Thomas Edison (Biographical details until 1886)

Thomas Alva Edison (February 11, 1847 – October 18, 1931) was an American inventor and businessman. He developed many devices in fields such as electric power generation, mass communication, sound recording, and motion pictures. These inventions, which include the phonograph, the motion picture camera, and early versions of the electric light bulb, have had a widespread impact on the modern industrialized world. He was one of the first inventors to apply the principles of organized science and teamwork to the process of invention, working with many researchers and employees. He established the first industrial research laboratory.

Edison was raised in the American Midwest. Early in his career he worked as a telegraph operator, which inspired some of his earliest inventions. In 1876, he established his first laboratory facility in Menlo Park, New Jersey, where many of his early inventions were developed. He later established a botanical laboratory in Fort Myers, Florida, in collaboration with businessmen Henry Ford and Harvey S. Firestone, and a laboratory in West Orange, New Jersey, that featured the world's first film studio, the Black Maria. With 1,093 US patents in his name, as well as patents in other countries, Edison is regarded as the most prolific inventor in American history. Edison married twice and fathered six children. He died in 1931 due to complications from diabetes.

Early life

Thomas Edison was born in 1847 in Milan, Ohio, but grew up in Port Huron, Michigan, after the family moved there in 1854. He was the seventh and last child of Samuel Ogden Edison Jr. (1804–1896, born in Marshalltown, Nova Scotia) and Nancy Matthews Elliott (1810–1871, born in Chenango County, New York). His patrilineal family line was Dutch by way of New Jersey; the surname had originally been "Edeson".

His great-grandfather, loyalist John Edeson, fled New Jersey for Nova Scotia in 1784. The family moved to Middlesex County, Upper Canada around 1811, and his grandfather, Capt. Samuel Edison Sr. served with the 1st Middlesex Militia during the War of 1812. His father, Samuel Edison Jr. moved to Vienna, Ontario, and fled to Ohio after his involvement in the Rebellion of 1837.

Edison was taught reading, writing, and arithmetic by his mother, who used to be a school teacher. He attended school for only a few months. However, one biographer described him as a very curious child who learned most things by reading on his own. As a child, he became fascinated with technology and spent hours working on experiments at home.

Edison developed hearing problems at the age of 12. The cause of his deafness has been attributed to a bout of scarlet fever during childhood and recurring untreated middle-ear infections. He subsequently concocted elaborate fictitious stories about the cause of his deafness.[16] As he was completely deaf in one ear and barely hearing in the other, it is alleged[17] that Edison would listen to a music player or piano by clamping his teeth into the wood to absorb the sound waves into his skull. As he got older, Edison believed his hearing loss allowed him to avoid distraction and concentrate more easily on his work. Modern-day historians and medical professionals have suggested he may have had ADHD.

It is known that early in his career he enrolled in a chemistry course at The Cooper Union for the Advancement of Science and Art to support his work on a new telegraphy system with Charles Batchelor. This appears to have been his only enrollment in courses at an institution of higher learning.

Early career

Thomas Edison began his career as a news butcher, selling newspapers, candy and vegetables on the trains running from Port Huron to Detroit. He turned a $50-a-week profit by age 13, most of which went to buying equipment for electrical and chemical experiments. At age 15, in 1862, he saved 3-year-old Jimmie MacKenzie from being struck by a runaway train. Jimmie's father, station agent J. U. MacKenzie of Mount Clemens, Michigan, was so grateful that he trained Edison as a telegraph operator. Edison's first telegraphy job away from Port Huron was at Stratford Junction, Ontario, on the Grand Trunk Railway. He also studied qualitative analysis and conducted chemical experiments until he left the job rather than be fired after being held responsible for a near collision of two trains.

Edison obtained the exclusive right to sell newspapers on the road, and, with the aid of four assistants, he set in type and printed the Grand Trunk Herald, which he sold with his other papers. This began Edison's long streak of entrepreneurial ventures, as he discovered his talents as a businessman. Ultimately, his entrepreneurship was central to the formation of some 14 companies, including General Electric, formerly one of the largest publicly traded companies in the world.

In 1866, at the age of 19, Edison moved to Louisville, Kentucky, where, as an employee of Western Union, he worked the Associated Press bureau news wire. Edison requested the night shift, which allowed him plenty of time to spend at his two favorite pastimes—reading and experimenting. Eventually, the latter pre-occupation cost him his job. One night in 1867, he was working with a

lead–acid battery when he spilt sulfuric acid onto the floor. It ran between the floorboards and onto his boss's desk below. The next morning Edison was fired.

His first patent was for the electric vote recorder, U.S. Patent 90,646, which was granted on June 1, 1869. Finding little demand for the machine, Edison moved to New York City shortly thereafter. One of his mentors during those early years was a fellow telegrapher and inventor named Franklin Leonard Pope, who allowed the impoverished youth to live and work in the basement of his Elizabeth, New Jersey, home, while Edison worked for Samuel Laws at the Gold Indicator Company. Pope and Edison founded their own company in October 1869, working as electrical engineers and inventors. Edison began developing a multiplex telegraphic system, which could send two messages simultaneously, in 1874.

Menlo Park laboratory (1876–1886)

Edison's major innovation was the establishment of an industrial research lab in 1876. It was built in Menlo Park, a part of Raritan Township (now named Edison Township in his honor) in Middlesex County, New Jersey, with the funds from the sale of Edison's quadruplex telegraph. After his demonstration of the telegraph, Edison was not sure that his original plan to sell it for $4,000 to $5,000 was right, so he asked Western Union to make a bid. He was surprised to hear them offer $10,000 ($258,647 in 2022), which he gratefully accepted. The quadruplex telegraph was Edison's first big financial success, and Menlo Park became the first institution set up with the specific purpose of producing constant technological innovation and improvement. Edison was legally credited with most of the inventions produced there, though many employees carried out research and development under his direction. His staff was generally told to carry out his directions in conducting research, and he drove them hard to produce results.

William Joseph Hammer, a consulting electrical engineer, started working for Edison and began his duties as a laboratory assistant in December 1879. He assisted in experiments on the telephone, phonograph, electric railway, iron ore separator, electric lighting, and other developing inventions. However, Hammer worked primarily on the incandescent electric lamp and was put in charge of tests and records on that device (see Hammer Historical Collection of Incandescent Electric Lamps). In 1880, he was appointed chief engineer of the Edison Lamp Works. In his first year, the plant under general manager Francis Robbins Upton turned out 50,000 lamps. According to Edison, Hammer was "a pioneer of incandescent electric lighting". Frank J. Sprague, a competent mathematician and former naval officer, was recruited by Edward H. Johnson and joined the

Edison organization in 1883. One of Sprague's contributions to the Edison Laboratory at Menlo Park was to expand Edison's mathematical methods. Despite the common belief that Edison did not use mathematics, analysis of his notebooks reveal that he was an astute user of mathematical analysis conducted by his assistants such as Francis Robbins Upton, for example, determining the critical parameters of his electric lighting system including lamp resistance by an analysis of Ohm's Law, Joule's Law and economics.

Nearly all of Edison's patents were utility patents, which were protected for 17 years and included inventions or processes that are electrical, mechanical, or chemical in nature. About a dozen were design patents, which protect an ornamental design for up to 14 years. As in most patents, the inventions he described were improvements over prior art. The phonograph patent, in contrast, was unprecedented in describing the first device to record and reproduce sounds.

In just over a decade, Edison's Menlo Park laboratory had expanded to occupy two city blocks. Edison said he wanted the lab to have "a stock of almost every conceivable material". A newspaper article printed in 1887 reveals the seriousness of his claim, stating the lab contained "eight thousand kinds of chemicals, every kind of screw made, every size of needle, every kind of cord or wire, hair of humans, horses, hogs, cows, rabbits, goats, minx, camels ... silk in every texture, cocoons, various kinds of hoofs, shark's teeth, deer horns, tortoise shell ... cork, resin, varnish and oil, ostrich feathers, a peacock's tail, jet, amber, rubber, all ores ..." and the list goes on.

Over his desk Edison displayed a placard with Sir Joshua Reynolds' famous quotation: "There is no expedient to which a man will not resort to avoid the real labor of thinking." This slogan was reputedly posted at several other locations throughout the facility.

In Menlo Park, Edison had created the first industrial laboratory concerned with creating knowledge and then controlling its application.[39] Edison's name is registered on 1,093 patents.

Phonograph

Edison began his career as an inventor in Newark, New Jersey, with the automatic repeater and his other improved telegraphic devices, but the invention that first gained him wider notice was the phonograph in 1877. This accomplishment was so unexpected by the public at large as to appear almost magical. Edison became known as "The Wizard of Menlo Park".

His first phonograph recorded on tinfoil around a grooved cylinder. Despite its limited sound quality and that the recordings could be played only a few times, the phonograph made Edison a celebrity. Joseph Henry, president of the National Academy of Sciences and one of the most

renowned electrical scientists in the US, described Edison as "the most ingenious inventor in this country... or in any other". In April 1878, Edison traveled to Washington to demonstrate the phonograph before the National Academy of Sciences, Congressmen, Senators and US President Hayes. The Washington Post described Edison as a "genius" and his presentation as "a scene... that will live in history". Although Edison obtained a patent for the phonograph in 1878, he did little to develop it until Alexander Graham Bell, Chichester Bell, and Charles Tainter produced a phonograph-like device in the 1880s that used wax-coated cardboard cylinders.

Carbon telephone transmitter

In 1876, Edison began work to improve the microphone for telephones (at that time called a "transmitter") by developing a carbon microphone, which consists of two metal plates separated by granules of carbon that would change resistance with the pressure of sound waves. A steady direct current is passed between the plates through the granules and the varying resistance results in a modulation of the current, creating a varying electric current that reproduces the varying pressure of the sound wave.

Up to that point, microphones, such as the ones developed by Johann Philipp Reis and Alexander Graham Bell, worked by generating a weak current. The carbon microphone works by modulating a direct current and, subsequently, using a transformer to transfer the signal so generated to the telephone line. Edison was one of many inventors working on the problem of creating a usable microphone for telephony by having it modulate an electric current passed through it. His work was concurrent with Emile Berliner's loose-contact carbon transmitter (who lost a later patent case against Edison over the carbon transmitter's invention) and David Edward Hughes study and published paper on the physics of loose-contact carbon transmitters (work that Hughes did not bother to patent).

Edison used the carbon microphone concept in 1877 to create an improved telephone for Western Union. In 1886, Edison found a way to improve a Bell Telephone microphone, one that used loose-contact ground carbon, with his discovery that it worked far better if the carbon was roasted. This type was put in use in 1890 and was used in all telephones along with the Bell receiver until the 1980s.

Electric light

In 1878, Edison began working on a system of electrical illumination, something he hoped could compete with gas and oil-based lighting. He began by tackling the problem of creating a long-lasting

incandescent lamp, something that would be needed for indoor use. However, Thomas Edison did not invent the light bulb. In 1840, British scientist Warren de la Rue developed an efficient light bulb using a coiled platinum filament but the high cost of platinum kept the bulb from becoming a commercial success. Many other inventors had also devised incandescent lamps, including Alessandro Volta's demonstration of a glowing wire in 1800 and inventions by Henry Woodward and Mathew Evans. Others who developed early and commercially impractical incandescent electric lamps included Humphry Davy, James Bowman Lindsay, Moses G. Farmer, William E. Sawyer, Joseph Swan, and Heinrich Göbel.

These early bulbs all had flaws such as an extremely short life and requiring a high electric current to operate which made them difficult to apply on a large scale commercially. In his first attempts to solve these problems, Edison tried using a filament made of cardboard, carbonized with compressed lampblack. This burnt out too quickly to provide lasting light. He then experimented with different grasses and canes such as hemp, and palmetto, before settling on bamboo as the best filament. Edison continued trying to improve this design and on November 4, 1879, filed for U.S. patent 223,898 (granted on January 27, 1880) for an electric lamp using "a carbon filament or strip coiled and connected to platina contact wires".

The patent described several ways of creating the carbon filament including "cotton and linen thread, wood splints, papers coiled in various ways". It was not until several months after the patent was granted that Edison and his team discovered that a carbonized bamboo filament could last over 1,200 hours.

In 1878, Edison formed the Edison Electric Light Company in New York City with several financiers, including J. P. Morgan, Spencer Trask, and the members of the Vanderbilt family. Edison made the first public demonstration of his incandescent light bulb on December 31, 1879, in Menlo Park. It was during this time that he said: "We will make electricity so cheap that only the rich will burn candles."

Henry Villard, president of the Oregon Railroad and Navigation Company, attended Edison's 1879 demonstration. Villard was impressed and requested Edison install his electric lighting system aboard Villard's company's new steamer, the Columbia. Although hesitant at first, Edison agreed to Villard's request. Most of the work was completed in May 1880, and the Columbia went to New York City, where Edison and his personnel installed Columbia's new lighting system. The Columbia was

Edison's first commercial application for his incandescent light bulb. The Edison equipment was removed from Columbia in 1895.

In 1880, Lewis Latimer, a draftsman and an expert witness in patent litigation, began working for the United States Electric Lighting Company run by Edison's rival Hiram S. Maxim. While working for Maxim, Latimer invented a process for making carbon filaments for light bulbs and helped install broad-scale lighting systems for New York City, Philadelphia, Montreal, and London. Latimer holds the patent for the electric lamp issued in 1881, and a second patent for the "process of manufacturing carbons" (the filament used in incandescent light bulbs), issued in 1882.

On October 8, 1883, the US patent office ruled that Edison's patent was based on the work of William E. Sawyer and was, therefore, invalid. Litigation continued for nearly six years. In 1885, Latimer switched camps and started working with Edison. On October 6, 1889, a judge ruled that Edison's electric light improvement claim for "a filament of carbon of high resistance" was valid. To avoid a possible court battle with yet another competitor, Joseph Swan, who held an 1880 British patent on a similar incandescent electric lamp, he and Swan formed a joint company called Ediswan to manufacture and market the invention in Britain.

The incandescent light bulb patented by Edison also began to gain widespread popularity in Europe as well. Mahen Theatre in Brno (in what is now the Czech Republic), opened in 1882, and was the first public building in the world to use Edison's electric lamps. Francis Jehl, Edison's assistant in the invention of the lamp, supervised the installation. In September 2010, a sculpture of three giant light bulbs was erected in Brno, in front of the theater. The first Edison light bulbs in the Nordic countries were installed at the weaving hall of the Finlayson's textile factory in Tampere, Finland in March 1882.

In 1901 Edison attended the Pan-American Exposition in Buffalo, New York. His company, the Edison Manufacturing Company, was given the task of installing the electric lights on the various buildings and structures that were built for the exposition. At night Edison made a panorama photograph of the illuminated buildings.

In 1882, in Pearl Street, New York City, Edison's 600 kW cogeneration steam-powered generating station, Pearl Street Station's electrical power distribution system was switched on, providing 110 volts direct current (DC) to initial customers in lower Manhattan, quickly growing to many customers with many lamps. The power station was decommissioned in 1895. Eight months earlier, Edison had turned on the first steam-generating power station at Holborn Viaduct in London. This

was a smaller 110 V DC supply system, providing street lights and nearby private dwellings but was shut down as uneconomic in 1886.

War of currents

As Edison expanded his DC power delivery system, he faced competition from companies installing AC systems. With transformers developed in Europe and the US, it became possible to transmit AC long distances over thinner and cheaper wires and "step down" (reduce) the voltage at the destination for distribution to users. This allowed AC to be used in street lighting and lighting for small business and domestic customers. Edison's DC empire suffered from being suitable only for the high density of customers found in large cities. His DC plants couldn't deliver electricity to customers more than one mile from the plant, leaving unsupplied customers between plants. Small cities and rural areas couldn't afford an Edison-style system at all. AC companies expanded into this gap. Edison expressed views that AC was unworkable and the high voltages used were dangerous. He struck out personally against his chief rival Westinghouse, stating that Westinghouse would kill a customer within six months of installing a system.

Many reasons have been suggested for Edison's anti-AC stance. One notion is that he couldn't grasp the more abstract theories behind AC and was trying to avoid developing a system he didn't understand. Edison also appeared to have been worried about the high voltage from misinstalled AC systems killing customers and hurting the sales of electric power systems in general. The primary reason was that Edison Electric based their design on low voltage DC, and switching a standard after they had installed over 100 systems was, in Edison's mind, out of the question. By the end of 1887, Edison Electric was losing market share to Westinghouse, who had built 68 AC-based power stations to Edison's 121 DC-based stations. To make matters worse for Edison, the Thomson-Houston Electric Company of Lynn, Massachusetts (another AC-based competitor) built 22 power stations.

Parallel to expanding competition between Edison and the AC companies was rising public furor over a series of deaths in the spring of 1888 caused by pole mounted high voltage alternating current lines. This turned into a media frenzy against high voltage alternating current and the seemingly greedy and callous lighting companies that used it. Edison took advantage of the public perception of AC as dangerous, and joined with self-styled New York anti-AC crusader Harold P. Brown in a propaganda campaign, aiding Brown in the public electrocution of animals with AC, and supported legislation to control and severely limit AC installations and voltages (to the point of

making it an ineffective power delivery system) in what was now being referred to as a "battle of currents". The development of the electric chair was used in an attempt to portray AC as having a greater lethal potential than DC and smear Westinghouse at the same time via Edison colluding with Brown and Westinghouse's chief AC rival, the Thomson-Houston Electric Company, to make sure the first electric chair was powered by a Westinghouse AC generator.

Thomas Edison's staunch anti-AC tactics were not sitting well with his own stockholders. By the early 1890s, Edison's company was generating much smaller profits than its AC rivals, and the War of Currents would come to an end in 1892 with Edison forced out of controlling his own company. That year, the financier J.P. Morgan engineered a merger of Edison General Electric with Thomson-Houston that put the board of Thomson-Houston in charge of the new company called General Electric. General Electric now controlled three-quarters of the US electrical business and would compete with Westinghouse for the AC market. Edison served as a figurehead on the company's board of directors for a few years before selling his shares.

West Orange and Fort Myers

Edison moved from Menlo Park after the death of his first wife, Mary, in 1884, and purchased a home known as "Glenmont" in 1886 as a wedding gift for his second wife, Mina, in Llewellyn Park in West Orange, New Jersey. In 1885, Thomas Edison bought 13 acres of property in Fort Myers, Florida, for roughly $2,750 (equivalent to $89,569 in 2022) and built what was later called Seminole Lodge as a winter retreat. The main house and guest house are representative of Italianate architecture and Queen Anne style architecture. The building materials were pre-cut in New England by the Kennebec Framing Company and the Stephen Nye Lumber Company of Fairfield Maine. The materials were then shipped down by boat and were constructed at a cost of $12,000 each, which included the cost of interior furnishings. Edison and Mina spent many winters at their home in Fort Myers, and Edison tried to find a domestic source of natural rubber.

Due to the security concerns around World War I, Edison suggested forming a science and industry committee to provide advice and research to the US military, and he headed the Naval Consulting Board in 1915.

Edison became concerned with America's reliance on foreign supply of rubber and was determined to find a native supply of rubber. Edison's work on rubber took place largely at his research laboratory in Fort Myers, which has been designated as a National Historic Chemical Landmark.

The laboratory was built after Thomas Edison, Henry Ford, and Harvey S. Firestone pulled together $75,000 to form the Edison Botanical Research Corporation. Initially, only Ford and Firestone were to contribute funds to the project, while Edison did all the research. Edison, however, wished to contribute $25,000 as well. Edison did the majority of the research and planting, sending results and sample rubber residues to his West Orange Lab. Edison employed a two-part Acid-base extraction, to derive latex from the plant material after it was dried and crushed to a powder. After testing 17,000 plant samples, he eventually found an adequate source in the Goldenrod plant. Edison decided on Solidago leavenworthii, also known as Leavenworth's Goldenrod. The plant, which normally grows roughly 3–4 feet tall with a 5% latex yield, was adapted by Edison through cross-breeding to produce plants twice the size and with a latex yield of 12%.

During the 1911 New York Electrical show, Edison told representatives of the copper industry it was a shame he did not have a "chunk of it". The representatives decided to give a cubic foot of solid copper weighing 486 pounds with their gratitude inscribed on it in appreciation for his part in the "continuous stimulation in the copper industry".

Other inventions and projects

Fluoroscopy

Edison is credited with designing and producing the first commercially available fluoroscope, a machine that uses X-rays to take radiographs. Until Edison discovered that calcium tungstate fluoroscopy screens produced brighter images than the barium platinocyanide screens originally used by Wilhelm Röntgen, the technology was capable of producing only very faint images.

The fundamental design of Edison's fluoroscope is still in use today, although Edison abandoned the project after nearly losing his own eyesight and seriously injuring his assistant, Clarence Dally. Dally made himself an enthusiastic human guinea pig for the fluoroscopy project and was exposed to a poisonous dose of radiation; he later died (at the age of 39) of injuries related to the exposure, including mediastinal cancer.

In 1903, a shaken Edison said: "Don't talk to me about X-rays, I am afraid of them." Nonetheless, his work was important in the development of a technology still used today.

Tasimeter

Edison invented a highly sensitive device, that he named the tasimeter, which measured infrared radiation. His impetus for its creation was the desire to measure the heat from the solar corona

during the total Solar eclipse of July 29, 1878. The device was not patented since Edison could find no practical mass-market application for it.

Telegraph improvements

The key to Edison's initial reputation and success was his work in the field of telegraphy. With knowledge gained from years of working as a telegraph operator, he learned the basics of electricity. This, together with his studies in chemistry at the Cooper Union, allowed him to make his early fortune with the stock ticker, the first electricity-based broadcast system. His innovations also included the development of the quadruplex, the first system which could simultaneously transmit four messages through a single wire.

Motion pictures

Edison was granted a patent for a motion picture camera, labeled the "Kinetograph". He did the electromechanical design while his employee William Kennedy Dickson, a photographer, worked on the photographic and optical development. Much of the credit for the invention belongs to Dickson. In 1891, Thomas Edison built a Kinetoscope or peep-hole viewer. This device was installed in penny arcades, where people could watch short, simple films. The kinetograph and kinetoscope were both first publicly exhibited May 20, 1891.

In April 1896, Thomas Armat's Vitascope, manufactured by the Edison factory and marketed in Edison's name, was used to project motion pictures in public screenings in New York City. Later, he exhibited motion pictures with voice soundtrack on cylinder recordings, mechanically synchronized with the film.

Officially the kinetoscope entered Europe when wealthy American businessman Irving T. Bush (1869–1948) bought from the Continental Commerce Company of Frank Z. Maguire and Joseph D. Baucus a dozen machines. Bush placed from October 17, 1894, the first kinetoscopes in London. At the same time, the French company Kinétoscope Edison Michel et Alexis Werner bought these machines for the market in France. In the last three months of 1894, the Continental Commerce Company sold hundreds of kinetoscopes in Europe (i.e. the Netherlands and Italy). In Germany and in Austria-Hungary, the kinetoscope was introduced by the Deutsche-österreichische-Edison-Kinetoscop Gesellschaft, founded by the Ludwig Stollwerck of the Schokoladen-Süsswarenfabrik Stollwerck & Co of Cologne.

The first kinetoscopes arrived in Belgium at the Fairs in early 1895. The Edison's Kinétoscope Français, a Belgian company, was founded in Brussels on January 15, 1895, with the rights to sell

the kinetoscopes in Monaco, France and the French colonies. The main investors in this company were Belgian industrialists. On May 14, 1895, the Edison's Kinétoscope Belge was founded in Brussels. Businessman Ladislas-Victor Lewitzki, living in London but active in Belgium and France, took the initiative in starting this business. He had contacts with Leon Gaumont and the American Mutoscope and Biograph Co. In 1898, he also became a shareholder of the Biograph and Mutoscope Company for France.

Edison's film studio made nearly 1,200 films. The majority of the productions were short films showing everything from acrobats to parades to fire calls including titles such as Fred Ott's Sneeze (1894), The Kiss (1896), The Great Train Robbery (1903), Alice's Adventures in Wonderland (1910), and the first Frankenstein film in 1910. In 1903, when the owners of Luna Park, Coney Islandannounced they would execute Topsy the elephant by strangulation, poisoning, and electrocution (with the electrocution part ultimately killing the elephant), Edison Manufacturing sent a crew to film it, releasing it that same year with the title Electrocuting an Elephant.

As the film business expanded, competing exhibitors routinely copied and exhibited each other's films. To better protect the copyrights on his films, Edison deposited prints of them on long strips of photographic paper with the U.S. copyright office. Many of these paper prints survived longer and in better condition than the actual films of that era.

In 1908, Edison started the Motion Picture Patents Company, which was a conglomerate of nine major film studios (commonly known as the Edison Trust). Thomas Edison was the first honorary fellow of the Acoustical Society of America, which was founded in 1929.

Edison said his favorite movie was The Birth of a Nation. He thought that talkieshad "spoiled everything" for him. "There isn't any good acting on the screen. They concentrate on the voice now and have forgotten how to act. I can sense it more than you because I am deaf." His favorite stars were Mary Pickford and Clara Bow.

Spirit Phone

In 1920, Edison spoke to American Magazine, saying that he had been working on a device for some time to see if it was possible to communicate with the dead. Edison said the device would work on scientific principles, not by an occult means. The press had a field day over Edison's remarks. The actual nature of this invention remained a mystery, as there were no details revealed to the public.

In 2015, Philippe Baudouin, a French journalist, found a copy of Edison's Diary in a thrift store with

a chapter not found in the previously published editions. The new chapter details Edison's theories of the afterlife and the scientific basis by which communication with the dead might be achieved.

Final years

Henry Ford, the automobile magnate, later lived a few hundred feet away from Edison at his winter retreat in Fort Myers. Ford once worked as an engineer for the Edison Illuminating Company of Detroit and met Edison at a convention of affiliated Edison illuminating companies in Brooklyn, NY in 1896. Edison was impressed with Ford's internal combustion engine automobile and encouraged its developments. They were friends until Edison's death. Edison and Ford undertook annual motor camping trips from 1914 to 1924. Harvey Firestone and naturalist John Burroughs also participated.

In 1928, Edison joined the Fort Myers Civitan Club. He believed strongly in the organization, writing that "The Civitan Club is doing things—big things—for the community, state, and nation, and I certainly consider it an honor to be numbered in its ranks." He was an active member in the club until his death, sometimes bringing Henry Ford to the club's meetings.

Edison was active in business right up to the end. Just months before his death, the Lackawanna Railroad inaugurated suburban electric train service from Hoboken to Montclair, Dover, and Gladstone, New Jersey. Electrical transmission for this service was by means of an overhead catenary system using direct current, which Edison had championed. Despite his frail condition, Edison was at the throttle of the first electric MU (Multiple-Unit) train to depart Lackawanna Terminal in Hoboken in September 1930, driving the train the first mile through Hoboken yard on its way to South Orange.

This fleet of cars would serve commuters in northern New Jersey for the next 54 years until their retirement in 1984. A plaque commemorating Edison's inaugural ride can be seen today in the waiting room of Lackawanna Terminal in Hoboken, which is presently operated by NJ Transit.

Edison was said to have been influenced by a popular fad diet in his last few years; "the only liquid he consumed was a pint of milk every three hours". He is reported to have believed this diet would restore his health. However, this tale is doubtful. In 1930, the year before Edison died, Mina said in an interview about him, "Correct eating is one of his greatest hobbies." She also said that during one of his periodic "great scientific adventures", Edison would be up at 7:00, have breakfast at 8:00, and be rarely home for lunch or dinner, implying that he continued to have all three.

Edison became the owner of his Milan, Ohio, birthplace in 1906. On his last visit, in 1923, he was reportedly shocked to find his old home still lit by lamps and candles.

Death

Edison died of complications of diabetes on October 18, 1931, in his home, "Glenmont" in Llewellyn Park in West Orange, New Jersey, which he had purchased in 1886 as a wedding gift for Mina. Rev. Stephen J. Herben officiated at the funeral; Edison is buried behind the home.

Edison's last breath is reportedly contained in a test tube at The Henry Fordmuseum near Detroit. Ford reportedly convinced Charles Edison to seal a test tube of air in the inventor's room shortly after his death, as a memento. A plaster death mask and casts of Edison's hands were also made. Mina died in 1947.