

Engineering - 24

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## Nikola Tesla- Is He Getting the Recognition that He Deserved?

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Our assignment for the freshmen seminar class was to do a web page or a five-page essay on anything relating to Nikola Tesla. I chose the essay project because I know nothing about making a web page. I have decided to write my essay on his contributions to the world and why I think these contributions is enough to make him be recognized. And yet, why is not getting that recognition.

Let me start by asking you, "What comes to your mind when I say Thomas Edison?" Probably something like "he invented the light bulb." And that would be correct. But what would have come to your mind if I had said Nikola Tesla instead of Thomas Edison? Probably nothing, right? You are not the only one. Not many people have heard of his name before or know what he did, including myself. Yet, I am learning more about him now in my freshmen seminar class called Engineering 24. Furthermore, the more I read and hear about him the more I think he should be known and recognized to the whole world for his tremendous achievements. Some of his inventions that we are still using today are only proof of his great achievements.

Nikola Tesla was born on July 10, 1856. He was the second son of Georgina Mandic and the Reverend Milutin Tesla. His mother was brilliant and inventive but unschooled; his father was a priest. He had three sisters and one brother. They lived in a small house that stood near the Serbian Orthodox Church in the pretty village of Smiljan. His childhood life was very happy until his older brother Dane died in a horse-riding accident. The loss of his brother had a major effect on Tesla's life. He felt a lifelong sense of obligation to his parents to compensate for their sadness and

of guilt that he, rather than Dane, had survived. Yet, at the age of ten, he was obsessed with the possibilities of vacuums, and was "passionately fond" of mathematics, performing calculations in his head more rapidly than his teacher could write them on the board. 1 He was essentially a self-taught scientist. However, he did attend the Technical University at Graz, Austria and the University of Prague for his training in the engineering career. Moreover, he was multilingual; he was fluent in English, French, German, Italian, and Serbian).

As a result of being born in poverty, Tesla started inventing things since his early age. He invented his own toys and tools. Some of the toys and tools he mentioned in his autobiography were his frog-catching "apparatus", his first "motor" powered by Maybugs, his "pop-gun", and other inventions.<sup>2</sup>

One of Tesla's most significant achievements was his discovery of the rotating magnetic field produced by the interactions of two and three phase alternating currents in a motor winding. It formed the basis of his induction motor and most of the alternating current machinery. Large amounts of electrical power could be generated and transmitted efficiently over long distances. To this day, the three-phase form of Tesla's polyphase system is still used for the generation and transmission of most electricity. Furthermore, the conversion of electricity into mechanical power is made possible by updated versions of Tesla's three-phase and split phase motors.<sup>3</sup>

Later he developed the "Tesla Coil" as a result from his experiments with high frequency and high potential alternating currents. Moreover, it is still used as a major component in numerous electronic devices.

Yet that was not the only thing he discovered from his experiments. Tesla also developed the precursors of modern neon and florescent lights as part of other experiments with high frequencies. He constructed these lights, elongated glass tubes filled with gas and coated with phosphor, excited in his high voltage experiments. He also discovered that high voltage current could be made harmless by using alternating current scheme at very large frequencies.<sup>4</sup>

Tesla also invented the radio. A lot of people thought Guglielmo Marconi did but he was only partly responsible for 'developing' radio. He did not invent it because Tesla did. Even the United States Supreme Court, on June 21, 1943, ruled against Marconi. The court decision was essentially the event that settled the long dispute between Marchese Guglielmo Marconi and Nikola Tesla. The court's decision identified as "Marconi Wireless Telegraph Company of America vs. United States," rendered invalid Marconi's basic patents which was dated June 28, 1904 because Tesla's patents had priority since it was dated way before Marconi's patent.

Moreover, Tesla developed receivers and transmitters and applied them in remote ship control. In 1898 he announced his invention of a teleautomatic boat guided by remote control which he demonstrated at the first Electrical Exhibition in Madison Square Garden that same year. This laid the foundation of remote control systems. He operated a three-foot model boat showing both radio control and robotry in one incredible presentation. This invention made Tesla an originator of remote control.<sup>5</sup> He also worked on "telecontrol" around 1893. From this, he demonstrated a remotely controlled submarine in 1898.

However, Tesla believed that his most important discovery was the terrestrial stationary waves. By this discovery he proved that the Earth could be used as a conductor and would be as responsive as a tuning fork to electrical vibrations of a certain frequency. He was also able to light 200 lamps without wires from a distance of 25 miles and created man-made lightning, producing flashes measuring 135 feet.

Tesla's ideas were ahead of his time. Even with all the inventions he came up with so far he still was coming up with more ideas every moment. He was very interested in wireless transmission of energy and information. He envisioned a "World Wireless System." Upon returning to New York in 1900, Tesla began construction on Long Island of a wireless world-broadcasting tower, which was funded by J. Pierpont Morgan. His three goals were to develop a transmitter of great power, to perfect means for individualizing and isolating the energy transmitted, and to establish the laws of propagation of currents through the earth and the atmosphere. <sup>6</sup> He expected to provide world-wide communication and to furnish facilities for sending pictures, messages, weather warnings,

and stock reports. Unfortunately, the project was abandoned as a result of financial panic, labor troubles, and Morgan's withdrawal of support. And it was demolished in 1917.

Tesla came up with more than 700 inventions and patents during his lifetime. However, most of his ideas remained in his notebook because of lack of funds. For example, in 1921 he had some ideas of vertical take-off and landing aircraft (VTOL). In his note he had drawings and gave a thrust analysis. It is a combination of a helicopter and airplane. He never built it though. Yet, VTOL is in military use today. Another example, was a hovercraft, it is horseshoe-shaped VTOL with a horizontally placed turbine. It rides on a thin layer of air. Unfortunately, Tesla never built it. And again it is commercially available today. Lastly his work on turbines and other project also remained in his notebooks.

It is ironic that even with all the achievements that Tesla has accomplished, not many have heard of him. And it is no surprise because in most books, the credit is given to Thomas Edison instead. Furthermore, his name was not even mentioned in the Smithsonian Book of Invention, which is a prodigious 3/4inch thick book of America's greatest inventors and their inventions. And in one of the Smithsonian's publication, "The Beginning of the Electrical Age," which traces the history of electricity from Volta to Edison, Tesla's name was missing. Instead, the curator shows pictures of the Niagara Falls Power project, and readers are carefully guided into believing that this was the work of Edison. However, it was Tesla's polyphase AC system that the power commission adopted and licenses had to be issued to use Tesla's patents. One reason that Edison probably got the credit was because the money for this publication came from the Thomas Alva Edison Foundation.<sup>7</sup> Another reason why his name probably did not become well known in United States was the lack of his notes on his work and research. After his death, his trunks, which contained his diplomas and other honors, his letters, and his laboratory notes, was impounded. Eventually his things were inherited by Sava Kosanovich, Tesla's nephew, and later housed in the Nikola Tesla Museum in Belgrade.

I agree with the few others that Nikola Tesla should be recognized. And the reason that the memory of him survives is a tribute to the passions he inspired in a few scientists, engineers, and researchers who refused to let him be forgotten. Tesla is indisputably the father of alternating cur-

rent power generation and transmission. No one can say otherwise since his AC technology, first introduced on a large scale at Niagara Falls in 1896, remains unchanged and unchallenged to this day. Moreover, his "Apparatus for Transmission of Electrical Energy," patented in 1900, is still the basis for transmitting and receiving all radio and television signals. These two technologies alone merit the recognition and gratitude of every inhabitant on this planet. But that is not the only thing he came up with during his lifetime. He also invented or patented the rotating magnetic field principle, polyphase alternating-current system, induction motor, wireless communication, fluorescent lights, and remote control. Furthermore, everytime we turned on a light, or a radio, or operate a remote control we continue his legacy. Therefore, Nikola Tesla deserves more recognition than he is getting now. He should even get more recognition than Thomas Edison should. One recognition so far that the people did in his honor was to have a unit of electrical measurement named after him.<sup>8</sup>

## Reference

- 1 Margaret Cheney and Robert Uth, *Tesla: Master of Lightning*, New York: Barnes and Nobles, 1999
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- 3 *Encyclopedia Americana*
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- 5 Nikola Tesla, "My Inventions," *Skolska Knjiga*, Zagreb, 1990
- 6 Nikola Tesla, "The Transmission of Electric Energy without Wires, *Electrical World and Engineer*."
- 7 Z. Herskovits, "To the Smithsonian or Bust: The Scientific Legacy of Nikola Tesla," *Yale Scientific Magazine*, V. 71, Issue 4 (1999)
- 8 Cheney and Uth, *Tesla: Master of Lightning*

