

Alexander II did send his fleet to New York and San Francisco to prevent British direct intervention on behalf of the Confederacy, and the United States began supplying ironclad warships to Russia.

Former Pennsylvania Gov. Andrew Curtin went to Russia as U.S. ambassador in 1869. Henry Carey hosted a send-off dinner for Curtin, where a U.S. general proposed that the czar should build a trans-Siberian railway, to link up with the United States, and to break British hegemony.

Carey's Philadelphia friend, George H. Boker, was ambassador to Russia from 1875 to 1878, and a new venture was undertaken.

The Russians appointed the publisher of Carey's polemical anti-British magazine articles, banker Wharton Barker, as Russia's American financial agent. In 1878 Barker built four battle cruisers for the Russian Navy in Philadelphia. Wharton Barker went to Russia to plan iron and coal mines, forges and factories, for the transformation of southern Russia. He formally proposed that the two nations prepare as allies for a war against Great Britain, aiming at "the accomplishment of the common work of Russia and America, namely the dismemberment of the British Empire."

Wharton Barker and his closest associates brought about the nomination of their candidate, James A. Garfield, who was elected U.S. President in November 1880. The czar signed the industrial development contracts with the Philadelphia organization on March 10, 1881; on March 13, Czar Alexander II was assassinated. One week later, Garfield was inaugurated; President Garfield was shot in July, and died in September. The new czar, Alexander III, continued some of the proposed southern Russian development, but now without participation by the clearly dangerous Philadelphians.

Count Sergei Witte, an advocate of Friedrich List's nationalism, would build Russia's Lincoln-style trans-Siberian railway and begin the country's industrial modernization in the 1890s. But the Russian Revolution overthrew Witte, and cut the American tie.

### **Ireland and the Carey submarine**

One hundred years after Mathew Carey had become an Irish revolutionary, his son, Henry Carey, plunged in and took responsibility for reviving the Irish struggle for independence from Britain. Carey's disciple, Philadelphia Irish immigrant physician William Carroll, was designated head of the Irish revolutionary underground—the Fenians, or *Clan na Gael*—in 1875. Dr. Carroll was chairman of the Clan na Gael executive committee from 1875 to 1880; he was backed in the movement's leadership by other Carey allies, notably Knights of Labor chief Terence V. Powderly, and University of Pennsylvania economics Prof. Robert Ellis Thompson.

Carroll and his colleagues sent cash and guns to Ireland, and in 1878 Carroll toured the British Isles, reuniting the bickering Irish underground into a cohesive force of 20,000 members. (Twenty years later this Careyite initiative would

result in the formation of the Sinn Fein, which went on to free most of Ireland from British rule.) Dr. Carroll's main partner in this work was Irish revolutionary John Devoy, who had become foreign editor for James Gordon Bennett, Jr.'s *New York Herald*. Several others of the Carey-allied Irish nationalist movement joined Devoy in guiding the *Herald*—a newspaper that would be useful to Thomas Edison.

Perhaps Dr. Carroll's most spectacular enterprise was the invention of the submarine. The *Clan na Gael* "skirmishing fund" paid Irish immigrant John Holland approximately \$60,000 to build prototype underwater warships; Carroll justified the expenditure by reference to Robert Fulton's similar craft in the 1790s. The three-man submarine *Fenian Ram* was tested in New York harbor in May 1881; the British embassy protested, but Garfield refused to interfere with the Irish operation. (Garfield died soon afterwards.) The U.S. Navy in the 1890s decided to revive the *Clan na Gael*'s project, and paid John Holland to build the Navy's first battle submarines.

## **8. The real Thomas Edison**

Thomas Edison was called by admirers "the Franklin of the nineteenth century," and it is not surprising that he should be slandered by his detractors precisely as was Franklin: "a mere tinkerer," "uneducated," "unscientific," "an empiricist." The Dec. 31, 1995 *Washington Post* labeled Edison "a grease monkey. A putterer. A mechanic." As the lie was put about, that Franklin was a "British agent," so has Edison been called a Wall Street stooge. It is said that J.P. Morgan sponsored Edison's work, or that speculator Jay Gould gave Edison his start.

These and other calumnies constitute an outpouring of Anglo-establishment rage which is puzzling until one knows who Edison really was.

At the height of their power, the Philadelphia industrial-scientific-political grouping (see previous sections) *discovered Thomas Edison* as a young, clever inventor of telegraphic devices. They set him up as an independent full-time inventor. They encouraged him into astonishing inventions. When they were grievously weakened, financially and politically, they schemed to make Edison famous. Recognizing the force of his genius, they asked him to invent the electric light and tutored him in the history of the field. They protected Edison as far as possible from the brutal sabotage of J.P. Morgan, their enemy, and they stayed with Edison, through to the victorious electrification of the world.

The following report is, as far as is known, the first published attempt to systematically account for Edison in his real relations to the "principalities and powers," and to see Edison's own thinking in the context of America's technolog-

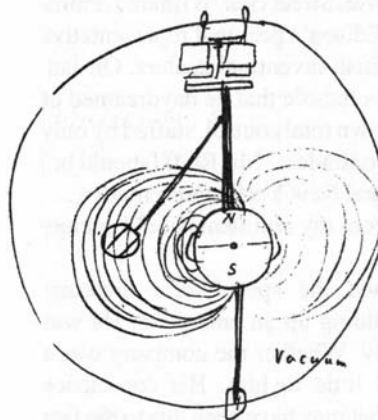
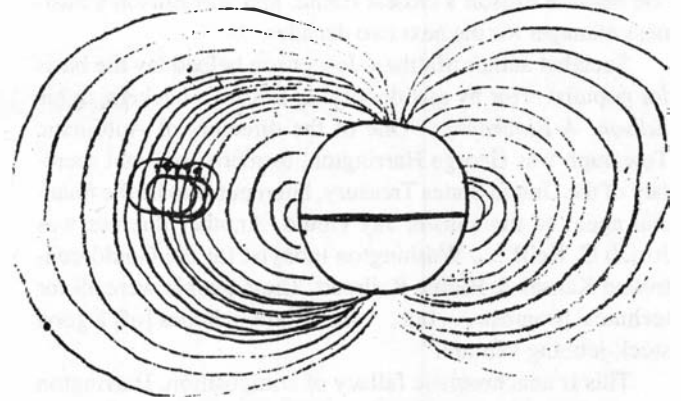


Thomas Alva Edison created the first modern research and development laboratory, an “invention factory” to transform the world, just as Leibniz had proposed. Edison perfected the telephone, and invented electric lights, the electric power industry, sound recording, and motion pictures. He is shown here with the “Edison effect” lamp.

ical optimism—something considered quite “incorrect” today.

It was William Jackson Palmer who directed the initial rescue of Edison out of Wall Street’s employ. By the end of the Civil War, Palmer had become a full partner in the “Philadelphia Interests.” He had converted the Pennsylvania Railroad to coal. As a Union officer, his cavalry had routed and captured an entire Rebel regiment in Alabama. The partners in 1866 sent Palmer and his assistant, telegraph expert Edward H. Johnson, out west to build the Kansas Pacific Railroad.

Backed by their industrial power, and the land grants and greenback-issuance policies put in place by President Lincoln, Palmer and Johnson surveyed the Kansas Pacific route through untracked wilderness in New Mexico and Arizona to the West Coast, and built the line from Kansas City, Missouri to Denver, Colorado. Johnson served as telegraphic constructor, surveyor, and Palmer’s secretary. With Johnson’s assistance, Palmer began building a line from Denver to Mexico City, with plans to develop modern manufacturing in both of the United States’ North American sister republics.



Entries in Edison’s notebooks, 1886. Edison hypothesized on the force geometries shaping the solar system, and theorized that overlapping force lines from the Sun and the Earth produced the Earth’s rotation. Left, an “apparatus to prove the theory.” Like Franklin, Edison had no use for Isaac Newton’s dead, purposeless universe.

But Wall Street was pressing everywhere to take over and milk or destroy productive enterprises. Jay Gould would get into the Kansas Pacific; the Boston Brahmins would move to shoot down Palmer’s operations.

### Backed by the Philadelphians

In 1870, Palmer, one of his Kansas Pacific executives named Josiah Reiff, and Philadelphian George Harrington, formerly Lincoln’s assistant secretary of the treasury, set up the Automatic Telegraph Company in New York City. The firm was supposed to compete with the Western Union Company, which only bought inventions in order to silence a potential challenge to its communications monopoly, and would suppress or make use of them as necessary.

Palmer sent Johnson back East to supervise Automatic’s work, and Johnson hired the 24-year-old Thomas Alva Edison to invent their technology. Edison had made a name for himself as an employee or contractor developing telegraphic devices, but Wall Street had hemmed him in. The Automatic Telegraph Company now gave Edison \$40,000 to set up a new shop; Reiff later arranged that Edison would be on salary

while doing his telegraphic inventing. Edison accepted on condition that Johnson be assigned as his chief assistant. Johnson became Edison's closest friend, and was Edison's business manager for the next two decades.

Socialist author Matthew Josephson helped lay the basis for populist error by misidentifying Edison's backers, in his *Edison: A Biography*: "One of the directors of Automatic Telegraph was George Harrington, formerly assistant secretary of the United States Treasury, but reputed to be the financial agent of the sinister Jay Gould. Another director was Josiah C. Reiff . . . Washington lobbyist for the Gould-controlled Kansas & Pacific Railroad. These people were all for technical progress . . . but . . . they were in hopes [of] a good stock-jobbing venture."

This is anachronistic fallacy of composition. Harrington eventually sold out to Gould; and Gould was contending for and eventually took over the Kansas Pacific. But Reiff, and Automatic's international representative Colonel Gouraud, were both agents of the anti-Wall Street Gen. William J. Palmer. Gouraud would become Edison's personal representative in England, dealing with British invention-stealers. On Jan. 17, 1870, Palmer wrote to his fiancée that he daydreamed of an "ideal railroad" under his own total control, staffed by only his closest and most trusted comrades: "Mr. Reiff [should be] general agent, Colonel Gouraud New York representative . . . and a host of good fellows from my regiment should occupy . . . various positions."

Edison himself explained the speculator's thinking: "Gould took no pride in building up an enterprise. He was after money, and money only. Whether the company was a success or failure mattered little to him. His conscience seemed to be atrophied, but that may have been due to the fact that he was contending with men [of Western Union] who never had any to be atrophied."

To understand Edison's mental map, it helps to consider the background of his Canadian immigrant father, Samuel Edison, who assisted Thomas in his Automatic Telegraph work and would construct his famous Menlo Park, New Jersey laboratory. Like Henry Carey's father, Mathew Carey, Thomas Edison's father was indicted for treason against the British Crown. Samuel Edison organized his townsmen against British rule, and, in 1837, he was forced to flee through the woods from British troops pursuing him. He escaped across the river-border from Ontario to Michigan, and later moved to Ohio, where Thomas was born in 1847.

### Attacking a problem

Johnson described Edison's probe of everything ever done before on the telegraph problem under study—how to send several messages simultaneously on the same wire, at high speed:

"There were numerous theoretical solutions in French books, but none of them enabled him to exceed the rate of 200 words a minute. . . . I came in one night and there sat Edison

with a pile of chemical books that were five feet high when laid one upon another. He had ordered them from New York, London and Paris. He studied them day and night. He ate at his desk and slept in a chair. In six weeks he had gone through the books, written a volume of abstracts, made 2,000 experiments . . . and produced a solution, the only one that could do the thing he wanted." Edison wrote, "I would construct a theory and work on its lines until I found it untenable, then it would be discarded and another theory evolved. This was the only possible way for me to work out the problem."

In 1876, Edison moved into the new Menlo Park laboratory, the "invention factory," with the Philadelphians' Johnson as his chief executive assistant. Alexander Graham Bell had recently developed a toy-like telephone device, somewhat better than two cans on a string, which could be used with difficulty over a short distance. Edison and his staff went to work to perfect the telephone; by 1877, he had invented the carbon transmitter and microphone, making the telephone practical.

Bell was backed on Wall Street by Boston's John Murray Forbes, a Baring Bank ally and head of the Boston-to-China opium syndicate; Forbes's son Hathaway would be Bell Telephone's first president. Edison, Johnson, and Colonel Gouraud created a rival telephone company and fought it out for preeminence in England itself against the Bell forces; the rival British companies eventually merged.

A few years earlier, Edison had met George F. Barker, a professor of physics at the University of Pennsylvania. Barker (no known relation to Wharton Barker) was chief scientist at the Franklin Institute, resuming Alexander D. Bache's role. Professor Barker became Edison's scientific "angel" and dear friend.

### Inventing the phonograph

The Bell-Edison telephone was going to market, and Edison asked: What if you call someone, and he is not in? The voice must be somehow preserved. Professor Barker encouraged Edison to take up the solution to the question—the invention of the phonograph. Edison had been partially deaf since childhood, but had trained his concentration so he could hear the entire musical overtone series. He loved Beethoven and hated Wagner; he worried that his new instrument could not reproduce a truly beautiful sound, and warned against its use for bad popular musical entertainment.

Once the phonograph was tested successfully, the embattled Philadelphia nationalists set out to make Edison famous.

Professor Barker arranged for Edison to be invited to the April 18, 1878 Washington, D.C. meeting of the National Academy of Sciences, an institution founded by Bache for loyal scientists during the Civil War. Barker and his friends made sure that the hall was packed with a warmed-up audience. The first words of the device to the public were, "The Speaking Phonograph has the honor of presenting itself to the Academy of Sciences."



*The Edison Museum in West Orange, New Jersey, displays a portrait of Thomas Edison alongside Edison's bust of German scientist Alexander von Humboldt. Edison considered Humboldt the father of American science.*

That night, a demonstration was held for the press in the Washington bureau of the *Philadelphia Inquirer*. The next day, with the cooperation of nationalist political leader James Blaine (soon to be President Garfield's secretary of state), the phonograph was demonstrated for congressmen in the home of Blaine's niece.

This publicity, organized by the Philadelphians and their political allies, made Edison world-famous.

To see a little bit of the connection between Edison and his political backers, we advert to a message from Professor Barker to Edison on March 22, 1878. Barker telegraphed that he wanted to hook up a direct telephone line from Menlo Park into the University of Pennsylvania for his forthcoming lecture. Barker then asked Edison, "Would it be too much of a favor to ask that you allow someone at your shop to give me occasionally a little time for experiment? For example I am to have at the University on Wednesday next, some of our most prominent men, Mr. Henry C. Carey, [Careyite journalist] Mr. Morton McMichael, Mr. Geo. H. Boker [former ambassador to Russia] etc. to see the telephone (the Bell [and two other devices]) and I should be very glad to use that opportunity to show them the greatest of the telephones, Mr. Edison's. Could you let someone do some talking [i.e., on the telephone from Menlo Park to the lecture-demonstration for Henry Carey et al.] about 4 p.m. on that day?" A few days earlier, General Palmer had written congratulations to Johnson: "Edison's last developments beat Aladdin completely."

### **The fight for light**

In July 1878, Professor Barker invited Edison to travel with him by the new railroad to Wyoming, to view a solar eclipse, and on to the West Coast. On this trip of two months,

Barker reviewed with Edison the development of electrical science, and the recent attempts to create light from electricity. *Barker proposed that Edison take this up as his own great project.* On Sept. 8, Barker next took Edison to Connecticut, to view an arc light (a bow of flame between two adjacent electrodes, unsuitable for indoor use) and a water-powered generator. Seeing a problem posed, and that no one was on the track to a solution, Edison excitedly took up the challenge.

Edison's object was to electrically heat, and cause to glow, some material ("filament") contained inside a glass, without consuming it; to "divide the light," by having an unlimited number of such devices running on the same power source; and to create a steam-driven generator that would convert fuel burned into electricity with such efficiency that the new light would be at least as cheap as the gas lights then in use.

Early the next month, October 1878, Edison boldly announced to the newspapers that he had invented the electric light, that he would produce light and electric power universally for the cities, thus moving civilization to a new stage.

Edison was confident he could do what he claimed. But the Philadelphians were staggering financially; Edison and his friends would have to get cash to move the work to completion. And those who controlled the main sources of available funding, Britain's U. S.-based financial agents, viewed Edison with alarm.

J.P. Morgan, his partner Anthony Drexel, and Rothschild representative August Belmont all came to Menlo Park in early December to negotiate for rights to Edison's yet-to-be-created electric light. Morgan immediately incorporated his Edison Electric Lighting Company (EELC).

Knowing that the London-New York financial axis wanted control so that they could suppress his work, and faced with

Morgan's lawyer Grosvenor Lowry's demands for secrecy, Edison used publicity to educate a broad range of supporters and potential financial backers.

The *New York Herald*, with its Irish underground editors, was Edison's special champion. A particularly influential article in the Dec. 21, 1879 *Herald* precisely and scientifically detailed the history of Edison's work on light and power up to that point, describing the result as "a bright, beautiful light, like the mellow sunset of an Italian autumn"; the author had accompanied Edison and Professor Barker on their trip out west.

The British scientific establishment and their American hangers-on churned out incessant, scornful anti-Edison propaganda. A special committee of Parliament heard experts testify that the electric light was impossible, and electric power would be dangerous in the general public's use. Sir William Preece told the Royal United Service Institution on Feb. 15, 1879:

"It is . . . easily shown (and that is by the application of perfectly definite and well-known scientific laws) that in a circuit [with constant] electro-motive force . . . additional lamps [inserted] . . . in series [will cause a sharp diminution of the light in relation to] the number inserted. Hence a sub-division of the electric light is an absolute *ignis fatuus*."

Among the attacks against Edison in the *New York Times* was an interview with a prestigious scientist, Henry Morton, pronouncing the whole electric light idea a failure, and repeating the British line that "no sub-division of the light is possible."

The nationalists' *New York Herald* replied, referring to the British heart of the problem: "Mr. Morton . . . will not have [the electric light] on any terms, and when a man of his eminence . . . refuses to consent to the electric light it is but little short of impertinence for Mr. Edison to invent it. . . . As Lord Russell [former British prime minister] was willing to consent that the progress of the British people might be admitted to go so far as he approved, but held that the point so gained must be a finality, so this professor will not admit that there may be any movement in the progress of invention beyond his finality; which is gas."

At length, Edison made his impossible light, his unlawful dynamo, and the hundreds of other inventions necessary for a working power system. Morgan blocked the manufacture of light bulbs, preferring to simply hold the patents. So Edison sold stock in the EELC and he and Johnson set up the Edison Lamp Company to make the bulbs.

A single power station was established, at Pearl Street, New York. The Morgan-controlled EELC bluntly refused to allow any more generators to be built. But the overwhelming public faith in Edison's competence made it likely that other money sources could somehow be found, and a brawl on the EELC board loosened Morgan's stranglehold for a time. Edison now proceeded with the spread of electricity the way the nationalists had built railroads before the Civil War—*municipalities issued their own bonds to pay for the building*

*of power stations*. Production of dynamos and their installation grew rapidly. Large city central power stations rose to 12 in 1884, and to 58 in 1886. By 1888, Edison had installed 200 central lighting stations and 1,500 isolated plants (and he held about \$4 million in municipal bonds).

Edison's power stations brought electricity to South America and Japan. Johnson and Professor Barker spread Edison's systems to Europe. German industrialist Emil Rathenau became Edison's partner in Germany. Rathenau was the opponent of the British-controlled Siemens company, whose 40% efficient dynamo had been bested by Edison's 90% rating. So it was Rathenau's Edison company, later called Allgemeine Electricitäts Gesellschaft (AEG), which turned on the lights in Berlin and electrified German industry.

### 'He couldn't solve a simple equation'

Who, then, really, was this man who brought light and power to the world?

With a mind that demanded problems to solve, that fought for solutions, Edison received direct support from America's best scientific thinkers, who had been trained in the milieu of Gauss and Humboldt. Edison's bust of Alexander von Humboldt sits in the Edison laboratory historic site in West Orange, New Jersey.

Edison's notebooks contain countless thousands of experiments and free explorations of much of the domain of science. His working hypotheses on the nature of gravity as electromagnetism, including his picturing of the origin of the earth's rotation in terms of the overlapping lines of force of the Sun and the Earth, are in the tradition of Johannes Kepler's work—and a challenge to the Newtonian dogma that separates gravity from electromagnetism.

At one point, J.P. Morgan's men brought in the young Francis Upton, trained by the prestigious Newtonian Hermann Helmholtz, to serve as "expert mathematician" to the presumably crude Edison. But, after a time, Upton confessed himself Edison's scientific inferior. Yet the man who brought Upton in, Francis Jehl, later bitterly complained to Upton that Edison had "such real little knowledge, a man that cannot solve a simple equation."

Edison attracted to himself fanatically dedicated young researchers, in the post-Civil War era of hope and determination to remake the world. Edison's laboratories were the first modern R&D facilities, in line with Leibniz's "Academy" proposal for "institutions of research and development with their own manufacturing and commercial houses directly attached . . . [to] offer a just, low price for merchandise. . . . The trading monopolies will be eliminated."

Edison's economic ideas were terrifying to the rentier financiers. As he put it, "The company with the best and cheapest machinery will do the business. . . . Fact is . . . all electric machinery is entirely too high now. These high prices hurt the business. With the leaden collar of the Edison Electric Light Co. all around me, I have never been able to show what

can be done. The ground of cheapening has scarcely been scratched. Let us break the leaden collar and you will see a brainy competition that will show them what real competition is. . . . [Prices] must go down 50 to 75% lower than now . . . and we will make a great profit.”

Among the assistants trained personally by Edison were Henry Ford, who created the automobile industry, and Frank J. Sprague. Sprague worked with Edison on electric trains,

then formed a new company led by the Philadelphian Edward Johnson; they developed the electric subways, the elevators, and many basic electric industrial tools.

The Edison companies, like all the great American industries, were usurped by Morgan and related British-approved financiers. No significant new technology is attributable to those financiers, to Wall Street, or to the “magic of the marketplace.”

## Bibliography and acknowledgments

The author gratefully acknowledges the research and counsel of the following persons in preparation of this article: Richard Black, Elliott Greenspan, Laurence Hecht, Denise M. Henderson, Carol Hugunin, Robert Hux, Michael Leppig, Alan Levinson, H. Graham Lowry, Arthur Murphy, Richard Sanders, the late Richard Sober, Charles B. Stevens, and Philip Valenti.

Many of the facts presented in this study are quite widely known, but they are not thought to be especially significant. Perhaps this may be attributed to the brain-death typical of academia, as much as to historians' Anglophilia or other prejudice.

Thomas Edison is a good case in point. Virtually every standard Edison biography mentions that a certain Prof. George F. Barker was Edison's science adviser and that he asked Edison to invent the electric light. And most biographies note that a certain Edward H. Johnson was Edison's best friend and business manager. But no biography really inquires into who these people were, where they came from, or what was on their minds.

A large volume of correspondence involving Edison and these two men, a vast array of Edison's notebooks and other treasures, are in the Thomas A. Edison papers, which are now available on microfilm at major libraries.

Some of the research for this article was done in the Duke of Bridgewater papers at Salford University, Salford, England; Matthew Boulton papers, Birmingham City Archives, Birmingham, England; Henry C. Carey papers, Pennsylvania Historical Society, Philadelphia; William J. Palmer papers, Pennsylvania State Library, Harrisburg; Wharton Barker papers, Library of Congress, Washington; records of the 1837 rebellion (for Edison's father), National Library, Ottawa, Canada; and the George F. Barker papers, University of Pennsylvania archives, Philadelphia.

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*the United States, 1776-1976* (Chicago: American Public Works Association, 1976). Many interesting facts are presented, but it is lacking the necessary history of public policy.

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Nancy Spannaus and Christopher White, *The Political Economy of the American Revolution* (New York: Campaigner Publications, Inc., 1977); to be reprinted in 1996 by Executive Intelligence Review. Many extracts from America's founding nationalists.

Since such historical figures as Franklin, Hamilton, and Lincoln acted on philosophical grounds which are today considered incorrect or dangerous, their own writings should be read in preference to most secondary works about them, which often range from pointless to deceitful.