

The Genius Behind It All

© 1999 Grayson Dietrich (note: this paper was written a while ago. I since have come to believe some of the ideas and information put forth here about Tesla and his work are false, specifically, the info on his wireless power transmission. Don't take it too seriously. Later, -The Electrophile)

The sky was ablaze with light above the village of Smiljan, in Croatia, litten by a dazzling electrical storm that had raged for several hours. Inside the household of the Rev. Milutin Tesla, a new child had just been born. That child was Nikola Tesla, born at midnight, July 9, 1856. The Tesla heritage was solid, with a background of scholarships, military honors, clerical dedication, and manual dexterity. There is a legend that the midwife predicted that he would be a child of the storm. The story credits the mother with evading the connotation, preferring to interpret that her son would be a child of light. The father added his own prediction. He was certain that his son would spread the light of the gospel.

Living up to the original two predictions, Nikola Tesla became one of history's greatest electrical engineers; his inventions changed and created, and continue to change, the world as we know it. His most well known creation is the 60-cycle alternating current electrical system utilized in our country since its introduction by Tesla in the 1890's, through alliance with Westinghouse. His working with Westinghouse gave his system the support it needed to triumph over Thomas Edison's direct-current system that was currently in use. Without the A.C. system developed by Tesla, our power grid and style of life could not exist. First of all, alternating current is much easier to generate than D.C., plus its voltage or current can be readily and easily changed, something impossible with direct current. This allows extreme high-voltage, which travels long distances on wires with little loss, to be stepped up to using transformers, and then sent cross-country on high-tension power lines. D.C. made this impossible, every few hundred yards a new generator was necessary to maintain power levels, so it could only be used within individual cities or ships. A.C. is also far less deadly than D.C., since if one were to receive a shock from a D.C. power line, your muscles would contract with crushing force, locking you onto whatever you happened to have touched. A.C., on the other hand, would force your muscles to vibrate, rather than contract, enabling you a slight chance of rulling away. Tesla created all aspects of the A.C. system, including the first motor to run off of alternating currnet, which made its adoption possible. After he succeeded, indeed during the struggle, he turned his expertise to another area, even more important than his electrical system: radio.

Nikola Tesla produced the very first radio apparatus, providing the basis for all modern communications. Without it, television, cellular phones, pagers, RADAR, radio broacasting, satellite communications, and many other aspects of daily life normally taken for granted couldn't exist. While it was Nikola Tesla's work that led to the realization of radio, history has it stated that Marconi, an Italian inventor and rival of Tesla, invented radio. His much-publisized trans-atlantic "s" signal ushered in the age of radio signalling and broadcasting, so most people naturally assumed that he had invented the appartatus he had used. When told of the feat, Tesla simply stated: " He is a good man. Let Mr. Marconi continue. He is using 17 of my patents." (Cheyney 161)

It wasn't untill after Tesla's death that in 1947 the Supreme Court overturned the Marconi patents and awarded Tesla as the true father of radio. Even so, Marconi still generally gets the credit, and Nikola Tesla is most often remembered for another of his inventions, dubbed for its creator, the Tesla Coil.

The Tesla Coil was developed by Tesla as a more advanced radio transmitter, and was in fact the first "modern" radio transmitter in that it gives a continuous signal, but the coil also has other properties, among what it is most remembered for being that it can produce electrical discharges amounting to millions of volts. He constructed a great number of the machines, the largest of which that any substantiating information exists about being a huge coil at his Colorado Springs laboratory which gave off lightening bolts nearly a hundred feet long. As it was this large, he designed it to run with special configuration known as a tesla magnifier or magnifying transmitter. He at least partially constructed another of these "magnifying transmitters", this one being what would have been the world's first trans-atlantic broadcasting station.

Located at Wardencllyffe, NJ, this station not only was built with communications in mind, but was to be the means of realization for Tesla's highest aspirations and wishes: the wireless transmission of energy. J.P. Morgan had backed the whole venture and was unaware of tesla's true goal; if he had been, he never would have backed it. Morgan had invested heavily in coal and electric companies; a means of transmitting energy freely would destroy most of those industries. And yet, even without that knowledge, Morgan was very catious about his investment in Tesla's project. An unstable economy and shaky investments in other areas, coupled with Tesla beginning to run over budget, caused him to cut his funding. Tesla stayed on untill the end though, as did his loyal employees, but eventually they left, too.

Before that happened, though, Tesla managed to give the local residents enough to spark legends about into the future. In the final nights of Wardencllyffe, before the station fell dark forever, Tesla filled the sky with indescribable displays. Reports tell of his device lighting up the dark sky for a radius of hundreds of miles.

When questioned during this time, he said, "The people about there, had they been awake instead of asleep, at times would have seen even stranger things. Some day, but not at this time, I shall make an announcement of something that I never once dreamed of."(Cheyney 165)

But, this was sadly the site's swan song, and soon afterward the building and tower lay abandoned. After the watchmen left, vandals broke in, smashed things, destroyed notes, scattered papers on the floor, and trampled them. Eventually, the entire structure was ordered destroyed to be sold as scrap to pay off some of Tesla's many outstanding debts. It took many attempts to dynamite the tower, it remained stubbornly glued to the spot until finally, on the ensuing labor day, the dynamite overcame the merely celestial. A junkman noticed some of Tesla's notes blowing down the street. "I did not exactly cry after seeing my place after so long an interval," the inventor wrote, "but I came very close."(Cheyney 174)

A Tesla Coil gives off huge amounts of RF (radio-frequency) energy into the surrounding air and can be collected very easily, with very, VERY simple equipment. Also, the only connection for the receiving equipment is a strong ground attachment, as the energy travels freely through the air. Tesla had envisioned using a network of massive magnifying transmitters to power a world-wide wireless power and communications grid, imagining being able to fly in ultralight plane or land vehicular nonstop with all power coming from a simple tunable coil and a large antenna. Sadly, his understanding of radio was flawed. The technology still in its infancy as it was, and while his system would have worked great for communications, his ultimate dream of a wireless power grid would have failed. He misunderstood how electromagnetic waves propagate through the atmosphere, though the principle behind the system still lies mostly intact today.

His idea was to set off a system of standing electromagnetic waves across the earth's surface. Either this would have been accomplished using the earth itself as a singular conducting body, or he would have used the gap between the earth's surface and the ionosphere as a massive waveguide. Either of these things could be done, theoretically, but the extremely low frequencies that would be needed to achieve resonance, only a few hertz in the case of the standing wave system, would be nearly impossible to produce reliably. To construct a Tesla coil with a secondary frequency of, say, 20 hertz, and dimensions of 100 feet by 33 & 1/3 feet, nearly 16 million feet of wire would be needed. That works out to be about 1,500 turns per inch, which means the wire could be only 2/3 of a mil (one one thousandth of an inch) thick!

So, yes, the Tesla power grid might (HUMONGOUS VERY IFFY "MIGHT") be achieved in this fashion, though another major drawback is that this would have made any and all advanced technologies that we have today utterly impossible. The Tesla communications grid would have been simple, but would have had a multitude of crude signals, being broadcast so strongly that anything would be exposed to huge induced voltages. This means no integrated circuits, so all technology would be reduced to the use of large and cumbersome vacuum tubes. And even then we still would not have radio as we know it, so no TV, cell phones, walkman radios, pagers, satellite communications, or any such things that we take for granted. It must be considered, however, that none of these things existed, aside from simple tones and beeps over long-wave radio, in the time when Tesla proposed and tried to achieve his wireless power grid. Despite his failure to complete his dreams, Tesla contributed more to society than is imaginable. His inventions affect every aspect of our lives, every second depends on principles he created, technologies he devised. Tesla: the true prophet of the modern world.

Perhaps even more important than his invention of radio, was Tesla's creation of the first electrical logic circuits. These are the basis of all computers, and allowed Tesla to use his radio transmitters to control several model boats and torpedoes without physical connection. He was using remote control. The most fundamental aspect of what computers are, the electrical switch known as the transistor, only makes the devices possible when used to make up logic circuits. These simple inventions of Tesla may have changed our world more than anything else, and yet, he is nearly never given credit.

Tesla pioneered a vast quantity of sciences, and many of his demonstrations and experiments have remained unreproduced to this very day. So Tesla is credited with a whole slew of "lost inventions", about which nearly all records regarding his experiments are either lost, destroyed, or classified as top secret by various governments. Among these are two actual inventions credited to have existed, and multiple laboratory phenomena unexplainable by any living person. The bladeless steam turbine, for instance, was said to have been so efficient that a 10-inch unit moving at 1000rpm could develop 100 horsepower, running off a conventional steam boiler. This far exceeds a gasoline engine in efficiency. Another invention reported to have been developed in Nikola's New York laboratory was a small, mechanical vibratory oscillator, about the size of an alarm clock. When clamped to any object, it would begin to vibrate, gradually increasing the frequency until it reached the resonating frequency of the object, whereupon the object would shatter. This was demonstrated on bars of steel, and, supposedly, by Mr. Tesla clamping it to a shaft of steel drilled and bolted into the bedrock beneath New York, and causing an earthquake for several blocks around his lab.

Unexplained phenomena he supposedly produced include a variety of plasma discharges, from ball lightning to indoor auroras. One of the least explainable of these is the indoor aurora, causing the very air within his lab to glow harmlessly with a soft, diffused illuminance, giving the sensation of standing in a cloud of light. The only related phenomena to this in nature is the rare low-level aurora, occurring when either the aurora borealis or the aurora australis forms only a few feet from the ground, which defies and contradicts modern theory as to how such displays form. Tesla would often amaze visitors with his handling what appeared to be a red

flame, with no fuel visible, his hands totally unprotected, letting the glowing ball roll around his body, and extinguished at a snap of his fingers.

Nikola Tesla was truly a man of genius, misunderstood, and many times labeled a charlatan, but in the end, time and time again, he was proved right. He realized that this would happen with time, that if an invention or idea were stolen, credit would eventually returned, and he would be viewed all the better for it. Tesla once commented when asked about Marconi's use of his (Tesla) radio patents: "Let the future tell the truth and evaluate each one according to his work and accomplishments. The present is theirs, the future, for which I really worked, is mine." (Cheney, 236)

Bibliography

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In addition, a wildly varied collection of web pages, each dedicated to the furtherment of Tesla Coils.

*A comment must be made here, about this book. It is highly suspect, as multiple statements made within it broke several laws of thermodynamics, including the law of conservation of energy. As such it was viewed with a critical eye, and was used as a source of speculative information only. It served no purpose to the scientific basis for any reasoning in this paper.