The First 'Corporate' R&D Lab

"One of Edison's greatest accomplishments was the invention of an entirely new institution—the independent industrial-research laboratory."

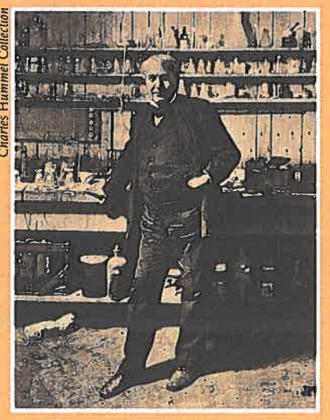
So wrote Kathleen McAuliffe in the December '95 *Atlantic Monthly*. While few would dispute this point, a case can be made that Edison accomplished something even greater at his West Orange facility—the creation of the first true "corporate" research laboratory in the world.

Not only was it the biggest and most intricately structured facility of its type, West Orange was also the first R&D lab to mass-produce the products that were invented there. Phonographs, recording cylinders, dictating machines, motion picture equipment, and storage batteries were all manufactured in factories and shops right on the site.

The sheer size of the new complex also precipitated a change in Edison's management style. He soon learned he could not remain the guiding force behind its every activity; within two years of the lab's opening, Edison's staff was engaged in more than 70 research projects, enough to overwhelm even the indefatigable Edison. If the new lab was to be as productive as he had promised it would be, he had no choice—he would have to delegate more responsibility to his lieutenants.

Thus arose what Kim Keister, writing in *Historic Preservation* magazine, has called a structured "team approach to scientific investigation"—an organizational style that would be copied by numerous other research-intensive companies in the years to come.

Biographer Neil Baldwin argues that the opening of the West Orange lab marked yet another watershed in Edison's career—and in the history of the American corporation.

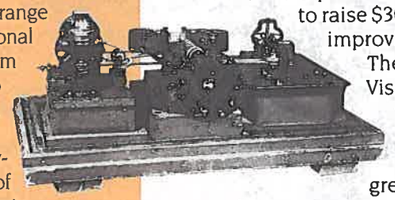


Charles Hummel Collection

Edison in his chemical lab, 1906

While his earlier labs represented "the Romantic Edison, his Whitmanesque period"—the rough and tumble years when the inventor was scrambling just to establish his name and keep his company solvent—West Orange was "a symbol of his arrival"—a monument to the "mature Edison," now "an established force on the landscape" of industrial America. At West Orange, his public persona transformed. No longer was he merely Tom Edison, struggling inventor and entrepreneur; now, he was Thomas A. Edison, CEO.

West Orange thus became the centerpiece of Thomas A. Edison Inc., the corporation he established to integrate all his businesses. Without the lab to churn out new products for Edison's factories, the whole structure would have fallen apart. In this sense, West Orange served as a prototype for the central R&D labs of many of America's greatest companies: the Westinghouse Science and Technology Center, AT&T Bell Labs, the DuPont Experimental Station, IBM's T.J. Watson Research Center, and RCA Laboratories (now the David Sarnoff Research Center). The West Orange lab, says Baldwin, "is very much a transitional symbol" straddling nearly five decades, from the waning of the Industrial Revolution to the flourishing of the modern corporation. "That's why it is so important."

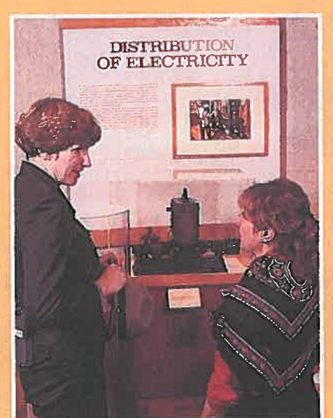


In 1984, citizens concerned about preserving this unique legacy formed the Friends of the Edison National Historic Site. The group's president, Michael McDonough, says that $800,000 in roof repairs and other physical improvements will be made this year, thanks to a Congressional appropriation. In addition, Square D Company is replacing the entire electrical system. Further improvements are needed to restore labs that have been converted to offices and storage space.

But the toughest challenge ahead is to raise $30 million for a new Visitors Center to house the extensive collection of artifacts and papers, provide an auditorium for lectures and film screenings, and upgrade the education program for the 85,000 visitors—20 percent of them in school groups—who come to the site every year.

The education component is crucial, says Superintendent Maryanne Gerbauckas, for the National Park Service "to be able to introduce our visitors, especially the children, to what life was like when this lab was operational, and to inspire them with the story of research and development as it began here."

Next February 11 will mark the 150th anniversary of Edison's birth. What more fitting way to honor our greatest inventor than to restore this American technology treasure, the Edison National Historic Site, to its former grandeur?



A National Park Service ranger describes an electricity distribution exhibit to a visitor (left).

Earliest prototype of the modern motion picture camera, Edison's 1889 strip kinetograph (above).

For more information about the Edison National Historic Site, call 201-736-0550; fax: 201-736-8496.

How You Can Help Save Edison's Invention Factory

Friends of the Edison National Historic Site, the National Park Service, the National Park Foundation, and Square D Company are working together to raise $30 million toward restoring and improving Edison's West Orange lab. The chief goals are: to build a Visitors Center for the collection, with an auditorium for holding meetings and exhibiting Edison's films; to provide greater access to the site by the public; to enhance visitor education; and to restore the lab to its historic condition.

You can join the cause by signing the support statement below—and by making a donation to the National Park Foundation, the official nonprofit partner of the National Park Service, which administers the Edison Site.

National Park Foundation
1101 17th St., N.W., Suite 1102
Washington, DC 20036

I join you in supporting the improvement of the Edison National Historic Site at West Orange, New Jersey.

Signature _____

Here is my donation of $_____ to support your effort to preserve this valuable technology treasure. Please make check payable to: National Park Foundation/Edison Site.

Checks only, please.

Name _____

Address _____

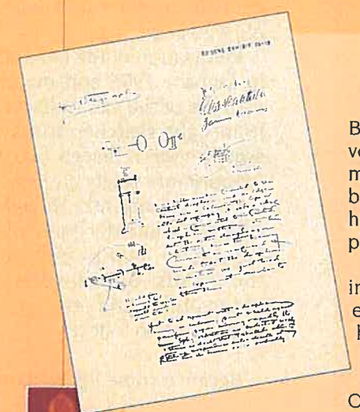
City _____

State/Zip _____

The National Park Foundation is the official nonprofit partner of the National Park Service. All donations will be earmarked for use at the Edison National Historic Site.

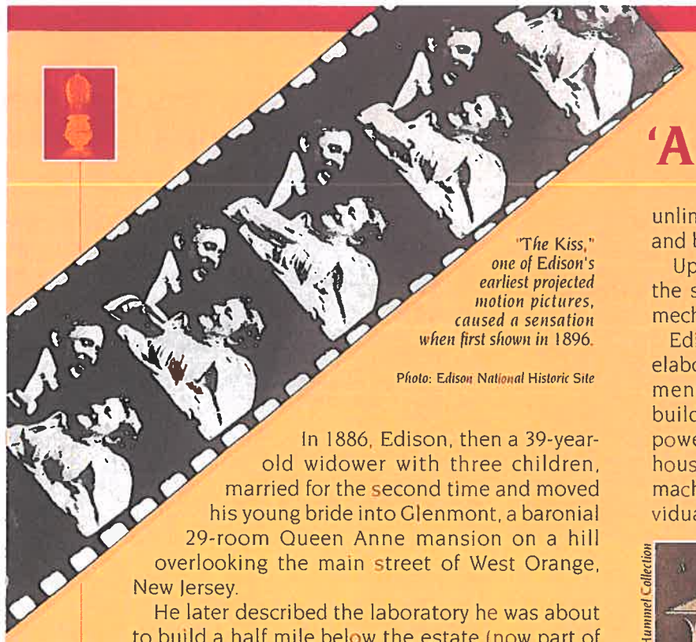
Grateful acknowledgment is made to the staff of the National Park Service, Edison National Historic Site, and to Charles Hummel for the use of his photo collection. Design: Judy Hall, Cahners Publishing Company.

Edison's Lab Notebooks Turning To Dust



Edison's biographer, Neil Baldwin, notes that the inventor—whom Baldwin describes as "a consummately visual thinker and a fine draftsman"—vowed in his early twenties to "keep a full record" of his work. That Edison did, five million pages worth—detailed drawings, conceptual sketches, patent applications, business agreements, countless doodlings, even love letters. The document shown here is a sketch of the speaking telegraph, with the first known notation of the phonograph, July 18, 1887.

The most important of these—including some 3,500 lab notebooks—were stored in a vault built in 1942, but the bulk of Edison's papers are threatened by decay. An eight-member team from Rutgers University, led by historian Robert Rosenberg, has microfilmed 250,000 pages of documents up to 1898 and issued three massive printed volumes (published by Johns Hopkins University Press). But it will be years before the printed works reach the period covering Edison's career at the West Orange lab. If their funding—and energy—hold out, the historians could finish the entire project by 2015.



"The Kiss," one of Edison's earliest projected motion pictures, caused a sensation when first shown in 1896.

Photo: Edison National Historic Site

'A Big Idea Every Six Months'

In 1886, Edison, then a 39-year-old widower with three children, married for the second time and moved his young bride into Glenmont, a baronial 29-room Queen Anne mansion on a hill overlooking the main street of West Orange, New Jersey.

He later described the laboratory he was about to build a half mile below the estate (now part of the Edison National Historic Site) in these words:

"I will have the best-equipped and largest facility extant, incomparably superior to any other for rapid and cheap development of an invention, and working it up into commercial shape with models, patterns, and special machinery. In fact, there is no similar institution in existence. My laboratory will be equipped with every modern appliance for cheap and rapid experimenting, and I expect to turn out a vast number of useful inventions and appliances in industry."

Kit Latham

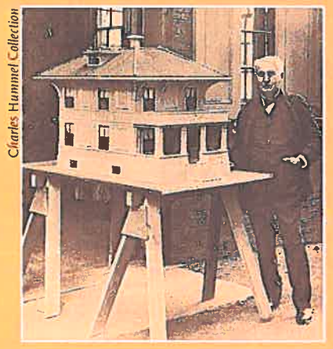
The chemistry lab as it appears today

In *Edison: Inventing the Century* (Hyperion), Neil Baldwin writes that the new lab was to be "constructed with the eventual goal of mass-producing inventions, effecting the final marriage between pure and applied sciences for the purpose of feeding the unlimited consumer appetite of Victorian America and beyond."

Upon its completion in 1887, it was ten times the size of Menlo Park, with ten times as many mechanics, chemists, physicists, and engineers.

Edison's new headquarters was also much more elaborate than Menlo Park, with discrete departments, several of them housed in separate buildings: the main lab building, with its own powerhouse, a magnificent three-story library housing 10,000 reference works, and shops for machining both heavy and precision parts; individual buildings for chemistry, metallurgy, and physics (largely electricity) labs; and an entire building for storing chemicals and making molds for castings.

Charles Hummel Collection



A model of a prefabricated concrete house (1910). Portland cement was poured from the top into precast molds. Edison built 11 such homes for his employees.

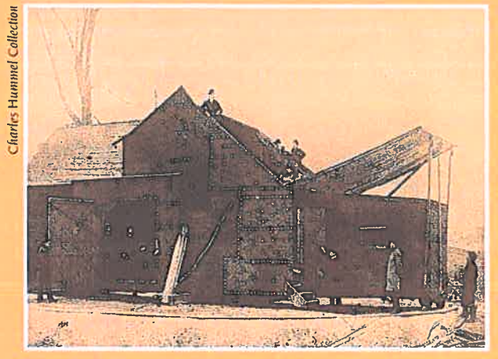
Here, Edison hoped, his researchers would turn out a minor invention every ten days and "a big idea every six months." He never achieved that level of productivity, but in the ensuing 44 years, he produced the majority of his 1,093 patents and several of his greatest commercial successes.

In 1888, shortly after occupying the new lab, Edison learned that competitors had developed a more practical version of his original tinfoil phonograph. Angered that others might capitalize on his most beloved invention, he closeted himself and his associates in the lab for three sleepless days and nights, emerging with an improved phonograph that became the foundation of his recording company. A year later, he applied the basic concept of his phonograph to the eye, winding images around a cylinder to create the first motion picture camera. The strip kinetograph camera and the kinetoscope peephole viewing device followed, along with the so-called Black Maria studio (a replica of which can be seen at the Edison National Historical Site).

And while he did not invent the motion picture projector (instead buying the rights to one patented by Francis Jenkins and Thomas Armat), he was an industry trailblazer. Among his many films was the first national "blockbuster" hit, *The Great Train Robbery*, in 1903.

As early as 1901, his belief in battery-driven vehicles prompted him to invent a storage battery that used nickel and iron elements in a potash electrolyte. He later improved the storage power of the battery by using nickel flake within the positive plate.

Charles Hummel Collection



The "Black Maria" motion picture studio (1894)

Even Edison's failures were remarkable. He spent years—and a fortune—on a scheme for magnetic ore separation. When he finally abandoned the idea, he used what he had learned to invent a horizontal roasting kiln that revolutionized the process for making Portland cement—an innovation that Edison licensed widely and used to launch his own cement company.

He died in 1931, leaving the world not only his inventions, but also a new kind of structure for inventing—the "corporate" R&D laboratory.

Edison, a pioneer of electric-powered vehicles, shown with an automobile using his alkaline storage battery.

Photo: Edison National Historic Site

Square D's Role in Preserving the Edison Site

As a company whose business is the distribution and control of electricity, Square D wouldn't exist without Thomas Edison. Our ties with Edison go much deeper, though. Square D electrical products have been used at Edison's West Orange, N.J., laboratory for almost 90 years—or just about as long as we've been in existence. In fact, Edison himself may have specified them. He also specified our equipment for the research laboratory in his Fort Myers, Fla., winter home.

With this history, we were naturally compelled to step forward when we heard about the condition of Edison's West Orange laboratory. We are very proud to be the first corporate sponsor of the Edison National Historic Site, contributing both financial support and the equipment needed to rebuild the lab's aging electrical system. This equipment, some of which dates back to 1887, threatened the safety of the collection of Edison's work and research and limited the number of people who could see it.

Square D safety switches in Edison's Fort Myers, Florida, research laboratory.

Renovation of the lab's electrical system began in January 1996 and involved a total electrical upgrade of the site's eleven buildings. Everything from light switches to panelboards and safety switches was replaced, and the facility was rewired for optimum safety and energy efficiency.

More importantly, though, we at Square D and Groupe Schneider have pledged our continued support to help protect and preserve the site's thousands of treasures, make them more accessible, and set an example for other companies to follow.

Because some lights should never go out.

A Message From Charles W. Denny

President and Chief Operating Officer, Square D Company
President and Chief Executive Officer, Groupe Schneider-North America

SQUARE D COMPANY
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CHARLES W. DENNY
PRESIDENT
CHIEF OPERATING OFFICER

Where would the electrical industry be without Thomas Edison?

The legendary inventor developed the first practical electrical light bulb and electrical residential generating system, created the first successful alkaline electric storage battery, and also invented the motion picture camera that launched the modern film industry.

The fact that Edison used Square D electrical equipment in his laboratories ties the inventor even more closely to our company.

That's why we reacted so strongly when the inventor's laboratory in West Orange, New Jersey, was placed on the list of "most endangered historic places." The Edison National Historic Site, where the inventor created more than half of his 1,093 patented devices, is in urgent need of repair.

As a leader in the electrical industry, we at Square D are committed to preserving this important and historic laboratory.

But we want to do more than preserve Thomas Edison's legacy. We want to live it.

Edison once described genius as "one percent inspiration and 99 percent perspiration." These are words to live by today. The simple values like hard work that guided Mr. Edison throughout his life should light the way for us as well. His dedication to developing innovative, more efficient ways of doing everyday tasks is an example for all of us.

At Square D and Groupe Schneider, we are committed, through the preservation of Mr. Edison's laboratories, to bringing his legacy to life today and for the future.

We invite you to join us in this cause.

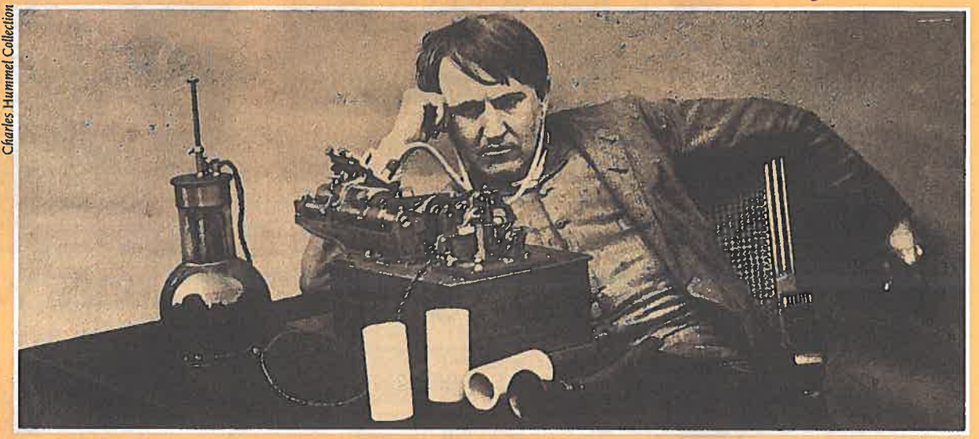
Sincerely,

Charles W. Denny

Square D equipment, such as this original Square D safety switch, has been used in the West Orange lab for almost 90 years. The company is donating the replacement of all electrical systems.

The Race Against Time To Save Edison's 'Invention Factory'

Charles Hummel Collection



Edison emerged with his improved phonograph after 72 sleepless hours in the lab (1888); the library as seen today (below left); and a visitors tour (below right). Light bulb icon taken from an 1881 photograph, Charles Hummel Collection.

Thomas Edison, America's greatest inventor, will forever be known as "The Wizard of Menlo Park," after the New Jersey laboratory where he perfected the first practical incandescent lamp, in 1879.

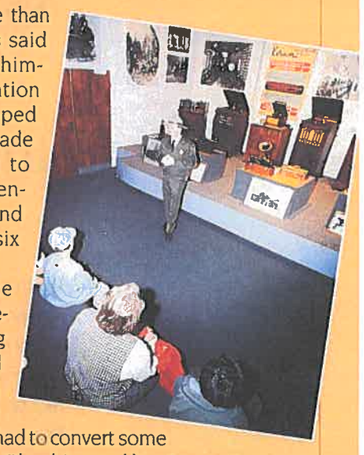
But it was at his laboratory in West Orange, New Jersey, which he built in 1887, that he either created or perfected some of his most important inventions.

Among them: the "perfected" phonograph, which spurred the development of the music recording industry; the first commercially successful alkaline storage battery; a fluoroscope based on calcium tungstate, still the compound of choice for certain x-ray devices; and a more efficient—and more profitable—process for making Portland cement. At West Orange, Edison launched the movie industry with the kinetographic camera, the kinetoscope viewing box, and the "Black Maria," the first structure designed for filming motion pictures.

Kit Latham

In fact, more than half of Edison's 1,093 patents were earned in the 44 years he spent at the West Orange lab, from 1887 until his death in 1931.

In its heyday, the complex housed some 10,000 factory workers and technicians, including more than 200 researchers.It is said that here, in what he himself called an "invention factory," Edison hoped to fulfill a promise made early in his career to turn out a minor invention every 10 days and a major one every six months.



Today, this once bustling center of creative energy is falling into disrepair and misuse. The National Park Service, which oversees the site, has had to convert some of the labs into offices. Plumbing and heating systems are out of date. Many of the 390,000 artifacts remain uncatalogued, and five million pages of Edison's lab notebooks and papers are in danger of crumbling to dust.

Conditions are such that the National Trust for Historic Preservation has placed the Edison National Historic Site on its list of the nation's Eleven Most Endangered Historic Places.

But there is hope. Private citizens, government officials, and Square D Company are working hand-in-hand to raise $30 million to restore and upgrade this national technology treasure.

1919

1992

Times may have changed, but the need for Square D safety switches hasn't.

We introduced the first safety switch in 1909. Since then, no one has designed more value and reliability into safety switches than Square D. The kind of value and reliability you've come to trust for over 80 years. And rely on today to protect your bottom line from the high cost of downtime and lost productivity. Look closely and you'll see why.

To prolong the life of the safety switch, the blades and jaws are constructed so the jaws clamp down with uniform pressure on both sides of the blade. And our powerful spring-driven quick-make/quick-break mechanism snaps all the blades into the ON or OFF position in one immediate, uniform movement.

Combine all this with our patented built-in or field installable fuse pullers, quick-release cover latches, a complete line of enclosures, plus the new optional cover viewing window, and you can see why Square D safety switches are preferred two to one over our closest competitor.

We offer the most complete and versatile line in the industry. Including general duty switches rated from 30 through 600 amperes, heavy duty switches rated from 30 through 1200 amperes and double throw switches rated from 30 through 600 amperes.

So specify Square D safety switches. Unless, of course, you want to keep up with the Joneses. For a FREE brochure, write: Square D Literature Center, P.O. Box 1258, Waukesha, WI 53187, or call: 1-800-392-8781.

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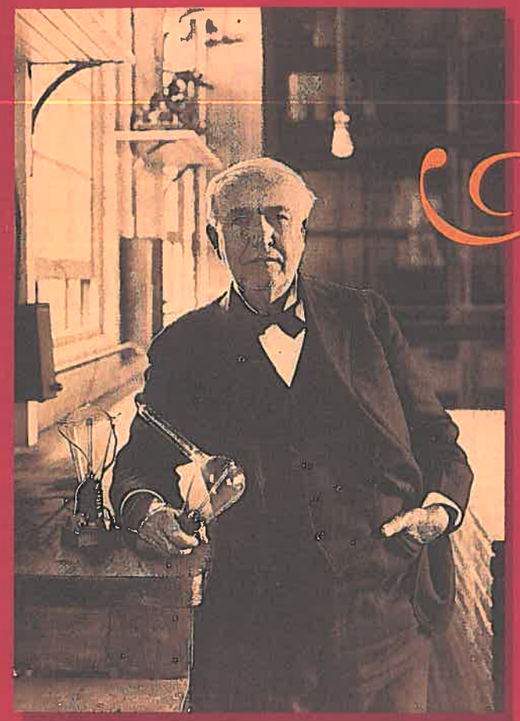
GROUPE SCHNEIDER



Preserving A National Technology Treasure

Edison posed in his West Orange lab about 1918-1919. Vacuum tube lamp in his hand shows electron discharge, or the "Edison Effect," which he discovered in 1880. Courtesy U.S. Dept. of the Interior, National Park Service, Edison National Historic Site

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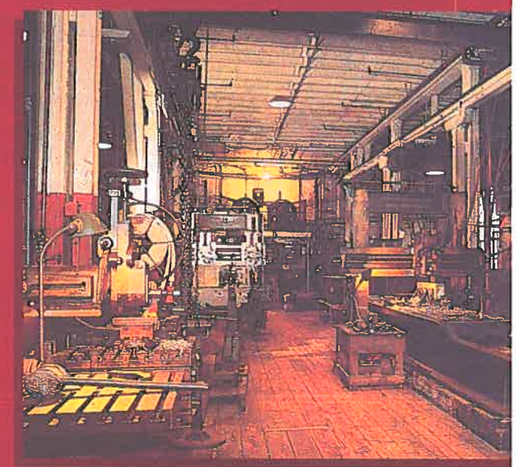

The heavy machinery shop. Courtesy Edison National Historic Site

The exterior of the main laboratory building today. Photo: Kit Latham

The Edison National Historic Site
West Orange,
New Jersey