Nikola Tesla, The First Radio Amateur

And the real inventor of radio

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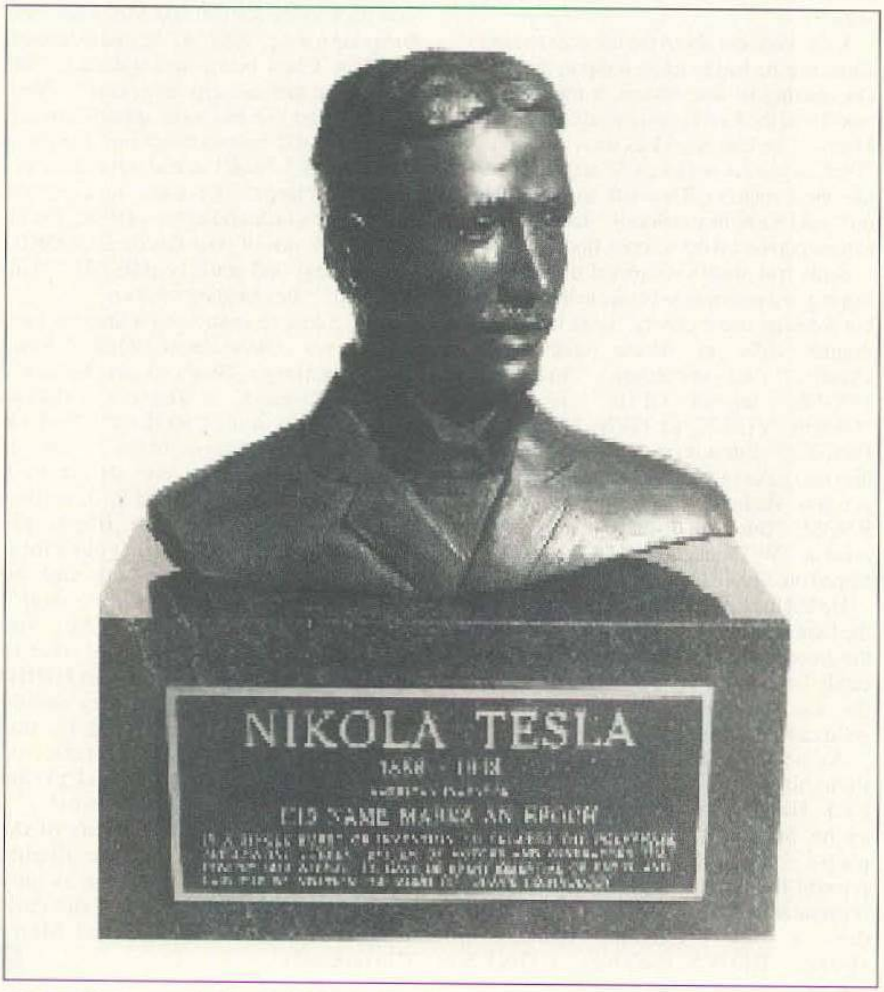
Nikola Tesla was born in 1856, and by the time he was 26 he had invented the rotating magnetic field principle. This discovery made possible the generation and distribution over long distances virtually unlimited electrical energy in the form of 60 cycle alternating current. This included the invention of the ac generator, the ac motor, and the transformer.

He then moved on to explore the world of high frequency phenomena. By 1890 he had conceived his famous "Tesla coil," still used as a major component in numerous electronic devices. By 1893 he had conceived, explained, and demonstrated the "four-tuned circuits," using the theories of Maxwell and Hertz for the transmission of intelligence. The circuits were tuned to resonance with each other, two on the transmitting side and two on the receiving side, using a Geissler tube detector. His apparatus used the first antenna, as well as a ground connection, plus an antenna-ground circuit containing inductance and capacity. Yes, he invented the tuned circuit! In 1893 he made the first "wireless" transmission before the National Electric Light Association in St. Louis, and it is this essential understanding that exists today in all modern radios. These principles served as the foundation for his U.S. patents that eventually had priority over Marconi's basic patents.



Most amateurs are unaware of what happened June 21, 1943, when the United States Supreme Court made a landmark decision that essentially settled the long dispute between Marconi and Tesla. The court's decision on Case No. 369, identified as "Marconi Wireless Telegraph Company of America vs. United States," rendered invalid Marconi's basic patent No. 763,772 dated June 28, 1904. Tesla's patent No. 645,576 of March 20, 1900, and its subdivision patent for apparatus No. 649,621 dated May 15, 1900, had priority. The court also cited John Stone's patent No. 714,756 dated December 2, 1902, incorporating greater tuning selectivity, and Sir Oliver Lodge's patent No. 609,154 dated August 16, 1898, providing variable inductance tuning.

The following definition served the Supreme Court well because it was then able to render a just decision: "A radio communication system requires two tuned circuits each at the transmitter and receiver, all four tuned to the same frequency." It is this "four-tuned circuit invention" that Tesla patented. This enabled the high court to give him priority for these necessary basic elements of "wireless," without which there would be no foundation for future advancements.

Most historians tend to attribute the birth of radio to the early technologists who made the first refinements, but it was Tesla who had laid the foundation. Historians also give great praise, and

correctly so, to such men as Maxwell and Hertz for their monumental work in wave theory. Unfortunately, Tesla's greatest contributions, AC power distribution and fundamentals of radio have largely been forgotten.

It is easy to understand why so many people have a distorted understanding of just who was the real inventor of radio. The newspapers hailed Marconi's first successful transatlantic radio transmission; then textbooks followed with their depiction of that exciting event. Both media sources had already raised the flag of victory for Marconi, much to Tesla's dismay, since he had done much of the pioneering work.

A similar media blitz is responsible for Thomas Edison becoming a familiar household name. In reality Edison did not create or develop our system of alternating current electricity. Indeed, he fought its adoption bitterly, choosing instead to promote a direct current system that had already been invented by others. In short, Edison's brief role in the electrical power industry was that of an entrepreneur who failed, rather than an inventor. It was Nikola Tesla's discovery of the rotating magnetic field principle in 1882 and patented in 1888 that gives us our modern day system of electrical power distribution.

In 1988-89 my students commissioned a bust of Tesla to donate to a large museum (any large museum). After discovering that the Division of Electricity and Modern Physics section of the National Museum of American History made no recognition of Tesla, we offered our bust. The curator promptly refused the offer, stating that he had no use for it. Later we discovered that he was displaying a bust of Edison alongside Tesla's induction motor. He also displayed photographs of the Niagara Falls power plant next to one of its original generators. A large brass inscription plate listed Tesla's patents, but with no mention of Tesla. In the middle of the display stood a life size replica of Edison with the caption, "While the Niagara AC plant was being built by Westinghouse, Edison was busy with other important things." The caption did not explain what these "other important things" were, nor why this was relevant to the Niagara power plant.

The *Smithsonian Book of Invention* is a prodigious 3/4 inch thick book of America's greatest inventors and their inventions. Tesla's name does not appear anywhere in that publication. One wonders how such an august institution, with all the learned historians in their employ, could possibly ignore Tesla's contributions in their chapters depicting the evolution of electric power and radio.

Further evidence of history being rewritten is seen in the Smithsonian's publication, "The Beginning of the Electrical Age," which meticulously traces the history of electricity from Volta to Edison, naming 43 significant contributors, and yet Tesla's name is never mentioned! Instead, it shows pictures of the Niagara Falls Power project with the inference being that this was the work of Edison. Yet it was Tesla's polyphase AC system that the power commission adopted and licenses had to be issued to use Tesla's patents. Since the money for this publication came from the Thomas Alva Edison Foundation, perhaps this explains why Edison's name and pictures appear so prominently and Tesla's name is missing. History, it appears. is indeed for sale at the Smithsonian.

Radio amateurs especially should take exception to the flagrant disregard for truth in history that exists in the Division of Electricity and Modern Physics section of the National Museum of American History, within the Smithsonian Institution. Why does the Smithsonian have such a biased view of electrical history?

Tesla's induction motor, using his rotating magnetic field principle, provides us our worldwide system of alternating current electricity. Few people realize the earthshaking importance of this discovery. Honored engineers have ranked it the electrical equivalent of the wheel.

Niels Bohr in 1956 stated, "Tesla's most ingenious inventions and researches have been fundamental for that development which so deeply influences our whole civilization."

Dr. W. H. Eccles, in the *Proceedings Of The Institution Of Electrical Engineers*, stated, "Tesla was the greatest electrical inventor we have had on our roll of membership; in fact we might go as far as to say that he was the greatest inventor in the realm of electrical engineering."

John Stone in 1917 stated, "Among all those, the name of Nikola Tesla stands out most prominently. Tesla with his almost preternatural insight into alternating current phenomena that has enabled him some years before to revolutionize the art of electric power transmission through the invention of the rotary field motor, knew how to make resonance serve, not merely the role of a microscope, to make visible the electric oscillations, as Hertz had done, but he made it serve the role of a stereopticon. He did more to excite interest and create an intelligent understanding of these phenomena than anyone else, and it has been difficult to make any but unimportant improvements in the art of radio telegraphy without traveling, part of the way at least, along a trail blazed by this pioneer who, though eminently ingenious, practical and successful in apparatus he devised and constructed, was so far ahead of his time that the best of us then mistook him for a dreamer."

Lord Kelvin in 1896 stated, "Tesla has contributed more to electrical science than any man up to his time."

Tesla was recognized by his peers, but then largely forgotten.

Tesla died in 1943, alone in his hotel room at the Hotel New Yorker, surrounded by a world of technological progress he was instrumental in creating. Yet the only monument to his memory in our country is a statue at Niagara Falls, a gift from the former country of Yugoslavia. He is one of only two Americans honored by the International Electrotechnical Congress in Munich. In 1956, the unit of magnetic flux density in the MKS system was designated the **tesla**. Thus, his name is alongside only fifteen others such as Volta, Faraday, Ohm, Watt, and Ampere. Joseph Henry is the only other American so honored.

For those who are old enough to remember, the Smithsonian Institution carried on a similar feud with the Wright Brothers that lasted 45 years. It was not until December 1948, after we had entered the jet age, that its officials finally relinquished their demand to honor Samuel P. Langley, whose plane did not fly. He was Secretary of the Smithsonian in 1903, when the Wrights flew their plane at Kitty Hawk.

At best, I hope to build enough support from the amateur radio community to petition the Smithsonian officials to honor Tesla. Certainly there is overwhelming evidence that he has earned his place in history in our country's premier museum. At the very least, this issue might stimulate some lively discussions on the ham bands.

Note: *Tesla was, in my estimation, the single greatest genius in history. In addition to inventing electricity as we know it and laying the groundwork for radio, Tesla also invented the electric clock, the loud speaker, the fluorescent lamp, and a long list of other firsts. At a time when the text books were claiming that voice could never be transmitted by radio, Tesla was planning a world radio broadcasting system, and was building a tower on Long Island to transmit free electric power. The electric companies, seeing this as a serious threat to their making and selling electricity, got together and put Tesla out of business. Please help put pressure on the Smithsonian to recognize this incredible genius.—Wayne.* 73