

Nikola Tesla

Michael Ballesteros

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Instructor, Kenneth Frawley

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In the world of electricity there is no inventor more famous than Thomas Edison who fills history books with his world of lights and electricity. Radios, X-Ray's, Alternating Current (AC) and the Television are all around today thanks to a man who most American students never hear about in school. *The Master of Lightning*, Nikola Tesla, is a man who is missing from the very same history book, as Edison. Tesla is the inventor of the electric motor, the remote control, and the Tesla coil. He lit up the world with amazing inventions still used today. To have such a bright inventor, who illuminated the path for such great inventions used today to be left in the dark is an insult to the world.

Born in July of 1856 in Austria, the son an orthodox priest and an unschooled woman, Tesla was an imaginative child who was highly encouraged to follow in his father's lead into priesthood (Hunt, 2012). At the age of seventeen Tesla contracted cholera, being an intelligent young man he made a deal with his father that if he survived he would be allowed to follow his dream and go to a technical college. With his survival Tesla was allowed to follow his dream and attended a Technical University at Graz. There he was introduced to the Gramme Dynamo, an invention that inspired and hunted him for years. At the age of twenty-four, while walking with a friend in Budapest, he saw a lightning strike and with a stick he drew in the sand his first design for the induction motor (Tesla's Early Years. PBS, 2012).

In 1882, Tesla was living in Paris, France and started working for The Continental Edison Company where he was worked with their Direct Current (DC) generator facilities. After years of working in his free time he was able to finish his first induction motor in 1883. Shortly after the completion of his motor Tesla decided to share his ideas with the world and headed to America. When he was 28 he finally arrived at New York City and was shocked by what he saw

stating, "What I had left was beautiful, artistic and fascinating in every way; what I saw here was machined, rough and unattractive. It [America] is a century behind Europe in civilization." (Coming to America. PBS, 2012) Tesla, with a few coins, some poems, and his designs for a flying machine, found employment with none other than Thomas Edison. As with any other pair of great minds on different paths they must have found it impossible to work with the other and went their own ways.

In 1885, when Tesla was losing hope, he met George Westinghouse of Westinghouse Electric. Westinghouse took the opportunity and bought the patents for Tesla's AC dynamos, transformers, and motors. This transaction caused a power struggle between Edison's DC and the Tesla-Westinghouse AC. The Tesla-Westinghouse AC would soon win out over Edison's DC, but they struggle would continue for years to come. To spread fear about the possible dangers of AC Edison would take AC and electrocute animals in public. In response to Edison's attacks Tesla would take his AC and allow it to run through his body to light a light bulb he was holding in his bare hand (Hunt, 2012).

Tesla, with the sale of his patents to Westinghouse Electric, was soon able to open his own laboratory. With his own space Tesla was now free to bring realization to all that was trapped in his head. He would experiment with shadowgraphs, the predecessor to X-ray. During this time he worked on the carbon button lamp, an improved version of Edison's Incandescent Light Bulb, which runs off of AC (Wikipedia, 2012) and other types of lighting.

In the years leading up to world fair, Tesla continued to do what he loved and experimented. In 1881, he patented one of his most well-known inventions, the Tesla Coil. The Tesla Coil would take house hold current and turn it into high frequency current. It could even be turned into extremely high voltage. What began with the Tesla coil would lead to neon lights and

fluorescent lighting, television, and radios. This invention began Tesla's lifelong pursuit to transmit energy through the air wirelessly (High Frequency. PBS, 2012).

Tesla's AC was under fire from Edison and others who tried to demonstrate how dangerous it was. The attacks included the electrocution of stray dogs, an elephant, and even a convicted ax-murder, William Kemmler, in New York's first electric chair. In 1893 Tesla's AC won its final great victory over Edison's DC when Westinghouse Electric Company under bid General Electric, which took over Edison Electric, to light the Chicago World Fair. From the moment that President Grover Cleveland threw the switch and lit up the fair for the millions attending it was clear that future of power was AC (War of the Currents. PBS, 2012).



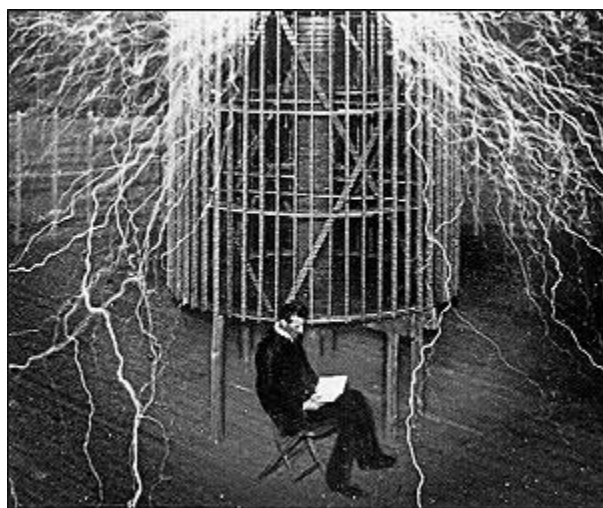
With the great success of the Chicago World Fair came the opportunity to light the world. In 1893, the Niagara Falls Commission, a group set up to pick a proposal on how to use Niagara Falls to create

electricity, awarded the Westinghouse Company the chance to harness the power of the falls.

With many major financiers to include; J.P. Morgan, John Jacob Astor, Lord Rothschild, and W.K. Vanderbilt backing the project, Tesla must have been under great pressure to succeed. The price of the project was costly, consuming both lives of workers, and money from investors. It became worth the cost when at midnight on November 16, 1896 when the first of the power reached Buffalo, New York (Harnessing Niagara. PBS, 2012).

With the world now seeing the power of AC, Tesla could have retired and lived a quiet life until he died. Not being a man to sit around Tesla continued to invent and experiment. The result of his latest set of ideas was displayed to the world in 1898 at Madison Square Gardens. With the stage set Tesla demonstrated another of his many astonishing inventions, the first remote controlled boat. It was an iron shelled boat that would race across the pond seemingly controlled by Tesla's mind. In reality, Tesla was using his radio waves to control the little boat from a small box with levers on the side. This was the first device to be run off a wireless remote control (Race of Robots. PBS, 2012).

After his amazing performance at Madison Square Garden, Tesla had plans to send the first long distance wireless signal that would go for 50 miles. There was much computation to create this way to send long distance signal. Across the ocean, Guglielmo Marconi was preparing to send a wireless signal from France across the English Channel to England. In 1895, there was a fire that destroyed Tesla's lab and research, which allowed Marconi to send his signal first. In 1899, Marconi, using Tesla's oscillator, sent his signal across the English Channel. It wasn't until 1943, after his death that Tesla was granted the recognition for his design and patents for the radio (Who invented Radio? PBS, 2012).



In 1891 Tesla patented the invention he is best known for, but not his best invention. The Tesla Coil is an invention that takes standard current and super charges it to high voltage and frequency to produces man made lighting. There are many pictures of him sitting in a room reading a book with lightning flying

all around him harmlessly. The Tesla Coil made a well-known appearance in the 2010 Disney Movie “The Sorcerer’s Apprentice,” where the main character, who is majoring in physics, uses the tesla coils to create tones as it flies through the air at different frequencies.



Tesla moved to Colorado Springs, Colorado, where he made a new lab and discovered terrestrial stationary waves. Tesla showed that the entire earth can be used to conduct and store energy. Tesla, after a lightning storm, went out and took a standard light bulb and stuck it into the ground where it was then powered by the electricity that was being held there. While in Colorado Tesla then took 200 lamps over a distance of 25 miles and used this to power the lamps wirelessly, he also produced a lightning flashes that was measured at 135 feet, nearly half the length of a football field (Hunt, 2010).

In 1900, he returned to New York where he continued to work on his ideas. Tesla was a man who was always designing, and dreaming, but he would dream on such global scales that the world would not believe his ideas possible. Upon his return he wrote an article for *Century Magazine*, in which he describes devices that would control weather, provide wireless communication to the world, and even make war impossible. This article caught the attention of the great bank man J. P. Morgan, who offered \$150,000 for Tesla to build a transmission tower,



and power plant. Although the price was far lower than was needed, Tesla took the money and started building (Tower of Dreams. PBS, 2012).

In 1901, construction on the massive structure began. It rose 187 feet into the air and supported a steel dome that weighted fifty-five-tons. The Wardenclyffe Tower, as it was named, was Tesla's dream to supply the world with free limitless energy. Sadly, with the stock market crash, the prices of building materials more than doubled the cost of the tower. Tesla went to his investors to plead for more funds but was denied by all. In 1905, with a partially completed tower standing, the doors closed, and all work halted permanently (Tower of Dreams. PBS, 2012).

Tesla, now entering the later part of his life, was penniless. A string of disappointments that started with the failure to complete his dream tower continued in the years to follow. In 1905 he lost the Nobel Prize to Marconi for his radio. Tesla continued to invent and although many inventions would be recognized after his death, in life they had little success. He created a new turbine engine to produce power more efficiently. He also designed a new type of aircraft that resembled both an airplane and a helicopter (Poet and Visionary. PBS, 2012). In 1934, Tesla's last gift to the world was his "Peace Ray," a partial beam weapon that would prevent wars. Tesla then seventy-eight, was unable to find investors (A Weapon to End War. PBS, 2012).

When Nikola Tesla died in 1943, he was alone in his hotel room. The greatest of mind that gave the world so much, and received so little, was now gone. The many praises that he had earned were left unsung. In the years after his passing he is finally starting to be recognized for the gifts he had passed on. Tesla's works are still seen in every home in many parts of the world. His many ideas continue to shape the future, inspire many who want to improve the world and

create sparks of imagination in future generations. The way, Nikola Tesla, *The Master of Lightning* will continue to do.



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