

3. The nationalists dump free trade

The success of the American Revolution established the United States as an enclave protected from the imperial fist, a strategic center for the pursuit of mankind's progress. The administration of President George Washington, and Treasury Secretary Alexander Hamilton, boldly asserted that the duty of republican government was to sponsor industry. A Bank of the United States was created, to combat financier wrecking operations and usury.

But the promoters of British free-trade doctrines, the alliance of Southern slave plantation owners (who exported to Britain) and Boston merchants (who imported from Britain), overpowered the Washington-Hamilton program. Hamilton's proposals for protective tariffs and for government construction of canals and other infrastructure were stifled in Congress.

Beside the Bank, certain national institutions were born, and struggled along: A small Navy was supplied with some warships, but Albert Gallatin (treasury secretary in 1802-13) virtually dissolved it, and most of the Army with it.

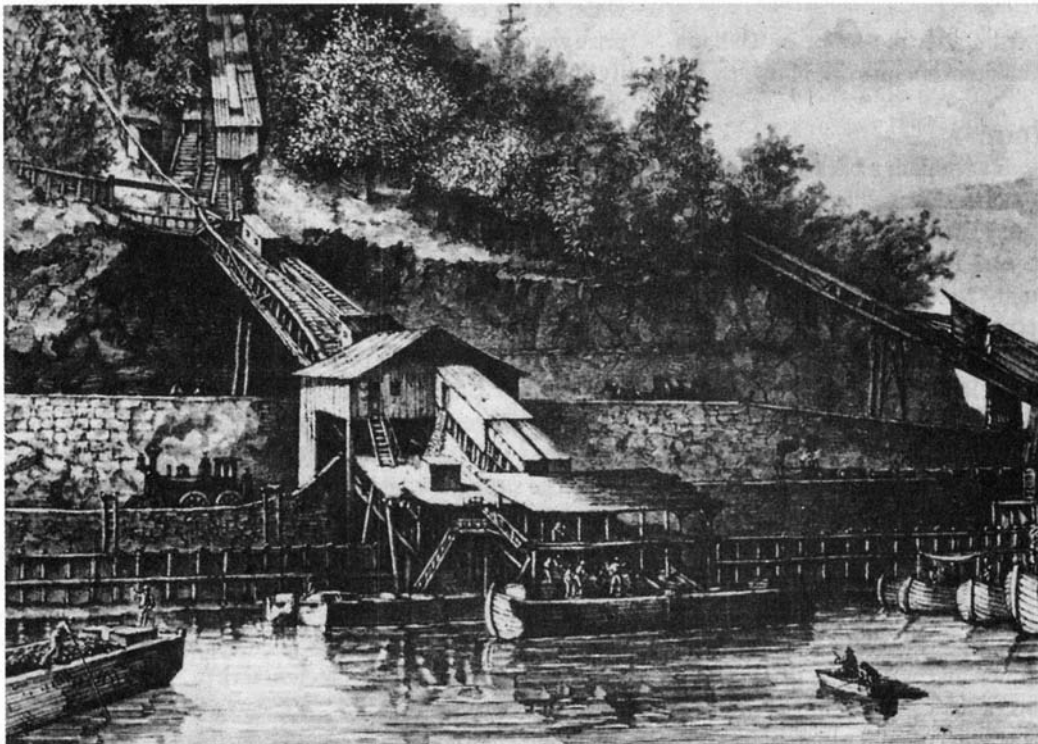
A U.S. Military Academy was established at West Point,

New York. Benjamin Franklin's nephew and former personal secretary, Jonathan Williams, was the tiny Academy's first superintendent. Williams founded a Military Philosophical Society, which lobbied for scientific, technological, and industrial development. Army arsenals, and certain private arms suppliers to the Army, pioneered in the precision design of interchangeable parts in manufacturing.

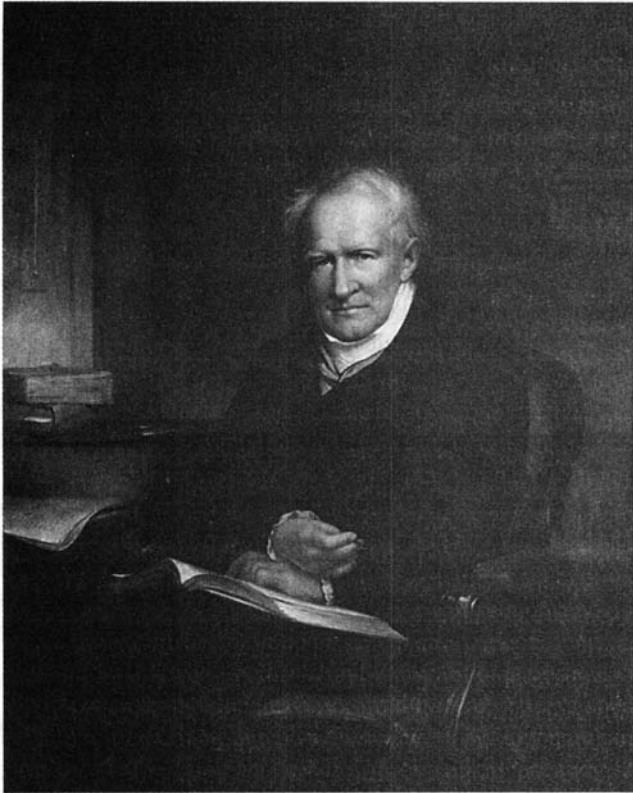
The nation also began to benefit from the steamboat invented by Pennsylvanian Robert Fulton. Franklin had introduced Fulton to his circle in England; Fulton had apprenticed in canal-building with the Duke of Bridgewater, and in steam engineering with the Boulton and Watt firm, which Franklin had guided, to produce the first commercial steam engine (see previous article).

Hamilton gave Fulton a private, lavish grant, enabling Fulton to move to France in 1797 to aid the French in their war against the British Empire. Fulton developed for Gaspard Monge, the Leibnizian geometer who had founded France's great technological institute, the Ecole Polytechnique, the previous year, a fully functional submarine and torpedoes. Fulton said they were designed "to destroy the British fleet," and to help end the "monstrous" British government. But Napoleon Bonaparte scuttled the project.

Fulton's steamboats, equipped with Boulton and Watt engines, made Fulton famous when they began to ply American waters in 1807. Fulton then led a campaign for a great waterway linking New York City to the Great Lakes. Construction on the Erie Canal would finally be started as a state enterprise



Pennsylvania's state-financed transport system delivered cheap coal, to fuel the first phase of U.S. industrialization. Here, anthracite coal is loaded at Mauch Chunk, later called Jim Thorpe, Pennsylvania.



This portrait of German scientist Alexander von Humboldt is on display at the American Philosophical Society in Philadelphia. Humboldt sponsored and coordinated the work of scientists throughout the world, using his diplomatic influence to protect champions of republicanism and scientific progress everywhere.

beginning in 1815, many years after the Jefferson-Gallatin administration had rejected federal sponsorship.

The nationalists regroup

But the United States was to remain a backward, mostly rural country, until a nationalist movement revived Hamilton's policies a generation after the Revolution. Then, in two spectacular jumps, in the period 1824 to the mid-1840s, and from 1861 to about the mid-1880s, the nationalists made America the world's biggest industrial power. From their U.S. base, the nationalists would operate simultaneously in many countries, keeping the enemy British Empire at bay while they brought the world into modern times.

A large portrait of the German scientist Alexander von Humboldt hangs on the wall of the American Philosophical Society in Philadelphia. The painting commemorates Humboldt's 1804 visit to the city, and his indispensable role as foster-father to American science and republican strategy until his death in 1859.

In 1804, Humboldt, the collaborator of the German "poet of freedom" Friedrich Schiller and a devotee of Franklin, reminded the Philadelphians of their fathers' limitless ambitions for their country, and the great esteem which Europeans

held for the American cause. From this visit, the intelligence channel between the republican elites of Europe and America was revived and strengthened.

Ten years later, a second war was raging between the United States and Great Britain. British troops burned Washington, D.C., but the Americans fought the Empire to a standstill and forced a peace treaty in 1815.

Secretary of War James Monroe quickly sent Gen. Winfield Scott and Maj. Sylvanus Thayer to tour European military installations. Humboldt aided these U.S. officers in acquiring valuable material and personnel from the Ecole Polytechnique, which was being suppressed and destroyed by the concerted British and Continental European oligarchy ruling France after the fall of Napoleon. Books, maps, charts, and equipment were taken off to America and installed in the Army's officer training school at West Point. In this effort to preserve the Leibnizian scientific tradition, Humboldt at the same time was finding positions for Ecole teachers in the German states. He paid special attention to building up the capability of Göttingen University in Hanover, which Franklin had visited in 1766.

Claudius Crozet was brought from the Ecole to West Point, where he introduced to Americans the study of descriptive geometry, the crucial engineering methodology devised by Ecole founder Monge. West Point now suddenly acquired great significance in American life. The Army officers who were subsequently trained there constituted the nation's only pool of competent engineers.

Following the War of 1812, American nationalists reestablished Philadelphia, the former capital city of the American Revolution, as a headquarters for republican politics worldwide. At the center of the leadership grouping of this enterprise were Mathew Carey (1760-1839), who is known primarily as a publisher, and Nicholas Biddle (1786-1844), famous as the president of the revived Bank of the United States. Their leading collaborators were the German-born economist Friedrich List (1789-1846), who was a Philadelphian for a few crucial years, and the great American statesmen John Quincy Adams (1765-1848) of Massachusetts and Henry Clay (1777-1852) of Kentucky.

The leaders

Let us introduce our protagonists.

Mathew Carey had come to America in 1784, an Irish Catholic refugee from British persecution. He had served as Franklin's leading political agent in the abortive Irish independence struggle, which coincided with the American Revolution (see *EIR*, Dec. 15, 1995, "America and the Irish Revolution," pp. 73-75). After working as a printer for Franklin in Paris, Carey had returned to Ireland to edit and publish the newspapers of the Volunteers movement, linking Protestants and Catholics together behind the Franklin-Carey program for Irish independence, protective tariffs, and industrial development.

When Carey was forced to flee to America, escaping a

British charge of treason, General Washington and the Marquis de Lafayette sponsored his start as a publisher. Carey went on to publish and promote the work of the best American writers, including James Fenimore Cooper, Edgar Allen Poe, and the geographer-theologian Jedidiah Morse, founder of the pro-republican Christian missionary movement.

Carey's widely popular pamphlet *The Olive Branch*, had rallied Americans to the bipartisan task of defense against Britain in the War of 1812. To counter the trade war which followed the peace in 1815, Carey wrote and issued economics pamphlets stressing protective tariffs for the defense of national interests. He challenged the British imperial free-trade economists such as Adam Smith and Thomas Malthus, who were considered "authorities" by Anglophile bankers and colleges under their influence. Carey was first and always a fighter for high wages and help for the poor.

In 1810, Carey, joined only by a few supporters, including **Nicholas Biddle**, led an unsuccessful campaign for the continuance of Hamilton's Bank of the United States, whose charter was due to expire in 1811. Then a Pennsylvania state legislator (and a classical Greek scholar), Biddle told his colleagues that without a U.S. Bank, there would be a credit squeeze and a financial monopoly by "moneyed aristocrats," which would "place the poorer classes at the mercy of the rich, and the great money lenders [would] issue abroad to prey upon their fellow citizens." After the nation was forced to fight the War of 1812 while bankrupt and disarmed, patriots generally followed Carey's lead; Philadelphian Alexander J. Dallas was installed as U.S. treasury secretary in 1814, and the Bank was rechartered in 1816.

Earlier members of Biddle's family had been members of Franklin's philosophical and political training group, the Junto. On an intelligence-gathering tour of Europe, Biddle had served (1807) as private secretary to James Monroe, then the U.S. ambassador to Britain, and had been virtually adopted into Monroe's family. Monroe was elected U.S. President in 1816; Biddle continued to serve him and his secretary of state, John Quincy Adams, as an intelligence adviser, with special responsibility for the growing movement for independence in Latin America. In 1819, President Monroe appointed Biddle to be one of the directors of the reestablished Bank of the United States.

Rep. **Henry Clay** had been the leader of the party demanding war against Britain in 1812. After the Peace of 1815, when Europe lay in the grip of combined feudal monarchies, Clay adopted the economic proposals of Carey as the means of ensuring the continued progress of Western civilization. Clay used the name "The American System," to signify Carey's proposed revival of Hamilton's protective tariffs, sovereign republican national banking, and national infrastructure projects.

John Quincy Adams was secretary of state in 1817-25, the sixth U.S. President in 1825-29, and the leading anti-slavery activist in Congress during 1831-48. He had taken up the study of Plato in 1784, at age 17, while he lived in Paris in

the company of the U.S. ambassador, Franklin. Later, Adams wrote that Plato's lesson of the "indissoluble union of moral beauty and goodness . . . made a deep and lasting impression on my mind." John Quincy Adams went to Prussia in 1797 as the first U.S. ambassador there, while his father, John Adams, was President. As America's main European intelligence officer, the young man immersed himself in the new German classics being written by Schiller, Gotthold Lessing, and other republicans. The younger Adams was for a time a Harvard professor—at odds with the fancy Bostonians—and a national leader in promoting German language and literature in America. Adams became an expert-historical student of the Grand Design of France's King Henry IV and his minister Sully, for the improvement of the world through sovereign governments acting cooperatively.

Friedrich List would become the leading international economist of the American System, in opposition to the British free trade dogma. List arrived in the United States in 1825, just as the nationalists had achieved political power. He had already spent several years in exile and in prison for his politics in Germany. He had taught political economy in Tübingen University, and was a protégé and political colleague of the Tübingen publisher Johann Friedrich Cotta, who had earlier promoted Schiller. List was the acknowledged leader and theoretician of the German republic movement.

In 1819, List was elected chairman of the new *Handelsverein* (association of industrialists). He aimed, as had Cotta, to unify the various German principalities under a single government which could industrialize backward Germany; this would make possible an alliance of Russia, Germany, France, and the United States, to break the power of the British Empire. A member of the Württemberg Parliament, List proposed government credits to build industry. The pro-British party and Austria's Prince Metternich procured List's imprisonment, then exile. Lafayette invited List, the honored convict, to accompany him to the United States. Lafayette's 1825 tour, with List, commemorated General Lafayette's role in the American Revolution, and recalled for Americans the Revolutionary ideas which the nationalists would now again pursue in earnest.

Government action directs the first phase

Before the nationalists—Carey, Biddle, Clay, and Adams—came to power in 1823-25, the United States had no railroads, no canals (though the Erie Canal was slowly being built, with primitive methods), an insignificant iron industry, no modern factories to speak of, no industrial steam power, no metal machines operating in production facilities, and virtually no public schools.

President Monroe appointed Biddle president of the Bank of the United States in 1823, replacing Langdon Cheves, a tight-credit man, previously in that post. That same year, Clay became Speaker of the House of Representatives. In 1824, Clay put through the first effective protective tariff law, and the General Survey Act authorizing the use of Army personnel



Nicholas Biddle (1786-1844), president of the Bank of the United States. Biddle and political strategist Mathew Carey allied with John Quincy Adams and Henry Clay to revive the Founders' nationalism. They used public credit, Army engineers, and high tariffs to create America's railroads, canals, iron forges, and factories.

to aid in civil engineering projects.

John Quincy Adams was elected President in 1824, and took office in March 1825. He appointed Clay secretary of state, and Richard Rush as treasury secretary, through whom Biddle's Bank of the United States would work with the Executive branch of government. Rush was a Philadelphian, closely tied by family to Franklin, and to Biddle.

The nationalists were now ready to organize the creation of railroads and canals, and the beginning of the large-scale coal, iron, and machine industries that would define an entirely new economy, virtually overnight.

The wealthiest Americans, the Massachusetts elite merchants, had made their money from participation in Britain's slave trade and opium trafficking, and from importing British manufactures. They looked with scorn on productive industry in general, and they would not risk money building railroads.

Thus, *virtually all U.S. railroad construction was of necessity sponsored by government*, involving cooperation at the federal, state, and local levels.

President John Quincy Adams assigned West Point's Army engineers to plan the route for America's first successful commercial railroad, the Baltimore & Ohio. The enterprise was financed by the city of Baltimore and the state of Maryland, whose stock purchases and loans brought timid private investors in as partners. The resulting railroad line was privately owned and managed by Baltimore merchants who were republican allies of Biddle and Carey.

In all, 61 railroads were designed by U.S. Army engineers, until a free-trade-crazed Congress in 1837 outlawed the use of Army engineers for railroad planning. Meanwhile, states, counties, and cities invested massive sums to connect themselves to the rail grid. **Table 1** shows only some of this nineteenth-century financing, and does not encompass President Abraham Lincoln's revolutionary transcontinental railroad projects (discussed below).

The various state and local authorities arranged to organize and charter private railroad corporations, as well as state-owned canals, and usually issued bonds to subsidize or entirely pay for the enterprises, both private and public alike. These bonds would be marketed under the direction of Biddle's Bank of the United States, and often would involve the allies of Biddle and Carey in state government banks. (British bankers and capitalists who bought these state-issued or state-backed bonds, from time to time provided a certain undetermined minority fraction of the total funds invested in U.S. railroad construction. This fact has been turned into the myth that "the British" or "the Baring Bank" built U.S. railroads.)

List was invited by Carey's Pennsylvania Society for the Promotion of Manufacturing and Mechanical Arts, to prepare a book on economic theory, to attack Adam Smith and the British free trade doctrine. List's 1827 *Outlines of American Political Economy*, published by the Society, prefigured his 1841 *National System of Political Economy*. His work, and that of Mathew Carey's son Henry C. Carey, was to circulate throughout the world as the *standard economics texts outside the British Empire*—until the British succeeded in suppressing this literature in virtually every school in the world, obliterating it from public memory.

In 1827, Mathew Carey and List organized a great protectionist national convention in Pennsylvania. The following year, their movement pushed through the U.S. Congress a higher tariff schedule, branded the "Tariff of Abominations" by free-trade advocates ever since. This 1828 tariff became the focus of attack against the whole nationalist program, with the new threat that southern slaveholding states would secede from the Union unless the tariff were lowered.

The effects of the nationalist tariffs can be read most clearly in the record of the U.S. iron industry (see **Table 2**). No regular statistics were kept for U.S. iron or steel output until 1820, because American production of these metals was only carried on in tiny, primitive local forges. In 1820, the U.S. manufacture of pig iron (metal output from smelting iron ore) was 20,000 tons, about what it had been in the eighteenth-century colonial days.

TABLE 1

Railroad construction financed by state and local governments

(selected examples, 19th century)

State	Corporation or jurisdiction	Years	Amount and type of government aid*
Alabama	Ala. & Tenn. River RR	1850 1850s	\$100,000+; purchase corp. stock Federal land grant for RR construction
Arkansas	7 railroads	1868-1879	\$5,350,000 state bonds Citizens could invest in RR in lieu of tax payments.
Connecticut	Cities/counties	as of 1883	\$5,106,000 RR debt=ca. 3/4 of the debt of the localities.
Delaware	5 railroads New Castle & Frenchtown	1837- 1852	\$961,000 state loans to corps. \$180,000 purchase corp. stock
Florida	railroad companies	Begin 1835	Grant right-of-way, construction materials, land for stations
Georgia	Monroe railroad Atlantic & Gulf RR	1842 1867	\$200,000 stock purchase \$1,000,000 stock purchase
Illinois	Illinois Central RR 86 counties	1850s Early years	Federal land grant for RR construction \$16,088,027 total state subsidies
Iowa	Towns and counties	as of 1856	\$7,000,000 railroad bonds issued
Indiana	2 railroads	Early years	\$687,000 state bonds issued
Kentucky	Lexington & Ohio RR Lexington & Ohio RR localities	1833 As of 1871	\$150,000 guarantee corp. bonds \$200,000 purchase corp. stock \$13,783,983 local govt. RR debt
Louisiana	New Orleans 2 railroads 4 railroads	as of 1853 before 1861 1865-1879	\$3,500,000 city RR debt \$1,483,000 purchase corp. stock \$3,842,000 purchase corp. stock
Maryland	Baltimore & Ohio RR Baltimore city govt. Baltimore & Susquehanna RR	1828-1836 1828-1853	\$11,700,000 purchase corp. stock \$7,830,000 city RR debt \$1,879,000 state loan
Massachusetts	towns European & No. Amer. RR Western RR Various railroads	as of 1871 Early years 1836 1837-1870	\$2,351,000 railroad debt \$678,362 state subsidy \$1,000,000 purchase corp. stock \$11,290,000 state loans
Michigan	4 railroads	1837-1938	\$240,000 state loans
Minnesota	48 railroads 4 railroads	1869-1905 1858	\$2,949,150 towns issued bonds \$2,275,000 state loans
Mississippi	New Orleans, Ja & GN RR New Or, Ja & GN RR	1854 1857 1850s	1/3 of Internal Improvement Fund 1/3 of Chicasaw school fund Federal land grant for RR construction
Missouri	7 railroads Missouri Pacific, etc.	as of 1853 1850s laws	\$8,124,075 city/county RR stock \$19,201,000 state bonds loaned
Nebraska	43 counties	Early years	\$4,918,000 railroad subsidy bonds
New York	294 cities and towns 51 counties N.Y. & Erie, 8 others	Early years Early years Early years	\$29,978,206 subsidies to RR construction subsidies \$5,000-\$3,000,000/county \$8,206,591 state loans
North Carolina	Wilmington & Rai RR Atlantic & N.C. RR Western N.C. RR Cape Fear & Yadkin North Carolina RR 2 railroads 4 railroads	1836 1854 before 1873 before 1873 before 1883 1838-1840	\$500,000 purchase corp. stock \$1,200,000 (2/3 of the stock) \$4,000,000 (2/3 of the stock) Entirely built by convicts \$3,000,000 (3/4 of the stock) state purchase corp. stock state guarantee corp. debts
Ohio	several railroads 6 railroads	before 1837 1837 law	Various specific RR subsidies \$717,515 state purchase stock
Pennsylvania	Pittsburgh Philadelphia 3 railroads	as of 1853 as of 1853 late 1830s	\$3,450,000 city railroad debt \$8,154,000 city railroad debt \$420,000 Bank of U.S. investment
South Carolina	Louvle Cin & Charleston 6 other railroads 8 railroads	ca. 1837 1848-1868 begin 1837	\$800,000 purchase corp. stock \$1,675,000 purchase corp. stock \$10,000,000 guarantee corp. bonds
Tennessee	Memphis/Ltl Rock RR 2 railroads various railroads various railroads	before 1852 before 1852 before 1852 Act of 1852	\$350,000 Memphis purchased stock \$851,000 state purchase stock \$2,196,000 state guarantee bonds \$28,351,000 state loans for RR construction at \$8-10,000 per mile

TABLE 1

Railroad construction financed by state and local governments *continued*

(selected examples, 19th century)

State	Corporation or jurisdiction	Years	Amount and type of government aid*
Virginia	counties	Early years	\$10,000,000+ total county RR debts
	Chesapeake & Ohio	before 1861	\$5,000,000 state purchase stock
	Chesapeake & Ohio	before 1861	\$1,750,000 direct state construction
	various other RRs	before 1861	\$16,000,000 state purchase stock**
	4 railroads	before 1861	\$730,000 loans & guarantees
West Virginia	Wheeling	as of 1853	\$1,100,000 city RR debt
Wisconsin	counties	as of 1874	\$8,522,224 county RR investment

* Subsidies, loans, and guarantees listed here total about \$300 million. ** State policy was to buy 3/5 of the stock of any railroad built in Virginia.

*Government—state, local, and federal—financed the construction of the U.S. railroads. Consider the early role of state governments. As of 1838, the individual states of the Union carried a total of \$60,202,000 in canal debts, \$42,871,000 in railroad debts, and \$6,619,000 in highway debts, for a grand total of \$109,692,000 in state transportation debts. This was 63.7% of the \$172,306,000 total debts of all the states at that time. [Source: Dorothy R. Adler, *British Investment in American Railways, 1834-1898* (Charlottesville: University Press of Virginia, 1970).]*

The 1838 state railroad debt of \$42,871,000 represented \$22,410 per mile for the 1,913 miles of railroad already built. But what proportion of the cost of the railroads did this state commitment represent? Did railroads cost \$25,000 per mile, or \$125,000?

The U.S. Commerce Department's Historical Statistics of the United States tells us that 12 years later, by 1850, the total direct investment in American railroads was \$318,126,000, or \$35,265 for each of the 9,021 miles built by 1850.

Thus the \$22,410/mile figure for state railroad debt as of 1838 suggests that the states arranged for a large proportion of the funds to build the early railroads.

Neither county nor city railroad debts are considered here, nor the various government stock purchases or other subsidies, nor state or federal land grants, nor military engineering.

There was some advance in iron production in 1821-23, with the mildly protective tariff of 1821. But the 1824, 1828, and 1842 tariff laws sharply increased protection against British-imported iron, and U.S. manufacturers immediately organized new production facilities in response to these changes in the law. As soon as the tariffs were lowered, in 1833 and again in 1847, new enterprises stopped being set up, and existing businesses contracted or folded.

Pig iron production rose from 61,250 tons in 1823, to 130,000 tons in 1828, to 200,000 tons in 1832. After the tariff was lowered, pig iron output rose and fell erratically, and was only 230,000 tons in 1842, when Clay was able to put through a sharply higher tariff. Iron output rose immediately, reaching 800,000 tons in 1847. Then, the Boston merchants and slave owners free-trade alliance reduced the tariff again, and U.S. annual iron production stagnated at an average of less than 800,000 tons until the Civil War of 1861-65.

Building an iron industry and railroads, the nationalists directed a radical shift in the national industrial base and a huge increase in energy throughput.

England had converted from primitive human- and animal-powered production, to artificially powered machine industry, by the projects of the Birmingham group: canals, coal, and steam engines. Fulton published a lavishly illustrated treatise in London in 1796, dedicated to President Washington, proposing the industrialization of America along similar

lines, and specifying Pennsylvania canals as the core strategy.

The Philadelphia group used the approaching completion of New York's Erie Canal as a public explanation for their dramatic proposal: in order to save their state's trade to the Great Lakes and the Middle West, in competition with New York, Pennsylvania must build canals on a grand scale. The Pennsylvania Society for the Promotion of Internal Improvements (Nicholas Biddle, secretary) won funding from the legislature for a \$13 million system of canals entirely within the state, the largest public works project yet undertaken anywhere, with a total mileage twice that of the Erie Canal.

Biddle's friends also built privately owned navigation projects. Ebenezer Hazard, a political operative of both Matthew Carey and Hamilton, financed the canalization of the Lehigh River for his son Erskine Hazard and Josiah White. Philip Hone, a political lieutenant to Clay and Biddle who was elected mayor of New York in 1825, built the Delaware and Hudson Canal, from northeast Pennsylvania into New York City; this was financed by the State of New York, and by Hone's merchant friends.

Coal-based industry

These canal projects, public and private, were backed to the hilt by Biddle's Bank of the United States. But their objective was to industrialize America with coal.

Eastern Pennsylvania is rich in hard anthracite coal,

TABLE 2

U.S. policy shifts, showing tariff rates and iron production

(Figures shown for every third year, 1791-1908)

Year	Tariff rate (%)	Iron production (000 tons)	Policy shifts	Year	Tariff rate (%)	Iron production (000 tons)	Policy shifts
1789-1800			Nationalists, President Washington and Treasury Secretary Hamilton, but free-trade Congress	1843			Beginning of Henry Clay's higher tariff
1791	22.94			1845	32.57	631	
1794	24.82			1847			Beginning of free-trade faction's reduced tariff
1797	17.07			1848	24.97	800	
1800	17.54			1851	25.44	532	
1803			Free-traders President Jefferson, Treasury Secretary Gallatin	1854	25.61	833	
	22.06			1857	22.45	798	
1806	19.18			1860	19.67	884	
1809	18.26			1861-65			Lincoln regime, free-trade/slavery bloc dissolves
1812	18.66			1863	32.62	947	Iron-steel tariffs at around 50%
1815	33.66		War of 1812	1866	48.33	1,206	
1816			Bank of U.S. re-chartered; Ecole Polytechnique teachers and methods transferred to West Point	1869	47.25	1,711	Iron-steel tariffs at around 90%
				1869-72		"	Philadelphia Interests" in vast steel and RR projects
1818	21.24			1872	41.35	2,548	
1819			Mathew Carey begins protectionist tariff agitation	1873			British bankers destroy Jay Cooke, crash U.S. economy
1821	35.97*	34		1875	40.62	2,023	
1823			Biddle appointed president of Bank of the U.S.	1878	42.75	2,301	"Philadelphia Interests" launch Edison power/light project
1824	37.53	75	House Speaker Henry Clay's iron-protective tariff	1881	43.27	4,144	Nationalist Garfield inaugurated, shot in 4 months
1825			President John Q. Adams begins Army-engineered railroads	1884	41.61	4,097	
			Carey-List tariff agitation, canal-coal projects	1887	47.08	6,417	
1827	41.35	116		1890	44.39	9,202	Congressman McKinley's protectionist Tariff of 1890
1830	48.88	165		1893	49.46	7,124	Free-trade Grover Cleveland regime begins
1832			So. Carolina secession threat forces tariff reduction	1896	39.95	8,623	
1833	31.96	214		1897			McKinley regime raises tariffs
1836	31.65	258		1899	52.07	13,621	
1839	29.90	301		1901			McKinley shot, Teddy Roosevelt strikes at nationalism
1842	24.00	230		1902	49.79	17,821	
				1905	45.24	22,992	
				1908	42.94	15,936	

* Tariff rates shown before 1821 are average *ad valorem* rates on free and dutiable imports; 1821 and after, rates on dutiable imports onlySources: Tariff rates and iron production from Fred J. Guetter and Albert McKinley, *Statistical Tables Relating to the Economic Growth of the United States* (Philadelphia: McKinley Publishing Co., 1924).

which burns with great heat and no soot. Anthracite was not in general use before the War of 1812, while the soft, bituminous coal found further west and south was used only in some locations, largely for home heating. Pittsburgh, a Philadelphia colony with immense mineral resources, had its own tiny, local coal-driven industrial economy. Boston and New York imported coal from England, for their fashionable hearth fires.

The Philadelphia nationalists, through such instruments as Hazard and White's Lehigh Coal and Navigation Company, bought up coal-bearing properties in the counties north of Philadelphia. Prof. Friedrich List was one of the leading mine operators, and a pioneer in coal transport technology.

While opening mines and digging canals, the group had to educate the community on the virtues of the new fuel. Public opinion had decided that anthracite was unusable. Blacksmiths had seen it *extinguish* their fires. A wide campaign of demonstrations and advertising, and plunging prices because of cheap canal transport, finally satisfied everyone that anthracite just had a higher ignition temperature, along with its higher energy content. Coal barges crowded the new canals, and a special fleet of Philadelphia steamers carried anthracite to all the cities of the Atlantic coast.

Anthracite production for the market rose from zero in 1819, to 8,000 tons per year in 1823, to 1 million tons in 1837. Production remained in that general range until the

opening of the Reading Railroad in the 1840s. This line had been a special creation of its fiscal manager, Biddle, backed by his Bank of the United States. Coal cars simply loaded up near the mines, went in trains down to the port, and rolled directly onto sea-going ships. Anthracite production jumped to 3.5 million tons by 1847.

Widespread American industrial use of coal, all of it the nationalists' Pennsylvania anthracite, began in the 1830s.

Biddle intervenes

Meanwhile, Biddle steered the national economy on an upward curve. The Bank of the United States invested in railroads and purposefully bid up the price of their securities. State governments run by Clay-Adams Whigs built canals, and issued bonds which were marketed by Biddle's Bank; midwestern states were populated and filled with towns and industry as an immediate consequence.

When Wall Street or London drove the prices of some commodity too high or too low, Biddle intervened directly into the market to counteract the speculators, and restore steady growth and prosperity for farmers. The Bank of the United States and other financial weapons at Biddle's disposal, were used in exactly the same way that Hamilton had fought against the international bankers who claimed the right to dictate to the world.

President Andrew Jackson vetoed a renewed charter for the Bank in 1836. American credit became pinched, and then the Bank of England pulled the plug on the United States, stopping all credit lines and sending into bankruptcy the British firms that dealt with America. Depression gripped the U.S. economy in 1837, with hunger, unemployment, and fear.

But Biddle continued the Bank for a time under a Pennsylvania state charter. Near bankruptcy, he and his allies kept pushing for modernization,

With the final push of the 1842 protective tariff law, every major American industry changed immediately to machine production, to factories in the general sense we have known them since. During the effective years of this last Clay tariff, 1843-47, metal machines came to replace wooden ones. Newly applied industrial steam power gave one American worker the power of hundreds of people in countries not thus equipped.

There was a general rush to invest in manufacturing, to cash in on the protective tariff and the new technological circumstances. Boston financiers shifted funds into industrial plants and railroads, as they had begun to do under the Carey-Clay tariff of 1828.

But America's great start toward modernization was being dragged down by the power of the slave owners and other free-market advocates, who had closed the national bank and again blocked the protective tariff. A new flank in science and technology would prepare the nation for victory in the great crisis to come.

4. International scene becomes electrified

The American nationalists worked closely with their European friends to overcome the British Empire's forceful opposition to industrialization. Britain's very active factional allies (or paid spokesmen) within each country reiterated Adam Smith's notion of the "division of labor between nations"—some were destined to supply raw materials, some could "naturally" manufacture.

In 1839, Czar Nicholas I sent Russian engineers to the United States, who met with engineers, inventors, and railroad officials throughout the country. The leader of this mission, Pavel Melnikov, reported back to the czar that Russia, with its great spaces to connect, must emulate America's railroad construction.

Several years later, Melnikov and Crown Prince Alexander II headed a committee to begin this development. The Russians hired a retired U.S. Army officer, George Washington Whistler, one of the original West Point engineers who had been assigned by President John Quincy Adams to design the first American railroad, as project supervisor. Whistler directed construction of the line from Moscow to St. Petersburg, Russia's first significant railroad. Whistler also built rail factories and fortifications, while engines were imported from the Baldwin Locomotive company of Philadelphia. In this period, Russia implemented a protective tariff, under which it began to create an iron industry and a factory system.

But the U.S. ability to sustain such development was in serious question. The charter of the Bank of the United States had expired on March 3, 1836. For the next 25 years, there would be only brief episodes of sane Presidential policy direction, until Abraham Lincoln rescued the country from impotence and bankruptcy.

Cognizant of the crisis they faced, the Philadelphia nationalists prepared a new enterprise to increase long-term national strength. A committee chaired by Nicholas Biddle came to be in charge of a substantial sum of money, the legacy of banker Stephen Girard, to found Girard College. On July 19, 1836, Biddle's panel commissioned Alexander Dallas Bache to tour Europe and study the finest educational methods. A confidential part of the young man's mission was to meet and coordinate efforts with the scientific elite of continental Europe.

Bache was to become one of the most important figures of civilization in the nineteenth century: The great-grandson of Benjamin Franklin, Alexander Dallas Bache had graduated with highest honors from the U.S. Military Academy at West Point in 1825—the year that West Pointers launched American railroads. Bache's cheerful diligence, and the general