

## The Spirit of Improvement

The March of Man! how slow his dull career  
 In Eastern Climes! how swift and splendid here!  
 Tis Freedom's force that works the wondrous odds  
 Freedom the friend of man, the bane of kings and gods.

—Joel Barlow, c. 1800

In the predawn darkness of Independence Day, July 4, 1817, a group of men with digging tools assembled in the village of Utica, New York. Early-rising spectators gathered around them. As the sun rose, one of the men stepped forward and addressed the crowd, promising that “unborn millions” would benefit from the task about to begin. Then another man sank his shovel into the ground, “and the laborers, amidst the acclamations of the people and the discharges of artillery, commenced the mighty work.” Construction of New York’s grand waterway from the Hudson River to the Great Lakes, the Erie Canal, had begun.

In the early United States, transportation projects, known as “internal improvements,” inspired a peculiar rapture among citizens who dreamed of national greatness. In 1815 the country’s eight million people lay scattered along a thousand miles of seacoast from Maine to Georgia and inland across the Appalachians and up the Mississippi. Within this vast domain, communication was fitful and precarious. News traveled slowly, passengers more slowly still, and freight often not at all, unless it was worth enough to bear the high cost of wagon haulage or could use a water route to avoid the rough and difficult roads.

Better transport would at once integrate the nation’s economy, promote the exchange of goods and information, and throw open for development millions of acres of western land. With this stimulus, road and canal pro-

motors expected the country’s untapped agricultural and mineral resources to yield a material abundance beyond any ever imagined. They looked for political and social rewards as well. Swift communication would foster patriotism, promote literature and the arts, and inspire refinement in intellect and morals. A Virginia legislative committee in 1815 declared internal improvements “an important auxiliary, if not a necessary ingredient of political liberty” itself. “They tend to diffuse more equally the knowledge which experience acquires, and the leisure which wealth alone can purchase; they strengthen the cords of social union, and quicken [a] generous feeling of patriotism.”

This promise of endless advance waited only to be set in motion. One early canal publicist foresaw in the western interior “a great republican community. . . . Yes, in this noble race of citizens, we see the cradle of liberty, laws, and the arts,—we see the hallowed light of our liberal institutions beaming in its native purity, blended with the mild lustre of virtue, magnanimity and intelligence.” Gouverneur Morris of New York boasted in 1800 that “the proudest empire in Europe is but a bauble compared to what America *will* be, *must* be, in the course of two centuries, perhaps of one.”

But before these dreams could be realized, some practical questions intervened. What kinds of improvements should be built, and where? Who would construct and operate them? Were such works feasible in a new country, short on capital, labor, and engineering skill? The Erie Canal provided some answers.

### *The Erie Canal*

Even before the Revolution, the cleft in the Appalachian wall carved by the Mohawk and Hudson rivers in northern New York caught the eye of those eager to exploit the future trade of the great West. In 1724 Cadwallader Colden, surveyor of New York colony, noted the possibility of an inland water route to the Great Lakes. After the Revolution promoters spread the idea, and in 1792 the New York state legislature authorized a private company to begin work. Lacking funds, expertise, materials, and men, this venture built only a few miles of canal.

Canal enthusiasts, who included landowners and speculators, town promoters, New York City merchants, and politicians, turned to state and federal authorities for help. In 1808 Albert Gallatin, secretary of the Treasury under President Thomas Jefferson, included the New York project

in his plan for a national transportation system. Gallatin envisioned several thousand miles of improvements: canals along the coast and around the falls of rivers, river-and-road routes across the mountains, a turnpike from Maine to Georgia. Gallatin reasoned that only the central government could afford such a program, and that "no other single operation, within the power of Government, can more effectually tend to strengthen and perpetuate that Union which secures external independence, domestic peace, and internal liberty." He reckoned the cost for the whole network at \$20 million over ten years.

This estimate proved far too optimistic, but it hardly mattered. Congress was hindered by debt, distracted by foreign crisis, and deterred by the doubts of leading statesmen, including President Jefferson and his successor James Madison, about the legitimacy of federal spending on internal improvement. Gallatin's majestic report lay on the table.

New York forged ahead alone. The legislature sponsored a series of route surveys and then, after a hiatus during the War of 1812, authorized construction of the Erie in a grand Canal Law of April 1817. "It remains," said De Witt Clinton, chief canal promoter and soon to be governor of New York, "for a free state to create a new era in history, and to erect a work more stupendous, more magnificent, and more beneficial than has hitherto been achieved by the human race."

The simple opening ceremony at Utica three months later thus followed years of speculating, surveying, publicizing, and politicking. Still, for all its preparation, the Erie Canal was an audacious undertaking. Its projected length of 353 miles was ten times longer than any existing American canal and three times the country's entire canal mileage in 1817. Designed for horse-drawn barges, the Erie would measure 40 feet wide and 4 feet deep, ascending via 77 locks from the Hudson River at Albany to Lake Erie. Though some long stretches were level, the canal would have to bridge rivers and streams, pierce through a rocky ridge several miles thick, and at one point climb a nearly vertical 60-foot slope. Parts of the route, including its western terminus, were still unlocated when digging began.

The countryside the canal would pass through was thinly populated, some of it nearly wilderness. The projected cost was several times larger than New York state's entire annual budget. No one knew for certain where or whether the money could be obtained. Neither the men who drew the plans nor those who would supervise the work had formal training as engineers or experience at building canals.

The only comparable works known in America, the great canals of

Europe, were much shorter than the Erie, traversed a more settled landscape, and could draw upon ample private funds or the resources of national governments. Some Americans viewed the Erie with incredulity. Thomas Jefferson thought it "little short of madness," a hundred years premature. New York City editor Mordecai Noah called it a "monument of weakness and folly." In the face of such doubts, the decision to go ahead affirmed an untested faith in American ingenuity and American destiny.

The faith was justified. In three years the canal's easy central section was finished, and tolls on its traffic already exceeded interest on the money the state had borrowed to finance construction. Engineers and contractors learned on the job, devising new inventions to speed the work: an improved wheelbarrow, a tree-felling machine, a cement that would harden underwater. Taking on more difficult tasks as the canal stretched west and east, they became adept at burrowing through rock, constructing locks, and erecting gigantic stone aqueducts, some more than a thousand feet long.

The canal's completion in 1825 drove New Yorkers to a delirium of self-congratulation. In Rochester, a city suddenly sprung to prominence at the canal's juncture with the Genesee River, the *Telegraph* proclaimed: "The Work is finished! Our brightest, highest hopes, are all consummated. Let the shouts of triumph be heard from Erie to the Atlantic, and from the Atlantic resound back to Erie. Let the air itself be made vocal with our paeans of exultation and gratitude."

On October 26, 1825, while a chain of cannon boomed the news all the way to New York City and back, a flotilla led by the canal boat *Seneca Chief*, bearing Governor Clinton and other dignitaries, entered the waterway at Lake Erie. Hailed at every village along the way, it arrived precisely a week later at Albany on the Hudson. From there the fleet, now accompanied by a steamboat escort, proceeded downriver to New York City, where citizens staged a celebration to outshine even the previous year's welcome for Lafayette. Committees representing every occupation and constituency in the city laid plans for a "Grand Aquatic Display," a "Grand Procession through the City," and an "Exhibition of Artificial Fire Works."

In the words of an official report, the spectacle presented "One Entire Whole, surpassing in novelty, magnificence, and grandeur, any exhibition which is recorded in history." Circled by canal boats, steamboats, pilot boats, warships, revenue cutters, and barges, Clinton poured a keg of Erie water into the Atlantic, invoking "the God of the Heavens and the Earth" to "smile most propitiously on this work, and render it subservient to the

best interests of the human race." As the boats returned to shore, they were met by fourteen shouted toasts, among them:

The great event which we this day celebrate—it is a proud monument of the genius and patriotism of a free people.

The State of New York, unaided and alone, has achieved a work which will cover her with imperishable glory.

The Fourth of July seventeen hundred and seventy-six, and the Fourth of July eighteen hundred and seventeen. Two great eras. The first gave birth to all that is wonderful and moral in war; the other has produced a stupendous effort of the arts of peace.

In the parade that followed, fifty-nine groups with banners and decorated carts made up a line of march a mile long, beginning with "Horsemen, with trumpets," and continuing through farmers and gardeners, cordwainers, furriers, hatters, chair makers, upholsterers, tin-plate workers, the medical society, the bar, and "Strangers of Distinction."

Completion of the Erie sparked rejoicing almost without reservation. In 1825 Americans were not yet inured to technological advance and its consequences. Improvement and invention were still new and exciting. The changes they brought seemed nearly miraculous. Canals opened up such vast opportunities that Americans groped for words to describe them. Celebrants hailed the Erie as insuring "to us a reward for industry, to our posterity an antidote for idleness; to the future inhabitants, the fertile lands of the West; the incalculable blessings of law, religion, morality and virtue; the legitimate offspring of knowledge and industry."

Sensitive to foreign jibes at American backwardness, New Yorkers crowed "that THEY HAVE BUILT THE LONGEST CANAL IN THE WORLD IN THE LEAST TIME, WITH THE LEAST EXPERIENCE, FOR THE LEAST MONEY, AND TO THE GREATEST PUBLIC BENEFIT." In patriots' eyes the canal proved the purity of American political institutions. Such a work could only have been "achieved by the spirit and perseverance of Republican Freemen." Europeans touted their superior civilization, but "where is there a work of their hands which will compare in grandeur and utility with the great Western canal?" Euphoric editors hailed the Erie as "next to the establishment of American Independence, . . . the greatest achievement of the age." The aged Jefferson, happy to be proven wrong, traced the result to Americans' "moral superiority."

In practical results the canal surpassed expectations. Travel time across New York state shrank from weeks to days. Land values rose as settlers

flooded into the interior. The cost of carrying flour, grain, foodstuffs, and lumber to New York City plummeted, raising profits for producers while lowering prices for consumers. Westbound traffic brought manufactured goods and thousands of emigrants to upstate New York and the shores of Lake Erie. Slashing freight rates as much as 90 percent, the canal did more than quicken and cheapen exchange. It created it, opening markets where none existed before and showering the fruits of commerce on everyone within its reach.

### *Canal Fever*

An engineering, financial, and commercial triumph, the Erie inspired faith in canals and in state enterprise. Other states rushed to copy its success. Already Virginia, North Carolina, South Carolina, and Georgia were pursuing internal improvement programs that blended public and private resources. West of the mountains, Ohio was the first to stir. Fronting Lake Erie on one side and the Ohio River on the other, Ohio straddled the divide between the Great Lakes and Mississippi River drainage systems. By bridging the summit with canals, Ohio could extend the Erie route across the state, completing an interior passageway all the way from New York City to New Orleans.

In 1818 Governor Ethan Allen Brown began agitating for a cross-state canal. The legislature authorized surveys in 1822 and construction three years later. At a ceremony on Independence Day, 1825, at the Licking Summit, east of Columbus near the center of the state, New York's visiting governor De Witt Clinton turned the first shovelful of earth on the 308-mile Ohio Canal.

This venture was in some ways even more ambitious than the Erie, for Ohio was a young community just emerging from the frontier, with half New York's population and only a fraction of its wealth. John C. Calhoun of South Carolina thought it "almost a miracle that a State in its infancy should undertake, and successfully execute so great a work, and it may be cited as one of the strongest proofs of the admirable effects of our political institutions in giving a high degree of intelligence and enterprize." But the Erie had shown the feasibility of mammoth canals and trained a cadre of engineers and contractors who now fanned out to design and build similar works throughout the union. Evangelists of progress spread the canal gospel, spurring initiative and fanning expectations. "A great spirit

of improvement prevails in our country," observed Boston merchant Lewis Tappan in 1825 to his brother Benjamin, an Ohio canal commissioner.

Never, I suppose, was so much mind at work, and never was matter in such agitation. . . . Long may we continue in the full career of improvement; may our children excel us in usefulness, and be able to look back on the present time as we do on years past with astonishment at the strides we have made & the changes we have noticed.

On July 4, 1825, the same day as the Ohio commencement, Connecticut governor Oliver Wolcott broke ground for a canal into western Massachusetts. Another was already being built inland from Rhode Island. New York soon began a series of lateral feeders to expand the completed Erie into a statewide network. The governor of Georgia proposed a state canal system, while Chief Justice John Marshall of the United States Supreme Court and former president James Monroe pressed for progress on Virginia's James River route to the Appalachians. Congress joined in the enthusiasm, pledging federal funds for selected projects. In 1830 a compiler counted more than thirty canals "finished or well advanced" and another ninety contemplated or under way, for a grand total of more than ten thousand miles.

Completion of the Erie spurred activity in Philadelphia and Baltimore. Philadelphia was New York City's rival for national preeminence in population and finance. Philadelphia and Baltimore were also the eastern depots for the over-mountain turnpike trade to Pittsburgh and the Ohio valley. This trade was mainly in westbound manufactured goods, while interior farm and forest products were floated down the western rivers to New Orleans. But now the New York-Ohio connection threatened to siphon off the whole future commerce of the West, in both directions, to New York City.

Philadelphia and Baltimore were both closer to the Ohio than was New York, and canals from either city could operate longer through the winter, when the Erie was closed by ice. But they would also have to climb over Appalachian ridges two thousand feet high or else tunnel right through them. There was little time to ponder these alternatives. Under the frantic urgings of Philadelphia and Pittsburgh businessmen, Pennsylvania authorized the first stages of a cross-state waterway in 1826. Work began, of course, on the Fourth of July. Not until five years later did the state abandon the idea of running a canal through the mountains. It settled instead for a thirty-six-mile "portage railway" at the summit, where stationary steam engines raised and lowered disassembled boat sections to the canal at either end. Even with this compromise, the completed Pennsylvania Main-

line Canal in 1834 was longer than the Erie, had twice as much lockage, and cost nearly twice as much to build.

Like New Yorkers, Marylanders and Virginians had eyed a Potomac River route to the West since before the Revolution. A company headed by George Washington did some digging in the 1790s. In 1825 Maryland authorized the Chesapeake and Ohio Canal. As this project would pass through three states (Maryland, Virginia, and Pennsylvania) and the federal District of Columbia, it was to be built by a private stock company, but with expected state and federal help.

United States engineers surveyed the route. The state of Maryland, the national Congress, and the city of Washington pledged funds; and on July 4, 1828, with ceremony appropriate to the occasion, President John Quincy Adams turned the first earth. A large crowd listened politely as the president proclaimed America to be "the empire of learning and the arts" and the canal itself to be "a conquest over physical nature, such as has never yet been achieved by man." But they really came alive when he sank his spade into the ground and struck a root. After three or four ineffectual thrusts, the usually reserved Adams "threw off my coat, and, resuming the spade, raised a shovelful of the earth," provoking "loud and unanimous cheering, which continued for some time."

On this same Independence Day, just forty miles away in Baltimore, what one report called "the most splendid civic procession, perhaps, ever exhibited in America" was taking place. Fifty thousand spectators cheered as troops, dignitaries, musical bands, fraternal societies, school groups, and uniformed contingents from thirty-four trades with horse-drawn floats and tableaux marched to a field two miles from town. There, ninety-year-old Charles Carroll of Carrollton, last surviving signer of the Declaration of Independence, laid the foundation stone of yet another "GREAT ROAD" to unite east and west.

This ceremony, eleven years to the day from the one in Utica that launched the Erie Canal, ushered in yet another chapter in American transportation. The Baltimore and Ohio, unlike the New York or Pennsylvania works, was a private project, though state and local governments helped finance it. What is more, it was no canal, but a railroad.

Like the projectors of the Erie a decade before, the Baltimore businessmen who organized the venture were stepping into the unknown. No general-purpose railway existed in the United States. In Britain, where dozens of short roads were built or in progress by 1828, the relative merits of propulsion by horses, steam locomotives, or stationary engines were still

being debated. So were track and roadbed design and even the very nature of the enterprise: Should it be, like a turnpike or canal, a highway open to public use, or a route reserved for the company's own cars?

Refusing to wait for answers to these questions, the Baltimoreans began without quite knowing what they were building. Work progressed slowly but steadily as technical and financial problems were resolved. In 1852, twenty-four years later, the Baltimore and Ohio Railroad reached the Ohio River at Wheeling, Virginia (now West Virginia). Meanwhile, its twin, the Chesapeake and Ohio Canal, crept up the Potomac and finally stalled with its western terminus at Cumberland, Maryland, still short of the mountains. Even while canals were entering their heyday in the 1820s, their successors had already appeared. In the end railroads would vanquish canals.

Of course no one knew this in 1828, and what is most remarkable is not the different fate of these two ventures but the grand expectations that underlay both of them. The impulse that spurred Marylanders to begin two gigantic projects on the same day—one an imitative canal, the other a daringly experimental railroad—reflected a nationwide surge of energy. The spirit of improvement propelled an accelerating cycle of innovation, emulation, and rivalry. States, communities, and citizens competed to seize the fruits of progress. Civic pride fused with hope of gain to drive forward invention and experiment. A half-century after the Declaration of Independence, internal improvements were finally realizing the hopes of the Founding Fathers. Quickening the flow of people, goods, and ideas throughout the country, they cemented the Union by collapsing distances and widening horizons.

### *The Steamboat*

The capital requirements of great canals and railroads demanded public subsidies or outright state control. Other innovations in transport, less monumental but just as important, relied more on diffused private energies. Foremost among them was the river steamboat.

British and American inventors had been working to harness steam power for propulsion on land and water since the 1780s. In the United States John Fitch and James Rumsey produced early steam vessels, and in 1805 Oliver Evans placed a steam engine in a boat, mounted it on wheels, and drove it through the streets of Philadelphia to the Schuylkill River. Two years later Robert Fulton's *North River* (better known as the *Cler-*

*mont*) performed its famous trial on the Hudson, steaming from New York City to Albany and back in five days. In 1811 the first western steamboat, built in Pittsburgh, ventured down the Ohio and Mississippi rivers to New Orleans.

By the War of 1812 boats built by Fulton and John Stevens were in regular use around New York and Philadelphia, and the practicability of steam craft was clear. But primitive design and workmanship, scarce capital, and legal battles over patents and franchise rights still hampered their spread. After the war these barriers fell away, and steamboats multiplied on coastal and inland waterways. Improvement in engines and hulls made boats bigger, faster, and more reliable. Thomas Gibbons in New York and Henry Miller Shreve in Louisiana broke the Fulton legal monopoly on steam navigation, clearing the way for competition. In 1815 Shreve's *Enterprise* made the first upriver voyage from New Orleans to Pittsburgh. By 1825 eighty steamboats plied western waters. Ten years more, and steam tonnage on the Ohio and Mississippi topped that of the Atlantic coast, and nearly equaled that of the whole British empire.

Eastern steamboats shuttled passengers along sheltered coastal routes, leaving longer, more dangerous open-water voyages to sailing craft. No longer subject to vagaries of wind and tide, steam vessels offered travelers speed, economy, and comfort. But the real impact was felt in the West. There, on the long rivers, steamboats carried freight as well as passengers, inaugurating a new era in inland commerce.

Before the steamboat, over-mountain settlers had floated their products on flatboats down the Mississippi and its tributaries to New Orleans. Though inexpensive, the trip was slow and risky. At its end the boats were broken up for lumber. Most of the crews walked back. Upriver transport was by keelboats and barges, laboriously poled and dragged against the current. By keelboat from New Orleans to Louisville, 1,350 miles by river, took three or four months; continuing to Pittsburgh, 600 miles further up the Ohio, added another month or more.

Few items were worth the expense of upriver haulage or wagon carriage over the mountains from Philadelphia or Baltimore. Inland residents paid dearly for outside goods or managed without them. High transport costs encouraged local manufacturing by shielding Pittsburgh glass and iron and Kentucky hemp and textiles from competition. Still, the drawbacks of distance far outweighed the benefits. The transmontane West boomed briefly after the War of 1812. But isolation impeded its growth, discouraging emigration and frustrating enterprise. The depression of 1819 brought an end

to prosperity, heightening westerners' discomfiture and their resentment of what they perceived as the rest of the nation's indifference and neglect.

To communities alive with hopes of greatness but chagrined at their stalled progress, the steamboat appeared as an angel of deliverance. Yet steamboats, like canals and railroads, did not just appear on the landscape. Adapting them to western conditions required mechanical ingenuity, entrepreneurial energy, and government aid. To run on shallow and variable streams, boat builders devised high-topped, flat-bottomed vessels that could operate on amazingly light drafts. Congress sponsored surveys of the Ohio and Mississippi channels and appropriated funds to clear them of snags (submerged tree-trunks that ripped hulls), sandbars, and other obstructions. The federally subsidized Louisville and Portland Canal, begun in 1825 and opened five years later, bypassed the hazardous falls of the Ohio, permitting regular through-traffic from New Orleans to Cincinnati and Pittsburgh. In its first year the canal logged more than four hundred passages.

Travel times shrank as improvements made steam navigation swifter and more reliable. In 1817 Henry Shreve's twenty-five-day upriver run from New Orleans to Louisville was considered a fast passage. But in 1819 this record was cut to fourteen days, in 1824 to eleven days, and two years later to eight. "If any one had said this was possible . . . thirty years ago," mused Hezekiah Niles, "we should have been ready to send him to a mad-house."

Steamboat arrivals, like canal and railroad inaugurations, occasioned rejoicing that merged patriotism with local boosting. "Their appearance would create a great excitement along the banks, and at the towns and villages their arrival and landing were great occasions," one participant recalled. "The citizens turned out, and civic ceremonies were observed." Cannon boomed and crowds cheered each new steamer "as if there never had been and never would be another."

Even as steamboats multiplied on the main stems of the Ohio-Mississippi system, keelboats continued to operate on their upper reaches and shallow tributaries, and even on the big rivers in times of low water. Flatboats, slow but cheap, still floated some bulk goods downstream, the crews now returning by steamboat instead of on foot. Steam did not wholly banish muscle power from western rivers. But it reawakened visions of accelerating development and gave new reign to prophecies of western greatness. Noting a new record passage upstream, *Niles' Weekly Register* pondered "what a progress is this against the currents of the rivers of the west—what a field does it present to the speculative mind, disposed to anticipate the future condition of things!"

In the West it was hard to tell speculative from practical minds, or dreams from expectations, for today's fancy might be tomorrow's reality. In 1828 a Cincinnati observer noted that "the steam engine in five years has enabled us to anticipate a state of things, which in the ordinary course of events, it would have required a century to produce." With faraway markets suddenly brought to their door, riverine westerners bent their energies to industry and commerce. Boat building flourished along the Ohio. Pittsburgh nurtured its iron foundries and glassworks, Cincinnati its processing of pork and grain. Steamboats linked St. Louis merchants to the lead mines of the upper Mississippi and the fur trade of the upper Missouri.

### *Town Promotion*

By bringing communities closer together, steamboats gave new spark to urban rivalries and new impetus to the old penchant for town promotion. Canal and river towns strove to improve their advantage in the battle for population and trade, while off-water rivals sought to neutralize it. Both spewed forth plans for connecting roads, canals, and river improvements. Civic boosters waged a war of words. Cincinnati was the "Queen City," Pittsburgh the "Iron City." Both claimed the title of "Western Emporium." Stranded by the steamboat, Lexington, Kentucky, settled for cultural distinction as "Athens of the West," "capital of Science and Letters." At every likely spot planners conjured up another mighty city, destined to be a future metropolis—depot of trade, hive of manufacturing, seat of government, citadel of learning and the arts!

At Buffalo, New York, western terminus of the Erie Canal, the English-woman Frances Trollope observed that

all the buildings have the appearance of having been run up in a hurry, though every thing has an air of great pretension. . . . Every body tells you there, as in all their other new-born towns, and every body believes, that their improvement, and their progression, are more rapid, more wonderful, than the earth ever before witnessed.

Trollope bridled at such conceit, yet even she acknowledged "the people of America to be the most enterprising in the world," and marveled at the "boldness and energy" of their public works and the "inconceivable rapidity" with which their cities rose from the forest.

Westerners laughed at their own exaggerations. A Missouri newspaper advertised the community of Ne Plus Ultra. Strategically located astride the routes from Washington to China and from Mexico to the North Pole, this great city was "destined to be the capital of the western empire, or perhaps

the world." A visiting New Englander enjoyed the satire. Yet contemplating "the astonishing change, which the last ten years have introduced over the whole face of the United States," the inexhaustible richness of western resources, and "the guardian genius, Liberty, hovering over the country," he could not help thinking that somewhere in the interior would appear a real *Ne Plus Ultra*. Four years later, speculators laid out the village of Chicago at the mouth of a projected canal into Lake Michigan. Most sites billed as future great cities settled in the end for the modest prosperity of a county seat or market town. Some, like Hygeia, Kentucky, across the Ohio River from Cincinnati, existed only in the elaborate plans and excited hopes of their sponsors.

The antics of western town promoters and the more dignified, though hardly less eager, competition among established cities like Louisville, Pittsburgh, and Cincinnati found reflection also in the port cities of the East. Thirst for civic distinction and commercial advantage led merchants and shippers to regularize and expedite seaborne commerce. Here, as in canal-building, New Yorkers took the lead. In January 1818 a New York City firm inaugurated the first scheduled transatlantic packet service. In seven years the original four ships plying the route grew to twenty-eight.

Playing off the natural advantages of the harbor—its central location, ample shelter, deep channel, and close access to the sea—New York merchants in the decade after 1815 corralled the largest share of the burgeoning coastal and overseas trade. By 1830 New York handled a quarter of the country's exports and fully half its imports. Carolina and Georgia cotton and Chesapeake tobacco brought around by sea, along with flour from the Erie Canal, cleared for foreign ports via New York, while the city's jobbers and commission merchants distributed British textiles and other goods to customers throughout the nation. New York soared past its rivals to become, at the Jubilee, the undisputed "great commercial emporium of America" and one of the busiest ports in the world.

### *American Manufactures*

Whether by canal, rail, steam, or sail, advances in transport at once built upon and encouraged experiment in techniques of building and fabricating. Canal builders developed new methods and tools of surveying, excavating, and stone laying. The use of steam for inland navigation spawned new ideas in naval architecture and engine design. Meanwhile, in dozens of workshops scattered up the coast from Baltimore to Boston, mechanics and in-

ventors devised ways to speed the production of everything from guns and clocks to cloth and newspapers. In manufacturing, as in transportation, the spirit of improvement was afoot.

For long after independence the United States had trailed Great Britain in industrial achievement. American artisans, less practiced than European craftsmen, generally worked with clumsier tools and inferior materials. Capital shortages thwarted the occasional effort to organize production on a large scale, or to exploit an isolated technological advance. In textile manufacturing, a leading industry by the end of the eighteenth century, American imitators struggled to match British success in mechanizing basic processes.

Still the United States presented a promising field for industry despite, and even in part because of, its lag in experience and skill. The scarcity and high cost of American labor offered incentive as well as impediment to manufacturing enterprise. Resources of iron, coal, building materials, waterpower, and especially wood were cheap and plentiful. Cultural and commercial ties across the Atlantic offered access to British expertise, while a prosperous, expanding farm economy ensured a home market. If American mechanics were less specialized than Europeans, they were also more versatile. The flexibility of a youthful society invited experiment. No craft guilds or entrenched social orders put up resistance to change.

Born of these conditions and of Americans' fascination with things new and better, the urge to tinker and invent was deeply ingrained in the national character. Alexander Hamilton in 1791 noted "a remark often to be met with—namely that there is, in the genius of the people of this country, a peculiar aptitude for mechanic improvements." That aptitude showed in the early experiments with steam power and in the adulation given to Benjamin Franklin, who became the first American cultural hero by exemplifying the penchant for novelty and efficiency.

Americans' willingness to try new things encouraged the efforts of native wizards like Eli Whitney, a Yankee who invented the cotton gin in 1793 and later made muskets with interchangeable parts, and Oliver Evans, trained as a wheelwright, who devised a fully automated flour mill in 1785, built the first commercial high-pressure steam engine in 1801, and wrote a series of manuals for young mechanics and engineers. American opportunity also lured enterprising immigrants like Benjamin Henry Latrobe, architect and engineer, and Samuel Slater, an English textile manager who arrived in 1789 and, with backing from Rhode Island merchants, established the country's first mechanized cotton spinning mill.

Statesmen and civic leaders of the young republic championed manufacturing, sometimes for their own profit, but also as a patriotic service, a way to promote national self-reliance in peace and self-sufficiency in war, expand the home market for farm goods, and create useful work for the poor and for idle women and children. Invoking all these aims, Treasury secretary Alexander Hamilton and his assistant Tench Coxe in 1791 urged government support for manufacturing and collaborated in founding the Society for Establishing Useful Manufactures.

Hamilton's proposals for federal subsidy died amid the emerging factionalism that produced the Federalist and Jeffersonian Republican parties. But stripped of its entanglement with government policy, the enthusiasm for invention and improvement knew no political bounds. Jefferson, his occasional outbursts against cities and manufacturing notwithstanding, was an avid tinkerer who ran nail and textile works on his plantation, encouraged new mechanical discoveries, and designed several ingenious time- and labor-saving devices. Joel Barlow, Jeffersonian diplomat and poet, sponsored Robert Fulton's work on steamboats and submarines. Tom Paine, radical pamphleteer, designed smokeless candles and iron arch bridges. All these men avowed civic and patriotic motives for their work. All regarded material advance as the natural fruit of American republicanism and proof of the country's virtue and promise.

Like the first efforts to build canals, early attempts at large-scale production in the United States foundered for lack of managerial and mechanical skill, capital, and incentive. Manufacturing might be patriotic, but overseas trade brought greater rewards. But the War of 1812 renewed interest in domestic industry. In retirement, Thomas Jefferson abandoned his last reservations. Admitting that "experience has taught me that manufactures are now as necessary to our independence as to our comfort," he concluded in 1816 that "we must now place the manufacturer by the side of the agriculturist."

The postwar resumption of British imports and the depression of 1819 dealt setbacks to nascent American producers. But by the mid-1820s industrial establishments were spreading across the countryside. Cotton and woolen spinning mills, driven by waterpower and for the most part still small and family owned, dotted streams and rivers across the northeast and Ohio valley. A thriving small-arms industry grew up along the Connecticut River, anchored by the federal armory at Springfield, Massachusetts. In Philadelphia and New York and Pittsburgh, ironworks, foundries, and machine shops produced tools and engines to power the new factories and steamboats.

Experiment yielded a growing tide of designs and devices. As the German visitor Friedrich List observed, "anything new is quickly introduced here, and all the latest inventions. There is no clinging to old ways, the moment an American hears the word 'invention' he pricks up his ears." In the 1820s the federal government doubled its annual issuance of patents. The most important developments were in machine tools—lathes, planes, milling machines and other wood- and metalworking devices fashioned by master mechanics, an inquisitive group that traveled widely and exchanged technical information freely on both sides of the Atlantic.

Together, improvements in transport and manufacture wrought a change in communications unrivaled since the printing press. In the 1820s entrepreneurs installed new technologies, both invented and imported, to mechanize the laborious work of paper-making. Steam presses, introduced in the early 1830s, multiplied printing speed twenty-five times. The output of publications soared as costs tumbled. Books and newspapers, religious and agricultural and literary journals, pamphlets and tracts of every description clattered off the presses. The Erie and other canals became conduits of ideas, carrying information and opinion back and forth across the country. Five thousand new post offices opened between 1819 and 1832, twelve hundred in the Jubilee year alone.

In 1811 Francis Cabot Lowell, a Boston merchant visiting in England, observed the new machinery for weaving cotton cloth in Manchester. Back in the United States he designed a power loom with the help of a master mechanic. Recruiting capital from fellow merchants, Lowell secured a charter from the Massachusetts legislature for the Boston Manufacturing Company. The company's new mill at Waltham thrived, and in 1822 the merchant group, latterly known as the Boston Associates, purchased land and waterpower rights at a nearly vacant site on the Merrimack River, north of Boston. There they erected a factory village from scratch, complete with mills, domiciles, and public buildings. In 1823 the first spindle turned, and three years later the newborn community became an incorporated city, named Lowell.

The Boston Associates negated the British textile industry's half-century head start in one huge leap. Lavishly financed, employing the latest machinery (including some wholly new devices as well as an improved version of the pirated power loom), and for the first time combining all the operations of production under a single roof, the Waltham and Lowell mills could compete with any textile manufacturer in the world. In the difficult years after the War of 1812, while British producers flooded the American market with cheap goods and small domestic firms failed by the dozens,

crying for federal tariff protection as they went down, Waltham earned steady dividends averaging nearly 20 percent.

### *Implications of Improvement*

In 1825 a Massachusetts minister named Timothy Flint returned home from a ten years' sojourn in the Mississippi valley. Passing through the Pawtucket textile district in Rhode Island, site of Samuel Slater's first small spinning mill a generation earlier, he inquired about the huge buildings he saw in the distance. Flint wondered if New England "had at last invented a new worship, and that these buildings were the temples. And so in truth I found it, the worship of the golden shrine," filled not with Christian devotees but with "mechanicians and manufacturers." At the peaceful old hamlet of East Chelmsford, now being reborn as Lowell, Flint was startled by the roar of construction blasts, the giant factory buildings going up in rows, the crash of machinery, "the noise, confusion, and clatter, of an incipient babble."

Like other Americans, Flint marveled at the changes he saw. Crossing the turbulent Mohawk River on an Erie Canal aqueduct, a "river in the air," he indulged a "feeling of sublimity," a conviction that nothing was "impossible to the union of intellectual and physical power." Yet Flint's enthusiasm was tempered with doubt. Our country "is great already," he acknowledged—"and may it be happy. What will it be in half a century to come?" Excited by progress, Flint also worried about the morals of children growing up in cotton mills, about the spread of "extravagance and luxury," about where "this rage for travelling, this manufacturing and money-getting impulse, and the new modes of reasoning and acting" would lead.

He was not the only one wondering. In Indiana young Robert Dale Owen, son of the philanthropist, having seen the misery of British factory life firsthand, also questioned.

Shall we proceed as at present on the road to wealth and prosperity, *with the certainty before us*, that so soon as we have over-supplied all our wants and all the wants of our neighbors, we shall begin to starve? not from famine or failure of crops, or loss of property; no, *only because we have too much of every thing*. Must abundance lead to want? prosperity to adversity? riches to poverty? plenty to starvation?

Hezekiah Niles, editor of the influential *Weekly Register*, gloried in the march of improvement and yearned to see American industry surpass even

Great Britain's. Yet looking at recent advances that "may be literally said to overcome the laws of nature, time, and space," even Niles could not help asking, "in astonishment, where is the end of all this, whereat shall we stop? . . . In contemplating the increase of labor-saving machinery and ease of transportation, may it not be feared that these things will be carried too far?" Niles thought another half-century of accelerating change might eliminate the need to work altogether, producing idleness and "a common degeneracy."

In the end he decided it was not worth worrying about. "It would not be wise to make ourselves miserable, because, in the improvement of our own condition, it is possible that posterity may have too much of the good things of this life!" But it was revealing that even this indefatigable enthusiast for progress could voice such qualms. And while the problem of superabundance could be safely left for later generations to handle, other questions could not.

At the Jubilee year, the new Erie Canal and Lowell mills signified the country's vigor in transportation and manufacturing. Surpassing anything in old Europe, they fulfilled the founding generation's hope of American leadership in the march of humanity. But they also brought thoughtful observers suddenly face to face with the full implications and consequences of progress. New means of travel and communication bypassed old towns while raising new cities, and disrupted familiar ways of living even as they introduced new goods and ideas. Factory production heralded a growing material abundance. But the din and dirt of the workplace belied arcadian visions of new-world tranquility, while the gulf between employers' luxury and employees' drudgery seemed to imperil America's treasured exemption from European class divisions and social strife.

A burgeoning economy raised questions along with opportunities. How could the unbridled and inevitably unequal acquisition of wealth, and of the power that came with it, be reconciled with Americans' cherished equality? Now that the fruits of improvement were multiplying beyond all precedent, who would ensure their fair distribution—who, indeed, would define what was fair? And in a society equally dedicated to democratic decision-making, the rule of law, the rights of private property, and the rewards of enterprise—precepts which, as Americans were now beginning to discover, sometimes crossed one another—how were such questions to be resolved?

The broader question facing citizens at the Jubilee was not if they would cling to tradition or accept a changing future. America had always been

the land of promise, of belief in a better tomorrow. Few doubted that the country's best years lay ahead. What they had to decide was not whether to welcome progress, but what content and meaning to assign to it.

As new horizons opened for future growth, the options for its direction also widened. A dizzying variety of plans appeared for reaching what everyone believed was America's special destiny. After a half-century of deferred hopes, suddenly, and finally, all things were possible. From the high vantage point of the Jubilee, Americans could see pots of gold shining at the end of a dozen different rainbows. Which one should they strike for? Debate was soon stirring.

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for Claudia  
the better angel of my nature