

*Thomas A. Edison* personified the age of invention, America's new frontier in the late 1800s. Though he was best known for the phonograph and incandescent lamp, perhaps Edison's greatest invention was a new way to invent: the industrial research and development laboratory. Today his largest lab complex is preserved at Thomas Edison National Historical Park. With his teams of scientists and technicians, he perfected his phonograph and developed motion pictures, a nickel-iron-alkaline storage battery, and many other devices and technologies. Edison earned 1,093 U.S. patents in his lifetime, most for inventions that came from here.

Ten times the size of the Menlo Park lab where Edison achieved early fame, the West Orange complex looked like a small college campus. A three-story building held a research library, machine shops for building models, space for experiments and various research projects, and Edison's office. Across from the

main building were separate labs for chemistry, physics, and metallurgy. Though Edison was the guiding force behind every project, a spirit of camaraderie prevailed among the 100 or so employees. Small teams worked independently on aspects of projects while Edison made the rounds daily to fine-tune, offering inspired "guesses" that usually turned out to be right. He spent most of his time at the labs, often working overnight and indulging in quick naps in his library.

Edison the inventor was also a shrewd entrepreneur who established dozens of companies during his career. "I always invented to obtain money to go on inventing," he said. The business side of his operation centered on the phonograph. His factories in West Orange produced a variety of cylinder and disc phonographs and recordings, plus a business phonograph for office dictation. He introduced motion pictures, and manufactured cameras, projectors, and films. In the Black Maria, the world's first movie studio, his staff filmed every-

thing from ballet to boxing. The phonograph and film businesses capitalized on consumer demand for new forms of entertainment.

Well into old age Edison was trying new things: a technique for poured concrete buildings, a fluoroscope to view x-ray images, methods for manufacturing large quantities of chemicals, huge machines for extracting iron from ore and for manufacturing cement. His final search was for a domestic source of rubber. Thomas Edison died in 1931. The West Orange labs soon closed, but reopened as a museum in 1948. Edison National Historic Site was established in 1962; in 2009 it became Thomas Edison National Historical Park. The park is a memorial to the man and a place where you can discover the roots of American inspiration and innovation.

Edison Labs  
NPS / MELINDA SLOATE SCHMITT

## 1847 An Inventive Career

**1847**  
Thomas Alva Edison is born in Milan, Ohio, February 11. Educated mostly at home by his mother.

**1854-63**  
Family moves to Port Huron, Mich. Thomas works as a newsboy on Grand Trunk Railroad. Suffers permanent hearing loss.



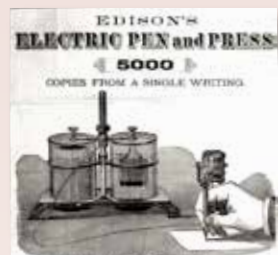
Thomas Edison, age 14.

**1864-69**  
Itinerant telegrapher in Indianapolis, Cincinnati, Memphis, and Louisville. Works for Western Union in Boston. Invents improved telegraph equipment.

**1869**  
Awarded his first patent for legislative vote recorder. Decides to become full-time inventor.



Vote recorder, 1869.



Electric pen ad, 1870s.

**1870**  
Invents commercially successful stock ticker. Income finances workshop in Newark, N.J., where Edison begins work on automatic telegraphy.

**1871**  
Marries Mary Stilwell, one of his employees, on Christmas Day.

**1874**  
Invents quadruplex telegraph device that sends four messages simultaneously along a single line. Pursues increased message capacity.

**1875**  
Invents and markets electric pen, an early document duplication system.

**1876**  
Builds laboratory at Menlo Park, N.J., world's first industrial research facility incorporating several fields of science and technology.

**1877**  
Building on experiments to improve Alexander Graham Bell's telephone, invents

"talking machine"—the phonograph. First recording is Edison's recital of "Mary had a little lamb." Hailed as the "Wizard of Menlo Park."

**1879**  
Using carbon filaments in a glass-enclosed vacuum, produces practical incandescent light powered by electric generator. Demonstrates lighting system New Year's Eve at Menlo Park.



First phonograph, 1877.  
NPS / DARRYL HERRING

**1880**  
Experiments with magnetic gold ore separation. Observes transfer of electrons between electrodes within a glass globe—the "Edison Effect"—which eventually leads to development of vacuum tubes used in radio and television.



Menlo Park lab and workers, ca. 1880.



Edison's 1879 lamp sketch (left) and reproduction lamp.  
COLLECTION OF THE HENRY FORD

**1881**  
Moves home and office to New York City. Begins construction of first permanent central power station on Pearl Street in Lower Manhattan, which opens in September 1882.

**1883-84**  
Establishes company to build central power stations throughout Northeast.

**1884**  
Mary Stilwell Edison dies.

**1886**  
Edison marries Mina Miller. Moves to Glenmont estate in West Orange, N.J.

**1887-88**  
Opens new lab complex in West Orange. Experiments with ore separation, shifting focus from gold to iron ore. Spurred by rivals' invention of graphophone, resumes work on perfecting his phonograph. Builds Edison Phonograph Works near lab complex. Begins work on kinetograph, a mo-



Mina Miller, ca. 1886.

tion picture camera, and kinetoscope, a boxlike device for viewing motion pictures through a peephole.

**1890**  
Establishes Edison General Electric Co., which merges with the Thomson-Houston Electric Co. in 1892 to form General Electric.

**1891**  
Demonstrates kinetoscope to the public for the first time.

**1893**  
"Black Maria" at West Orange labs becomes world's first motion picture studio.

**1894**  
Sells General Electric stock to finance ore milling operation, thus exiting electrical industry by 1897. Ore milling is ultimately a commercial failure. "Edison Kinetoscopic Record of a Sneeze" becomes first copyrighted motion picture.

**1896**  
Introduces Edison Home Phonograph, affordable and easy to operate. Begins experimenting with x-rays.

**1899**  
Establishes Edison Portland Cement Company; uses waste rock and ore milling technology to produce cement, an increasingly popular building material.

**1902**  
Introduces "Gold Moulded" black wax cylinder, made by a molding process that



Edison Portland Cement bag, early 1900s.  
NPS / JANE S. HANNA

improves sound quality, yields more recordings, and lowers costs.

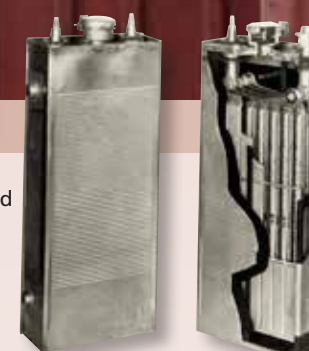
**1905-08**  
New company manufactures phonographs for office dictation, later known as the Ediphone and the Voicewriter. Introduces Amberol cylinder recordings that play for four minutes rather than two. With other film producers, forms company to control patents and fight competitors.



Gold Moulded cylinder and container, 1902.  
NPS / JANE S. HANNA

**1910**  
After 10 years of experimentation, introduces nickel-iron-alkaline storage battery for electric automobiles. With demise of electric cars, battery eventually used in other industrial applications. Demonstrates kinetophone, a motion picture projector synchronized with a phonograph to produce sound films.

**1911**  
Organizes Thomas A. Edison, Inc., to consolidate most of his companies.



Nickel-iron-alkaline storage battery, 1910.

**1912**  
Introduces Home Projecting Kinetoscope to show films in homes, schools, and churches. Introduces Diamond Disc, a vertical-cut groove disc record made of Condensite (a plastic).

**1914**  
Fire damages or destroys 13 factory buildings; laboratory buildings are spared. Edison vows to rebuild, resumes limited production within one month.

**1915**  
Named chairman of Naval Consulting Board, advisory group that evaluates civilian inventions for military application.

**1918**  
Sells motion picture business.

**1920**  
Postwar economic downturn and poor sales result in huge layoffs at Edison factories and dismissals of many managers and office workers.

**1927**  
Begins search for domestic source of rubber that can be grown and processed quickly. Eventually settles on goldenrod and continues experiments for the rest of his life. Menlo Park lab recreated at Henry Ford Museum in Dearborn, Mich.

**1928**  
Awarded Congressional Medal, one of the highest civilian honors.

**1929**  
Light's Golden Jubilee celebrates 50th anniversary of electric lighting. Ceases manufacture of entertainment phonographs.

**1931**  
Dies October 18. Lights dimmed nationwide for one minute on the day of his funeral.

**1955**  
Edison company begins conveying West Orange property to National Park Service.

**1962**  
Edison National Historic Site established to preserve lab complex, Glenmont, and historical collection.

**2009**  
Congress redesignates site as Thomas Edison National Historical Park.

### Electric Servants

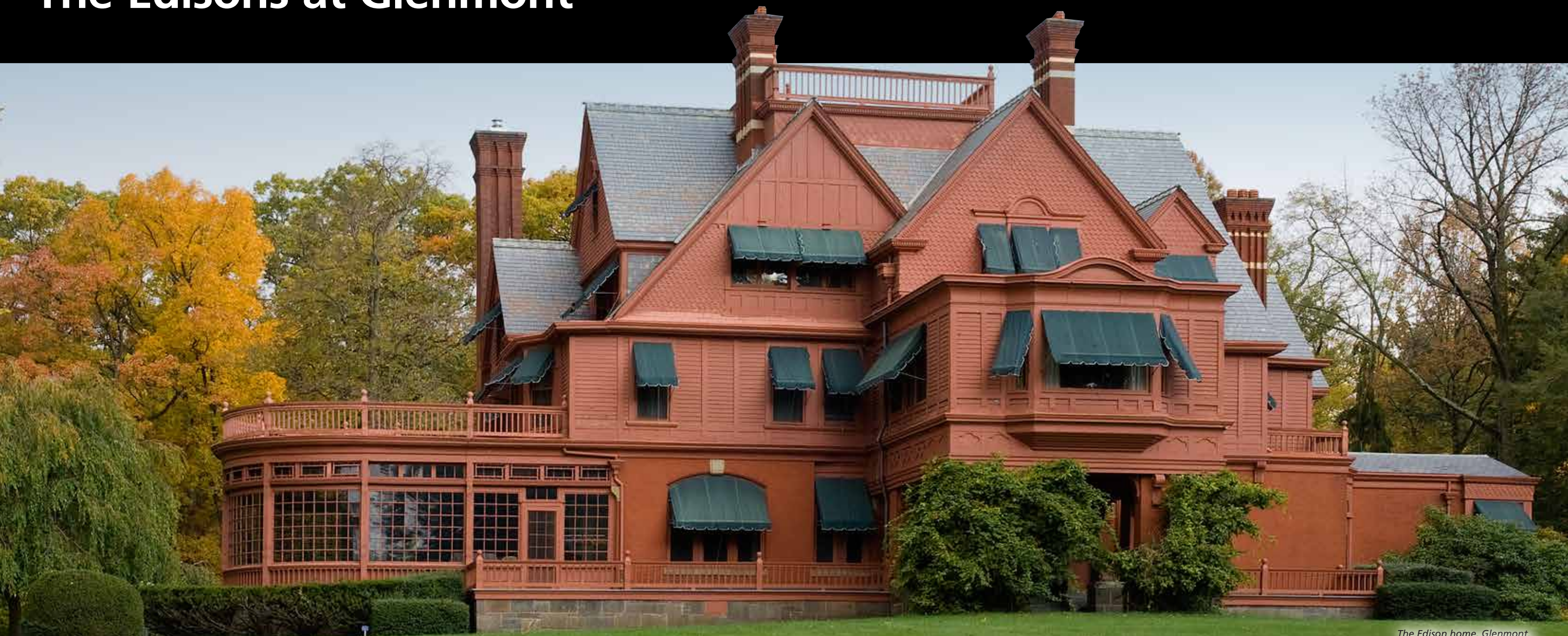


In the 1920s, the Edicraft division of Thomas A. Edison, Inc. began making coffee-makers (above), waffle irons, sandwich grills, and toasters. These "electric servants"—a popular term for kitchen appliances—fit in with notions of modern American domestic life. Sales of the pricey gadgets dropped during the Great Depression. Edicraft ceased production in 1934.





# The Edisons at Glenmont



The Edison home, Glenmont.  
NPS / JANE S. HANNA



Mina Miller Edison and baby, ca. 1888.

Theodore Edison taking his piano lesson with Miss Bogue, 1907.

Mina and Thomas Edison, 1908.

Family gathered on the back steps of Glenmont, 1906.

Thomas Edison enjoying a quiet moment on the grounds of Glenmont, 1917.

Edisons celebrate Thomas' 80th birthday, 1927.

In 1886 Thomas Edison married Mina Miller, the 20-year-old daughter of a wealthy Midwestern manufacturer. According to family lore, Edison gave his fiancée the choice of a townhouse in New York City or a home in the country. They soon settled on the Glenmont estate in Llewellyn Park, a fashionable neighborhood that advertised "Country Homes for City People."

The 29-room red brick and wood mansion was built in 1880 by an office clerk who spared no expense (including funds embezzled from his

firm). The architect was Henry Hudson Holly, who also designed Edison's nearby lab complex. The exterior of the house exhibits the hallmarks of the American Queen Anne style, which Holly introduced to the nation: asymmetrical facade, high-pitched gables, rooftop balcony, wrap-around porch, and unified color. Interior elements include stained-glass windows (right), chandeliers, wainscoting, and hand-painted ceilings. Expansive grounds, a greenhouse and potting shed, barn and stables, and poured-concrete garage complete the estate.

Glenmont was very much Mina's domain; in fact Thomas sold the property to her in 1891 to avoid possible seizure by creditors. Mina referred to herself as a "Home Executive" and took those duties very seriously. She managed money, oversaw the servants, and raised the couple's three children, Madeleine, Charles, and Theodore and Edison's three children from his first marriage, Marion, Thomas Jr., and William.

Because Edison spent most of his time at the labs, Mina represented him in the community



A large stained-glass window depicts Penelope awaiting Ulysses' return from the Trojan war. This subject from Greek mythology fit the Victorian notion of a woman's role as homemaker and faithful wife.

ALL PHOTOGRAPHS NPS / THOMAS EDISON NATIONAL HISTORICAL PARK UNLESS OTHERWISE CREDITED

and by hosting social events at Glenmont. Guests included Orville Wright, Helen Keller, the King of Siam, and Edison's friend Henry Ford. Products of Edison's labs and factories—phonographs, kinetoscopes, and of course electric lights—were displayed throughout the rooms, as were Edison's many honorary gifts and awards.

After Thomas died in 1931, Mina married again and lived at Glenmont until her death in 1947. Mina and Thomas are buried side by side in a simple plot behind their home.

**Museum and Archival Collections**  
Thomas Edison National Historical Park administers one of the largest museum collections in the National Park System. There are some 400,000 artifacts—everything from prototype and commercial Edison products to laboratory furnishings and equipment to the Edisons' personal possessions. Also included are 48,000 sound recordings, Edison's own library of 10,000 rare books, and the Edison archives with 60,000 photographic images and an estimated five million documents.

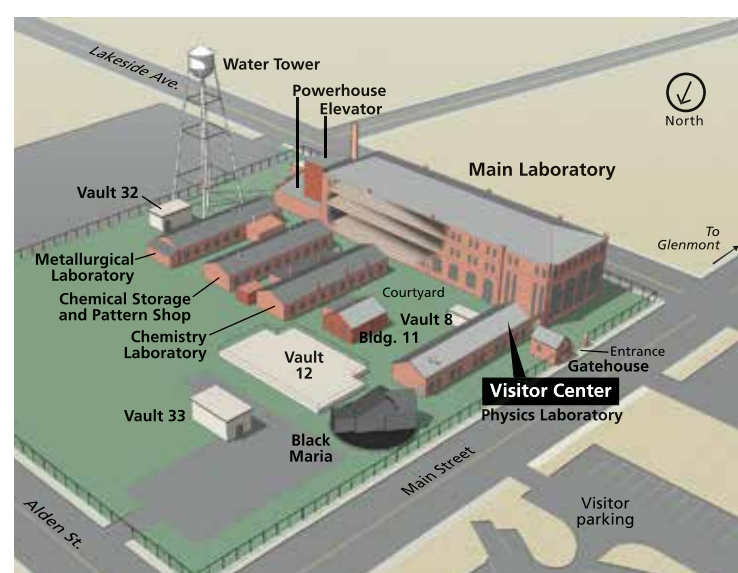
## Planning Your Visit

Begin your visit at the Laboratory Complex Visitor Center, which offers orientation information. Call ahead or check the park website for hours and days of operation and special events. Reservations are required for groups. The Laboratory Complex tour is self-guiding. You can see the 1877 tinfoil phonograph, the kinoscope, and many more original inventions. The Edison Home at Glenmont offers a guided tour; the estate grounds are self-guiding.

Thomas Edison National Historical Park is one of over 390 parks in the National Park System. To learn more about national parks visit [www.nps.gov](http://www.nps.gov).

Thomas Edison National Historical Park  
211 Main St.  
West Orange, NJ 07052  
973-736-0550  
[www.nps.gov/edis](http://www.nps.gov/edis)

## Laboratory Complex



## Glenmont Estate



## West Orange Area



From New Jersey Turnpike: Exit 15W to I-280. From Garden State Parkway: Exit 145 to I-280. From I-280 westbound: Exit 10. Turn right on Northfield Ave. Left on Main St. Go about 0.75 mile to parking on left and Laboratory Complex on right. From I-280 eastbound: Exit 9. Turn left at end of ramp. At second light, left on Main St. Go about 0.5 mile to parking.

N. J. Transit: take bus #21; [www.njtransit.com](http://www.njtransit.com).