

# THE AMERICANS

*The National Experience*

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by DANIEL J. BOORSTIN

"There is nothing like the  
elbow room of a new country."

JOHN TYLER

VINTAGE BOOKS

A DIVISION OF RANDOM HOUSE

New York

# **THE AMERICANS**

*The National Experience*

BOOKS BY DANIEL J. BOORSTIN

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FOR Ruth

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## NEW BEGINNINGS

*In 1845, The Emigrants' Guide to Oregon and California recorded Lansford W. Hastings' experience with his company of one hundred and sixty who set out overland from Independence, Missouri, on May 16, 1842:*

"Now, all was high glee, jocular hilarity, and happy anticipation, as we thus darted forward into the wild expanse, of the untrodden regions of the 'western world.' The harmony of feeling, the sameness of purpose, and the identity of interest, which here existed, seemed to indicate nothing but continued order, harmony and peace, amid all the trying scenes incident to our long and toilsome journey. But we had proceeded only a few days travel, from our native land of order and security, when the 'American character' was fully exhibited. All appeared to be determined to govern, but not to be governed. Here we were, without law, without order, and without restraint; in a state of nature, amid the confused, revolving, fragments of elementary society! Some were sad, while others were merry; and while the brave doubted, the timid trembled! Amid this confusion, it was suggested by our captain, that we 'call a halt,' and pitch our tents, for the purpose of enacting a code of laws, for the future government of the company. The suggestion was promptly complied with, when all were required to appear in their legislative capacities."

\* \* \*

*The nation was beginning not at one time or place, but again and again, under men's very eyes. Americans were forming new communities and reforming old communities all over the wild expanse of the western world. Within less than a century after the American Revolution—even before the Civil War—the fringe of colonial settlements, ocean-bound to their mother countries, would become a continent-nation.*

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# BOOK ONE

## COMMUNITY

"America was meant to be everything. . . . There are many soils and many climates included within the boundary line of the United States; many *countries*; and one rule cannot be laid down for all."

HARRIET MARTINEAU

AMERICA grew in the search for community. Between the Revolution and the Civil War the young nation flourished not in discovery but in search. It prospered not from the perfection of its ways but from their fluidity. It lived with the constant belief that something else or something better might turn up. A by-product of looking for ways of living together was a new civilization, whose strength was less an idealism than a willingness to be satisfied with less than the ideal. Americans were glad enough to keep things growing and moving. When before had men put so much faith in the unexpected?

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## PART ONE

# THE VERSATILES

## New Englanders

"I sing New England, as she lights her fire  
In every Prairie's midst. . . ."

WILLIAM ELLERY CHANNING

THE American Puritans' "City upon a Hill" prospered because it was a City on the Sea. How different the story of New England, or of America, might have been if they had built their Zion in a sequestered inland place—some American Switzerland, some mountain-encircled valley! The sea helped New Englanders find resources, not in the land, but in themselves and in the whole world. The sea was the great opener of their markets and their minds.

Who could have predicted that Puritans would become Yankees? That a people noted in the Old World for stiff-necked dogmatism would on this side become exemplars of ingenuity? That an Old English sect notoriously single of purpose would become New England paragons of versatility? That Englishmen famous for keeping their eye on the path to heaven would develop an uncanny vision for new markets and a facility for shifting investments?

New Englanders proved that Americans could range the world without being uprooted, that they could cling to ancestral headquarters. The sea carried abroad hundreds of tight little shipboard communities who adventured without ever leaving New England.

New England's cosmopolitanism somehow kept her the most colonial part of the new nation. The same framework that saved 17th-century

American Puritans from utopianism helped their descendants fence in their shifting problems. More than most other Americans, New Englanders commanded Old World techniques. They knew how to flex Old World technicalities to seize New World opportunities.

New Englanders were the Transplanters in the first epoch of national life. What the Virginia country gentlemen had been to the English squire, what Thomas Jefferson was to Squire Western, that is what the Boston entrepreneur was to his Manchester counterpart. The contribution of New England—a stronghold of conservatism and radicalism, of genteel Brahmins and of unwashed immigrants—to the new nation was far out of proportion to her numbers or her extent. Geography, population, and ideas made her a cultural limbo between an old world that refused to die and a new world not quite born.

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# 1

## The Sea Leads Everywhere

THE SEA WAS a path direct from Old to New England, from Babylon to Zion. It was both a waterway from colony to mother country and a gulf that separated colonists from poverty, decadence, and dynastic conflict. It was a highway to the world.

The sea was impartial. It carried anything anywhere: Puritans and Bibles and theology texts to build a City upon a Hill; rum to West Africa in exchange for slaves to be carried to overwork and death in the West Indies; opium from Smyrna to China. The versatility of the sea was the versatility of New England.

The sea was empty and had no culture of its own—except that which seafarers made for themselves on shipboard. This was a blessing for New Englanders whom it enabled to go everywhere without leaving home. The earliest Puritans sailing to New England had huddled together, threatened only by God and the elements. Their new community life began at sea; the Mayflower Compact was made even before they landed. Shipboard sermons like Winthrop's "Model of Christian Charity" cemented their community while it still traveled. Unlike later companies of Americans who moved westward on the land, seaborne communities en route were not overwhelmed by sights of new plants or new animals nor threatened by savage tribes. Travelers by land saw new landscapes, they encamped, dispersed, and made homes as they went. But the very ships which brought New Englanders to their Promised Land kept them together and made them more compact, more insular, and more united when they arrived than when they had left.

By the early 19th century, the New Englander had learned to deal with the banian in Calcutta, the co-huang and the mandarin in China, but his peculiar talent was his inability to forget his native land. The sea captain seldom lost his nostalgia for a farm and chickens in the land of his childhood. From his "Captain's Walk" on top of the farmhouse of his ideal retirement he looked back on the wandering ocean; but the sea never became his home. When Jefferson accused the merchant of being a man without a country he spoke with the provincial voice of the Old South and he showed his ignorance of New England. Virginians seldom understood the sea-roving spirit of the New Englander, who yearned more for his native land as he wandered farther from it. Jefferson's love of Virginia was an affection for Monticello and the familiar scene of his verandah. But the attachment of Massachusetts men to their "country"—the New England patriotism of the Adamses, Perkinses, Jacksons, Cabots, and Lees—while just as profound, was more diffuse. They were attached to a spiritual and commercial headquarters.

From the earliest days in Massachusetts the wealth of the sea offset the poverty of the land. "The abundance of Sea-Fish are almost beyond beleueing." Francis Higginson wrote in 1630, "and sure I whould scarce haue beleueed it except I had seene it with mine owne Eyes." The first settlers found not only mackerel, cod, bass, and lobster, but also "Heering, Turbot, Sturgeon, Cuskes, Haddocks, Mulletts, Eeles, Crabs, Muskles and Oysters." Before the end of the 17th century, fishing was the main industry of Massachusetts Bay. The codfish was to colonial Massachusetts what tobacco had been to colonial Virginia. If the Old Dominion was founded, as its hostile critics said, "on smoke," the Puritan Commonwealth was founded on salt water. New England's fishermen, like fisherfolk in other parts of the world, had their own kind of conservatism. It once seemed only a little less difficult to convert a codfisherman into a mackerel man or a whaler, than to make an Englishman into a Frenchman or an Italian. Yet, while tobacco and the newly dominant Southern crop, cotton, put Southern roots ever deeper into the soil, the fisheries drew New England out toward the world.

The commerce of the sea demanded versatility. It called for quick decisions and the willingness to jettison unprofitable cargo. It called for sale in Buenos Aires of whatever at the moment was unusually scarce there; for the ability to pick up unexpected bargains anywhere; for changing destination from Canton to Calcutta if war threatened or storms made the passage dangerous; for sudden disposal of the ship itself if the voyage could not go on with profit. Captain and supercargo had unfettered discretion to shift investment, to convert the voyage from one purpose to another, to give up and return home—to do whatever promised most.

By 1784, when the Massachusetts House of Representatives passed

a resolution "to hang up the representation of a Codfish in the room where the House sit, as a memorial of the importance of the Cod-Fishery to the welfare of the Commonwealth" (a totem which kept its place into the mid-20th century) the sacred cod had more than earned its eminence. The Revolution itself was, in a sense, a by-product of the New England fisheries. For it was to serve her fishermen that New England colonists had built their own ships and so had begun to justify English jealousy of a colonial merchant marine. The gathering place of Massachusetts rebels, Faneuil Hall, which Daniel Webster called "the cradle of American liberty," was the gift of Peter Faneuil, a Boston merchant who had prospered by carrying New England codfish to distant markets.

The peak of the New England fisheries was passed ten years before the Revolution, when New Englanders were catching more fish, and their catch was a larger part of their income than it had ever been before or would ever be again. During the era of the Revolution, New England fishing dwindled, less from the force of English laws than from the distractions and demands of war. In 1774 the little town of Chatham, for example, still had twenty-seven codfishing vessels; ten years later there were only four or five. Fishing schooners were fitted out as privateers and peace-loving fishermen became fighting seamen.

Nothing did more to make Americans independent than this very War for Independence. New fortunes, like those of George Cabot (who had been commander of a codfishing vessel by his eighteenth birthday), came now from privateering. The great world outside the British Empire, once open only to the smuggler, tempted every New England merchant. John Adams of Massachusetts, with the slogan of "fisheries or no peace," secured extensive fishing rights all over British America in the treaty of peace with Great Britain in 1783. But at the War's end, while the fisheries did revive, it was the discovery of new markets for old commodities and new commodities for old markets that stirred New England imaginations.

There are countless examples of this search: stories of men long since forgotten—so commonplace was adventure in their day—and of commodities we hardly remember. As good as any is the story of Major Samuel Shaw and the marketing of ginseng.

The first American ship to reach China arrived at Canton on August 30, 1784. In charge of the business of that voyage was Major Samuel Shaw, Boston-born veteran of the American Revolution. When a young man in his late twenties, Shaw had fought at Trenton, Princeton, and Brandywine; he had suffered with General Washington at Valley Forge; he had witnessed the mutinies of the soldiers of Pennsylvania and New Jersey; and he had heard Washington deliver his tearful farewell to his officers in December, 1783. Early the next year, Shaw like many others re-entered civil life without property and burdened with debt. When

some businessmen purchased the *Empress of China*, a ship of 360 tons, and organized a venture to export ginseng to Canton, they appointed Shaw supercargo. Leaving New York harbor in early 1784, he sailed eastward to the Cape Verde Islands, enjoyed the jovial ceremony of his first crossing of the equator, saw whale and swordfish, and after six months finally reached the exotic shores of Java and Macao en route to Canton.

Until these New Englanders carried the American flag to China it had been assumed that the whole annual Chinese consumption of ginseng—a rare herb found in North America as well as China and prized by Chinese physicians as an aphrodisiac and prolonger of life—would never be more than four tons. But this first American ship alone carried ten times that amount; within another year Americans more than doubled their ginseng exports to China. The demand and the price kept up. In exchange for ginseng, American businessmen secured tea and other marketable products of China which, in turn, produced additional good profits.

At first, as Shaw explains in his journal, the Chinese could not quite understand the distinction between Englishmen and Americans. "They styled us the *New People*; and when by the map we conveyed to them an idea of the extent of our country, with its present and increasing population, they were highly pleased at the prospect of so considerable a market for the production of their own empire."

No corner of the world remained untouched by these New Englanders. In 1784 one of George Cabot's ships carried the first American flag to St. Petersburg in Russia. From Salem, vessels traded with the west coast of Africa, brought copal for varnish from Zanzibar on Africa's east coast, and rubber and overshoes from Brazil. Boston ships carried food to starving Irishmen. They picked up sandalwood in Hawaii or otterskins in British Columbia as currency for Chinese tea. Others played "hide-and-go-seek"—finding cheap hides in South America or California to supply the new shoe factories back home. They sought out the best coffees in the Southern Hemisphere, bought Peruvian bark to make quinine against malaria, jute for gunny sacks, linseed oil for paint and ink, shellac for ships and furniture.

Nothing was too big or too small, too exotic or too commonplace for New England enterprise. Salem quickly became the world headquarters for trade in the tiny peppercorn, which in the era before refrigeration was wanted everywhere. In 1791 the United States re-exported less than 500 pounds of pepper; in 1805, it re-exported 7,500,000 pounds, which comprised nearly the whole crop of Northwest Sumatra. The immense whale, long the staple of New Bedford and Nantucket, was pursued at mortal risk on voyages lasting as long as three years all over the North Atlantic and the South Pacific.

In distant places New England became a name for the new nation. At the source of otter skins on the northwest coast of North America, "Boston" became a synonym for the whole United States. In the 1830's, prosperous native merchants on South Pacific islands thought Salem "a country by itself, and one of the richest and most important sections of the globe."

New England seafaring enterprises were a broken, shifting pattern. Before the Revolution much of this business had been outside the law; afterwards much of it was as perilous and as uncertain as the new trade routes. By contrast, the adventurousness of more ancient seafaring peoples had frozen; in the Old World the profits of the sea ran in tradition-worn channels. In early 19th-century England, for example, seaborne commerce continued to be dominated by organizations like the East India Company whose history went back to Elizabethan days. Such organizations had their own long-established practices and were regulated by time-honored government policies. It was no accident that the British East India Company commonly provided berths for unenterprising younger sons or favorite nephews of rich families. Not only in England, but elsewhere in Europe, officers at sea, like those on land, were a branch of the ruling aristocracy. It was almost unheard of for a common seaman to become first mate or captain: he had neither the education, the language, the manners, nor the "background." In New England, however, young men starting as common seamen rose to command their own vessels. A Beverly sea captain who had begun as a foremast hand on a ship out of Salem could recall that every one of that ship's crew of thirteen had risen to become master of a vessel. Since New England had no ancient trading companies nor any rigid tradition of adventure, her enterprise was controlled by upstart Cabots, Jacksons, Lees, Higginsons, and Perkinses, ingenious at finding their own markets and making their own ways. She inherited no established aristocracy from which officers were drawn nor a deep-sea proletariat from which came the "old salts" of English fiction and folklore.

## 2

## Inventing Resources: Ice for the Indies

NEW ENGLAND DID NOT raise pepper or coffee or sugar or cotton, or any other staple crop to sell the world. The greatest resource of New England was resourcefulness. Using the sea, New England versatility made the very menaces of the landscape into articles of commerce. "New England," went the common taunt, "produces nothing but granite and ice." The supreme proof of New England ingenuity was her ability to turn her rocky soil and heavy winters to profit.

Until almost the middle of the 19th century, ice for summer cooling had been a rare luxury. The ancient Romans had brought snow down from the mountains as a curiosity. But from the beginning of history, diet had been limited by the seasons. Generally speaking, fresh fruit and vegetables were available only when just ripe, meat only as it was slaughtered, milk only as it came fresh from the cow. A recipe for a syllabub about 1800 instructed the housewife: "Sweeten a quart of cyder with double refined sugar, grate nutmeg into it, then milk your cow into your liquor." Before the days of refrigeration, milk could be preserved only in the form of butter or cheese, and meat had to be dried or salted. Everything was spiced to lend variety or to conceal the staleness.

In the 18th century, ice cream was found in Paris, in London, or in the colonies only on aristocratic tables. Occasionally on the sideboard of a great English country house one might see a water cooler which used ice. An icehouse was part of the luxurious equipment of the palace of the royal governors of Virginia at Williamsburg, of Washington's Mount Vernon, of Jefferson's Monticello, and of Monroe's Ash Lawn. Before the end of the 18th century, a few Philadelphia families had got together to maintain an icehouse and at least one rich Cambridge estate had an icehouse of its own. But there had been almost no progress in the general use of refrigeration since that winter day in 1626 when Sir Francis Bacon caught a fatal chill while experimentally burying a chicken in the snow.

Since North American summers in the same latitude were hotter than those of Europe, food spoiled here even more quickly. Putrid meat, tainted poultry, rancid cream, and sour milk were items which unfriendly European tourists in the 18th and 19th centuries especially noted in the American cuisine.

Then, quite suddenly, in the half century before the Civil War, there was a greater increase in the consumption of ice than in the whole millennium before. By 1860 the household icebox (the word had lately been invented in America) was a commonplace in growing American cities; cookbooks took it for granted. Ice cream had become a common dish, described by *Godey's Lady Book* (August, 1850) as one of the necessities of life; a party without ice cream was said to be like a breakfast without bread or a dinner without a roast. Some New York families even had ice water all summer.

The rapid growth of cities put more and more people farther from sources of fresh milk, meat, and vegetables, while the increasing number of household refrigerators enlarged the demand for ice. New Orleans, which in the late 1820's consumed less than 400 tons of ice a year, in one decade increased its consumption tenfold, in another decade twentyfold, and before the Civil War seventyfold. Within the same period ice consumption in such northern cities as New York and Boston increased almost as spectacularly. By the late 1830's, when New England merchants suffered from high tariffs and when Boston's carrying trade between Calcutta and Europe had fallen disastrously, the new ice industry provided a staple New England export which helped save the port of Boston and incidentally revived Boston's commerce to the East and West Indies.

The "Ice Age" of American diet—with its emphasis on sanitation, nutrition, and refreshment, on the health of the body rather than the pleasures of the palate—had begun. By mid-20th century, the word "ice" in various combinations had provided more new compounds than perhaps any other word in the American language.

The man who did more than anyone else to make ice an American institution was Frederic Tudor of Boston, who came to be known as the "Ice King." An enterprising businessman cast in a New England mold, he was no Horatio Alger hero. He succeeded not by the prosaic, abstemious virtues but by a flamboyant, defiant, energetic, and sometimes reckless spirit. He was not considerate and gentle, generous and frugal, but, on the contrary, he was imperious, vain, contemptuous of competitors, and implacable to enemies. While energetic in competition, he preferred legalized monopoly. He had not risen from poverty but, like many another substantial Massachusetts merchant, amassed wealth by exploiting all opportunities, including his family connections and his social position.

Tudor came of a prominent Boston family. His father, a Harvard graduate, had studied law in the office of John Adams, had served George Washington as judge-advocate-general and then built a prosperous law practice. His three brothers graduated from Harvard, but Frederic instead began in business at thirteen. It was he who gave his brothers em-

ployment and eventually recouped the family fortunes. Despite his omnivorous mind and insatiable curiosity, he idealized work and the life of action. He distrusted the idle "academic" life and worried when, visiting his brother John's room at Harvard one day, he found it littered with the paint brushes and canvasses of John's roommate, the romantic painter Washington Allston.

In the winter of 1805, when Tudor was barely twenty-one, his brother William at a gay Boston party whimsically asked why the ice on nearby ponds was not harvested and then sold at ports in the Caribbean. Frederick took up the suggestion, as if to prove that no enterprise was too outlandish, no commodity too commonplace, for New England commerce. He purchased a notebook, calling it his "ice house diary," and made his first entry on August 1, 1805 in what was to be a classic record of New England business enterprise. On the leather cover he printed the motto: "He who gives back at the first repulse and without striking the second blow despairs of success[,] has never been, is not, and never will be a hero in war, love or business."

All Boston derided him as a madman when, within the year, he invested ten thousand dollars in shipping 130 tons of ice to the sweltering island of Martinique. He then went to Martinique to promote sales by personally showing prospective customers how to preserve and use ice. From St. Pierre's he wrote back on March 10, 1806:

The man who keeps the Tivoli garden insisted ice creams could not be made in this country and that the ice itself would all thaw before he could get it home! I told him I had made them here; . . . I wrote an order for 40 lbs. of ice, and in a pretty warm tone directed the man to have his cream ready and that I would come to freeze it for him in the morning, which I did accordingly, being determined to spare no pains to convince these people that they can not only have ice but all the luxuries arising as well here as elsewhere. The Tivoli man recd. for these creams the first night \$300; after this he was humble as a mushroom. . . .

But the Martinique venture lost nearly four thousand dollars when the whole cargo melted within six weeks.

It was fifteen years before Tudor established the ice trade as a paying business. During all this time he struggled: to secure legal monopolies of the trade, and exclusive rights to build icehouses in Charleston, Havana, and in the British and French West Indies; to dominate the New England ponds which were the source of ice; to create a demand for ice, iced drinks, ice cream, and ice-preserved fruit, meat, and milk in every part of the world his ships could reach. For a while, Tudor sold chilled beverages at the same price as unchilled beverages, hoping to encourage a taste for cold drinks. He demonstrated the use of ice in hospitals. Wherever he managed to build an efficient storage depot, he

had a great advantage against competitors: he would sell his ice at a penny a pound till his competitor's stock had all melted at the dock and then he would raise his price to recoup his profit. "Drink, Spaniards, and be cool," he exhorted the perspiring patrons of the West Indian coffee houses, "that I, who have suffered so much in the cause, may be able to go home and keep myself warm."

Had he not conquered the technical problems, none of this would have been possible. And he doggedly devoted himself to the task of designing an efficient icehouse. Deliberately risking yellow fever in Havana to experiment on the spot, he tried every conceivable kind of insulating material—straw, wood shavings, blankets. Watch in hand, he stood outside his Havana icehouse and measured the melting water hour by hour. He recorded the effects of changes in design and of opening the icehouse doors on the rate of melting. Finally he produced an economical and efficient design for an ice depot in tropical climates. The seasonal loss from melting in icehouses of the old underground type was over sixty per cent, but in Tudor's houses it was less than eight per cent.

To secure large quantities of ice for tropical areas, Tudor had to perfect a way of harvesting ice from New England ponds so that it could be conveniently transported and preserved. The early 19th-century ice harvests had been laboriously cut by hand into pieces of miscellaneous size. When a warm winter, like that of 1818, shortened the supply from New England ponds, the captain of a Boston brig would risk ship and crew to pry fragments off a Labrador iceberg with picks and crow-bars. These irregularly shaped pieces were troublesome to ship and uneconomical to store. Ship captains were ordinarily willing enough to ballast ice instead of rocks on their voyages southward, but shipowners objected because these pieces could not be tightly packed, they shifted in the hold, and their melting spoiled other cargo. It was necessary, therefore, to find a way to mass-produce uniform blocks from natural ice.

By a lucky collaboration, Tudor solved this problem. He enlisted the ingenuity of another well-born Cambridge man, Nathaniel Jarvis Wyeth, who had inherited a part of the shore of Fresh Pond, one of the best sources of ice around Cambridge. Although his father had been a Harvard graduate, Wyeth, like Tudor, passed up Harvard to go into business. Before he was thirty he was successfully running the Fresh Pond Hotel which, with its rowboats, tenpin alley, and other concessions, was an attractive summer resort for nearby cities. In 1824, Wyeth became manager of Tudor's ice company, which reaped the winter crop from Fresh Pond. Before long he invented a machine that revolutionized the harvesting of ice and without which the great New England ice industry might not have been possible.

Wyeth's solution was simple, probably suggested by the marks left by

sleigh-runners on the surface of Fresh Pond in winter. His ice cutter consisted of two parallel iron runners about twenty inches apart drawn by a horse. Each runner was notched with saw teeth, making a device which cut two parallel grooves as it was pulled along. These grooves were deepened by repeating the operation; additional parallel grooves were cut by using one of the grooves as a guide. By pulling the device at right angles to the original grooves, one formed a checkerboard of squares in the ice. A few men with iron bars then pried off the cubes and floated them into a channel, quickly producing a great number of blocks of uniform dimension. At the end of the channel Wyeth provided a novel horse-drawn hoist which lifted the blocks out of the water up to a chute, which then deposited them in the icehouse on the shore of the pond.

These devices, which Wyeth had in workable form by 1825, reduced the cost of harvesting ice from thirty cents to ten cents a ton. Under the arrangement with Wyeth, Tudor controlled the use of all these devices. But these were not Wyeth's only inventions for the ice industry; he went on elaborating until, by the time of his death in 1856, its technology was almost entirely of his making. He designed a new type of ice-scraper to clean the surface of the ice before harvesting, in this way producing a still more uniform product. He discovered that sawdust could be used to prevent blocks from melting together in transit, thus keeping them neat for sale—and incidentally creating a demand for the until then useless by-product of the Maine lumber mills.

But Wyeth was no mere mechanic. During a five years leave from the ice business, after 1832, he led an overland expedition to Oregon and organized a company to exploit the Columbia River region for salmon, fur, timber, and tobacco. He thus became one of "the pioneers of the pioneers" of the Pacific Northwest. Despite a series of dramatic misadventures—lightning striking his company's ship at Valparaiso, struggles with the Rocky Mountain Fur Trading Company and the Hudson's Bay Company over the fur trade—he founded Fort Hall, a well known trading station on the Oregon and California trails. Lacking resources to establish a permanent fur-trading company of his own, he returned to Boston and re-entered the ice business for himself. He improved techniques still further. His versatile new type of ice cutter was melodramatically tested in 1844, when the Cunard steamship *Britannia* was frozen in Boston harbor; within three days he had cut a two-hundred-foot channel seven miles long to the open sea.

Despite competition from Wyeth and others, Tudor remained the Ice King. But his adventuring energies were never confined. In his early years he had traded in pimento, nutmeg, flour, sugar, tea, candles, cotton, silk, and claret. Later he dug for coal on Martha's Vineyard; he invented a siphon for pumping water from the holds of vessels; he made

a new design for the hull of a ship (*The Black Swan*) and for a "double dory," supposedly an improvement over earlier fishing vessels; he operated a graphite mine; he made paper from white pine; and he experimented with the raising of cotton and tobacco at Nahant. He brought to New England the first steam locomotive, an engine of one-half horsepower which ran on the sidewalk at four miles an hour pulling a car for one passenger. He set up what was probably the first amusement park in America. And he even tried raising salt-water fish in Fresh Pond.

Tudor's miscellaneous speculations from time to time plunged him deeply into debt, even after he had put the ice trade on a profitable basis. For example, his speculations in coffee involved him to the extent of \$200,000 before the end of 1834, but this drove him to redouble his efforts in the ice trade, out of which he managed to repay the coffee debt in the next fifteen years.

Tudor had now decided to ship his ice halfway around the world—to the East Indies. In May, 1833, in the most spectacular experiment of his career, Tudor sent his ship *Tuscany* with 180 tons of ice to Calcutta. To reach India from Boston the *Tuscany* had to cross the equator twice, preserving its cargo unmelted for four months. Tudor reminded his captain that ice had never been carried so far south; this was a "discovery ship." The *Tuscany* reached its destination, bringing the combined delights of a new toy and a new candy. The first shipment sold profitably, Tudor's reputation soared, and before long the ice trade flourished between Boston and the Far East. Using experience gained in the Caribbean, Tudor built a large Calcutta ice depot and encouraged Anglo-Indians to buy household refrigerators and water coolers; he tried to change their eating habits by his well-preserved shipments of apples, butter, and cheese.

Soon ice was being shipped from Boston to all parts. By 1846, sixty-five thousand tons were shipped; only ten years later more than twice that amount went in nearly four hundred different shipments to over fifty different destinations in the United States, the Caribbean, South America, the East Indies, China, the Philippines, and Australia. Ice had become a major commodity, a New England staple for the world market.

One brochure proposing a railroad to connect Fresh Pond with the docks at Charlestown asked whether ice did not contribute "as much to refreshment in the South as coal does to comfort in the North?" Others urged the importance of ice in promoting good morals. "How often do men in health drink ardent spirits as a beverage because they cannot procure good or only tepid water that ice would render palatable?" Edward Everett, American minister to England, reported receiving the thanks of a Persian prince for the New England ice which was saving the lives of patients in Persia, whose fevers were reduced by applying ice to their foreheads.

Tudor's ice industry reached not only to Persia but even to the fastnesses of nearby Walden Pond, where it disturbed a would-be recluse named Thoreau who reported in the winter of 1846-47:

A hundred Irishmen, with Yankee overseers, came from Cambridge every day to get out the ice. They divided it into cakes by [Wyeth's] methods too well known to require description, and these, being sledged to the shore, were rapidly hauled off on to an ice platform, and raised by grappling irons and block and tackle, worked by horses, on to a stack, as surely as so many barrels of flour, and there placed evenly side by side, and row upon row, as if they formed the solid base of an obelisk designed to pierce the clouds. They told me that in a good day they could get out a thousand tons, which was the yield of about one acre. . . . They told me that they had some in the ice-houses at Fresh Pond five years old which was as good as ever. . . . the sweltering inhabitants of Charleston and New Orleans, of Madras and Bombay and Calcutta, drink at my well. . . . The pure Walden water is mingled with the sacred water of the Ganges.

## 3

## Inventing Resources:

### Granite for a New Stone Age

EARLY NEW ENGLAND FARMERS cursed the rocks that broke their ploughs, the rocks they laboriously collected along their boundaries to make fences as they cleared. The first settlers of Boston occasionally built with boulders they found strewn loose on the land, but stone in this form was not plentiful enough to become a common construction material. When houses were not built of wood, the usual materials were clay, brick, slate, cement, or red Connecticut sandstone. The great rough granite boulders made foundations and doorsteps but, even for this purpose, they soon became so scarce that the town meeting of Braintree, for example, in 1715 penalized anyone who carried a boulder away from the commons. To build King's Chapel in Boston, boulders were dug up, heated by a fire built directly on the stone, and then split by the dropping of heavy iron balls. This, the usual technique, was haphazard and ex-

pensive, and it could only be applied to boulders having a free side. In mid-18th century, German immigrants in Braintree began using gunpowder to split off large chunks of granite (hoping for the best shapes) which they then cut into smaller pieces by laboriously making a groove with a hammer having a cutting edge like that of an axe.

At the end of the 18th century an energetic governor of Massachusetts, while traveling about the state to find cheap stone for a new State Prison to be built at Charlestown, came upon a workman near Salem who used the novel method of drilling holes several inches apart and then splitting the stone in a straight line along the holes. When this improved technique for cutting granite came into general use, it halved the price of hewn granite, which now for the first time began to be in wide demand as a building material. The new Middlesex Canal, the longest in the country, from Chelmsford to Boston (employing granite for its sixteen locks), opened a convenient water passage from granite-source to port-city.

The great "Stone Age" of New England architecture, sometimes called the Greek Revival, followed. Not since the Mayans and Aztecs had North America seen so many buildings of monumental stone. In 1818 \$25,000 worth of hewn granite was shipped for a church in Savannah, Georgia. And before long New England's best architects (Charles Bulfinch, Alexander Parris, Solomon Willard, Ammi Burnham Young, Gridley Bryant, and H. H. Richardson) used New England granite for homes, churches, markets, and public buildings all over the eastern and southern United States. Their work was possible only because New Englanders—by opening quarries, by inventing new ways of shaping, handling, and transporting granite, and by using their old ally, the sea—had now made stone a profitable export.

The American Revolution, in a strange and unforeseen way, was also indirectly responsible for the exploitation of Quincy granite. William (brother of Frederic) Tudor, who had first casually suggested the sale of ice in the Caribbean, is also credited with the first proposal in 1822 that a monument ("the noblest column in the world") be built on Bunker Hill to commemorate the first battlefield defense of the Republic. The design and engineering of the Bunker Hill Monument were the work of Solomon Willard, a talented jack-of-many-trades. Though coming from an old New England family, and a descendant of the famous minister, Samuel Willard, he was of the class of "self-made men" (his contemporary biographer explained) "peculiar to our own country, born with its birth—existing even before its birth as a nation—and growing with its growth, with a vigor which proves its congeniality, if not its indigenoussness to the soil." As the son of a carpenter, Solomon Willard had only a common-school education and himself became a carpenter. By teaching himself the rudiments of architecture, by working hard, and by seizing his opportunities, he became a prosperous and prominent

citizen. Under the direction of Charles Bulfinch, in 1818 he made the architect's model of the national capitol. In the 1820's, when American sources of coal were beginning to be exploited, he developed a hot-air system with a basement furnace and pipes leading to different rooms, which became the first widely used American system of central heating.

In 1825, Willard was chosen architect and superintendent of construction of the Bunker Hill Monument, for which he bore responsibility during nearly twenty troublesome years. The actual cost of the monument, Willard calculated, was over one hundred thousand dollars; including uncompensated services, it must have cost several times that. It had been entirely financed by voluntary contributions, but the citizens of Boston had taken twice as long to build the monument as they had to win the Revolution. At the dedication in 1843 in the presence of President John Tyler and his cabinet, Daniel Webster, who had delivered one of his most famous orations at the laying of the cornerstone 18 years before, gave the principal address. This monument, Webster commented, bore no inscription—"and it needs none, since the lessons of patriotism it is designed to commemorate, can only be inscribed upon the hearts of those who behold it."

An unexpected by-product of the building of Bunker Hill Monument was the great New England granite industry. Seeking a suitable material for the Monument, Willard had walked three hundred miles to examine different quarries until he finally discovered the granite quarry in Quincy. This was purchased in June, 1825 by Gridley Bryant, who sold it to the Bunker Hill Monument Association for \$350 (still giving Bryant what was then called a "handsome profit"). From the so-called "Bunker Hill Ledge" in the Quincy quarry came the stone for the Monument. In securing this stone, Solomon Willard invented nearly every piece of machinery later used in the granite industry: lifting-jack, pulling-jack, hoist, and other devices for moving and placing large blocks of granite. Part of the construction scheme was the famous Granite Railway, planned and built by Gridley Bryant and sometimes called the first railroad in the United States. Over a primitive wooden track six inches high, covered with iron plates and resting on stone sleepers, granite blocks were hauled by horses from quarry to tidewater. It was while building this road, too, that Bryant developed his famous eight-wheel car and such other fundamental railroad devices as the switch, portable derrick, movable truck, turntable, and snowplow.

The Bunker Hill Quarry soon became a full-scale experiment in granite production. By selling granite at prime cost—only the cost of labor and materials directly used in procuring it—which was about one fourth of the going commercial price, Willard antagonized his competitors but he did widen the market. After completion of the Bunker Hill Monument, Willard could boast that the widespread use of granite

as a building material was largely a result of improvements developed during its construction. "A business has grown . . . since the work commenced, and in a space of a few miles, amounting . . . to \$3,000,000, which would not otherwise have been done at these quarries, and of which the work on the obelisk is but about one-thirtieth part."

In cities all along the eastern and southern seaboard, the most prominent public structures—customs houses, courthouses, markets, banks, and merchants' exchanges—were now built of granite. Willard's improved techniques of moving and placing the stone actually produced a new architectural style. Until then granite had been used mostly in small pieces for cellar walls, underpinnings, and lintels. Willard was now able to use it in large blocks, creating a monumental effect, the first example of which was, of course, the Bunker Hill Monument itself. Willard noted with satisfaction the improved construction of the granite drydocks in Charlestown and Norfolk, built soon after the commencement of the Monument. He observed a consequent improvement in "architectural taste and mechanical execution" in many buildings: in the Astor House and the Merchants' Exchange in New York, in the Tremont House, the Exchange and the Customs House in Boston, and in numerous public buildings and store-blocks elsewhere. In an age of gingerbread and gewgaws, the very intractability of granite encouraged a happy simplicity of design.

A coincidental interest in public health and landscape architecture fed a movement to replace the fetid charnel houses and the haphazard, crowded burial grounds of the colonial period with new "garden cemeteries." The leader of this movement was the versatile Boston botanist-physician Jacob Bigelow who founded Mount Auburn Cemetery in Cambridge in 1831. Its grandiose Egyptian portal, its markers and monuments for the wealthy and the famous buried there, and its neat granite curbing for its winding drives, consumed large quantities of stone from the Bunker Hill quarries. As garden cemeteries became popular, they created a large new market for Quincy granite.

With the growth of cities, the demand for a hard paving stone increased. Solomon Willard laid the first such blocks of Quincy granite in front of the Tremont House in 1840. Before the end of the century, New England was producing over sixty million granite paving blocks each year.

The influence of granite reached out—to the edge of the sea, across the sea, and among people working on the sea. When Harriet Martineau visited Massachusetts in the fall of 1835–36, she found the remote New Englanders of Cape Ann using the sea to help them harvest the granite of the land. She found them employing ox teams and sleds to embark stone for foreign parts. "Blocks of granite lay by the road-side, marked . . . prepared to order for some great building in New York,

or Mobile, or New Orleans. . . . We went into a quarry, and saw an untold wealth of fissured stone. The workmen contrive to pursue their business even in the winter. When the snow is on the ground, and the process of drilling is stopped, they remove ordinary pieces out of the way, and make clear for their spring labours. They 'turn out' 250,000 dollars'—worth a-year; and the demand is perpetually on the increase."

A *tour de force* in granite was Minot's Ledge Lighthouse in Boston Harbor, completed only after eight years of planning and construction. Because of the peculiar location of the site, stones could be placed only when there was a perfectly smooth sea, a dead calm, and low spring tide. Even then nothing larger than a small sailboat could be used to carry the two-ton stones to the only point at which a boat could be brought up to the ledge. When Minot's Ledge Lighthouse first shone on November 15, 1860, it was celebrated as a prodigy of architecture and marine engineering. It was, in fact, a demonstration not only of the wonderful qualities of granite, but of the ability of New Englanders to meet the challenge of the sea. And it was not long before New England's most respectable orators had reversed the proverbial taunt. No one now could deny their boast, uttered by Charles Francis Adams, Jr., that "the three great staples of New England are ice and rocks and men."

## 4

## Organizing the American Factory

BY THE MIDDLE of the 19th century Europeans began to notice an "American System of Manufacturing" quite different from their own. They should have called it more precisely a "New England System," for there was hardly an important manufacturing innovation in the shaping years before the Civil War that did not have its decisive trial in our Northeast.

This New England System was versatility made into a way of production. It grew not from a specialized skill at making particular things—guns or clocks or textiles or boots—but from know-how that could make anything. It was the offspring of ingenuity and lack of skill, of scarce labor and vast markets, of abundant water power and meager raw materials, of private ambition and large-scale cooperation, of commercial

enterprise, corporate capital, government subsidy, and happy accident. For the first time it offered a way of planting New England's seafaring agility firmly on the land.

Transforming production by new ways of bringing together some processes and of separating others, the new factory arrangements had a revolutionary simplicity, a simplicity hidden from the custom-blinded Old World. The new combining meant simply bringing together the different processes for making a commodity under a single management and under a single roof. This was, properly speaking, the new American factory organization, which is the subject of this chapter. The second feature, a new way of separating the parts of the operation, is the subject of the next chapter.

The system, which later was to have the look of grand invention and bold discovery, began in the casual experiments of men unencumbered by century-accumulated skills and intricate social regulations. If the American Factory System was a triumph of organization and of cooperation, it was also a triumph of naiveté, for its essence was a loosening of habits and of ways of thinking. Ignorance and "backwardness" had kept Americans out of the old grooves. Important innovations were made simply because Americans did not know any better.

Nearly every feature of the American system of manufacturing, from the elements of the new textile machinery to the concept of interchangeable parts, had actually been conceived earlier by Europeans. But while a few Europeans could see the possibilities, their communities kept them powerless to give their ideas a fair trial. Too many had a stake in the older ways. Industrial progress in Europe required extraordinary courage to break the prevailing pattern; in America it required a willingness to try the obvious. American genius was less for invention or discovery than for experiment.

It was no accident that the headquarters of American seafaring adventure became the headquarters of adventure in manufacturing. Both trafficked in the raw materials of remote places; both sold to the world market. The willingness to change from one commodity to another, to invest grandly and then shift investments, to experiment with novel and outlandish products, to try new ports and test new routes—this would also be required of the new manufacturer.

The commerce of the sea had accumulated capital. And successful seafaring merchants had learned to keep a considerable proportion of their capital fluid because New England habits, climate, and landscape had discouraged the amassing of impressive manorial landed estates, or the building of luxurious mansions for descendants. Whoever heard of a New England Mount Vernon, Monticello, Montpelier, or Ashlawn? With the wealth which the Rhode Island Browns and the Massachusetts Tracys, Lees, Cabots, Higginsons, Jacksons, and Lowells had gathered