, of course, had its price--one that the British did not wish to continue paying. As its import bills (all settled in silver) soared, the English sought in vain for a good they could sell to China in equal amounts. The answer they eventually found was opium grown in their Indian colonies, leading to war, dislocation, and a massive addiction problem in China.

Only after that "solution" was in place did Europeans begin to get their hands on the plants they needed to grow tea in their own colonies (growing it in Europe itself was impossible). Tea plants finally made it to Dutch-occupied Java in 1827 and to British-ruled Ceylon in 1877. Even then, these islands alone were insufficient to meet European demand.

Ultimately, a still larger area was needed: Assam, a very sparsely inhabited region of Northeast India filled the bill nicely. The Assam Tea Company was formed in 1839, just as the Opium War was beginning; but production did not really take off until the 1880s. The Assam Tea Clearance Act of 1854 gave any European planter who promised to cultivate tea for export up to 3,000 acres in the region. But the indigenous population had other ideas: clearing the forests for tea plantations (or any other form of private property) would mean the end of their semi-nomadic way of life.

It took no small amount of force--from outright warfare to tax collection that forced people into debt to laws against "trespassing" and "poaching" on the forest lands suddenly granted to foreigners--to displace these people. And it took plenty more effort to create the transport net, including heavily subsidized railroads, to ship large amounts of tea out of this remote and mountainous region.

In the long run, it worked: between about 1870 and 1900, Assam's exports jumped twentyfold and other regions in the Himalayan foothills also saw tea-growing take off. (One of the most famous, Darjeeling, is within sight of Mt. Everest.) At last, the West had a tea supply equal to its thirst, and as safely controlled by the consuming countries as were its supplies of coffee, sugar, and other little "pick-me-ups." But the tea plant's road from China to India had been even harder-and more surprising--than a trek over the dizzying peaks between them.

3.3 Mocca Is Not Chocolate

When Jean de la Roque and three French East Indian Company ships arrived in Yemen's port of Mocca in 1708, they were the first Frenchmen ever to round Africa and sail into the Red Sea. They had undertaken this dangerous year-long voyage with one purpose in mind: as a way to purchase coffee directly.

Although coffee has long been associated with Latin America, for some three hundred years-half of coffee's lifetime as a commodity--*coffea arabica* was an Arabian monopoly. Not only was all of the world's commercial coffee produced in the mountains of Yemen, but the great majority of it was consumed in the Middle East and Southwest Asia. Most galling the Gauls, the commercial middlemen were also mostly Arabian, Egyptian, and Indians. But this would soon change. De la Roque was an integral part of a tide that would sweep away that monopoly, leaving behind only a faint and distorted memory.

Although *coffea arabica* appeared as a native plant in Ethiopia, the coffee beverage was probably developed around 1400 in the Yemeni city of Mocca. By 1500 the beverage became ubiquitous on the Arabian Peninsula. Muslims adopted it in their worship and spread the beverage throughout the Islamic world as far as India and Indonesia, as religious pilgrims brought beans back from their pilgrimages to Mecca. Coffee also became intimately related to the growth of secular society. The cafe was born in the Middle East. Restaurants were almost unknown and taverns were forbidden to Muslims. Hence, coffeehouses became one of the few secular public places in Muslim lands short on public space.

Europeans were slow to adopt the coffee habit for several reasons. First, as a Muslim drink it was viewed as heretical. Second, the Turkish fashion of a very thick, hot, black unsweetened drink did not please European palates. Finally, the rather rare caffeine spice or drug was quite expensive. In fact, Europeans rarely consumed the drink before the last quarter of the eighteenth century.

Coffee's role in sociability and prestige in Europe was enhanced by the arrival of emissaries of the Ottoman Sultan in France and Austria in 1665-1666 who poured the exotic liquor for their aristocratic European guests during extravagant soirees. The Turks also propagated European coffee drinking unintentionally. When their siege of Vienna in 1683 failed to break the Austrians' spirit, the Turks departed, leaving behind bags of coffee. The owner of the first Viennese coffeehouse then thought to remove the sediment from Turkish coffee and add honey and milk, which made it much more attractive to Europeans. But the arabica remained a rather exceptional specialty product.

The problem was coffee's high price. Yemen's artisanal production, layers of commercial intermediaries, and expensive transport made coffee something of a luxury. Until the 1690s it was grown only in Yemen on small, steep, irrigated mountain gardens by hundreds of peasants in three coffee districts.

The town of Betelfaguy, a two-day trip inland from Mocca, was one of the major markets. Farmers brought their beans down from their nearby plots throughout the year. De la Roque noted that the harvest was "not fixed and regular so that the Arabians know no crop." Growers brought their coffee in small increments six days a week; when the price was low they held back. In the marketplace Indian merchants (particularly from the city of Banaras) and Arabs controlled the trade. Even though the Dutch and British East Indian Companies had representatives in Mocca beginning in the early seventeenth century, they--as did de la Roque--used Indian intermediaries who were said to drive the hardest bargain. The Europeans' commercial position was weak because they had no political influence and the only European good the Yemeni wanted was Mexican silver piasters--on the spot.

Although coffee was one of world trade's most precious goods, de la Roque discovered that this was

still very much petty, face-to-face commerce embedded in a tributary state. He had to sign a treaty with the governor of Mocca to be permitted to trade in the first place. Then he had to wait patiently for coffee to come to the market. He ultimately purchased some 600 tons of coffee, but it took six months to acquire that amount. When de la Roque attempted to solve this bottleneck by advancing a large sum to an Indian merchant who claimed special access to coffee, he was swindled.

Not only did assembling the cargo require a lengthy stay, the sudden burst of demand that the Frenchmen represented caused prices to escalate. Prices had already swollen tenfold in twenty-five years because of Europeans' growing taste for the arabica. Now de la Roque caused another spurt, so irritating the Turks that the sultan's ambassador complained to Yemen's king about the European's direct purchases. In addition to suffering rising prices, the sultan was losing customs duties.

The Ottoman had good reason to be concerned. Theirs was already an expensive and cumbersome route from Yemen's mountains to their own cafes. They transported their purchases from Betelfaguy to a small port ten leagues away on camelback. Then they shipped the cargo sixty leagues to the major Ottoman port on the Red Sea, Jeddah, where it was transferred to Turkish ships and sailed to Suez. At Suez, the coffee returned to camelback for the trip to Cairo or Alexandria. From Alexandria the cargo was again shipped, this time to Constantinople. Until de la Roque's voyage, almost all French coffee was also bought in Alexandria and shipped to Marseilles. This was such an expensive route that de la Roque found his direct venture all the way around the Cape of Africa to Mocca profitable--even though it took two and a half years to complete!

Pleased by the success of the voyage, de la Roque returned to Mocca two years later when he made a visit to the king of Yemen, whom he found planting a large garden of coffee trees. The Frenchman criticized the monarch, explaining that European kings planted only decorative plants in their botanical gardens, adding "if there was any fruit, they generally left it to their courtiers." The king was unimpressed by this argument.

What made this discussion so poignant was de la Roque's discovery upon returning to Paris that he was wrong about Louis XIV's botanical garden. The merchant ended his account of his adventure: "We cannot end this treatise more properly, nor agreeably than by speaking of ... the coffee tree which is at length arrived from Holland."

Planted in the Sun King's garden, this plant was a progenitor of European colonialism in the Americas. It would be the ancestor of many of the coffee trees that would be planted in the Americas as its seedlings were taken across the Atlantic. The French had found a way to break the Arab coffee monopoly. Within fifty years, coffee grown in Martinique was displacing Mocca coffee in the Cairo market! Yemen could not compete with colonial production. By 1900 Yemen produced less than 1 percent of the world's coffee and the formerly thriving port city of Mocca had fallen to four hundred stragglers living amidst its landlocked ruins. Today, the only memory of proud Mocca's three-hundred-year hold on the world coffee market is a drink distinctive for adulterating coffee grown in the Americas with chocolate!

3.4 The Brew of Business Coffee's Life Story

Coffee starts our morning, organizes our work breaks, and complements our meals. The world's second most traded commodity is such an integral part of modern life that the world before coffee is unthinkable. Yet it took a five-hundred-year voyage to reach your breakfast table. Along the way it passed through four continents and wore many masks.

The legendary Ethiopian shepherd who hopped around after tasting the bitter berries that left his flock animated and in disarray, discovered the secret that eventually led to coffee's domestication in Yemen. The Arabs who transported the berries across the Red Sea may well have been slave hunters, linking from the beginning the beverage and human chattel, a horrible marriage that would last four hundred years. At first welcomed by the mystical Sufi in Arabia who wished to stay awake to contemplate the infinite in the mid-fifteenth century, coffee soon was denounced by conservative mullahs who feared that its addictive properties would divert men's minds from exploring the sublime; already in ISII they burned bags of coffee in the streets of Mecca. Later, the Turkish grand vizier decreed that the punishment for operating a coffehouse was cudgeling; for a second offense the perpetrator was sewn into a leather bag and thrown into the Bosphorus.

These rulers were right to fear the sociability of coffee. Coffehouses in Cairo, Istanbul, Damascus, and Algiers became centers of political intrigue and fleshly vice. From stimulating, to addictive, to subversive, coffee's trajectory would be repeated in other centuries and on other continents.

In Europe, coffee's favor rose in the seventeenth century along with the emergence of commercial capitalism. The medieval Mideastern bean evolved into a Western capitalist commodity. Fittingly, it was first brought to Europe by Venetian traders. Thank God! Otherwise we might not have espresso and cappuccino. But the first purveyors of coffee regarded it as a medicinal drug that could cure sore eyes, dropsy, gout, and scurvy. London merchants soon were imbibing the potion in coffeehouses that doubled as centers of commerce. Jonathan's and Garraway's also served for three-quarters of a century as England's main stock exchanges; the Virginia and the Baltic doubled as mercantile shipping exchanges; and Lloyd's cafe became the world's largest insurance company. The coffeehouses served as office buildings, "penny universities" that disseminated the latest news, and the first men's clubs. Coffee helped stimulate business but outraged wives who, resenting their husbands' addictions to the dark, noisy coffeehouses, issued broadsides against the "base, black, thick nasty bitter stinking nauseous Puddle water" alleging that coffee caused impotence. King Charles II, concerned more with cafe patrons' political discussions than their familial responsibilities, tried unsuccessfully to close them down. It would take the rise of the East Indian Company and Indian colonies to make Britain a tea-totaling country.

On the continent, cafes came to symbolize and serve the beneficiaries of capitalist prosperity who constituted the new leisure class that would become known as "cafe society." But not without a fight. Debates raged about coffee's medicinal value. In the best scientific tradition, Sweden's King Gustav III commuted the death sentences of twin brothers convicted of murder on the condition that one be given just tea to drink and the other coffee. The tea drinker died first-at age eighty-three-and Sweden became the world's largest per capita coffee consumer. Frederick the Great was less open-minded and less concerned with his subjects' health than with their political proclivities and the balance of trade. He sought to prevent commoners from drinking the brew by making it a royal monopoly. He failed, though the high import duties restricted consumption to the relatively affluent in major cities. The same was true in France and Austria.

But in the capitals cafes prospered. Their great popularity in Paris, according to Thomas Brennan, attested "to the elite's determination to gather separately from its social inferiors." Yet this was an elite of achievement, a bourgeois elite. Coffee's great virtue, in contradistinction to alcohol, was that it stimulated the body while clearing the mind. Some coffeehouses such as Paris's Procope served as centers of intellectual and artistic life where men like Voltaire skewered aristocratic foibles. The Cafe Heinrichhof in Vienna inspired Brahms and other great composers as well as merchants who preferred the sound of money. Other coffeehouses, such as my grandmother's Cafe Mozart in Vienna, hosted cards and billiards and other such less inspired diversions. The leisure of the coffeehouse was serious business. Coffee "speak-easies" were intimately involved in the birth of civil society, public space, and the democratization of a semi-feudal aristocracy. Appropriately, then, it was at Paris's Cafe Foy that Camille Desmoulins sat on July 13, 1789, planning the assault on the Bastille that ushered in the modern world. Coffeehouses continued to serve as bastions of intrigue and agitation during the French Revolution.

As clanging factories gave birth to the industrial age, coffee came to represent not only leisure, but also labor. In the United States coffee became democratic as a drug to prop up the drooping eyelids and awaken the flagging consciousness of an army of laborers. No longer primarily the beverage of spiritual contemplation, commerce, or leisure, coffee became the alarm clock that marked industrial time. By the late nineteenth century the cafe yielded to the cafeteria and cafe society to the coffee break. North Americans' coffee imports swelled almost ninetyfold in the nineteenth century. Now instead of seeking divine inspiration as did those early Moslem patrons, profit as did London's businessmen, or the artistic inspiration of continental drinkers, the straggling customers at the factory cafeteria sought survival. In some coffeehouses they plotted to subvert bourgeois society. And, in a ironic twist, temperance societies promoted coffee and coffeehouses as the antidote to the alcoholism of the saloon. The mullahs would have been dumbfounded to see coffee, derived from the Arabic *qahwah* meaning "wine," lauded as a remedy for one of the principal social ills of the industrial world: wine addiction.

Coffee consumption has continued to expand in the twentieth century, though it is now attacked for causing heart attacks and ulcers rather than praised for its invigorating qualities. Rather than a moment for spiritual contemplation or socializing, coffee drinking is often a hurried gulp while sitting at the wheel of the car or on the run. Coffee not only fuels the agitated pace of modern industrial life, it has become itself an industrial commodity. Some of the modern processed concoctions that shamelessly masquerade as coffee are more the invention of chemists than farmers.

Coffee has become domesticated, commodified, and adulterated; although some religions still denounce it, coffee has lost its subversive edge. From Ethiopia to Yemen to Europe and then the fields of Latin America, coffee has accompanied the development of the modern world. From divine elixir to bourgeois beverage to industrial commodity, coffee has become the brew of business.

3.5 America and the Coffee Bean

Americans love coffee. For a long time now, we have been the world's largest coffee drinker. Indeed, our love of coffee rather than tea is often seen as a mark of national identity that distinguishes us from the British. Historians even see coffee-drinking as noble and patriotic. Most agree that the coffee habit was an intimate part of the creation of the nation: Colonists took up the beverage as an act of rebellion against the British.

Every schoolchild has heard of the Boston Tea Party, in which American patriots, dressed as Indians, threw cases of Chinese tea into Massachusetts Bay. This is an inspiring story that infuses a consumption habit with glory. Unfortunately, as with too many glorious stories, it is not true. Quite simply, avarice and profit, not glory and patriotism, animated America's turn from tea to coffee.

Tradition has it that the American colonists, as British subjects, loved tea rather than coffee. The truth is that Jamestown's John Smith--who earlier spent more than a year pressed into the service of the Turkish vizier--is said to have brought the Turkish coffee habit to America as early as 1607. It is true, however, that colonial Americans drank more tea than coffee.

Colonial imports of tea ballooned from a meager 2.5 million pounds in the 1790s to almost 90 million pounds 100 years later. But, at the same time, coffee consumption grew seven times as fast. By 1909, Americans downed an average of 1.25 pounds of tea and 11.5 pounds of coffee per person per year. That was 40 percent of all the coffee consumed in the world. By the 1950s, Americans drank a fifth more coffee annually than all of the rest of the world combined.

How did this coffee mania come about? Not because of American patriotism or Anglophobia. Rather, the cause was, in a word, slavery. American shippers carried off the products of Haiti's huge slave labor force (the world's largest at the time) and supplied many of their basic necessities. Haiti's slaves produced huge amounts of sugar on large plantations. However, Haiti's yeoman and freedman population lacked the capital to carve out sugar plantations. Instead, the rural middle class opened up smaller and cheaper coffee farms to sell to the island's elite who were anxious to imbibe Paris fashion. Coffee became sufficiently profitable that production soon exceeded local demand.

Yankee merchants came to the rescue. New England and Chesapeake traders had long been involved in a triangular trade with the sugar island that saw Americans deliver foodstuffs to feed Haitian slaves, as well as lumber and British manufactures in exchange for sugar and rum, which in part would be sold in Britain to obtain other manufactured goods. These shippers sometimes found themselves with carrying space to bring back consignment goods seeking new markets. Coffee, which withstood sea travel and was slow to spoil, was ideal freight.

The price of coffee plummeted. The drop in price from 18 shillings per pound in 1683 for Arabian coffee to 9 shillings in 1774 for Haitian coffee under British mercantilism and even further to 1 shilling in the independent United States made the beverage available to a far wider public. By 1790, coffee imports were a third greater than tea imports, and a decade later coffee shipments outstripped those of tea tenfold.

When Haiti's slaves, inspired by the American and French Revolutions, revolted in the 1790s--abolishing slavery and declaring independence in the process--coffee production slumped severely, prices shot up, and exports to the United States were cut in half. This might have spelled the end of America's love affair with the coffee bean if another country, also based on slavery, had not taken advantage of the situation and turned much of its arable land into coffee groves. The first Brazilian coffee reached New York in 1809. By mid-century Brazil was supplying two-thirds of the coffee consumed in the United States.

In the past, Lisbon's tight control of Brazil's commerce had shut out Yankee traders from doing business with the vast Portuguese colony. But again the French Revolution intervened. Napoleon, bent on seizing Lisbon---one of the finest ports in Western Europe---Convinced Portugal's King Joao VI to decamp to Rio de Janeiro and throw open Brazil's ports to the world. U.S. flag ships now could enter Rio easily to load coffee, but what could they sell? Brazil--a continent-sized colony--was self-sufficient in provisions, unlike its Caribbean competitors. But it needed more slaves.

As world demand for coffee swelled in the 1830s, Brazilian planters sought more African chattel to work the coffee groves. Anti-slave sentiment—and eventually an act of Parliament—virtually ended the traditional British participation in the "peculiar institution." By the early 1840s, American ships carried one-fifth of Brazil's record slave imports across the Atlantic. By the last year of the slave trade—1850—one-half of the bound unfortunates came to Brazil in ships flying the Stars and Stripes.

Brazilian slaves toiled to grow the coffee to which America's teeming urban and industrial masses became addicted. Coffee became an integral part of the American way of life, not so much because Americans rejected the "Britishness" of tea but simply because slavery made coffee cheap—and profitable.

3.6 Sweet Revolutions

Tens of thousands of Haitian refugees have landed on U.S. shores to flee the misery of their island. Haiti, with its staggering child mortality rates (about one-tenth die in their first year), life expectancy of about fifty years, per capita income of under \$400 a year, and 25 percent literacy rate is the American disaster area.

Two centuries ago, however, the island was coveted as one of the richest in the world—the pearl of the Antilles. But while sugar made her delicious to outsiders, it rotted the fabric of Haitian society.

Sweetness was a taste little known to mankind before the early modern period. Honey was the only natural sweetener (which is why paradise was a land of milk and honey), and it was not in great or widespread supply. People had to rely on bland diets of gruel, or rice, or tortillas. Only seasonal fruits relieved the tedium.

Sugar began its march to global acceptance in the Far East or perhaps the South Pacific. A tall grass, it was first domesticated in India by 300 B.C., but spread slowly. A thousand years later it had reached China, Japan, and the Middle East. The Arabs were the first great sugar cultivators; Egyptian sugar was regarded as the world's finest. The bitter Arabian conquest of the Iberian Peninsula brought with it the planting of the sweet spice. Other Europeans became familiar with this new plant as they battled their way to Jerusalem during the Crusades. Sugar and violence became intertwined.

The merchants of Venice used their large commercial fleet and navy, combined with their forts and trading posts that dotted the Mediterranean, to dominate the European sugar trade of the Middle Ages. They prospered though the spice was still a luxury good with a small market.

Sugar continued its westward march with the rise of the Ottoman Turks who, by the fifteenth century, had deprived the Venetians of their Moslem sources. The Italians turned first to the recently reconquered areas of Sicily and Iberia. Then they joined with the Portuguese in a momentous departure that would reshape the world economy.

Sailing their seaworthy and maneuverable *naus* and *caravelas*, the Portuguese discovered Atlantic islands such as Madeira and, off the African coast, Sao Tome. In Sao Tome, sugar production was revolutionized. But it was a terrible revolution. Africans were enslaved and brought to work on sugar plantations. The small, previously desert island became a bonanza for its Portuguese lords and Italian merchants—and a hell for its tens of thousands of slaves. Europe's dramatic prosperity during the sixteenth century created a considerably larger group of people who could afford to indulge their sweet tooth.

To meet this new demand, the Portuguese decided to expand production further by bringing sugar to Brazil. America became the fourth continent to be pulled into the world sugar market. It was a truly international crop, combining an Asian plant, European capital, African labor, and American soil.

Although Columbus was the first to bring the spice to the Americas since his father-in-law owned a sugar plantation on Madeira, it was in Brazil that sugar first flourished on a large scale. For a hundred years the Portuguese dominated world sugar production. In 1513, to demonstrate his newfound majesty and wealth, the king of Portugal offered to the pope a life-size effigy of the pontiff surrounded by twelve cardinals and three hundred four-foot-high candles—all made of sugar!

Then came the Caribbean's turn and particularly Haiti's moment of glory. The lush tropical French island became a vast sugar plantation and slave prison. Some 30,000 free whites shared the island with a like number of free mulattos and 480,000 slaves. Sugar brought the ancient labor form of slavery and the modern forms of industrial capitalism into a gruesome marriage. The sugar plantation was perhaps the first modern factory. It had a large, disciplined labor force and specialization and integration of tasks almost in assembly line fashion. It required sophisticated refining techniques and expensive equipment. The planters were often prominent absentee members of the French bourgeoisie such as merchants and

bankers.

But they relied on an archaic and brutal form of labor. Slavery had died out in Europe and was on the wane in Africa when sugar combined with the Age of Discovery (read: imperialism) to give it new life. Between 1500 and 1880 some 10 million Africans were shipped across the Atlantic under the most indescribably horrible conditions. Most of these people were destined for sugar plantations, a large share for Haiti (which imported twice as many Africans as the United States). No wonder that the historian and former prime minister of Trinidad- Tobago, Eric Williams, after noting: "no sugar, no Negro," rued: "Strange that an article like sugar, so sweet and necessary to human existence, should have occasioned such crimes and bloodshed." Williams went on to claim a second paradox: he made the controversial argument that it was the profits accumulated from the sugar-inspired slave trade that financed the industrial revolution in Europe.

In Haiti the contradictions between industrialism and slavery, between the bourgeois and the archaic could no longer be contained once the French had their revolution. The island exploded when the bourgeois Rights of Man clashed with French colonial intentions. Although the revolutionaries in Paris were willing to extend suffrage to free white Haitians and eventually to free brown ones, they had no intentions of undermining one of France's main sources of revenue by abolishing slavery. So Haiti's Black Jacobins freed themselves. The world's first modern war of national liberation was also arguably its first race war. Fighting almost continuously from 1791 to 1804, the ex-slaves seized the island, killing or exiling the free population.

After more than a century of the bitterly harsh slave regime, the freedmen were ready for a vacation. Once they returned to work, they refused to work for plantations; instead they undertook their own land reform, breaking up the large estates into small parcels. The Black Jacobins became black peasants. They also refused to grow sugar. Although the individual black peasants no doubt were far better off than they had been while the sugar economy was booming, Haiti no longer played a role of importance in the international economy. Today the island ranks 112 out of 125 countries in per capita exports. The island found itself with little infrastructure, little capital (for sugar's wealth had always been mostly invested in France), and an uneducated peasantry with no political experience. A small mulatto aristocracy arose who exploited the population for their own benefit but brought little development. When their rule wavered, the United States lent a hand (as during the U.S. occupation between 1915 and 1934) to maintain "stability" and keep the peasants quiescent. After 1804 Haiti found nothing to replace sugar as the island's population swelled. Certainly an economy based on exporting baseballs and blood was not likely to be dynamic. Europe's sweet tooth turned a tropical paradise into a miserable, impoverished backwater. The world economy does not only bring progress.

3.7 Where There's Smoke ... by Will Swaim

At the end of the sixteenth century, the Virginia colony was a hellish bog, sheltered from the summer sun by a whining fog of mosquitoes, protected by nothing when winter winds sucked the sense out of the minds of full-grown men. Rumors rose like the stink of death from every early English settlement. In one place, colonists outlasted winter by slicing, dicing, salting, and eating their dead and dying loved ones. In another, bony survivors were discovered bowling amidst the skeletons of their dead.

The Spanish had set up housekeeping a few hundred miles to the south. During their few tours of the Virginia colony they saw nothing in the giant mosquitoes, the Indians, or arctic winters that warranted anything more permanent than a glance skyward, a hastily pronounced prayer, and an assurance to a queen weeks across the Atlantic that this, too, was hers. In the end, they left the place to *los angeles*. And to English eyes the place was utopia. Never mind the starving times that followed in the weeks after maddening winters finally released the colony. Never mind the bitter winds! Look at those Indians!

"So soone as they shall begin but a little to taste of civillitie, [they] will take mervailous delight in any garment be it never so simple," Sir George Peckham predicted. The natives' "mervailous delight" in English things would soon, Sir George believed, translate itself into lucrative Atlantic trade. Pent-up Indian demand would set the English textile mills humming. An England "swarming at this day with valiant youthes rusting and hurtfull by lack of employment" would turn to meet demands of America's natives.

Except that most Native Americans showed no appetite for the British pantaloons, the brocaded collar, the lace cuff. Nor did English settlers display many of the business instincts that would, within a few years, drive their nation to the front of the international economic order. Many were vagrants--phlegmatic

sorts dredged up from the bowels of London's evil-smelling prisons and shipped Americaward to hold down a colonial outpost.

Others were gentlemen who seem to have expected in Virginia a kind of seventeenth-century Club Med where "idle savages" might be made less idle in the production of export items--glass bottles and iron bars, for example--for the profit of the colony's private backers in London.

Inauspicious beginnings, indeed. But by 1617 English slavers pushed the first shackled Africans ashore. And the rich folks that met them--like men judging horses--were prepared to bid. Within a few years, farmers--farmers!--throughout the region were sending their children to school in England. Within a century, Colonel Robert Quarry could report to the London Board of Trade, "In every river there are from ten to thirty men who by trade and industry have gotten very competent estates."

By trade? By industry? By tobacco. Columbus had seen natives smoking the stuff on his first trip to what he thought was the easternmost extension of Asia's estate. Later explorers found the same thing: All along the eastern lip of the Americas, and scattered across the islands in their maw, natives smoked, cooked, licked, ate, and snorted tobacco. They offered tobacco to their gods, plied their women with it, and pulverized it into enema formulas.

When Spanish soldiers splashed ashore in what is now Paraguay in 1503, the locals "came forth to oppose them, beating drums, throwing water and," noted an appalled British historian, "chewing herbs and spitting the juice toward them ... the latter really formidable in close combat, if the herb was tobacco, and the juice directed to the eyes."

The Spanish priest Bartolome de las Casas found natives whose sole interest seemed to be smoking what "they call *tobaccos*," a "smoke that dulls their flesh and as it were intoxicates and so they do not feel weariness." In Brazil, Tupinamba Indians smoked and then went "three or four days without eating anything," a Frenchman reported. In the Yucatan, an explorer said, Mayan shamans smoked until they passed out--and stayed passed out "for the greater part of the day or night." Upon awakening, they cleared their eyes and regaled their listeners with tales from the beyond.

"Its effects upon the Indians seem to have been more violent and peculiar than upon Europeans since," one disappointed historian noted.

But European sailors gave it a go. They were soon enough hooked. And in port cities around the world--in London and around the cusp of Europe, in China and Japan, in India, the Middle East, and along the coasts of Africa--the common-folk who saw sailors smoking began, themselves, to fire up the "demonic vegetable."

Still, England's rich held back. Blinded by their own great expectations of the New World, English global traders were slow to see that, where there was smoke, there was money to be made. They saw in the New World only the things they expected to see--silk, glass, salt, sugar, pitch, and iron. And, anyway, wasn't smoking, well, vaguely *heathen*?

England's King James I, for one, was beside himself. Writing in 1603, he reminded his subjects that *Indians* had started this business of smoking.

Indians! "What honour or policie can moove us to immitate the barbarous and beastly manners of the wilde, godlesse, and slavish Indians, especially in so vile a custome?" the king asked. "Shall wee that disdaine to immitate the manners of our neighbor *France* ... and that cannot endure the spirit of the *Spaniards*. . . . Shall wee, I say without blushing, abase ourselves so farre, as to immitate these beastly *Indians* ... refuse of the world, and as yet aliens from the holy Covenant of God?"

The answer was a resounding yes. Throughout Europe, folks took up smoking with the fervor of the religious. And the religious in particular reacted with horror. Around the world, in fact, stories of tobacco-inspired native rituals were the manure from which sprang a crop of laws restricting the increasingly popular tobacco use. In Switzerland, Greece, and Italy religious fervor, and the near certainty that only someone quite intimate with Hell could *enjoy* breathing smoke, led to laws against tobacco use. However, demand simply overwhelmed attempts to curb supply. A Turkish sultan executed as many as eighteen smokers a day but with little success.

But finances--the "decay of Trade," an Englishman called it--really nettled some critics. Spain's virtual monopoly over tobacco production and trade meant that the silver of a nicotine-addicted nation like Edward Bennet's England was being sucked into Spain. "Shut the gates of entrance to Tobacco, and you open the gate for the entry of Treasure," Bennet advised King James.

But Bennet's *Treatise Touching the Importation of Tobacco* was an anachronism upon publication, printed as it was in the waning days of the Spanish tobacco monopoly. For in Virginia, eight years before Bennet put quill to paper, twenty-five-year-old James Rolfe first cultivated the seeds of *Nicotiana*

tabacum, a native of Brazil favored by Spanish growers, and produced a milder crop in 1612, a bit of which Rolfe shipped to London the following year. By 1615, Virginia's growers shipped one pound for every twenty supplied by the Spanish. By 1619, Virginians' sales equaled Spanish sales in London. By 1620, they were twice that.

Tobacco plantations spread across the Virginia countryside, eating forests in their paths. And suddenly it seemed as if all the tobacco in the world was roaring in a great, brown tsunami up the Thames toward London. Criticism--whether economic or religious--withered as profits rose.

The tobacco trade brought with it the holocaust of slavery, the social cataclysms of civil war, and environmental devastation. But these--as well as lung cancer, surgeon generals' warnings, and Jesse Helms--would haunt the children of another generation. In the 1600s, the tobacco trade represented everything Europeans hoped for in a new world. Up and down the Americas, Native Americans were exterminated or pushed west. Africans worked the crop. And, in Virginia, English settlers could follow higher pursuits and study for the day when they would make a revolution in the name of freedom and the equality of people. Some of us might, from the promontory of the late twentieth century, wonder if the Indians were smoking, well, something else. But the question was less important to the Spanish, Portuguese, and British sailors of that earlier time. They believed that the Indians were smoking tobacco, picked up the habit themselves, and brought it round the world within a few years.

3.8 Drug Wars by Will Swaim

The British public paid almost no attention to a squadron of seventy-five British ships ascending the Yangtze River in the summer of 1842. Three miles long when well ordered, the fleet of gunboats and steamers aimed to put paid to Chinese harassment of Britain's lucrative opium trade.

In British eyes, though, more important things were afoot in Kabul. An English garrison had surrendered in the midst of a popular uprising, made for the Khyber Pass, and was trapped by blizzards and wiped out. An Army of Retribution was gathering, one that would resurrect the empire's flagging reputation for military superiority.

The rising in Afghanistan was the apotheosis of imperial nightmares. By contrast, one historian has said, "The China war was nothing." "It is impossible," the *Times* of London suggested in 1842, "to view that contest with the same exciting interest that attaches to the terrible realities of our Afghan warfare."

If the war in Afghanistan gave vent to the unmixed and righteous indignation of the British public, the China war was more difficult to square with the mid-Victorian morality. But most Englishmen were unprepared to come much to terms with the pernicious trade. Harvested by the banks of the Ganges in northern India, packed into 170-pound chests and loaded into the holds of British schooners bound for China, English opium was as essential to the foundations of empire as forty-two-gun frigates and austere public schools. Opium shipped to China brought Chinese silver and Chinese tea to England--£3 million to the exchequer, and two pounds of tea for every English man, woman, and child each year.

Besides, the British pointed out with scholastic zeal, they didn't actually smuggle the stuff into China. They merely transported it to Chinese receiving ships anchored off the Chinese coast--all perfectly legal, they claimed. What the receiving ships did with their cargo was beyond our control, the British argued. Not the English, but Chinese officials grown beefy on European kick-backs were the real criminals. "We are not smugglers, gentleman!" one English opium merchant told a festive gathering of his colleagues in Canton, the belly of European opium-smuggling operations. "It is the Chinese government, it is the Chinese officers, who smuggle, and who connive at and encourage smuggling, not we." Hosannas to Queen Victoria, back-slapping, and choruses, hear-hears for British decency.

Imperial Commissioner Lin Tse-hsu arrived in Canton in 1839, promised to eradicate the trade in opium, and left two years later for exile in the fastness of Turkestan, a cosmopolitan bureaucrat surrounded by barbarians who made his head ache. He left Canton--and several other port cities--opened to international trade. He left the opium trade intact. And he left the British making sizable inroads into Chinese commerce.

Between coming and going, Lin managed only to attain the status of Great Satan in the eyes of British merchants. In the spring of 1839, he demanded and received the surrender of 20,000 chests--about 3.5 million pounds--of opium resting in the holds of receiving ships in the fifty-mile-long, V-shaped waterway that pointed, at its vertex, toward the port at Canton. Lin addressed the spirit of the sea--apologizing for polluting its water--diluted the opium and let it flow like hallucinogenic lava to the sea.

The British, sound financial minds to the end, were aghast in the face of such terrible waste. Having sacrificed some opium, the British were not about to sacrifice their rights as free-born Englishmen. The war they took to the Chinese--which ended with the seventy-five-ship assault on Chinkiang--was less a war for opium, they said, than a war for freedom of trade. Never mind the product. What the British wanted--and what they won after three years of very strange battles--was the freedom to establish bases at the port cities of Canton, Amoy, Foochow, Ningpo, and Shanghai. They wanted islands off the China coast. And, above all else, the British wanted money.

The Opium War was less a war than a series of battles against a badly armed, disorganized empire. In battles along the Chinese coast, two or three well-placed armed British frigates were able to overwhelm Great-Wall efforts at national defense. *The Blonde* turned her broadside guns on the city of Amoy as a thousand Chinese who had struggled to a high point outside the city looked on. There was not, after all, much to be done in a nation defending itself with bows, arrows, and sheer numbers. To the north, the *Atlanta*, *Wellesley*, *Conway*, and *Alligator* opened seventy guns on Tinghai, sent ashore a landing party, and raised the standard of the Royal Irish Grenadiers on Chinese soil. Once on land, the British were positively without sympathy.

"The slaughter of fugitives is unpleasant," one British officer admitted, "but we are such a handful in the face of so wide a country and so large a force that we should be swept away if we did not read our enemy a sharp lesson whenever we came in contact."

And read a lesson they did. Several Chinese cities--including Canton and Yongchow--were suitably impressed and offered the British millions in silver to flex their military muscles at the expense of some other feckless Chinese city.

While most battles were just as easy, several were not. At Dinghai, bungling English officers camped their troops in mud that seemed to metamorphose into dense clouds of mosquitoes. Less than half of the 3,300 soldiers survived the diarrhea, malaria, and dysentery. In the winter, vicious monsoons stripped sails from British masts, scoured decks of English sailors, and drove British ships into the sheltering lee of coastal islands. In the summer, a hellish sun beat down on colonial British foot soldiers like nothing so much as a two-by-four across the forehead.

But only the British fought. Though they too were opium traders, other Europeans and the North Americans refused to raise a gun in support of the British effort. Nor did they try to halt the massacre. U.S. Chairman of the House Committee on Foreign Affairs John Quincy Adams concluded that the British response to Chinese insolence--in refusing to truck and barter with the West--was reasonable. In Western eyes, the Chinese treated every one with disdain, something no condescending Westerner could brook. *In* one historian's words, "The war, Adams decided, was about the kowtow."

It was the Chinese, of course, who took the last deep bow in the Opium War. The Celestial Empire paid \$21 million into the exchequer, opened five ports to world commerce, and handed over Hong Kong. In the cabin of the *Cornwallis* the treaty was signed, Chinese and British colors run up at mizzen and main, and twenty-one guns fired in honor of the end of the Opium War.

The world was made safe. But for what remains, a century and a half later, unclear.

3.9 How Opium Made the World Go "Round"

It's a vaguely familiar story, though not a pretty one. One hundred fifty years ago, British sea power forced China to accept the Treaty of Nanjing, ending the three-year Opium War. China was forced to tolerate massive imports of a powerful addictive drug and various other injuries; but the treaty's clauses and defenders spoke more generally of promoting free trade and "opening" China.

Not only British generals, but supposed liberals and radicals throughout the West, assured their audiences that opium was a side issue. Former U.S. president John Quincy Adams, no lover of European colonialism, explained that "Britain has the righteous cause ... but to prove it, I have been obliged to show that the opium question is not the cause of the war. The cause of the war is ... the arrogant and insupportable pretension of China that she will hold commercial intercourse with the rest of mankind ... upon the insulting and degrading forms of lord and vassal." Even Karl Marx argued that the *real* significance of the Opium War was that the global bourgeoisie's insistence on "battering down the Great Wall" would bring a "stagnant" China not only into the world market, but into world history.

Nobody today would defend dope-peddling at gunpoint; but the received wisdom remains that drugs per se were not the big story. John King Fairbank, dean of U.S. sinologists, explained the war

in words Adams could have endorsed: "the Chinese position on foreign relations ... was out of date and insupportable Britain represented all the Western states in demanding diplomatic equality and commercial opportunity ... it was an accident of history that the dynamic British commercial interest in the China trade was centered not only on tea, but on opium." One of his students wrote that had war not broken out over opium, it could as easily have happened over cotton or molasses.

But in fact, opium was not incidental. A closer look shows that it was central to promoting world trade and accelerated economic growth--not for China, of course, but for Europe and the Americas.

The international opium trade began in the 1700s as an answer to a crisis in Europe's (especially Britain's) international trade. For centuries, Europe had consumed spices, silk, and other Asian products, but exported very little to Asia. Spain's conquests in the New World provided a temporary solution. New World gold and silver were shipped in huge quantities to Asia perhaps 50 percent of these metals found their way to China alone--in return for things that Europeans could actually consume. But by the mid-1700s, Europe's Asian imports were reaching new levels (particularly in England, where tea became the national drink). Meanwhile, the New World mines were yielding less ore, and new cargoes from the Americas (mostly sugar and tobacco) were also draining Europe's cash hoard.

So how to pay for all these new tastes? Force was one answer: conquer producing areas in Asia directly and make them export to meet new taxes. The Dutch (in Indonesia) and the British (in India) each had some success, but not enough; and the Chinese state was still far too strong to contemplate such measures there. Meanwhile, attempts to sell European products--including British woollens in semitropical Canton--remained frustrating.

Eventually the British East India Company turned to opium, which could be produced in its Indian colony. The drug (previously used in China as a medicine, but rarely as a narcotic) was initially a luxury: bored government clerks, soldiers garrisoned at long-pacified sites, and wealthy women confined to home were among the early users. This traffic grew more than twentyfold between 1729 and 1800, which helped stanch the flow of bullion from Britain to China. But the flow was not decisively reversed. For China these imports--enough to supply perhaps one hundred thousand addicts in a nation of 300 million--were serious but not catastrophic.

The consequences became more grave when in 1818 somebody developed a cheaper, more potent blend called Patna opium. The results were as spectacular as those that the Medellin cartel would later achieve by turning expensive cocaine into cheap crack. The Indian opium entering China in 1839 was enough to supply 10 million addicts. Enough silver now flowed out of China to buy opium to offset much of Britain's world-leading import bill--and cause monetary havoc in parts of China.

The number of addicts became sufficiently alarming that China took a stand in 1839, with dreadful results. The Chinese not only lost their battle to exclude dope and their war with the British navy: they lost their tariff autonomy, a large indemnity, the right to subject foreign residents to Chinese law, and the land that would soon be Hong Kong. The worst was yet to come: its military weakness exposed, China entered a calamitous century of foreign aggression, domestic disorder, and civil war. Skyrocketing opium use--to perhaps 40 million addicts by 1900--played no small role in this.

One might think that the opium trade--and all the suffering it caused--would have become unnecessary to Britain just about the time that they went to war over it. After all, by the 1840s Britain was the world's industrial leader, and would remain so until the eve of World War I. It seems a good guess that "the workshop of the world" would not need to sell drugs to pay its import bills. Had China granted the British the free trade they demanded, couldn't the civilized Europeans they have done without selling this one commodity? No. The British still needed opium, even in the early 1900s. Industrial superiority did not guarantee adequate foreign exchange in an era when most of the world still used few mass-produced goods and Britain's appetite for foreign foods (and raw materials) grew as fast as its industrial might. When Britain had turned to free trade in the 1830s and 1840s, the problem got worse: a flood of New World grain and meat was now added to tea, sugar, tobacco, and cotton. Meanwhile, most of Europe and North America stuck to protectionism, limiting British sales in the world's richest markets for manufactured goods--and nurturing new industrial competitors. By 1910 Britain's deficit with the Atlantic world was so large that even doubling British exports to the United States and industrial Europe would not quite have balanced the books.

Invisibles--returns on foreign investment, shipping, insurance fees, and the like--helped a bit, but not nearly enough. Moreover, Britain was a large and vital supplier of capital to the very countries with which it ran huge deficits.

This imbalanced trade, which subsidized living standards in England and rapid growth elsewhere in the West, was sustained for decades by Britain's trade with India and China, in which opium played a key part. As late as 1910, Britain's 120 million pound deficit in the Atlantic world was largely balanced by its trade with Asia. The empire (not counting India) had a 13 million pound surplus with China; and aside from cotton thread, manufactures contributed less to this surplus than did farm products, including non-Indian opium.

Most important of all was Britain's annual 60 million pound surplus with India--about half of its deficit in the Atlantic world. British manufactures of all sorts--from cloth to kerosene to railroad cars--completely dominated the Indian market, aided by protection against other industrial countries and (in the case of textiles) laws that hobbled India's own producers. The foreign exchange that enabled India to keep buying all these British goods came in large part from China, especially from drugs.

Britain itself was India's biggest customer (taking 54 percent of exports in 1870), but obviously not the source of India's cash hoard. India earned large surpluses on its trade primarily in Asia--and especially China. From 1870 to 1914, India ran an annual surplus of about 20 million pounds with China; by 1910, its surplus with the rest of Asia as a whole was about 45 million pounds.

And how did India earn those surpluses? With rice, cotton, and indigo, but above all with opium. In 1870, opium accounted for at least 13 million pounds, or two-thirds of India's surplus with China. It remained the most important item in Sino-Indian trade until the early twentieth century, and also figured prominently in exports to Southeast Asia. In other words, dope not only helped create Britain's direct surplus with China, it made possible the even larger British surplus with India. Without those surpluses, Britain could not have remained the West's chief consumer and financier; and the Atlantic economy as a whole would have grown much more slowly. Though a century of British-led industrialization transformed much of the West, it was only near the end of that century that the West outgrew its reliance on piracy in Asia.

This equation still leaves a mystery: China had no countries with which it ran huge surpluses. So how did it pay for its century of unbalanced trade with Britain and India, which was so important to the growth of the world economy? Records are not good enough to offer a definitive answer. But the best bet is that remittances from Chinese workers and merchants overseas plugged the gap.

The already substantial Chinese communities in Southeast Asia grew much more rapidly as late-nineteenth-century colonialism opened up new areas for export-oriented production. The California gold rush created openings in the New World; plantations from Cuba to Hawaii sought cheap and skilled sugar-growers; and new channels of information made it easier to know what opportunities existed in the first place. Since millions of these workers came without wives and children (often at the insistence of their "host" societies), those laborers who resisted gambling and brothels could send a fair amount home even out of tiny paychecks; and telegraphs and new financial institutions made the transfers easier. No hard numbers are available, but the totals must have been quite large. Thus the Chinese laborer laying track for the Union Pacific may not only have provided muscle to build the railroads: his earnings, routed through China to India to England to the United States may have helped provide the capital, too.

Thus opium not only bound together China, India, England, and the United States in a quadrilateral of trade, but also played a central role in sustaining Britain's industrialization drive and the revolutionary nineteenth century expansion of the world economy.

3.10 Chewing Is Good, Snorting Isn't: How Chemistry Turned a Good Thing Bad (Coca)

We tend to associate technology with modernity and modernity with improvement. Thus the transformation of coca leaves from a ritualistic, almost magical potion to the more complex medicinal extract, cocaine, would appear to be progress. From a simple, natural leaf, sophisticated chemistry made coca into an industrial medicine. From a natural substance that was used in reciprocal exchanges and state tribute payments and was used locally for spiritual ceremonies, it became a valuable commodity that was traded internationally. The world economy helped change the meanings and consequences of coca, unfortunately for the worse. It became much more valuable, but also more dangerous and socially corrosive.

The coca tree is indigenous to the lower lying tropical valleys that cut into the high altiplano of Bolivia and Peru. Although the Inca asserted that coca was one of their great contributions to Andean culture, in fact humans have probably consumed its leaves for thousands of years. Certainly the

people of Tiawanaku, which preceded the Inca by 600 years, already knew and took advantage of the leaf's effects. By chewing the leaf into a cud and adding a bit of lime paste, the user released alkaloids that had an effect similar to caffeine: they alleviated hunger, thirst, and fatigue. Coca is not hallucinogenic and probably not addictive.

Prior to the Spanish, it seems that coca consumption was not widespread. Although cultivation and harvest techniques were simple, the trees grew only in a restricted ecological niche. Coca was not a commodity; the Andean societies did not use money. Instead, they exchanged through barter, often within kin groups. Coca's importance was its use, not its exchange value. It created social networks and ceremonies, not markets.

The Incan "divine plant" was mostly used in religious rites and medical applications. It was burnt by wise men to initiate religious ceremonies, offered as a ritual sacrifice, and also taken to maintain wakefulness for nocturnal spiritual rituals. Its leaves were used like tea leaves to foretell the future or to diagnose the cause of a disease. It was also seen as a medicine to treat digestive problems or to cleanse wounds. Little bags of coca were exchanged as hospitality gifts and were used to pay tribute to local and imperial leaders. The Inca redistributed to local political leaders some of the coca they acquired in order to win allegiance. Coca was thus central to the spiritual and social rituals that held together Andean societies and allowed the creation of large empires such as Tiawanaku and the Inca.

Coca's social meaning began to change when the Spanish quest for silver created a rudimentary market economy. The mountain of silver known as Potosi demanded tens of thousands of Indian laborers at a time to bore into its rich veins in the sixteenth through eighteenth centuries. The mines were located at 14,000 feet above sea level in a frigid, barren landscape. The miners suffered cold, hunger, and fatigue. Coca was their best friend. Since the Indian miners under the Spanish were paid in money (albeit very little money), they created a potent, new demand for the divine plant. Tens of thousands of llama from the valleys of Bolivia and Peru carried the dried leaves up the narrow mountain paths to Potosi.

Many Spaniards, particularly priests, denounced coca chewing because the leaf was associated with the pre-Christian deities and ceremonies they sought to stamp out. The Spanish king thought coca the work of the devil and his viceroy outlawed the plant's use. Within a year he had to reconsider: the silver that financed the operation and expansion of the colonial state and supported the bishop of Potosi demanded coca-numbed workers to mine Potosi's rich veins. Coca had been transformed from a spiritual elixir to a secular drug. Instead of underpinning traditional communal reciprocal relations, it became an individualistic commodity. Rather than representing spiritual sociability, it came to signify arduous labor. This indigenous plant, which was so intimately tied to the traditional native world, became part of the fiscal foundation of the Spanish colonial system. Coca chewing was still very much bound up with the traditions of the indigenous Andean world, however. Few Spaniards in the New World took up the habit. Even though the first coca was exported to Europe in 1544, Europeans found nothing about the plant to be divine.

It was modern medicine that would turn coca into an internationally traded commodity and lead to the unraveling of its social role. German scientists isolated coca's alkaloid in 1860, naming it "cocaine," and discovered its use as an anesthetic. Sigmund Freud touted it as a medical panacea. Successful patent medicines, such as "vin de Mariani," included cocaine. A beverage concocted in Atlanta, Georgia, for medicinal purposes used both cocaine and the kola nut to create Coca-Cola. Later, de-cocainized coca was used for the drink until 1948, when coca was omitted from the drink altogether. Cocaine's use as an anesthesia spread in Europe and the United States. It also was used as a safer pain killer than morphine or opium. Unlike coca, cocaine was consumed much more abroad than in the Andes as foreign pharmaceutical companies patented the more complex processing procedures.

The major companies in the United States, Germany, and Japan used their governments to restrict imports of cocaine so that the pharmaceutical firms could import the coca raw material and enjoy a monopoly. To succeed, they had to join the budding campaign against recreational drugs at the beginning of the twentieth century. Medicine was good, drug bad. The word "drugstore" became replaced by "pharmacy." Cocaine fell victim to the same wave of opposition to intoxication that outlawed alcohol in the United States effective 1920; cocaine imports were prohibited in 1922. International organizations such as the League of Nations joined the fight against nonmedical uses of cocaine. Demand fell dramatically.

Cocaine's new boom period began in the 1970s because of changing tastes and mores in the

developed consuming countries. Affluent societies initially bent on spiritual self-realization but soon caught up in hedonistic pleasure-seeking, propelled international sales of cocaine. International agreements had sought since 1918 to outlaw non-medicinal uses of cocaine. Its de-legalization removed pharmaceutical companies from production and brought in what became known as *narco traficantes* (narcotics traffickers).

At its most profitable stage with greatest demand, the coca derivative became a pariah. The one important internationally traded commodity whose production and marketing was controlled by Third World nationals, cocaine commerce was added to crime statistics rather than trade and GNP data. Well-financed and -connected traffickers, now mostly from Latin America (especially Colombia and Mexico), used their wealth to create paramilitary organizations and bribe government and police officials as well as invest in municipal and civic improvements to win local favor. Whole regions of Peru, Bolivia, and Colombia fell under the control of *narco traficantes* as national governments and international institutions proved helpless to stem the flow of cocaine from the poor producing countries to the rich consumers. In Bolivia and Peru, indigenous peoples continue to grow and chew coca, but government pressure seeks to irradiate their trees and replace them with another drug bush, coffee, because of fear that their coca leaves will be used for cocaine. So even though the Aymara people of Bolivia continue to share the religious coca rituals and traditional views of their ancestors, they are now caught up in a world of drug traffickers and U.S. DEA agents. Even for the Aymara peasant, coca has become a commodity with new and dangerous meanings.

In five centuries, then, coca went from a substance of religious celebration and token of sociability, to a colonial commodity used to maximize exploitation of native labor, to a wonder drug that promised escape from pain and great profits to pharmaceutical companies, and finally to a recreational drug that is seen as threatening the fabric of society. The introduction of foreign technology and consumers--that is, the modernization of coca--caused it to have ever more pernicious social effects. Rather than strengthening societies and states, "modern" coca in the form of cocaine undercuts them. Rather than healing, it injures. Rather than spirituality, the coca-derivative brings materialism and carnality. Commodification and technological change do not always bring improvements.

Chapter 4: Transplanting: Commodities in World Trade

The following section contains stories that focus on the trade in some specific animal or vegetable product: cocoa, cotton, tea, rubber, and so on. But just because these products occurred in nature does not mean that their usefulness was obvious or even stable over time. Often they emerged only after other advantages had attracted people's attention to an item; other times they had as much to do with stereotypes of the people or place associated with an item as with any properties of the item itself. Yet as they became global commodities, they inevitably came to have a value and a meaning different from their role in a local ecosystem (if we can even speak of the "meaning" of such roles) and from the values and meanings they had had in a local social and cultural system. It is the ways in which these clashing meanings and values reshape both the natural and social worlds the commodity comes from and the ones it moves into that we focus on.

The potato (reading 4.12), for instance, had been known by the Incas for centuries, but was unknown to Europeans. What first brought it to European attention was the fact that it could grow at several thousand feet of elevation--not a particularly important advantage until the great silver-mining boom at Potosi suddenly made it necessary to feed tens of thousands of people way up in the Andes. And even after that, its first use in Europe was as an exotic spice thought to be an aphrodisiac; ordinary people, associating it with Andean miners, rejected it as "slave food." When it took hold in Ireland, it was largely because it was easy to grow, store, and run with when invading troops were burning above-ground crops and barns. What we now think of as the tuber's "natural" advantages--that it yields far more nutrition per acre at a far lower price than corn or wheat--became relevant only much later, in the more crowded Europe of the late eighteenth and nineteenth centuries.

California's Gold Rush of 1849 (reading 4.3) did not introduce any new plants into the world market. But it did incorporate a previously ignored, marginal area into the center of world commercial and migratory currents as the world came to California. The gold found in the Sierra Nevada, as well as a little later in Australia, the Klondike of Alaska, and South Africa, vastly increased the world's money supply and stimulated unprecedented growth in international trade. Even obscure stuff, such as guano, became valuable.

Guano (reading 4.5)--mountains of bird-droppings preserved by the very dry weather on some islands off the Chilean coast--had been ignored for centuries. These nitrate-heavy mounds suddenly became valuable when two trends coincided in England and the United States. First, profit-seeking farmers trying to maximize yields pressed the soil to its limits; second, those same farmers, who worked with hired labor on fairly large farms and did not want to increase their wage bills, rejected the very labor-intensive methods of restoring the soil (mostly through very frequent plowing, marling, and careful cultivation of seeds tailored to the local micro-environment) with which peasant farmers on the European mainland approached the same problems. Thus what seemed utterly worthless became suddenly valuable thanks to events thousands of miles away--not just a population increase creating the physical need to replenish the soil, but a particular socioeconomic system in which it was more advantageous to do this by buying supplies from a remote source than by drawing on traditional methods.

Europe's hunger also transformed the social world of Argentina's Pampas (reading 4.9). The gaucho cowboys who roamed the plains, hunting feral cattle, themselves became tamed when the barbed wire fence and the railroad conquered the interior. As the number of cattle grew, the number of gauchos--and their freedom--declined.

In other cases, new commodities were introduced into the world economy. The new commodity sometimes rested on associations and combinations that were actually antithetical both to the good's original use and its "natural" properties. Cocoa, for instance, is naturally bitter, not sweet; the Olmecs and Mayans who first cultivated it often mixed it with peppers or lime water, and used it for medicine, to build strength, and as part of hallucinogenic potions. Moreover, its use in Mayan civilization seems to have been restricted to aristocrats, so that it was an item of tribute, not of widespread commerce. Only once Europeans had mixed it with sugar and milk did it become one of life's "little luxuries," available in small quantities to everyone (and perhaps especially valued because it had initially been just for the elite in Europe as well); and only then did it

become associated with women, children, home, and hearth, rather than girding for battle, religious ecstasy, and rough elite masculinity.

Cochineal (reading 4.4), a scarlet dye, graced some of the most beautiful and expensive cloth and tapestries of Europe. The aristocrats who so proudly showed them off would have been surprised and shocked to discover that the coloring was made from the crushed bodies of thousands of insects, harvested by the dirty, sweaty hands of Mayan farmers.

But the plasticity of commodity use does not mean that the purchasers could do whatever they wanted. Both the natural properties of the crops and the societies in which they were cultivated imposed limits. Consuming societies struggled against these limits---sometimes through commercial or military offensives, sometimes through attempts to transplant the crops, and from the late nineteenth century on, through attempts to synthesize substitutes--but with mixed success.

Where the obstacles to stable, cheap supplies were largely sociopolitical, transplanting was quite effective. Thus, for three centuries, Europeans failed to break the monopoly of Arabs and Indians over the supply of coffee (available for purchase only at Mokka, on the Red Sea); but once a coffee tree made it safely to Europe, and its progeny flourished in several European colonies (mostly but not exclusively in the Americas), power in this market shifted forever after to the processors and to the consuming countries.

Sugar was first brought to the New World by Christopher Columbus to be grown on the Caribbean islands he encountered. Europe's sweet tooth led to massive slavery, turning a tropical paradise into a concentration camp. After the slaves of Haiti revolted and abolished the inhumane institution, sugar moved elsewhere. Hawaii (reading 4.7) began to produce for the United States market. While this brought prosperity for some, it cost the Hawaiian monarchy its kingdom, as U.S. marines conspired with the American sugar plutocrats to conquer the island and make it American. Sometimes, though, sugar was not so ruthless. The Chinese state was more interested in encouraging rice production than sugar production--even though East China developed a sweet tooth to match Europe's in the seventeenth and eighteenth centuries--and was interested most of all in ensuring stability on its frontiers. Thus, although Taiwan (reading 4.8) was one of the world's largest sugar producers between 1650 and 1800, it was never allowed to become a monoculture dominated by sugar.

Rubber (reading 4.2) became valuable in the nineteenth century. When world demand for rubber boomed (thanks to the bicycle craze and pneumatic tires), Brazil, the world's major producer, did not hold up the world for ransom: indeed, it expanded production as best it could, often by enslaving people to work as rubber-tappers. (The indigenous population was scarce, and many were subsistence-oriented and uninterested in money.) But neither did the tapping of Amazonian trees conform to "rational" capitalist standards. Trees grew at great distances from each other, interspersed with other jungle vegetation, so tappers "wasted" much time wandering from one to another and were hard to supervise. Thus, when the English-man Henry Wickham smuggled some rubber tree seeds from Brazil to London, the plan was clear. Rubber trees were planted on newly cleared plantations in British Malaya and other tropical colonies--and planted in nice neat rows at the minimum possible distance apart. Then Indian and Chinese laborers were imported and placed in barracks, adding an engineered immigrant labor force to the engineered "immigrant" landscape. The result was rubber cultivation too efficient for Brazil to compete with. But control wasn't perfect here either--for instance, the originally all-male work force eventually won the right to bring women and start families, and had to be paid higher wages to support this improvement in life-style. (They extracted this partly by being so unruly that plantation owners decided the stability of family life might be worth its costs.)

Where serious natural limits on transplanting coincided with strong resistance to control by the producing society, the struggle could be protracted and nasty. As early as the 1600s, Europeans showed an interest in cultivating Chinese tea plants elsewhere, and made many attempts. But the fragility of the plants, the long sailing times of the pre-steamship age, and a Chinese ban on exporting seeds meant that the first transplanting that was even partly successful was not until the 1820s. Since British tea demand multiplied about 400 times over the course of the eighteenth century and would rise still further in the nineteenth--partly, as with cocoa, because it was combined with ever-cheaper sugar from slave plantations--the Chinese monopoly became quite expensive. British strategies ranged from selling opium to China at gunpoint to bloody and expensive campaigns to conquer Assam (northeast India), move out the nomadic peoples, and plant tea on the hillsides, but it was only in the 1880s that they finally got a significant crop--and

then they had to spend more money on a long railway line through a rugged region that otherwise had little need for it. The cost of these measures to Chinese and Indians was incalculable, but it is worth noting that they were not cheap for Europeans either, and that the ultimate source of the tea craze for which they chased themselves across the globe was in part that when tea had first reached Europe, the Chinese civilization it was associated with had been synonymous with prosperity and refinement. (See reading 3.2, "Brewing Up a Storm" in Chapter 3.)

So changes in what certain commodities were used for and struggles over their control go way back: but both were probably greatest from the late eighteenth to the early twentieth centuries. In this era, population, industrial production, and per capita demand soared--first in Europe, then elsewhere--but in other respects the world was a Malthusian one. Land was finite, and in a pre-synthetic era, food, clothing fiber, building materials, and so on all had to be harvested from it annually; there was not yet a chemical industry that could revolutionize per acre yields through petrochemicals. In that context, supply bottlenecks for burgeoning industries could suddenly bring massive global demand to bear on surprisingly obscure places and commodities, creating bizarre social changes.

As the economic historian William Parker has put it, bottlenecks created by technological innovation can be solved in one of two ways: either by a new technological innovation or by applying vastly more resources to old production processes. Thus, for instance, when cotton spinning was mechanized, it created two bottlenecks: a shortage of weavers to use all the yarn and of cotton to be turned into yarn. The first bottleneck led to a further technological change--mechanized weaving. The second led to a massive expansion of cotton planting, which for various reasons could not be done in Europe. Instead it was done with slaves in the American South, and when that supply proved inadequate (or was threatened by politics) by spreading the particular cotton varieties that mills needed to India, Egypt, and China--where peasants who preferred older varieties (and had tailored social customs such as the scheduling of harvests, gleaning, and festivals to the rhythms of that particular plant) were attacked by special, armed patrols--which still couldn't stamp out the old customs everywhere (See reading 4.11).

Slave-planted cotton in the United States is probably the outstanding example of technological progress in one place leading to the extension of drudgery and misery elsewhere, but there are others. When the McCormick reaper conquered the American Midwest--making freehold family farming possible and profitable on a staggering scale--the demand for twine boomed, too, and much of it came from the Yucatan where conditions of near-slavery were introduced in order to grow cheap henequen (reading 4.10). In other cases, the social results were just as dramatic, but harder to evaluate. When the late-nineteenth-century silk boom made rural Japanese women work longer hours--but made their incomes more equal to those of their menfolk--the shifts in power, life-style, and attitudes were subtle but far-reaching.

But whatever their local social results, global trade, specialization, and the (re)making of commodities rolled on. Cotton, for instance, went from being just one fiber plant among many to being the global standard. Here the physical realities of the plant mattered. Flax, for instance, is very labor-intensive and fertilizer-intensive to grow, and it took longer to figure out how to spin flax fibers mechanically. Thus, despite a long-established linen industry, flax couldn't compete with cotton for most uses in an age of factories and plantations, as Ireland, Silesia, and other linen-producing regions learned to their cost.

With other products, the bottleneck-induced boom was as intense as with cotton, but didn't last as long: chemistry intervened, and land- and labor-intensive solutions gave way to technological ones. We have already discussed rubber and guano, but there are many other examples. The peanut (reading 4.6), a marginal food grown mostly for subsistence, suddenly became a hot commodity when its oil proved to be a useful industrial lubricant--and violent feuds erupted over sandy strips of North China that would grow nothing else and so had never been worth claiming legally. But just as quickly as the boom started, it died--undercut first by cheaper Indian and African peanuts, and then by new chemical processes. In other places, the boom--bust cycle was even more painful. When the Amazon rubber boom subsided (readings 4.1 and 4.2), the people who had been moved there to work tapping trees tried clearing and farming the land instead; and since the soil underneath was thin, stripping the heavy canopy of foliage that used to replenish the land when its leaves fell quickly created an ecological nightmare.

Coffee's longer-lived success was even more devastating for Brazil's huge Atlantic Forest

(reading 4.1). Felling trees to make way first to grow manioc and then to plant coffee caused serious problems of erosion. But the culprit was not ignorance. The less technologically sophisticated the farmer, the less harm he did. The real tragedy came with modern coffee farmers and their railroads, which made even distant forests accessible and turned the land into a commodity.

Development may have been particularly rapacious in Brazil, where the land at first seemed infinite and the investors were often foreigners who had little direct stake in the rainforest and little understanding of how indigenous people lived with it, but more carefully managed enterprises still present conundrums. Indeed, modern notions of economic development exist in a basic tension with ecological stability.

One of the prime motors of economic progress is increased division of labor and specialization. But specialization in a particular crop works against bio-diversity, which (among other things) makes ecosystems able to survive external shocks. The standardization of crops, in which a few out of hundreds of varieties of wheat or rice are selected, is also part of modern development, since only interchangeable products can be traded sight unseen (see reading 6.4, "Growing Global" in Chapter 6), and it too reduces bio-diversity.

Even more fundamentally, neoclassical economic theory, ever since its birth, has held to some version of a "labor theory of value"--that is, a notion that the price of a thing depends on the amount of labor-time required to bring it to market, and the amount of production (or other benefits, such as leisure) foregone by using that labor-time to produce this good. This notion is visible, in fact, even before economists such as David Ricardo formalized it, in the ideas about "the state of nature" and the *origins* of property in such English classics as John Locke's philosophy and Daniel Defoe's *Robinson Crusoe*. (Marxism, which was for a century the main alternative to these economic theories, was in this area no alternative at all, holding to a particularly rigid version of the labor theory of value.) But this often clashes with what we take to be "value" in nature: few people think that the value of a redwood is adequately measured by the work it takes to cut one down. At the same time, the value we may attribute to "nature" is often also more a matter of our own tastes than of scientific laws. Whatever the merits of redwoods, from a strictly biological point of view it is hard to explain why one very old, magnificent tree is better than two newer ones: in fact the younger, faster-growing trees provide more of certain "forest services," such as oxygenating the air. While the consequences of replacing a local social and cultural code for valuing some object with a global one may be huge, as several examples in this chapter show, we at least know how to map and compare the "before" and "after" points; when we compare the values of commodities on the market to their "value" in nature, we are doing something important, but considerably murkier.

Solving problems through long-distance trade also often had consequences nobody could have guessed at for the outsiders (usually Europeans) who represented the globalizing, commoditizing side of the story. After all, they, too, came from "local" cultures and societies, which were inevitably affected by the arrival of foreign alternatives to local resources and local ways of doing things. While the mountains of guano Europeans and North Americans imported proved finite--leaving the places they came from as poor once the boom was over as when it began--the idea of mining nutrients and hauling them to the farm had quite a future. It led eventually to synthetic fertilizer (which essentially turns coal or petroleum into plant growth)--a soil-conserving strategy that has now completely overwhelmed the older one based on careful tailoring of endlessly varied seeds to localities. Generations of carefully accumulated local knowledge--the main "human capital" of millions of peasants--became obsolete, rendering peasants "ignorant" in the eyes of those promoting a new farming of uniform seeds (which themselves became a major internationally traded commodity) and chemical inputs. (Much of that knowledge has only recently been rediscovered due to interest in organic farming.) This is a process that seems about to be repeated today, as we move towards bio-engineered plants whose patented seeds are already impregnated with the qualities that help them respond optimally to particular, patented fertilizers, insecticides, and so on.

Yet in this context of biological standardization, societies still create unsuspected "needs," touching off mini-gold rushes for items previously considered worthless. The new prosperity of South China, for instance has created sudden demand for geoducks, a species of large sea turtles living off the Pacific coast of the United States, making struggling fishermen rich, and quite possibly making the turtles themselves extinct. And in an irony that millions of peasants would have appreciated, water shortages and high labor costs in the United States have touched off a search for slower-growing, hardier, and less thirsty grass varieties to be bred for the next generation of American lawns. This has sent the heirs of the folks who promoted standardized cotton, transplanted rubber trees, and so on scrambling to see if, somewhere in the cracks of some pavement or under a railway trestle, they might find an overlooked bit of bio-diversity with which to meet new needs.

4.1 UNNATURAL RESOURCES

"Children, you live in a desert; let us tell you how you have been disinherited"

-Warren Dean

When the first Portuguese arrived on the coast of Brazil almost five hundred years ago, they encountered the vast Atlantic Forest that spread along the country's southeastern coast and far inland. While a few stood in awe at its grandeur, admiring it as landscape, most Europeans viewed it as an area of frightening animals, a barrier to movement, or as a resource to cut down. In a real sense they did not see the forest for the trees and would not see it until it was almost all felled. As a result, economic calculations were always shortsighted. For centuries, Brazilians lived off of the inheritance of their children.

Man cannot truly live *in* the dense Atlantic Forest, for he must cut clearings, but he can live with the trees. For four hundred generations indigenous peoples had been living with the forest. Largely hunters and gatherers, they also developed a sophisticated slash and burn agriculture. While destroying forest and undergrowth with fire, this method required movement to new forested land every several years, allowing the cleared spaces to grow over. Since the indigenous population reached no more than 3 million people over an enormous area, their sparse settlements did little harm to most of the forest. And since they sustained themselves in good part with the fish and game of the forest, they would quickly notice if an area was overhunted and move, allowing the fauna to recover.

Then came the modern enlightened Portuguese. For much of the first century after contact, the Portuguese relied on native techniques and native labor to extract resources from the forest. This was not so much production as plunder. Some Portuguese colonizers, especially the clergy, hoped to create a devout settler society in the New World. They named the colony Holy Cross but the rest of the world recognized the truth of the colony and knew it by the trade good that was being cut from its forests--brazilwood, used to make a red dye. In its first century, six thousand square kilometers of the Atlantic Forest were affected by this trade. Still, the forest was vast, so not much damage was done.

Indeed, in a perverse way, the Portuguese may actually have helped restore the forest in the sixteenth and seventeenth centuries. Disease and slave raids exterminated most of the native Tupi people. Survivors often hid in remote forests, afraid to engage in agriculture for their fields would reveal them to the slave-hunting Portuguese. Indigenous agriculture virtually ceased and the forests returned.

The small Portuguese population of 300,000 in 1700 hugged the coast. Instead of using native knowledge to cultivate native crops, they transferred the slave-based sugar economy from their Atlantic island colonies. Land was given out to the politically favored in enormous grants. Salvador da Sa received 1,300 square kilometers! But the state in actuality had little control over land. Ownership depended upon who could conquer and hold territory. The result was a predatory, hierarchical society in which a few controlled the land and the majority worked in some capacity for them. Agriculturalists were increasingly African slaves. Although at home the Portuguese had

worked the same land for many generations and the Africans were skilled agriculturalists, the New World slave society disdained reverence for land. The Europeans brought a new religion and language; they introduced an exotic crop and foreign laborers; and they imposed the concept of commodity production for a foreign market. But underneath the facade of colonizing, Christianizing modernity lay the same slash-and-burn techniques they learned from Brazil's original inhabitants. Land was worked and then quickly abandoned. But now, with a population five or six times more dense, and a greater need for firewood, some of the forest close to the coast had little time to recover. Equally seriously, rather than living from the hunt, the neo-Europeans brought livestock. For the pigs, cattle, goats, oxen, horses, and mules the forest was not a shelter but an enemy. Domesticated animals sped the assault on the Atlantic Forest. Still, when Brazil secured independence in 1822 the great majority of the Atlantic Forest remained. After all, the entire country's population was only at most 5 million people, one-fourth the current population of the city of Sao Paulo.

Another exotic crop, coffee, led the attack on the interior. Introduced at the end of the eighteenth century, by 1900 Brazil's coffee production surpassed that of the rest of the world combined. Although coffee has been widely heralded as a "modernizing" crop and Brazilian coffee planters as enlightened entrepreneurs, in fact this was hardly agriculture at all. It was not simply coincidence that the same word for miner (*lavrador*) was also applied to agriculture workers. Trees were wantonly cut and burned; then coffee seedlings were planted around their stumps. No shade, no fertilizers, and no tools beyond the hoe were used. After twenty or thirty years, coffee trees had consumed the nutrition of the virgin forest, so they were abandoned to pasture, which in turn often became denuded wastelands. Planters recognized that this was less cultivation than devastation. In the coffee-growing state of Minas Gerais in the early twentieth century, uncleared forest land was worth 70 percent more than coffee lands because forest soil was more fertile. Brazil was able to capture the world's market for low-priced coffee precisely because land was cheap and fertile. No one calculated depreciation or replacement cost of the living "capital stock." In this sense, coffee planters were feasting and leaving the bill for future generations.

It was an expensive bill because the Atlantic Forest was not a renewable resource. Deforestation had enormous consequences. Once the mangroves around Rio de Janeiro's bay were cut down, shellfish and fish numbers declined as did the game that had fed on them. The rivers that ran into the bay silted over, halting much maritime traffic and increasing the threat of malaria because of now stagnant waters. Elsewhere the destruction of trees caused periodic droughts and greater extremes in temperatures. Many species disappeared.

Depredations were not caused primarily by ignorant Indians or colonizing Europeans. Even the primitive techniques of coffee planters were not the main culprit. Rather, modern technology accelerated the destruction of the Atlantic Forest. The railroad made distant forests accessible, encouraging planters to leave their existing groves more quickly to assault more distant virgin forests. The iron horse made great demands for cross ties and wood for fuel. It also enabled other industries, especially iron smelters, to grow by expanding the area in which they sought charcoal.

The state had not been willing or able to protect the forest on its own lands in good part because it was poor, weak, and dominated by the landed elite. This changed in the 1930s with the establishment of a populist state, and the sense of the forest as an inexhaustible resource began to change by the 1970s. Some efforts to create nature preserves and safeguard public lands followed. But the pace of the assault on forests has slackened little. The response to Brazil's tremendous social inequalities has been to stress economic development rather than redistribution of wealth. Under this mind-set forests are not a patrimony, a treasure, but rather are "unexploited resources." All animals and plants exist for the plunder and profit of humans. Populists and even leftists share conservatives' disdain for other species. They argue that conservation is a luxury for the rich. The poor countries must cut down ever more to feed their burgeoning populations. Never mind that the land itself is being exhausted.

This is not a new story of course. Areas of longer dense human settlement cut down their forests long ago. As historian Warren Dean bitterly noted: "South America is the forest historian's freshest battleground, where all the fallen still lie sprawled and unburied and where the victors still wander about, looting and burning the train." Today, at most 8 percent of the original Atlantic Forest remains. Will its value be recognized before the only remnants of the forest available to our children are stuffed into ill-tended botanical gardens?

4.2 Bouncing Around

In the early hours of March 28, 1876, in Santarem, Brazil, Henry Wickham loaded a cargo of seeds onto the London-bound British freighter *Amazonas*. Wickham--a colorful world trader given to self-promotion and not, perhaps, the most reliable source--would later tell eager audiences that he secreted the contraband seeds on board in sight of a menacing Brazilian gunboat and then later slipped them by Brazilian customs agents in the capital city of Belem. Once in London, botanists quickly planted the seeds in the Kew Gardens. Nature handled much of the rest: the seeds sprouted, giving birth to rubber trees, heretofore confined to South and Central America. Some were transplanted in Malaya and, later, in other European colonies in the East Indies. By the outbreak of World War I, these colonies had seized control of the world rubber market from its former leader, Brazil.

The story Wickham told earned him a British knighthood and the eternal enmity of Brazilian nationalists. Whether or not the British adventurer's exploits were as swashbuckling as he painted them, the transfer of rubber across the world certainly had dramatic consequences, only one of which was the decline and fall of the Brazilian rubber empire.

But until the Scotsman Charles Macintosh found a solvent for rubber in 1820 and the American Charles Goodyear discovered the vulcanization process in 1839, no one much cared where rubber grew. The ancient Maya and Aztecs had kicked rubber balls in their ceremonial games, and Europeans had long noted rubber's peculiar characteristics. But before Macintosh and Goodyear, rubber was too weather-sensitive. It melted in the heat. It became brittle in the cold. After Macintosh's process and vulcanization, rubber's impermeability made it ideal for raincoats (known as "mackintoshes"), boots ("rubbers"), and more personal waterproof wear. But it took the bicycle craze and John Dunlop's pneumatic tire at the turn of the century, and later the automobile, to create the enormous demand that would revolutionize production and bring far-flung populations into its orbit.

Initially, rubber production could not increase rapidly enough to meet worldwide demand. That provoked a dizzying rise in prices. Nor, at first, was there much rubber merchants could do to increase supply, because the rubber tapping process itself was unwieldy. Rubber trees did not grow naturally in convenient, concentrated stands, but in isolation across the immense Amazon rain forest. Tappers, known as *seringueiros*, wandered trails several miles long to gather the rubbermilk. As a result, the tapping process was slow and inefficient.

One way to expand production was to hire more tappers. Rubber merchants did so, contracting with more and more of the independent *seringueiros*, and reaching into ever more distant tributaries of the Amazon. But finding tappers was difficult. Because of the climate, disease, and the previous lack of valuable natural resources, few people lived in the Amazon area. Many who did were indigenous peoples uninterested in money or working for someone else. Rubber did not care. The native populations became victims of the Amazon's integration into the world economy. This last bastion of pre-Columbian culture fell to the disease or arms carried into the jungle by the Europeanized *seringueiros*. Luckier natives sometimes suffered enslavement as coerced tappers. Survivors settled in ever more distant, isolated corners of the Amazon.

But Indian labor was the exception. More often rubber employed *seringueiros* from the arid, overpopulated, and desperate Northeast of Brazil. A devastating drought between 1878 and 1881, followed by another in 1889, starved hundreds of thousands of people and uprooted additional hundreds of thousands. Their misery drove them into the rubber forests of the Amazon. Even malaria and other tropical diseases that hid in the jungle did not frighten men, women, and children driven by hunger.

Although the rubber boom caused much suffering, it also brought unprecedented wealth to the main cities of the Amazon. Great, colorful mansions that captured the world's imagination popped up in remote Manaus, 900 miles upriver from the coast. More fantastic yet was the ornate Manaus Opera House where Enrico Caruso sang opening night. So extravagant were the nouveau riche merchant princes of Manaus, that they reportedly sent their laundry out. To France.

The wealth created by the rubber boom changed international boundary lines. As the virtually uninhabited, uncharted expanses of the tropical forest neighboring countries laid claim to dispute was the rubber-rich Bolivian province of Acre. Ignored by the highland populations of Bolivia, the Bolivian government attempted to profit from its territory by leasing the area to a U.S.

company, all but issuing them sovereign rights in return for rent. The neighboring Brazilians protested loudly. Since the area was settled de facto by Brazilian citizens, the Bolivian government had little choice but to renounce the agreement. This did not satisfy Brazilian squatters, who seized the area and proclaimed its independence. After brief skirmishes and diplomatic wranglings, the area became incorporated into Brazil.

The World Wars gave great impetus to the creation of synthetic rubber, which today provides most of the world's rubber needs. By 1960 Brazil produced only 2% of the world's rubber and imported or synthesized from petroleum most of its own rubber needs.

4.3 California Gold and the World

The story of how California, with only some 15,000 nonindigenous residents in the beginning of 1848, became a beehive of human activity with over 100,000 residents in two years and 250,000 in four is well known. So is the tale of San Francisco, slumbering on the forgotten Pacific with 850 inhabitants; she soon became a boisterous painted madame and then an elegant lady with over 30,000 newcomers crammed onto her hills and along her coast. Less well known is the impact of Marshall's gold specks on the world economy. Long before Hollywood captured the world's imagination, before Disneyland, before surfers, hippies, and yuppies, a "California Dream" enthralled the world.

In fact, foreigners arrived first. First word of the strike at Sutter's Mill reached foreigners well before the East Coast of the United States became infected with gold fever. Great distances and poor transportation made California much closer to other Pacific nations than to the Atlantic seaboard. Even as intrepid a traveler as the famous scout Kit Carson took three months to rush the news of gold from the fields to Washington D.C. Most travelers in the early days, whether they sailed around the horn or drove a covered wagon across the plains, took twice as long. Thus, gold fever did not break out in New York until ten months after Marshall's discovery. By then, some five thousand Mexicans had already marched across the desert from Sonora. Thousands more Chileans and Peruvians heard word from ships coasting down around the horn and joined in the rush. Hawaii and Tahiti too sent hundreds of prospectors. As a Honolulu editor wrote of California: "If it isn't the land that flows with milk and honey, it abounds with wine and money, which some folks like better."

More distant areas got the news later; but even they quickly joined East Coast Americans in the race to the gold fields. Within the year thirty-six ships delivered more than two thousand Frenchmen. (Louis Napoleon hoped to dump his unemployed and threatening proletarians in the California gold fields; he established a national lottery to raise funds to that end and succeeded ultimately in ridding himself of almost four thousand of his countrymen.) Several dozen British convicts sentenced to labor in Australia also found their way from down under to the San Francisco Bay, where they formed a much feared band of thugs. The single largest nationality, besides Americans, were the Chinese. China may have been across an ocean, but the ocean served as a highway, not a barrier. Clippers crossed it in as little as thirty days. Within five years some forty thousand Cantonese arrived on the credit-ticket system (a form of indentured servitude). By the 1860s they were the predominant nationality in the mines. All in all, foreigners from twenty-five different countries constituted one-quarter of the California population.

Working together, these forty-niners dug up more gold between 1848 and 1860 than the world had uncovered in the previous 150 years. The gold was quick to find its way abroad; in the early years Californians imported almost everything they needed and paid up to ten times East Coast prices. All of that gold flowing out of California reversed the global deflation of the previous three decades. The minting of coins increased six- or sevenfold. This sparked the greatest boom in international commerce the world had ever seen as world trade almost tripled between 1850 and 1870. California ore also helped pave the yellow brick road that allowed gold to replace silver as the standard metal for world currencies.

The fact that a formerly ignored area like California now had tremendous purchasing power also created a revolution in transportation. For the United States, of course, the lure of the West

Coast greatly accelerated the building of the transcontinental railroad, which connected in Logan, Utah, in 1869. But the implications of California's wealth were even more important for shipping. The Pacific Coast of the Americas had been largely cut off from world commerce since Peruvian silver declined in the eighteenth century. Only a few ships a year worked their way up and down the coast of South and Central America. Now, all of a sudden, seven steamship lines connected Panama (which in 1855 received a railroad that cut the isthmian crossing to less than five hours) with New York, California, South America, the West Indies, and Europe. Nicaragua, Mexico, and Cape Horn, the other trans-American routes, also enjoyed much greater maritime traffic. Chile and Peru now had a market in California for their wheat; so did sleepy El Salvador. More reliable and cheaper shipping also allowed West Coast coffee producers in El Salvador, Costa Rica, and Guatemala to begin exporting to Europe and the East Coast of the United States.

But the South American export boom was not an unmixed blessing. The ports on the eastern coast of Central America fell into abandonment. More seriously, in all of these countries the export booms led to increased land value and greater demand for labor, which in turn encouraged land concentration and repressive labor relations and despoiling of indigenous peoples.

The discovery at Sutter's Mill also sucked the United States into the Pacific Rim. Hawaii came more tightly into the U.S. commercial orbit now that Yankee skippers ventured more frequently into the Pacific. China also slowly increased its trade with Americans, though the much coveted "China Market" never lived up to expectations. And even Japan, long suspicious of foreigners and reluctant to trade, was forced by Admiral Perry in 1854 to open her ports to U.S. goods.

The Gold Rush also signaled the beginning of a new international position for the United States. While the thirteen colonies were huddled on the Atlantic seaboard, the United States had been preoccupied with Europe. Now that the country had become bicoastal, its economic and strategic concerns grew. Suddenly South America was in the United States' "backyard" because it stood between the two coasts. Now a Central American canal became important to U.S. national integration. And the Caribbean, the sentinel of a canal, also became strategically important. The Pacific-Hawaii, Guam, Japan--had suddenly moved closer to American shores and its affairs became of consequence to the United States.

James Marshall might have wished he had kept his mouth shut. His mill never came into use and Sutter's agricultural empire was overrun by goldcrazed arrivals. Marshall died broke and Sutter ended his years in Pennsylvania. The local Californios fled to the southern part of the state and the indigenous population was decimated. Instead of building a sawmill, Marshall changed the face of California and helped build a new world economy.

4.4 Beautiful Bugs

When wealthy Dutch burghers sat down to sumptuous feasts, they took great pride in the sophisticated and lavish decorations that appointed their dining rooms. They were particularly fond of the exquisite Flemish tapestries that covered their walls. Crafted from wool or silk, bordered by silver, and dyed with brilliant scarlets and crimsons, these wall hangings declared not only their owners' wealth, but their worldliness: they were a creation of world trade. But for two centuries few Europeans knew how these lovely creations were bathed in color. Yes, they knew that the mysterious cochineal dye had been sent back to Spain by Hernan Cortez after the conquest of Mexico. But they were not exactly sure what it was made from. They assumed that it was a seed like many other vegetable dyes. Not until the end of the seventeenth century did Italian chemists discover that the cochineal seeds were not seeds at all; they were the dried bodies of insects. The stately, elegant tapestries were smeared with dead bugs!

Of course Indians in southern Mexico and Central America had long known this. The Aztecs had already demanded cochineal as a tribute good from the southern regions of Chiapas and Oaxaca. But Enlightenment Europeans could not imagine asking Indians about a matter of natural science. So they remained ignorant for a couple of hundred years. The superior knowledge of the Mixtec and Mayan Indian producers meant that they would continue to dominate production for centuries.

Most Mixtecs knew that cochineal was made from the female cochineal insect (*Dactylopius coccus*), which fed on a particular nopal cactus that inhabited a limited range. In the wild, Indians would pluck them off the cactus and plunge them in hot water or into an oven. This was a precise,

laborious business since it took some 70,000 dead bugs to make one pound of cochineal. Only the female insect would do, but since she outnumbered the males by 150-200 to 1 (talk about a man-hungry world!) this was not a great problem. However, mature virgin bugs, which were more prevalent early in the season, gave off stronger colors. So timing was important.

Wandering the countryside hunting for female bugs was a time-consuming business for Indians who had children and other crops to tend to. Thus a more intense form of "cultivation" was developed. "Seed" pregnant cochineal were placed in bags made of maize leaves and pinned to cactus leaves. Shortly, the insects began to breed and the young crawled out onto the cactus. After roughly three months--depending on the weather--they were ready for harvesting. In good climates three crops a year were possible. After about five years new nopals had to be found or planted since by that time the guests had eaten the host. This practice was termed agriculture with "seed" and "harvests." But it really was livestock raising. (Instead of a flea circus, one had a herd of bugs.)

The tiny scale of the livestock, however, meant that the social implications were quite different from cattle raising. Whereas grazing bovines usually caused land to be concentrated in the hands of Europeans who expelled Indians and left the pastures sparsely inhabited, a herd of cochineals, as one would imagine, required very little space. Consequently, they did not much affect other activities or living arrangements. Indeed, the nopal were usually interspersed between subsistence crops such as maize and beans. Often they occupied the house plots. In Guatemala's former capital of Antigua, destroyed by a volcano, cochineal were raised in the ruins of what used to be elegant houses and stables.

Indian communities were not harmed and, indeed, were sometimes strengthened by cochineal. There were no economies of scale. Small plots tended to produce better quality dye than larger ones where labor and supervision were lacking. Moreover, this was a very risky trade that required considerable expertise. Only the proper cactus and climate yielded cochineal. Even then, unseasonal heavy rains or locusts could slaughter the little bugs. The unglamorous, back-breaking, neck-craning work of "cultivation" meant that few Spaniards ever attempted to ferret out the Indian trade secrets. Instead, they allowed the Indians to maintain their domination of this pre-Columbian crop.

For most of the boom period of cochineal, the colonial Spanish state was responsible for collecting the insects as tribute. In the late colonial period, to expand production, the *reparto de mercancías* was sometimes employed. This was the forced sale of goods by government officials and sometimes churchmen to Indians who were required to purchase the often unwanted goods with cochineal. In effect, the bugs could not only be sold for money; they served as money themselves.

When state coercion officially ended after independence, in few places did Indians lose control of the "industry." Indians usually rented communal land to grow the cactus so much of the income went to village coffers for collective celebrations and public buildings. Only in a few places did Europeanized ladinos appropriate the land and dominate production.

In virtually every other case in Latin America the increased export of indigenous crops such as cacao, rubber, and henequen led to subjugation and impoverishment of Indians. They were only able to keep their grip on cochineal bugs because of the precarious and labor-intensive nature of the enterprise and special-expertise harvesting required.

The result was that many of the finest drapes, silks, and tapestries of Europe depended upon the Indians of Mexico, Guatemala, and later Peru for their eye-catching crimsons and scarlets. The jackets that the famed British "redcoats" wore on their backs were colored with the bug dye as were the scarlet letters real-life Hester Prynnes wore on their breasts.

For four centuries the world economy could not crack the Indian monopoly on cochineal. After the 1850s German and British chemists substituted for it by inventing aniline dyes. Although initially not as brilliant and colorfast as natural dyes, they were cheaper and could be produced in the great amounts that the cotton textile revolution was demanding. Sterile factories replaced the gathering of insects. The heroic cochineal bug, which sacrificed her brilliant body to palpably introduce the cactus-strewn countryside of the New World into the wealthy dining halls of Amsterdam and other major European cities, disappeared from the world economy. The new industrial dyes became just as colorful as cochineal, but alas their stories were not.

4.5 How to Turn Nothing into Something: Guano's Ephemeral Fortunes

This is the story of how hungry yet prosperous people in Europe turned mountains of excrement on remote, barren islands halfway around the world into piles of gold and how that sudden wealth led to disaster.

The Chincha islands off of the coast of Peru are barren dots in the Pacific. Uninhabitable to humans because of their lack of rain, they became paradise to cormorants, pelicans, and other birds. The birds thrived on one of the world's richest fishing waters, refreshed by the cold Humboldt current. Feasting on anchovies and facing no natural predators, the cormorants stretched their land legs on the Chinchas where they created a virtual aviary carpet. As many as 5.6 million birds per square mile crowded onto the specks of land, making not only a tremendous racket, but mountains of excrements hundreds of feet deep. The lack of rain allowed the manure to pile higher and higher, generation after generation.

Although no humans lived on the islands, humans did know about the bird manure. Indeed, the Incas had a name for it: *huanu*, which meant dung. It was later corrupted into "guano," one of the few Quechua words still current in the English language.

The Incas, marvelous agriculturalists, used guano to fertilize fields in the coastal valleys to feed their dense populations. But its use fell into abeyance after the Spanish conquest. The dramatic fall of the Indian population because of disease, and the marginalization of survivors to the Andes mountains, where transporting guano was infeasible, virtually ended demand. The small Spanish population that commanded the best lands had no need for fertilizers beyond the cow manure they introduced along with cattle. But the cormorants kept working their magic and the islands' treasure grew.

Three centuries after the Spanish conquest, in the late 1830s, the world once again woke up to guano's wonders. Europe's burgeoning population put a strain on her agriculture. Urbanization, the end of the frontier and the spread to marginal lands, and increasing prosperity meant there was greater demand for food than ever, yet fewer natural resources to meet that demand.

Science, as well as hunger, led Europeans to look to guano. Only at the end of the eighteenth century did European scientists begin to understand plant nutrition; the first field experiments were undertaken in 1834 by Jean Baptiste Boussingault, and only in 1840 did Justus von Liebig disprove the theory that plants derived nutrition from humus. Agriculturalists began experimenting with soil supplements besides the age-old use of manure and lime.

Of course demand and knowledge needed their handmaiden: feasibility.

To bring fertilizer economically from halfway around the world required a revolution in transportation. Great advances in sailing ships' size and speed, the steamship which began to be important in the 1840s, and more efficient port facilities combined with the new railroad to transport the landed guano all radically lowered carrying costs.

All of a sudden, Peru, riven by internecine fighting in the two decades since independence and reeling from the loss of most of her silver mines, found herself rich. The guano boom was literally like finding a pot of gold, for it required almost no investment.

Imagine the perfect employee: he does not need to be fed because he hunts his own food, needs no shelter because he gladly lives outdoors, is productive even while seeking food or at leisure. He never goes on vacation. The worker needs no tools or machines. Indeed, this employee is actually the factory himself. He finds the raw material, which he obtains for free, transports it, processes it, and delivers it, then steps aside while it is taken at no charge. Aside from the tens of millions of cormorant worker/factories, the guano trade needed only some 1,000 to 1,600 humans. Chinese and Polynesian indentured servants as well as Peruvian convicts shoveled the sweltering manure into the holds of awaiting ships. It was transferred, virtually untouched, to the fields of Europe.

Initially, Peruvians had little to do with the trade. The British house of Gibbs won the monopoly contract, contracted British ships, and marketed guano primarily in France, England, and the southern United States where it nurtured crops such as turnips, grains, and tobacco.

Surprisingly, in this age of empire the weak Peruvian state was able to maintain a monopoly over the guano trade and indeed, for a while, award the concession to a Peruvian company. Historian Shane Hunt has estimated that 65 to 70 percent of the final sales price reverted to the Peruvian government; that was more than 100 percent of the FOB (Free on board-price from the

point of departure) price.

In the short run there were important gains for Peru. These revenues allowed the state to abolish barriers to capitalism such as the head tax, internal duties, and slavery, as well as payoff its debt. Some of the new wealth led to new sugar plantations on the north coast and drove up wages by 50 percent.

Unfortunately, the pot of gold also led to what is today known as the "Dutch Disease." A strengthened Peruvian currency led to massive imports, displacement of local artisans and manufacturers, and grandiose building programs. Aware that exports, which reached the herculean total of 50,000 tons in 1856, were far outstripping the cormorants' ability to eat and excrete, government officials sought to use the windfall (or perhaps "currentfall") to diversify and develop the economy for that not long-off day.

The government in Lima borrowed in Europe at a furious pace on the collateral of their guano deposits (one of history's most peculiar collaterals). Enormous railroad projects were undertaken. Historian Paul Gootenberg argues that these were far-sighted, if failed efforts, while others have accused them of being fraudulent and foolish. In either case, Peru's guano wealth led it to become Latin America's largest debtor and, in 1876, to declare what Gootenberg has called a "world-shattering default."

With easily mined guano deposits much depleted, Europeans turned to another source of nitrogen, nitrates. Coincidentally, the greatest deposits were found in the area between Peru and Chile and what was then Bolivia. Although at first this appeared to be another windfall, in fact it proved to be another tragedy. Disputes over the nitrate lands led to the bloody War of the Pacific (1879-1883) between the three countries. Peru lost not only the war, but the southern part of the country and its nitrate fields.

Overmining of the guano islands, substitutes like nitrates, and eventually chemical fertilizers ended guano's golden age. Today, Peruvians have to work much harder at turning fish into gold; they catch and process fishmeal, not as a fertilizer as much as a dietary supplement for livestock. The cormorants, once the heroes of Peru's waste-to-wealth treasure chest, are unemployed.

The world economy, then, transformed waste into wealth. Unfortunately, to a considerable degree humans wasted the wealth.

4.6 Not Just Peanuts: One Crop's Career in Farm and Factory

The industrial revolution arrived in a Western Europe already short of many raw materials, with shrinking forests and often overworked soil; it was accompanied by unprecedented population growth. And since most nineteenth century industrial goods still required large inputs of cotton, wood, or other natural products--only the twentieth-century chemical revolution would dispense with that--where were the necessary farm goods to come from?

The most famous answers--such as the rise of American cotton and wheat exports and the development of rubber plantations--are the stuff of legends, but millions of humbler farm goods also had a brief day in the sun as coveted producer goods. The strangest case may be guano--vast deposits of bird excrement shipped from Latin America to Europe in the years between the discovery of soil depletion in Western Europe and the development of chemical fertilizers. When these new agro-industrial inputs already had a very different role in more locally oriented economies, strange transformations could occur. Consider the career of the peanut.

Like potatoes, com, and tobacco, peanuts came to much of the Old World via the New. (They were known in Africa before Columbus, but seem not to have spread from there to Europe or Asia.) Spanish traders brought them to the Philippines, from whence intra-Asian networks took them to the mainland; and it was there that they attracted attention. A highly labor-intensive crop with a taste very different from basic grains, peanuts were never a staple anywhere--specially not in the sparsely populated New World. They remained the stuff of decorations, sauces, and snacks. But for poor people in densely populated areas they were nonetheless very important.

Peanuts would grow on the thinnest and sandiest of soils, and in fact gradually improved them and held them in place. This made them perfect for places where population pressure had led to earlier ecological mismanagement: when Chinese who cut down trees to make farms of the Yangzi Valley highlands found the soil eroding too fast, they found that switching to peanuts could help save their farms. Farmers in the post-civil War American South, inheriting land exhausted from

growing too much cotton, also made peanuts an important part of living with a legacy of ecological decay.

Moreover, every part of the plant was usable: the vines made excellent pig food and the shells a useful fuel, and the oil was good for both cooking and heating. And while peanuts required an enormous amount of extremely dull post-harvest work such as cleaning (dirty peanuts easily get mildews that ruin the entire pile), this was work that even small children could do, thus adding one more contributor to the tight budgets of many poor families. The labor requirements were too burdensome for any family to put all its land into peanuts, but the enormous (and high-protein) yields per acre made peanuts an ideal homemade safety net for those taking a gamble in cash crops: many South Chinese and Indian peasants who were switching some of their land into lucrative but risky sugar in the nineteenth century switched the rest of it into peanuts, which became a home-grown food supply protected from the ups and downs of prices. (These same qualities made peanuts a favorite of reformers seeking to improve rural diets, from Georgia to Jiangsu: suggested recipe lists compiled by American 4-H clubs and Chinese Nationalist extension agents alike contain any number of ideas for sneaking more protein and vitamins into poor people via peanuts.)

Then, around 1900, everything changed. German and American chemists (including the famous George Washington Carver) discovered dozens of industrial uses for the peanut and its oil: as a lubricant, a paint ingredient, and a soap ingredient. (In parts of Europe, peanut oil replaced increasingly pricey olive oil in this process.) Demand boomed and exports soared—first from China, then India, and then from West Africa. In Seattle, the main port for U.S. imports, special wharves were built in the 1920s just to accommodate peanut oil tankers. And with demand soaring, prices soared, too. Since peanuts were not a large part of the cost of any final industrial product, Western markets were not very price sensitive; needs kept growing faster than supplies, especially during and immediately after World War I.

But prosperity had its perils, too. Because much of the land on which peanuts had traditionally been grown would support nothing else, it was often land that none but the poor had bothered to claim: dry former river beds, sandy wastelands, and rocky hillsides. But now that these lands could generate *cash*, richer and more powerful people became interested in them, often "rediscovering" old deeds. In some cases, peasants had once paid a nominal fee to secure use of these lands from owners who were glad to get anything from land they couldn't or wouldn't farm themselves; now, all of a sudden, these rents could double or triple overnight. In parts of the North China peanut belt, local "sand land wars" raged throughout the 1920s, often ending with the eviction of the earlier peanut growers.

Even the winners in those battles found their triumph short-lived. When peanut prices got high enough, large-scale production for the market expanded on lands more fertile than those traditionally set aside for peanuts in Asia. West African peanuts, in particular, soon claimed an ever-growing share of the world market. Thanks to higher productivity, they survived the 1930s slump in peanut prices that drove many Chinese and Indians out of the world market. Finally, a bubble created by industrial innovation fell victim to industrial innovation: a new round of chemical discoveries in the 1930s and 1940s created synthetic substitutes for industrial peanut products. Before long, peanuts were again marginal, except perhaps to North American children. But their rise and fall are more than a curiosity. They stand with many other now-forgotten booms created between the time when the industrial revolution placed massive new demands on the land, and the time when chemists rerouted much of that demand underground: to products of the mines, as transformed in laboratories.

4.7 As American as Sugar and Pineapples

How did sugar, a German grocer, gold in the Sacramento River, and a Republican protective tariff turn a Polynesian paradise into the fiftieth star on the American flag? The Hawaiian islands had enjoyed a prosperous anonymity, distant from the world's trade routes, before Captain Cook gave them the dull and inappropriate name of Sandwich Islands in 1778. The Englishman slowly brought the kingdom into the world economy. But there was little demand for their chief products of breadfruit and sandalwood, and the Hawaiians had few needs. The force for change would come from America, not Europe.

The gold discovered in California's Sacramento River brought hundreds of thousands of consumers to the West Coast and merchants to sell to them. One of the newcomers was a German immigrant who had arrived in South Carolina in 1846, Claus Spreckels. After working his way up in a Charleston grocery store to become its owner, ambition drove him a few years later to New York, where his new grocery store again prospered. Starry-eyed with the possibilities in the Golden State, Spreckels sailed to San Francisco in 1856 to mine the miners.

Spreckels was not the sort of man to let mere success stand in the way of real fortune. After a few profitable years in the mercantile business, he branched out into sugar refining. Headquartered on the West Coast, he naturally turned to Pacific producers of sugar rather than the conventional U.S. sources in the Caribbean and Louisiana.

So the offspring of Protestant missionaries in Hawaii--less otherworldly than their forebears--began to grow sugar to meet the new demand. Sugar changed the face of the islands. Foreigners, mostly Americans, began buying up the land for sugar plantations. The native population--around 300,000 when Cook first wandered to the kingdom--had fallen to 50,000 one hundred years later. Chinese laborers, imported as contract workers, soon outnumbered the native population.

This transformation gained speed after 1876 when the United States and Hawaii signed a reciprocal trade treaty that awarded Hawaiian sugar a privileged position in the U.S. market. Hawaiian sugar production ballooned almost twentyfold in the next two decades; virtually all of it went to the United States. Twenty-five years of sugar boom saw Americans come to own 80 percent of the sugar plantations and the number of native Hawaiians fall to 35,000. Hawaiians became strangers in their own home as they neither owned the lands (Americans owned sugar production, Chinese rice, and Portuguese cattle) nor the companies that prospered in Hawaii's heady sugar economy; they did not even work in the sugar fields.

Spreckels was single-handedly responsible for much of the growth. On Maui, he developed one of the largest sugar plantations in the world, controlled most of the island's irrigation and docks, erected its electric lights and giant mills, and laid the island's railroad track. He joined with the kingdom's largest exporter and financed much of the Hawaiian crop. His Spreckels Oceanic Line then carried his sugar--and that of other planters--to California where his refineries finished it. To secure his position he became the principal banker for King Kalakaua and one of the most politically important people in the kingdom.

The king was friendly toward Americans. In 1874 he had made a great hit in New York when he became the first reigning sovereign ever to visit the United States. However, Spreckels's political control and economic empire became endangered when he fell out with King Kalakaua. Legend has it that Spreckels and the king were playing a Hawaiian card game with two visiting admirals when Spreckels boasted that if this were poker, his hand (which held three kings and two smaller cards) would win. The British admiral--holding three aces--disagreed. But Spreckels insisted, saying he would win because he *had/our* kings. "Where is the fourth king?" he was asked. Spreckels boldly replied "I am the fourth king."

King Kalakaua was so upset by the ex-grocer's arrogance that he bolted from the party and began plotting a way to reduce U.S. influence. His first step, in 1886, was to float a successful loan on London, a center of growing European interest in the islands.

The London loan worried Spreckels. More troubling still were the side-effects of the American McKinley tariff of 1890. To increase trade with Latin America and Europe the tariff made sugar duty-free for everyone signing a trade treaty. The agreement effectively removed Hawaii's privileged position. Even worse, King Kalakaua was unwilling to accept America's draconian terms for a reciprocal treaty: President Harrison wanted in effect to establish a protectorate over the kingdom and claim Pearl Harbor. Without the trade treaty, painfully high duties would close the U.S. market to Maui sugar.

The only alternative was annexation. If Hawaii were to be annexed by the United States, the planters would not only find their sugar duty-free, but would have the windfall of a bounty, intended to help Louisiana's planters.

Ironically, most planters did not initially want annexation. They feared that American racism would prevent the immigration of Chinese workers in Hawaii just as it had in California. Refiners such as Spreckels feared that annexation would stimulate the creation of refineries on the islands that would break the monopoly of their West Coast refineries.

But when strong-willed nationalist Queen Liliuokalani ascended to the throne in 1891 the

foreign planter minority overcame their reluctance toward annexation. Although a small group of foreigners owned 80 to 90 percent of the kingdom's wealth, native Hawaiians represented the overwhelming majority of the electorate. Planters feared that the queen would side with her indigenous subjects to reduce the power of the sugarcrats. Plotting with the U.S. consul, Edwin Stevens, the annexationists arranged to have U.S. marines and sailors land just as a coup was set off. The queen was overthrown almost without bloodshed. The new government headed by the Sanford Dole, son of missionaries and cousin of the king of the pineapple, sought annexation to the United States.

Initially there was heated opposition to annexation. Royalists on Oahu threatened Spreckels's life. They posted a sign in bold red letters on the sugar king's Honolulu mansion: "Gold and Silver will not stop Lead." There was an anti-imperialist outcry in the United States as well that President Cleveland heeded when he refused to annex the islands on the grounds that the coup had been precipitated by a small minority.

However, four years later, in 1898, President William McKinley took Hawaii as a territory of the United States. The annexation of Hawaii was, as *The Nation* charged, "of sugar, for sugar, and by sugar."

4.8 Saved from Sugar Shock

Starting around 1500, sugar conquered the world--at a terrible cost. As Europe's sweet tooth grew, and cane replaced honey as the main way of satisfying it, tropical island after tropical island was deforested, covered with slave plantations, and committed so completely to export agriculture that they even imported their food. In Southeast Asian colonies, indebted or coerced peasants replaced slaves, but the results were not much better. Even today, most former sugar colonies are very poor, and bear permanent ecological scars as well: Jamaica, Haiti, Cuba, Northeastern Brazil, Java, the Philippines.... But one of the early modern world's big sugar islands-Taiwan-wound up on a different path, which has led to a much happier present. One big reason was an unlikely benefactor-a combination merchant, pirate, and Chinese rebel named Zheng Chenggong, who conquered the island in 1662.

In the early 1600s, Taiwan was a sparsely populated island with a largely self-sufficient economy. Traders who stopped there were either getting supplies en route between China and Southeast Asia, or acquiring deerskins-a logical export for a place that was still overwhelmingly forest. But when the Dutch set up forts and trading posts there in the 1610s and 1620s, they began to think more in terms of what the conquered natives could produce for them; sugar, which fetched a high price in both Europe and Asia, was a logical choice. By the 1650s, the island was one of the world's largest sugar producers, even though most of the island was still forested, and much of what wasn't was producing rice.

Meanwhile, on the mainland, massive civil wars and an invasion by Manchus from the North brought down the Ming Dynasty in 1644. But a number of officials swore never to serve the new "barbarian" Qing Dynasty, and grouped themselves around relatives of the last Ming emperor, who set up new "capitals" in South and Southeast China. Since the horse-riding Qing knew little about sailing, the Ming loyalists fared better on sea than on land-indeed, most of the financial support for the resistance came from the profits of overseas traders based along the South China Coast.

The most important of them was a combination merchant official named Zheng Zhilong, whose trading interests and personal fleet extended all the way to present-day Singapore. When Zheng Zhilong abruptly went over to the Qing in 1646, his sons remained with the Ming and took over his assets. By 1650 one son, Zheng Chenggong, had not only consolidated his father's vast holdings, but achieved a near monopoly over China's foreign trade, using the cover of civil war to subjugate his relatives (some of whom he murdered), his other Chinese rivals, and any foreigners, Asian or European, who were foolish enough to fight his navy rather than cut a deal with him.

Though most of his staggering wealth was located offshore, Chenggong's overriding obsession was always to bring back the Ming Dynasty. Throughout the 1650s, he struck repeatedly at port cities on China's coast and up the Yangzi River as well. He captured several, but couldn't hold them-in large part, because he never held enough of the countryside to feed his mainland bases. Like the tiger and the shark, Zheng and the Qing were each supreme in their element and unable to

subdue the other.

Desperate to gain lasting control of an area with a rice surplus, Zheng's eyes turned to Taiwan. In 1661 he invaded the island, with hundreds of ships and over 20,000 soldiers. The Dutch were far less numerous, and they had alienated most of the natives through their harsh policies. (In dispatches back home, the missionaries blamed greedy merchants and the merchants blamed intolerant missionaries; there was probably blame enough for both.) Within a few months, the island was Zheng's. (Twentieth-century Chinese nationalists later made Zheng's conquest into an "anti-imperialist" crusade against the Dutch, but there is no sign that he thought in those terms: for him the enemy was always the Qing.) Zheng himself became increasingly tyrannical and irrational as his dreams of reconquering the mainland faded; he died at age thirty-eight, soon after conquering Taiwan.

Nonetheless, Zheng's invasion had lasting implications. Once Taiwan had become an anti-Qing base, the Qing became determined to conquer it; when they finally did in 1683, it became part of the Chinese Empire for the first time. And though China had its own sweet tooth--indeed, per capita sugar consumption was probably higher there than in Europe until the early 1800s--the government had no desire to create the kind of sugar monocultures that Europeans created on so many islands that they ruled.

For European governments, sugar--a much coveted (and even mildly addictive) substance that could not be grown at home--was a perfect item on which to grant monopolies, levy heavy taxes and pay for colonial and naval competition; for colonial authorities, a more exclusive concentration on sugar also meant more revenue; and for big planters, an island without much land left in food crops was an island on which runaway or rebellious slaves could not hold out very long.

But the Chinese regime--in part because of its experience with the Zhengs--had no desire to see major concentrations of wealth and power created on the edge of the empire; and being more concerned with internal stability than foreign threats anyway, they always made sure that sugar did *not* crowd out rice production on Taiwan, or destroy too much of the forests. (Preserving forests, the Qing reasoned, would enable the indigenous population to maintain enough of its old way of life to prevent rebellions.)

So Taiwan kept growing sugar, but sugar never took over the island. When the Qing weakened and the foreigners came again after 1860, sugar production on Taiwan boomed again; and when the Japanese took over in 1895, they did much to push sugar production, too. But even then, the island kept a base of rice production and diversified agriculture--Japan, short of rice itself by the twentieth century, could hardly afford to have its colonies become rice importers. Sugar mills (and roads and port facilities) came, but monoculture never did. That danger, in retrospect, had probably been greatest in the 1600s--and had been warded off thanks to a wild-eyed trader turned would-be king maker.

4.9 How the Cows Ate the Cowboys

First there was Argentina's wide-open, fertile, treeless prairie known as the Pampa that stretched for hundreds of miles. Then came an expedition of Spanish conquistadors seeking precious metals. They found no wealth in the ground, but they left behind them some cattle that would bring Argentina future riches. With no natural predators and endless pasture, the number of bovines grew astoundingly. The Spanish population on the Pampa, however, rose slowly. Devoid of silver and gold, but rich in a hostile, intractable nomadic population, the Pampa held few charms for the Spanish. Until the nineteenth century, the Pampa remained very much a frontier, a huge area contested by the native indigenous peoples and the few Spaniards and ruled over by the swelling herds of cattle.

This land gave birth to the Argentine cowboy, the "gaucho." If ever a man was made for his work, it was the mixed-blood gaucho who roamed the Pampa-gypsy-like, trailed by his string of horses--herding cattle. Legs bowed by his almost permanent residence on horseback, his job literally shaped him; eating little other than beef, he consumed his work. Today the gaucho occupies the same romantic position in Argentine national mythology as does the cowboy in the United States: a symbol of individualism, freedom, masculinity, he became the quintessential Argentine.

In the nineteenth century, however, foreign visitors and the Argentine elite scorned him as idle, disorderly, "half horse, half man." He was both held in awe and disdained for his equestrian brilliance. One visitor noted, "In some respects they are the most efficient Cavalry in the world--dismount them and they are nothing, for they are scarcely able to walk."

The gaucho did almost everything from horseback--wash, fish, attend mass, draw water, beg. In fact, his boots left an open space in front for the toes so they could grip their stirrups better. These boots were relatively useless on the ground.

But until the last part of the nineteenth century, the Pampa needed horsemen, not peons. The cattle industry was essentially an organized hunting party. Semi-wild cattle, mostly left to fend for themselves, roamed the vast fenceless land holdings, some as large as 800,000 acres. Real estate in this sparsely settled frontier was largely a legal fiction. The rancher was much more a merchant than an agro-industrialist. His only contribution to the cattle industry was to provide the gaucho with a few cherished goods such as tobacco, *mate* tea, alcohol, and sugar in return for the hunted cattle carcasses and hides.

The gaucho owned his means of production and enjoyed his independence. The quality of the cattle in this system was unimportant; fresh meat would spoil aboard sailing ships long before it reached Europe and cattle were so plentiful and people few in Argentina that there was essentially no home market. Only salted meat, prepared in salting houses (*xarquerias*, which, corrupted, produced the word "jerky") could be exported. But its quality was so poor that the major market were the slaves of Brazil and Cuba who had little choice over what they ate. This was a small market. In fact, most cattle carcasses were left to rot on the Pampa; the gaucho just cut out the tongue to eat and skinned the hide for export. Returns per cattle were of course low, but costs were virtually zero.

The gaucho began to slowly lose his way of life and freedom in the nineteenth century. Independence from Spain was a long, bloody, drawn out affair that gave rise to many local war lords. Fighting became endemic. Now the gaucho's horsemanship and his ability with the lasso, knife, and bolas became valuable military weapons. The Argentine cowboys, however, were truly self-interested. Not much concerned about questions of partisanship or patriotism, they had to be forcefully conscripted. Governors began issuing passports to confine their movement and pass vagrancy laws to force into the army those not employed on ranches. But it was Europe's hunger for beef that most doomed the gaucho life-style. Ironically, the growth of the cattle industry brought the decline of the cowboy.

Several forces combined to make Argentina one of the world's greatest meat exporters. Demand had grown in urbanizing Europe. The steamship made the Atlantic passage faster and more reliable and, with its larger carrying capacity, reduced freight rates.

Cattle on the hoof could be brought to Europe, but that was still a risky and expensive proposition. A major breakthrough was one of the miracle foods of the nineteenth century: Liebig's Meat Extract. Beef bouillon brought the taste of meat to tens of thousands of poor European households where it previously had been a rare visitor.

More revolutionary yet was the experimentation being done in Chicago with refrigerated rail cars. Applied to ships, refrigeration permitted great amounts of dressed, chilled, or frozen beef to be transported across the Atlantic. Refrigerator ships, known as *frigorificos*, proliferated in the last two decades of the nineteenth century and were perfected in the beginning of the twentieth.

But to take advantage of the new technology, Argentina had to improve the quality of its livestock. No longer admired were the creole cattle who were so well adapted to the wild Pampa. Ranchers began importing plumper, fatter European shorthorns. To ensure selective breeding, they erected fences across the plains.

The fences, with their palpable boundary limits, eventually put an end to the gaucho way of life. In a real sense, they created property. Ranchers who invested in improving their herds became much more concerned about branding their herds to prevent rustling (which gauchos considered simply hunting). Labor contracts were increasingly written to constrict the gaucho's freedom of movement. The draft and jail constantly hung over him.

The gauchos became an underclass on the plains where they once reigned, as being a migrant ranch hand became virtually a crime. Rued one observer in 1904: "The poor creole class that has lost all idea of the right to own land, sees it as unalterable patrimony of the grandes and vegetates with no other possibility than to be a soldier, a ranch peon or a rustler." And there was ever less

need for ranch peons. A man with a herd dog in an enclosed pasture could do the work of four or five men on the open range. Some of the Pampa became populated by the cowboy's nemesis: the sheep. Most gauchos could find no more than part-time work.

The final insult came when the need for alfalfa pasture convinced ranchers to let out parts of their land on shares to farmers who would prepare the ground for feed. Believing "the gaucho on foot is fit only for the manure pile," ranchers attracted Italian and Spanish immigrants to till the pampa, marginalizing the gaucho even further. As the cattle industry prospered and fat domesticated herds filled the countryside, the gaucho passed into history. The need to feed beef cattle cost the gaucho his freedom and his existence. And that is how the cattle came to eat the cowboys.

4.10 The Tie that Bound

Chaos theory tells us that a butterfly beating its delicate wings in the Amazon can create a monsoon in India. Actions can have completely unexpected and distant consequences. So it was with the American wheat farmer, who, mechanizing his midwestern farm with the most modern technology, unintentionally and unknowingly brought cruel archaic slavery to the Maya Indians in Mexico's tropics.

As the "Great West" around Chicago became tamed and tilled in the nineteenth century, settlers discovered that the flat, treeless expanses were perfect for grains. When rain was ample, the virgin lands offered astounding yields, more than anyone had ever heard of. Getting the bountiful harvests to urban consumers on the eastern seaboard or abroad remained a major problem until a web of railroads and canals linked the scattered farms to the Great Lakes, the Mississippi, and beyond.

This was capitalist farming almost from the outset. Land was surveyed and sold in segments of 160 acres or more by large land companies who extended credit to the new arrivals. The indebted farmers had to sell to market to service their debts. They were calculating and profit-seeking. It is no coincidence that the world's first commodity market and first futures market sprang up in Chicago. These capitalist-farmers realized that since the land was so fertile and relatively inexpensive, they could enjoy greater profits if they worked more land.

Their problem was labor. With land abundant and accessible, it was hard to convince the scarce rural population on the frontier to work for someone else, even for a reasonable wage. This bottleneck was overcome by machines. Cyrus McCormick brought his invention of the mechanical reaper to Chicago, where he opened a factory in 1847. His company improved the machine; sales mounted along with grain production.

Just reaping was not sufficient, however. Gathering the cut sheaves to bring to the thresher still required ample labor, especially since the wheat was so rapidly cut. Another inventor, John Appleby, solved this problem in 1878 when he invested a mechanical knotting device that led to the reaper-binder. This ingenious machine gathered up the cut grain, bound it together, loaded and carried it. Now two men with the machine could reap fourteen acres a day. Thus the yeoman Yankee family farmer used his investment in labor-saving devices to reduce production costs and provide low-cost food to the hungry populations of the eastern United States and Europe.

Completely unknown to the midwestern grain agro-industrialist, his success at modern technological farming was impoverishing peasants thousands of miles away. The success of the reaper-binder depended upon a steady supply of low-cost binding twine. The place best able to supply it was Yucatan, Mexico.

A rather dry, infertile land, the Yucatan peninsula had fallen upon bad times in the seven hundred years since the collapse of the last Mayan empire. A backwater of Mexico, the state was rich in only cactus and poor people. But since the cactus was henequen, whose fibers were well suited to binding twine, the local landed elite saw an opportunity.

In the decade after Appleby's invention, henequen exports swelled almost sixfold. But the raw material necessary for one of the world's most modern agricultural machines was produced in a very old-fashioned way. Men, women, and children used machetes to cut leaves off the henequen and then carted the heavy wheelbarrows to the simple rasper that separated the fiber from the pulp. Aside from rail spurs to carry off the heavy product, little technology was employed.

Tens of thousands of local Maya Indians were impressed into the backbreaking work through

debt peonage or the threat of draft into the military. Others found their land seized by the planters; landless, they had to work on the plantations. Sometimes workers were sold from one plantation to another like slaves and their children were obliged to pay off their parents' debts to perpetuate the slavery generation after generation. The bountiful harvests of wheat in North America brought hunger to the Maya, now stripped of their corn fields.

The most egregious case of enslavement involved the Yaqui Indians of the northern Mexican state of Sonora. Embroiled in a land dispute with Mexican farmers who sought to emulate midwestern Americans, the Yaqui were hunted down by the Mexican army and marched in chains to the henequen fields of the Yucatan.

The henequen "divine caste" ruled, built grand palaces, and adorned their capital city of Merida. They boasted that by supplying the twine that International Harvester craved (the successor to the McCormick Company and the world's largest agricultural implement manufacturer), the divine elite brought progress to Yucatan. But what a difference a change of latitude made.

Although the Yucatan and the U.S. Midwest were bound together by the umbilical cord made of henequen, mother and child were virtual opposites. The mechanized, capitalist, family farm of the Midwest, with its labor-saving machines and wage workers, gave birth to the extensive Yucatecan plantation that relied on intense use of coerced labor with rudimentary tools. Wheat spread land-ownership among the newly arrived settlers; henequen appropriated the land from the Maya who had lived there since time immemorial. The labor that the reaper-binder saved in the Midwest was expended in the tropics. The consequences are often unpredictable and even contradictory when the butterfly of world trade begins to beat its wings.

4.11 The Good Earth

In its first 100 years, the United States imported far more technology than it exported. Often, in fact, it stole know-how, especially from Britain. But by 1900, things had changed, and Americans began exporting "Yankee ingenuity" for prestige and profit.

Prospects were especially bright on the farm, where the United States could capitalize on the skills that had made it the world's agricultural leader. While Europeans often limited agricultural extension to their own empires--the British, for instance, stole rubber and tea plants so they could grow them where they had greater control--Americans dreamed of spreading better farming methods everywhere.

In particular, the missionaries of scientific agriculture turned to China--and especially to China's fledgling cotton industry. Sheltered from international competition during World War I, mechanized textile mills appeared in Shanghai, Tianjin, and Qingdao. At first, they all relied on foreign (mostly Indian and U.S.) cotton, for though China was one of the world's largest cotton producers, native cotton fibers were too short for machine spinning. Thus Chinese fanners who supplied raw cotton to hand-spinners stood to lose more and more of their own market as their compatriots turned to machine-spun thread.

The Chinese government intervened. Officials successfully tested U.S. breeds in North and Central China soils, where some U.S. varieties--Trice, Alcala, and Lone Star--grew better than native breeds, yielding 30 percent more cotton (by weight) per acre. And because modern mills could spin them, the U.S. breeds sold for 20 percent more per pound. Another unforeseen bonus: U.S. cotton flourished on the sandy wastes near the Yellow River, and on land where the only other profitable crop was opium.

Beyond supplying China itself, the crop had enormous export potential; it could be grown in China for about 20 percent less than in the United States itself. That caught the eye of Japanese mill owners in Osaka. In 1920, they approached the Industrial Bank of Japan, which was planning to finance a North China water-control project, to seek guarantees that the land reclaimed in the process would be planted with U.S. cotton.

Soon an army of American missionaries and agronomists, agents for Chinese and British-owned mills, and reform-minded Chinese officials was in the field, offering seed, advice, credit, and guaranteed markets. Japanese agents, whose ambitions worried Chinese officials (and the U.S. State Department), undertook a separate, parallel campaign, using American varieties that they had modified in their Korean colony. The colorful cast included Cornell agronomist John L. Buck, who married (and used as his translator) one Pearl Sydenstricker, the daughter of American

missionaries; her experience yielded *The Good Earth* and other popular works that shaped American views of China for decades.

The American reformers knew they faced social as well as technical hurdles, but they were confident. Many had done agricultural extension work in the United States' own slice of the Third World--the Deep South--promoting these same cotton varieties. They felt sure that what had worked among poorly educated Americans--demonstration farms, fairs at which short plays about new farm techniques were performed, and a kind of early 4-H movement--would also work among poorly educated Chinese.

At times, their naiveté and cultural ambitions produced bizarre results. At the first Chinese agricultural fair, in Linyi, Shandong, the county's agricultural extension chief and an American missionary played themselves in a skit with the following plot: Farmers, frustrated by the low price their native cotton is fetching, pray to a local god for help. The missionary lectures them on the vanity of "idolatrous worship," and sends them to the extension agent, who gives them seeds for the new cotton varieties. The new crop solves their problems, and makes the old gods unnecessary. But Linyi was near places where Christian converts and other Chinese had killed one another in the Boxer Uprising just twenty years before; there were undoubtedly better ways to advertise the new cotton.

More material problems were a still greater impediment. The new crops sometimes interfered with well-established local customs in destabilizing ways. In western Shandong, the poor had a customary right to glean anything left in the ground after a certain date. But the new cotton grew more slowly than native varieties, and about 70 percent of its bolls were not yet open when, in the words of county agents, "tens and even hundreds of men and women" stood on their rights and rushed the fields, claiming most of the crop. In response, the local "cotton societies" that had been organized to distribute seed and information became armed vigilantes. Some county agents wound up leading a war against the poor, and even against old elites, who objected to the power that new seed, credit, and marketing arrangements gave outsiders over "their" peasants.

Where the crop did take hold, peasants of all classes reaped more lucrative harvests. But local spending for public security soared, too. Meanwhile, many farmers who used to hire their poorer neighbors to help with (and guard) the harvest were now unwilling to run the risk of miniature class wars; instead, their wives and young children began to do more field work. And increased dependence on outsiders had its hazards, too: one group of entrenched Japanese seed suppliers/cotton buyers even tried to pay for the crop in opium.

Despite such setbacks, the new crop did work. By statistical measures, Chinese peasants in some areas responded to the new crop as quickly as their counterparts in the American South--despite the added barriers posed by warlordism, shaky transportation, and other problems. But it was no panacea: as the costs of social conflict mounted, some Americans gained new respect for village elders who had banned a more efficient sickle on the grounds that its benefits were not worth the new struggles it would touch off between farmers, hired harvesters, and thieves.

Certainly Buck's hope that these efforts would ward off communism by showing that science could help the poor without class conflict did not come to pass. Ironically, in areas where gleaners had successfully disrupted the new cotton in the 1920s, it was left to the Communist regime of the 1950s to create an environment in which the rural poor stopped interfering with the new breeds. The idea of uplifting the world's poor through American botany, educational techniques, and involvement in world markets has a rich history: so do exaggerated hopes and ignorance of the varied ways in which world trade affects local societies.

4.12 One Potato, Two Potato

Sometimes the big story is buried in the fine print. When Spain conquered much of the Americas, the excitement in Europe was over silver and gold. As other Europeans followed, interest turned to exotic agricultural exports. Tobacco, coffee, cocoa, sugar: all New World crops, or crops that could be grown there on an unprecedented scale. None was very good for you, but Europeans soon craved them all, and grew none of them at home. Huge plantations were cleared, slaves imported, companies chartered, royal monopolies created, fortunes made and lost.

But the New World crops that would keep the world's burgeoning population eating were humbler fare, which excited no such interest from big investors. One was maize, a corn variety that

grew throughout the Americas; it spawned no new types of agribusiness for centuries, but it was so miraculously hardy and nutritious that even without big sponsors it was soon being planted by peasants around the world.

Humbler still was the potato, "discovered" by Spanish soldiers in the Peruvian Andes in the 1550s. Considered a second-class food even in its homeland, it had never made it north of Colombia, and was rarely planted outside the marginal farmlands of mountain slopes. No London merchant ever formed a new company to trade potatoes; and the European masses gave it a far cooler welcome than its less nourishing, even poisonous, New World cousins. But crises created needs to which the potato was beautifully suited; today, potatoes are the second largest food crop in the world.

Potatoes were important in the Andes for four simple reasons. First, they would grow at extremely high altitudes, withstanding frosts that killed almost any other edible plant. Second, they yield a lot of calories per acre--more even than rice, and vastly more than wheat, oats, or other grains--and a wide variety of vitamins. Third, they required little labor, leaving highland people time to cut trees, mine ore, and gather the other mountain and forest products with which they paid the lowlanders for textiles, pottery, and fruit--and for not attacking them. Finally, they were easy to store--even without special buildings--and so a great protection against the constant specter of crop failure.

Spanish sailors carried potatoes to the Philippines, warding off scurvy in the process. In Asia, the same advantages that made potatoes popular in the Andes helped them find a niche wherever growing populations were pushing further up the mountainsides. Potatoes and maize were particularly important in opening up the highlands along China's huge Yangzi River; thus, these New World crops were crucial in allowing eighteenth-century China to reach new levels of population, and in the nineteenth- and twentieth-century ecological nightmares that followed from hillside deforestation. But it was in Europe that potatoes finally conquered the towns and farms of lowland majorities.

The potato entered the Atlantic economy at its two extremes: as a luxury side-dish for Europe's rich and as a staple for the enslaved Indians working the mines of Spanish Peru. At the high end potatoes benefited from the belief that they were a potent aphrodisiac; and like most other vegetables and herbs in early modern Europe, they were grown in small quantities in the gardens of the rich. (A seventeenth-century recipe, though written by a rich Londoner, includes substitutes to use if potatoes were too expensive.) At the bottom of the scale, feeding miners on potatoes was an obvious move. Mining begat instant cities in places too mountainous to grow or import much else. But this use contributed to a strong popular belief that as a staple, potatoes were fit only for slaves; a belief that helped postpone for centuries the use of potatoes by the European masses.

As Europe's population boomed after 1600, an unprecedented food crisis developed, and a slowly growing chorus of botanists, reformers, and royal commissions became interested in the potato as a solution. But as late as 1770, a cargo of potatoes sent to Naples as famine relief was refused; in France, the belief that potatoes could cause leprosy lingered into the early 1800s. Where the crop made progress at all, it was usually in the wake of intense misery.

Such was the case in Ireland, the first place in Europe to live on potatoes. Potatoes arrived shortly before 1600, according to legend in the hold of a shipwrecked member of the Spanish Armada. Here no aristocratic reformers promoted the new miracle food, but the viciousness of Ireland's conquerors proved far more effective than benevolence could have been. Intent on subduing a series of uprisings, the British resorted to a scorched earth policy, burning storehouses, mills, corn, barley, and oat fields, and killing livestock to starve out recalcitrant areas. The rebels replied in kind. In such a setting, the potato's virtues stood out. They grew underground, in small wet plots surrounded by trenches, and were thus hard to burn; they stored safely and compactly inside the farmer's cottage; they needed no mill processing; and families who had no plough left (much less a plough animal) could plant the crop with just a spade. In the seventeenth century, the fighting got worse; one account has it that 80 percent of the population died or fled during the rebellion of 1641-1652. By the end of the century, potatoes had become the dominant source of Irish food (and drink): an adult male consumed about seven pounds of them a day, and little else other than milk. Potatoes helped Ireland's population recover rapidly and then soar to new heights in the 1700s. Not only did the crop yield a staggering amount of food per acre, but one needed almost no capital to get started in potato farming--no storehouse or plough animal, and very few

tools. A small plot of land was usually rented in return for free labor on some other piece of the owner's land. As a result, even very poor people could afford to marry and start having children earlier than their English or French counterparts. The combination of deep poverty, a booming population, and overwhelming reliance on one crop that never seemed to fail (until the catastrophe of the 1840s) made Ireland and the potato a subject of much discussion throughout Europe. But where some saw the salvation of a hungry continent, others saw a worsening nightmare.

The Enlightenment's new philosophers--economists--mostly anticipated disaster. While Smith, Malthus, and others disagreed on how much to blame the potato itself, they all agreed that population booms were dangerous. A crop that required so little in the way of a homestead was at best a mixed blessing, driving the socially acceptable "living wage" ever lower. Indeed, those who saw great opportunities in the potato during the 1700s were precisely those whose dreams depended on making it cheaper than ever to feed large numbers of poor people--the commanders of the continent's armies (whose costs were growing much faster than their tax receipts), and the owners of England's emerging factories (who were struggling to gain markets by producing more cheaply than artisans could).

In England, many manufacturers and reformers spoke glowingly of the potato's possibilities as a cheap, nutritious substitute for wheat-based bread. By the end of the 1700s, potatoes had moved out of the garden and become a field crop, especially in the rapidly industrializing North. Nonetheless, millions of ordinary people resisted its adoption: to many English workers, for instance, the Irish were low-priced rivals willing to live like beasts. Their favorite food proved the point: it was, after all, the same food the English had come to feed their pigs. For urban and especially agricultural workers, eating the same white bread as their "betters" was a prized status symbol; any attempt to substitute potatoes was fiercely resisted. What happened instead was a far cry from what at least the more nutritionally conscious reformers had imagined. As bread took up more and more of English workers' budgets during the harsh early years of industrialization, people did indeed eat more potatoes: as a substitute for the meat, cheese, and poultry they could no longer afford once they'd bought bread. Only the very poorest--those forced to eat the potato gruel of orphanages, relief stations, and workhouses--made potatoes their main starch. Thus, once English living standards began to rise again a generation or two later--and especially once protection against American grain ended--protein returned to poor people's diets, and potatoes remained forever a subsidiary starch in England.

War and famine created a larger and more lasting opening in Central and Eastern Europe, as they had in Ireland. The high yields and easy storage of potatoes made them the food of choice for armies, and of statesmen obsessed with military readiness. Frederick ("An army travels on its stomach") the Great of Prussia promoted the potato aggressively in what is now Eastern Germany and much of Poland. In the War of the Bavarian Succession (1778-1779; part of the Wars of the American Revolution), both sides were so dependent on the miracle tuber that people called it the Potato War; it ended when the potato crop of Bohemia was exhausted. The unprecedented strains of mass military mobilization during the twenty-five years of war that began with the French Revolution spread potato use across much of the rest of Europe; extensive government-sponsored plantings in Russia after an 1831-1832 famine completed the crop's sweep of the continent. Three hundred years after the Spanish "discovered" it, one of the New World's greatest gifts was now far more widely grown and eaten in Europe than it had ever been in its homeland; but it conquered the world's richest continent as the food of the poor, and despite its merits, each step of its advance had struck its new users as a defeat.