

## READING 35-1

Source: H. Hobhouse. 1986. *Seeds of Change: Five Plants that Transformed Mankind*. Harper & Row, New York.

### Tea & the Destruction of China

In the 1770s a Mr. Twining, head of a firm of tea importers which still carries his name, wrote a pamphlet in which he claimed that there was a village near London whose primary product was material for adulterating tea. The village produced 20 tons of this material a year, and sold it to the trade at half the going price of tea itself. The adulterants were “ash leaves, collected by children and boiled in a copper with sheep’s dung. The mixture is then trod upon to exclude the water, dried, and carefully roasted till the product resembles tea leaves.... For scented teas of a finer nature, the children are set to collect elderberry flowers, which are dried and roasted and sold at twice the price....”<sup>1</sup> More generally available, and more generally used, even in the memory of people still living today, were iron filings. The fact that adulterants were such big business shows just how necessary a commodity tea had become to the British in the years since its introduction.

Tea, coffee, and cocoa all arrived in London in the same year, 1652. The word “tea” occurs in Shakespeare, and “cha,” the Canton-Macao form, crops up in Lisbon from about 1550. “Cha” was used in English seaports until quite recent times, and was corrupted inland to “char” (no link with “charlady”).<sup>2</sup> The upper classes pronounced it “tay” and spelt it “thé,” as in French, and this was the common pronunciation of the genteel classes until Victorian times. The word was also spelt “te,” “thia,” and “kia,” in imitation of various Mandarin alternatives in China itself. Significantly, the word was unknown in India until it was introduced by the English.

The Portuguese were probably the earliest tea drinkers in Europe, since they brought it to Lisbon from about 1580 onward. They may also have been keen consumers of the Arab mint tea, which was a well-known infusion before the arrival of tea itself. Today there are offered chamomile, linden flowers, comfrey, and many other herbal teas, yet there is no evidence that any of them, including mint tea, was ever widely drunk. Mint was only used in Moslem countries, where alcohol was not permissible, or by people who had acquired the habit from Arabs. So why did tea become so popular in Europe?

The reason must be that all successful hot nonalcoholic drinks contain socially acceptable stimulating drugs. Without them, they are no more effective than hot water. In the 19th century organic chemists finally identified the alkaloid of tea, theine, as being the same as that of coffee, caffeine. To be fair, theine is less effective.

At the time of the introduction of these beverages, water was not really fit to drink in most towns and villages, unless one knew how and when and by whom the water had been drawn from the spring. So, to avoid the risk of waterborne disease, people had to drink safe, boring, boiled water, or alcohol strong enough to kill germs. A simple method of allocating importance to a resource that modern man takes for granted is to imagine life without it. Nonalcoholic beverages are an excellent example; it is hard to see how one could manage without them. The alternative, alcohol, however mild, must have had an unfavorable effect upon the conduct of business, the schooling of the young, the control of horses, or the navigation of a ship. The demand for tea soon after its arrival in Europe was evidence that it filled a need.



1. Quoted in *Encyclopedia Britannica*, 3rd edition, 1788–97, under Tea.

2. Charlady, charperson, to char: derived from an archaic word “char,” meaning “work,” and used as a noun, a verb, and a prefix (*OED*). The American form is “chore.”

By 1820, millions of pounds of tea were being imported into Europe every year, and re-exported all over the world, more than half by the British. Probably 30 million pounds was consumed in the United Kingdom annually. Despite its high cost at this date, tea was drunk throughout the British Isles by all who could afford to buy it.

All the tea came from Canton, on the southern coast of China, and none of the merchants had as yet penetrated inland. Although China had made available to the West much of the technology of the preindustrial age, tea growing and tea curing had never moved westward, only eastward and southward to Japan, Formosa, and Java. Tea was unknown in India, except as an imported consumable from China, enjoyed only by some Europeans and a few Europeanized Indians.

History's joke on Europe is that for nearly 2 centuries a commodity was imported halfway across the world, and that a huge industry grew up involving as much as 5% of England's entire gross domestic product, and yet no one knew anything about how tea was grown, or prepared, or blended.

In that great burst of mercantile activity that followed the Renaissance, western European influence spread about the globe and created the world we know today. But Europe held many beliefs which we now know to have been fallacies. It thought of itself, for instance, as superior, gifted, in a position of natural leadership. However, there was no technology known to the Renaissance Italians of which the Chinese of the same period were not also aware (see table). A great deal of highly developed intermediate technology in fact put China and Japan, and in some instances India too, far ahead of Europe. Persia and some of the Arab-controlled countries were equally in advance of much of Europe. The one exception to this was gunpowder, discovered by the Chinese, who abhorred its use for violence or warfare, as did the Japanese.

It is entirely possible that the Chinese rejected the use of gunpowder for violent purposes not because they were noble lovers of fireworks, as opposed to gunnery, but because they realized that guns would destroy the complicated feudal system which they had evolved. This view is certainly sustainable in Japan.<sup>3</sup> But whatever the reason, because the Orient denied itself the use of gunpowder for violence, it laid itself open to defeat by the Western barbarians. With guns, European ships could survive at sea, European armed men could establish themselves ashore, and European armies could ultimately defeat the natives, even if those armies contained many native soldiers. The precious metals were the only objects which could be generally traded in the Far East. It was not a backward, empty part of the world, like America or Africa. East of Suez the ruling classes were sophisticated in the best sense, highly educated, of a far older civilization than any in Europe, and clever in their dealings with other peoples. To any shipmaster or trader who achieved the long voyage, the merchants of the East must have appeared as magical and complex as any great man in any great city in the West.

The 2nd mistaken view was that most people in the world, except for the post-Renaissance Europeans, were incapable of rational thought. This form of invented fallacy is akin to that which says that women cannot think straight, or that children cannot pursue an idea beyond the same evening, or that all animals are incapable of elementary reason of the cause-and-effect kind. Indeed, it was common even in the early 20th century to believe that Orientals were so mixed-up and mysterious that their thought processes were quite different from those of Western man. Certainly, the 16th century Chinese were capable of the subtlest kind of reasoning of a Jesuitical nature, and they appreciated and made use of Jesuits for special diplomatic purposes.<sup>4</sup> The Chinese and Japanese also produced the most elegant engineering designs, using such materials as were available in each locality. Before 1700 Japan, China, India, Persia, and the Arab countries

3. See Noel Perrin, *Giving up the Gun: Japan's Reversion to the Sword 1543-1879*, Random House, 1980. The purity of the narrative in this book, most of which appeared first in *The New Yorker*, is somewhat modified by a secondary argument that what was possible in one feudal country should be viable in the whole world: i.e. Japan gave up the gun, therefore the world can give up nuclear weapons.

4. The Jesuits—the Society of Jesus, founded in 1539 in Spain by (Saint) Ignatius Loyola—had spread all over the then known world within a generation. They were educators, propagandists, and, in Europe, warriors of the Counter-Reformation. In the non-European world they established a missionary standard which few could later achieve and none excel. They arrived in China about 1570, and were much more acceptable there than in Japan, which provided the Society with saints and martyrs from about 1600 onward.

### Technological Advances Transmitted from China to the West

<b>Invention or Discovery</b>	<b>First known date</b> (A.D. unless stated otherwise)	
	<b>China</b>	<b>Europe/America</b>
Rotary winnowing machine, with crank handle	40 B.C.	Late 18th century
Rotary fan for ventilation	180	1556
Blowing engines for furnaces and forges, with waterpower	31	13th century
Blowing engines for furnaces and forges, crank-drive type	1310	1757
Draw loom for figured weaves	c. 100 B.C.	4th-5th century
Silk-working machinery:		
reeling machine	1st century B.C.	both c. end of the 13th century
flyer; twisting and doubling	1090	
waterpower applied	1310	14th century
Wheelbarrow	231	c. 1200
Iron casting	2nd century B.C.	13th century
Concave curved iron moldboard of plow	9th century	c. 1700
Seed drill plow, with hopper	85 B.C.	c. 1700
Gimbals	180	c. 1200
Shipbuilding:		
stern-post rudder	8th century	1180
watertight compartments	5th century	1790
Rig:		
efficient sails (mat-and-batten principle)	1st century B.C.	19th century
fore-and-aft rig	3rd century	9th century
Gunpowder:	c. 850	13th century
rockets and fire lances	c. 850	15th century
projectile artillery	c. 1200	c. 1320
explosive grenades and bombs	c. 1000	16th century
Magnetism:		
floating magnet	1020	1190
knowledge of magnetic declination	1030	c. 1450
theory of declination discussed	1174	c. 1600
Paper:	105	1150
printing with wood or metal blocks	740	c. 1400
printing with movable type	1045 (earthenware) – 1314 (wood)	–
printing with movable metal type	1392 (Korea)	c. 1440
Porcelain	3rd–7th century	18th century

Adapted from Needham, *Science and Civilisation in China*, Vol. I, table 8 (CUP).

were certainly more advanced in their knowledge of the natural sciences than most Europeans, and for this to be true the reasoning powers of the elite must have been of a high order.

Finally, it is a great mistake to believe that nautical information available to the Portuguese was also known to the Dutch, or that the French and English had a common pool of received wisdom. Sailing directions, charts, positions of snags and rocks and reefs and eddies and currents—information which the world now shares—were then jealously guarded secrets. If Magellan managed to sail through the Strait to which he gave his name in 1519, or if in the 17th century the French managed to sail a large fleet round the Horn, earlier and with more ships than any other maritime power, or if the British had a tradition of dead reckoning by longitude in the 18th century that made their navigators the envy of the world, it is wrong to believe that the knowledge or advantages that enabled them to make these achievements became quickly available to other nations. These were practically state secrets, and to reveal them to foreigners was to court justifiable punishment.

From the early Portuguese adventures down the coast of Africa until the 1st European arrival in Australia was a period of about 250 years; its commencement preceded that of the Renaissance, and it was of longer duration. The early explorers started out from Europe, that small, insignificant peninsula, with certain set ideas. The later explorers were different. They did not start out with obsessions. They did not, like Columbus, imagine that they had discovered Asia when they had found the Caribbean. They did not resemble those who sought the Northwest Passage, like Hudson. They had little in common with those Spaniards who believed in Eldorado. The prudent behaved in a much more pragmatic way, seeking knowledge by navigation, enhancement by exchange, and profit by piracy. The realities of life at sea and the unknown nature of the lands they visited created a new race of mankind that followed the rules of expediency. The same spirit which permitted astronomers of the age to reject the conventional view about the sun rotating round the earth also made seamen contemptuous of land-based authority. The post-Renaissance exploratory phase of the European adventure abroad produced daily evidence to acute-witted travelers to the east, south, or west that conventional wisdom was of no value to men in their situation. Was this a concept of the same kind as that which occurred to the religious reformers? Did the growth of skepticism, the chief glory of the Enlightenment, first start at sea, and was it then confined to the Atlantic seamen? Was it so much part of the Atlantic development that it became a characteristic feature of Atlantic countries, lasting, in many ways, to the present day? Whatever the answers to these questions, there is a more limited truth to be extracted from the failings of the state of the art at any time. Successful Mediterranean powers have always been able to comprehend conditions all through that sea. The Atlantic presents the antithesis. Few Atlantic initiatives have been successful unless the man on the spot has been left to manage his own mission.

This simple truth is the result of the tyranny of the time/distance equation, which did not materially improve at sea before about 1830–50 and which has certain obvious effects.<sup>5</sup> The man on the spot has to have the appropriate qualifications, or the operation fails; and the powers at home need the ability to select those who can succeed without reinforcements of intelligence, money, or manpower. No political system ever produced the right answer, but the ultimate primacy of the British in East-West trade can be traced to the fact that in following these “Atlantic rules,” the British were usually more successful than the opposition.

The true British failures, such as the loss of the American colonies, can be blamed on the Atlantic rules being broken. They were broken from about 1763 by an ambitious set of politicians trying to serve a king who did not understand the peremptory nature of this logic—a logic which also made the colonist far freer than anyone at home. Even the feudal Spaniards were quite clear as to why men went to America. The conquistadores said that they had volunteered to serve their king and their God and—a pause—to become rich. They were obsessed by gold and silver, and regarded the huge Spanish Empire as a fief of the king.

5. With reasonable winds a sailing ship averaged between 100 and 200 miles per day, but this might be the equivalent of only 60–80 miles on a direct course—the vessel had to allow for contrary winds and tides and currents. South America might thus be nearly 6 months from Spain, North America nearly 3 months from France or England, and the Caribbean somewhere in between. A letter sent from the East Indies could not expect a reply in less than a year.

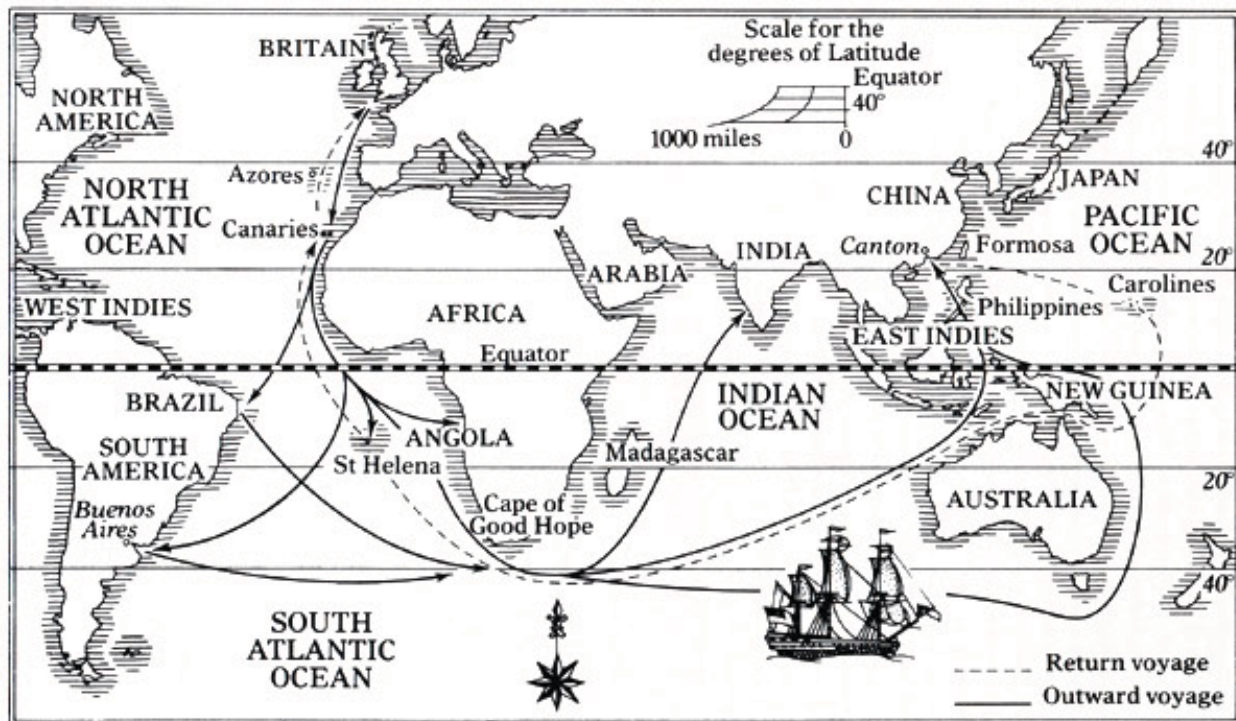
The Portuguese regarded themselves primarily as trading merchants rather than imperialists, as did the Dutch and English in their turn. All 3 peoples tumbled into foreign possessions as an adjunct to trade, if not, as is often said of the English, in a fit of absent-mindedness. The French position was somewhere between that of Spain and that of England, with the State playing all important part, as in Spain, and more efficiently, but with the individual also enjoying more opportunity than in Spain.

The post-Renaissance exploratory phase was rather like the Crusades in that western Europe was on the move; but instead of an immense effort which achieved very little, the oceanic efforts of western Europe changed the world. The difference arose partly because the horizons were so much wider, partly because the times had changed, and partly because Atlantic peoples and not Mediterranean ones were involved at the core; but largely because the individual, even in rigid Spain, was able to win enough wealth to buy himself an estate at home, a title perhaps, and a noble bride, and to found an aristocratic family.

This opportunity for “socially upward mobility” was of fundamental importance. For the 1st time in history a crude, coarse seaman could earn enough by means close to piracy to establish himself among the elite of a stable society. Piracy could be practiced abroad, and when they returned home, the survivors would not be averse to keeping silent, or to painting a rosy picture of what had occurred, or to suffering selective amnesia. The few who had weathered Hawkins’ attacks on the Spanish Main, or Drake’s circumnavigation of the globe, would either lose their fortunes in a few weeks or months, or settle down at home several notches higher on the social scale than when they had left. In such ways were the new elite of society selected.

The immediate cause of western European Atlantic expansion was the closure of the eastern Mediterranean by the Ottoman Turks, served by Greeks, who defeated every rival until the battle of Lepanto in 1572. Trade was inhibited after the fall of Constantinople in 1453, and became particularly difficult from the 1480s onward.

All the early westward transatlantic voyages were aimed at the discovery of a route to the Indies—originally a blanket word for India, Malaya, and all the East Indies—whence came most of the spices. Following Vasco da Gama in 1498, in the next century some 200 eastward voyages were undertaken round the Cape of Good Hope; most of them were also Portuguese, and perhaps 50 were originally Dutch.<sup>6</sup> Only half the ships returned.



The Routes Taken by the East Indiamen

When the Portuguese and then the Dutch finally reached the source of the spices, the products first became much cheaper in Europe, and then each country in turn tried to establish a monopoly. The means of trade were East India Companies, bodies of merchants who came together to reduce risks and internecine competition, and in the hope of becoming stronger and more successful than they could on their own. They used bigger ships with better crews and more armament, and their record of achievement is generally better than that of individual merchants.

East India Companies were established by the English, Dutch, French, Danes, Spanish, Swedes, Scots, and for a very short time the Austrians (the last as nominal rulers of Antwerp and Ostend). The English, founded in 1600 and known colloquially as John Company,<sup>7</sup> was ultimately to be the most important.

The Dutch had been the traditional northern European carriers of the world's tropical products from Lisbon, the port to which the Portuguese brought spices from the East until 1580, when Spain and Portugal were "united." Lisbon then came under the deadening control of Madrid. The Dutch found prices rising against them; corruption and inefficiency ruled in place of enterprise; trade was subordinated to the missionary fanaticism of Spain; war became almost continuous in the Netherlands and on the high seas. To trade directly with the East Indies was the only answer.

By the end of the century the merchants of Amsterdam, Zealand, Delft, Rotterdam, Hoorn, and Enkhuizen were sending more than a dozen ships a year to India, the Malay archipelago and the East Indian islands. They fought the Portuguese, the English, and each other. Logic dictated a national combine, and so the Dutch East India Company was formed, with a European headquarters in Amsterdam. Trade was regulated; customs duties were removed from the Company's imports; it was authorized to make treaties, maintain armed forces at sea and on land, set up trading posts (called factories), and coin money.

The local headquarters was at Batavia in Java, on the site of the ruined native capital of Jakarta, today restored in importance and known as Djakarta. The Dutch expelled the Portuguese from Ceylon and Malacca and established the 1st white colony in South Africa, with momentous consequences. Ultimately they had 8 foreign "governments," in Amboyna, Banda, Ternate, Macassar, Malacca, Ceylon, the Cape of Good Hope, and Java. Factories were established in Bengal, Coromandel, Surat, Thailand, and the Persian Gulf. Until about 1670 the Dutch East India Company was the richest corporation in the world, supporting the high Dutch civilization that produced Rembrandt, Vermeer, Frans Hals, Vondel, Grotius, Spinoza, the greatest printing trade in the 17th century world, together with innumerable unsung minor writers, poets, painters, architects and, above all, patrons. Before the decline of its powers, the Dutch East India Company mustered 150 trading ships and 40 ships of war, with 20,000 sailors, 10,000 soldiers, and nearly 50,000 civilians on its payroll, and still managed to pay a dividend of 40%. The Company was the envy of all its rivals.

The Dutch traded between Japan, China, India, the Persian Gulf, Africa, and Europe, and between all those places and Amsterdam. Spices were exchanged for salt in the Persian Gulf, salt for cloves in Zanzibar, cloves for gold in India, gold for tea and silk in China, silk for copper in Japan, copper for spices in the East Indies. A huge Indies-to-Indies trade was nearly as profitable as the Grand Trade from the East to Europe. Despite heavy losses from pirates—then, as now, the scourge of the China Seas—weather, European rivals, corruption, inefficiency, theft, and disease, the Company prospered. The Dutch were without scruples. They raised the price of essential spices by 180%; they formed monopolies; and they destroyed local rivals.

The Dutch and English had been ideological and religious allies against Spain at the time of the Armada in 1588, but became trade rivals a few years afterward. During the Thirty Years' War of 1618–48, which devastated large parts of central Europe, both England and the Netherlands tried to keep aloof from this vicious, internecine, and seemingly interminable war between Christians, which was fought nominally for faith, not for political or national advantage. Anglo-Dutch rivalry was expressed on the high seas, not in Europe.

The 1st Anglo-Dutch combine, that of an East India Company, had been proposed in 1613, but the men on the spot refused to ratify the merger that had been almost agreed between Amsterdam and London. A

6. By 1600 other objects of trade had been discovered in the East, and had become more profitable than spices.

7. Probably after John Bull.

solemn “treaty of defense” was signed in 1619, but when the news reached the East, a kind of farcical joust ensued. For an hour, hostilities ceased; Dutch and English Ships dressed their ships overall with flags and sailed up and down, saluting with blank shot. After an hour the flags were taken down, the ships stripped for battle, and the cannon loaded with shot once again. The undeclared war culminated in 1623 with the Amboyna massacre, in which nearly a hundred men, women, and children of the English East India Company were tortured and killed. These final atrocities effectively confirmed Dutch hegemony in the East Indies; the English were confined to the mainland of India itself.

The far-reaching consequences were not immediately apparent to the English, who nurtured a slow, angry resentment which was to mature in the wars against the Dutch in the times of Cromwell and Charles II a generation later. General Monk, a moderate Protestant and no lover of things Spanish, quoted with approval the Andalusian proverb: “Revenge is a dish which tastes more pleasant when cold.” Only the combined monarchy of William III of Orange and Mary II of England from 1689 was to bring Anglo-Dutch rivalry in the East to an end, and by that time the Dutch were in decline. Their trade was now reducing every year, confined to the Grand Trade between the East Indian islands and Europe, and their East India Company was bogged down by bureaucracy, corruption, and overheads, and enervated by monopoly profits. Driven from their trading preeminence in the Indian Ocean, the Dutch were to survive as colonists in the East Indies until in World War II the Japanese demonstrated to the indigenous Indonesians that the White Ruler was not for ever.

The English East India Company owed its success to 3 factors of an accidental nature. Like other happy accidents in history, these discoveries became “principles” by which men subsequently conducted their affairs. The earliest, and perhaps the most important, of these accidents took place in 1609. To help alleviate the slump and lack of purpose in the shipbuilding trade under James I, particularly in the southeast of England, the Company decided to establish its own shipyard on the lower Thames. Thus were developed the East Indiamen, the best merchant ships in the world until the arrival of the American clippers in the 19th century.

The English East Indiamen had to contend with Indian, Chinese, and Annamese pirates, European privateers, often indistinguishable from pirates, Portuguese and French, as well as Dutch, rivals who, it might be discovered at the end of a voyage lasting more than 6 months, were now at war with England. Sometimes a foreign ship would pretend to be a pirate, and turn out to be a naval vessel of another country. Sometimes a ship would pretend to be a naval vessel and turn out to be a pirate—Chinese and Japanese junks were very fond of this ploy. Sometimes a brigand-ruler of an island would be encouraged by the Dutch, Portuguese, or French to board an East Indiaman in a friendly manner, and then try to seize the ship—junks in the East Indies were inclined to this activity.

For all these reasons the East India Company built their ships well, fitted them with the best sails and rigging, and finished them with tar and paint of the highest quality. Because they had to carry bulky cargo, the ships were, to modern eyes, massively plump and awkward to windward; but they were of finer design and construction, it was said, than those of any navy, including that of France which was pre-eminent for long periods. The East Indiamen could not outsail pirates or other enemies, so they were supplied with enough powder and shot to fight at least 2 battles, and although they often sailed in convoy, there are many records of successful single-ship actions.

They could renew their stores at St. Helena, a British base for fresh food and water and other necessities of life at sea, and an absolute possession of the East India Company from 1674 until the Napoleonic Wars, but the Cape of Good Hope was in the hands of the Dutch, who were not always friendly, while Madagascar was a fierce, inhospitable, little-known island, a nest of pirates of all European nationalities. Ships frequently called at the Canaries to take on stores of citrus fruits as an ascorbic against the dreaded scurvy, but would then often travel down the length of the Atlantic, round the Cape of Good Hope, and all the way to India or China without seeing another vessel. This 25,000 mile voyage<sup>8</sup> took perhaps 6 months. Other

8. The minimum distance from the English Channel to, say, Canton, via the Cape of Good Hope, is less than 12,000 miles. This is increased in a sailing ship, which is incapable of making a straight-line course, to about double.

ships might have an even longer trip if chance, wind, or weather obliged them to call not only at St. Helena and the Canaries, but also in Brazil, Buenos Aires, or Angola. The intention was for the ships to be so well found that they were self-sufficient.

As with ships, so with men. "Freight is the mother of wages" was a doctrine which held good in English law until 1854. A shipwrecked mariner was not rewarded for an unsuccessful voyage, and a man was only paid at the end of a complete round trip, England to England. Men had to be selected and chosen for their ability to work and fight a ship with a far smaller crew than a vessel of equivalent size and armament in the Royal Navy. In modern parlance, productivity had to be high, and the men therefore of a corresponding high quality. East India Company ships attracted better officers than did the Royal Navy, and the men were not forcibly pressed, as in the Navy, but volunteers. Adventure, a desire to see the world, and a love of the sea were, as always, the reasons for young men to go to sea, but a particular motive for joining the East India Company was the attendant exemption from impress, kidnapping, conscription, hijacking, or whatever it might be called by the Royal Navy, at sea or on shore. As a result the crews were of the best, not the paltry collection of men of all nations, the dregs of the world's seafarers, with which the Navy had to do its business.

The Company had also, by chance, managed to make the interests of its officers coincide with those of the management, by giving the ships' officers a right to a certain free tonnage with which to trade. This privilege varied from time to time, but might be about 10 tons for a captain, with other officers pro rata. The profit on a ton of tea was equivalent to many years' wages if it were magnified by evading customs duty and selling the tea to smugglers, a common enough practice. Because the privilege of "private trade" was limited to space, not weight, the tendency was for officers to buy or transport only the very best tea. Smuggled tea therefore acquired a reputation of being of higher quality than the legally imported supplies auctioned by the East India Company. The Company, of course, frowned on smuggling, and the crew, if maltreated, would inform on any captain and officers who engaged in the practice. But there was enough profit in the smuggling transactions to grease the palms of most of the crew. This gigantic conspiracy was partially stopped by the reduction of tea duty in 1784, but other goods took the place of tea, and "private trade" was always a very important element in the saga of the Company.

For good or ill, China turned her back on the world during the 15th century. The Imperial Court was transferred from Nanking to Peking, much further north. Overseas trade by Chinese nationals was gradually abandoned, until in 1521 it was declared illegal. The myth was established that China lacked nothing. From about 1500, the Chinese genius for improvisation, development, arid philosophical inquiry was replaced by a static defense of tile past, a regressive complacency about the superiority of Chinese culture, and a refusal to accept the worth of anything foreign. This psychological defense was matched by a requirement that foreign trade, if any, should be conducted by foreigners, though the Chinese were sometimes still the actual negotiators, bankers, and merchants, known as *hongs*. Foreigners were despised as "foreign devils," but for reasons of state, trade was carried on by Japanese, Koreans, Formosans, and Europeans.

Before 1840 there were no treaty ports in China; Europeans were restricted to a small enclave at Canton, and permitted to trade only with the *hongs*, who were sureties for payment of customs dues and for the proper conduct of business. The trade in China tea was largely in the hands of the British East India Company, who had established a near-monopoly in the finished product, challenged by the Dutch, Portuguese, and French with varying success. This was the position from about 1686 until 1834, when the liberal sentiments of the day led the English to throw open the tea trade to all comers.

The China ships, which were not only owned but chartered by the Company, sailed direct to and from Canton. During some periods of history they were in fact prohibited from sailing via India, in order to prevent their crews from indulging in a highly profitable local trade or other corrupt practices. On the way out to China round the Cape of Good Hope, East Indiamen often took a track to the south of Australia—in the days before it had been discovered—along the Roaring Forties, and then north past New Guinea. At the end of the 18th century, they returned from China almost due east from Canton, through the passage between Formosa and the Philippines, then south through the Carolines, to Dampier Strait at the northern end of New



Guinea. This track, which left the Pacific north of Australia and was fully 4000 miles longer than going via Singapore, took less time because the winds were usually fair. It was also chosen to avoid unfriendly ships in the narrow waters of the Straits of Malacca.

In the century and a half after 1680, almost no one in the Western world knew anything about tea: what it was or how it was grown, treated, sorted, and blended. Their acquaintance with it began on the wharfside at Canton, and, as long as the quality of the product could be ascertained by a ritual tasting, and the price was reasonable, the European buyer was satisfied. An elaborate chain of intermediaries was imposed between the Chinese peasant who grew the tea and the European who drank it. There was a tea purchaser in each village who might buy the few pounds each peasant produced at each plucking. A tea center in each district prepared the tea for sale, after which it went to an elaborate provincial sorting and blending establishment. The tea was then sent to Canton by water, by packhorse, or on the backs of coolies; here the cases were opened and the whole process of blending began again.

Tea is a dried and blended preparation of the leaves, buds, and flowers of a single species, *Camellia sinensis*,<sup>9</sup> and much adulteration of this preparation took place along the line. After arriving in London, Amsterdam, or Paris, the tea was sorted, blended, and adulterated again. Then it was auctioned, and the merchant would blend and pack the tea in quantities small enough to sell to the shopkeeper, who might blend and adulterate yet again. Both Europeans and Chinese mixed tea with twigs, both of the tea camellia and other members of the Theaceae family. They also used wood, pine bark, alien leaves, sawdust, soot, and Prussian blue, as well as legitimate additives in the form of scented bergamot, orange, lemon, verbena, or the leaves of other shrubs to give the tea a particular taste.

Adulteration was one of the early answers to the exponential European demand for tea which the Chinese were unable to satisfy legitimately, and it illustrates the innocence of the European buyers. The merchants did not mind adulteration as long as they could pass the product on and there was no customer to gainsay them, and when the Europeans began to apply rational methods to the problem of producing tea, they discovered that the subtle Chinese had been able to meet market demand, if not always with tea. It is one of the great ironies of the trade that the bergamot-flavored Earl Grey, now regarded as a “great tea,” was originally scented with *Chloranthus inconspicuus*, *Jasminum sambac*, *Gardenia florida*, *Murraya exotica*, and *Aglaia odorata*, as well as orange and lemon leaves. The “great tea” started as a standard adulteration to spin out a shortage.

If properly grown in the right place and properly fertilized, the tea bush will yield up to 5 pounds (wet weight) per bush per year. The Chinese peasant grew his bushes as a garden crop, probably innocent of all fertilizer (even human manure, or “night soil”), and he might pluck a 10th of what is produced in an Indian plantation today. In the early 18th century he would not have been paid more than 1 penny per pound (wet) for his efforts, equivalent to between 3 pence and 6 pence per pound of dry weight. This tea then arrived in London, Amsterdam, or Paris, and cost, retail, from £3 per pound in 1700 down to all average of 3 shillings one hundred years later. To this had to be added the exorbitant duty which every European government imposed upon tea imports and, in the case of all continental countries, internal customs duties or octroi as well. From the Chinese peasant to the European consumer there was a markup of between 8 and 12 times in the hands of the commercial intermediaries, plus the government’s impost, which ranged between 50 and

9. In his *Genera Plantarum*, published in 1753, Linnaeus included all teas under the name *Thea sinensis*, and recognized 2 camellias, *Camellia japonica* and *C. sasanqua*. The camellia was named in honor of a Moravian Jesuit called Came (Latinized as Camellus), who lived from 1660 to 1706 and wrote about plants in Asia. In 1762 Linnaeus distinguished 2 varieties of tea, *Thea viridis* and *T. bohea*. The former means “green”; the latter is the name of a range of mountains from where, it was once thought, black tea came.

For 2 centuries every botanist has made a contribution to the debate, but the distinctions postulated by O. Kuntze are now the accepted ones. *Camellia* and *Thea* are regarded as members of the same genus—*Camellia*—belonging to the family Theaceae. Widely different ecotypes exist, notably the bushy variety *sinensis* and the rangy tea trees of Assam (var. *assamica*), which also grow wild in China. There are about 240 species in the Theaceae family, of which about 7 produce some sort of infusion. Only 2 of the species, however, the bushy and the rangy types, have any real economic importance.

100% of wholesale value and was always levied at the ports. It was no wonder that smuggling and adulteration were common practices, probably doubling the legal tonnage imported.

Legal imports into England were probably about 50 short tons in 1700, at a wholesale value of about £4000 per ton, or £2 per pound. The continent probably imported about a 3rd as much. About a 5th was re-exported by the East India Company to British colonies, including America. The total imports into Britain grew from 50 tons in 1700 to at least 15,000 tons in 1800. The average for the century was rather less than 4000 tons, and the wholesale, landed but untaxed, value in bond was about £350 per ton, falling from £4000 in 1700 to about £200 (or 2 shillings per pound) in 1800. The volume rose 300 times, or 30,000%, while the price fell to 5% of what it had formerly been in London.

All this tea, if tea it was, came from China. All of it passed through the tiny area of Canton in which the Europeans were welcome. Ships would carry only a few hundred tons each, in order to spread risks. Transporting 15,000 tons was therefore quite a task, but a rewarding one.

The British East India Company was believed to add at least a 3rd to the price of tea, thus taking £100 a ton out of the 375,000 tons imported during the century. This global figure obscures the rise, on the same basis, of the East India Company's cut, from a sum equivalent to \$17 million at the beginning of the century to an annual equivalent of \$800 million in 1800. The East India Company was big business, hated and loathed by smugglers and consumers alike, and a symbol of corrupt, complacent monopoly.

It may be a surprising connection, but the influence of the tea trade upon European porcelain was profound and complicated, and had a great deal more to do with freight and trading requirements and good ship trimming than with mere cups and teapots directly connected with tea consumption. Porcelain is a very fine, translucent ceramic, loosely and originally called "china" and distinguishable by anyone from earthenware, pottery, or stoneware, the crude native products of all other areas of the world before the 18th century. The word "porcelain" itself comes from the Italian *porcellano*, literally a little pig, which describes the shape of the common Mediterranean cowrie shell, whose fine, smooth, translucent surface porcelain was considered to resemble.

Long before Europeans discovered China (or china), porcelain had been exported to Persia, Arabia, and Turkey, and fine examples of pre-1500 Chinese porcelain can still be found in everyday use in parts of the East. (A hundred years ago an English traveler collected nearly 5 tons of Ming pieces in Persia. When part of the collection was sold on his death in 1905, the sum realized was over £30,000 nearly \$1.5 million in today's money. He had paid less than £200—£6000 today—for the whole collection 30 years before.) From about A.D. 800 onward, Chinese junks or Arab dhows took porcelain all over the Indian Ocean, and shards have been found as far west as Morocco, as far south as Zanzibar and Bali, and as far east as Hawaii. The porcelain had been transported by Chinese, Arabs, Polynesians, or East Indians. The first trade with Europeans was conducted in the Middle Ages in Cairo and other North African entrepôts. The first imitation of this china was attempted in early Renaissance Italy; the result was not porcelain, but faience or majolica, because it contained only silica, alumina, lime, magnesium, oxide of iron and carbon in varying proportions. None of the ceramics made in Europe before the 18th century contained any kaolin (china clay), the ingredient which is the secret of true porcelain.<sup>11</sup>

The China trade, as conducted by the Portuguese in the 16th century, the Dutch in the 17th, and the English in the 18th, in order of sequential pre-eminence, and by the French, Danes, and Swedes as minor trading powers, involved 2 water-sensitive, high-value commodities: tea and silk. To trim the ship and make her sail properly, about half the weight, but much less than half the volume, of heavy, water-resistant goods or ballast was needed in the bilges. This ballast could be carried permanently in the ship's bottom or externally, as a keel; but permanent ballast paid no revenue—it was dead weight. A far better method was

10. Short ton = 2000 pounds; metric tonne = 2200 Pounds; long ton = 2240 pounds.

11. Ironically, the world's best supply of kaolin, which is now used in many other process industries as well as china, is found in Cornwall, and the residual dumps around St. Austell give the landscape its peculiar character. Cornish kaolin (china clay) is today exported all over the world, even to China, but these deposits were unknown before 1750.

to find some heavy commodity, which could be traded. The problem of ballast was much more acute in the China trade than in any other, since both tea and silk had to be carried in the middle of the ship to prevent any risk of wetting from the sea, from condensation or from rain.

China did have 1 major raw material deficiency, copper ore, so copper, gold, and silver bullion became the medium of exchange with the Celestial Kingdom. Japan supplied most of the copper before the Europeans arrived, after which the various East India Companies came to dominate the copper trade with China. The ships returned with tea, ballasted with mercury, other minerals, and porcelain, which Europeans were unable to make until the 18th century, as mentioned above. Very roughly, a quarter of all tea imported was to be matched by heavy goods—ballast—called *kentledge* in the 18th century; and from the ships' records available, about a quarter of all the *kentledge* was porcelain. Therefore, for every 100 tons of tea, 6% by weight of porcelain was imported into Europe. Thus if, on average throughout the 18th century, 4000 tons of tea were imported in England each year, probably 240 tons of porcelain were also imported. Nearly as much again would have been imported into Europe and the American colonies.

This huge tonnage of porcelain was often handled by the supercargoes, independent traders carried by each East India Company. The porcelain was treated with scant respect. Heavy objects were wanted, or small, easily stowed plates, cups, and saucers. The job of the supercargo was to see that the tonnage was filled. Highly complicated arrangements were very common, and corrupt and convoluted the deals turned out to be: There were orders from England, patterns from France, and specifications from the Netherlands. The Chinese *hongs* in Canton were driven down to the lowest possible prices: £5/10 shillings in 1712 for a 216-piece dinner service; £7/7 shillings in 1730 for a tea service for 200 people, each piece decorated with the arms of the ambassador who ordered it; teapots, 5000 of them in 1732, imported at 1½ pence each. Even if these prices are multiplied by 100 to give an approximation of today's prices, china of this quality was incredibly cheap.

The tonnage should be put into perspective. A porcelain teacup of the 18th century weighed less than 2 ounces, and a dinner plate less than 8 ounces. There are nearly 36,000 ounces to an imperial ton. If the average piece weighed 4 ounces, and 240 tons were imported, then over 5 million pieces were imported on average every year into Europe. This kind of order of magnitude is confirmed by the records of certain East India Company ships: 250,000+ pieces in a 20-ton lot in 1718 (average 2.8 ounces per piece); 332,000 pieces in a 40-ton lot in 1724 (average 4.3 ounces per piece); and 178,000 pieces in 1732 in an 18-ton lot (average 3.6 ounces per piece).

The origin of teapots and teacups presents a problem. The Chinese, like many other peoples at a later stage—Indians, Arabs, and Turks—did not have pots. Their tea was made in a kettle. The early English silver or other metal teapot was known as a kettle, and the tea was mixed with sugar and, perhaps, other herbs and “brewed up” in the kettle. This practice is followed in Morocco, Algeria, and Tunisia to this day.

Before about 1720 no factory in Europe would have been capable of making a ceramic pot that could withstand boiling or even very hot water, but some entrepreneur, observing the beautiful shape of the Chinese wine flask, suggested that it should be copied and sold in Europe as a teapot. The pot, therefore, is in effect a foreign invention, not used in China.

The teacup with a handle is also a foreign invention, specifically European. The Chinese did not put handles on their own teacups, because they drank their tea cool enough to render handles unnecessary—though they did not use milk. Handleless cups stow more easily than cups with handles, but handles can be designed specifically for easy stowage rather than easy drinking; some early teacups were designed in this way, and are difficult to use with either delicacy or efficiency. Such cups were designed in England and made in China. Handleless cups were made in England after porcelain manufacture began to imitate Chinese styles. Handles were specifically added to cups made in China after about 1750, and the trade of handle maker became an acknowledged one in large European cities. About half the cups in use in 1770 in Europe would have had handles, half not. So why did Europeans add handles to cups?

The 18th century Europeans, like the Japanese but unlike the Chinese or the Russians, regarded tea making as a ceremony. There was the boiling water, not boiled for too long. There was the specially warmed

pot. There was the infusion time. There was the pouring, a little bit of a ceremony all on its own. There was, of course, originally no question of adding milk, either before or after the tea, but there was the problem of 18th century sugar, which had to be put into the cup before the tea or it would not dissolve. The cup of tea was then sipped, hot, and therefore needed a handle. In Russia and China the tea kettle was on the hob all the time, and drunk lukewarm in a small bowl by the Chinese or in a glass by upper-class Russians. Of Course, there is no merit in drinking China tea of the highest quality overhot, since the flavor is best sampled at a temperature a few degrees above blood heat; it should never be drunk at a temperature which requires a handle on a cup. In some societies, praise was showered on the tea by blowing upon the surface and by making exaggerated sucking noises when consuming it. This seems curious, since it would appear to be a criticism of the temperature of the tea, but it should surprise no one: There are a great many variants in the human family's approach to tea consumption.

By the end of the 18th century the trade in made-for-Europe porcelain had come to all end, and the traders had to find something else to act as ballast. At the behest of their own manufacturers European governments had made the export of porcelain for the West a difficult proposition, even at the ridiculously low prices paid in Canton.

Classic Chinese porcelain was (and is) a once-fired, hard-paste, high-temperature (1400°C) ceramic, cheaper and better than early European porcelain, which was twice-fired, soft-paste, low-temperature (1250°C) and often mis-shapen or rejected as imperfect. Chinese porcelain was also stronger and truly vitrified; the glazes on the European version were often porous or partly porous, more granular and less stable. But from 1760 onward the Europeans, and particularly the English, developed home-produced stoneware, heavy, coarse, with a short life, but far cheaper even than Chinese porcelain. *Hongs* were left with enormous stocks of real porcelain on their hands; one merchant in Canton had 12 million pieces left in his warehouse when the British East India Company decided in 1791 to discontinue official imports. The East India Company in London was already complaining in the 1780s of having huge quantities of unsold porcelain in its warehouse. Private imports by ships' officers as ballast among their teas continued; there must have been many bargains while millions of pieces were being sold off below cost. Twelve million pieces were then worth £20,000 sterling. Today, the same pieces would be worth at least a billion dollars—a good investment which no one made.

If 400,000 tons of tea were imported by the British East India Company in the 107 years between the beginning of its monopoly in 1684 and 1791, when the decision was made to cease imports of porcelain, then about 24,000 tons of porcelain were imported as ballast in the same period. This is equivalent, at an average 4 ounces per piece, to 215 million pieces of Chinese porcelain. This sounds a great many pieces, but it only amounts to about 5 pieces for every Briton who lived beyond the age of 10 in the same period. The vast majority would not have used ceramics at the time, but of people who used china at all in the 18th century, most would have used Chinese porcelain, because before about 1780 it was cheaper than ordinary pottery. For a short period in history, therefore, the tea trade was responsible for the highest "quality of life" in the middle-class houses of England.

The tea trade is, of course, responsible for much more than this. The willow pattern was derived in England from a Chinese version of an English idea of a Chinese scene. Chinese images were anglicized: European scenes were chinified. *Chinoiserie*, the concept of European furniture, decoration, and textiles imitating Chinese designs, came into fashion as a result of the tea trade. The unlocking of the secret of porcelain manufacture, which took place in Europe between 1709 at Meissen and 1742 at Chelsea, was the direct result of a desire to compete with the Chinese imports, and the product was something different—a whole new industry.

Europe's first image of Japan, Korea, and Annam also came from the imports of porcelain from those countries; carried by Chinese junk, these goods were traded in the East Indies or exchanged at trading posts in Formosa, which was occupied by the Dutch for most of the 17th century, becoming Chinese only in 1682. Porcelain from these 3 countries was not as fine as the Chinese product, but better than most contemporary European ceramics. These "heathen," "primitive" peoples made a peculiar product in difficult conditions

for many hundreds of years before the “clever” Europeans discovered how to compete. When competition came, it was not exactly on equal terms. The Europeans altered the rules, cheapened the process, and changed the product. In 1800 the European pottery industry was only about 5% involved with porcelain; the rest consisted of coarse, heavy wares. This represented a regression in the 50 years since 1750. Before heavy, factory-made earthenware, the European bourgeoisie drank tea in the finest porcelain people of relatively modest means would ever use. Earthenware may or may not have been an improvement over tinware, pewter, and wood in the kitchen, but it was certainly a regression in Victorian parlors.

The tea trade was in crisis in the last 3rd of the 18th century. All tea came from China and was imported, legally by the East India Companies of the European countries, illegally by smugglers. Over 200 heavy ships were involved in voyages from Canton: two-thirds of them reached Europe each year. (The other third traded in the Orient.) The tea tonnage they brought was probably 12,000 In 1770. English duty amounted to more than half the cost of the tea. It is probable that the illegal trade amounted to an additional 6000 tons. The obvious answer was to reduce the duty.

This proved too simple and too radical a solution for the government of Lord North. For reasons which appeared very attractive at the time, North’s cabinet decided to kill 3 birds with 1 stone. They would sell the tea in the American colonies, which would get rid of the stuff. They would apply a duty of only 3 pence per pound (against the norm of 2 shillings 6 pence, on average, or one-tenth the former duty); this would make the bargain irresistible, and drive the smugglers out of business. Finally, the imposition of this tiny duty, though making the tea irresistible, would compel the colonists to admit the right of the home government to tax the people of America.

This last issue was seen by all politicians, on both sides of the Atlantic, to be the key problem; but like so many matters of bedrock principle which become the inherent fulcrum on which all other motives depend, the question of “taxation without representation” was not at first raised. This old English Radical cry, which goes back in essence to the Magna Carta, had been raised in the American colonies in 1765, when the British government sought, not unreasonably, to make the Americans help to pay for the war against France, which had cost the English nearly as much as it had benefited the Americans.

There were 3 million people in the colonies, more than in Scotland, Wales, or Ireland, and about half as many as in England itself. They were not poor. They were probably much richer than the average Englishman—partly because the ownership of slaves increased apparent wealth, while reducing the numbers of people among whom that wealth had to be divided.<sup>12</sup> But Americans, like Englishmen, disliked paying taxes. The stamp tax<sup>13</sup> was withdrawn in 1766, but in the same session of Commons a resounding declaration was made that the British Parliament had every right to tax the colonies, and trifling, annoying duties (“of principle”), costing far more to collect than they produced in revenue, were imposed on glass, lead, paper, and tea. But King George III obstinately persuaded his ministers that, when the other taxes were reduced, the 1 on tea should remain, though at only 3 pence per pound. This too would cost more to collect than it would ever produce in revenue, since there was no current likelihood of importing more than 5 million pounds of tea at, say 1 shilling 6 pence per pound retail. This would produce about £60,000 in revenue at 3 pence per pound duty. The actual import of all tea, legal and smuggled (at a much higher price), was only about a quarter of this quantity. The British motives were most curious, to say the least. In May 1769 the government had declared that it did not propose to levy any more taxes on the colonies for the sake of raising revenue; by their own reckoning, therefore, the tea duty was imposed only to establish the right of the government to tax the colonies.

Englishmen were deeply divided on the issue; so, to be fair, were the colonists. But New England was probably overwhelmingly in favor of resistance. After all, for many years the prosperity of the traders and

12. Alice Hanson Jones’ seminal *Wealth of a Nation to Be* provides an excellent picture of the true wealth of the colonists in the 1760s and 1770s.

13. The stamp tax was levied on all legal transactions involving real estate, partnerships, shares, etc., usually at about 1% of the sale/purchase or succession or whatever. The tax was difficult to escape, and therefore doubly unpopular.

shippers of the Northeast had relied on an absolutely independent trade between the French West Indian colonies—flying a successful ribald salute in the direction of the Navigation Acts<sup>14</sup>—and trading in breach of the Indian laws.<sup>15</sup> They made money by smuggling French sugar from the West Indies, turning it into rum, and selling the rum to the Indians; no duty was paid on either the sugar or the rum. Most New Englanders paid scant heed to the government in London. Some Americans had continued to trade with the enemy while their brothers or neighbors or friends were fighting the French or the Indian allies of the French. Not for them the modern idea of total war—in stony New England, the sea and its trade represented greater wealth than anything on land, and that trade had to continue, war or no war.

Massachusetts only needed a spark to ignite it when the tea duty came in, and on 16 December 1773 a body of whites, disguised as Mohawk Indians, boarded 3 ships in Boston harbor and threw the whole cargo into the water. The shores of the tidal reaches of the Charles River were covered with tea leaves. Other parts of the colonies had their own tea parties. Large quantities were destroyed at New York, Philadelphia, Annapolis, Savannah, and Charleston. At most of these parties the jokers wore Indian dress. Women of quality met all over to proscribe the more usual kind of tea party. Sometimes they passed resolutions; one from Edenton, North Carolina, included these words: “...how zealously and faithfully American ladies follow the laudable example of their husbands...” and they went on to forswear tea in favor of other drinks.

The intellectually respectable reason for American resistance was that the chosen corporation, the East India Company, would have a monopoly of legal tea, sold through chosen merchants who would have a local monopoly, and other trade in other commodities would in turn be awarded by the crown to other monopolists. Legitimate objection was mixed up with the interests of the smugglers of Providence, New York, and Philadelphia, until the whole of New England and the middle colonies were yelping about cheap tea interfering with liberty. Tea became not so much a tippie, more a talisman. The party in favor of the English proposal was held to be stuffy, establishment, and overcorrect in its attitude; the opposition joined the coffee party, which was young at heart, forward-looking, and independent in spirit. It is quite extraordinary that this beverage, tea, should have become an important element in the apparently irresistible process of the American Revolution. But ever since Independence, tea has had a slightly un-American feel about it, and *loyal* Canada has drunk 4 times as much tea per head than has the independent United States. Tea is identified as the principal nonalcoholic drink of Anglo-Saxons everywhere except in the United States. Can this be another result of Lord North’s parlous administration? Some have even claimed that the Boston Tea Party was one of the prime reasons for the Revolution.

The tea parties might have become just a sour joke, but the British reaction was to close the port of Boston, which led directly to the Declaration of Independence. Resistance to tea became a causative factor in the colonists’ major struggle against taxation without representation.

The war increased the numbers of Americans who found virtue in Independence, but it was the adhesion of England’s jealous European rivals to the American cause which guaranteed the existence of the United States. At the end, the British were fighting their own kith and kin, plus the French, the Spanish, and the Dutch, while the Baltic countries formed a neutral but unfriendly Northern League with the aim of preventing the Royal Navy searching neutral ships for contraband. By 1783 the exhausting war was over. The next year, England had a more prudent, more careful, more sensible First Lord of the Treasury, William Pitt the Younger.

Encouraged by his friend Mr. Twining, Pitt turned his attention to tea. In 1784 the duty was nearly as much as wholesale, bonded cost, being 50% of the wholesale price, plus 1 Shilling 1 pence per pound. Thus for the cheapest tea, a Bohea retailing at 5 shillings per pound, the duty was more than 2 shillings 6 pence,

14. The Navigation Acts, only repealed in the late 1840s, decreed that trade into and out of the United Kingdom should only be conducted in British ships, or vessels of the country of origin of the imports (or country of destination in the case of exports). This restrictive practice was intended to strengthen the Merchant Marine.
15. The Indian laws, of various dates, prohibited the sale of intoxicating liquor, firearms, or explosives to the Amerindians. As every connoisseur of westerns is aware, these laws were honored more in the breach than in the observance.

or 50%, and for the most expensive tea, say a Hyson costing as much as £1, the duty amounted to about 8 shillings 6 pence, or 42½%. As a direct consequence of high duties, about half the tea was smuggled in from the Netherlands, or sold at sea by smugglers from the private trade of ships' officers on board the East India-men themselves. The revenue was being made ridiculous, the nation divided and disaffected, and the law brought into disrepute. Pitt acted boldly. Tea tax was reduced to a sliding scale of between 2½ pence and 6½ pence—about 10%. Smugglers and Dutch tea traders were outraged, but imports of legal tea doubled, and everyone else was full of praise for Pitt's obvious commonsense.

In 1801 the English each consumed 2½ pounds of tea and 17 pounds of sugar (much of it with tea) per head. Sugar "demanded" slavery: What was the cost of tea? At retail, the nation was paying out £7.5 million, at the English port about half that sum, and about a quarter of that sum, £2 million, in China.

This huge sum of money (equivalent to about a billion dollars a year in today's value) had to be met every year in Canton, and found by the East India Company, by the supercargoes who traded for the London importing houses, or by the ships' officers who had the privilege of conducting private trade. At that date no new technology existed which could interest the Chinese. China was self-sufficient in food, textiles, most minerals, and all the other necessities of life. For more than 2 centuries of trade with Europeans, the Chinese, the greatest preindustrial traders, had accepted only copper, gold, and silver in exchange. The enormous rise in the consumption of tea in England, which was replicated in the Netherlands, Germany, Sweden, and the British colonies, could be supplied at that date only from China, and apparently only in exchange for bullion. Concurrently, the French Revolutionary and Napoleonic Wars had placed a great strain upon the finances of all the belligerents: In France so much money was printed (the assignats) that inflation resulted. In continental Europe French armies lived off the country, and the French government legalized looting on a vast scale; in England the government abandoned the gold standard,<sup>16</sup> which gave rise to the only serious inflation between 1660 and 1914 in a country where sound money was more important than the views of economists. The world went mad with war, and money lost its value.

Nothing of this kind, however, happened in China. The local merchants, half a world away from Europe, had no use for paper money. They recognized gold as a store of value, but they preferred silver to gold. Relatively, these true commodities had risen in value against European labor, materials, and manufactures by 20% in 1801, and by 50% in 1810. The price of tea also rose, but not by any like multiple. The East India Company, its trading partners, and its officers found themselves the classic victims of inflation. Costs rose; product value rose less. Result: misery. An answer had to be found.

That answer was opium, which had been an East India Company monopoly in India since 1758, the year after Clive's great victory at Plassey. In 1773 the illicit trade with China was wrested from the Portuguese by the English. China had banned opium in 1729, making its growing, supply or smoking an offense, and ultimately a capital crime. The British nevertheless exported 60 tons in 1776 and 5 times that quantity in 1790; this was all sold to smugglers or to corrupt Chinese. After 1800 the traffic was organized and became an immense industry. The growing and preparation of opium in India was a monopoly, carefully controlled by the East India Company, which was at that date not only the monopoly trader within India, but also the government. Areas of Bengal most suitable for growing the opium poppy were carefully selected by the English, as advised by Turkish and Persian experience. The white-flowered poppy was grown around Patna, and the red-flowered one in the hills. The collection of the opium juice started about 25 February, and consisted of making the poppy-head "bleed" its juice daily for 2 to 3 weeks. The collection of this juice and its cure, and the preparation of the opium cake by drying, pressing, and fermentation, became an industry employing at its height nearly a million men, women, and children.

16. From 1660 to 1914, with a short period of suspension during the Napoleonic Wars, England (and later the United Kingdom) was on a standard of currency value which related the pound (sovereign) to a known amount of gold. This was the "gold standard." It gave the British economy a stability and discipline which proved too irksome for more recent politicians. Since the Bank of England stopped gold payments in 1914, the price level in Great Britain has inflated more than 100 times. Between 1660 and 1914 the price of wheat, for example, remained static within a range which reflected the state of trade, harvests, and surpluses, and which was free of long-term inflation.

The growing and manufacture of opium at that date not only proved to be from 1½ to 3 times as profitable per acre as growing wheat or rice, but the added value to the East India Company was of an order of profit which can only be described by the well-known phrase “the right to print money.” The Indian peasant was, of course, taxed by the Company, so that most of his advantage in growing opium rather than wheat reverted to the Company. The British charged the Chinese merchants about £1500 per ton for opium at a time when tea was about £40 per ton at Canton, and gold less than £4 per ounce. To be historically fair to the British, and to allow that opium required twice the effort in growth, preparation, and manufacture of the best tea, and 4 times that of the average tea, that would still make opium only 3 times the average value, by weight, of tea. But in fact the ratio over all teas at Canton was nearly 40:1 in favor of opium. In 1830 the British exported nearly 3 million pounds, or 1500 tons, of opium a year, worth £2 million in the money of those days. This is equivalent to a billion dollars a year in today’s money.

The East India Company and the British government rationalized the opium trade with the kind of bland hypocrisy which has made the English establishment a byword for 3 centuries. There was no direct connection between the opium trade and the East India Company which, of course, had a monopoly position in the British tea trade until 1834 and ruled India until 1858, after the Mutiny. The opium was sold at auction in Calcutta. After this, the Company abjured all responsibility for the drug.

The “country” merchants, that is those who traded between India and other places in the East, bought the opium and took it to Lintin Island in Canton Bay, where it was stored in hulks anchored offshore. Thereafter it was handled by Chinese. Again the Company, whose ships passed Lintin Island on their way to and from Canton, knew quite well what went on, but could plead ignorance to the Chinese authorities. Though the country merchants traded in other goods, notably cotton, opium represented 75% of the trade and was exchanged for silver coin, which was taken back to Calcutta and sold to the East India Company against bankers’ drafts in London. Again, this trade was continuous, and the Company could claim that there was nothing unusual in buying silver in Calcutta in the normal way of business; indeed, the Company would always exchange silver for anyone in banking or commerce any day of the year—except Sundays, of course.

The silver then went all the way back to London, the Company taking a cut on the freight and insurance. The Company’s agents, or the supercargoes leaving the Port of London, were supplied with the necessary Chinese silver dollars to buy tea in Canton itself. Again, the Company could claim that they did not know that this silver was already dirty money, obtained in exchange for opium. Protests from China to the Company or to the British government were greeted with a shrug and regrets about the inability of the Company or the government to interfere; no wonder the Chinese had a loathing and contempt for the British. An alternative arrangement involved the country merchants selling their cargoes further up the coast—offshore, but in Chinese territorial waters—doing a deal with the opium merchants in junks rather like rumrunners importing alcohol offshore during Prohibition. Efforts were made by the Chinese to check the trade, but they were no more successful than today’s Italian or American efforts to check the Mafia. To quote from a Victorian account, *The Fan Kwai at Canton*, by W.C. Hunter:

*So perfect a system of bribery existed (with which foreigners had nothing whatever to do) that the business was carried on with ease and regularity. Temporary interruptions occurred, as for instance on the installation of newly arrived magistrates. Then the question of fees arose; but was soon settled unless the newcomer was exorbitant in his demands, or, as the broker would express it, ‘too muchee foolo’. In good time, however, it would be arranged satisfactorily, the brokers re-appeared with beaming faces, and peace and immunity reigned in the land..*

*The Canton officials rarely made any reference to the Lintin station; but sometimes, compelled by force to do so, would issue a proclamation ordering vessels ‘loitering at the outer anchorage’ either to come into port or sail away to their own countries lest the ‘dragons of war’ should be opened, and with fiery discharges annihilate all who opposed this, a ‘special edict’.*



The American tea merchants<sup>17</sup> were not directly involved in the opium growing, as were the East Indian government officials who controlled the drug culture in Bengal. The American merchants bought opium at Constantinople, Salonika, Smyrna, or Beirut, all then part of the Ottoman Turkish Empire. The Turkish government monopoly was less honest than the Indian one, and the opium was adulterated with grape juice thickened with flour, fig paste, liquorice, half-dried apricots, gum tragacanth, and sometimes even spirits of lead. After these adulterants had been removed, the Turkish opium was graded as shipping, druggist's, or manufacturing quality. The last was used to make morphia, then, after the 1870s, heroin.<sup>18</sup> The druggist's opium was used for the ethical trade, and the very best supplies were reserved for smoking or eating. It was this, the finest grade, which the American tea merchants bought, or had bought for them, and which they shipped direct to Canton or sent via the eastern seaboard of the United States. These merchants were anxious to conceal their vital connection with the drug trade, but the opium element was as important in the American tea trade as in the British. Many a fine family in New York, Boston, or Salem grew rich on this commerce, and opium became as much of a permeating problem in the Chinese Empire in the late 19th century as is heroin in the United States today. Ironically opium, even of the purest type, is less damaging than heroin, since it takes longer to enter the bloodstream, just as the *coca* leaf is relatively harmless compared with *cocaine* injected via the hypodermic needle.

The opium—silver—tea syndrome was a perfect self-enrichment process, yet strangely one not studied by great economists such as Maynard Keynes, who in his youth wrote a book about Indian silver. In order to meet the demand for a mildly addictive drug infusion—tea—which ultimately goes down the drain, the merchants had previously exchanged silver, which requires between 1 and 1000 tons of rock to be crushed to produce each ounce of bullion, which is then worth more than most commodities. Silver becomes short and difficult to obtain. Substitute a crop—opium—which is ultra-addictive and goes up in smoke, and the possession of which is semilegal at the place of demand. Provided that the supply of the drug is carefully controlled so that it never outruns the increase in the number of addicts, you are effectively “growing” silver much more cheaply than you can mine it, and so “printing money,” but in a way which guarantees that the recipients of that money destroy it as soon as they can. Significantly, though the poppy can be grown in

17. The importance of tea, even a hundred years after the Boston Tea Party, can be appreciated from the widely known and practiced habit of coffee adulteration. Between 1859 and 1875 genuine coffee doubled in price in real terms in New York. *The American Grocer* of 29 April 1876 gives the following as an excellent basis for “ground coffee” retailing at 25c per pound, at a gross profit of 400%:

Roasted peas	40%
Roasted rye	20%
Chicory	10%
Other	5%
Best coffee	25%

“Other” included tallow, depending on the greasiness of the chicory, which was always to be premixed with the dry rye before grinding the whole concoction. All this adulteration took place before the massive imports of Brazilian coffee made the task too much trouble for too little gain. But even in 1940 a great deal of “coffee” being served to the public was essentially adulterated. A hundred years previously, “real” coffee had been a great rarity. Most coffee served outside the homes of the rich was roasted corn. Slaves, servants, and children, served real coffee as a treat on Christmas Day, were often very unwell, suffering from the effects of unfamiliar caffeine.

18. Opium, from the correct poppy, was known in Ancient Greece and Rome, and was eaten, drunk as an infusion, chewed but not swallowed, and, for recreational purposes, smoked, before any pills, tinctures, or concentrations were made. Morphine was produced as a painkiller in the early 19th century, and heroin after 1870. Neither was recognized as being dangerously more addictive than opium. Opium itself, as a consumer drug more widespread than tobacco, was stamped out by the Americans in the Philippines before World War I, by the Chinese Communists in China after World War II, and more recently by the authorities in Singapore. The successful banning of opium has always required far more stringent measures—death, transportation, mutilation—than democracies appear to be prepared to mete out to addicts of any kind. Unbelievably, the purer morphine and heroin were used in turn to “wean” people from opium addiction. This “successful” method produced results that were not what the proponents of substitution had in mind.

almost every province of China, all opium was imported (originally only about 3000 pounds a year), usually bought by Chinese merchants from the Portuguese. The British increased the trade to 3 million pounds or by 1000 times. An expanding demand and an unlimited supply of opium were substituted for a finite supply of bullion. Trade could ask for no more.

The mandarins of China were outraged at the debasement of their people. Opium, probably introduced into China as a painkiller by the Arabs in the 11th century A.D., was used only as a medicine until the 18th century. The Chinese government, still at that date not yet completely beyond hope of reform, made effort after effort between 1796 and 1830 to bring the trade to an end, but failed. There were too many addicts, too many pushers, too many "respectable" merchants making too much money. In 1838 the Emperor Tao-kwang sent a commissioner, Lin Tze-su, to Canton to stop the contraband trade in opium. He issued an order to the Chinese merchants to destroy their stocks and to the British to remove their drugs, but no one paid any attention. The merchants had heard it all before, and had ignored the same kind of orders with impunity in the past. So Commissioner Lin set fire to the Chinese stocks ashore and to British hulks in the harbor. A year's supply of opium went up in smoke in a vast bonfire instead of in thousands of pipes; the smell was said to have been memorable.

The British did not object to this *auto-da-fé*, but continued to smuggle opium ashore at Canton. However, they had misjudged Commissioner Lin, who arrested the British, burned the opium, jailed British sailors, and tortured Chinese merchants. Outraged, the British shelled Canton as a precautionary and punitive measure. Commissioner Lin refused to kowtow. Barbarities were committed on both sides. War, at the leisurely pace of these pretelegraph days, was ultimately declared.

The Chinese in 1840 had no idea of the character, strength, or determination of the Europeans in general and of the English in particular. The Portuguese had been limited to Macao since the 16th century, and all other Europeans to Canton since the 1690s. The British had carried on a great trade with China for 2 centuries, restricted to a wharveside less than 800 yards long and 40 yards wide. The Chinese had met and sometimes defeated European ships at sea; more often, they had lost. The Emperor and his advisers probably did not hear of these defeats. No reports were carried back to landlocked Peking about the failures of Chinese pirates and naval vessels at sea in the far south, in the China Sea itself. Dead men tell no tales, and the vanquished found it difficult to make rulers accept that there was anything to explain lack of success other than incompetence. Europeans were still regarded as ignorant foreign devils, barbarians, only interested in money, drink, trade, and women.

In 1834 the East India Company monopoly of the China trade, and of course of the British trade in tea, had come to an end. New men, enlightened, competitive free traders, 19th century liberals to a man, succeeded the comfortable and corrupt servants of the Company. The pressures on the home government to "open" China increased. The outrages at Canton, of which the British complained so much and which formed the *casus belli* of the Opium War of 1840–42, were probably as much a Chinese response to the changed circumstances as to the long-term debauchery of opium itself. To the Chinese mind, then as now, if you have to deal with foreign devils, it is better to deal with a fixed group of men whose character and strength and weakness may be gauged, than to have to assess an ever changing cast of characters in a long running play called *The Market Economy*. The Chinese knew the Cantonese Europeans of old. They did not know the new men.

But the new men were determined that China and Chinese trade of all kinds should be opened to the West. The British took the initiative, secure in the power and pre-eminence of the Royal Navy. The Chinese did not have a chance. The 1st part of the war was short and decisive. In 1840 Chusan was captured, and the following year the British bombarded and destroyed the Bogue Forts on the Canton River. The local Chinese commander, Ki Shen, who had succeeded Commissioner Lin, agreed to cede Hong Kong and pay an indemnity of 6 million Chinese silver dollars, worth about £300,000 then and about \$20 million today. When the news reached Peking, the Emperor was persuaded that Ki Shen was incompetent and unpatriotic. He was degraded and exiled to the country. War was resumed. Inevitably, the Chinese lost. In the aftermath Amoy, Fuchow, Ningpo, and Shanghai became "open ports," while the government had to pay a further indemnity

of 21 million silver dollars to the British and to accept European supervision of the Chinese customs. No mention was made of the import of opium.

For a further 60 years, the trade in Chinese tea exceeded the trade in tea from all other countries. In fact, in the hinge year of 1840 the 1st puny export of tea from India and Java had begun; less than a ton was sold in London. Chinese exports to all countries in the previous decade had averaged over 200 million pounds (100,000 short tons), worth about £25–30 million in contemporary terms, or more than \$3 billion in today's money.

Throughout the rest of the 19th century China was gradually “opened up,” aided by a succession of wars in 1856, 1861, 1871, and 1894. The period was characterized by the gradual weakening of the central government in Peking, occasionally delayed by the employment of vigorous, sometimes foreign, generals including Charles Gordon. Russia pursued a deliberate—sometimes open, sometimes covert—policy of imperialism in the north. The British and Americans were primarily interested in trade and the making of money, apart from their illusions that every Chinese was one of nature's Protestants. The French had the same illusion about Catholicism and the same greed about trade. The rivalry between merchants was almost exactly mirrored by the rivalry between Christian sects. The Chinese did not reveal their preferences, and acquired the reputation of being inscrutable, though perhaps they were only resentful and confused. The opium trade accelerated, imports almost exactly matching the deficit in the balance of payments which the West had with China. Opium represented one-sixth by value of the imports into China during the 19th century.

The material conditions of the Chinese did not improve. Spiritually, despite the missionaries—who were to form such a massive lobby in the next century—the huge country was in decay. Politically, the once efficient dictatorship gave way to local despots called T'ai-pings, who were usually corrupt and nearly always a more onerous alternative to central government. The material treasures of China were destroyed or dispersed all over the world. The loss of this cornucopia of 2 millennia of civilization was matched by the destruction of the Chinese genius for craftsmanship and design. The Chinese became copiers and coolies, hewers of wood and drawers of water for the West.

The wrongs committed against a relatively weak China have been as damaging as any transgression against other non-European peoples. Perhaps the insidious nature of the opium evil should be noted and the advanced state of Chinese technology accepted. From iron and steel making to pumps, to mills of all kinds, to canals, irrigation, and other water management, textile machinery, harness, crossbows, concave plows, bridges of all 3 types, sternpost rudders and watertight compartments in ships, fore—and—aft sailing rigs, magnetism and compasses and gimbals, paper of all sorts, as well as gunpowder and porcelain, China was between 4 and 17 centuries ahead of all European nations (see table “Technological Advances Transmitted from China to the West”). We forget this—most people know only about printing, porcelain, and gunpowder. And this materialistic list takes no account of Chinese supremacy in astronomy, biology, medicine, or any other purely intellectual area.

China, a repository of arts and artifacts, of craftsmanship, design, ingenuity, and philosophy, was raped for a few years' increase in the national income of the white man. For a pot of tea, one could say, Chinese culture was very nearly destroyed. Whether it will ever recover under the post-1950 regime is another matter, which has nothing to do with tea. The significant factor about the “new” China is unlikely to appeal to any old European “China hand.” Supposing it be agreed that both Sun Yat-sen in 1910 and Mao Zedong in 1945 both saw the existing regime as being corrupted by Europe, but not susceptible to reform. After the agony, is China going to forge ahead, without European domination? Is China going to prove, once again, the possibility of trade without dominion of any kind? Will China yet again prove the irrelevance of political control in world trade?

After the East India Company's monopoly in tea came to an end in 1834, the Company knew that they could not compete with faster ships and sold their entire fleet of dumpy, heavy vessels, each containing up to 1000 tons of well-seasoned timber. They were so well built that 1 of them stayed afloat until 1897. Another was sold for breaking-up, and the timber was so valuable that the hulk was worth over £7500 (more than \$3 million in today's money).

The “free” tea trade developed in Liverpool, Dublin, and other ports for the 1st time, since all East India Company ships had previously landed their cargoes in London. There was great growth in tea imports, and a great growth in the instability of the market, since no single organization, Chinese or British, continued to hold stocks as had the East India Company and its Chinese trading partners in Canton. The Opium War not only interrupted trade for nearly 3 years, but the disruption in China probably destroyed or damaged as much as 1 year’s complete stock of tea. In the 1840s no one, anywhere in the world, carried large buffer stocks.

The East Indiamen had traveled in a most leisurely, comfortable fashion, outward via the Cape of Good Hope; east of, sometimes all round, Australia and then due north to China, avoiding the East Indies altogether. The squat, matronly East Indiamen, “floating warehouses” built for comfort rather than speed, sometimes anchored at night in fog or when navigation was difficult and had no incentive to sail at speed, because no one apart from the Company traded in tea. After 1815, however, the Pax Britannica, maintained by the Royal Navy, meant that self-defense and long voyages avoiding land were no longer necessary. The safe, slow East Indiamen gave way to competitive ships, trading for a product whose supply might well be short, and whose sale was enhanced by early disposal. Finer ships with a length/beam ratio of 5:1 or 6:1 replaced the Company ships whose ratio had been 2½:1 or 3:1. During the 1840s British sailing ships gradually became sleeker and carried smaller crews, the combination making for higher profits but less safety. In 1850 the Navigation Acts were repealed, and the ships of any nation were free to enter British ports with any cargo; previously, foreign ships had been limited to cargoes from their own country or Britain, and were debarred from carrying “third nation” freight. But only the Americans were ready and willing to compete in the China trade.

During the 1850s the short reign of the China clippers began. The clipper ship was built for speed and the carriage of valuable cargo: illegal slaves; mail; rich Atlantic passengers; emigrants to California round the Horn. The length/beam ratio was increased to about 8:1, the bow was flared and sharpened to slice through the water rather than bash and shake and slow the ship in a seaway; the foremast was brought aft by about a tenth of the ship’s length, to prevent the foresails driving the bow under water; the masts were raked to increase the effective sail area; the stern developed from a massive wall into the graceful “clipper stern,” still used in steamships after World War I.

Clippers were not the first fast ships; there had been many fast, small frigates, revenue cutters, and smugglers’ sloops. But the clippers were the first fast *big* ships, and set up all sorts of problems for naval architects, shipowners, and the men who sailed in them. The risk of losing ship and cargo probably doubled, but the revenue-earning capacity of the ship probably also doubled. A ship now took 90–120 days to sail from China to New York or London, instead of the 180–270 days of the East India Company fleet. New-season tea arrived much more quickly. Clippers were used in every one of the Seven Seas, but most of their fame first rested on the tea race.

The economic justification for the race is difficult to assess. Properly packed, tea does not deteriorate. In the old days it had sometimes taken a year to assemble a cargo in Canton, and nearly a year to reach London, followed by another year in store. Carefully handled, tea nearly 3 years old does not taste any different from tea 3 months old. (In 1955 a tea merchant made and drank some tea that he had found in a sealed cask belonging to his great-grandfather, who had died in the Opium War in 1840; 115 years later it was still perfect, delicate, and unlike any modern tea in its subtlety.)

The public, therefore, was somehow persuaded that new-season tea was in some way superior to last year’s tea. It is easy to see the advantage to the merchants. If the public is brainwashed into the belief that tea goes “off,” the merchant can clear his stocks every year and sharpen his turnover. For the public, the advantage is less obvious. But no one stopped to think, and the clipper races became as exciting as any other race. In the 1850s Americans and British raced impartially from China to New York or London. In the 1860s the Americans were otherwise occupied, first in the Civil War, and then in the trade with California, Alaska, Japan, and the east coast. After 1862 the clipper races were exclusively British. When the Suez Canal opened in 1869, the races ended, and the expensive sailing ships had to find other employment, carrying emigrants to Australia, New Zealand, and the American west coast.

Clippers charged £5–6 per ton for tea, China-London, double the slow-ship rate, and with a big bonus if they got there first. Snobs would make a point of saying that the tea came from the clipper *Ariel*, or *Era*, or *Cutty Sark*. This was a marketing ploy comparable to that used to sell *Beaujolais Nouveau*. The clipper races were supported by atavistic, deep-seated nonsense, and they were finally killed by steam.

Early, inefficient steamships with low-pressure boilers had to carry so much coal, even if helped along by sails, that they could barely cross the 3000 miles of the North Atlantic without refueling. To reach China round the Cape of Good Hope they had to refuel at least once in the Atlantic, once at Cape Town, at least once in the Indian Ocean, and again in Singapore, and there is little evidence that any steamship line made much profit before the Suez Canal was opened. After 1869 steamships could beat sailing vessels, which still had to go round the Cape rather than through the Canal since the winds in the Red Sea were too unreliable. For bulk cargoes, where time was of no importance, the Cape continued to be used until the 1880s, when the more efficient triple-expansion steam engines had been developed and finally started to beat sail for all cargoes other than those of very low value. But for many years it was only passengers, mail, silk, tea, and other light, important freight which went through the Canal. The steamships needed the Canal, but the Canal needed the steamships just as badly. The symbiosis would not have worked a decade earlier, and a decade later large steamship efficiency might have increased so much as to render the Canal unprofitable.<sup>19</sup>

Suez and steam together made one great difference to all high-value cargoes. Stocks were no longer maintained in a long, slow pipeline to and from the East. They were held at either end, separated by less than 50 days' voyage time, half the time of the fastest, most dangerous, riskiest, most romantic clipper which needed a picked crew, a high freight rate, and a great deal of luck. Steam, smelly steam, had brought the tea trade into the industrial age.

Early in 1820 David Scott, commissioner for the newly acquired state of Assam in British India, sent samples of leaves from Cooch-Bihar and Ranpur to his superiors in Calcutta. Here they were declared to be leaves of one of the innumerable species of camellia, and sent by Dr. Wallich, the government botanist, to London where they were re-examined by the herbalist of the Linnaean Society, and pronounced to be leaves from the tea plant. This was the 1st known identification of a wild tea plant in India, which at that date had no tea plantations. At this time nearly all tea came from China, except for a small export surplus available in Japan, and even less in Formosa.

Ironically, when the tea industry started in Assam a dozen years later, the tea gardens were planted with cuttings from Chinese trees, which died, or did not thrive, or failed to become productive. The native Assamese wild plants had been uprooted and burned to make space for them, and now the hills were scavenged for surviving samples of the wild plant from which to breed better suited specimens. Yet the native Assamese people had never, as far as the British knew, used tea to make an infusion. This was conventional wisdom, though in 1 or 2 places on the banks of the Brahmaputra River there is evidence in abandoned gardens of ancient cultivation of tea. But there is no native Assamese folklore about these plantations.

Tea is much more than a garden crop harvested to make the raw material of a drink. It is complicated by the methods of drying the wet material, which may ultimately turn out green or black. Green tea is made from leaves dried shortly after picking so that the chlorophyll, and much else besides, is not subject to great changes. Black tea does not come from any special place, but is the green product subjected to a process wrongly called fermentation.

The young leaves and buds of the tea plant may be pickled and made into "Leppet tea," as in the Shan States in the mountains between Burma and China, and eaten as a vegetable. Green or black tea may be made into cakes, which in Tibet are turned into a thickish soup and, mixed with rancid yak butter, slurped or eaten with a spoon—an acquired taste. Tea may be chewed, either green or black, as in some parts of

19. Throughout its history, the Suez Canal has had to match dues (in other words, charge what the traffic can bear) to meet the twin requirements: maximizing profits, while minimizing the number of ships that found it worth their while to take the long route round the Cape of Good Hope. The Canal has been widened and/or deepened 4 times since 1869. It has not proved worth-while to make the Canal capable of taking the largest supertankers, which still have to use the Cape route from the Persian Gulf to both Europe and America.

Indo-China. It may even be ground and sniffed like snuff, as in Yunnan.

Brick tea was made for export to Russia and Mongolia, because it was relatively easy to transport in this form by camel or horse caravan overland from China, taking 6 months to get to European Russia. The tea was of the highest quality, the best dust and siftings, steamed and compressed into bricks under hydraulic pressure. A great brick tea industry started more than 300 years ago, becoming mature in the 1860s, ultimately involving Chinese labor, Russian supervision, and French and British capital. Brick tea needs a kettle or samovar in which to brew, and it is notable that this type of tea was so popular that the industry continued long after steamships rendered it unnecessary. Tea bricks often also became stores of value, a consumable money substitute, like cigarettes in post-1945 Germany.

Perhaps 90% of all the tea sold in the last hundred years has been black. It has been sold, outside the countries of production, in packets to the ultimate consumer. Adulteration has become rare, not because of a change for the better in human nature, but because the practice ceased to pay.

Tea has spread to many countries. It has been grown in its original home, China, and in Japan, Formosa (Taiwan), Burma, India, Malaysia, Ceylon (Sri Lanka), Indonesia, Iran, Turkey, the Philippines, and Queensland, as well as in a dozen parts of Africa, Indian Ocean islands, and Latin America; South Carolina, Argentina, and Georgia in the Soviet Union are the extremes in geographical terms and the furthest from the original centers of cultivation. The absolute necessities of tea cultivation are these: climate, which must be wet and warm; soil, which should be deep, friable, high in humus, and have a pH<sup>20</sup> of about 5.0 to 5.5; and labor, which must be cheap and plentiful. These are the conditions which led to the development of the European tea industry in India, Sri Lanka, Indonesia, and Africa, in order of original successful plant transfer and in the same order of tonnage of tea today—more than 80% of the world trade in tea.

The process of plant transfer was a hit or miss affair. After China was opened up following the Opium War, the botanist Robert Fortune, a Scotsman from Berwickshire, finally corrected the Linnean misclassification<sup>21</sup> by observation in China itself in 1842–43. This story is important, not because it denigrates Linnaeus but because the European tea industry, and specifically the Anglo-Chinese tea industry, had grown into a vast affair with an annual turnover of millions of pounds sterling, and had made the East India Company the IBM or General Motors of its day—and it was all done through trading in a product whose origins were unknown for 2 and a half centuries. From the 1840s, tea husbandry in the field was no longer a secret. After much experiment and many failures, an industrialized European tea industry was successfully established in Assam by about 1860, and in Ceylon and Java by 1890.

The Assam tea plant is of an agrotype, or ecotype, which, if left to its own devices, would reach a straggly height of 30–60 feet. In cultivation, however, it is plucked and pruned into a convenient, 3 feet high bush which may be reached with ease by the picker. There is a correlation in the agrotypes between response to fertilizer, leaf type, morphology of the cell structure, and yield of raw tea per acre. Selection has therefore become intensely practical and discriminating. In Japan, where the highest yields are obtained, an average of more than 1½ tons of finished product per acre has been achieved, in some gardens 2 tons, in one recorded case 3 tons. The wrong type of bush, grown in the wrong way, will not yield one-hundredth of that quantity of tea.

All this kind of husbandry took many years to develop. We do not, of course, know much of the tea husbandry of China before the 19th century, but after 1890, quality took second place to quantity, and for a long time, at least until after World War I, teas from India and Ceylon had a reputation for being second-rate. This reputation was perhaps undeserved, but it is also true that, if China had not been destabilized and subsequently destroyed by Western penetration, then India and Ceylon would not have become tea producers. Despite all the political troubles which finally destroyed the Empire, Chinese tea exports were higher than those of the whole of the rest of the world until 1890, and higher than any other single country as late as 1910. During this time Indian tea planters were still trying to imitate the Chinese product. In the end, it was

20. pH is a scale of acidity/alkalinity with the number 7 representing neutrality; 5.0-5.5 is moderately acid—suitable for azaleas, rhododendrons, and even potatoes, but a poor soil for good cereal crops.

21. In the original Linnean classification green tea and black tea were thought to be 2 separate species (see 9).

realized that manufacture begins in the field, and that however much effort is made to mechanize the curing of tea, it is the growing that remains a precondition of a successful, salable product. If the correct ecotype is planted, pruned, and fertilized, and the picking matches the season, the desired result will be much easier to obtain. Manufacture is carried out on the estate, and the post picking process was an early candidate for mechanization. Picking itself is another matter.

The bushes are picked more frequently if a higher quality is required, and less frequently if greater quantity is the aim. The 1st spring pick makes the best tea. Frequency of picking depends on weather, fertilization of the soil, pruning, and so forth. The tea leaves should be picked dry, but this is not always possible, and large quantities of low grade material result from “rains teas.” The industry might be better off if these inferior grades were thrown onto the compost heap.

The picked leaves can be turned into 3 different products, though each estate tries to concentrate on one speciality. Black tea represents over 95% of world trade today; green tea is of importance in the Far East and a cult in the West; Oolong is important in China and Taiwan, with a small export to the United States. Black tea is fully processed. Green tea is fired before any oxidization has taken place. Oolong is partly “fermented” and then fired early. All living vegetable materials are covered with organisms which permit the recycling of the material as soon as “death” occurs, so when tea leaves are picked the enzymes start at once to recycle the green material. In order to control this process, the green leaves are allowed to wither naturally by being spread out on special racks. Here they lose, by evaporation, 50% of their moisture. If the ambient humidity is naturally high, as during the rains, the process takes longer, but the aim is to wither within a maximum of 12–16 hours. A longer wither is 1 more reason why “rains teas” are inferior.

After withering, the teas are rolled by machine in order to accelerate oxidization, and this process, all essential precursor to “fermentation,” was formerly done by hand. Of all the mechanical innovations in the industry, the rolling machine pays the highest dividend. One machine today can do the work of up to a hundred people. The rolling goes on until the still green tea is a mass of pulp. Strict control of the severity and timing of the rolling is necessary to prevent the green, partially dried tea turning into a pulpy mass resembling cold, overcooked spinach.

In the case of black and Oolong tea the so-called fermentation follows. This is done in another special area, in a temperature of about 80–82°F, and the green mass turns coppery red in color. The temperature, depth of mass, and evenness of oxidizing action are all necessary elements in achieving quality. The most critical decision, however, and difficult to make other than by instinct and experience, concerns the right time to terminate the process by moving the mass into the firing cylinders. This choice is dependent upon the judgment of eye and nose, and is often varied from batch to batch according to local conditions.

Firing involves virtually the same process as does high quality grass drying. The moisture content of the withered, fermented mass of tea has to be reduced from about 45% to about 5%, and this must be done without affecting the quality of the tea. Too high a temperature produces a taste nearer to burned toast than to tea. Underfiring leaves the infusion more like green tea than black, even if the tea is black in appearance. Firing can be mechanized, but human control must be continuous, skilled, and devoted.

After firing, the tea must be sorted. The names given to the various teas are so similar that they are very confusing. The main grades are broken and small leaves, which produce the grades (not the quality) called broken orange Pekoe, flowery orange Pekoe, broken Pekoe, Souchong, and so forth. These are all “small” teas, and the 2 smallest grades are called fannings and dust. These are not, as their names suggest, sweepings, but the smallest, youngest, and probably “strongest” teas. They were formerly the constituents of brick teas, but nowadays they nearly all go into teabags. The bigger teas are called flowery orange Pekoe, orange Pekoe, and Pekoe. The word “Pekoe” appears in all the grades except fannings and dust; the word “orange” appears in more than half the grades, but has nothing to do with taste or oranges; the word “Souchong” appears once, but has no meaning as in the phrase “Lapsang Souchong.” The tea trade does itself a great disservice by this obfuscation, especially as these expressions mean different things in different countries to the producer and in different countries to the consumer.

Though the (mostly female) picking force has proved impossible to replace by machine, efforts were

made in the hopeful 1920s in Soviet Georgia to use a modified hedgecutter for the job. Needless to say, it was a great failure. The Japanese invented a form of shears with a bag suspended below, which looked disconcertingly like a pelican's beak and which was also not a success. Both failures were the result of inability to discriminate. Two leaves and a bud are the aim of the clever fingers of the underpaid human picker. No machine short of a laser-controlled robot could approach a skilled woman in speed, accuracy, or reliability—as long as the supply of labor continues. One day, perhaps, the picking problem might be solved. If the process were mechanized, a great change could come over the industry. At least 6 American states would be able to produce tea of a high quality, as was once achieved in South Carolina. Only the high cost of picking prevents such a development today.

The other 3 candidates for mechanization are withering to 50% moisture, rolling, and drying to 5% moisture. Withering by the use of heated air gives a poorer quality-product, so that during the rainy season air is predried by being passed over silica gel, thus achieving the same result as with hot air but without added temperature. This was a development of the 1930s, but as early as 1850 withering fans were in use in India, and from the 1870s in Java. A huge machine like a domestic tumble drier was developed to finish off the wither at 100°F. No machine except the silica gel drier does as good a job as a cool loft in the dry season.

Rolling is an easier problem to surmount. Machines were in use in the late 1880s, and little improvement has been needed or made since. These machines effectively release all the juices from the withered leaf, and they destroy the leaf surface so that air can enter, oxidize and “ferment.” During the rolling process, which may take up to 2 hours per batch, the temperature of the mass rises, and efforts have been made to restrict this temperature rise by cooling the rollers with water. Technology has been borrowed from the tobacco, meat processing, and dairy industries. Since 1870 over 5000 English patents have been filed on this subject alone. Few have been manufactured even as prototypes, let alone entered quantity production.

Between 1870 and 1890 no fewer than 200 successful driers were invented. Early models resembled Roman corn driers, while the later types lent their technology to the whole of 20th century agriculture. Many of today's grain, grass, or seed driers are based on the tea industry's efforts in the period before the rest of agriculture was out of the horse reaper stage of harvesting.

One manufacturing method which was developed in the 1930s was CTC or “cut-tear-curl.”<sup>22</sup> Like manufacturing conveniences in other industries, CTC made the achievement of a standard product very much easier and surer, but while it eliminated the lowest quality, it also destroyed the best. It is a form of manufactured standardization. CTC makes average dry tea out of almost any leaf, and may well save rains-picked teas, but however successful the “average” CTC tea, no one has made a fine or great tea with this method.

Since 1960, an ever larger proportion of the world's tea crop has been marketed in Europe in teabags by supermarkets and huge importers whose product has little identity and is based on fannings and dust. For this kind of mass production, the CTC machine is ideal, and the natural alliance between CTC and the teabag is disastrous to quality. Teabags of the pillow type, with a surface area several times that of the traditional teabag, make better tea, but cost, in packaging, about 5 times as much as the cheapest heat-sealed bags.

The other modern development, instant tea, is a complete failure. No process has produced a drink which approximates the real thing as closely as do the better instant coffees. In fact instant tea bears no relation at all to properly made tea.

“A good cup of tea” is becoming more and more difficult to find unless it is made by a devotee at home. Picking apart, the raw material is handled like alfalfa, bundled into huge machines, reduced to a blended

22. Cut-tear-curl machines were 1st produced in the early 1930s. The original machines consisted of 2 engraved metal rollers, rotating in opposite directions, like a mangle, but feeding the product through in a continuous flow. One roller would rotate 10 times faster than the other—typically at 750 and 75 rpm. The coarse leaf which has been withered and rolled once is put through the CTC machine, a process which breaks the leaf's cells without loss of juice or rise in temperature from friction. The end product makes a strong infusion, brisk but harsh. The method greatly improves teas picked in the rain. Later, other machines were designed to do the same job. All the machines produce a reliable, second-class tea, which may be more profitable than producing very variable teas; in other words, CTC machines produce reliable mediocrity.



dust, and then packed in little bags whose paper often imparts taste and whose contents only produce an infusion with coarse strength and lots of color.

Subtle tea is as far from the bag as is a bottle of plonk from a château-bottled claret. It requires 5 to 7 minutes for infusion, the correct leaf for the local water, and a certain degree of ceremony. Apart from any other factor, tea requires freshly drawn water for each brew: Unlike coffee, tea absorbs oxygen, and therefore cannot be made with water from a simmering kettle. As a quick, nonalcoholic “fix” such a product can never compete, in convenience terms, with alternatives.

So tea must necessarily lose the battle for convenience, on the grounds of speed and time. There remains the question of quality, and this can only be guaranteed if the tea drinker also closely supervises the brew itself.

There is 1 other point to be made. In 1840 no native Indian ever drank tea, except as a Europeanized foible. Today two-thirds of Indian production, the greatest in the world, is consumed domestically. The Indian government’s interest lies in cheap, widely available, and not very interesting tea for its people at home. The discriminating tea drinker is fighting a losing battle.

Chinese civilization, then, was debased and almost destroyed by tea and opium. In the light of this, it is interesting to consider Japan, a country whose history might have evolved along similar lines, but, as it turned out, did not.<sup>23</sup>

Today the Japanese tea industry is in agronomic terms perhaps the most efficient in the world. Given Japan’s well known discipline and genius for organization, this was probably true even in the 17th century. Yet in the critical development of the tea trade with the West, the Japanese took no part, for from the 1640s until the mid-19th century, the period between the start of the tea trade and its near maturity, Japan was almost cut off from Europe and Europeans. But Japan has not always been isolated. For 11 centuries the country was proudly secluded. Then, for a hundred years from 1541 to 1641, the Japanese welcomed trade to a greater or lesser degree with merchants from Portugal, Spain, the Netherlands, and England. Japanese ports were opened to the commerce of the world. They wanted silk and silver; they exported gold and copper. The Europeans also acted as middlemen between Japan and China, and between Japan and European trading stations in the East Indies, India, and Africa. From about 1550 until 1616 the Japanese traded with Europeans at home, in Osaka, Nagasaki, and Yokohama, and all over the East. The Japanese bargained and exchanged with the Spanish in the Philippines, with the Portuguese in the Indies, and with the Dutch in Formosa. The Dutch in particular were of great importance as intermediaries with China, who would not countenance direct trade with the foreign devils, the Japanese.

In the mid-16th century the Japanese were known as the Kings of the Sea; they had perfected a form of sea warfare based on the clever maneuvering of ships, which defeated the Koreans and dismayed the Chinese until that inventive people devised a tactical antidote. On land, Japan had mounted and sustained an invasion of Korea which involved an army of 200,000 men and 500 ships, forces which few European powers were to launch for 2 centuries or more. Certainly, no amphibian invasion of this size was launched in Europe until 1942–44.

By the mid-16th century the Japanese homeland was a federation of loosely connected feudal satraps, nominally under an emperor in Kyoto, but some of the greater feudal lords were as independent as any duke of Burgundy in medieval France. During this period 3 farsighted superlords, Oda, Toyotomi, and Tokugawa, had acted in sequence to unite the country so that it became a cohesive state under the emperor, rather than a confused and warring country—an example of feudalism at its most chaotic. The foreigners were gradually squeezed out of the right to travel freely all over the country, and they were confined to certain factory ports, as were Europeans later in China. In the end, all white men except the Dutch were expelled. This happened in 1641, and for 2 centuries after that the Japanese were in a position of self imposed isolation.

23. The extraordinary and highly successful city of Hong Kong, itself a child of tea, is an indicator of how urban China might have turned out had it not been for the Anglo-American use of opium as a payment mechanism, and China’s consequent destabilization.

The Dutch were confined to Deshima Island near Nagasaki, a mere strip of sand and shingle 200 yards long and 3 yards wide. While in harbor their ships had to take guns, rudder, and sails ashore, and offload their ammunition. Thus rendered safe and immobile, the ships were unloaded at Dutch expense, and the trade conducted on Japanese terms. No Japanese was allowed to speak to any foreigner unless another was present to note what was said. The Dutch were not allowed to be buried ashore, or to go ashore from the island to the town of Nagasaki, or to pray in public, or to celebrate the Sabbath. Nor were they allowed to entertain anyone in a Dutch house or ship, except for “public women” (the Japanese were always practical people).

These severities were imposed upon the Dutch, and all other foreigners were excluded, for 1 reason only. For the 50 years up to 1640 Japan had suffered Christian missionaries—mostly Roman Catholics, but some Protestants. In addition to proselytizing large numbers of Japanese, these missionaries also took up the secular cause of their homelands. Spanish Jesuits intrigued against the Portuguese, and both Catholic sets of nationals schemed against the Protestant Dutch and English merchants. Elizabeth’s war with Spain, Spain’s war with the Netherlands, and all Europe’s Thirty Years’ War were mirrored in Japan, itself a victim of a complicated feudal struggle.

By 1641 the Japanese had had enough. The exclusion of foreigners was not mere xenophobia: It was specifically anti-Christian, because it appeared that the Japanese could not trade with the Europeans except with the implicit toleration of Christian missionaries. These missionaries proselytized thousands and upset many thousand more. By the early 17th century the Japanese position was simple: They wanted trade, but if trade involved missionaries, they would do without all foreign contact. Even Japanese ships were denied the right to go abroad, to leave Japanese territorial waters. In 1638 the Dutch had put the date (according to the Christian era) upon their new warehouse in Osaka. A mob, incensed, or bribed, or otherwise induced, collected to challenge this presumption. The Dutch trading chief, one Caron, saw the mob approaching and without a moment’s hesitation set 400 of his own men to tear down the offending warehouse. Cheated of its prey, the mob dispersed, and the Dutch were saved. This sacrifice of Christian principle led the Dutch to survive as traders in Japan; all other Europeans, traders as well as priests, were expelled, and Japanese Christians were executed or forcibly reconverted. The Europeans objected to maltreatment of Christians, but it was no worse and not much better than that inflicted by Protestants and Catholics on each other in Germany at the same time. So Japan became self-sufficient except for a few Dutch ships (ultimately only 1) a year, carrying the essential silk from China to be exchanged for the equally essential copper from Japan. 24 The nominal reason for the expulsion of all foreigners, then, was Japanese distaste for Christianity, but there is another possible reason for Japan’s vehement hatred of foreigners which had nothing to do with religion.

The whites brought to Japan not only Christianity, but also syphilis from the Americas, via either Europe or the Philippines, the potato from Mexico, also via the Philippines, tobacco from the Americas, via the Netherlands, and gunpowder. Syphilis was controlled by scrupulous hygiene, and the potato was gratefully adopted. Tobacco was outlawed, though not for medical reasons. Most Japanese houses were built of wood, paper, and textiles to avoid major earthquake damage, and were thus very inflammable, and smoking in bed had been a cause of serious fires in Japanese cities before 1620.

No native European material product was introduced, but traders did bring gunpowder, which had been discovered in China and had moved to Europe to become a weapon of war. The Chinese (and probably the Japanese) knew about gunpowder as a propellant and explosive for wartime use 400 years before the backward Europeans. It is entirely possible that China, as well as Japan, had rejected its use for aggressive purposes because it rendered the whole pyramidal structure of feudalism too shaky to survive. Did gunpowder help destroy feudal order in Europe? Almost certainly. Did the Orient know about it? Surely not. But the Oriental nations were logical in a way that the hasty, individualist white man would never be. If guns

24. China had no copper deposits of its own; for the wealthy, silk was the only material that was comfortable to wear in the hot, humid Japanese summer.

threatened the good order and discipline of feudal society, then guns and the Europeans who brought them would be abandoned to save feudalism.<sup>25</sup>

An end to Japanese aloofness came not from Europeans, now involved in trades of all sorts in the Orient, but from the American North Pacific whaling fleet. In 1823–24, 86 American whaling ships had passed within sight of Japan's most northerly island, Yezo. American whaling schooners were shipwrecked from time to time and the survivors sent to Batavia in the Dutch East Indies by the single Dutch ship allowed to trade with Japan. Japanese fishermen and sailors turned up in California or Oregon in the 1840s, driven 6000 miles across the Pacific by bad weather. Commodore Biddle was sent to begin trade and consular relationships in 1846, but was politely and positively told to leave, which he did, without setting foot ashore. Various European nations made further approaches, using both the carrot and the stick as inducements for the Japanese to open up their country to the West. Finally Commodore Perry, USN, brought more than 200 years of seclusion to an end in 1853.<sup>26</sup>

This isolation, unmatched for obvious reasons in the Eurasian land mass, led to a prolongation of feudalism and a self-sufficient autarchy with an extraordinarily narrow but highly developed form of civilization. There was no knowledge of the universe, of the theory of gravity, of the differential calculus, of the circulation of the blood or of electricity. But in the 17th century Japanese agriculture was the most highly developed in the world, as was fishing and fish farming. Botany was ahead of anything in Europe. On the other hand the world of medicine was limited to herbal remedies, little use being made of surgery or compound drugs. Mathematics was unknown in terms of algebra or geometry. Astrology was known, but not astronomy, and the Japanese could not construct a calendar without Dutch or Chinese help. They disputed with the Chinese the invention of printing, but the art was more advanced than in Europe, and they could print in full color. They were much addicted to poetry, music, and painting, and their textiles and ceramics were of a higher standard than those of Europe, if not comparable to the best in China. They were convinced of their natural superiority and of the unnecessary nature of foreign intercourse. This led to 3 characteristics which enhance the Japanese character today and are often baffling to the Westerner.

The 1st is that because Japan was a homogeneous, integral civilization when the white man arrived in force for the 2nd time, in the 19th century, the Japanese were able to absorb the invasion of ideas without their society being disrupted, as in China, America, and Africa. They have adopted the apparently desirable and rejected the apparently unsuitable without detriment to the form and nature of their own complicated culture.

Secondly, for centuries (with only one short break) the Japanese have had to be self-sufficient. They have had to count their blessings and live with what they had, refusing to become addicted to any foreign import. Their staple foods were rice, fish, and the long radish; they did not crave lamb or beef. Their drink was tea or rice wine; they did not crave beer. Whatever they did, they did well. Their land was the most productive in the world, before artificial fertilizers came along, and every farm was treated as a garden. Even today their tea gardens, their rice paddies, and their vegetable patches are the most productive per acre in the world. Their industry was equally efficient. They produced the best steel in the world before Bessemer, the best shipbuilding technology in wood, and the best answer to building in an earthquake zone before ferro-concrete. In World War II their self-sufficiency and ingenuity allowed them to defeat the British in Malaya

25. The whole question of guns, gunpowder, Europeans and Christianity is discussed at length in Noel Perrin's *Giving up the Gun*.

26. Perry arrived in Japan in 1854, and signed a convention which apparently opened Yokohama to American traders. He had, however, impressed the reluctant Japanese with the overwhelming nature of his naval force rather than the virtue of his economic arguments. More than 10 years elapsed before there was any appreciable trade between the Americans, who were keen, and the Japanese, who were the reverse. It was not until 1866 that the tariff duties fixed on imports were reduced from 15 to 5%. At no point since has Japanese foreign trade been permitted to diverge from what has been conceived to be the national interest.

with a much smaller force, mounted on bicycles, to produce the most economically efficient fighter aircraft of the time, and to survive in a vast theater of war against the most powerful nation on earth. They were defeated not by technology, but by science expressed as the atomic bomb, and power, as in the monstrous increase in energy employed by the Americans.<sup>27</sup>

There is a 3rd point. The Japanese were cut off from the world for the most important period in the history of science. Within the limitations of their lives, their technology was very efficient and appeared to answer problems. This respect for technology, the ability to make other people's ideas work in their own context, this infertility of invention, has led the Japanese to be called copyists in the 1st half of the 20th century and to be feared in the 2nd half as the industrial power which can turn ideas into hardware faster, more economically, and more profitably than anyone else, whether with the robot, the laser, or the chip. The Japanese have been the finest technologists in the world today, and they think practically, technologically, not scientifically. There is evidence that the 2 generations born since Hiroshima are considerably more curious than their ancestors. Yet the Japanese answer the question "How?", very rarely the question "Why?"

Whether Japanese isolation from 1641 to 1853 was caused by religious (not racist) xenophobia or by their desire to do without gunpowder, the effect has been more than profound. The decision taken in 1641 has made Japan the only non-white country to have resisted Europe. This is what, in different circumstances, could have happened in India or China. Japanese history is a tribute to isolation from Europe, the result of not being in the tea trade.

27. In terms of firepower, vehicles, aircraft, even food consumed, the Americans used nearly 20 times as much crude energy in defeating Japan as Japan used in defending herself. In the end, that 20 times would have been massively exceeded but for the successful explosion of the 2 atomic bombs which arguably saved another year of conventional warfare. Those 2 bombs, however, cost more energy than was expended in warfare in Egypt and Libya in the whole of 1940–42. Profligate Westerners still fail to understand the importance of Japanese *energy* efficiency in the whole matrix of Japanese industrial success.