THE ACADEMY OF ELECTRICAL CONTRACTING

Paper Presented by
E. Milner Irvin, Fellow

THOMAS A. EDISON:
ONE MAN—AN ENTIRE INDUSTRY

June 2002

FOREWORD

In a recent Smithsonian Magazine, Harvard professor and historian, John Stilgoe writes, "Our past is slipping away and it is rarity that creates value." His point is that all too frequently we ignore the history and artifacts that are closest to us because they don't seem valuable.

Having just celebrated the 100th anniversary of the founding of the National Electrical Contractors Association, it's good to look back at our history, at the men who contributed to it and at what occurred along the way. We have a rich and proud heritage, but unless we reflect on it from time to time, we may lose sight of what propelled us to where we are today.

With that in mind, I've taken a look back at the invention of the electric light bulb and the one individual who I believe did more to launch the electrical industry than perhaps any other person.

Thomas Alva Edison was eccentric, egotistical, tyrannical and stubborn. He was also charismatic, entertaining, and persistent, but above all he was a genius. Edison never questioned whether something might be done, only how.

This is by no means a history of NECA, just some important facts leading up to the founding of the National Electrical Contractors Association. Neither is it a complete chronicle of Thomas Edison's life, only that portion involving electricity and the electric light.

Milner Irvin
March 2002

To equate one man, Thomas A. Edison, with an entire industry may appear excessive or presumptuous at first glance. Perhaps no other single individual has had such a dramatic effect on our industry as the person many consider to be the father of electrical contracting. Thomas Alva Edison is arguably the Man of the Millennium – the person whose actions positively affected people throughout the world to a degree greater than any other human being of the second millennium.

Certainly there are numerous actions and discoveries that warrant consideration as most important. In fact, a probable claim of the single most significant advancement of the past 2000 years is that of the printing press. It has been said, "Necessity is the mother of invention." And of all the millennium's transitional movements, a consensus points to the fact that man's intellectual growth exploded during the era known as the Renaissance (1400 -1700).

By 1450 a middle class began to rise throughout Europe at a time ripe for invention. Its hunger for knowledge led innovators to exploration of the mind as well as geography. It was in this Renaissance Europe that German inventor Johann Gutenberg succeeded in creating a new kind of moveable press that dramatically separated medieval culture from nature – it certainly pointed human culture in two directions. We could begin the systematic accumulation of knowledge; at the same time nature came to be seen as a set of mechanisms that we could develop for our own purposes.

Gutenberg didn't invent printing. That craft emerged in 8th century China. He didn't invent movable type. Chinese printer Pi Sheng accomplished that in 1040. What Gutenberg devised was aided by all that preceded him — he learned from others (as did Edison) and obviously profited from their experiences. Gutenberg's achievement unleashed an information rush that continues to this day. Within 5 years of his press being introduced, an estimated half a million books were in circulation, including Columbus's reports from the New World.

Thus we move from perhaps this millennium's single most significant invention to the millennium's single most significant person.

Life magazine published its list of the 100 most Important People of the past 1000 years. It ranked Thomas Alva Edison first. Christopher Columbus was second and Albert Einstein 21st.

A second testimony to Thomas Edison's esteem is his selection by Time magazine as its most important person of the 19th Century. With

these noted publications as supporting evidence of the significance of Thomas Edison, it is appropriate to look back at this man and his genius.

Much has been said and written of the importance of electricity in the development of mankind's social and economic world. History has noted that electricity was discovered around 600 BC. The Greek philosopher Thales noticed a piece of amber rubbed with cloth or fur would first attract and then repel small objects brought near it. Unfortunately this information lay gathering dust for over 2000 years. In 1600 William Gilbert published a book entitled De Magnete in which he stated the fundamentals of magnetism and named the mystifying force "electricia" after the Greek word for amber.

We know of many that experimented with electricity prior to Edison, certainly the best known being Benjamin Franklin in 1752. Hans C. Oersted, a Danish physicist discovered in 1820 that an electrical current flowing near a compass needle would cause the needle to move. He was the first to prove a connection between electricity and magnetism. By 1830 Michael Faraday, the American physicist, discovered that moving a magnet near a coil of wire produced an electric current in the wire. In the 1860's the German inventor Ernst Von Siemens discovered the principle of the first efficient electric generator, which he called a dynamo. He used an electromagnet to produce current.

Thomas Alva Edison was born in Milan, Ohio on February 11, 1847. He was the seventh and youngest child of Samuel and Nancy Elliot Edison. Samuel Edison had become a prosperous shingle manufacturer after leaving Canada during the Rebellion of 1837-1838.

At age 7, Edison moved to Port Huron, Michigan with his parents where his father established a grain and lumber business, and young Alva entered school for the first time. Al, as his family and friends knew him, soon irritated his teacher by asking too many questions. The schoolmaster used a heavy strap to whip the boys, especially those who asked questions. After overhearing the schoolmaster tell the district superintendent that he thought the Edison boy was addled, Alva went home and told his mother. She went directly to the schoolmaster and told him, in no uncertain terms, that Alva "had more sense in his little finger" than the schoolmaster had in his entire body. She withdrew him from school, thus ending young Edison's formal education after just three months.

Nancy Edison, Alva's mother, had been a schoolteacher, and she had the notion that learning could be fun. She invented games for young Alva – she called it exploring the exciting world of knowledge. He caught on and learned rapidly. At the age of nine, she bought him a chemistry book by Richard G. Parker, a mid-1800's teacher. He duplicated every experiment in the book to try to prove the author wrong. At one point, he had over a 100 bottles of various chemicals in his room.

In 1859, at the age of 12, young Alva took a job as "news butcher" on the Grand Trunk Railway. His job was to sell newspapers, peanuts, candy and sandwiches on the train as it traveled between Port Huron and Detroit. It was during this time that he actually printed his own newspaper, the Weekly Herald, the first newspaper to be printed on a moving train.

When he wasn't selling newspapers, he would go to the baggage car and continue his chemical experiments. During one experiment a stick of phosphorus burst into flames setting the baggage car on fire. The conductor threw Alva, his chemicals and his printing press off of the train. This incident is sometimes cited as the cause of Edison's deafness.

After the fire, young Al sold newspapers in the railroad stations along the Grand Truck Railway. While working at the Mt. Clemens station, Edison noticed a freight car rolling towards the station agent's son. He managed to rescue the boy just before the car rolled past. Out of gratitude, the agent taught Edison the new technology of telegraphy.

In 1862, at age 16, Edison's first assignment as a telegraph operator was in Ontario, Canada on the Grand Truck Railway. His job was to report to Toronto every hour by telegraph signal. He considered this reporting to be a waste of time, so Edison rigged up a gadget attached to a clock that would send the signal automatically, even if he were asleep. This was his first invention, but it

almost cost him his job when the superintendent found him asleep. In 1863, during the Civil War, Edison returned to the United States and roamed from city to city as a telegraph operator.

At about the age of 17, Edison began losing his hearing and by the time he was middle aged, he was almost totally deaf. Some speculate that this loss of hearing made Edison a more self-disciplined person, well suited for the often long and tedious hours and long days devoted to a single innovative success. He never became completely deaf; however, in his later years he could barely hear a shout. His deafness could have been cured by an operation, but he refused to undergo the surgery for he found that his deafness made it easier to concentrate. Later in life it was not unusual for Edison to spend 20 out of every 24 hours at work. Edison encouraged others around him to work hard and his quote, "Genius is 1% inspiration and 99% perspiration," is perhaps a self-description.

In June 1868 the U.S. Patent Office granted Edison his first patent, #90,646 for an electrographic vote-recorder, a device for electronically recording the voice votes taken in a Legislative Assembly. He took the machine to Washington, D.C. and tried to sell it to Congress. A committee gave him a hearing but was not interested. The chairman explained that "it takes 45 minutes to call the roll and during that time we trade votes. Your machine would make that impossible." Congress still uses the old-fashioned roll-call method of voting for the same reason. It was however the forerunner to electronic vote tabulation used in most governmental bodies today.

Edison learned a vital lesson – investigate the necessity of a product before inventing it! He vowed never again to invent something unless it could be commercially marketable. He kept his word and from that time on, he devoted himself to the "desperate needs of the world."

In the early part 1869, Edison drifted from Boston to New York. He was practically broke and managed to convince an employee of the Gold Indicator Company, a stock-ticker company, to allow him to sleep in the office. Edison spent considerable time studying the stock ticker, a telegraph device that the company used to report the price of gold to brokers' offices. One night, instead of sleeping, he took the ticker machine apart and put it back together before the office opened the next day.

Several days later when one of several ticker machines broke down, Edison amazed the manager by repairing it after other people had failed. The manager offered young Edison a job as supervisor for $300 a month, a large salary at the time. During the time of his employment with the company, he continued to experiment and make improvements to the stock ticker. After every successful improvement, Edison would apply for a patent.

These improvements came to the attention of General Marshall Lefferts, president of the Gold and Stock Telegraph Company. Lefferts asked Edison how much he would take for the various patents on the stock ticker. Before answering Edison thought he might ask for $5,000 but would settle for $3,000. He finally said: "Well, General, suppose you make me an offer." After thinking for a minute, Lefferts said: "How would $40,000 strike you?" Edison had to grab the table to keep from collapsing, and he said slowly, "Yes General, I think that will be fair."

That same year, with the $40,000 earned for the stock tickers he opened what he named an "invention factory," with 50 consulting engineers as his employees in Newark, New Jersey. This venture lasted six years and Edison was granted 200 new patents for work completed in the Newark laboratories.

In his Newark workshop, Edison started manufacturing his improved stock ticker. In 1874, he improved the typewriter by replacing wooden parts with metal ones. He also corrected the alignment of the letters and the distribution of ink. Until this time a person could actually write faster by hand than he could by machine.

He outgrew Newark and in 1876 relocated to Menlo Park. In that same year, he made improvements to the telephone by adding the carbon transmitter. Prior to this development people had to shout into the telephone.

Thomas Edison employed many people at his laboratories and at Edison Manufacturing Company. Under his direction they handled the bulk of the design, research and experimentation on the projects. Ultimately Edison took complete

credit for everything made within his company and most, if not all, patents were applied for under his name.

Throughout his life Thomas Edison was granted 1,093 U.S. patents, as either sole inventor or co-inventor, the most ever issued one person. Over 1,300 patents, world wide, were issued in his name! He received 389 for electric light and power, 195 for the phonograph, 150 for the telegraph, 141 for storage batteries, and 34 for the telephone.

By 1876 the following patents had been issued to Edison and his companies:

- electrographic vote-recorder (1868)
- printing telegraph (1869)
- stock ticker (1869)
- telegraph transmitter (1870)
- telegraphic recorder (1871)
- typewriter (1871)
- automatic telegraph (1872)
- galvanic storage batteries (1872)
- duplex telegraphs (1873)
- quadruplex telegraph repeater (1875)
- telephonic telegraphs (1876)
- acoustic telegraphs (1876)

Until 1877, all of Thomas Edison's inventions were really improvements on existing machines or devices. In that year he invented the phonograph, or record player. It ranked as one of the world's most original inventions. No one had ever made a working model of a phonograph. Edison generally considered the phonograph to be his favorite invention.

In 1877, on September 10, Edison conducted his first experiments with incandescent electric lighting. We know incandescent lamps were not Edison's invention. Joseph Swan, an Englishman, was actually granted a patent in 1848 for converting an electrical current into light. While others were also experimenting with electricity and incandescence, no one had developed a successful lamp for practical commercial use – a light that would last. Edison set himself a goal – "to effect imitation of all done by gas, so as to replace lighting by gas, with lighting by electricity."

The concept was simple enough. When an electrical current passes through a thin wire, it encounters resistance that causes this wire to become warmer and at some point this wire becomes hot enough to glow or to reach incandescence. The problem Swan had encountered was that as wire gets hot it tends to burn up. In theory at least, the solution to this problem is to encase the wire in a vacuum. In Swan's time, however, it was not possible to obtain a good enough vacuum to prevent wires from burning up or oxidizing. The wires could be brought to incandescence and produce light but only for a brief few seconds.

Another problem with Swan's lamp was his filament was of the low resistance type. Low resistance filaments require considerably more current to flow before incandescence takes place. This required larger feeder wire and a larger power source.

In 1878 Edison saw a demonstration of a carbon arc light. This device produced extremely bright light by sending electricity across a gap between two carbon terminals. This dazzling successful arc light was illuminating outdoor areas, streets, and even a large department store in Paris. This same year, arc lights were used to light a field in Sheffield, England where 30,000 fans watched the first night soccer game.

Arc lights, with their power source requiring close proximity to the area being lit, were dependent upon being wired and functioning in series and did not lend themselves to softer interior lighting. Remembering his lesson learned about the necessity for an invention, Edison knew the time was right for a practical, commercially feasible electric light system.

Edison was an inventor, but he was also a promoter who knew the art of marketing. On September 13, 1878 he announced he had solved the problem of incandescent electric lighting. He realized that this project would take more money than he personally could come up with. So he made a trip to New York, to Wall Street, to meet with J.P. Morgan and other financiers. Because of previous inventions, Edison was well known and well received. He did, however, use some subtle scare tactics. J.P. Morgan was heavily invested in the natural gas industry, the primary source of lighting, and Edison used the argument that the electrical light would replace the gaslight. Since the financiers wanted to cover all the bases, his

funding was secured.

It would be over a year later before he actually perfected the lamp. Edison knew he had to wire his smaller lamps in parallel, not in series, as arc lights required, so that each could be turned off and on independently. He also knew he needed a power source that would provide constant voltage.

The key to Edison's lamp proved to be thin wire filaments having high resistance, which would incandesce at reduced current levels. In 1879 he applied for two patents on lamps that used wire filaments made from platinum. Platinum was expensive, making the lamps too expensive to be commercially successful. He kept experimenting with other materials as filaments.

Finally on Sunday, October 19, 1879, he carbonized sewing thread and used it as a filament. After nine attempts this "metal" filament was successfully installed and tests began on this lamp. It was energized and actually glowed with a brilliant light. This lamp held out for more than 40 hours – the longest existence achieved at that time by an incandescent lamp.

Edison's mind raced forward. He is quoted in October of 1879; "We are striking it big in the electric light, better than my vivid imagination first conceived. Where this thing is going to stop, Lord only knows." He later wrote that:

... a complete system of distribution for electricity had to be evolved...A commercially sound network of distribution had to permit being placed under or above ground, and must be accessible at all points and be capable of being tapped anywhere. I had to devise a system of metering electricity in the same way as gas was metered, so that I could measure the amount of electricity used by each consumer...Means and ways also had to be devised for maintaining an even voltage everywhere on the system. The lamps nearest the dynamo had to receive the same current as the lamps farthest away. The burning out or breaking of lamps must not affect those remaining in the circuit, and means had to be provided to prevent violent fluctuations of current...Over and above these things, many other devices had to be invented and perfected, such as devices to prevent excessive currents, proper switching gear, lamp holders, chandeliers, and all manner of details that were necessary to make a complete system of electric lighting that could compete successfully with the gas system.

Man's search for electric light had ended. Yet, in other ways, the search was only beginning. Armed with his October success and remembering his past experiences, Edison focused on the value of publicity to gain public recognition and financial backing. He agreed to a public demonstration of his new wonder. Already dubbed "Wizard of Menlo Park" by the New York Daily Graphic in April of 1878 for his phonograph invention, Edison selected New Year's Eve, 1879 for the public demonstration.

Keeping his new kind of light a secret during the day was not a problem, but nighttime proved more difficult. The laboratory at Menlo Park began manufacturing incandescent lamps. Edison had his workmen wire the laboratory and replace its gas light system with electrical lamps. As neighbors began to observe strands of small bright electric lights strung from building to building in Menlo Park, rumors and jokes naturally followed.

Public excitement grew and Edison invited Marshall Fox, a reporter from the New York Herald, to tour the lab. The story that resulted made the front page of the Sunday, December 21, 1879 edition. Edison was reported to be extremely upset by the breach of confidence. His displeasure was short lived, however, because they were almost ready for a public demonstration anyway. There was no waiting for New Year's Eve. Crowds began forming the next day and Edison opened the doors of Menlo Park answering questions about his work in progress.

New Year's Eve arrived and the promised display of lighting did occur; two lights framed the gate of the office building, eight on poles outside the laboratory building, thirty ablaze inside, and two dozen more in the street and in several nearby houses. The newspapers reported that "light as bright as sunshine had pushed darkness back into far corners."

But Edison and his technicians had only just begun. The Edison Electric Light Company was now organized "to own, manufacture, operate and

license the use of various apparatus used in producing light, heat and power by electricity." Edison's entrepreneurial spirit was evident and the financial world was quick to embrace his efforts.

Subsequently in April of 1880, the first order for incandescent interior lights was placed with Edison. Surprisingly, the order was to light the steam ship Columbia for her maiden voyage.

With the introduction of electric incandescent lamps, others besides Edison also realized that a total electrical generating and distribution system was necessary. An entirely new support industry was needed. Rising to aid this new industry were other great inventors such as George Westinghouse with his transformer and Nicola Tesla who advanced the transmission of high voltage electricity. Electrical firsts continued to be very exciting to an eagerly waiting world. In 1881 the first electrical contracting business opened in New York City, and within 20 years, electrification would expand throughout the United States, Europe, and the world.

Edison's promotion and concept of research laboratories like Menlo Park was copied throughout the world. By the early 1900's this idea was commonplace and the new term "corporate research" was born. There are those who point to this concept as Edison's greatest innovative success. After he moved to the Menlo Park laboratory he promised he would turn out a minor invention every 10 days and a "big trick" every six months. Edison and his staff were working on as many as 40 projects at one time and he was applying for nearly 400 patents each year during this time.

In 1881 Edison and his associates relocated to New York City to promote construction of electric power plants in cities. Here the Pearl Street Station, a steam power plant, soon provided electricity to numerous customers near the Manhattan Wall Street area. The reason Edison chose the Wall Street area was obvious. His investors were primarily located here and this would provide proof of his progress.

The year 1883 marked the debut of electricity in Florida. Edison lights were installed in the luxurious St. James Hotel in Jacksonville where eight light outlets lit the lobby. As Edison's fame grew, so did his research laboratory.

By 1883 Edison designed the first hydroelectric generator for a plant in Wisconsin. One of Edison's companies has evolved into Consolidated Edison, the major electric utility company in New York.

Edison was in his prime by the mid 1880's. He realized a more expansive and sophisticated laboratory was required if he were to maintain his inventive pace. He is quoted as saying, "I find out what the world needs. Then I go ahead and try to invent it." In 1887 he purchased 14 acres of land in West Orange, New Jersey, and began construction of a new laboratory. Here, half of Edison's 1,093 U.S. patents were earned in the 44 years he spent at this massive factory complex. Edison and his staff were transforming inventive thoughts into mass produced reality.

Edison's tireless work ethic at times proved to be a point of conflict with some of the thousands of employees working at his laboratory and factories. Workdays of ten to twelve hours were the norm because Edison felt everyone should share his dedication. At times, later in the expansion of the Edison Companies, the workday would become an issue.

Edison knew the absolute power of electricity and the dangers it presented. Certainly working conditions were not equal to today's standards. Unfortunately accidents did occur during the installation of the many systems the Edison companies became involved in. Edison's concern for safety was apparent when, on July 23, 1889 he testified regarding electric power and electrocution in a lawsuit between William Kemmler and Charles F. Durston.

Edison employed over 10,000 workers and technicians, and many of these workers no doubt today would be referred to as electricians. Is it, therefore, not too much to argue that Edison's accomplishments directly resulted in the forming of a craft guild of electrogists (as electricians were once known). Craft guilds were evolving in New York City and other major cities throughout America and electricians/electrogists were no exception.

The companies that were generating the electrical power did most of the first electrical installations. From 1881 through 1885, as demand for electric power increased, other companies began

contracting. The probable location of the first electrical contractor was in New York.

In 1889, at a Convention of the National Brotherhood of Electrical Workers (as the IBEW was then known) attendees lamented the working conditions of American electrical workers.

In 1890, St. Louis was the site of a national exposition featuring electricity. Technicians, electricians, electrogists from around the country traveled to wire the booths, displays and decorations. Following numerous organizational meetings on November 21, 1891, Henry Miller, a St. Louis lineman, was elected president of the National Brotherhood of Electrical Workers and J.T. Kelly, a wireman from St. Louis, was elected Vice President. Thus was the beginning of the International Brotherhood of Electrical Workers

By 1892, Charles Eidlitz who operated an electrical contracting business in New York City, helped form the New York Electrical Contractors Association.

By 1893, the number of central station lighting companies in cities across the United States using Edison equipment had reached 1,277, supplying electricity to some 2.5 million incandescent lamps and 1.1 million arc lights.

By the middle of the 1890's, electrical contractors began to work together to solve common problems. The need for an organized association became obvious and by the turn of the century, there were a number of local trade associations for electrical contractors.

By 1901 it became apparent that all the local organizations should be combined into one. On July 17, 1901 a meeting was held, led by six local organizations from New York State, to explore the possibility of establishing a national association. The meeting was held in Buffalo, New York, in the New York State Building on the Pan American Exposition grounds. Forty-nine contractors attended the meeting from 18 cities in eight states. The states represented were New York, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Ohio, and Pennsylvania.

This first convention of electrical contractors proceeded to adopt a constitution, draft by-laws and to elect officers. Charles L. Eidlitz of New York was elected the first National President and Utica, New York was selected as the site of the national office. Thus the new National Electrical Contractors Association of the United States, as it was called, was founded.

This new electrical industry rapidly expanded throughout America and the much of the world. England, Australia, Central and South America were interested in this new electrical energy, as were many urban areas of the United States. By the turn of the century, electricity was fast becoming a major part of America's culture.

At this time the city of Atlanta was also deeply involved in the conversion to electrical energy. In 1900, Mr. T.J. Harper, City of Atlanta superintendent of electrical affairs stated:

Electricity has become so large a factor in the commercial affairs of our city that few people comprehend its magnitude. There is more capital invested in electrical enterprises and more people dependent upon this branch of business for support than any other line of business. Electrical construction has increased more than 100% over any previous year and under city requirements, the class of work, both underground and overhead in New Street, railway, electric light, power and telephone construction is unsurpassed.

Machinery turned to electrification. Especially suited were textile mills of New England and the South. For example 65 mills were "electrified" by the end of 1899, though the honor of being first went to Columbia Mills in Columbia, South Carolina in 1895.

In summing up Thomas A. Edison's accomplishments, *Invention and Technology Magazine* writes,

> *"Edison's electric light was as mystifying and awe-inspiring as any invention of the age. Few things could have been more marvelous than the piece of charred paper glowing bright enough in its glass container to light up a room and yet not burning up. The magic represented by scientific technology was a source of unalloyed hope, not distrust. This attitude toward the powers of science and technology is one of the nineteenth century's most important legacies, and no single instance better represents it than the enthusiasm generated by the electric light."*

Thus, through the genius and vision of one man, Thomas Alva Edison, one of the world's largest industries is traced from its early beginnings of 1879 through today. Along the way, NECA (National Electrical Contractors Association) and the IBEW (International Brotherhood of Electrical Workers) were founded, so it only seems appropriate that we point to Mr. Edison as truly the founder of our great industry, not only the contracting, but also, the manufacturing, generating, distribution, and regulatory portions. "One Man – An Entire Industry," is perhaps not at all presumptive or excessive.

REFERENCES

A Century of Light, James A. Cox, Benjamin Publishing Co. 1979

Atlanta Historical Society, City Archives, Commission Meeting Minutes 1900-01, Mr. T.J. Harper, Superintendent of Electrical Affairs

Edison – Ford Museum, Fort Myers, Florida

Edison In Florida, Olav Thulesius, University of Florida Press, 1997

Encyclopaedia Britannica, Vol. 6, Pages 50-52, 1973

Invention and Technology, *"The Great Inventions That Changed The World,"* Robert Friedel, 1994, Page 31

Legends In Their Own Time, Anthony Sera Fini, Plenum Press, Pages 31,66,120

Life Magazine, The Millennium Issue, Fall 1997, Pages 120,135,146,147

Notable 20th Century Scientists, Vol. 1, Emily J. McMurray, Editor, Gale Research Inc., Publisher

South Florida Business Journal, March 2000, *"Journal of the Century"*, Page 10

Thomas A. Edison – Humanity's Friend, A.J. Palmer

Thomas A. Edison Papers, Edison Chronology, 1847-1878, Rugers University, March 2000

Thomas Alva Edison Preservation Foundation, *"The Inventions"* Document, Newark, New Jersey

Thomas A. Edison – Young Inventor, Sue Guthridge, Simon & Schuster

IBEW Journal, *"They Dared To Dream"*, 1991, Pages 2-3

This is NECA, 1990, National Electrical Contractors Association, Page 5

Time Magazine, Jan. 10, 2000, Vol. 154 – No. 27 Pages 184-186

World Book Encyclopedia, Vol. 6, *"Thomas A. Edison"*, Page 77, 1997

World Who's Who In Science, Allen G. Debois, Editor, Page 508

E. Milner Irvin, III, President of Riverside Electric Company, Miami, Florida, first became involved with NECA in 1972. The Company was founded in 1922 by his grandfather and became a NECA member in May 1949. He has served on the Board of Directors of the South Florida Chapter since 1979: 13 years as Treasurer, 2 years as President and 9 years as Governor. He served on the Council of Industrial Relations from 1999 to 2000. He is the current District III Vice President and is chairman of the Manpower Development Committee.

TIMELINE OF THOMAS A. EDISON'S LIFE

Thomas Edison's life mirrored the transformation and turbulent times in which he lived. When Edison was born, much of America was still rural, the railroad was a new concept and the South was plagued by slavery. By the time of Edison's death, airplanes and automobiles were the preferred forms of transportation, the nation had survived the horrors of the Civil War and World War I, and most American cities were illuminated by Edison's electric lights.

The following highlights the milestones in Thomas A. Edison's prolific life and career:

1847

Thomas Alva Edison was born in Milan, Ohio, on February 11 to Samuel and Nancy Elliott Edison.

1854

The Edison family relocated to Port Huron, Michigan.

1855

Thomas Edison briefly attended school. Considering him a poor student, Edison's teachers recommended home schooling.

1857

Edison developed his first chemistry laboratory in the family's cellar, where according to his father, young Edison "spent the greater part of his time."

1859

At the age of twelve, young Edison had lost much of his hearing. He believed his deafness was caused by an accident, although there is no proof to support his claim.

1862

To thank Edison for saving his son from being hit by a train, a stationmaster taught Edison how to use a telegraph. Edison worked as an itinerant telegraph operator, holding several jobs and moving thousands of miles. Edison served as a telegrapher for the Union Army during the Civil War.

1869

Edison invented the electrical vote recorder, which earned him his first patent the following year. The vote recorder was a commercial failure, leading Edison to vow to create only things that people would buy.

1870

Edison perfected the stock ticker and opened a shop in Newark, New Jersey. He employed people to manufacture and market his stock tickers. Many of these workers, or "muckers" as he called them, worked for Edison for years.

1871

Edison married Mary Stillwell, a worker in his Newark shop, on Christmas Day.

1876

Edison opened his laboratory in Menlo Park, New Jersey, In March. Many of his faithful workers went with him.

1877

Edison invented his first phonograph, wrapping a piece of tinfoil around a cylinder and singing "Mary Had a Little Lamb." Later, Edison said of his favorite invention, "This was my baby and I expected it to grow up and be a big feller and support me in my old age."

1878

Edison and his "muckers" began developing an electric lamp, as well as the dynamos, wires, switches and fuses for the "electric light system."

1879

After much experimentation, Edison and his workers perfected a light bulb that burned for more than 13 hours.

1881

First electrical contracting firm opened in New York City.

1882

Edison opened the first commercial electric power station for incandescent lighting in America at 255-257 Pearl Street in New York City.

1884

Edison's wife, Mary died at the age of 29. They had three children: daughter Marion and sons Thomas Alva, Jr. and William.

1886

Edison married Mina Miller in Akron, Ohio, on February 24. As a wedding gift to Mina, Edison purchased Glenmont, a 13-and-1/2 acre estate with a 29-room home in West Orange, New Jersey. Edison and Mina had three children: daughter Madeleine and sons Charles and Theodore.

1887

Edison opened his laboratory in West Orange, New Jersey, and invented the motion picture camera.

1890

Edison attempted to invent a means of separating ore from rock at his iron ore mine in Ogdensburg, New Jersey. He lost millions of dollars on this enterprise – his greatest failure.

1891

National Brotherhood of Electrical Workers organized in St. Louis. Henry Miller was elected President.

1894

On April 14 the first kinetoscope parlor opened at 1155 Broadway in New York City. People paid a nickel to look through a small hole to watch a very brief movie.

1896

Edison's vitascope, which projected movies onto a large screen, was introduced, ushering in the modern movie era.

1900

Envisioning electric cars, Edison set out to improve the storage battery. Electric cars never caught on, but Edison's batteries were used on railroads and in the mines for years.

1901

National Electrical Contractors Association of the United States founded. The first members of the organization called themselves "electrifers" (a term also applied to their productive employees). The group elected Charles L. Eidlitz as president.

1915

While World War I raged in Europe, Edison worked with the United States Navy to develop more advanced weapons systems.

1916

Edison went on his first camping trip with some of his famous friends, including car manufacturer Henry Ford, tire manufacturer Harvey Firestone, and naturalist John Burroughs.

1920

Half of the people living in urban areas had electrical power in their households for the first time.

1927

Edison searched for a new source of natural rubber. This quest occupied him until his death.

1928

The United States Congress awarded Edison a special Medal of Honor on May 21st.

1929

Edison was awarded an honorary Academy Award for his contribution to the cinema.

1931

At the age of 84, Edison died on October 18th, at Glenmont.

THE ACADEMY OF ELECTRICAL CONTRACTING

Paper Presented by
Claud O. McCrory III, Fellow

HOW TECHNOLOGY HAS DRIVEN CHANGES IN ELECTRICAL CONTRACTING

June 2002