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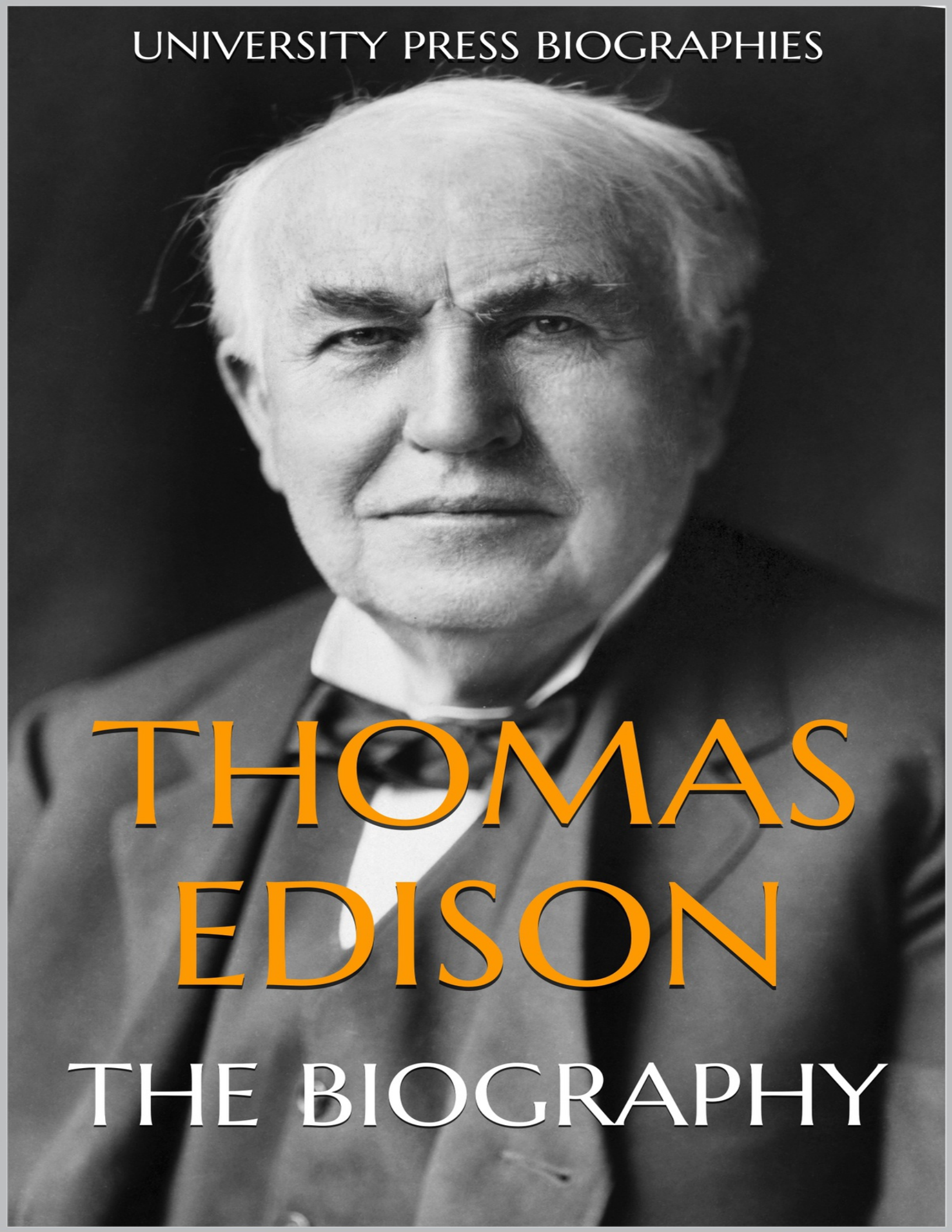

THOMAS EDISON

THE BIOGRAPHY

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The Biography

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Cover Image:
Thomas Edison, Photograph by Louis Bachrach, 1922

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Introduction

Thomas Alva Edison has been referred to as the Wizard of Menlo Park, the Napoleon of Inventors, and America's Uncrowned King, and he was voted number one in TIME Magazine's list of people who made the millennium. It is not hyperbole to say that Thomas Edison truly changed the world. Simply imagine the realities of the life Edison was born into, compare it to the world he left behind, and consider how much this one man contributed to the rapid change that dragged the world into the modern age.

The list of inventions attributed to Edison is astoundingly long. Edison developed the world's first incandescent electric lamp, or light bulb, he invented the phonograph, the motion picture camera, and introduced the very principles of electrical distribution. Edison created the first industrial research laboratory and awakened the world to what could be achieved by collaboration. With over 1000 US patents to his name, Edison invented hundreds of new and improved devices that radically changed the way people lived all over the world.

Born into humble beginnings, Edison's life story looks at first glance like a rags to riches archetype, but dig a little deeper and you soon see that his trajectory was far from a straight line. Edison was an intelligent man and a hard worker but these qualities alone were not enough to take him from selling candy and fruit on train carriages in Port Huron to being one of the most famous and respected men in America.

Remembered now, Edison was one of the world's winners, rich and famous and accomplished, but during his lifetime Edison failed time and time again. As a young man he was frequently fired, as an older man his ventures sometimes failed, he lost his fortune more than once, and at times his inventions simply did not work. But Edison never gave up, he bounced back from every disaster, and with good-natured stubbornness went on to bigger and better things.

Edison made a contribution to the world that is coveted by many but rivaled by few. Edison's life begins with a small boy educated by his

mother in Port Huron and ends with the death of the greatest inventor America has ever known, but Edison's story will never end. A new chapter is added to Edison's story every time a new wizard pushes the boundaries and invents something no one has ever seen before.

Chapter 1

Early Life

Thomas Alva Edison's ancestors emigrated from their home in the Netherlands to Elizabethport, New Jersey in 1730 but were forced to flee to Nova Scotia, Canada following American Independence. Samuel Ogden Edison Jr, Thomas Edison's father was then forced to flee from Canada and settle in America for his part in the failed Mackenzie Rebellion, a reversal of a desperate journey his grandfather had taken seventy years ago. It is thought that Samuel travelled by foot for two and a half days to escape those pursuing him and crossed from Canada into America via the frozen St Clair River at Port Huron, Michigan.

Samuel's wife, Nancy and their three children joined him in Ohio and the Edisons became one of the most prominent families in town. Already the mother of Marion, 18, William, 16 and Harriet Ann, 14, Nancy gave birth to Thomas Alva Edison on February 11th 1847. For the first six years of Thomas Edison's life he lived in Milan but when the town's economy took a serious downturn the family decided to relocate to Port Huron, Michigan.

Soon after the family moved to Michigan young Edison became seriously ill with Scarlet Fever, an illness that caused a hearing impairment that would affect him for the rest of his life. Anecdotes describing Edison's inquisitiveness as a child are common and include the story of how he burned down the family barn to see what it would look like, how he almost suffocated after falling into a grain-storage bin and how he talked his friends into eating chopped up worms and Seidlitz powder.

Due to his illness Edison didn't enter formal education until 1855, when he was eight years old. As was common at the time, Edison was enrolled into a private, church-ran boarding school where he was taught by Englishmen. Unhappy with the school's instruction and confident that she could do a better job of educating her son, Nancy soon became Edison's full-time tutor.

With access to his father's bookshelves - home to the works of leading

Enlightenment scientists and philosophers - Edison became familiar with Gibbon's Decline and Fall of the Roman Empire , Hume's History of England and the writings of Thomas Paine at a young age. Unsurprisingly, Edison was particularly drawn to scientific experimentation as a child and set up a laboratory in the family's basement where he carried out every experiment he found in his father's copy of the Dictionary of Science .

At twelve years old Edison got his first job as a 'candy butcher' with the Grand Trunk Railroad. Edison would board the train at Port Huron and during the three hour trip to Detroit would sell candy, peanuts and newspapers to passengers before enjoying an eight-hour layover in Detroit and making the same trip back home in the evening, arriving back in Port Huron at 9.30pm. Unlike other candy butchers, Edison kept a laboratory in an unused section of the baggage car so that he could continue with his scientific experiments while on the road. He also used his position on the railroad to get started as a businessman, opening stands in Port Huron and Detroit selling vegetables and hiring another candy butcher to work for him on a different railroad line.

Edison was still working for the railroad four years later, by now selling newspapers, when civil war broke out in America. On the day news broke of the Battle of Shiloh, Edison convinced a telegraph operator in Detroit to send headlines to each stop on the railroad and convinced station masters to chalk the breaking news up on the schedule board. Each time the train arrived at a station, the platform was already full of passengers desperate to get their hands on a newspaper and Edison and his assistants were ready on the train to sell them at an ever increasing price. This first entrepreneurial venture taught Edison a number of important lessons; that investors will take a chance on something new if the possibility of profit is great enough; that the market will pay whatever is asked if what you're selling is perceived to be of value; that the telegraph had uses beyond those currently being employed and that timing is everything.

Edison used the profits he made from selling newspapers to buy a used printing press which he installed on the Grand Trunk Railroad alongside his laboratory. In the spring of 1862 Edison became a publisher and with the help of an editorial assistant who also happened to be the train's conductor, launched the Weekly Herald. The newspaper grew to around

five hundred subscribers and was a financial success. It's impossible to say how successful the Weekly Herald might have become as an accident on the Grand Trunk railway brought Edison's publishing enterprise to an end. A bottle of phosphorus stored in Edison's laboratory in the baggage car of the train fell and instantly combusted causing a serious fire that prompted the train's conductor, and newspaper's editor, Stevenson, to strike Edison and throw him, his printing press and his laboratory off the train.

This incident marked the end of the Weekly Herald but did not stop Edison from continuing his work as a candy butcher or releasing a new paper, a precursor to the gossip magazine entitled the Paul Pry that ran scandalous stories on the private lives of local citizens. Another incident on the railroad occurred in early 1862 when the three-year old son of the station telegrapher, Mackenzie, wandered onto the tracks. Edison leapt from the platform onto the tracks and scooped up the child, carrying him out of the path of an incoming train and into safety.

Mackenzie was so grateful for Edison's bravery that he offered to give him formal lessons in the art of telegraphy. In just five months, Mackenzie admitted that Edison had surpassed his own knowledge and there was nothing more that he could teach him. After taking his first job as a telegraph operator, reading every book and journal in the office and learning the rudimentaries of how to take a press report, Edison was ready, aged just seventeen, to move on to the next stage in his career.

Chapter 2

A Tramp Telegrapher in Boston and New York

The first message communicated over telegraph wire was sent my Samuel F.B. Morse on the 24th May 1844 and read, 'What hath God wrought.' By 1861 a transcontinental telegraph line stretching from Nebraska to California had been completed by a conglomerate company known as Western Union and the telegraph industry was booming. In 1864 Edison left home for the first time to join the ranks of the traveling 'tramp' telegraphers seeking their fortune along the telegraph lines and took his first job as a telegraph operator on the Grand Trunk Railway located at Stratford Junction, Ontario.

Although clearly an incredibly ambitious young man, Edison didn't exactly excel in his role as a telegraph operator. Taking an unpopular night shift position in Stratford Junction, Edison ensured that the demands of his job were few. As long as he stayed awake throughout the night, listened for messages about the train's schedules and passed that information on, he was free to spend his time as he chose. As became his lifelong habit, Edison spent his spare time conducting scientific experiments and reading scientific works.

Over the next few years Edison travelled around the United States, taking up telegrapher positions in Adrian, Michigan, Fort Wayne, Indiana, Cincinnati, Nashville and Memphis. Edison's deep understanding of the mechanical workings of the telegraph machinery, his ambition to learn all that he could about the trade as quickly as possible and the few friendships he made along the way ensured that by 1866, at the age of 19, he had reached the status of a first-class telegrapher.

In 1866 Edison secured a position with Western Union in Memphis, a city struggling to enforce peace and order following the devastation of the American Civil War. At the time Western Union was struggling to figure out a way of creating a direct telegraph line from New Orleans to New York. Edison took up the challenge of how to make existing telegraphy technology work over long distances in his spare time and soon had an

answer. Edison's superiors could not deny that his invention of a modified repeater device solved the problem but, perhaps out of professional jealously, they did not reward him for his triumph and fired him instead.

After working for a time in Louisville, Kentucky and enjoying the cultural scene the prospering city had to offer, Edison and a few friends boarded a steamship bound for Brazil. It is thought that Edison, like many young men of the time, was hoping to create a dramatic change in his fortunes by swapping the United States for more exotic lands. But just a few days into the journey Edison had cold feet and decided to return to Louisville, a decision he later revealed was made on the advice of an old man on the steamship who told him that, 'any man who left this country to better his condition was an ignorant fool.' The old man's advice had the ring of fate as soon after Edison's companions contracted yellow fever in Vera Cruz, Mexico and all died within a month.

Back in Louisville in 1867, Edison again lost his job due to his passion for experimenting. First Edison took apart every piece of telegraphy equipment in his office and reconfigured them in order to test the effectiveness of duplex telegraphy. This experiment ultimately failed and left his office with no working telegraphy equipment. After a dressing down by management Edison continued to experiment but tried to keep it secret. Edison's secret came out in a fashion that was characteristically calamitous when he accidentally spilled a battery containing sulphuric acid on the floor. The highly erosive acid seeped through the floorboards of his office and dripped onto his boss's desk below. Stating that Western Union wanted 'operators, not experimenters' Edison was again fired.

Now twenty years old, Edison was an accomplished telegrapher with many great ideas for improving the instruments of telegraphy but he had spent his early adulthood as a drifter, quitting jobs or being fired on a regular basis and he owned little but the clothes on his back. At home in Port Huron, Edison's family was not faring much better. The Edison family home had been confiscated by the military, Samuel was out of work and forced to walk to Detroit to find daily work while Nancy was living a secluded life in temporary military housing.

After spending a short time with his family and working odd jobs at the Port Huron train depot to provide financial support to his aging parents,

Edison heard of a job opportunity that drew him east. Edison's friend from Cincinnati, Milt F. Adams, sent him a letter advising of a job opening in Boston's Western Union telegraph office. In the era immediately following the American Civil War Boston had become second only to New York in its prominence in the world of telegraphy. What's more, Boston was a hub for telegraph inventors and teeming with organizations desperate to purchase the patent rights to improvements made to telegraphy equipment. The city of Boston was the perfect place for Edison to make his mark.

Walking directly into a job at the Western Union telegraph office in Boston, Edison became known in the technical community almost instantly. The first message Edison took was, unbeknownst to him, a sort of hazing ritual and transmitted by the fastest sender in the company, a man based in New York. Edison impressed his colleagues by taking the message with ease and even making fun of the man on the other end of the line, telling him to, 'change off and send with the other foot'.

Once settled in the new city Edison turned his attention back to his inventions, adding Michael Faraday's two-volume Experimental Researches in Electricity to his personal library and experimenting with fire-alarms, facsimile telegraphs, burglar alarm and printing devices. Edison knew the value of marketing himself and published a number of job notices and scholarly articles announcing his inventions and detailing his career progression.

Edison soon attracted the attention of investors keen to make a killing by manufacturing new telegraphy equipment and entered into an agreement with a man named Dewitt C. Roberts to develop an instrument that would print stock-ticker quotations. With Robert's support, Edison also created his very first patented invention, an electric vote counter for which he was granted United States patent no. 90,646 on the 1st June 1869.

Despite the fact that the congressional committee in Washington to whom Edison demonstrated his vote counter were uniformly disturbed by it, Edison had had his first taste of success as an inventor and quickly moved on to other projects. Edison developed a Magnetograph that allowed people to type out telegraph messages without learning Morse code and used this invention with his stock printer in a gold and stock quoting

service where he served as a manager. This business venture was short-lived and left Edison feeling cheated out of the profits made possible by his inventions but it did give him the opportunity to leave his position as a telegraph operator and become an inventor full time.

After borrowing $800 from an investor and friend, Edison again turned his attentions to his duplex telegraph machine but when it came to testing the device it became clear that Edison's system was a failure – his duplex telegraph machine simply didn't work. Penniless and disappointed but as passionate about inventing as ever there was only one place for Edison to go now. New York.

Chapter 3

Edison in New York

Edison's first weeks in New York City were not easy. Arriving without a cent to his name and without friends or family to call on he spent his first night walking the streets and had to borrow a dollar from a fellow telegrapher for a cup of coffee and a bite to eat. Although down on his luck, Edison had made a name for himself in Boston with his inventions and published a number of articles in engineering journals. When Edison met Franklin Pope, the superintendent of the New York Gold Exchange, Pope was already familiar with Edison and knew him to be an accomplished inventor and engineer. Although Pope was unable to offer Edison a job with the New York Gold Exchange at that time, he did offer him a place to sleep on the premises and the use of the company's machine shop to work on his inventions.

While living in the New York Gold Exchange headquarters Edison became familiar with a piece of machinery invented by S.S. Laws, the president of the company known as a gold and stock indicator. Similar to the device Edison had worked on in Boston, the indicator used basic telegraphy principles to send and receive up to date price quotes throughout the day. At the time, gold and stock trade in New York City was booming and competition between the New York Gold Exchange and their chief rivals the Gold and Stock Telegraph Company was fierce.

Not for the first time, Edison's fortunes were reversed thanks to his being in the right place at the right time and playing a role in averting a serious disaster. In June 1869, gold trading on Wall Street was reaching record highs and the devices used to keep track of stock were working overtime. One fateful day the central indicator in the New York Gold Exchange headquarters broke down causing panic amongst buyers. Pope and Laws were unable to fix the machine and a shouting match ensued, adding to the chaos, until Edison took control, fixed the machine and saved the company from financial ruin. Incredibly grateful, Laws hired Edison on the spot as Pope's assistant.

Soon after, having had enough of the cut throat world of the stock exchange, Laws sold his company to Western Union who then merged it with the Gold and Stock Telegraph Company, a sale that included the patents to many inventions and modifications of existing devices that Edison had been working on. Longing to be his own boss, Edison formed America's first electrical engineering company with Pope and J.L. Ashley, the current publisher of The Telegrapher. During this time Edison's catalogue of patents swelled as he and his colleagues made huge improvements to devices currently used in the telegraphic industry and developed Edison's Universal Stock Printer. However, Edison only stuck at this venture for a little over a year, as he felt that he did the lion's share of the work and received only a third of the profits.

Bouncing back to a position at Western Union, Edison was asked to solve a mechanical problem with a stock printer that easily slipped out of alignment. His solution was so successful that the company asked to acquire the patent rights to the modified machine, offered Edison $40,000 and ordered 12,000 new machines from him. With this huge cash injection, Edison was able to set up his own factory in Newark and became the founding member of the Newark Telegraph Works.

In time Edison's enterprise grew to a sizable operation with over 250 members of staff working on over forty different inventions at any given time. With his professional life going from strength to strength, Edison was able to send money home to support his parents. Although he wrote to them frequently, Edison could not spare the time to visit Port Huron and, sadly, was never able to see his mother again. On 11th April 1867 Edison received a telegram that told him his mother had died.

Soon after on the 15th of December 1647, Edison was married. After a very brief courtship Edison wed sixteen-year old Mary Sitwell, a girl he met at his Newark factory when he offered her shelter during a rainstorm. Matrimony did little to slow Edison down and it's said that he spent the night of his wedding working late at the factory. The most notable invention Edison patented during this time was his quadruplex telegraphic system that allowed two messages to be sent at the same time, in opposite directions. A tussle over patent rights ensued between Western Union, with whom Edison had made a verbal agreement to sell his invention, and

Jay Gould of the Atlantic and Pacific Telegraph Company. The disagreement went to court where a number of shady dealings Edison had little to no knowledge of came to light. Western Union won Edison's rights but Jay Gould had the last laugh when he acquired Western Union soon after.

With Gould in charge of Western Union, Edison turned his attention to inventions outside the world of telegraphy. By autumn 1875, Edison's life had changed dramatically from those difficult days when he first arrived in New York. Edison was 28 years old, with a wife and two children to take care of and knew that the industrial mire of Newark was no place to raise a family. With the help of his father, Edison purchased Menlo Park, a large real-estate development close to both New York and Newark that had the space and amenities to become Edison's full time invention factory.

To have the funds to create a fit for purpose laboratory where he could work on inventing full time was a dream come true for Edison. In early 1876 work began on Menlo Park laboratory, an epic structure 100 feet long and 30 feet wide with two floors. The laboratory featured a library, a chemical laboratory, a testing room and a machine shop with the second floor dedicated to work stations where a number of inventions could be developed at one time.

Edison's Menlo Park laboratory was completed in March 1876 and fitted out with machinery and tools from the Newark factory, transported by horse-drawn wagons. In other similar workshops of the time the men worked on individual projects, rarely sharing information or findings but in Edison's workshop the men all worked for Edison and were encouraged to keep detailed notes and sketches of all their work. Edison's men were also expected to work around the clock and produce incredible results on a regular basis, a standard Edison also applied to himself, rarely leaving the factory and working every day of the week without exception.

The first major invention undertaken at Menlo Park was the development of a 'speaking telegraph', a project initiated by Western Union. Alexander Graham Bell had already invented the telephone, a world-changing instrument that Western Union's president, William Orton, had the chance to buy the patent for but turned it down calling the invention 'nothing more than a toy'. There were problems with Bell's design, particularly the

efficiency of his transmitter and Edison was presented with the challenge of creating a superior version, which he did, almost a year later. On April 27th 1877 Edison filed a patent for his ‘speaking telegraph transmitter’, an invention that would earn him one hundred thousand dollars spread out over the lifetime of the patent, a guaranteed steady income for the next seventeen years.

Chapter 4

The Wizard of Menlo Park

Edison's years of work on the telegraph and 'speaking telegraph', or telephone, directly fed into his creation of the phonograph. The phonograph earned Edison the moniker 'The Wizard of Menlo Park' and transformed him from a successful inventor to a living legend.

Already very familiar with the mechanics of the embossing telegraph machine, Edison began experimenting with the machine's sounding device – the part that makes a clicking noise when a message is being recorded. Using a stylus, Edison's experimental machine made little indentations on a spiral of cardboard determined by the current of the incoming message. These pieces of embossed cardboard could be received and then re-transmitted without the need for transcribing the message in words.

On the 18th July 1877, an otherwise ordinary day, Edison made the discovery that when a larger than usual electrical surge was forced through the embossing telegraph and the cardboard disc spun faster than before, sounds were emitted. Inspired, Edison took hold of one of a metallic disc he had been experimenting on for use as a diaphragm and placed a metallic point in the centre, drawing a strip of wax paper through the point as he shouted 'hello'. The vibration of his voice left indentations on the strip of paper that could be drawn back through the machine and play back the sound of the human voice.

Edison worked secretly on his new invention for a number of months but gradually news of his latest project began to leak. Sensationalist articles began to appear describing the phonograph as an instrument for 'listening to the dead' based on the fact that it would be possible to record a person's voice and play it back years after their death. Once Edison had perfected his phonograph he tested it in his laboratory with a number of his assistants at his side. Edison spoke the words 'Mary had a little lamb' into the recording diaphragm then set the reproducer and played it back. Everybody present was astonished, Edison himself included.

Initially conceived as an instrument to be used in business, Edison showed little interest in using the phonograph for entertainment purposes. Yet on the evening Edison first demonstrated his phonograph at Menlo Park he couldn't have imagined the frenzied interest it would generate in the press and, as a result, the phonograph craze that would grip the American public. Investors clamored to get a piece of the phonograph action and Edison quickly made deals with a number of prominent financiers to create the Edison Speaking Phonograph Company.

Edison took his speaking phonograph on a whirlwind tour of Washington D.C. where he demonstrated it before a huge crowd at the National Academy of Sciences. Without speaking, Edison turned the crank of his phonograph which introduced itself in clearly audible words saying, 'The Speaking Phonograph has the honor of presenting itself to the Academy of Sciences'. Unsure what to make of the recording the audience sat dumbfounded until Edison's close friend and assistant Batchelor stepped up to the instrument and sang, shouted and whistled into the mouthpiece as Edison recorded. Hearing Batchelor's voice played back three women in the crowd fainted while the rest burst into shocked applause. Later, Edison demonstrated his phonograph for US President Hayes who was so thrilled by the wonder of recorded sound that he woke his wife and guests to listen to what the phonograph could do until the early hours of the morning.

Exhausted after his tour of Washington D.C. and irritated by the endless stream of visitors who now turned up at Menlo Park asking to meet Edison and see more of his amazing inventions, the now famous inventor retreated from his invention factory and took a vacation to California. Edison took his friend George F. Baker, who also happened to be a professor of physics at the University of Pennsylvania, with him on this trip and the two men spoke at length of current experimentations into transforming electric current into light. The possibilities of incandescent light took hold of Edison's imagination and refused to let go. Work on further developing the phonograph took a backseat for the next ten years as Edison focussed his attention on brining the world out of darkness and into incandescent light.

Chapter 5

Let There Be Incandescent Light

In September 1898, Edison visited the brass-manufacturing workshops of William Wallace in Ansonia, Connecticut. Accompanied by a few of his close friends and assistants from Menlo Park and a reporter from New York, Edison toured the workshop to see Wallace's incredible interior arc lights. Wallace was the co-inventor of the first American electric dynamo and a forerunner in the race to create electric light. His workshop was lit by eight five hundred-candlepower arc lights that were powered by his eight horsepower Wallace-Farmer dynamo.

Duly impressed, Edison inspected every inch of the light system and immediately pulled out his notebook and calculated the cost of running such a system. In a direct challenge to Wallace, Edison stated, 'I believe I can beat you making the electric light. I do not think you are working in the right direction'.

Yet much work had already been done in the right direction. Alessandro Volta had demonstrated the light produced by a glowing wire back in 1800 and a number of incandescent electric lamps had already been invented by James Bowman Lindsay, Humphrey Davy, Joseph Swan and Henrich Gobel but none were fit for purpose. The challenge was to create a system of electrical illumination that could replace gas and oil-based lighting while being commercially successful. Edison's goal, as recorded by him in one of his many notebooks, was to '…effect exact imitation of all done by gas, so as to replace lighting by gas by lighting by electricity. To improve the illumination to such an extent as to meet all requirements of natural, artificial and commercial conditions.'

It was a goal that had been declared impossible by a number of the leading scientists of the day and yet Edison saw the potential in selling electric light as a commodity. Arc light were already being used to illuminate the streets of Paris, New York and other American cities but they were considered too bright, unsuitable for use indoors, economically unviable and difficult to maintain.

Edison knew that in order to create an incandescent light bulb that would have a long life and yet be cheap to produce he would need to design a lamp that would draw a low amount of current, one made of a material with high resistance that would glow using a relatively low voltage.

On the 13th of September, Edison filed his first caveat for incandescent lighting. Edison knew that the answer to creating a complete electrical lighting system lay in the use of lamps containing a long strip of platinum, shaped into spirals and declared that he had solved the problem of incandescent lighting. The very next day negotiations began with potential investors and legal paperwork was prepared for the creation of the Edison Electric Light Company. A number of New York financiers paid fifty thousand dollars each for a stake in the enterprise, a financial gamble that would pay off into the millions if Edison was to succeed.

But success took time and as Edison spent months in the laboratory, conducting test after test to discover the best material for his innovative filament, investors began to grow anxious. Finally, after exhausting all of the possibilities for using metal as a filament, Edison turned his attention to carbon. The date was October 21st 1879, a whole thirteen months since Edison had publicly declared that he would illuminate the world with electric light, and Edison and his men embarked on a series of experiments with carbon filaments that would last two whole days. Finally, a lamp with a carbon filament was tested and stayed illuminated for thirteen and a half hours, only breaking after the current was increased too high. A second lamp was tested and burned for over forty hours.

Over the coming weeks Edison improved on his original design and set about outfitting the whole of Menlo Park with his incandescent light bulbs. Soon the news broke that Edison had finally done it, he had solved the problem of electric light. On November 4th, 1879, Edison filed for U.S. patent 223,898 for an electric lamp using ‘a carbon filament or strip coiled and connected to platina contact wires’ Gas stocks plummeted while stocks in Edison’s Electric Light Company soared to heights never seen before and the excitement reached fever pitch when Edison announced his first public demonstration on 31st December, 1879 in Menlo Park.

The bombastic language used in the press to describe Edison’s new

electric lighting system combined with a measure of sour grapes from prominent inventors and businessmen with a vested interest in gas lighting ensured that Edison was not without his detractors. Leading scientific minds were still publicly questioning Edison's claims and doubted that Edison's system could ever perform the way he was suggesting it would.

Critics and fans alike gathered at Menlo Park on the 31st December and spent the evening wandering the grounds and buildings in the glow of incandescent light while Edison himself, in his work clothes, explained how the system function and boasted that it would soon illuminate all of New York. The demonstration was a roaring success, investors handed over a further $60,000 for research and development and Edison gained the reverence of scientist, inventors and ordinary men and women the world over.

Chapter 6

The War of the Currents and the Improved Phonograph

Despite the positivity generated by his demonstration at Menlo Park, if Edison wanted to make his lighting system affordable and practical he still had much work to do. To get his system ready for mass marketing, Edison employed new men at Menlo Park and began giving them more freedom to experiment and manufacture without his micromanagement. Soon, Edison and his team had perfected an electrical distribution system introducing underground wiring, safety fuses, regulators, measures and various safety features. Edison also discovered a new, even more effective material for manufacturing filaments – carbonized bamboo – and revolutionized the way electricity was distributed publicly.

To oversee the epic feat of bringing electric light to the streets of New York, Edison had to relocate his family to the city and purchased a mansion on Fifth Avenue to act as his showroom and headquarters. It was just ten years since Edison arrived in New York from Boston looking for work as a tramp telegrapher and was forced to walk the streets all night without enough money to buy a bed. Now Edison was a millionaire living in a mansion on Fifth Avenue and was about to change the city of New York forever.

In the weeks before his relocation Edison had welcomed legendary actress Sarah Bernhardt to Menlo Park for a private demonstration of his greatest inventions. Kept at the theatre late by rapt audience who demanded 29 curtain calls of the celebrated actress, Bernhardt arrived at Menlo Park in the early hours and was led through the entire complex, lit by a network of glowing incandescent light bulbs, by Edison himself. Miss Bernhardt was said to be so thrilled with Edison's demonstration of his phonograph and with hearing her own voice played back that she asked to take the model home with her. Edison promised to build her a personal phonograph and a telephone for her Paris home, a promise he fulfilled soon after.

This private demonstration for Miss Bernhardt was followed by a much more formal demonstration by Edison and the board of directors of the

Edison Illuminating Company of New York for a group of New York City officials. These influential men had the power to give or withhold permission for Edison to install his electric lighting system in New York and were treat to the finest hospitality Edison could muster. Permission was granted and Edison set about acquiring six of the world's largest dynamos, four oversized boilers and six 240-horsepower steam engines before erecting a central power station in which to house it all. By September 4th 1882, amidst all the noise and pressure of a skeptical press and a number of frustrated shareholders, Edison flipped the switch and ushered in a new age.

Mass-production of Edison's light bulbs began at Menlo Park with an average of 1,000 light bulbs being produced per day, a figure that grew to an astonishing 45 million bulbs by the year 1903. Additional factories were set up to manufacture Edison's own patented switches, regulators and other fittings needed for his system and the Edison Illuminating Company of New York was founded to meet New York regulations for the system's installation.

Edison's victory over the problem of creating affordable and efficient electric light for the masses was complete with sales pushing his company assets up from $1.5 million to $10 million in just two years. Sadly, Edison's beloved wife, Mary, died on the 9th of August 1884. To distract himself from his grief and with time on his hands now that the sales of his lighting system were healthy, Edison returned to inventing full time. During this time Edison avoided Menlo Park and often spent his evenings at the home of his friend Gilliland, who made it his mission to find Edison a new wife. He fulfilled his mission in the summer of 1885 when he introduced Edison to 18 year old Mina Miller. Mina and Edison were married soon after, a union that proved to be a long and happy one and resulted in three children, Madeline, Charles and Theodore.

Edison had an elaborate home built for his new wife in Fort Myers, Florida and purchased Glenmont, a mansion in West Orange, New Jersey complete with a new laboratory less than half a mile away. Once completed, the West Orange laboratory was everything Menlo Park had been, only grander. But Edison's hopes of using his new laboratory to work on inventions had to be put on hold in the mid-1880s as he defended

his work against the threat of alternating current. In 1885 a company founded by George Westinghouse, one of Edison's chief rivals, developed the technology needed to transmit AC current over very long distances using less expensive wires that operated at a lower voltage.

Using transformers AC could be produced at a low voltage, raised in order to transmit the current many miles before being lowered back down to a safe level at the end of the line whereas Edison's system of direct current could supply a maximum of 250 volts, a level of electricity that was safe to use in the home and would not burn out incandescent filaments. Edison feared the potential for disaster AC posed but could not deny that his use of DC posed certain limitations. Edison's lighting system was only suitable for supplying large cities with lots of customers living close together. Electricity could not reach customers living more than one mile from Edison's DC plants, leaving a huge number of customers between Edison plants that could be easily convinced to go with an AC supply.

In 1886, the newly created Westinghouse Electric and Manufacturing Company developed a light system powered entirely by alternating current, a clear contender to Edison's DC-fueled dominance in the market for electric light in the US. The ZBD AC system, named using the initials of the three men who developed it – Zipernowsky, Blathy and Deri – had already spread throughout Europe and Edison was forced to purchase the rights to this new system to stop it its manufacturers getting the upper hand in the American market. Yet, at first, Edison did not take the threat AC technology posed seriously. Edison's advantage lay primarily in the fact that all industrial machinery in operation in the US at the time was dependent on DC current but Edison had already committed a serious error of judgement and made an enemy in a certain young man who joined forces with Westinghouse to bring him down – the man's name was Nicolai Tesla.

In 1884 Nikola Tesla arrived in New York from Paris and met with Edison at his headquarters on Fifth Avenue, holding a letter of recommendation from Edison's close assistant, Batchelor. The two men seemed to be on good terms and despite their differences in opinion on the potential of AC, Edison offered Tesla a job which he accepted. The working relationship between the two inventors came to an abrupt end when Edison offered

Tesla $50,000 to improve Edison's dynamo only to laugh and say, 'Tesla you to not understand our American humor', when he finished the job and asked to be paid. Tesla was outraged but it wasn't long before he made his own name in New York with his invention of an induction motor powered by alternating current as well as the dynamos, transformers and controls that would make it work as part of a system. Westinghouse made Tesla an offer he couldn't refuse to take control of his patents and the Westinghouse system soon looked unstoppable.

By 1888 Edison had already merged his many companies, including the Edison Lamp Works Company, the Edison Electric Light Company and the Sprague Electric Railway and Motor Company to form the Edison General Electric Company, later known as General Electric. Following this merger, Edison sold his share in the industry he had founded for $1,750,000. Edison reverted back from being one of the most prominent capitalist businessmen in the world to being simply an inventor, the Wizard of Menlo Park. But Edison couldn't bow out of the war of the currents without putting up a fight and that fight had become personal.

In a canny attempt to turn the public against the Westinghouse system Edison took to the press to publicize his criticism of the use of AC. In June 1888 legislation had been passed in New York to design and make an electric chair to be used as the state's preferred method of execution. With the help of his many powerful friends, Edison was able to make sure that a Westinghouse AC dynamo was used to power the first electric chair to ever kill a man. Three Westinghouse dynamos were purchased in secret and sold to Sing Sing Prison in Auburn State.

While Edison organized demonstrations, killing cats, dogs, horses and other animals, using a Westinghouse dynamo, Westinghouse's lawyers worked on appealing the first prisoner's sentence, stating that death by electricity was a 'cruel and unusual punishment'. The man to be put to death was named William Kemmler and had been convicted in March 1888 of murdering his wife with an axe. Kemmler's execution was set for August 6th 1890 and 21 individuals were invited to spectate. The execution was a botched, inhuman affair, during which Kemmler was electrocuted for long periods of time and repeatedly until he died. Westinghouse commented on the matter, '…it has been a brutal affair. They could have

done better with an axe.'

Ultimately, Edison could not push back the tide and just as he feared, alternating current took over from direct current as the standard. And yet all was not lost for Edison, in fact he finally had everything he had always wanted. An incredible laboratory all of his own, a beautiful home, a loving family and all the time he needed to work on his own inventions. Once more, Edison turned his attention back to the invention that had won him the title, 'the Wizard of Menlo Park' – his phonograph.

While Edison was fighting in the war of the currents two inventors, Chichester Bell and Charles Tainter, had been working at the Alexander Graham Bell laboratory to develop the 'graphophone', a perfected version of Edison's phonograph. Once completed the pair approached Edison, acknowledging that their phonograph was only a refinement of his original gramophone and hoping to join forces. Edison flatly refused and when the pair made plans to launch their graphophone he became furious and vowed to manufacture his own improved phonograph and sell it at factory prices in order to crush their opposition.

Again using the press to his advantage, Edison invited a number of newspapers into his West Orange Laboratory to report on his work on the phonograph and lure potential investors into buying a stake in future projects. Edison made a number of significant changes to his new phonograph, including replacing the brass cylinder coated with tin foil used to record indentations from the stylus with a cardboard cylinder coated with a plumbago-stearite compound. He also installed two Bunsen wet batteries, replacing the need for a hand crank and transforming his phonograph from a mechanical device to an electrical one. It must be said that around this time Edison also utilized a number of innovations from Bell and Tainter's 'graphophone', including the use of a wax cylinder to save recordings and a floating stylus that only made contact with the recording cylinder when there was sound to record.

In April 1888, Pittsburgh millionaire Jesse W. Lippincott purchased Bell and Tainter's Volta Graphophone Company and put the newest model of the graphophone on the market. Edison reacted with characteristic determination and gathered all of the workers at his West Orange Laboratory to let them know that no one was to leave until the newest

version of his phonograph was perfected. Days later Edison went public with his new phonograph, giving demonstrations all over the US at fairs and exhibition halls. Edison even had a phonograph installed in his business manager's London office where presentations of new recordings were given every day, including a speech recorded by Prime Minister William Gladstone.

Edison entered into negotiations with Lippincott to sell the Edison Phonograph Company and allow Lippincott to manufacture and sell Edison's improved phonograph. After days of negotiations headed by Edison's close friend Gilliland and Gilliland's attorney, Edison acquiesced. Unbeknownst to Edison, Gilliand had also sold the rights to sell Edison's phonograph in North America for $50,000 cash and $200,000 shares. Edison soon found out about the transaction and cut off all ties with Gilliland, completely heartbroken by his close friend's betrayal. Those close to Edison later revealed that the episode irrevocably changed his relationships with his employees and once stated he would, 'never trust anyone ever again'.

As part of his contract with Lippincott, Edison still had to manufacture his phonograph for sale under the Volta Graphophone Company. Edison had always seen the phonograph as a business tool rather than a toy or an entertainment device and as a result sales of the phonograph were slow. Lippincott soon found himself in crippling debt and following a devastating stroke control of the company passed back into Edison's unwilling hands. Edison was able to have Lippincott's company declared bankrupt and following a number of protracted legal proceedings was able to again manufacture and sell his phonograph himself. Outside of the US the phonograph was growing in popularity as a device on which to record and play music. Edison began marketing 'recordings' of popular songs and speeches of the time and phonograph 'parlors' began popping up in a number of American cities.

Edison's phonograph became one of his most popular and enduring inventions, surviving in some form to this day. Although he was no longer the Wizard of Menlo Park, as such, Edison was a world leader in the world of electrical invention and miles ahead of his rivals. The only inventor to come close to posing a challenge to Edison's version of the phonograph

was Emile Berliner who invented the ‘gramophone’ in 1887, a forerunner to the Victor Talking Machine, and used an image of a terrier dog listening attentively to his master’s voice as his trademark. Berliner’s model only overtook Edison’s when it became possible to record sound for up to 4 minutes, double what Edison’s phonograph could do. For now Edison had his mind on other matters and was already in the planning stages of undertaking what many called the greatest folly of his life.

Chapter 7

Edison’s Iron Ore Mill

It is often remarked that Edison was no businessman in the early years of his career. Interested only in experimenting and inventing he made a number of poor business choices that led to lost rights and earnings but as he aged, Edison bloomed into a committed capitalist, albeit one that appeared to be driven more by pride and prestige than wealth.

Edison had been interested in mining since the 1880s when he was unpleasantly surprised by the high cost of the iron ore he needed to manufacture his dynamos. Mines on the East coast of the USA were almost depleted and most mills relied on iron ore transported from mines in Northern Michigan for their raw material. There was money to be made in mining.

Edison’s first foray into iron ore mining was not a success. After noticing black particles in the sand on a section of the long Island coast while on a fishing trip, Edison realized that there were particles of metallic elements in the very sand beneath his feet. Edison developed machinery that would separate the metal from the non-metal particles using magnets but the metal (including gold, silver and lead) he successfully extracted was broken into particles too small for existing smelters to do anything with. Losing a small sum of money to this failed experiment only invigorated Edison’s determination to revolutionize iron ore mining.

On visits to existing mining plants, Edison noticed that almost every step of the difficult process of iron ore extraction and processing was done by hand by an army of miners. Edison’s goal was to create an automated system where innovative machinery would do the work of hundreds of men. Edison envisioned a system where dynamite would do the work of removing chunks of rock from mountainsides, huge boulders would be transported by steam-shovel onto a railroad car. Once at the plant, the stones would be moved along rollers that would break them down until they were nothing but powder. This powder would be passed through a magnetic field that would remove the iron-ore particles before smelting

them into briquettes.

Edison knew that the only way to make this process cost-effective would be to undertake it on an epic scale. With the help of friend and prominent investor, Walter Mallory, Edison created the Edison Iron Concentrating Company and work began on his first iron ore processing plant on 27th December 1888. Edison chose private investors for this project, having grown tired of Wall Street's investors' insistence on interfering with his inventions, a decision that would backfire when his venture began to fail.

From the outset there were serious problems with the plant, the magnets were too weak; the blowers that helped separate the iron from the dust were too strong; some parts of the system were too large; some too small and, most disastrously, the iron ore extracted was of a lower concentrate than that needed by buyers.

After raising another huge cash injection from his investors, Edison opened a number of small test operations and used the findings garnered from these to open a full-scale iron ore processing plant at Ogdensburg, New Jersey. Ogdensburg was a significant site for Edison as it was named after his ancestors, the maternal line of his family who had emigrated from Europe in the late 18th century and it was also an area rich in iron deposits. In order to attract men to work at his plant, Edison had fifty brand-new homes built, all with running water and electricity. The Ogdensburg plant operated on such a scale that the area became known simply as 'Edison'.

The Ogdensburg plant was completed in April 1891 and began working at full capacity immediately. Initially, manufacturers were willing to take a chance on Edison's new material and John Fritz of Bethlehem Steel put in an order for one hundred thousand tons of the low cost iron. Soon it became clear that Edison's iron briquettes did not travel well and they began to break up during transit. What's more, the iron was found to contain high phosphorus levels that continued to climb in the weeks after processing.

Edison demolished and rebuilt sections of the plant, modified machinery and made changes to the whole processing operation over the next several years but could never get the plant running efficiently. When investors balked at further demands for capital, Edison began to fund the operation

alone. It is thought that Edison used around $2 million of his own money to keep the plant running but eventually, in 1898, Edison was forced to call it quits on his ‘greatest folly’. He was unable to make payroll, his workers were deserting him and in reaction to the news that two of the wealthiest men in America had bought one of the most iron-rich mountain ranges in the country in order to mine it, the cost of iron dropped dramatically.

In September 1902 Edison closed the ‘Ogden Baby’, as he affectionately called it, for good. Financially ruined Edison did manage to claw something back from the venture by using left-over machinery in a cement-making plant and, as ever, he was still developing a number of new inventions, one of which was so remarkable and successful that the world would soon forget Edison ever had anything to do with mining.

Chapter 8

Moving Pictures and Final Years

Even while spending the majority of his time dealing with the endless list of mechanical failures at the Ogden iron ore milling plant, Edison was still working on new inventions at his West Orange laboratory. In November 1895, Edison invented the world's first x-ray machine, the prototype of which was used by a doctor at Columbia University in an operation to remove shrapnel from a bullet hole in a man's hand.

In an interview about his latest sensation, the phonograph, in 1887 Edison had revealed that he saw a day when, 'the pictures and gestures of (an) orator, as well as his voice, could be exactly reproduced, and the eyes and ears of the audience charmed by the voice and manner of the speaker. Whole dramas and operas can be produced in private parlors.'

The concept of moving pictures was not invented by Edison. Throughout history others had pondered the possibility of recording, reproducing and viewing objects in motion and invented certain apparatus that began to make that possibility a reality. In 1860, Frenchman Pierre Habert Desvignes invented the zoetrope. Made from a hollow cylinder with vertical slits cut along its circumference, the zoetrope had images painted on its inside surface each depicting the different stages of an object in motion. Viewed through the slits of a spinning cylinder the painted images appeared to move. Another simple invention of the time was John Barnes Linnet's kineograph that featured images painted on a series of pages that, when flipped, tricked the eye into seeing motion.

Edison was interested in these inventions but was more directly inspired by Eadweard Muybridge, a British photographer who had become famous for his photographic book entitled A Horse in Motion . Muybridge had developed an instrument known as the zoogyroscope that used spinning mirrors and an oxyhydrogen lantern to depict the running motion of different animals. Muybridge visited Edison in his West Orange laboratory in February 1888 to ask for his assistance in bringing sound to his motion picture invention. Although Muybridge backed out of this arrangement in

coming months Edison was captivated by the idea of a ‘talking phonograph’ and dedicated the next two years to creating an instrument that record images and replayed them in motion.

While attending the 1889 Paris Exhibition where he was the main attraction, Edison met Louis Jacque Made Dagger, inventor of the Daguerrotype photographic process, and Etienne Marey, famous for his photographs of animals in motion. On his visit to Marey’s photography studio, Edison experienced an epiphany. Noting that Marey’s camera was capable of shooting sixty frames per second and seeing a clear similarity between Marey’s machine’s use of filmstrips and his own use of paperstrips in his automatic telegraph, Edison turned to the telegraph to solve the problem of perfecting a motion picture camera.

As it was too early to apply for a patent, Edison leaked word of his latest invention to the press in order to protect it from competitors and drum up investor interest. Edison was on the minds of many following his role in the Paris Exhibition and word of this newest invention caused a sensation in the press. Not everyone was thrilled with the concept of motion pictures, as a reporter from the London Pall Mall Gazette made clear, stating, ‘Edison has added a new horror to existence’.

And yet this horror was still far from being a reality. Between 1890 and 1891, Edison and his assistants worked full time on perfecting Edison’s Kinetograph. The goal of having the kinetograph and phonograph work together in unison was quickly dropped while developments in celluloid film helped advance the men’s work.

In May 1891, Edison went public with his kinetograph (the machine used to capture images) and the kinetoscope (the machine used to view those images in motion) publishing detailed drawings and descriptions of his latest invention in Harper’s Weekly. Edison was also granted a patent in the US for his machines but declined to pay the extra to get the same patent in Europe, an oversight, perhaps one of financial necessity, which would cost him greatly in the future.

Over the next three years Edison built the world’s first motion picture studio, dubbed ‘Black Maria’ and invited a number of guests to perform and be recorded at his laboratory including famous strongman Eugene

Sandow, boxers Corbett and Courtney and dancer Carmencita.

By 1894 investors were ready to take control of Edison's invention and distribute motion pictures amongst the masses but Edison had been burned in the past by poor business decisions and refused to relinquish control of his kinetograph and kinetoscope no matter what price was offered. Eventually Edison sold a license to a group of investors to sell Edison films using a coin-slot apparatus he had invented and the first Kinetoscope Parlors opened on Broadway in New York City.

Kinetoscope Parlors began to pop up in major cities all over the US and Europe, charging a small fee for an individual to watch a short motion picture through a peephole. It seemed a natural progression that the technology be developed to allow people to experience motion pictures on a larger scale, as a group audience but Edison refused to endorse other inventor's projectors or create his own, stating it would be to 'kill the goose that lays the golden egg'.

Eventually Edison had no choice but to develop a projector to compete with his competition, yet with all of the other projects he was involved with at West Orange he had neither the time nor perhaps the know-how to create a projector himself. Here Edison did something he would never have done as a younger man and paid to lend his name to an invention that was not his. Thomas Armat had invented the Vitascope projector and agreed to allow Edison to market it – while making clear that Armet designed it – for a profit. When the press mistakenly referred to the Vitascope as Edison's latest wonder, no one moved to correct them and later Edison made only a minor adjustment to the device before re-naming it Edison's Projectoscope and selling it as such.

The world of motion pictures exploded and within just a decade there were thousands of movie theaters and nickelodeons across the US. Edison had failed to file patents for his original kinetoscope and kinetograph in Europe back in 1891 so manufacturers were able to use his original designs with only small adjustments and market them as their own. Competitors popped up all over the US and Europe desperate to get a slice of the motion picture pie but Edison stuck to his guns and fought those who used his inventions in court. In 1907 Edison won a major lawsuit in federal court, protecting his 1891 patents and forming the Motion Picture Patent Company, a

national trust that controlled the production and distribution of films and would earned Edison a huge fortune in the years to come.

Between 1900 and 1910, Edison's epic West Orange laboratory began to appear too small for all of the product development and manufacturing of Edison inventions going on within its walls. Edison was the head of thirty companies producing a range of products from phonographs to movie cameras to dictating machines to moving pictures themselves. In 1911 Edison formed Thomas A. Edison incorporated in an attempt to remain in control of the many branches of his business empire.

Edison could control many aspects of his business empire but he could not control the course of history. In August 1914 Germany declared war on Russia and Britain declared war on Germany, officially beginning the First World War. Edison relied on both Britain and Germany for regular shipments of Carbolic Acid, a key component in the manufacture of phonograph discs. An embargo was enforced, stopping all shipments between Britain and America and Edison was forced to take on the production of Carbolic Acid himself.

It was believed that it was inefficient to produce this acid in America as the quality of American coal was too low. Edison assembled a team of top chemists and engineers and set about creating his own chemical plant. The plant, like the vast majority of Edison's ventures was a huge success and soon Edison was supplying acid to other manufacturers all over America.

Edison's contribution to the war effort was not limited to the production of carbolic acid. From the earliest days of the war in Europe, Edison was vocal about his belief in the need for military preparedness. Edison was both a respected public figure and a major leader in industry and business and had the power to sway the opinions of many, including Congress. In acknowledgement of Edison's influence he was approached to lead the Naval Consulting Board, a group of advisors tasked with readying the US military for war.

In October 1915, aged 68, Edison attended the first meeting of the Naval Consulting Board. By this time it is said that Edison was so significantly hard of hearing that he had an assistant tap out what was being said in the meeting on his knee in Morse code. It was also around this time that

Edison first became friends with Henry Ford. Edison had met Ford as early as 1897 and the men had been in each other's company before but it wasn't until 1916 that the two men went on a camping trip together and Ford sought Edison's advice on his concept of a gasoline-powered automobile. Just two years after getting Edison's approval of his plans, Ford opened his first automotive manufacturing plant.

Although Edison never stopped working in his later years, he did spend more time than ever before with friends, amongst them Henry Ford, John Burroughs and Harvey Firestone. The foursome took a number of road trips out in the Catskills and Smoky Mountains, 'vagabond' trips as they referred to them, driving Ford automobiles and dragging a number of servants along with them. The itinerary for these regular trips was released to the press, encouraging hundreds of reporters to follow on their trail in an early 20th century version of the modern day paparazzi.

Even in the final years of his life, Edison never gave up on experimenting and innovating and started a major research project in 1927, hoping to find a plant that could be grown to harvest rubber. Just days before his death, Edison presented Harvey Firestone with four vulcanized specimens of rubber derived from the goldenrod plant.

Thomas Alva Edison died on the 18th October 1931. A number of newspapermen, acquaintances and employees kept vigil outside Edison's home in the last hours of his life. Suffering from complications related to diabetes, Edison slipped into a coma before taking his last breathe at 3.24am. To alert those holding vigil that the great man had finally expired, an electric light in his bedroom was switched on.

Conclusion

Edison lived long enough, not only to see the incredible changes his discoveries and inventions created in the world but to feel the gratitude of its people. At the fiftieth anniversary of Edison's invention of the incandescent lamp Henry Ford joined others in celebrating Edison's achievements by dedicating a museum he intended to build to his friend. Edison was present in Dearborn, Michigan on the 27th of September, 1928, to lay the cornerstone of what would later become the Henry Ford Museum and Greenfield Village.

This was not merely a gesture on Ford's part as the ceremonial laying of the cornerstone signaled the beginning of many months of planning, building and collecting as Ford slowly gathered the necessary materials to recreate Edison's past. Ford demolished, transported and reconstructed whole buildings that were significant in US turn of the century history, including the Smith's Creek Grand Trunk Railroad Depot where Edison once sold newspapers and candy while experimenting in his laboratory and running his own printing press.

The star of the project however could be found in the village where Ford had painstakingly restored Edison's entire Menlo Park Laboratory, Fort Myer's Laboratory and even outlying buildings from the complex such as the old boarding house. Despite being in ill health, Edison attended the grand opening and dedication of the Dearborn Museum and Village on the 21st October 1929. Led around the complex Edison was astounded and as he stepped inside the reconstruction of his legendary Menlo Park library he was dumbstruck. Unable to speak, Edison sat down in a chair and felt the weight of decades of memories flood over him. As legend has it nobody spoke for maybe ten minutes or more, awed by the sight of this powerful man contemplating his life's work.

Edison's tour was followed by a dedication ceremony and dinner, attended by distinguished guests from all over the world, including Madam Marie Curie, President Hoover, Charles Eastman, Orville Wright, John D. Rockefeller, Walter P. Chrysler and countless others. Indulging his taste for the theatrical, Edison performed a demonstration for a select few,

including President Hoover, where he re-enacted the moment he created the first functional incandescent lamp. The demonstration was broadcast live on the radio so that people all over the world could hear Edison triumphantly proclaim, ‘let there be light!’

As Edison’s life drew to a close, the world’s newspapers praised everything the man had contributed to humanity, all of the jobs he had created, the industry, revenue and improvements he had made to ordinary people’s daily lives. It’s difficult to overstate the impact Edison’ work had on the world and when he finally died the world’s reaction was all-consuming. The name Thomas Alva Edison may not inspire the same wonder and awe it did one hundred years ago but the man’s legacy is all around us and becomes apparent every time we flip a switch.