

The Athens of America

1800-1825

by Edgar P. Richardson

When I resided in the Athens of America. . . .

— GILBERT STUART

. . . they had some [anthracite] brought down by teams. . . . They expended some three hundred dollars in experiments, but could not succeed in making it burn. . . . they became exasperated, threw a large quantity of the "black stones," as they called them, into the furnace, shut the doors and left the mill; it so happened that one of them had left his jacket in the mill, and in going there for it some time after, he discovered a tremendous fire in the furnace—the doors red with heat."

— CHARLES V. HAGNER¹

In the year 1800 Philadelphia was the most successful example in North America of the seaport city, a kind of city that the eighteenth century had brought to perfection. It was a community of merchants, mariners, and mechanics. It was urban but preindustrial, a tree-lined checkerboard of red-brick houses trimmed in white.² Within the next twenty-five years it began to be transformed into something new—the first major American industrial city.

I

Philadelphia's ships and seamen were famous. The emblems of the city's coat of arms officially adopted in 1789—a plow and sheaves of wheat and a ship under full sail—were true emblems. The prosperity of the city rested, as it had in colonial times, upon the exchange of the products of the fertile soil of its hinterland for the commerce of the seas. The city directories of 1800-1805 give ample evidence of the dominance of merchants, shipowners, shipbuilders, and seamen in the economy of the city. A writer in *The Port Folio* underlined the importance of this trade: "The staple commodity of Philadelphia is flour, of which 400,000 barrels have been exported in a year."³

The first serious threat to the preeminence of Philadelphia came from the meteoric rise of Baltimore after 1783. From the newly opened farmlands of the

Susquehanna Valley grain and other produce were floated downriver by ark and raft from as far upstream as the southern counties of New York. Difficult and imperfect though navigation of the shallow Susquehanna was, it threatened to divert the trade of the interior of Pennsylvania to the mills and wharves of Baltimore. In the years 1798-1800 the value of Baltimore's exports exceeded that of Philadelphia's.⁴ To meet this competition Philadelphia built the first paved turnpike in America, west to Lancaster. It was the city's first move in a long contest with Baltimore and later with New York as those rival cities tapped wider hinterlands than they had been able to reach in the colonial period. This economic battle was fought with turnpikes, canals, and finally railroads, to capture the trade of the interior.

In 1800 no one could have imagined the changes that were to shift the city's energies inland, away from the sea; by 1825 Philadelphia would find more attractive opportunities in the coal and iron of northeastern Pennsylvania, the factories of Kensington and Manayunk, the roads and canals spreading north and west. Looking westward as had the Philadelphia fur traders of an earlier century, a stage line to Pittsburgh was advertised in the newspapers of 1804. The stage was to leave weekly from John Tomlinson's hotel on Market Street; the fare was \$20 and the journey was promised not to exceed seven days. The adventurous could go farther, floating in a keelboat or ark down the winding reaches of the wild Ohio to reach in twelve days the falls where the frontier settlement of Louisville had sprung up, projected two decades earlier by the Philadelphia Gratzes and their land-speculating associates. To go from Pittsburgh to New Orleans, which had just become American territory, was a journey of twenty to twenty-five days.⁵ Farsighted Americans, notably Philadelphia- and Lancaster-based mercantile consortia and intrepid individuals such as the Pennsylvanian Daniel Boone, had long had their eyes fixed on the interior of the continent. But the rapid development of the West in the nineteenth century was made possible by two inventions of the industrial revolution, the steamboat and the railroad.

On the high seas the Napoleonic Wars from 1798 to 1815 absorbed so much of the shipping and manpower of Europe that the United States became the chief neutral carrier. The new opportunities afforded American merchants also exposed their ships to considerable risks. When Great Britain established a naval blockade to close all ports to French ships and to prevent supplies from reaching France, France and her allies retaliated. A long struggle ensued during which neutral ships were seized and the rights of noncombatants disregarded. From the earliest days the chief market for Pennsylvania's products shipped from the port of Philadelphia had been the sugar islands of the Caribbean. Since these were French, Spanish, Dutch, and English colonies, a naval war of blockade and seizure by British men-of-war and French privateers now raged about them.

The complications of the black uprisings against the French, notably in Saint Domingue where Negroes established their own government, and of the harassment of American vessels, made West Indian trade less and less



Arms of the City of Philadelphia, painted by Thomas Sully (1783–1872) for the Mayor's Court in the former Supreme Court Chamber (c. 1821). The configuration of Peace and Plenty with the scale of Justice as a crest was adopted in 1789 and is the basis for the city seal used today.

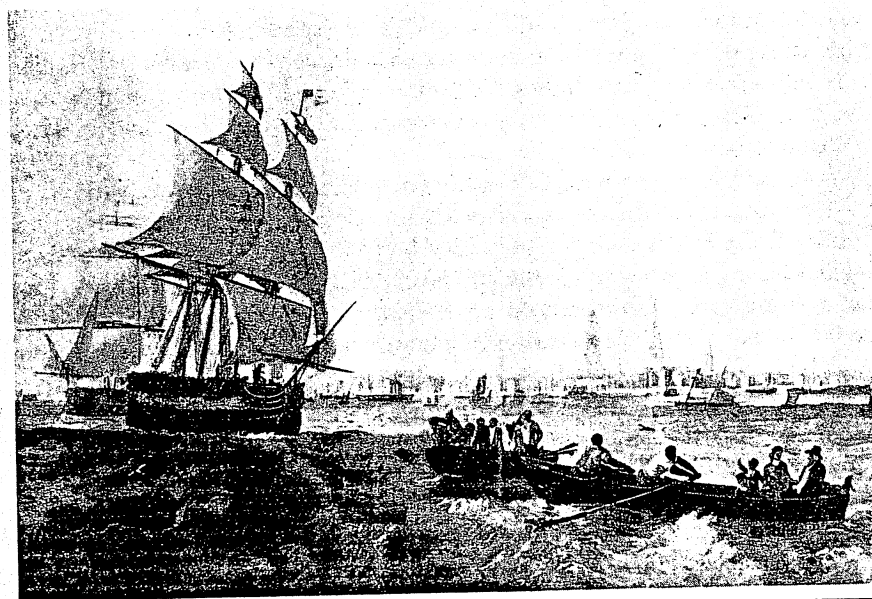
INDEPENDENCE NATIONAL HISTORICAL PARK COLLECTION

attractive to the Philadelphia merchants. Despite diplomatic peace in 1802, naval warfare in the Caribbean continued. American mercantile losses were heavy. By 1812 even Stephen Girard, the crabbed, one-eyed genius at making money, had withdrawn from the West Indian trade. Girard, Richard Waln, and other merchants once active there shifted their importing and exporting commerce to China, India, Europe, and South America.⁶

Philadelphia played a major role in the China trade. This commerce, in spite of the facts, has usually been associated with Boston and Salem. It was Robert Morris of Philadelphia and Daniel Parker of New York who sent the first American ship, the *Empress of China*, to Canton in 1784. The merchant vessel *United States*, sailing from Philadelphia that same year, opened the trade with India. When these voyages showed that the monopoly of the British East India Company could be broken, other Philadelphia merchants—Tench Coxe, Mordecai Lewis, James Large Mifflin, Joseph Sims, and the Walns, Drinkers, Hazelhursts, Dales, Fishers, Willings, and Emlens—followed. In 1800 there were forty ships owned in Philadelphia and using it as their home port that were devoted exclusively to the China trade.

China was a difficult market to enter, yet the rewards were great. The Chinese wanted few products that American merchants could exchange for the tea, porcelains, and silk and cotton goods the Western world sought. The young American Republic could ship out only specie (of which it had but little), ginseng, furs, and some metals. But American seamen had become skilled in triangular trading. Their ships collected cargoes for Canton in Amsterdam, Antwerp, and Gibraltar; they stopped at Valparaiso for hides, at Smyrna for opium, in Batavia or Malacca for tin, and on the Malabar coast for sandalwood and pepper. As soon as the accounts of Capt. James Cook's voyages spread word of the rich, deep-piled sea otter skins of the Northwest coast of America—luxuriant furs were especially desired by the Chinese—American ships made the long voyage around Cape Horn and up the Pacific coast to barter knives and blankets with the Indians for those splendid pelts. The sealers in the South Atlantic and the Pacific harvested islands almost to the point of the extinction of the easily killed sea-going mammals. These were the outbound cargoes.

In return they brought home from Canton chiefly tea, and also silks, nankeens, porcelains, and camphor. During the War of 1812 the British bottled up the American ships in Canton and drove American vessels from the Northwest fur trade and from Hawaii, but as soon as the war ended they were back again. Of the American ships at Canton between June 6, 1816, and May



Philadelphia from the Jersey Shore, painting by Thomas Birch (1779–1851), c. 1812. A China trade ship is greeted by its merchant owner and his family in the longboat.

FRANK T. HOWARD

25, 1817, Boston was the home port of eleven, Philadelphia nine, New York seven, Salem five, Baltimore four, and Providence three. Contrary to the overemphasis on New England's China trade, the merchants of that region seem to have shared equally with those from the Middle Atlantic states. In 1825 business in the Celestial Empire was chiefly in the hands of four American firms of which two, Samuel Archer and Jones, Oakford and Company, were Philadelphian; the others were Perkins & Company of Boston and T. H. Smith of New York.⁸

The stimulating effect of the China trade was not limited to the value of the goods brought to the American home markets or reexported to Europe, or to the increasing number of fortunes made in the trade. Tea, porcelains, and textiles had found their way to America before the Revolution through the hands of the East India Company, but to most Americans Asia was little more than an Oriental fable. Now they had direct contact with the accumulated wealth and ancient culture of China.

A Dutch merchant, Andreas Everardus van Braam Houckgeest, who had spent years in China in the service of the Dutch East India Company, settled in Philadelphia in 1796, bought a farm on the Delaware near Bristol, and built a fifteen-room house called "China's Retreat," where he lived surrounded by the curiosities he had brought back with him and waited upon by Chinese servants and a Malay housekeeper. A description of his visit to the court of the Ch'ien Lung emperor was published in Philadelphia by Moreau de Saint-Méry in two handsome volumes in 1797-1798. His collection of Chinese art was soon sent across the Atlantic and sold at Christie's in London in February 1799. Other objects of Oriental workmanship arrived in Philadelphia. Exhibition pieces from the East Indies and China appeared in the accession book of the Peale Museum, and mementos of Asia accumulated in homes up and down the Delaware.

The son of one of the pioneer China merchants, Robert Waln, Jr., visited the Far Eastern mainland as a supercargo on his father's ships. In 1823 he published the first major work of its kind by an American, *China, Comprehending a View of the Origin, Antiquity, History, Religion, Morals, Government, Laws, Population, Literature, Drama, Festivals, Games, Women, Beggars, Manners, Customs, etc., of that Empire*. Some years later the architect John Haviland built the first great marble mansion on Chestnut Street for Charles Blight, an East India merchant; and Nathan Dunn, another merchant, opened a Chinese Museum on the northeast corner of Ninth and Sansom Streets to show his collections. The China trade was the beginning of a great enlargement of the nation's horizon. Mercantile contacts with South America, which began as early as 1799, were also to be of importance.⁹

In 1805 when Philadelphia's maritime trade was near its peak, 547 ships arrived at its Delaware wharfs from foreign ports, while 617 cleared; 1169 coasters arrived and 1231 cleared. A total of 3564 ships came up the river, anchored, unloaded, loaded, or sailed away, an average of better than ten a day, since the port was closed by ice for several weeks in the winter.¹⁰ The

maritime activity was brought to a sudden end in 1808 when President Jefferson placed an embargo on foreign commerce in answer to the British Orders in Council of December 1807, the final tightening of the screw of the naval blockade, and to Napoleon's retaliatory Milan Decree of the same month. Ships were tied up in port; shipbuilding stopped.

Mayor Robert Wharton wrote to his brother: "Our city as to traffic is almost a desert, wharves crowded with empty vessels, the noise and buz of commerce not heard, whilst hundreds of labourers are ranging the streets without employ or the means of getting bread for their distressed Families." In January 1808 hungry and discontented sailors marched behind the Stars and Stripes to City Hall at Fifth and Chestnut Streets to appeal to the mayor. Wharton first sternly told them to lower the flag, which they did; he then expressed his pity for their distress, asked them to disperse peaceably, and told them that the Chamber of Commerce would do what it could for them. Money was raised to aid the sufferers; it was only a palliative. By April the distress was so general that sailors drifted away to other places, many going to Halifax, Nova Scotia, to enter the British service.¹¹

The lifting of the embargo in 1810 brought a brief revival of ocean trade; that was ended in 1812 by the declaration of war against Great Britain. In the first months of open hostilities the small American navy gave a gallant account of itself, but it was soon driven into port by overwhelming numbers of British ships. The United States had seven frigates and fifteen sloops-of-war and other smaller vessels to fight a British navy of 1060 sail, 800 of which were in commission.¹² The American frigates had been designed in Philadelphia. Nine of the sixteen gold medals of honor voted by Congress for naval gallantry went to officers from the bay and river Delaware: Jacob Jones for the capture of the *Frolic*, Stephen Decatur for taking the *Macedonian*, William Bainbridge for overcoming the *Java*, William Burrows for the capture of the *Boxer*, James Lawrence for taking the *Peacock*, Thomas Macdonough and Stephen Cassin for their victory on Lake Champlain, Charles Stewart for bringing in the *Cyane* and the *Levant*, and James Biddle for his success against the *Penguin*.¹³ But from March 1813 until the end of the war a British blockading squadron, cruising off the capes of the Delaware from Egg Harbor to Chincoteague, effectively bottled up Philadelphia's shipping.

Although Col. Winfield Scott raised the Second Artillery Regiment in Philadelphia for service on the Canadian frontier,¹⁴ only a direct threat to the city stimulated the mobilization of local land forces. In March 1813 the British squadron appeared at the mouth of the Delaware. It bombarded Lewes in April and the following month sailed upstream as far as Reedy Island. Excitement and alarm stirred the city. Volunteer companies were raised. The Philadelphia Blues, the Independent Volunteers, and the Washington Guards under the command of Col. Lewis Rush marched down the river to protect Wilmington and the du Pont powder mills.

The next year a strong British force sailed into the Chesapeake, burned Washington, and attacked Baltimore. It appeared that General Howe's 1777

advance from Elkton to Philadelphia might be repeated. Commanded by Brig.-Gen. Thomas Cadwalader, the Philadelphia militia marched south, once again to guard the line of the Brandywine. Citizens turned out with enthusiasm to fortify the approaches to the city, digging redoubts at Gray's Ferry, at the Woodlands, on the west bank of the Schuylkill, along the Darby and Lancaster Roads, and on the south side of Fairmount. With the death of British Maj.-Gen. Robert Ross, at the head of a landing party near Baltimore, the invasion came to an end. Philadelphia's troops were home by December.¹⁵



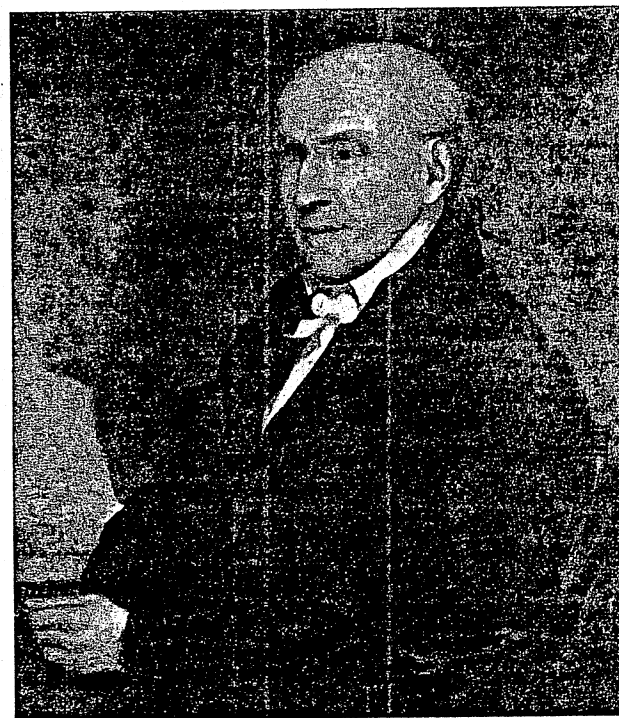
Independence Day Celebration in Centre Square, Philadelphia, painted by John Lewis Krimmel (1786–1821), 1819.

HISTORICAL SOCIETY OF PENNSYLVANIA

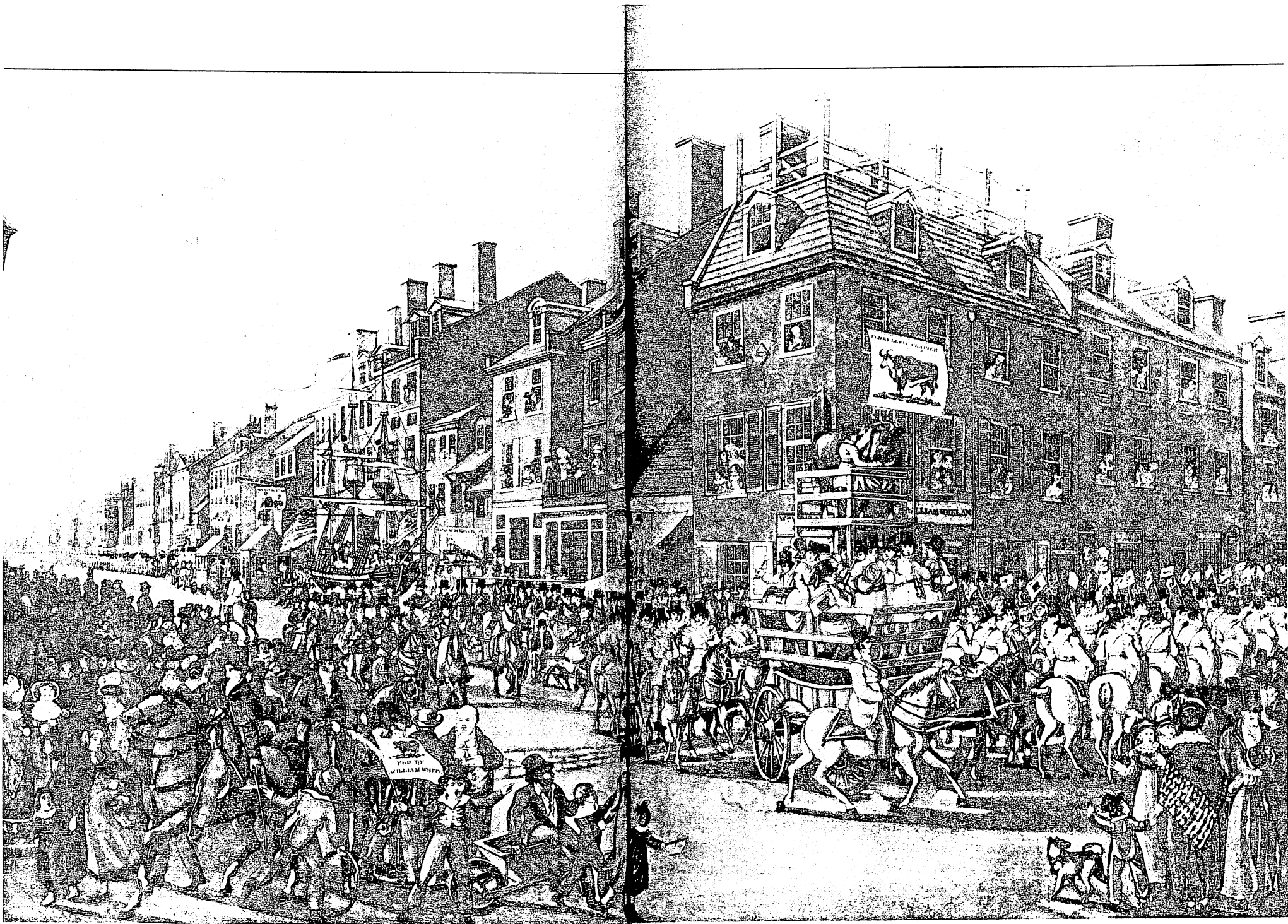
After the war the port of Philadelphia never regained its former position. Trade and shipbuilding returned for a time, only to be stifled by a depression as European ships and men, released from half a generation of wartime demands, resumed international commerce and supplanted American shipping. For a number of reasons New York now forged rapidly ahead of Philadelphia. Its great ice-free harbor was more easily accessible. Its wharves were not a hundred difficult miles from the ocean as were those of Philadelphia. Moreover British manufacturers who had accumulated large surpluses of cottons and woollens chose New York as the port at which to dump their textiles for "whatever they would bring." Buyers flocked in from all over the

country. To hold this trade New York in 1817 passed auction legislation that made the port so attractive that the flood of British manufactures continued to pour through it. More important still, in 1817 New York established the first line of regular packets, later called the Black Ball Line, to replace the old spring and fall sailings, thus initiating a new pattern of ocean commerce.¹⁶

During the constant naval wars of the eighteenth century the seas had been so dangerous and communication so uncertain that the captain and supercargo of a merchant ship were given great freedom to find a safe port and bring back a profitable cargo. When the *United States*, for example, sailed from Philadelphia for China in March 1784, her officers decided in mid-voyage, while taking on a cargo of madeira wine at Funchal, to go instead to the Coromandel coast, thus becoming the first American ship to venture to India.¹⁷ Stephen Girard gave his officers this authority and rewarded them handsomely with a percentage of the profits. William Wagner, one of Girard's men, was able to retire quite young to devote himself to science and to found the Wagner Free Institute of Science.¹⁸



Stephen Girard (1750–1831), painted by Bass Otis (1784–1861), c. 1831. Girard, a merchant and banker who purchased the Bank of the United States building on Third Street in 1812, was the wealthiest man in the United States at the time of his death.



Procession of Victuallers, aquatint and etching by Joseph Yeager (c. 1792–1859) after John Lewis Krimmel (1786–1821), 1821. An extraordinary parade

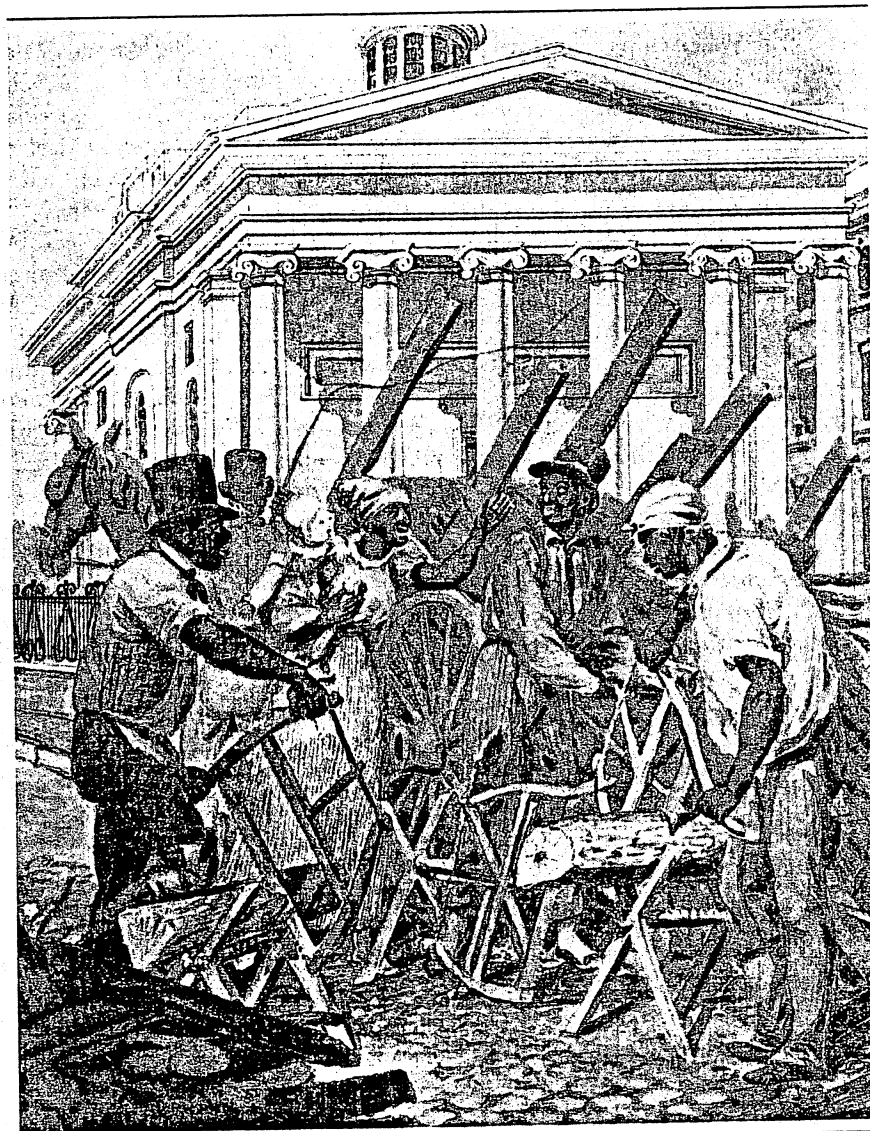
and livestock show which attracted 300,000 spectators is shown turning at the northwest corner of Fourth and Chestnut.

As the new era dawned, frequent and regular schedules replaced more adventurous voyaging. Successive packet lines to Liverpool, Le Havre, and London enabled New York, even before the opening of the Erie Canal, to forge ahead of Boston, Philadelphia, and Baltimore in ocean commerce.¹⁹ Philadelphia nonetheless continued to be a center of shipbuilding and a major port for the South Atlantic and Gulf trade. But by 1824 its foreign commerce had declined to a poor third or fourth place in the nation. In the opinion of one maritime historian, this decline showed not so much lack of energy as extraordinary foresight.²⁰ Businessmen in Philadelphia had found other, more secure, more profitable uses for their talents and capital; they moved into the technological revolution.

II

In 1800 Philadelphia was the biggest city in the United States; 67,787 people lived within the municipality and its contiguous suburbs of Southwark and the Northern Liberties.²¹ The shape of the populated area had changed little over the past fifty years, but the half-moon of houses was expanding. To the south, beyond Old Swedes' Church, were farmlands and marshes. To the north, above Pegg's Run near Vine Street, were the houses and dockyards of the Northern Liberties. There were scattered structures west of Seventh Street, but Centre Square was at the fringe of open country. The fields, trees, and lawns of farms and country estates lined the banks of the Schuylkill. Here and there along its shores were famous private gardens, like Lemon Hill and the Woodlands, and public pleasure grounds such as Gray's Garden at the Lower Ferry and the Wigwam Baths at the end of Race Street, to which citizens walked, rode, or drove according to their means. Until 1818 a grove of walnut trees, a last remnant of the original forest, stood on Chestnut Street facing the State House.²²

The semicircumference of the half-moon was being pushed farther and farther out into the fields. The city was growing rapidly, four to five hundred houses a year since the formation of the federal government in 1789.²³ In the new century its population increased by 40–50 percent in each decade, except during the troubled years 1810–1820 when growth was about halved. Fast as Philadelphia grew, New York grew faster. In the census of 1810 the latter became first in the nation. Numbers were not indicative, however, of the nature of the city. In some respects Philadelphia retained characteristics of a medieval town. Many merchants and craftsmen still lived over their shops; and people of every sort, gentleman and ironmonger, bishop and soap-boiler, resided pell-mell together. There was no "good neighborhood," although there were areas where certain groups tended to congregate. The Germans were in the northwest. The Negroes lived on the southeast edge of town where the Mother Bethel African Methodist Episcopal Church stands on Sixth Street below Pine, the oldest piece of property in continuous black ownership in the United States. Arch Street was a Quaker street. Third and Fourth Streets below Market, and Chestnut and Walnut Streets were especially handsome, with many of the houses of the wealthy.



Negroes in Front of the Bank of Pennsylvania, painting by Pavel Petrovitch Svinin (1787/88–1839), 1811–1813. The bank, on the west side of Second Street above Walnut, was designed in 1789 by Benjamin H. Latrobe (1764–1820) and demolished c. 1871.

Market Street too, not yet wholly devoted to business, still had great houses, mostly to the west, for the market at Second Street dominated the river end. When ships came into port, their cargoes from India, China, or the Mediterranean were bought by merchants up and down Front or Second Street and advertised in the papers. Many goods were disposed of by auction, as they had been in the eighteenth century, but gradually wholesale dealers with warehouses to store specialized goods and retail shops established a pattern of commerce more like that of today.

Philadelphia was a pretty city, as the views published in 1798–1800 by William Birch most pleasantly show. The citizens were proud of it, and most foreign travelers shared the opinion of the French botanist André Michaux that it was “the most extensive, the handsomest and most populous city in the United States.”²⁴ Some, accustomed to the winding, crooked streets of European cities, thought its rectangularity monotonous. Sir Augustus Foster, who had been a young chargé d'affaires in Philadelphia before the War of 1812, considered it “built too much in the shape of a chess board to be beautiful,” adding, “There is nothing surely so unfavorable to Architectural ornament as long lines of broad streets cutting each other at right angles.” But the Swedish traveler Baron Axel Klinckowström described it as “one of the loveliest cities in the world.”²⁵

The highest form of flattery, however, came from fellow Americans. As new cities were laid out in the Old Northwest, along the Great Lakes and down the Ohio and Mississippi, the rectilinear pattern of Penn's first plat of his city-to-be was repeated over and over again. Philadelphia was the “model metropolis”; visitors to the West were struck by the similarity between the frontier cities and Philadelphia. And not only in urban regularity, but also in language and social and cultural trends, Middle America assumed the ways of the Quaker City rather than those of New England or the Old South.

In 1805 a writer describing the city in *The Port Folio* said of it:

The streets of Philadelphia are paved with pebblestones, and bordered with ample footways, raised one foot above the carriageway, for the ease and safety of passengers. They are kept cleaner than those of any city in Europe, excepting the towns of Holland. . . . London is the only capital in the world that is better lighted at night. Many of the New Streets have been latterly planted with Poplars. . . . Their introduction has already given to some sections the air of Public Walks, for ornament of which nothing is wanting but Fountains and Statuary.²⁶

Statues and fountains were added in the first decade of the century. The Board of Managers of the Pennsylvania Hospital, proud of their striking new building, solicited works of art to adorn it. John Penn presented a leaden statue of his grandfather, which arrived in September 1804 on the ship *Pigou* and was set up on the lawn facing Pine Street.²⁷ The expatriate Benjamin West promised a large painting of *Christ Healing the Sick*, which arrived a decade later. It was housed in a special building on the Spruce Street side of the hospital's block, known as the West Picture House, the cost of which was more than paid for by public admissions.²⁸ In 1809 the city's first fountain,

The Nymph of the Schuylkill, carved in wood by William Rush, was erected in Centre Square. Two years later Rush was commissioned to supply life-size figures of Faith, Hope, and Charity for the new Masonic Hall designed by William Strickland on the north side of Chestnut Street between Seventh and Eighth.²⁹

In Washington, diplomats and congressmen, irritated by the mud, emptiness, and inconveniences of the unfinished new capital, recalled longingly the city they had left. In February 1808 a congressman from New Jersey introduced a resolution that “it is expedient, and the public good requires, that the Seat of Government be removed to the city of Philadelphia.” It passed on the first reading. But the members from Maryland, Virginia, and the Carolinas rallied; the debate went on for several days, and the proposal was talked to death.³⁰

The congressmen had much to regret. Washington was a raw settlement of muddy roads and crowded boardinghouses, a hall for Congress in which no one could hear the speaker, a few scattered unfinished rows of houses—“like the ruins of Palmyra,” one congressman said—empty distances and a malodorous swamp where the Mall now is. Philadelphia was an amusing and cosmopolitan city with good hotels, theaters, restaurants, circuses, bookshops, a fine library, a natural history museum, an art museum, the greatest scientific institution in America, and a galaxy of interesting and talented people. The poet Tom Moore—riding the peak of his Anglo-American popularity—remembered as a bright spot of his visit to America the evenings spent at the house of the talented lawyer Joseph Hopkinson, the picnics by the Schuylkill, and the young literati who gathered in the mornings at Asbury Dickins's bookstore opposite Christ Church.³¹

No longer did state legislators and federal officials vie for lodgings during the meetings of their respective bodies. No longer seen about the corner of Sixth and Chestnut Streets were Washington, now at the top of the pantheon of dead heroes; Hamilton, slain in a duel by Aaron Burr; Adams, now in Quincy, Massachusetts; and President Jefferson. Robert Morris, once a genial entertainer of guests, was in debtor's prison. Gone too were the speculators and the men who had collected on the raffish fringes of government. Philadelphia was settling down to its own particular kind of society, sometimes rich and extravagant, more often genteely cultured.

Pres. Jared Sparks of Harvard College found that John Vaughan, the treasurer, librarian, and most active member of the American Philosophical Society, was the cicerone and friend of all distinguished visitors to the city. Under Vaughan's guidance he was “at a society, or at a dinner, or at a tea every day and almost every hour . . . almost wholly among scientific men and artists.”³² “At the beginning of this century,” an editor of Franklin's writings, Albert H. Smyth, wrote retrospectively as the nineteenth century came to a close, “Philadelphia was the most attractive city in America to a young man of brains and ambition.”³³

III

The city certainly was politically exciting. Although Congress no longer met there, it was the cockpit where the conflicting views and policies of the two emergent political parties were pitted against each other in the press and in pamphlets. The revolt against the Federalists which carried Jefferson to the presidency of the United States in 1801 first came to a head in Pennsylvania. It was led by three dominating figures, Gov. Thomas McKean, Dr. Michael Leib, and William Duane. McKean, whose election as governor of Pennsylvania in 1799 helped pave the way for Jefferson's electoral victory in 1800, was a tall, choleric, volatile Scots-Irish lawyer. During the Revolution he had been a fiery Whig; he was a Federalist when the Constitution was adopted; he went over to the radical side in the 1790s and had the distinction, while living in Philadelphia, of holding offices in two states, as chief justice of the Supreme Court of Pennsylvania and as a member of Congress from Delaware. A lawyer, he was a leader of the postrevolutionary democracy that feared and distrusted lawyers. Better educated and more experienced than his rural followers, he served at times as a brake on their "crude theories, fanciful alterations, new projects and pleasing visions," as he put it, vetoing a measure passed by his own party.

Dr. Leib, fond of power and office, seems to have enjoyed playing the sport of politics for its own sake. He was Philadelphia's first political boss. He successfully organized the voters—as well as those not entitled to vote—into a political machine, a coalition of dedicated Jeffersonians, anti-English Irish expatriates, and a mass of citizens who feared the rise of an aristocracy of wealth and position.

His ally in Philadelphia—and Jefferson's in the nation—was William Duane, who made his newspaper, the *Aurora*, the national voice of the new democracy. Jefferson is said to have attributed his election to its effective support. In an age of bitter and abusive partisanship, Duane was one of the most abusively partisan. His attacks on his opponents were so vitriolic that at one time he was defendant in more than sixty libel suits.

While the alliance of these three hot-tempered, domineering men held, they were unbeatable. Their party—then called "Republican"—captured the governorship and control of the lower house of the Assembly in 1799 and of the Senate in 1802. That latter year the Federalists, polling 17,125 votes for James Ross against 47,567 for McKean, were not so much defeated as annihilated; in 1803 they could not find candidates for all the offices slated.³⁴

The "Revolution of 1800" was in Pennsylvania as much a social as a political turnabout. It was the revolt of the small farmer, the frontiersman, and the city's poor against the old ruling class of Philadelphia merchants and large landowners. Partisan feelings, on a national and international level rather than on a local one, particularly the sympathies aroused by the world war between France and England, were intense. Each party had its own armed militia units, and occasionally demonstrated its muscle. Yet these excited feelings

expressed themselves only through ballots; the transfer of power in 1800 took place peacefully.

With the moving of the state and national governments to other cities, the buildings they had occupied reverted to local uses. Congress Hall, the westernmost of the State House complex, again became the courthouse; the east building, where the Supreme Court of the United States had sat, became the City Hall.³⁵ The municipal government, little more powerful than in the eighteenth century, consisted of a mayor, the Select and Common Councils, the Board of City Commissioners, and a registrar. Some of their functions were judicial as well as administrative. The mayor, elected for a term of one year, was, as he had been since the time of Penn's charter, a leading citizen—a merchant perhaps, like John Inskeep (1800–1801, 1804–1806) or Robert Wharton (1798–1800, 1806–1808, 1810–1811, 1814–1819, 1820–1824), or a lawyer like Michael Keppele (1811–1812). His duties were little more than those of a chief of not very effective police. In return for the honor of the post he was required to handle riots and tumults, which were not uncommon. Mayor Wharton was described by one who knew him:

This Mr. Wharton was Mayor of the City in 1798, and for many years after. He was bold, intrepid, and very active, ready at a moment's notice to quell a riot. His appearance at such gatherings with staff in hand, and hat tipped a little on one side of his head, with firm step, and independent authority, would scatter the ire and quell the fire of the most ferocious mob. Philadelphia never had a more efficient and popular municipal officer.³⁶

Other functionaries and commissions of the city remained virtually unchanged from an earlier period. Constables and watchmen kept order by day and night. Authority lay with twelve "viewers" to lay out new streets, and another similar jury assessed damages for such appropriation. The Watering Committee of the Councils assumed greater importance as the pumping system of the city expanded, and the municipal guardians of the poor continued their traditional concern.³⁷ The administration of the port, a state responsibility, was reorganized in 1803 to consist of a master warden and six (later raised to twelve) assistants, the majority from Philadelphia and originally one from Southwark and one from the Northern Liberties.³⁸

IV

The tradition of voluntary association was strong in Philadelphia. Protection from fire had been and would continue to be for many years the work of volunteer fire companies. The primitive engine, hauled to the scene of a fire, filled by a bucket brigade and expelling water from a metal nozzle at the top of the tank, was a hand-pumper operated by a horizontal bar on the side. Although the flexible fire hose had been invented in Holland in the seventeenth century, it did not reach Philadelphia until 1803. In that year, after a series of fires costly in damage and lives, a group of men met at the house of Reuben Haines on Bank Street to form the Philadelphia Hose Company. Money was raised by subscription to purchase a hose carriage and to build

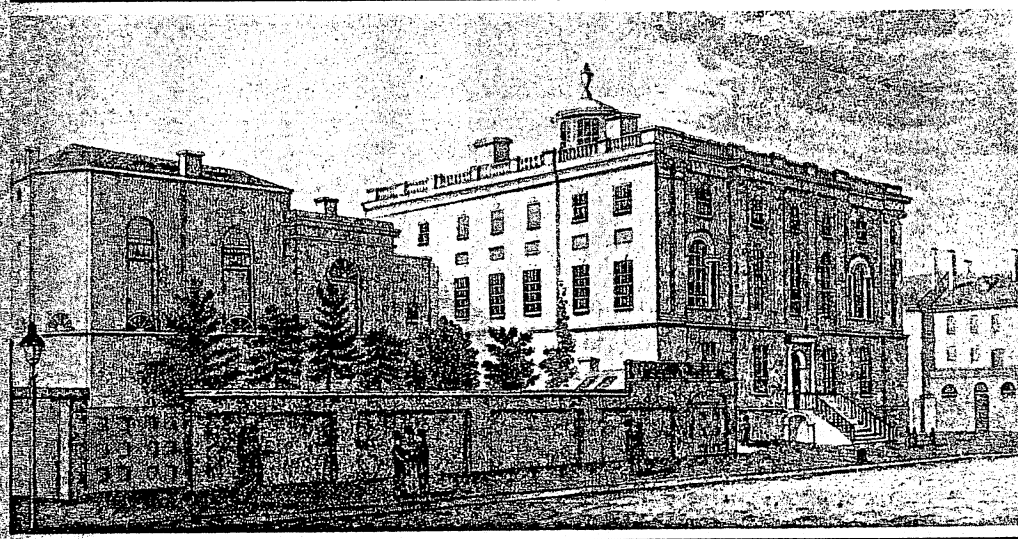
a house for it at 17 North Fourth Street. The new machine proved so valuable in quenching a stable fire in Whalebone Alley on March 3, 1804, that two more hose companies were organized. In 1811 the city Councils appropriated \$1000 to support the fire and hose companies, the first use of public funds for such a purpose.³⁹

The same pattern of self-help by private association prevailed in education, although the state at this time took the first tentative steps toward assuming responsibility. The churches remained active in sponsoring schools, orphanages, and free academies for the poor. The Quakers, Episcopalians, Presbyterians, Moravians, Baptists, Roman Catholics, and Lutherans all had schools, many of which in original form or by succession still exist. There were also numerous private academies, taught by men who conceived "that their business was to make their scholars good writers, good readers, good arithmeticians, and intelligent grammarians."⁴⁰ Further intellectual graces were left to self-education or to the host of teachers who advertised their ability to produce pupils competent in French, singing, dancing, drawing, and other such arts.

Alexander Wilson, who later became famous as an ornithologist, taught such a school in Darby Township. The Rev. Samuel Magaw, rector of St. Paul's Episcopal Church, was president of Poor's Academy for Young Ladies, a notable establishment for girls on Cherry Street. The Negro Episcopal and Methodist churches had started schools for their own people, and in 1804 a group of the black community, desiring education separated from religious instruction, formed the Society of Free People of Color to promote an independent institution.

The University of Pennsylvania in 1800 purchased for its college building the large house on Ninth Street built by the state as a mansion for the president of the United States. Yet the college, so influential and so productive of leaders before the Revolution, made slow recovery from its more recent, bitter divisions. Provost William Smith had been energetic but prickly; his successors were less prickly and less energetic. The first twenty years of the nineteenth century have been called "the lowest point in the history of the college."⁴¹ One factor damping its revival was the sectarian emphasis of American education in the nineteenth century. The University of Pennsylvania was nonsectarian, part of its legacy from Franklin. As a result, Presbyterian boys went to Princeton or Dickinson, Germans to Franklin and Marshall; Quakers, though cultured and great readers, continued to consider advanced education superfluous. A further impediment to the institution was its organization as college, academy, and charity school, confusing its tone and its purpose. The one exception to this ineffectiveness was the university's medical school which, housed in Anatomy Hall on Fourth Street, was the outstanding center of medical training in the United States, basking in the reputation of the nation's most famous physician, Dr. Benjamin Rush.

At other levels the educational experiments going forward in Europe were making themselves felt in Philadelphia. William Maclure, who had observed



The University of Pennsylvania, engraving published by Cephas Grier Childs after George Strickland (1797-1851), 1828.

FREE LIBRARY OF PHILADELPHIA

the schools for poor children started by Pestalozzi in Switzerland, brought a disciple of his, Joseph Neef, a German, to Philadelphia. In 1808 he established the first kindergarten in America in Provost William Smith's mansion near the Falls of Schuylkill.⁴² Contemporaneously the Abbé Espée was developing in Paris a method of teaching children born deaf and dumb, who had hitherto been hopelessly cut off from a normal life. When his successor, the Abbé Sicard, toured America in 1816 to demonstrate this method, David G. Seixas, a Philadelphia tin and crockery merchant, became interested. Something of an inventor himself, Seixas introduced his own system of manual communication, and in 1820 founded the Philadelphia Institute for the Deaf and Dumb. After a bitter quarrel between the founder and some members of his board, he was ousted and the institution renamed the Philadelphia Asylum for the Deaf and Dumb. Its building, erected in 1825, still stands at Broad and Pine Streets as part of the Philadelphia College of Art.⁴³

Meanwhile the feasibility of schools for the children of the poor, to be paid for by public taxes, was under discussion. Bills had been introduced in the state legislature for this purpose but had been defeated. The opposition consisted principally of Quakers and Lutherans, who supported their own schools without state aid and felt a general tax would be unfair to them; of the German sectarians, who wanted to educate their children in their own tongue as they had been doing; and of conservatives generally, who were against any new tax.⁴⁴ In 1802 an act was passed, applying only to the city and

county of Philadelphia, which provided that children whose parents could not afford schooling might attend the most convenient private school at the county's expense.⁴⁵

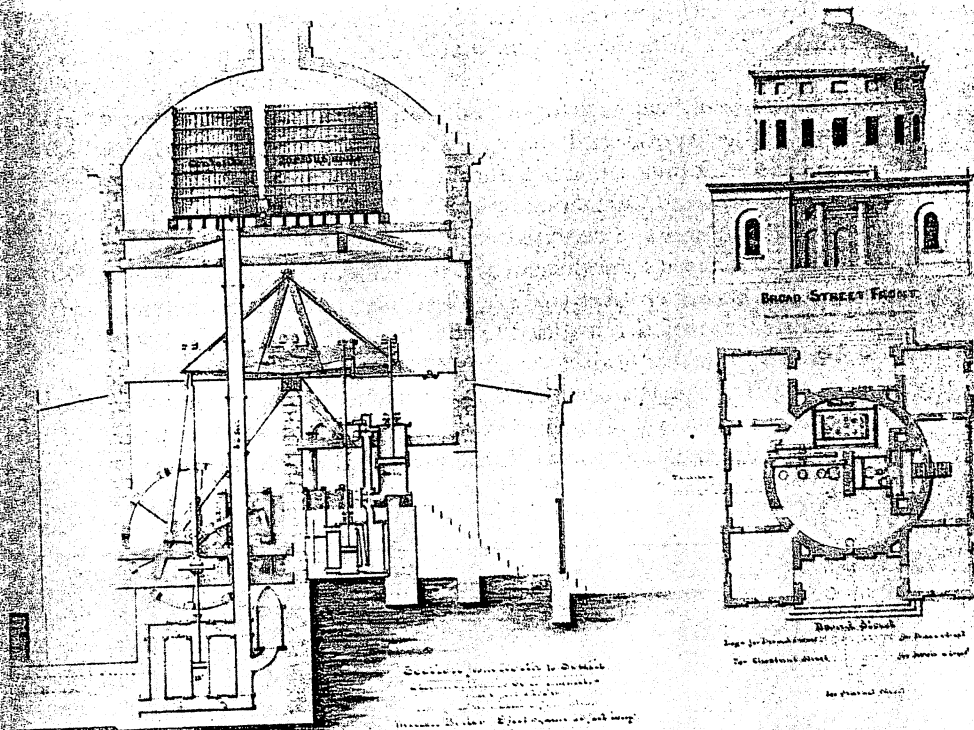
Far away, in Madras, India, the Rev. Dr. James Andrew devised a system by which children taught one another under the supervision of a master. The method was introduced into England by Joseph Lancaster and became known as the Lancastrian method. It was brought to Philadelphia in 1817. Although it eventually proved a failure, its promise of educating large numbers of children without the expense of paid teachers helped persuade the Assembly, during the depression year of 1818, to pass an act that set up the city and county of Philadelphia as the "First School District" of Pennsylvania and provided for education on the Lancastrian plan at public expense. In a real sense this marked the beginning of the public school system in the state.⁴⁶

V

The great civic improvement of the period was the waterworks on the Schuylkill. Philadelphia, like all cities for centuries past, had drawn its water supply from wells and cisterns. These were in the lowland of the city proper, shallow, and easily contaminated by surface drainage from the streets and by the underground flow from the cesspools and outhouses. The death toll from the yellow fever epidemics of the 1790s had been appalling. Nothing was known about their cause, but it was believed that adequate good water would mitigate, if not prevent, the terrible scourge. It was also argued that existing water supplies were inadequate for fighting fires. In 1799 a petition signed by several hundred citizens asked the city Councils to seek a new source of water.

One proposal recommended that it be drawn from an unfinished canal, begun nearly ten years earlier, to connect the Delaware and Schuylkill Rivers near the line of Vine Street. Because of the low level of the land between the rivers, purer water was to be brought to the Vine Street area by a feeder canal from a point near Norristown, where the Schuylkill was nearly forty feet above its level in Philadelphia. Authority for the provision and sale of water to the city had been written into the charter of the Delaware and Schuylkill Canal Company which in 1792 had begun, but never completed, the construction of the feeder canal. The company now proposed that the state complete this canal and bring water to the city from Spring Mill Creek below Norristown.

The engineer-architect Benjamin Henry Latrobe was engaged by the city to survey the route. He reported that water could be brought by an aqueduct from Spring Mill, but that a better method would be to build a basin on the Schuylkill above Chestnut Street, the bottom of which would be three feet below low water. From this basin, water, lifted and forced by steam pumps, would be brought by canal and tunnel along the line of Chestnut Street to Broad and up Broad to a pump house in Centre Square. There another steam engine would raise it to a reservoir thirty feet above ground holding 16,000 gallons. Thence it would flow by gravity in wooden pipes throughout the



Centre Square Water Works, colored drawing by Frederick C. Graff (1774–1847), c. 1828. Designed by Benjamin Henry Latrobe (1764–1820) in 1798–1800, the pump house at the intersection of Broad and Market Streets was built to be "ornamental as well as useful" and to "supply the City of Philadelphia with Wholesome Water," according to Latrobe's report of 1798.

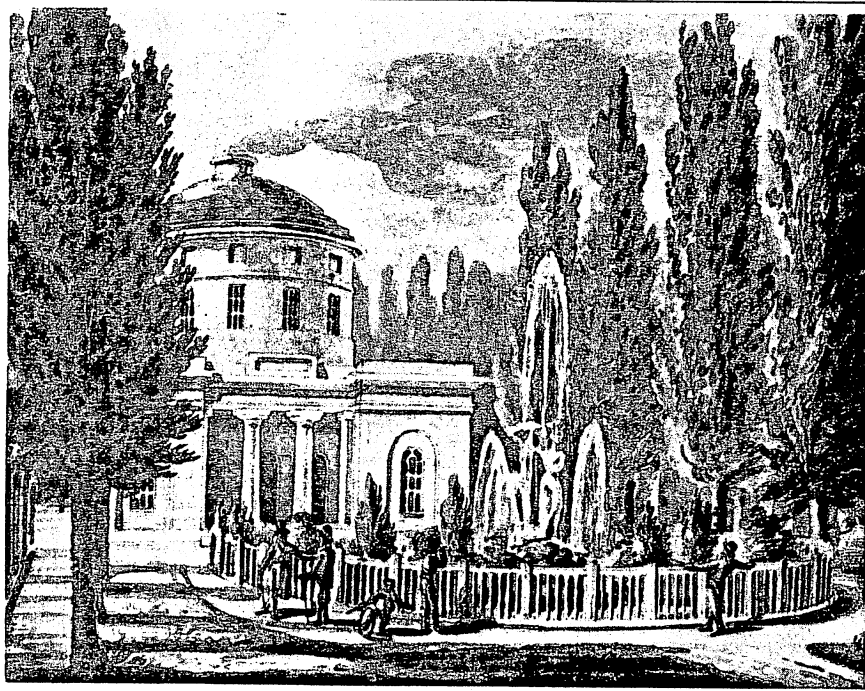
HISTORICAL SOCIETY OF PENNSYLVANIA

city. Latrobe's plan was adopted over the determined opposition of the canal company and the doubts of those who had no faith in steam engines.⁴⁷

Latrobe himself designed the pump house in a new classical style in Centre Square, for years one of the sights of Philadelphia. A contract was made with Nicholas I. Roosevelt of New York to build the steam engines, which were to be capable of supplying a million gallons of water a day. Roosevelt was an inventor and machine builder of talent; among other improvements he designed the vertical paddlewheel that made Robert Fulton's steamboat successful. On January 27, 1801, with public rejoicing, the Latrobe-Roosevelt waterworks were put into operation. In the year that followed, sixty-three houses, four breweries, and a sugar refinery were supplied with Schuylkill water, and thirty-seven hydrants were installed in various parts of the city. But Roose-

velt's low-pressure engines were unequal to their task; by 1804 he claimed he had lost \$45,000 on his contract. After much dispute, the Watering Committee settled with him for \$15,000, and put Frederick Graff in charge of the works.⁴⁸

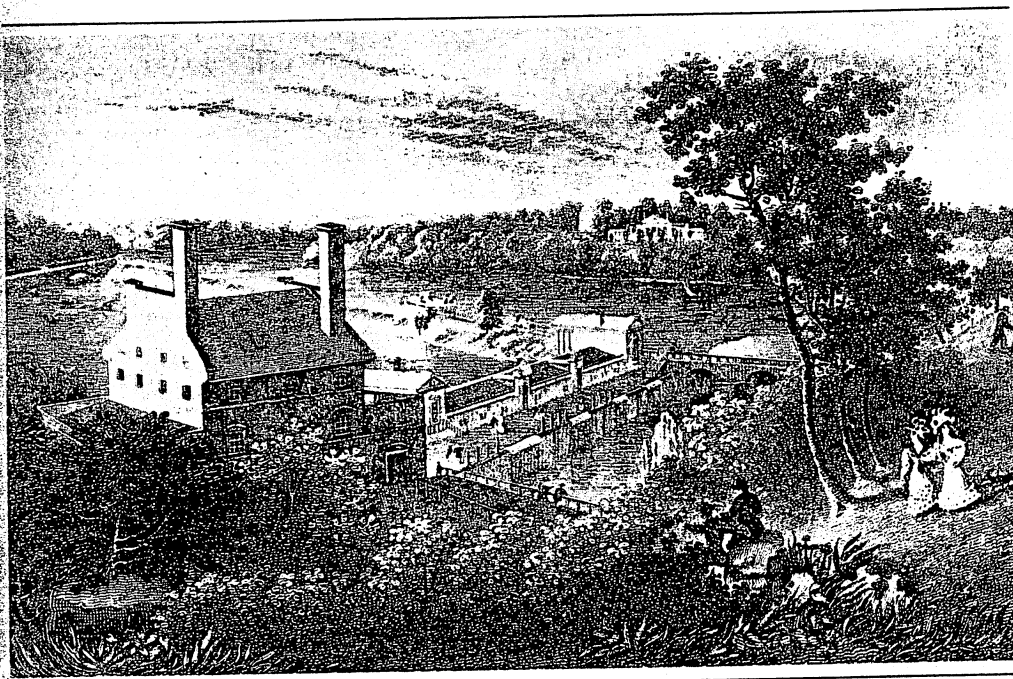
Frederick Graff, whose battered and neglected monument stands between the Water Works and the rocky slope of Fairmount, was one of Philadelphia's great civil servants before that term was invented. His grandfather, who came from Germany in 1741, and his father before him had been skilled master builders and contractors. The son, trained as a carpenter, had gained some skill also as a draftsman and was employed by Latrobe in erecting the pump house. On April 1, 1805, Graff was made superintendent and engineer in charge of the works. He was to serve the city for forty-two years and to become the leading American expert on hydraulic engineering. Graff created for the Water Works a new technology for control of the movement and delivery of water: iron pipes replaced the old piping of wooden logs; fire hydrants to which the fire engine could be directly con-



View of Centre Square, *water color*, c. 1812, by Pavel Petrovich Svinin (1787/88–1839). *The Nymph of the Schuylkill sculpture by William Rush (1756–1833) was added c. 1809.*

nected (Latrobe's hydrants delivered the water into a ground-level pool, from which the water was moved by hand pump into the tank of a fire engine); stopcocks to stop the flow of water in case of a leaking or broken pipe. His advice and innovations were followed by about thirty-five American cities and drawings of them sent to England. He changed the habits of the people of Philadelphia.⁴⁹

After spending five years trying to make the original system work, Graff recommended that the intake be moved upstream. In December 1811 the city Councils approved his plan for a reservoir on top of Morris Hill (later Fairmount) with a pumping station at its base. In 1814 the Watering Committee bought from Oliver Evans a high-pressure steam engine to lift the water to the reservoir, but before the works were completed Graff decided to switch to a hydraulic system by which waterwheels supplied the power. In 1818 he began to replace the wooden mains with cast-iron pipes, an innovation that involved new problems. Graff himself designed the stopcocks and hydrants for the new distribution system, which was completed in 1822. Within two years the use of Schuylkill water and the handsome buildings by the river that



View of the Waterworks on Schuylkill—Seen from the Top of Fair Mount, *engraving published by Cephas Grier Childs after Thomas Doughty (1793–1856), 1829.*

housed the Water Works were the pride of the city. To visit Philadelphia without seeing Fairmount and its Water Works was, people said, like viewing London without seeing Westminster Abbey. Of all the views of the city, the Schuylkill at Fairmount was that which attracted most artists and resulted in most paintings and prints. Graff, as the result of his local success, was called for advice by New York when it installed the Croton water system in 1842 and by Boston in 1848.⁵⁰

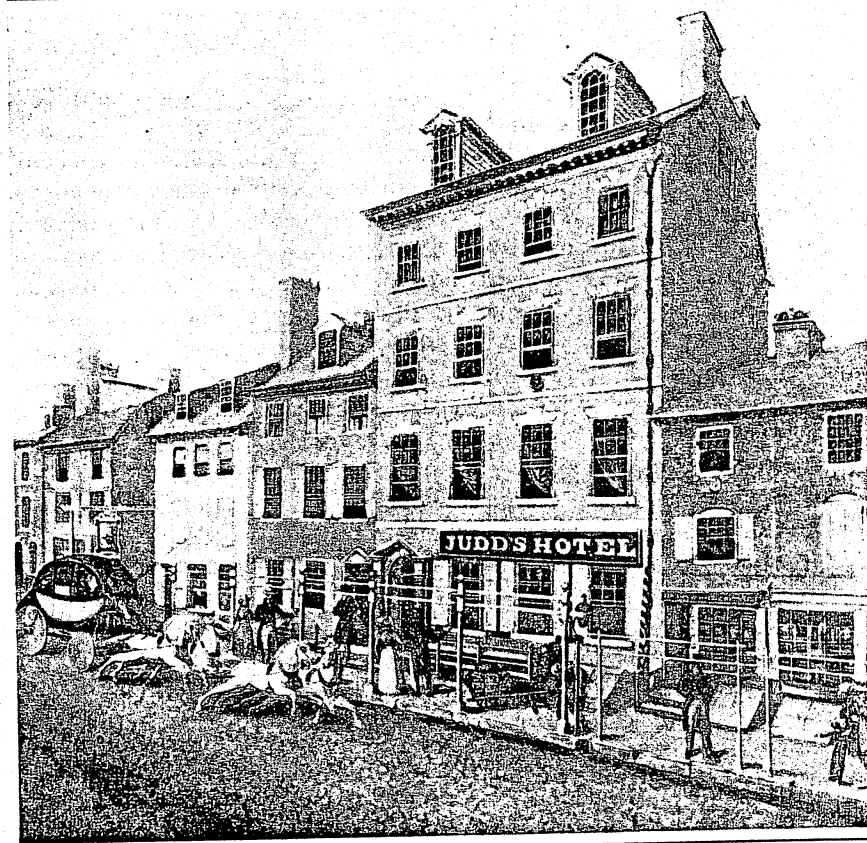
Despite the improvement in Philadelphia's water supply, yellow fever continued to recur periodically. Because of it, in 1810 the Board of Health opened a hospital for contagious diseases, with a capacity of about 500, out in the open country near the present intersection of Nineteenth Street and Fairmount Avenue.⁵¹

The city's authority, including its police and its water supply, were then, and would long continue to be, confined to the area from river to river between South and Vine Streets. As population increased and as houses were built outside these bounds, the environs were incorporated as separate boroughs, as Southwark had been in the 1760s. Frankford became a borough in 1800 and the southeast corner of Northern Liberties Township three years later. Penn Township was carved out of the western part of the Northern Liberties in 1807, and its western portion became Spring Garden Township in 1813. Moyamensing was incorporated in 1812, and Kensington in 1820. Although county courts and certain county offices were maintained, each borough had its own government and borough hall, its own lower courts and police. A quarter of a century after Schuylkill water was first introduced into the city proper, the boroughs of Spring Garden, the Northern Liberties, and Southwark contracted to have the system extended into their jurisdictions.

V I

Among the developments that made the modern city possible were the new forms of transportation created in the nineteenth century: bridges, turnpikes, canals, steamboats, and finally, railroads. The example of the macadamized Lancaster and Germantown pikes encouraged the organization of other turnpike companies. Following the chartering of the pike from Front Street through Germantown to Reading in 1798, a company was created to build a road from Third and Vine Streets to Germantown and Perkiomen (the Ridge Pike) in 1801. Two years later the Cheltenham and Willow Grove Turnpike Company was incorporated to run a pike from the Rising Sun Tavern to the Red Lion Inn on Old York Road, and another the same year was to go from Front Street through Frankford to Bustleton and Morrisville, where it connected with a ferry to New Jersey. These pikes broke through the checkerboard pattern of Philadelphia's streets and have remained thoroughfares. By 1821 eighty-five turnpikes had been chartered in the state, mostly financed by Philadelphia capital. A network of paved toll highways had been pushed out from the city to New York, Reading, Harrisburg, Lancaster, and Baltimore, and into New Jersey.⁵²

But Philadelphia lay at the end of a narrow peninsula between two deep and navigable rivers; their tributaries were hardly less formidable barriers to travel by land. From the city's infancy there had been ferries; from the time of the Revolution two floating bridges crossed the Schuylkill. These expedient bridges were repeatedly swept away by freshets, and various designs for a bridge that could withstand storms and floods had been proposed. Although a model for an iron bridge had been produced by the pamphleteer Tom Paine and a design for a wooden truss bridge patented by the artist-inventor Charles Willson Peale,⁵³ it was not until 1798 that a company organized by Judge Richard Peters as president adopted a plan by Timothy Palmer for a wooden structure to cross the Schuylkill at Market Street. Its cornerstone was laid on



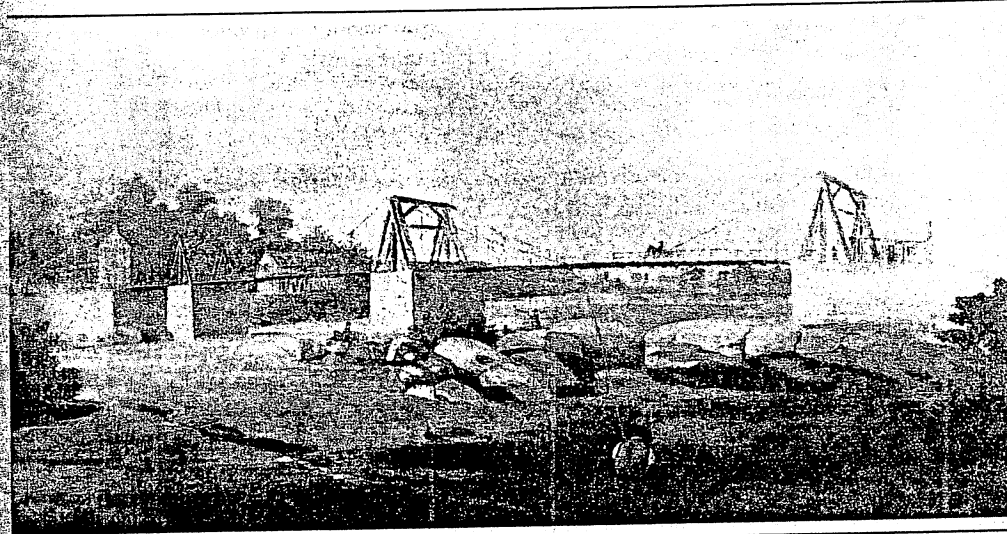
Judd's Hotel and the United States Mail Coach, painted by an unknown artist (1817–1825). Judd's Hotel was at 27 South Third Street, and the U.S. Mail coach office was across the street at no. 30. Advertisements for the mail and passenger service promised arrival in New York "the same day" following a 5 A.M. departure.

October 13, 1800, and the single-arch bridge, 552 feet long and 31 feet above the river at its greatest elevation, was opened on January 1, 1805.

At Judge Peters's insistence a protective wood cover was added that same year, and the covered highway across the river was embellished with two carved wood statues by William Rush, *Commerce* at one end and *Agriculture* at the other. A marble obelisk at the western approach bore a long inscription describing the bridge and praising those "who by enterprising, arduous, and persevering exertions achieved this extensively beneficial improvement." The city was immensely proud of the Permanent Bridge, as it was called. When a tavern near the western end caught fire one January night in 1806, the *United States Gazette* reported: "It is due to the respective Hose and Fire Companies, to state, that notwithstanding the distant situation of the fire, and the badness of the walking the citizens turned out with alacrity and ardor highly honorable—we understand that not less than 5,000 persons crossed the bridge on this occasion."⁵⁴

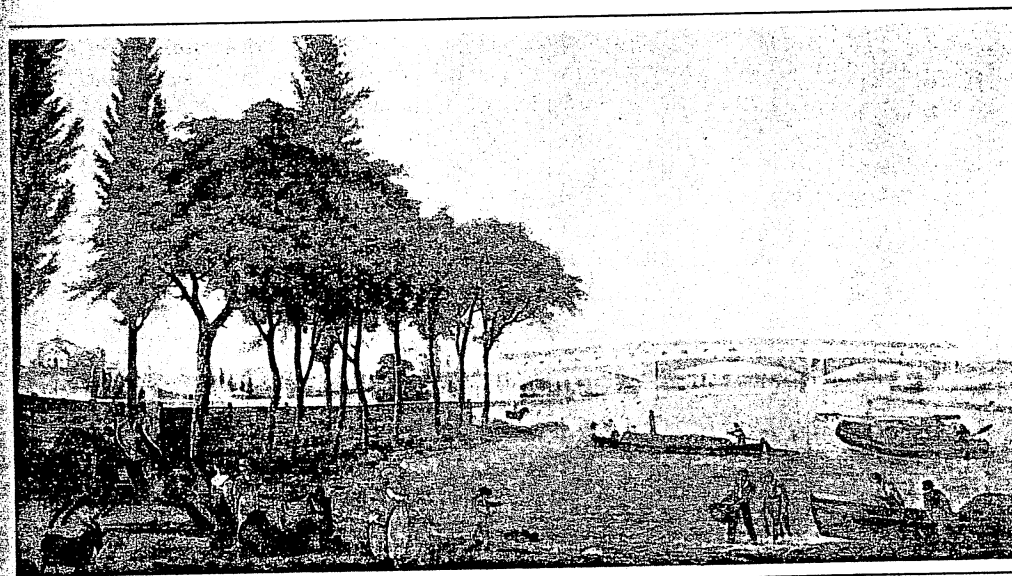
The Permanent Bridge inaugurated a period of great activity in bridge building. On February 1, 1806, a bridge over the Delaware at Trenton, built by Theodore Burr, was formally opened: for the first time stagecoaches could travel all the way by land between Philadelphia and the Hudson opposite New York.⁵⁵ The Gray's Ferry Bridge Company was chartered in 1806; but only a floating bridge, first built by the British during their occupation of the city, actually crossed the river there until the Philadelphia, Wilmington and Baltimore Railroad built a bridge in 1838. In 1809 a bridge of novel design was erected at the Falls of Schuylkill. Its stone abutments and two stone piers supported two spans 253 feet long held up by chains. The bridge collapsed in 1811 under the weight of a drove of cattle; in 1816 its replacement fell down too. An inventive manufacturer, Josiah White, who had a wire factory at the Falls, then constructed a footbridge across the river, which is said to have been the first known suspension bridge of wire. Another bridge company was chartered in 1809 to build a bridge still farther up the Schuylkill at Flat Rock (Manayunk); it completed a bridge to Lower Merion in 1810.

The great bridge builder of Philadelphia, and of the age, was Lewis Wernwag. Coming to the city from Württemberg at the age of fifteen, he worked in his youth as a machinist. In 1810 he threw a wooden bridge across Neshaminy Creek on the road to New York, and the following year a wooden cantilever drawbridge across Frankford Creek at Bridesburg. His reputation made, Wernwag was asked to design a bridge across the Schuylkill just below Fairmount to replace a floating one that had been carried away by a freshet in 1810. The Upper Ferry Bridge, as it was called, was a single wooden arch whose chord (length) was 340 feet, 98 feet greater than the longest up to then built in North America. The crest of the arch rose thirty feet above the water. From a broad base at either end the roadway tapered to twenty feet in the center. The wooden casing protecting it from the weather was designed by the architect Robert Mills. Although Lewis Wernwag built over two dozen other bridges, worked on steel-mill machinery, and interested himself in



The Chain Bridge at the Falls of Schuylkill, built 1809, collapsed 1811, painted by Thomas Birch (1779–1851), c. 1810.

HISTORICAL SOCIETY OF PENNSYLVANIA



Permanent Bridge (Market Street Bridge over the Schuylkill River), painting by John J. Barralet (1747–1815), c. 1810. The bridge was completed in 1804 and demolished in 1875.

HISTORICAL SOCIETY OF PENNSYLVANIA

anthracite coal and canals and dams, his fame has all but vanished for his greatest achievements were in wood. The great Upper Ferry Bridge stood only twenty-six years; fire destroyed it in 1838.⁵⁶

VII

Philadelphia had one advantage over any other seaport city except Baltimore: it was on the fall line and hence internally channeled by streams that could supply water power. The Delaware River, in its southwesterly course from Bristol to Wilmington, flows along the border between the granite hills of the Piedmont plateau and the sandy coastal plain. Waterpower sites on Philadelphia's streams ranged from Kensington in the northeast—where there had been mills since the city began—in an arc across the watershed through Germantown to the Schuylkill, into which flowed many useful tributaries. To the west and southwest, Cobbs, Darby, Ridley, and Chester Creeks offered abundant waterpower.⁵⁷ Streams that have long ago dried up or disappeared beneath the city streets once kept mill wheels turning. One example will suffice: James Traquair had a mill on Falls Creek, somewhere in the valley up which automobile traffic now climbs from the East River Drive to join Roosevelt Boulevard. There a waterwheel thirty-six feet in diameter worked a number of saws which cut the marble front steps and door frames of Philadelphia's brick houses.⁵⁸

Such a basic source of power, easily accessible, gave the city an incalculable advantage at the beginning of the industrial revolution. In 1803 the Pennsylvania Society for the Encouragement of Useful Arts and Manufactures, founded in 1787, was reorganized with Dr. Benjamin Rush as its president and Tench Coxe as one of its vice-presidents.⁵⁹ Coxe was the first of a number of economists in Philadelphia who strongly advocated the establishment of manufactures in the United States. He had assisted in the composition of Alexander Hamilton's famous Report on Manufactures, encouraged planters in the South to grow cotton, and worked to nurture a cotton-spinning industry in Philadelphia. In 1805 Seth Craige acquired a site on Cohocksink Creek in Kensington, where the Penns had owned a flour mill, and there established the first large cotton mill in the state. By 1816 it was the largest manufactory of its kind in the country.⁶⁰

The embargo of 1808, a disaster for the merchants, was an impetus to the establishment of factories to make the goods that could no longer be imported from Europe or Asia. When the foreign shipping trade was in desperate straits, the little mills around the city were prospering. The *Aurora*, a firm supporter of Jefferson and the embargo, on November 15, 1808, published a list of the principal manufacturers of the city:

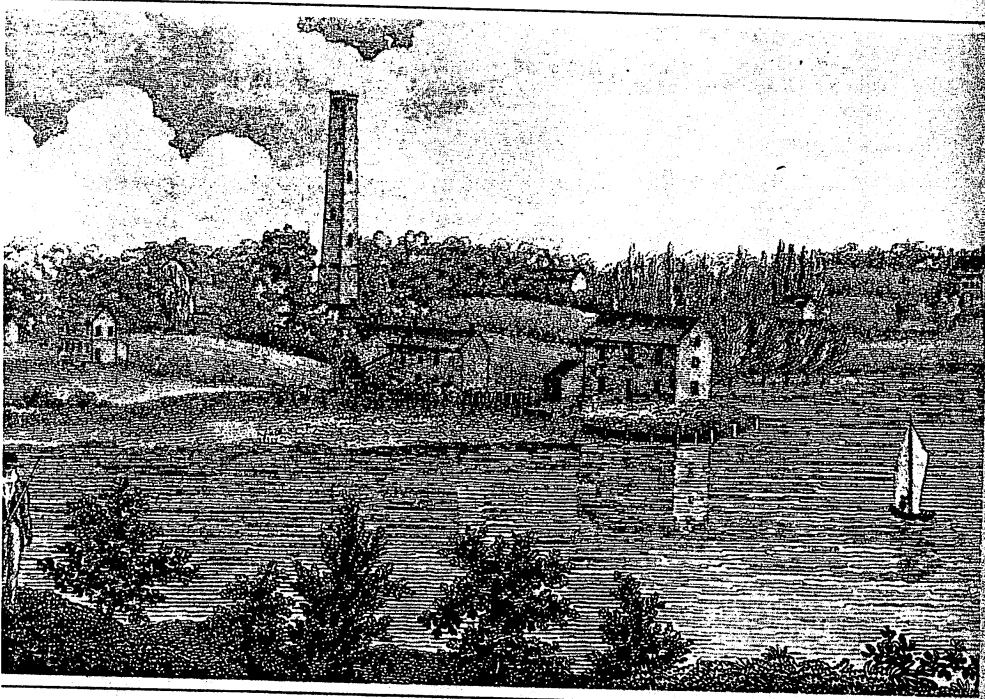
Floor cloth & carpets	John Dorsey, Chestnut above 12
Oilcloth carpeting	John McNulty
Printed calicoes	John Thoburn & Co., north 3

Cottons & linens	Domestic Society's Warehouse, south 3
Calicoes	John Hewson, Jr. 3
Windsor & fancy soaps & sealing wax	W. Lehman, W. Smith & Son, south 2
Cotton bagging	Macclure & Robertson, south wharves
Earthenware (tea & coffee pots, sugar boxes)	Binny & Ronaldson, South St.
Window glass	Agent, Elisha Kane, south Front James Lee, agent John Wetherill North Front
Shot	Paul Beck, north Weber [whose shot tower was for many years one of the city's landmarks] Bishop & Co., South wharves
Red lead	R. Hovenden & Co., South Front
Catheters & bougies	Dr. Vincent King
Refining of camphor	Joseph Lehman, Market St.
Twine & cotton bagging	Capt. Towers
Woolen stocking cloth	Wm. Davy, Germantown ⁶¹

The *Aurora* reported as among the toasts at the festival held in Pottstown to celebrate the election of Simon Snyder as governor: "American manufacturers—may they receive encouragement worthy of a free people," and "The American fair—may they soon substitute for the fineries of Europe, our own manufactures, and spurn from their sides the enemies of freedom."⁶²

The *Aurora* failed to mention some of the industries most important for the future. Paper and paper-making machinery and printing presses, as well as Binny and Ronaldson's type foundry, were basic to Philadelphia's foremost position in the printing and publishing industry. Leather too was important. The city had become a center of boot and shoe manufacturing, with a lucrative export trade to the South. The cordwainers, as the makers of boots and shoes were called, had organized as masters and journeymen into traditional guilds. In the fall of 1805 the journeymen struck for a long time, but unsuccessfully, for higher wages. The next year eight of them were brought to trial before Judge Moses Levy for illegal combination and conspiracy, and were convicted. The journeymen's loss was a blow to what might have been the beginning of the trade union movement; on the other hand it speeded the transition from the handicraft to the factory system. The cotton industry, which sprang up at mill sites outside the city proper, being wholly new, was mechanized from the first. In contrast the extensive woolen, satinet, and rug businesses were long carried on by hand-weavers as home industries in South Philadelphia.⁶³ The first Jacquard loom in Philadelphia was put into operation by William H. Horstmann in 1824.

The most significant developments, however, were in the machine and foundry industries. Two men were representative of the new era. Josiah White was a successful merchant who abandoned that field when he was still



Northwest view of Mr. Paul Beck's Shot Tower near the Schuylkill, after a painting by Thomas Birch (1779–1851), in *The Port Folio*, December 1812. The tower, near the present Twenty-First and Cherry Streets, was abandoned in 1828.

LIBRARY COMPANY OF PHILADELPHIA

young to start a factory. He prospered from the time of the embargo until peace in 1815 brought in a flood of cheaper European goods and put him out of business. White's factory was at the Falls of Schuylkill, where in 1807 a tavern keeper, Robert Kennedy, had bought the right to build a bridge and to use the waterpower on condition that he build locks around the falls for freight boats coming down from Reading. Kennedy, in partnership with Conrad Carpenter, built a chain bridge but did nothing about the locks. Around 1809 they sold their water rights to Josiah White and Erskine Hazard, who built a rolling mill and wire factory there. At first they used bituminous coal from Virginia in their furnaces, but White became interested in the possibilities of Pennsylvania anthracite which, although it was abundant on the upper Schuylkill, no one then knew how to use. In 1815 luck solved the problem for White:

... they had some [anthracite] brought down by teams at an expense of one dollar per bushel (twenty-eight dollars per ton). They expended some three hundred dollars in experiments, but could not succeed in making it burn. The hands in the mill got heartily sick and tired of it, and it was about being abandoned: but, on a certain

occasion, after they had been trying for a long time to make it burn without success, they became exasperated, threw a large quantity of the "black stones," as they called them, into the furnace, shut the doors and left the mill; it so happened that one of them had left his jacket in the mill, and in going there for it some time after, he discovered a tremendous fire in the furnace—the doors red with heat. He immediately called all hands and they ran through the rolls three separate heats of iron with that one fire.⁶⁴

This accidental discovery of how to burn anthracite in mill furnaces is said to have been the first successful industrial use. White immediately threw his restless energies into experimenting with various kinds of cast-iron grates in which the hard coal could be burned in homes, and into the organization of a canal company to bring it down the Schuylkill to Philadelphia.⁶⁵

Essential to the rise of an industrial age was a new kind of man. The inventor Oliver Evans is an early representative. He grew up in Delaware, a millwright by trade and the owner of a flour mill at Newport on the Christiana River. He turned his inventive genius first to the production of flour and, using waterpower as the source of energy, developed a method of continuous mechanical handling of the operation from unloading grain to sacking flour, a mechanization that revolutionized the milling industry.

All his life, however, Evans had been haunted by a dream of a steam-propelled carriage to move freight overland. In 1792 he moved to Philadelphia and established the Mars Works, which became the first important foundry and ironworks in the city. He filed the first specifications for a steam engine to be registered in the United States Patent Office, and in 1800–1801 began to build steam engines commercially. The *Aurora* in 1803 carried the first notice of the high-pressure engine, patented the following year, which was his greatest contribution to the new technology.

When Evans received an order in 1804 from the Board of Health for a steam-powered dredge to clear the wharf area of the Delaware, he saw an opportunity to prove his idea of a steam carriage. He built the dredge in his shop at Ninth and Market Streets, mounted it on a heavy wooden carriage, and connected the dredge's engine with the wheels of the carriage. For several days in June 1805 he demonstrated this remarkable self-propelled vehicle—to which he gave the equally remarkable name of "Orukter Amphibolis"—driving it around Centre Square and out Market Street to the Schuylkill. There he transferred its power to water propulsion wheels, to take it down the Schuylkill and up the Delaware as far as Dunk's Ferry, sixteen miles above Philadelphia, before finally returning to the city. Unfortunately as a dredge the machine does not seem to have been a success. But Evans had a successful career building high-pressure steam engines to power both mills and boats. To reach markets on the western waters, Evans opened a factory in Pittsburgh.⁶⁶ Evans was the first of a great line of designers of machines in Philadelphia in the nineteenth century.

The horse-powered railroad—wooden carts with cast-iron wheels pulled over wooden rails—built by Thomas Leiper in 1809 to move stone from his quarry on Crum Creek three-quarters of a mile to a dock on Ridley Creek was

an isolated practical novelty.⁶⁷ Transportation by water ruled the thoughts of engineers. In 1807 on the Hudson River Robert Fulton launched the first successful steamboat, using a British engine and Nicholas Roosevelt's paddle-wheel. It was the culmination of earlier efforts made by Roosevelt, Chancellor Robert R. Livingston, and Livingston's brother-in-law John Stevens, the inventor. Stevens, who held a United States patent, was preparing to build a steamboat of his own design. In competition, Chancellor Livingston and Fulton secured a monopoly from the state of New York for their boat. Not to be completely defeated, Stevens brought his boat, the *Phoenix*, around by sea to Philadelphia in 1810 and initiated steamboat navigation on the Delaware. After demonstration trips to Chester and Bordentown, the *Phoenix* was advertised to leave Philadelphia at 2:30 P.M. each Monday, Wednesday, Thursday, and Friday for Bordentown, arriving in the evening and connecting with the stage lines for the Raritan River and New York.⁶⁸

Industry could expand only within a narrow geographical area as long as the transport of goods was confined to horse and wagon. Water, chief source of power, was also the easiest highroad. Transportation by water was essential for heavy freight, and was far more pleasant for passengers than the stage-coach. Philadelphia had a great river leading to the sea, but her water routes to the interior—the upper Delaware and its tributaries, the Schuylkill and the Lehigh, leading westward—were hampered by swift currents, falls, and sudden changes in depth when droughts or floods occurred. Between the city and the next great river valley to the westward lay broken hills of Piedmont upland and, beyond the Susquehanna, range after range of the Appalachian Mountains. The industrial revolution required a revolution also in water transport. The geography of Pennsylvania interposed formidable obstacles.

A dream of canals had haunted the minds of Americans almost since the first settlement. "The parent of all canal projects in this country," said *A Connected View of the Whole Internal Navigation of the United States, Natural and Artificial, Present and Prospective*, published by the Philadelphia firm of Carey and Lea in 1826, was the Chesapeake and Delaware Canal, first seriously proposed in 1767 or 1768 but not built until sixty years later. During the 1790s several canal projects were started in Pennsylvania, but only the Conowingo Canal, a short-cut around the Conowingo rapids on the Susquehanna, was completed. The construction of Robert Morris's canal to connect the Delaware and Schuylkill Rivers was halted by lack of funds. A still more ambitious proposal to join the Delaware with the Susquehanna was twice surveyed by David Rittenhouse by authorization of the Assembly. By 1796 that project too was out of funds. In 1811 when the reopening of ocean commerce produced a spirit of optimism in Philadelphia, these two defunct plans were combined into one called the Union Canal, to be built from Reading along the line of the Tulpehocken and Swatara Creeks to the Susquehanna.⁶⁹

After the war Josiah White's interest in anthracite coal led him to organize the Schuylkill Navigation Company to connect Philadelphia with the hard-coal country above Reading. Becoming dissatisfied with the management, he

and his partner Erskine Hazard withdrew and in 1818 inaugurated a still more adventurous undertaking, the Lehigh Coal and Navigation Company, to canalize the Lehigh River.

Philadelphia thus had three canal projects underway in the years following the war, two to tap the anthracite coal beds north of the city and one to reach westward to the Susquehanna. The long postwar depression made their financing difficult, and it was not until after the revival of business in the 1820s that construction really got underway. By that time the Erie Canal, the mammoth state-financed project in New York to link the Hudson River with the Great Lakes, begun in 1817 and opened in October 1825, had given a tremendous impetus to canal building.

The importance of the Erie Canal as an engineering feat and as an element in the rise of New York City as a transfer point of inland products and ocean commerce has been well documented, while the significance of the Pennsylvania canals has been overshadowed. The Erie Canal extended from Albany to Buffalo through generally level country; it required only eighty-one locks in its 362-mile length. The Schuylkill Canal, when completed in 1825, measured 108 miles from Fairmount in Philadelphia to Port Carbon above Reading. It had fifty-eight miles of canals, fifty miles of pools, 129 locks, thirty-four dams, one tunnel 385 feet long, and a rise of 610 feet. The Union Canal began at a pool in the Schuylkill three miles above Reading, followed the Tulpehocken Creek forty-one miles to a high-point 498 feet above tidewater, ran along a summit level for seven miles, and then went down westward for thirty-four miles. The ascent and descent required ninety-three lifts and two guard locks, forty-nine culverts, 135 bridges, fourteen aqueducts, and one tunnel 729 feet long at the summit. The Lehigh Coal and Navigation Company canal, begun in 1827, was of a different type, being in essence the canalization of a mountain torrent. As designed by White and Hazard, it consisted of downward navigation only. Coal from the mines at its head came by gravity down a nine-mile railroad to Mauch Chunk; from that point the coal vehicles, called arks, floated down forty-seven miles of canals and pools, entering the Lehigh River above Easton. The route descended 364 feet, requiring nine dams and fifty-four locks, some of which were of great height.

Coal began to reach Philadelphia from the Lehigh in 1820, well before a canal facilitated its passage, and from the Schuylkill in 1823, although the whole latter canal from Port Carbon opened only in October 1825. In that year it was stated: "The coal trade is increasing with great rapidity; the demand for coal being, just now, much beyond the means of transporting it from the mines." Single-horse boats made the journey from the anthracite beds above Reading to the city in four days and returned in the same time; packet boats with passengers took half the time. Passengers for Reading left the White Swan Hotel on Race Street above Second by coach to Fairmount and there boarded a canal boat; the fare was two dollars. These canals, together with turnpikes, bridges, and steamboat lines, began to transform Philadelphia from a seaport to a manufacturing city looking inland and living by mine and mill.⁷⁰

The industrial revolution could not have taken place without men competent to develop a new technology, able to invent, build, and use precision tools and precision machines. Philadelphia had such men; it was such assets, still in process of maturation, that persuaded the federal government, upon removal to Washington, to leave behind our institutions that required technically skilled management and workers—the United States Mint, two arsenals, and the Navy Yard.

One of the great sources of such skills was the long-established craft of the clock and watchmaker. Men trained in that trade turned their experience into other channels, as David Rittenhouse had become astronomer, builder of scientific instruments, and first director of the mint. Oliver Evans had been trained as a millwright; but Matthias W. Baldwin, a watchmaker, turned to the manufacture of locomotives for the infant railroad industry; and Joseph Saxton, who made the clock in the State House tower, became constructor and curator of the standard weighing apparatus at the mint, and called to Washington when Alexander Dallas Bache took over the direction of the Coastal Survey and the Office of Weights and Measures, furnished most of the states with their sets of linear, volumetric, and weight standards. (His standard balance scale may be seen in the collection of the American Philosophical Society.)⁷¹

The problems of metallurgy, precision tools, and precision balance scales for assay work encountered by the United States Mint and successfully solved in the first forty years of its existence were equally basic for the dawning industrial age. The importance of the mint's technical skills was illustrated by the contents of the *Mechanics Magazine*, a journal later absorbed into the *Journal of the Franklin Institute*, which in its first volume in 1825 printed six articles on the process of coining at the Royal Mint in London, seven on railways, and eighteen on steam engines.

November 1, 1800, marked the end of the use of the British monetary system by American merchants.⁷² Brokers announced that they intended thereafter to buy and sell public bonds for dollars and cents. Conversion books were published for the use of those accustomed to the old method of computation.

The supply of coins was an old and a complicated problem. The most numerous hard coins in the early Republic were Spanish milled dollars, but there were also French louis and Portuguese, Spanish, and English gold coins. Each of the states also had its own coinage, and the various pieces were valued at varying rates.⁷³ To create order, the United States Mint was established in Philadelphia in 1792 to produce a decimal coinage in gold, silver, and copper for the new Republic. David Rittenhouse, recognized as the nation's foremost scientist and instrument-maker, was appointed its first superintendent. When the mint began operation it lacked not only the necessary machinery but even tools to build the machines. The only sources of power in the first mint buildings at Seventh and Filbert Streets were the muscles of men and of horses: a team of horses drove the rolling mill; men swinging a weighted

screw press stamped the coins.⁷⁴ In 1816, after a fire destroyed the old wooden mill house, a steam engine was purchased from Oliver Evans to drive the rolling and drawing machines. It was only after the mint's director, Samuel Moore, sent Franklin Peale abroad in 1833 to study European mints and refineries that the mint technology became mechanized. By that time the great age of the Philadelphia machine designers had dawned.⁷⁵

The federal government also maintained in Philadelphia a navy yard on the Delaware River at Southwark and two arsenals. The Navy Yard, for which the land was purchased in 1800–1801, was and remained important to the city's economy and to the development of American naval technology, although vessels were built also at other yards in Southwark and Kensington. The yard's two shiphouses, erected in 1821 and 1822 to protect the ways against the weather, were for half a century the largest, most conspicuous objects in and around the city. The Schuylkill Arsenal, constructed between 1802 and 1806, was primarily a storage depot. The Frankford Arsenal, established in 1816, was used both for storage and for the development and repair of military equipment. Mint, Navy Yard, and arsenals remained part of the fabric of Philadelphia. As the tempo and character of the times changed, so indeed did the activity and development of those federal institutions.⁷⁶

The industrial revolution, whose freight of human good and human ills no one could foresee, was underway. The change amounted to the invention of a new kind of city, for the industrial city, based on unprecedented forms and uses of energy and techniques of work, and successor to the maritime city of the eighteenth century, was a new kind of social organism. While some other of the older seaport cities faded away before the thrust of machines, Philadelphia exploited its natural advantages to survive. It had the necessary ingredients for success. Its geographical situation provided abundant water-power and easy access to coal and iron. Because Philadelphia was the financial center of the country, there was ample investment capital available at hand. There were also human resources; the city was the home of inventors and engineers like Latrobe, Wernwag, Evans, and White. It had escaped the curse of slavery; its labor was skilled, hard-working, and free. Mechanical aptitude and commercial experience combined to unlock the door for the expansion of industry and trade.

VIII

Philadelphia had a tradition of science and technology inherited from Franklin and Rittenhouse and embodied in the American Philosophical Society, in the early nineteenth century the leading scientific institution of North America. Thomas Jefferson, third president of the United States, was the third president of the society as the century opened. It met twice a month to hear reports and papers, the more important of which appeared in its internationally distributed *Proceedings*. The contents of the volume that appeared in 1817 evidenced the broad interests of the society: geology, geography, the archeological remains and customs of the American Indians, metallurgy,

mathematics, phonology, astronomy, anatomy, ichthyology, entomology, the vital statistics of the city of Philadelphia, and mechanical inventions. The society was living up to its full title, "for Promoting Useful Knowledge."

The role of the society in the life of the city was too general to be felt directly. Its influence arose rather from the fact that its members were not academic scholars and scientists; they were lawyers, merchants, physicians, farmers, clergymen, and publishers who combined their intellectual interests with busy and active careers. Meeting frequently and knowing each other well, they created a scientific community. Yet they were also diffused throughout the life of the city.⁷⁷

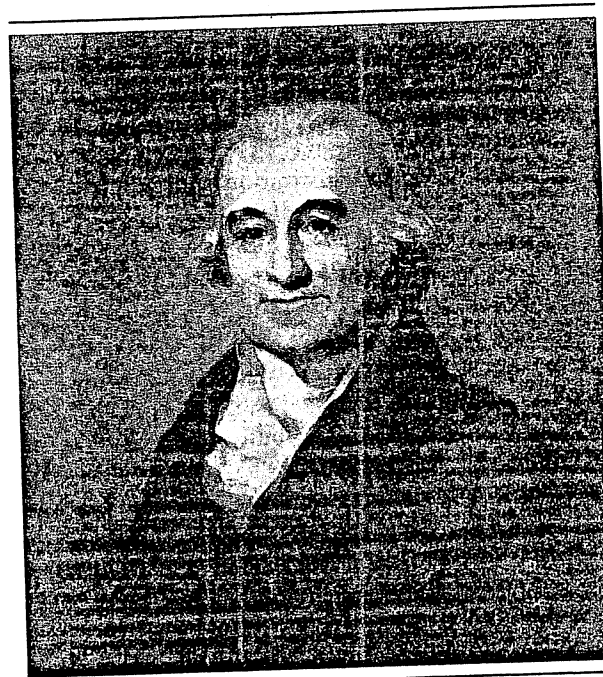
As the nineteenth century progressed the sciences developed by an ever-increasing degree of specialization. Other institutions were founded to pursue more concentrated fields of study and research, and the American Philosophical Society's role gradually changed. It became a national institution for honoring men of scholarly and scientific distinction and for promoting and disseminating the results of their work. But the age of the specialist had not yet altogether arrived; men were still catholic in their interests. The same men who were active in the American Philosophical Society were among the founders of the institutions that sprang up around it, and in some instances evolved from it: the Pennsylvania Academy of the Fine Arts (1805),⁷⁸ the Academy of Natural Sciences (1812),⁷⁹ the Athenaeum of Philadelphia (1814),⁸⁰ the Franklin Institute (1824),⁸¹ and the Historical Society of Pennsylvania (1824), as well as the innumerable societies for the improvement of personal and civic moral and economic good so characteristic of this period.

A brief mention of some of the American Philosophical Society's members and their activities suggests the influence and dynamism of the place and the time. William Maclure, properly called the founder of American geology, constructed the first geological map of the eastern United States.⁸² Benjamin Henry Latrobe, as an engineer, advanced the society's concern in internal improvements and trained the young men who built America's first railroads, and as an architect, left his impress throughout the nation.⁸³ Benjamin Smith Barton, with his *Elements of Botany* in 1813, Thomas Nuttall, who published his *Genera of North American Plants* in 1818, and John Torrey, whose *Flora of the Northern and Middle Sections of the United States* appeared in 1824, were among the botanists who made Philadelphia the American center of the study of that science.⁸⁴ The Lewis and Clark expedition and other subsequent government-sponsored exploratory and surveying ventures were supplied in and received their scientific briefings from the city's resources of men and equipment.

The fact that so many of these men working in Philadelphia have been honored as the "father" of one or another American science gives testimony to the intellectual creativity their milieu engendered. Thomas Say has been called the father of American entomology, but that title rightfully belongs to Frederick Valentin Melsheimer, whose *Catalogue of Insects of Pennsylvania* appeared in 1806.⁸⁵ There is no doubt that Alexander Wilson, a Scottish poet

and schoolmaster, made the first major contribution to American ornithology with his handsomely illustrated, nine-volume work issued in 1808-1813.⁸⁶ Scientific agriculture, economics, electricity, and other special fields all had their mentors and inventors.⁸⁷ There was even the beginning of the study of Indian linguistics with the important contributions of the lawyer Peter S. Du Ponceau, the Moravian missionary John Heckewelder, and the financial expert Albert Gallatin.⁸⁸

The leaders, however, of Philadelphia's intellectual—and to a great extent civic and social—life were and remained for years her physicians and her lawyers. It was a brilliant period for medicine. The distinction of the city's doctors lay more in their role as teachers and in their skillful and sympathetic practice than in medical discovery or research. The surgeon Philip Syng Physick, the anatomist Caspar Wistar, and the obstetrician William P. Dewees set high standards for their profession. John Redman Coxe compiled the earliest American pharmacopeia, and Franklin Bache, the great-grandson of Benjamin Franklin, building on his knowledge of chemistry, laid the foundations for both the official *United States Pharmacopeia* and the *United States Dispensatory*. The brilliant physician Nathaniel Chapman, later to become the first president of the American Medical Association, in 1820 founded



Caspar Wistar (1761-1818), painted by Thomas Sully (1783-1872) in 1830 after a portrait by Bass Otis (1784-1861), painted in 1817.

the *Philadelphia*—or, as it was later called, the *American—Journal of the Medical Sciences*, which was the most important American medical periodical of the period, and the forerunner of the association's own journal.⁸⁹

The most celebrated physician in America was the passionate reformer and stubborn medical theorist Benjamin Rush. His innovative treatment of the insane at the Pennsylvania Hospital and his book on the diseases of the mind, published in 1812, have obtained for him the accolade of being the founder of American psychiatry. Rush's greatest impact was as a teacher; dozens of the doctors who practiced medicine from New York to Georgia in the first half of the nineteenth century had received their training under him at the University of Pennsylvania's medical school. As a medical thinker, however, Rush was a builder of holistic systems in the manner of the medical past. The road to the future lay rather in the slow and patient study of pathologic anatomy, which was to be the achievement of other men.⁹⁰

The University of Pennsylvania did not long maintain its monopoly in the field of medical education. In a storm of professional hostility, the popular teacher Dr. George McClellan in 1825 founded another medical school, Jefferson Medical College. The preparation of medicines used by physicians had become at this time a separate professional skill. To train qualified druggists the Philadelphia College of Pharmacy was founded in 1821; four years later it published its own journal, which in 1835 became the *American Journal of Pharmacy*.⁹¹

Lawyers were even more ubiquitous in Philadelphia's life than the doctors. They seem to have been in everything but medicine. At this period the Philadelphia lawyer was often a man of erudition, frequently of a philosophic mind. He took the lead in founding institutions and working for civic betterment. Whether one reads the writings of lawyers in *The Port Folio*, in the *Proceedings of the American Philosophical Society*, in the scores of addresses given on anniversaries and other celebrative occasions, or in the reports and decisions of the Supreme Court of Pennsylvania, one is struck by the amount of vigorous thinking that went on—and the voluminous flow of words.

The role of the judge and the lawyer in a new nation that had passed through revolution and was in the process of establishing a new form of government was one of great responsibility. Edward Shippen, Thomas McKean, and William Tilghman (successive chief justices of Pennsylvania), Richard Peters (who served on the District Court of Eastern Pennsylvania for thirty-six years), and Bushrod Washington (who, since the United States Supreme Court then rode circuit, spent much of his judicial career in Philadelphia, where he died), were among the jurists who gave dignity and strength to state and federal high courts at a critical period of American history. The federal bar before the Supreme Court was then almost a monopoly of Philadelphia, Maryland, and Virginia lawyers.

The leaders of the local bar, Jared Ingersoll and his two sons Charles J. and Joseph R., Joseph Hopkinson, William Rawle, John Sergeant, and Horace Binney set a tone of dignity, learning, and urbanity. Most of the city's lawyers, representative of the conservative mercantile class, were Federalists

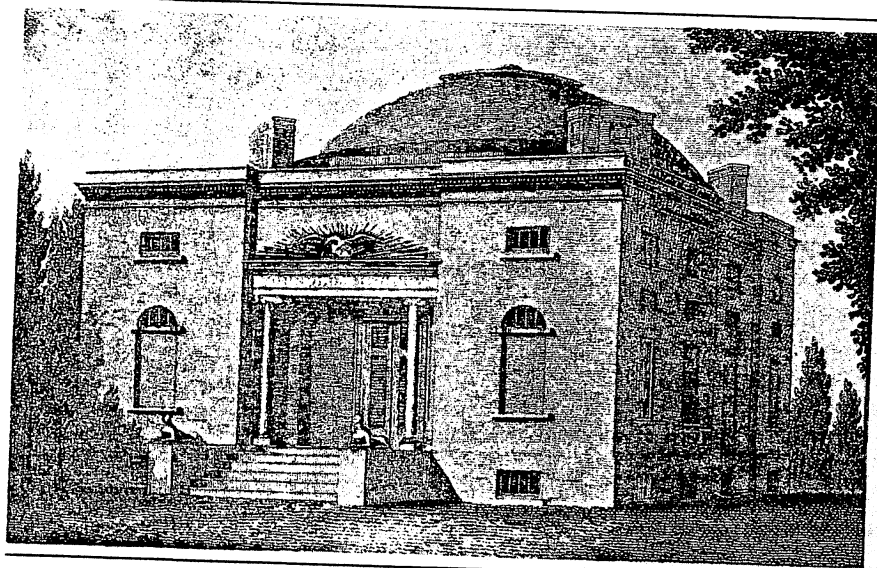
but the leading Democrats, Alexander James Dallas, Charles J. Ingersoll, Richard Rush, and Peter S. Du Ponceau, were also in the upper stratum of society, well born and well educated. The dignity of the law is always vital, but its competence and stature at this time made an important contribution to the new Republic's stability and order.⁹²

I X

In the arts, imagination sometimes turns toward nature and the normal experience all men share; at other times it coils inward to a private world of fantasy and dream. In the neoclassic period of the early nineteenth century the arts were outward-looking, based—as were medicine and law—on disciplined knowledge. Arts and sciences were related in their interests. Charles Willson Peale, a gifted portrait painter, provides an example of this interrelation; his museum has been called the first significant natural history museum in North America. When the offices of the government moved out of the State House, Peale got permission to move his museum into its second floor. In the long room where once banquets were held and official receptions given, above the cases containing habitat groups of animals, birds, fishes, and insects, he hung a double row of portraits from his own brush. They represented man in the great order of nature. They were also his own record of the men, his contemporaries and friends, who had led the country in the struggle for independence and the creation of the Republic. The museum's collections were dispersed in mid-century, but many of the portraits were acquired by the City of Philadelphia and long remained in Independence Hall. Now part of the National Historical Park collection, they are a unique historical record of the age.⁹³

In 1805 the city acquired another museum. Joseph Allen Smith of South Carolina, the first American to form a collection of art in Italy, offered Philadelphia an assemblage of engravings, paintings, gems, and cameos, as well as a number of carefully made casts of classical sculpture. He considered the city the best location in America for the encouragement of artistic taste.⁹⁴ To accept the gift, a group of citizens organized the Pennsylvania Academy of the Fine Arts, with the elderly banker George Clymer, a signer of the Declaration of Independence, as its president. To house the gift, an elegant little classical building was erected on the north side of Chestnut Street above Tenth. Nicholas Biddle, in Paris as secretary to the American minister, purchased additional casts of classical statues with the advice of the famous sculptor Jean Antoine Houdon. There was some difficulty with the artists of Philadelphia, who considered that an academy was for artists rather than laymen, but under the leadership of Joseph Hopkinson, the second president of the academy, a *modus vivendi* was found. An annual exhibition for artists on the model of the Royal Academy in London began in 1811, and an art school was established. The Academy of the Fine Arts, still in existence both as a museum and a school, is the oldest museum and school in America and among the oldest in the world.⁹⁵

The largest and most vital group of American artists was then in Philadel-



The Pennsylvania Academy of the Fine Arts, designed by John Dorsey (c. 1759–1821), built 1805, burned 1845. Engraving from The Port Folio (June 1809).

LIBRARY COMPANY OF PHILADELPHIA

phia: painters, sculptors, and a large number of engravers, whose role was then more significant than it is today. Their interests were in man and his world and in nature; there was little of the historical retrospection that absorbed so many European artists. It was a great age of portrait painting. Gilbert Stuart, who had been in Philadelphia since 1794, left in 1802; Charles Willson Peale was absorbed in his museum and left portraiture to other members of his family. This opened that popular field to a new generation of which Thomas Sully, Bass Otis, Rembrandt Peale, and Jacob Eichholtz of Lancaster were the leaders. In two exhibitions sponsored by the Society of Artists of the United States, held in the academy in 1811 and 1812, artists from other cities joined local painters. The major themes of American art were enunciated in these exhibitions. There were portraits in oil and miniatures by many artists. There were landscapes and city views by William Russell Birch, William Strickland, and John J. Barralet; genre scenes by John Lewis Krimmel; monumental and portrait sculpture by William Rush; and still-life paintings by the American pioneers of that charming form, James and Raphaelle Peale. The earliest painter of the wild landscape of America, one of the dominant romantic themes of nineteenth-century painting, was Thomas Doughty, a Philadelphian, who first exhibited in 1816. This was a vigorous and distinguished period.⁹⁶

Engraving was then a highly skilled form closely related to the art of

painting, of which it was a delightful and relevant extension. The century began with one of its most attractive landmarks: William Russell Birch's volume of engraved plates, usually hand-colored, celebrating the beauty of Philadelphia, its buildings, streets, and port. Birch followed this in 1808–1809 with a smaller second volume, *The Country Seats of the United States*. The two form a most appealing record of the eighteenth-century city and its environs.⁹⁷ Engraving on copper was the technique most in use before the War of 1812. Birch used it, as did other engravers such as Alexander Lawson, who did the plates for Alexander Wilson's ornithology, and David Edwin, whose portrait engravings played a significant role in elevating the standard of book illustration. Relying on the freer and somewhat less demanding method of etching, William Charles, an immigrant from England, issued a number of wartime cartoons and a host of charming illustrations for children's books. Aquatinting was introduced in America after the war by W. J. Bennett and John Hill, also transplanted Englishmen. With a compatriot, Joshua Shaw, Hill produced a portfolio of aquatints, *Picturesque Views of American Scenery*, issued in Philadelphia in 1820–1821, which was a landmark in the dawning appreciation of the natural beauty of the American continent. To round out the printmaking techniques that took root and flourished in the city, Bass Otis in 1818 made the first American lithograph as an illustration in the *Analectic Magazine*.⁹⁸

The census of 1820, taken during a major depression, listed by city only ten industries in the entire country whose annual sales exceeded \$100,000. One of these was book publishing in Philadelphia, among the city's oldest industries. All the elements for the making of books were locally available: the Gilpin mill on the Brandywine produced high-quality woven paper; Binny and Ronaldson's foundry cast a full selection of the modish boldface type, with appropriate ornaments; Adam Ramage had his improved cast-iron press manufactured at Evans's Mars Iron Works. Joseph Hopkinson, in an 1810 address reviewing the state of the arts in Philadelphia, found the best augury for their future in the astonishing advances made by the city's printers and booksellers.⁹⁹ Looking back twenty-five years to the close of the War of Independence, he pointed out that in 1786 the whole book production of the city had been no more than 500 octavo volumes. By 1810 it had increased to at least 500,000 volumes, and possibly twice that number. In 1786, he said, four leading booksellers had hesitated a long time before combining to issue a small school edition of the New Testament in 3000 copies. Its success was such that four years later Dobson boldly undertook the first American edition of the *Encyclopaedia Britannica*, issued in 1790–1802 in twenty-two quarto volumes, with 542 copper plates.¹⁰⁰

There were many notable publishing projects in these years. In 1804–1805 Caleb P. Wayne issued John Marshall's *Life of Washington* in five volumes. When C. and A. Conrad, with the financial backing of Robert Fulton, put out Joel Barlow's patriotic epic poem *The Columbiad* in 1807, they were ambitious to show that an American publisher could produce a sumptuously beautiful

book. This they did, although they were obliged to use plates engraved in London. In publishing Wilson's *American Ornithology*, Samuel Bradford in the preface to the second volume noted: "Hitherto the whole materials and mechanical parts of this publication have been the production of the United States, except the colors." Advances in chemistry were overcoming this exception, and Bradford congratulated himself particularly upon a yellow "from the laboratory of Messrs. Peale and Son, of the Museum of this city."¹⁰¹ National pride thus extended to every ingredient of the handsome set: paper, ink, colors, type, and presswork. Bradford also brought out an American edition of Rees's *Cyclopaedia; or Universal Dictionary of Arts, Sciences and Literature*, with American additions and emendations, in forty-one volumes of text and six of plates, which appeared in parts from 1810 to 1822.¹⁰² Such projects attracted to the city numbers of printers and engravers. They seem to one glancing through the directories of the period only a little less numerous than merchants and sailors.

The most influential publisher in Philadelphia was the Irishman Mathew Carey, who developed a well-organized network of booksellers, particularly in the South and West, to distribute his books. Bibles were among his stock in trade, and the type of the "standing Bible" of 1801—30,000 pounds of metal—was kept standing for successive editions. Carey was a man of great energy and enterprise, of an inquiring mind and generous impulse. He was also a prolific and effective propagandist for political and economic causes. The *Olive Branch*, his appeal in 1814 to the good sense of both Federalists and Democrats to lay aside their differences during the war with Great Britain, went through ten editions.

Such an active mind was naturally drawn to the economic problems of his city. In 1810 he was one of the Democrats who supported the renewal of the charter of the first Bank of the United States. After the war Carey, originally a free trader, saw the city's industries overwhelmed by a flood of imported goods. He changed his point of view. In the *New Olive Branch* in 1820, *Essays on Political Economy* two years later, and numerous pamphlets, he made himself the spokesman for a combination of ideas new in American thought. He advocated tariff protection for American industries, internal improvements publicly financed, and a strong banking system to maintain a supply of credit. Carried into national politics as "the American System" by Henry Clay, Carey's ideas became the program of the new Whig party. Public spirited, charitable, and concerned, he left his mark on the life of the city in many ways.¹⁰³

Carey's *American Museum* had been a successful, if short-lived, periodical before 1800. The new century saw Philadelphia become the center of magazine publishing in the United States. The first major continuing literary and critical journal on the continent, *The Port Folio*, began publication on January 3, 1801. It owed its initial success to the editorial skill and strong personality of its first editor, Joseph Dennie, a transplanted New Englander who, according to the inscription by Nicholas Biddle on his tombstone in St. Peter's

Churchyard, "devoted his life to the literature of his country." The professional literary man was a rarity in the first decades of the 1800s, but Dennie was one. A dandy and a bon vivant, a stout conservative in domestic politics and supporter of Great Britain in foreign affairs, the editor gathered about him a coterie of bright young men known as the Tuesday Club, which met initially at the bookshop of the Methodist publisher Asbury Dickins. Most of the members of the club were lawyers or doctors. One of them, Charles Brockden Brown, was a pioneer American novelist.¹⁰⁴

In 1812 another influential periodical appeared, the *Analectic Magazine*, which Washington Irving edited in 1813-1814. The magazine was well illustrated, with many excellent portrait engravings, and in July 1818, as has been mentioned, carried the first lithograph made in America. Its contributors, like those of *The Port Folio*, were chiefly young lawyers and doctors for whom literature was an avocation.¹⁰⁵

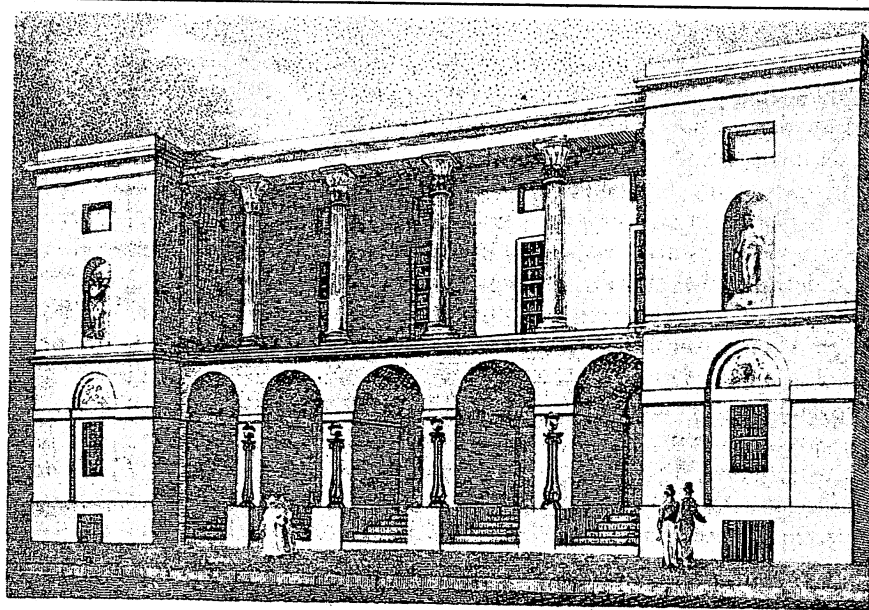
Another aspect of Philadelphia's publishing industry had been, was, and remained its excellent and important newspapers. In addition to the two Democratic papers, the *Aurora* and *Democratic Press*, there were others that supported the political conservatives, of which the chief were the *United States Gazette* edited by Enos Bronson, and *Poulson's Advertiser*. The latter was published by Zachariah Poulson, Jr., who had purchased Claypoole's *American Daily Advertiser* in 1800. Poulson, longtime librarian of the Library Company and active in many civic and humanitarian causes, reflected the quiet, benevolent commonsense conservatism of the Quaker community.¹⁰⁶

The Quakers had long looked upon the stage as an abomination. Nonetheless the theater flourished in the city. It was closely linked to England; most of the plays produced were by English authors, and there was a constant coming and going of London stage companies in Philadelphia and New York. Actors like George Frederick Cooke, Thomas Abthorpe Cooper, Edmund Kean, and others made American tours, or, like Junius Brutus Booth, settled in America and founded a theatrical dynasty on this side of the ocean.

The principal playhouse in Philadelphia at this time was the Chestnut Street Theatre, on the north side of Chestnut Street above Sixth, a Palladian building modeled on the theater in Bath. From 1810 the theater was under the management of William Warren and William B. Wood, the most enterprising entrepreneurs of the American theatrical world. The old Southwark Theatre of the 1760s was in occasional use, and Ricketts's Circus on Fifth Street below Market still offered equestrian performances. In 1809 a new company of equestrians headed by Victor Pepin and John Breschard built another circus at Ninth and Walnut Streets. Enlarged in 1811, with a stage added, the building was rechristened the Olympic Theatre; now known as the Walnut Street Theatre, it is said to be the oldest in the English-speaking world that has remained in use for stage performances. In addition to the playhouses there were popular places of amusement like Vauxhall Garden, opened in 1814 at the northeast corner of Broad and Walnut Streets, and Columbian Garden, on Market Street between Thirteenth and Centre Square, where refreshments

were served, with music and singing on a stage as complimentary attractions. Smaller theaters were opened in converted buildings from time to time, but had only a brief life. The Chestnut Street Theatre remained the best house, offering the best plays with the most competent actors and drawing the most distinguished audiences. When it burned in 1820, it was rebuilt on the same site in 1822 after a design by William Strickland, with the new splendor of gas lighting.¹⁰⁷

Philadelphia also had an active musical life. Music can be said to have emerged from an amateur to a professional level in the period 1795–1825. The most influential of a group of well-trained and versatile musicians who emigrated to the city was Benjamin Carr. He was a performer, composer of orchestral pieces, music publisher, and proprietor of a music store. With its large publishing industry, it is not surprising that Philadelphia led in the publication of sheet music. Carr, George Willig, and Michael Hillegas were prominent in the business, but publishers like James Aitken, Robert Shaw, and Mathew Carey also issued music. In such a musically aware milieu it was inevitable that the manufacture of pianos—America's main musical industry in the nineteenth century—should have become centered in the city, with Charles Albrecht, Charles Taws, John T. Hawkins, and Thomas Loud the leading makers. To Taws and Hawkins together in 1800 is credited the inven-



The New Theatre in Chesnut Street Philadelphia, engraving by William Birch (1755–1834), 1823. Designed by William Strickland (1788–1854), this, the second Chestnut Street Theatre, was demolished in 1856.

PHILADELPHIA MUSEUM OF ART

tion of the upright piano, which did much to make the instrument popular in private homes.

A series of small string ensembles meeting in homes during the years 1816–1820 led to the founding in 1820 of the Musical Fund Society, which remained the center of musical life until the Civil War. It was created to meet two needs: to offer concerts, and to raise funds “for relief and support of decayed musicians and their families.” For a few years its concerts were given in Washington Hall, the Chestnut Street Theatre, and St. Stephen’s Church. In 1824 the society bought a church in the 800 block of Locust Street and engaged William Strickland to remodel it. Musical Fund Hall proved to be so acoustically perfect that it was the favorite auditorium of the city until the erection of the present Academy of Music.¹⁰⁸

X

While the life of Philadelphia was changing, growing, and becoming richer in content, the city itself was being remade architecturally. Two modes of building were simultaneously at work. The first was that of the master builder, trained by apprenticeship in the traditional eighteenth-century Philadelphia style of construction—brick exterior walls with wooden interior frame and roof. In the new century the master builders continued to serve the city well, providing the quiet dignity of the brick residential town, much of which still survives between Front and Tenth Streets. An early outstanding example of this manner is the central building of the Pennsylvania Hospital, completed in 1805 from the design of David Evans, Jr. The exterior design may be a little flat, but within, the slender, airy elegance of the double staircase shows what grace this traditional mode could achieve.¹⁰⁹

About the same time William Sansom, a Quaker philanthropist and builder of artistic taste, bought the block from Seventh to Eighth Streets on Walnut where Robert Morris’s “folly” had been left unfinished. There, on the north side of Walnut Street he erected Sansom’s Union Row, and on the south side of the newly cut Sansom Street Thomas Carstairs built his row. They introduced into the city block-long rows of houses, planned as a unit, such as had earlier been erected in the crescents and squares of London, Bath, and Dublin. These rows were a novelty in America, and when built elsewhere in the country such units were known as “Philadelphia rows.”¹¹⁰ Alterations have since almost obliterated Sansom’s buildings, although one or two of them, now devoted to business, retain nearly their original exteriors. The dignity and elegance given the city by these long architectural units can still be seen in Stephen Girard’s later row construction on Spruce Street between Third and Fourth, and elsewhere to the west on Spruce and Pine Streets.

While the master builder was creating a red city of brick, a new kind of construction appeared. The local blue-toned Schuylkill marble varied the pattern. In interiors, marble fireplaces and mantels, appropriate in scale to larger rooms and higher ceilings, took the place of carved wooden ones in the homes of the new city.¹¹¹ In public view, Benjamin Henry Latrobe inaugu-

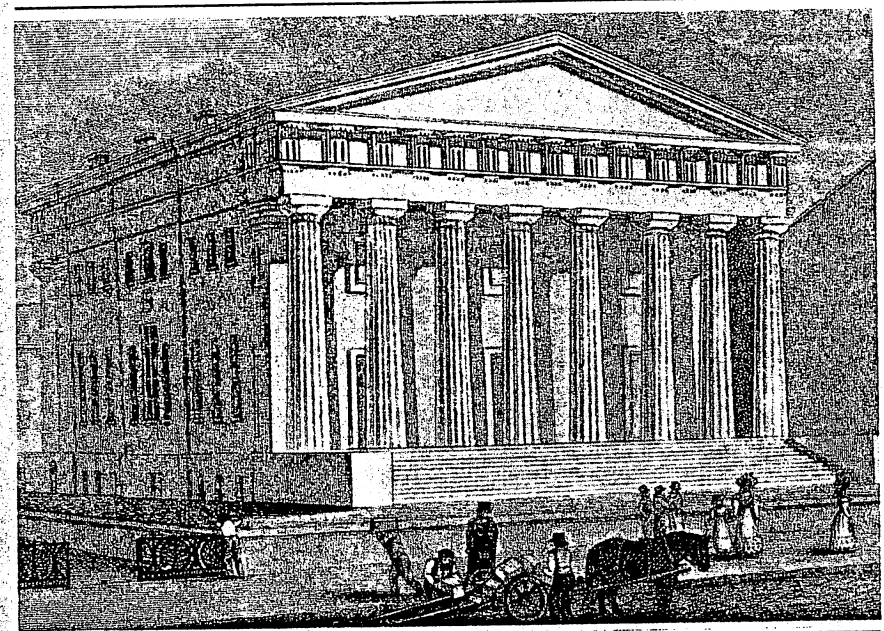
rated the new style. A well-trained professional architect, he had come to Philadelphia from London in the late 1790s, and through his own work and that of his pupils effected a fundamental change in building design. His Bank of Pennsylvania, on the west side of Second Street above Walnut, built in 1799–1801 and demolished in 1865, initiated what is called, somewhat misleadingly, the Greek Revival in American architecture. The bank building was of white marble, with a Greek Ionic temple portico facing Second Street and a similar portico in the rear. The banking room inside was a large rotunda, covered by a low marble dome crowned by a graceful lantern. Although some refined classical ornament was used in columns and moldings, the building was unlike any Greek structure. The large simplicity of the design, its spacious interior, and its unity foreshadowed a new national style. The men who created it—on occasion using Gothic ornament as well as Greek detail—were at the same time engineers who built canals, breakwaters, and bridges. The use of masonry arches and vaults was as characteristic of their work as was the classical portico.¹¹²

Shortly after the beginning of the new century President Jefferson appointed Latrobe the architect of the Capitol in Washington, and thereafter his career lay outside Philadelphia. His pupils, Robert Mills and William Strickland, and the London-trained John Haviland, continued what he had begun. James Traquair, who emigrated from Greenock, Scotland, in 1784, bringing with him the disciplined skill of the Scottish stonemason, was the first of the master stonecutters capable of carrying out the new designs.¹¹³ He was succeeded by John Struthers, who executed most of Strickland's buildings.

Robert Mills was the most important architect working in the city from the time Latrobe left in 1802 until his own departure for Washington twelve years later. His construction was notable for its large scale and solidity. He created an auditorium-type structure for the Sansom Street Baptist Church in 1808, and the Octagon Unitarian Church on the northeast corner of Tenth and Locust in 1813. Washington Hall, on the west side of Third Street above Spruce, completed from his designs in 1816, gave the city an auditorium capable of holding 6000 people. But all these buildings have disappeared, and Mills's achievements can be seen today best in Washington and Charleston.¹¹⁴

John Haviland was trained in London as Latrobe had been. He came to Philadelphia in 1816, apparently planning to establish a school of architectural drawing with the artist Hugh Bridport. Together in 1818–1821 they published the three-volume *Builder's Assistant*, a work that made the Greek orders available for the first time in an American design book. Haviland, however, became immediately involved in practice rather than theory, and he showed himself a designer of originality and power. His major surviving works were executed after 1825.¹¹⁵

The fourth man to make Philadelphia the center of the new American architecture was William Strickland. He studied under Latrobe, but then earned his living for some years as an illustrator, drawing street views and scenes to be engraved. He began his long and fruitful career as an architect



The Second Bank of the United States, designed by William Strickland (1788–1854), engraving published by Cephas Grier Childs (1829). The building, part of Independence National Historical Park, now houses a portrait and special exhibitions gallery.

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by winning, as his first major commission, the most important building project of the decade, the second Bank of the United States. It has been said that Nicholas Biddle, who had fallen in love with Greek temple architecture on a visit to Greece in 1806, used his influence as a director of the bank in favor of the Greek temple design submitted by the relatively untried young man. Unlike most of the buildings that have been mentioned, the second Bank of the United States still stands, on Chestnut Street between Fourth and Fifth. An English critic of the 1830s wrote that it “excells in elegance and equals in utility, the edifice, not only of the Bank of England, but of any banking house in the world.” Even today this Greek temple, with its two fronts facing north and south, stands out strikingly from its surroundings. When it was built in 1819–1824 its eight massive white marble columns on each front and its monumental unity of design must have been astonishingly novel. The dignity given by the weight of heavy masonry was one source of its effect; another was the changing patterns of sunlight and shadow upon deeply carved white marble. In the main banking room with its barrel vault overhead and a rank of marble pillars—between which were the tellers’ desks—along either side, Strickland achieved unity and grandeur.¹¹⁶

There was one bold project in these years that was never realized. In 1820 Paul Beck, merchant and philanthropist, proposed that the city acquire all the land along the Delaware River from South Street to Vine and clear away the congestion of waterfront buildings and narrow alleys which were believed to be the breeding place of yellow fever. He engaged Strickland to draw a plan for rebuilding from Front Street east to a new avenue along the river. The planner's estimate of the cost was \$3,651,000. It was the first ambitious essay in city planning for Philadelphia since Penn's original design. The plan was blocked, partly, it was said, by the opposition of Stephen Girard; but when Girard wrote his will twelve years later, he left a legacy of half a million dollars to the city for the purpose of cutting a wide street along the Delaware.¹¹⁷

The impulse to improve and beautify the city, to transform it from brick to marble, would have made greater progress in the first quarter of the nineteenth century had not business conditions been so troubled. Architecture is closely related to economic life. The successive trade catastrophes of the embargo, the war, and the postwar depression postponed the greater part of the rebuilding of the city until the years after 1825.

X I

European visitors in the preceding century had been astonished to see so many religions living peacefully together in Pennsylvania. In the new century most denominations grew in numbers, and many new churches were built as the city expanded from one river toward the other. The great issues which had arisen in the past and would arise again were not, in these years, disruptive factors. To be sure, the German churches were troubled by the language controversy. The Roman Catholics were divided by a dispute over the control of church properties—the Hogan schism, or the trusteeship controversy, during which the bishop was for twenty years locked out of his own cathedral, St. Mary's, and withdrew to St. Joseph's. But the memorable religious achievement of the period was the creation of the black churches. It was in the churches that the black population of Philadelphia first had opportunity to develop its own leaders and create its own institutions.

In the census of 1790 fewer than 300 slaves remained in Pennsylvania; in the census of 1820 there were only three in the city and four in the northern suburbs, but there were 7579 free Negroes. Absalom Jones and Richard Allen, who had helped Girard as volunteers during the yellow fever epidemic of 1793,¹¹⁸ had established the first two black churches in the city. Jones became the first Negro rector of an Episcopal church. By 1809 there were five black churches whose ministers, it is said, constituted the first Negro clergy in America: St. Thomas (Episcopal), founded by Jones; Bethel (Methodist), established by Allen and the parent church of the African Methodists who separated from the white Methodists in 1816; Zoar (Methodist), a mission of Methodist St. George's; Central (Presbyterian); and the African Baptist. The erection of these churches, destined to exert a mighty influence not only

religious but social and educational upon the black people of America, was one of the original and significant achievements of the time.

There was the small beginning of a black middle class, even of wealth. James Forten made a fortune as owner of a sail loft and spent the greater part of it in buying the freedom of other Negroes and on charities for his people. Other men acquired ample means and reputation in the catering business, which became a black specialty. Robert Bogle had a celebrated catering establishment on Eighth Street near Sansom, and Peter Augustin in 1818 started a second firm which made Philadelphia catering famous throughout the country. The best and most elegant service of food at balls and parties was provided by black business.

There had been little racial friction in eighteenth-century Philadelphia and great hopes were held for the future of the black population. Following the War of 1812, as the city became a magnet for poor and untrained Negroes from the South and at the same time for poor and untrained white immigrants from Europe, competition for jobs between the two produced increasing racial bitterness and tension. The relations between the races were worse in 1825 than in 1800; they would continue to deteriorate.¹¹⁹

X I I

Growing pains were inevitable. In the first quarter of the nineteenth century Philadelphia was the metropolis of what was swiftly becoming the great industrial state of the nation. One source of its strength, as has been noted, was an abundant supply of capital. Yet as the city grew it passed through a series of severe financial and business crises—the embargo, the War of 1812 and the naval blockade of the Delaware, the panic of 1814 when every bank south of New England suspended specie payments, and postwar hard times culminating in a severe depression in 1819–1820. These troubles affected every aspect of the city's life and underlay the fluctuations of all its activities.

Although in 1800 Philadelphia was the financial center of the country, it had in the early years only three banks: the first Bank of the United States, which had a federal charter and a national purpose; and two state-chartered institutions, the Bank of North America and the Bank of Pennsylvania, which latter in a large degree was a state agency.¹²⁰ Thomas Willing, the head of one of the city's most prosperous mercantile firms, was president of the Bank of the United States, and his son-in-law, the former United States senator William Bingham, was its most influential director. By 1824 there were eight chartered banks in addition to the second Bank of the United States, of which Nicholas Biddle was the president. In 1800, however, financial institutions did not play the same role that they do today. Investments, loans, and the sale or mortgage of real estate were largely direct transactions between individuals. Lotteries were a common method of raising funds for every purpose from building a church to paving a road. Commercial banking and, still more so, investment banking were unorganized.¹²¹

The needs of homeowners had created fire insurance companies, and the

needs of merchants and shipowners had created marine insurance companies, long before the chartered bank appeared. In 1816 the first bank for savings in the country, the Philadelphia Saving Fund Society, was organized. There were also private banking houses that assisted merchants in their foreign trading: Thomas Biddle, Alexander Brown and Sons, and Stephen Girard.¹²²

But banks were neither understood nor trusted. The Bank of the United States had been founded when Alexander Hamilton was secretary of the treasury to help finance the operation of the federal government and stabilize its new currency. It had served its purpose well; yet when the renewal of its charter came before Congress in 1810, and was strongly recommended by Albert Gallatin, secretary of the treasury, Congress refused to renew it. During the War of 1812 the state banks financed the government, but the panic of 1814 brought a general suspension of specie payments. To find a way out of the financial confusion, Alexander James Dallas of Philadelphia, then secretary of the treasury, proposed to charter a second Bank of the United States to deal with the problem on a national basis. It was chartered in 1816 and went into operation the following year, but this bank too was strongly opposed both in Congress and out by those who believed in hard money and states' rights.¹²³

With the coming of peace, American exports sank and European imports poured into the country. The nation's balance of trade was upset and the reserves of state banks ran down. When the banks after 1817 tried to call in their paper and return to specie payment, the great depression of 1819 resulted. Banknote circulation dropped from \$110 million to \$45 million. "The whole country was involved in one universal scene of distress and ruin," wrote a Philadelphia merchant.¹²⁴ *Niles' Weekly Register* reported in August 1819, "It is estimated that there are 20,000 persons *daily seeking* work in Philadelphia."¹²⁵ A year later, a director of the Bank of the United States wrote to a London colleague:

Houses which rented for 1,200 dollars, now rent for 450 dollars. Fuel which cost 12 dollars, now costs 5-1/2 dollars—flour which was 10 and 11 dollars, is now 4-1/2; beef 25 cents, now 8 cents—other things in proportion. . . . The farmer is become as poor as a rat—the labor of the farm costs him more than the produce is worth. He cannot pay the storekeeper, and the storekeeper cannot pay the merchant.¹²⁶

When Nicholas Biddle became president of the second Bank of the United States in 1823, he reversed the tight-credit policy of his predecessor and recovery followed slowly.

In the quarter century 1800–1824, beset with difficulties and distresses, the people of Philadelphia accomplished remarkable things. They created the institutions and laid the foundations for the great scientific and industrial city that was to come. While doing so, they reached a higher level of intellectual and artistic life than any other city of the United States. Gilbert Stuart, after

he removed to Boston, liked to remember this, and used to begin his anecdotes with "When I resided in the Athens of America."¹²⁷

Exiles from the great convulsions of the Napoleonic Wars gravitated to the city—the vicomte de Noailles, the duc d'Orléans, Général Moreau, Joseph Bonaparte and Charles Lucien Bonaparte, Achille and Napoléon Murat, and the former Empress Itúrbide of Mexico. Life was agreeable and interesting; the location, halfway between New York and Washington, was convenient. Joseph Bonaparte's house and park, Point Breeze, near Bordentown, was filled with great works of art; it housed the country's first major art collection, dispersed in the 1840s. The count de Survilliers, as the one-time king of Spain called himself in exile, spent his winters in Philadelphia. One catches a pleasant glimpse of him walking on a Sunday morning to St. Joseph's Roman Catholic Church in Willing's Alley where he occupied a high-walled, old-fashioned pew, accompanied by his two children and a huge Newfoundland dog.¹²⁸ Both he and Charles Lucien Bonaparte, prince of Canino and Musignano, were members of the American Philosophical Society. Joseph presented a Greek kylix or drinking cup to its collections.¹²⁹ Charles Lucien, a naturalist, devoted himself to the preparation of a supplement to Wilson's ornithology, which appeared in 1825–1833. A new species which he described, the smallest and prettiest of the gulls, called after him Bonaparte's gull, is still commonly seen in spring and fall along the reedy shores of the Delaware.

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37. Edward P. Allinson and Boies Penrose, *Philadelphia, 1681-1887: A History of Municipal Development*, Johns Hopkins University Studies in Historical and Political Science (Philadelphia: Allen, Lane and Scott, 1887); Scharf and Westcott, *History of Philadelphia*, passim.
38. Allinson and Penrose, *Philadelphia . . . Municipal Development*, pp. 100-10.
39. Scharf and Westcott, *History of Philadelphia*, 1:551.
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41. Edward Potts Cheyney, *A History of the University of Pennsylvania, 1740-1940* (Philadelphia: University of Pennsylvania Press, 1940), p. 186.
42. Scharf and Westcott, *History of Philadelphia*, 3:1925.
43. Edwin Wolf 2nd and Maxwell Whiteman, *The History of the Jews of Philadelphia from Colonial Times to the Age of Jackson* (Philadelphia: Jewish Publication Society of America, 1957), p. 333; Scharf and Westcott, *History of Philadelphia*, 1:501, 514.
44. Louise Gilchrist Walsh and Matthew John Walsh, *History and Organization of Education in Pennsylvania* (Indiana, Penna.: R. S. Grosse, 1930), p. 122.
45. *Ibid.*, pp. 94 ff.
46. *Ibid.*, pp. 101-3, 104.
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48. Theo B. White et al., *Philadelphia Architecture in the Nineteenth Century* (Philadelphia: University of Pennsylvania Press, 1953), p. 22, plate 2; George B. Tatum, *Penn's Great Town: 250 Years of Philadelphia Architecture, Illustrated in Prints and Drawings* (Philadelphia: University of Pennsylvania Press, 1961), pp. 57, 167, plates 40, 41; Fritz Redlich, "The Philadelphia Waterworks in Relation to the Industrial Revolution in the United States," *PMHB* 69 (April 1945): 243.
49. There is dispute about where credit is owed for the ideas and innovations decisive for the success of the waterworks. Thomas Gilpin, "Fairmount Dam and Water Works, Philadelphia," *PMHB* 37 (Oct. 1913): 471-79, gives credit to Joseph S. Lewis for the shift from steam to hydraulic power, as does the long inscription on Lewis's tomb in Laurel Hill Cemetery. Lewis was president of the Watering Committee. Gilpin also gives the credit for the design and construction of the dam and waterwheels to the millwright Thomas Oakes. The author of Lewis Wernwag's biography in Appletons' *Cyclopaedia of American Biography*, 6:437 (who was probably Col. Josiah Granville Leach), says that the dam and waterworks "were erected in accordance with his [Wernwag's] plans." But see the Reports of the Watering Committee; also Scharf and Westcott, *History of Philadelphia*, 1:560, 605; Allinson and Penrose, *Philadelphia . . . Municipal Development*; and the biography of Graft by Horatio Gates Jones in Appletons' *Cyclopaedia of American Biography*, 2:700. For Graft's technical innovations, see *The Engineering Drawings of Benjamin Henry Latrobe*, edited by Darwin H. Stapleton, Maryland Historical Society Publication no. 53 (New Haven, Conn.: Yale University Press, 1980), pp. 196-98, for illustration of Graft's hydrant and stopcocks adopted by Latrobe for the New Orleans water system.
50. Scharf and Westcott, *History of Philadelphia*, 1:530; Allinson and Penrose, *Philadelphia . . . Municipal Development*.
51. *Hazard's Register* 1 (1828): 298-99.
52. Scharf and Westcott, *History of Philadelphia*, 3:2141; Charles E. Peterson, "Iron in Early American Roofs," *Smithsonian Journal of History* 3 (Winter 1968): 48-50.
53. *Report of the Patent-Office, February 22, 1805* (covering patents issued 1790-1804), "Number 148. Improvement in Bridges," Jan. 21, 1797.
54. Scharf and Westcott, *History of Philadelphia*, 3:2142; *United States Gazette*, no. 4185, Jan. 22, 1806, p. 3.
55. Scharf and Westcott, *History of Philadelphia*, 1:524; Peterson, "Iron in Early American Roofs," pp. 51-52.
56. [Col. Josiah Granville Leach,] "Lewis Wernwag," Appletons' *Cyclopaedia of American Biography*, 6:437.
57. Mill Creek in West Philadelphia, Falls Run, Cohocksink Creek, and Gunner's Run all provided valuable mill sites, but like the once-useful tributaries of Frankford Creek they have all disappeared.
58. Hagner, *Early History of the Falls of Schuylkill*, p. 32.
59. Scharf and Westcott, *History of Philadelphia*, 1:515. The role of waterpower in the growth of the city's manufacturing is not a well-understood phenomenon. The contributors to the chapter on manufacturing in Gilchrist, ed., *The Growth of Seaport Cities* (1967), assumed without discussion that Philadelphia, like Boston, New York, and Charleston, lacked waterpower. The simple observation of the countryside, old maps, and local histories like Scharf and Westcott or Hagner's history of Manayunk shows how erroneous this assumption is. Baltimore also had waterpower but did not exploit it as did Philadelphia. R. Malcolm Kerr, "Causes for the Growth of Philadelphia as an Industrial Center," *Bulletin*

- of the *Geographical Society of Philadelphia* 13 (July 1915): 101, says there were fifteen creeks in the vicinity of the city developed for their waterpower.
60. Scharf and Westcott, *History of Philadelphia*, 1:522.
61. *Aurora*, Nov. 15, 1808.
62. *Ibid.*, Nov. 22, 1808.
63. Sam Bass Warner, Jr., "Innovation and Industrialization of Philadelphia, 1800-1850," in Handlin and Burchard, eds., *The Historian and the City*, pp. 63-69; Ian M. G. Quimby, "The Cordwainers Protest," *Winterthur Portfolio: A Journal of American Material Culture* 3 (1967): 83-101.
64. Hagner, *Early History of the Falls of Schuylkill*, p. 43.
65. Henry Simpson, *The Lives of Eminent Philadelphians, Now Deceased, Collected from Original and Authentic Sources* (Philadelphia: William Brotherhead, 1859).
66. Greville Bathe and Dorothy Bathe, *Oliver Evans: A Chronicle of Early American Engineering* (Philadelphia: Historical Society of Pennsylvania, 1935); Eugene S. Ferguson, *Oliver Evans, Inventive Genius of the American Industrial Revolution* (Wilmington, Del.: Hagley Museum, 1980).
67. *United States Gazette*, Sept. 29, 1809.
68. John Stevens, Jr., "A Letter Relative to Steamboats," *American Medical and Philosophical Register* 2 (1812), gives Stevens's own account of his experiments with steamboats, in answer to an anonymous article (generally admitted to be the work of Robert R. Livingston), "An historical account of the application of steam to the propelling of boats," in the same volume; Henry Winram Dickinson, *Robert Fulton, Engineer and Artist: His Life and Works* (London: John Lane, 1913); George Dangerfield, *Chancellor Robert R. Livingston of New York, 1746-1813* (New York: Harcourt, Brace, 1960); James Thomas Flexner, *Inventors in Action: The Story of the Steamboat* (New York: Collier Books, 1962). See also Talbot Hamlin, *Benjamin Henry Latrobe* (New York: Oxford University Press, 1955), p. 370n, citing a letter of Oct. 1, 1798, from Roosevelt to Livingston, reprinted in J. H. B. Latrobe, *A Last Chapter in the History of the Steamboat*, Fund Publication 5 (Baltimore: Maryland Historical Society, 1871), for Roosevelt's claim to the invention of the paddlewheel.
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70. [George Armroyd,] *A Connected View of the Whole Internal Navigation of the United States, Natural and Artificial, Present and Prospective* (Philadelphia: H. C. Carey & I. Lea, 1826); S. Alpach, *Schuylkill Navigator* (Philadelphia, 1827); Henry S. Tanner, *A Brief Description of the Canals and Railroads of Pennsylvania and New Jersey* (Philadelphia: Privately printed, 1834); Simpson, *Lives of Eminent Philadelphians*; J. Lee Hartman, "Pennsylvania's Grand Plan of Post-Revolutionary Internal Improvement," *PMHB* 65 (Oct. 1941): 439-57; Francis D. Klingender, *Art and the Industrial Revolution* (London: N. Carrington, 1947); [Pierre Stephen] Robert Payne, *The Canal Builders: The Story of Canal Engineers through the Ages* (New York: Macmillan, 1959).
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72. *United States Gazette*, Nov. 3, 1800.
73. Don Taxay, *The U.S. Mint and Coinage: An Illustrated History from 1776 to the Present* (New York: Arco, 1966), p. 15.
74. Hindle, *David Rittenhouse*, pp. 334-35.
75. Taxay's *U.S. Mint and Coinage* gives the best and most recent review of the technical problems and the development of the mint.
76. Scharf and Westcott, *History of Philadelphia*, 3:2339-40.
77. *Ibid.*, 2:1192.
78. The first two presidents of the academy, George Clymer and Joseph Hopkinson, were members of the APS.
79. Maurice E. Phillips, "The Academy of Natural Sciences of Philadelphia," in Eisenhart, ed., *Historic Philadelphia*, pp. 266-74.
80. Arthur M. Kennedy, "The Athenaeum: Some Account of Its History from 1814 to 1830," in Eisenhart, ed., *Historic Philadelphia*, pp. 260-65.
81. Henry Butler Allen, "The Franklin Institute of the State of Pennsylvania," in Eisenhart, ed., *Historic Philadelphia*, pp. 275-79.
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83. *Ibid.*, p. 48.
84. *Ibid.*, pp. 63, 108.
85. *Ibid.*, p. 126.
86. Appletons' *Cyclopaedia of American Biography*, s.v. "Alexander Wilson," 6:545; *Dictionary of American Biography*, s.v. "Alexander Wilson," 14:49.
87. E.g., *Early History of Science and Learning in America*, pp. 52-62, 91, 153-55, 157-61.
88. *Ibid.*, p. 189.
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THE AGE OF NICHOLAS BIDDLE, 1825-1841

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2. *Fisher Diary*, p. 155.
3. Ibid., p. 158.
4. Craig Biddle and James S. Biddle, *Autobiography of Charles Biddle: Vice President of the Supreme Executive Council of Pennsylvania* (Philadelphia: Privately printed, 1883).
5. Nicholas B. Wainwright, "Nicholas Biddle, 1786-1844" (senior thesis, Princeton University, 1930), p. 52.
6. Thomas Payne Govan, *Nicholas Biddle: Nationalist and Public Banker, 1786-1844* (Chicago: University of Chicago Press, 1959).
7. R. C. H. Catterall, *The Second Bank of the United States* (Chicago: University of Chicago Press, 1903), p. 51.
8. *American Daily Advertiser*, April 1, 1825.
9. *Niles' Weekly Register* 29 (1825-1826): 31.
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11. *National Gazette*, Jan. 1, 1827.
12. *American Daily Advertiser*, April 1, 1825.
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15. Ibid., 33 (1827-1828), p. 132.
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