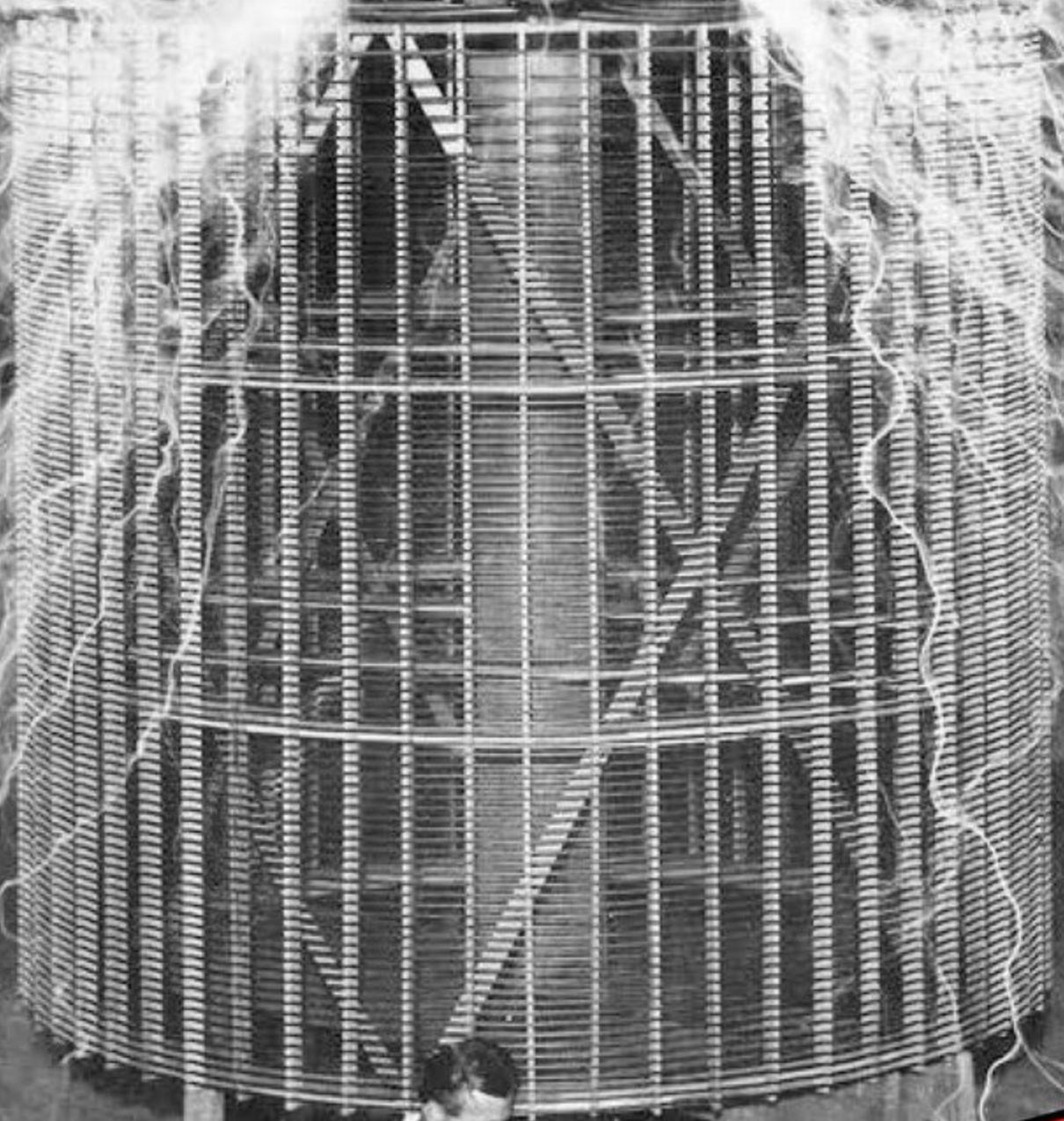


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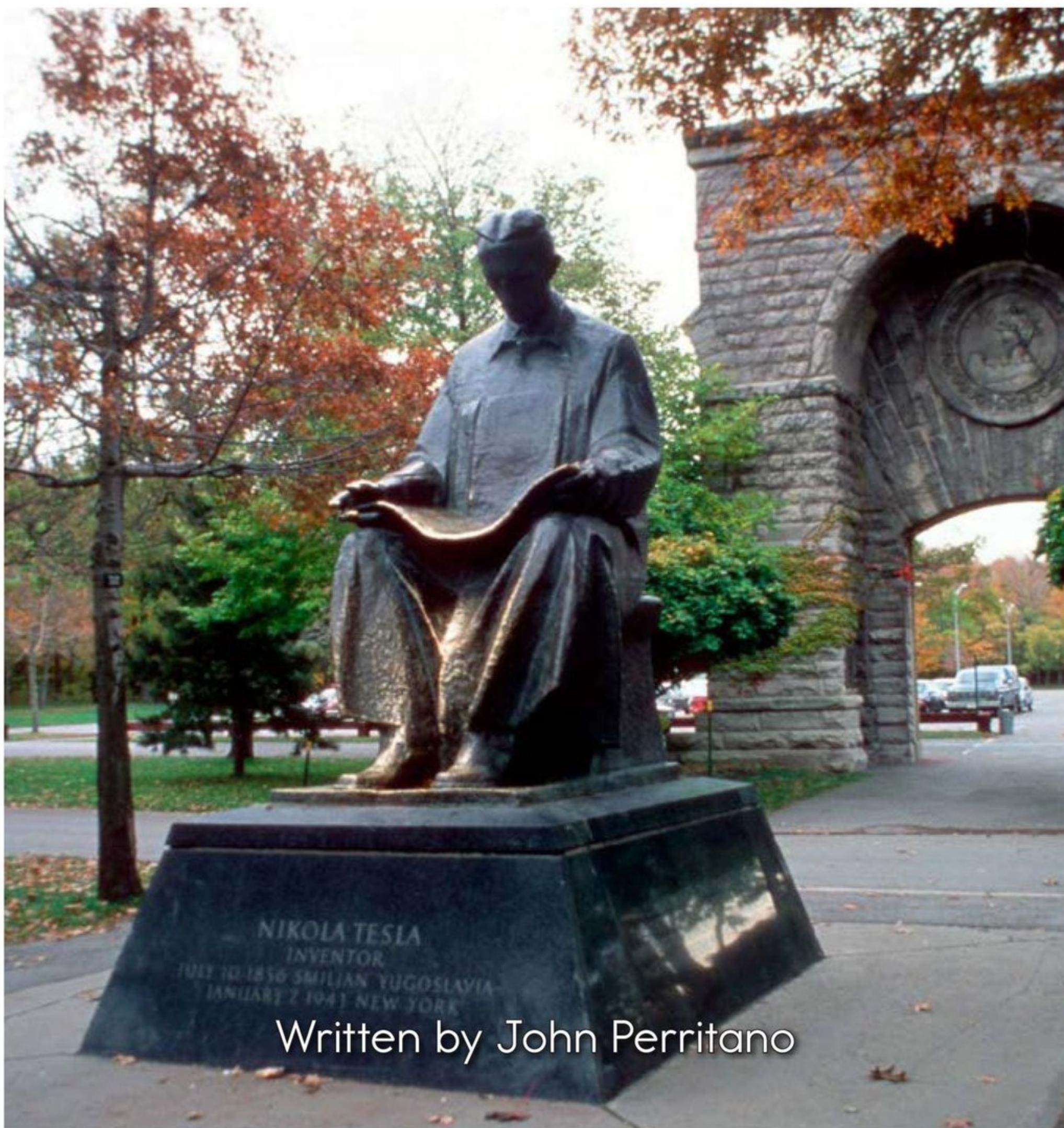
The Genius of Tesla



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Written by
John Perritano

The Genius of Tesla



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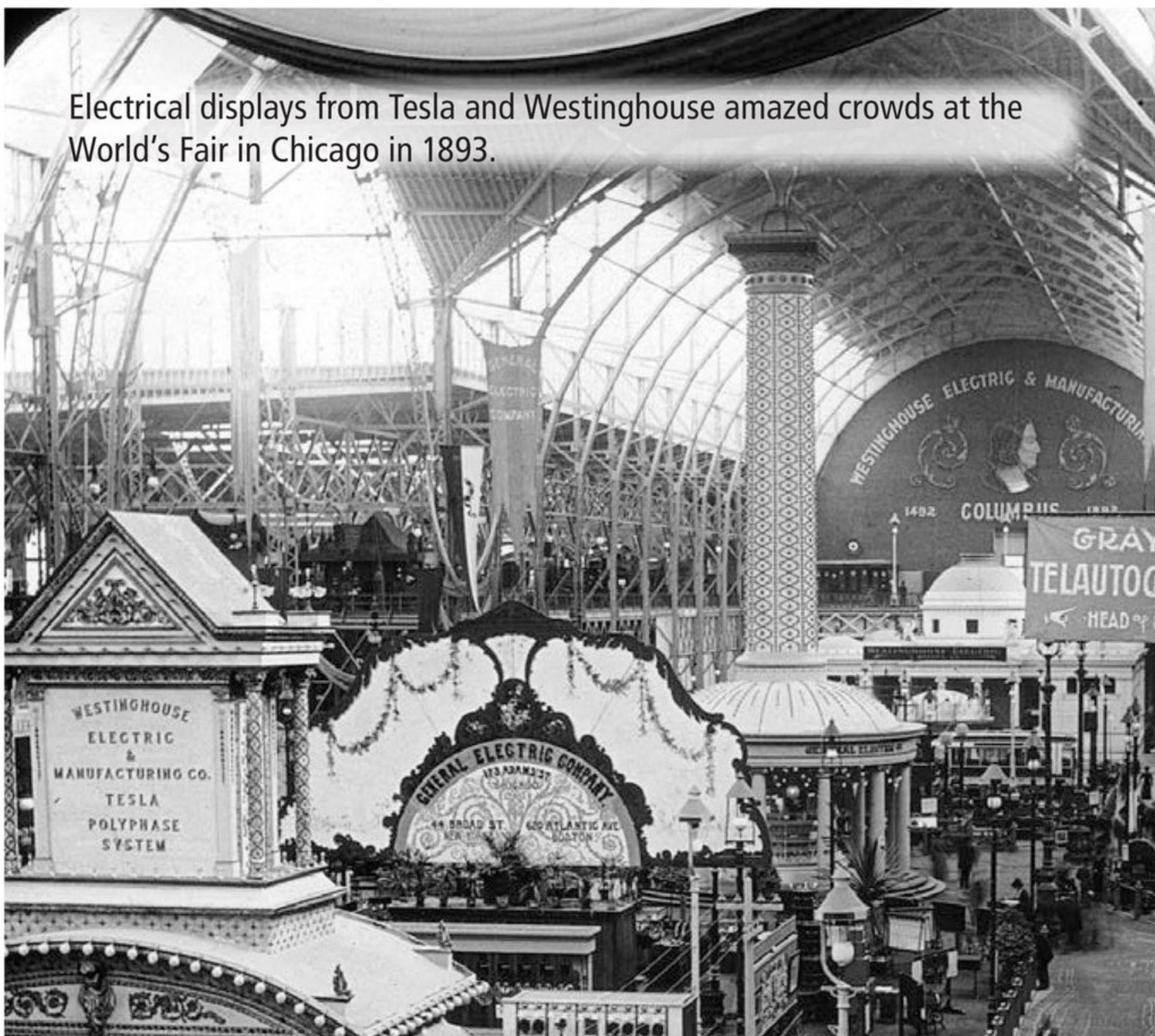
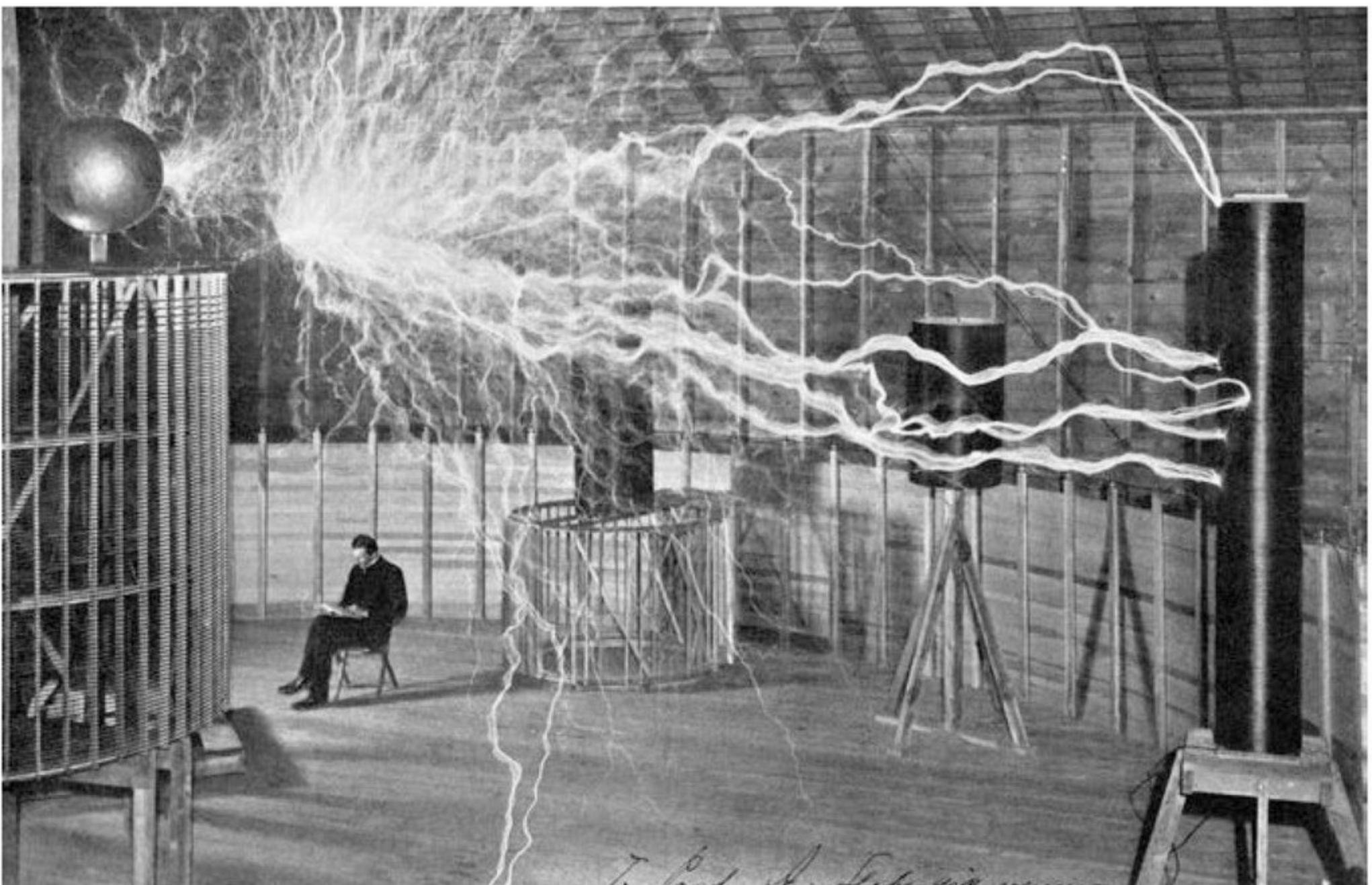


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Tesla sits calmly reading a book while artificial lightning fills his laboratory.

The Magician

One day, a man invited a group of people into his laboratory to watch one of his **experiments**.

As the crowd took their seats, the man, Nikola Tesla, walked calmly to a wooden stage and sat on a chair. Under the stage was a powerful electrical **generator**.

Tesla flipped a switch.

Wild streaks of light sparked across the room. Some struck Tesla. When the light show was over, Tesla stepped off the stage unharmed. The crowd burst into applause.

Tesla was no magician. He was a scientist who had just showed how safe a newly discovered form of electric **current** was. His discovery, alternating current (AC), changed the world. It would go on to power modern industry and light up nations.



Tesla's demonstrations of new technology were often spectacular.

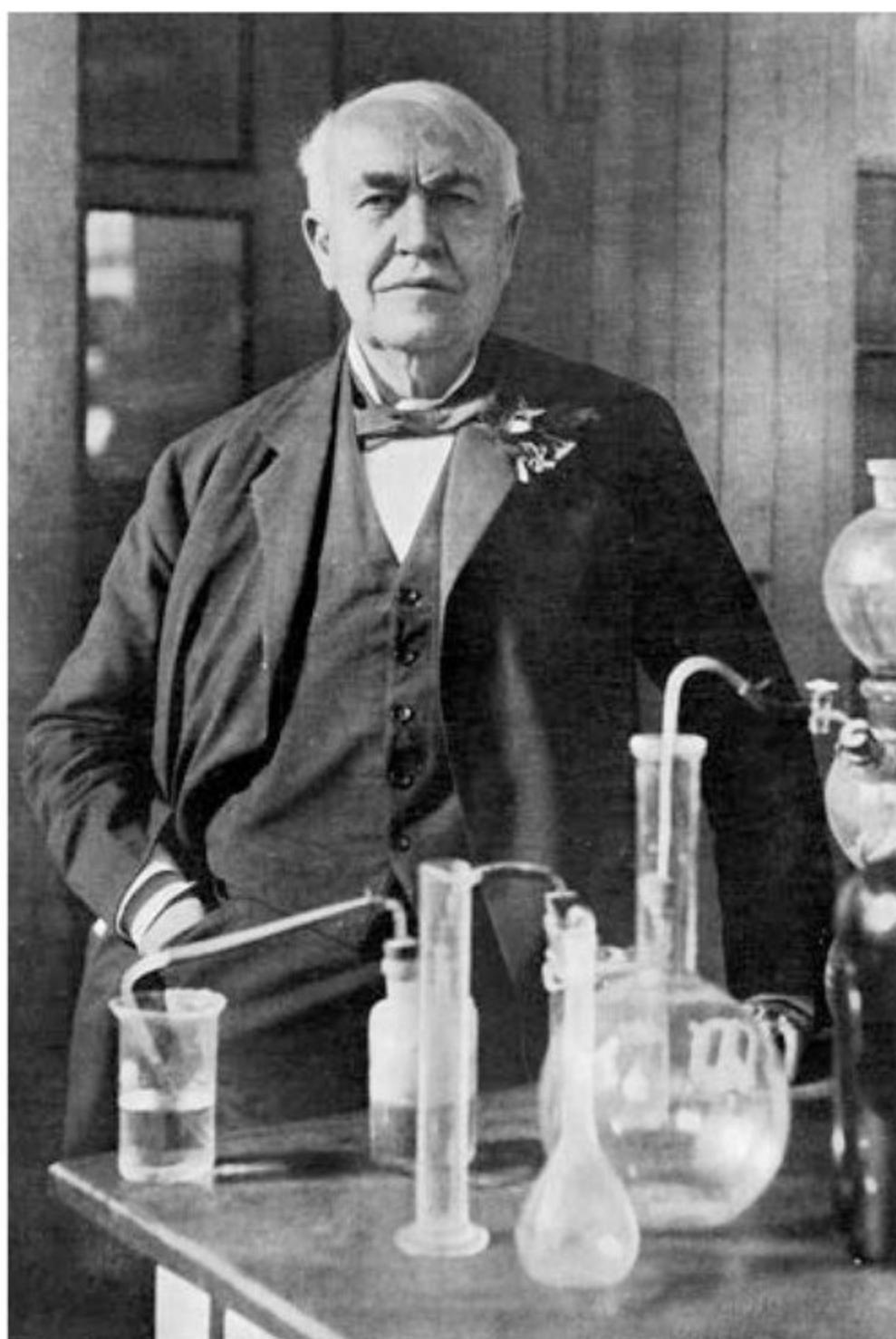
Meeting Mr. Edison

Tesla was born during a lightning storm in 1856 in Eastern Europe. Tesla's love of **inventing** came from his mother, who built small household appliances in her spare time.

Tesla wanted to study **electricity** when he grew up. After years of schooling and work, he figured out a way to generate electricity safely by using alternating current.

Tesla moved to the United States in 1884 at age twenty-eight. On his second day in America, he walked into Thomas Edison's

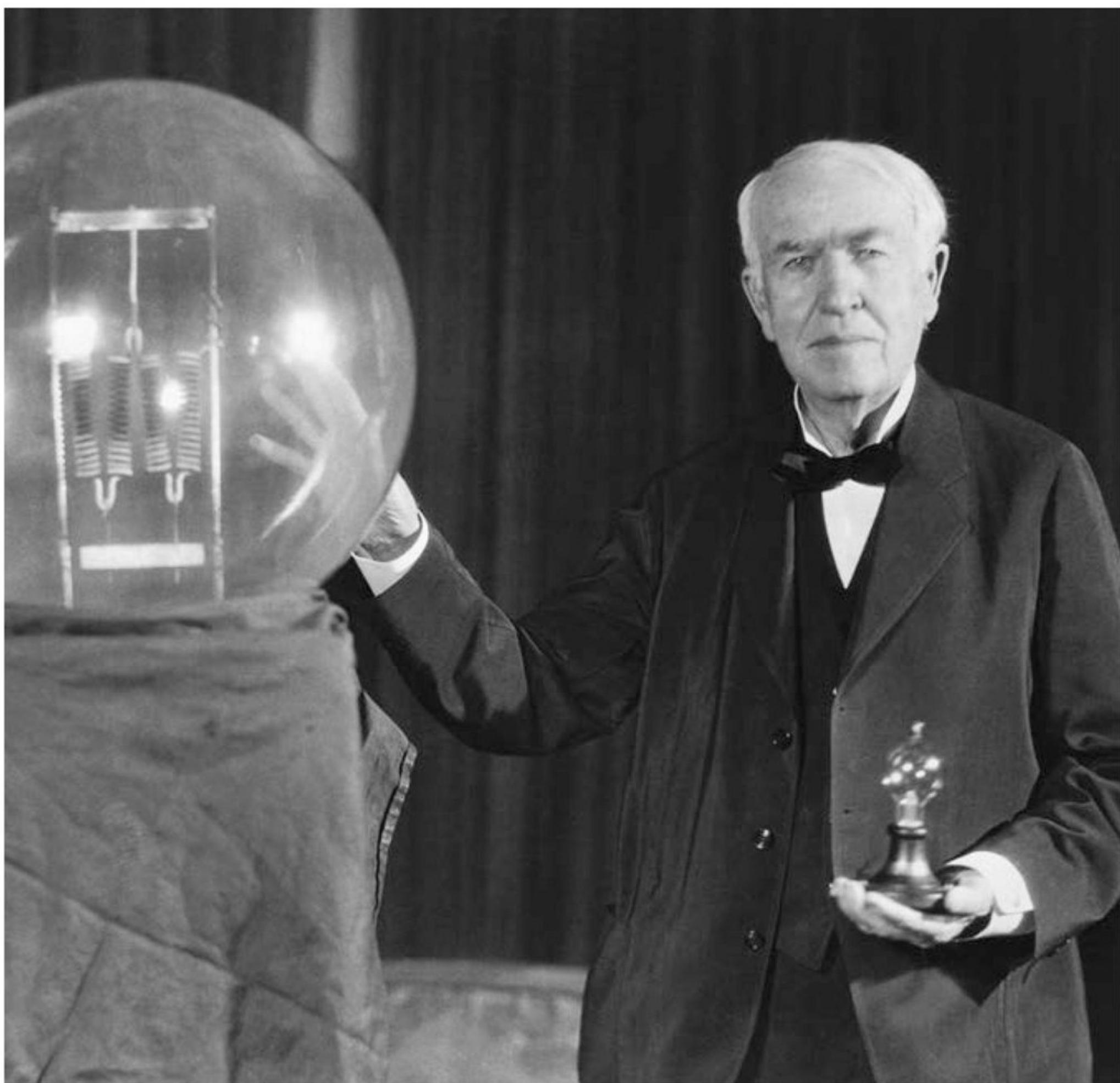
New York office. Tesla handed the great inventor a letter from one of Edison's European friends. It read: "My Dear Edison: I know two great men and you are one of them. The other is this young man!"



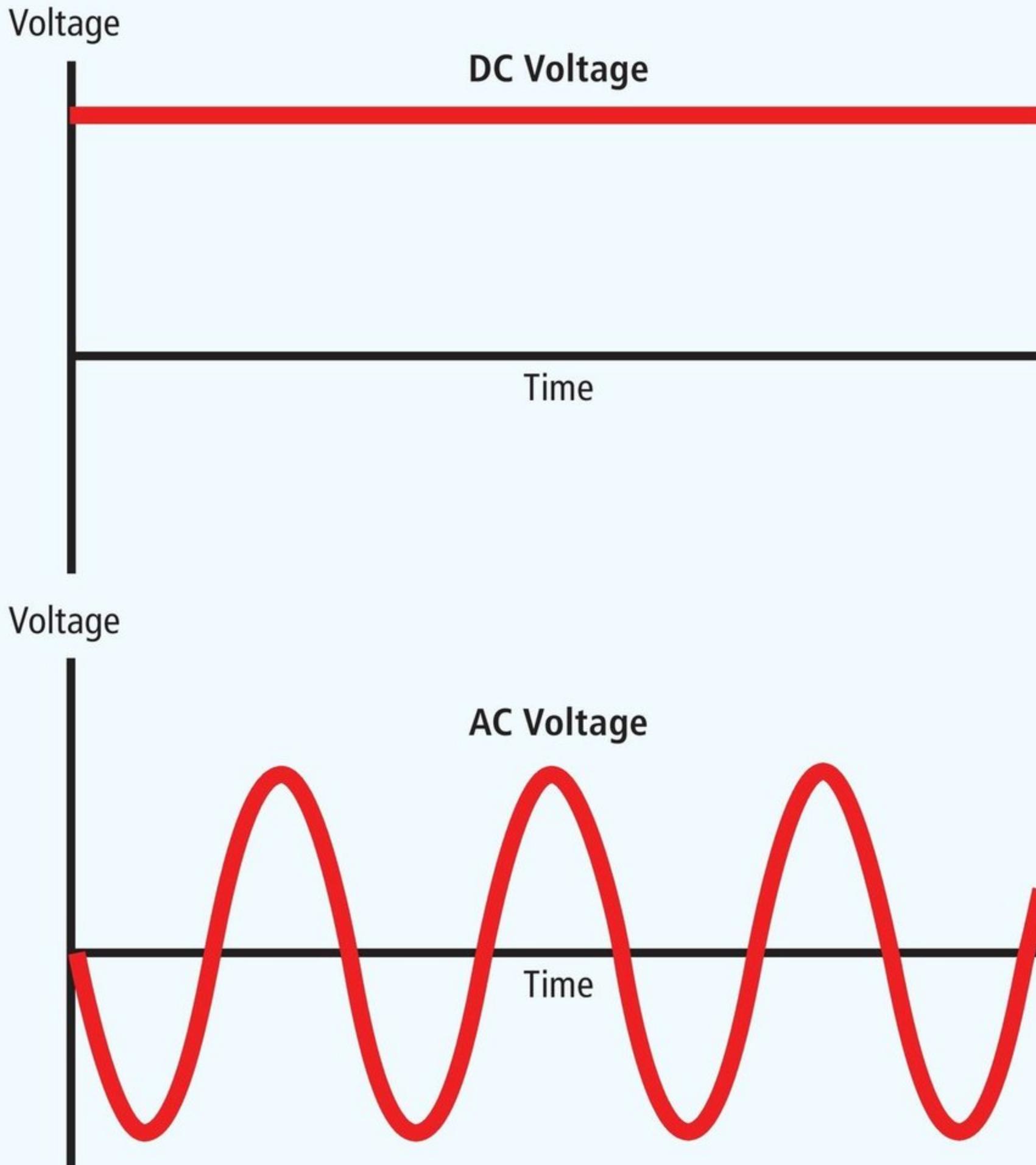
Thomas Edison was a smart businessman as well as an inventor.

At the time, Edison was famous as the father of the electrical age. He had invented a lighting system that used lightbulbs and direct current (DC) power stations.

Edison gave Tesla a job. Edison promised the young **engineer** \$50,000 if he could increase the power of his DC electric system in New York City. Tesla accepted the challenge.



Edison's first successful lightbulb gave off the light of sixteen candles.



AC and DC: What's the Difference?

Electricity is the flow of charged particles called *electrons*. Electricity can flow in two ways: by an alternating current or by a direct current. Direct current moves in one direction as a straight line and is difficult to send over long distances without losing energy. Direct current is not easily changed to higher or lower voltages.

In an alternating current, electrons move rapidly back and forth, changing direction sixty times per second. Alternating current can easily be changed to lower and higher voltages and be sent over long distances without losing a lot of energy.

Digging Ditches

Tesla worked long hours. He slept and ate very little. A few months later, Tesla announced success. Edison, however, refused to pay the \$50,000. He said his offer had only been a joke.

Tesla was angry. He quit his job and stormed out of Edison's office. However, word spread about Tesla's achievements. A short time later, a group of businessmen asked Tesla to invent a better lightbulb. His new lightbulb made the businessmen rich. Almost none of the money went to Tesla, however.

Tesla ran out of money. He took a job digging ditches for Edison's light company. It paid two dollars per day. Tesla's luck changed when he met A. K. Brown of the Western Union Company.

Tesla told Brown about his ideas of how to use alternating current. Brown was impressed. He gave Tesla money to work on his ideas. Working just a few short blocks from Edison's office, Tesla designed and built all the parts needed for an AC power station.

The Life of Nikola Tesla

- **July 10, 1856:**
Tesla born “at the stroke of midnight” as a lighting storm rages.
- **1873:**
Tesla, 17, contracts cholera and nearly dies. Tesla’s father promises to send his son to an engineering school if he recovers.
- **June 6, 1884:**
Tesla arrives in America.
- **March 1885:**
Tesla founds the Tesla Electric Light Company.
- **1891:**
Tesla builds a special coil that he uses to produce high-voltage, high-frequency alternating current.
- **May 1, 1893:**
Tesla’s AC generators illuminate the Chicago World’s Fair.
- **1895:**
Tesla experiments with radio waves.
- **1898:**
Tesla demonstrates the first robot—a remote-controlled boat.
- **Jan. 7, 1943:**
Tesla dies at the age of 86.

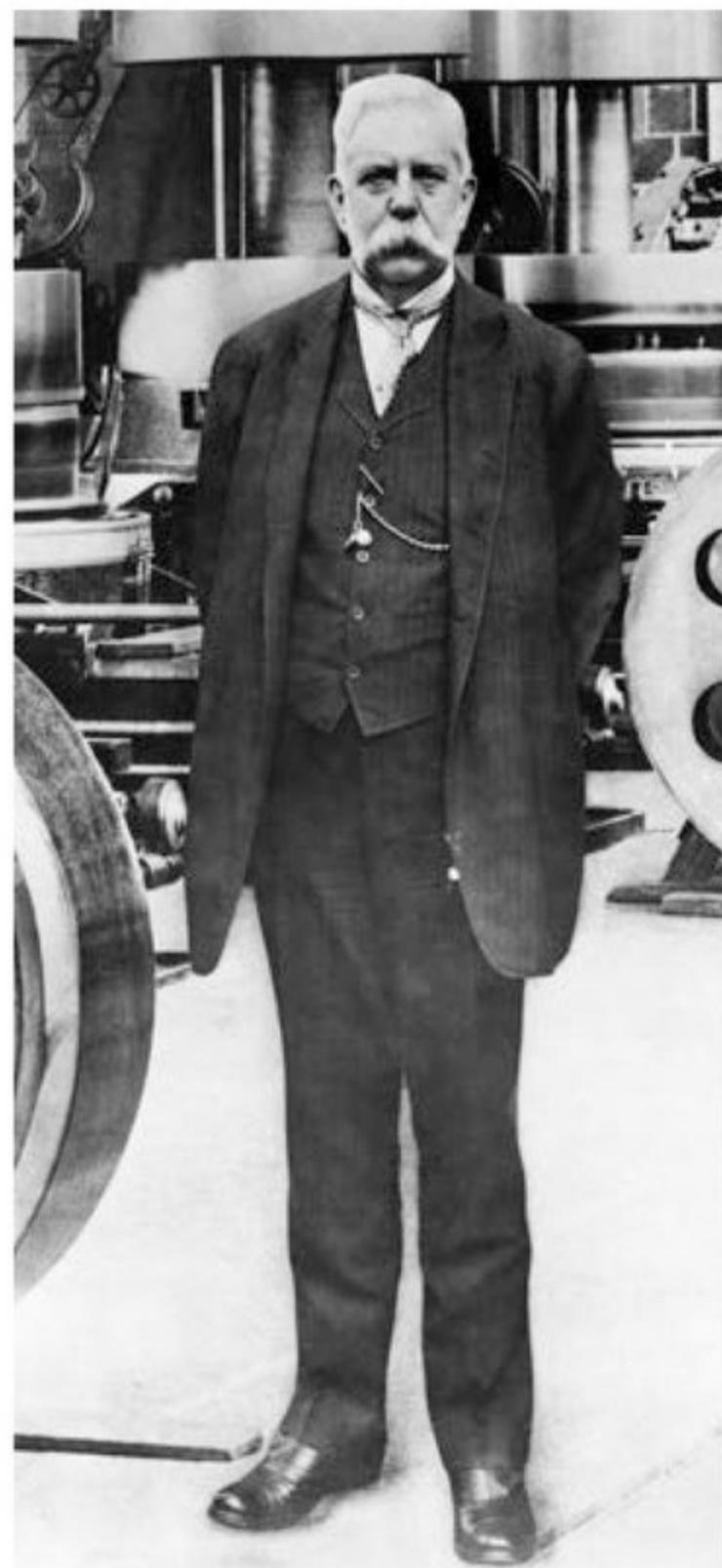
Battle of the Currents

A wealthy inventor named George Westinghouse was sure that alternating current was the future. He bought the rights to use Tesla's inventions for \$60,000—about \$1.4 million today—plus part ownership in Westinghouse's company.

Tesla quickly spent the money on a new laboratory. The two men then began to deliver electricity to different parts of the United States.

Edison was angry as Westinghouse began building AC generators in rural areas that Edison's DC system could not reach. Westinghouse sold the electricity at a cheap price in order to cut into Edison's business.

Edison stood to lose a lot of money. He said bad things about Westinghouse and warned the public that alternating current was dangerous.



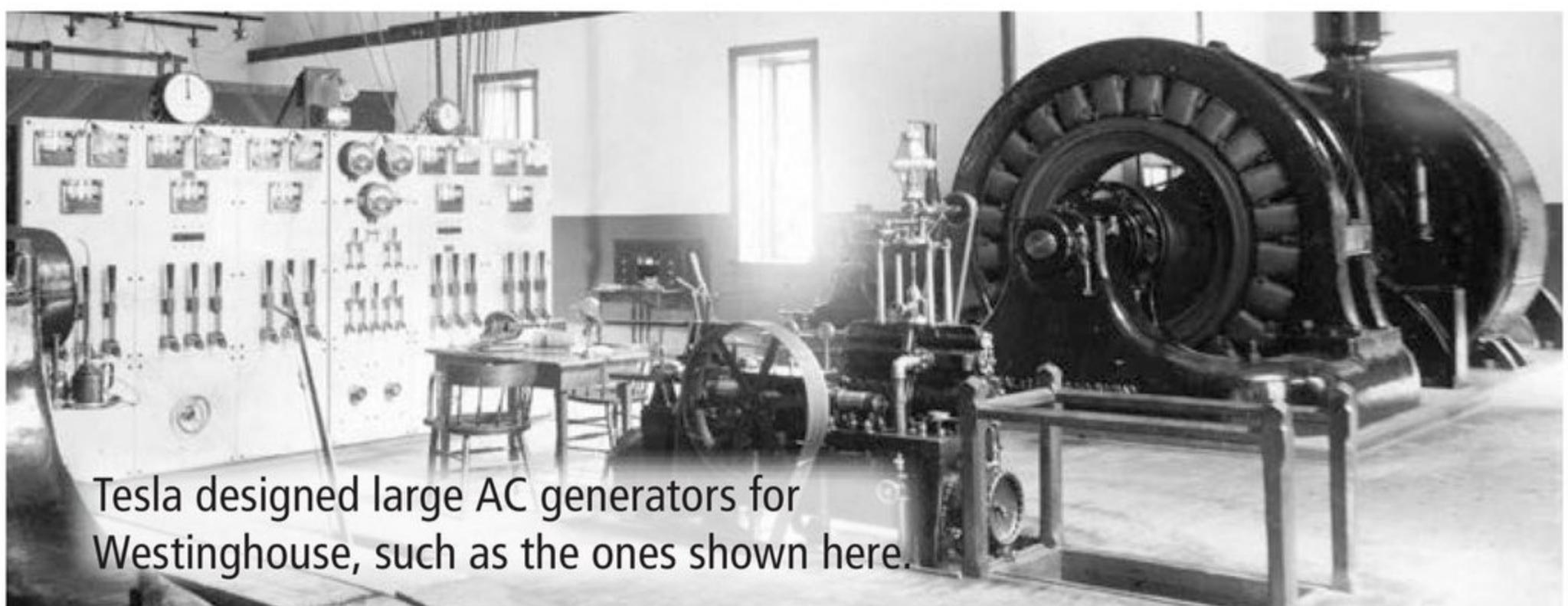
George Westinghouse

Westinghouse got a chance to prove Edison wrong when he won the job of lighting the 1893 World's Fair in Chicago. Westinghouse asked Tesla to use his AC generators for the event.

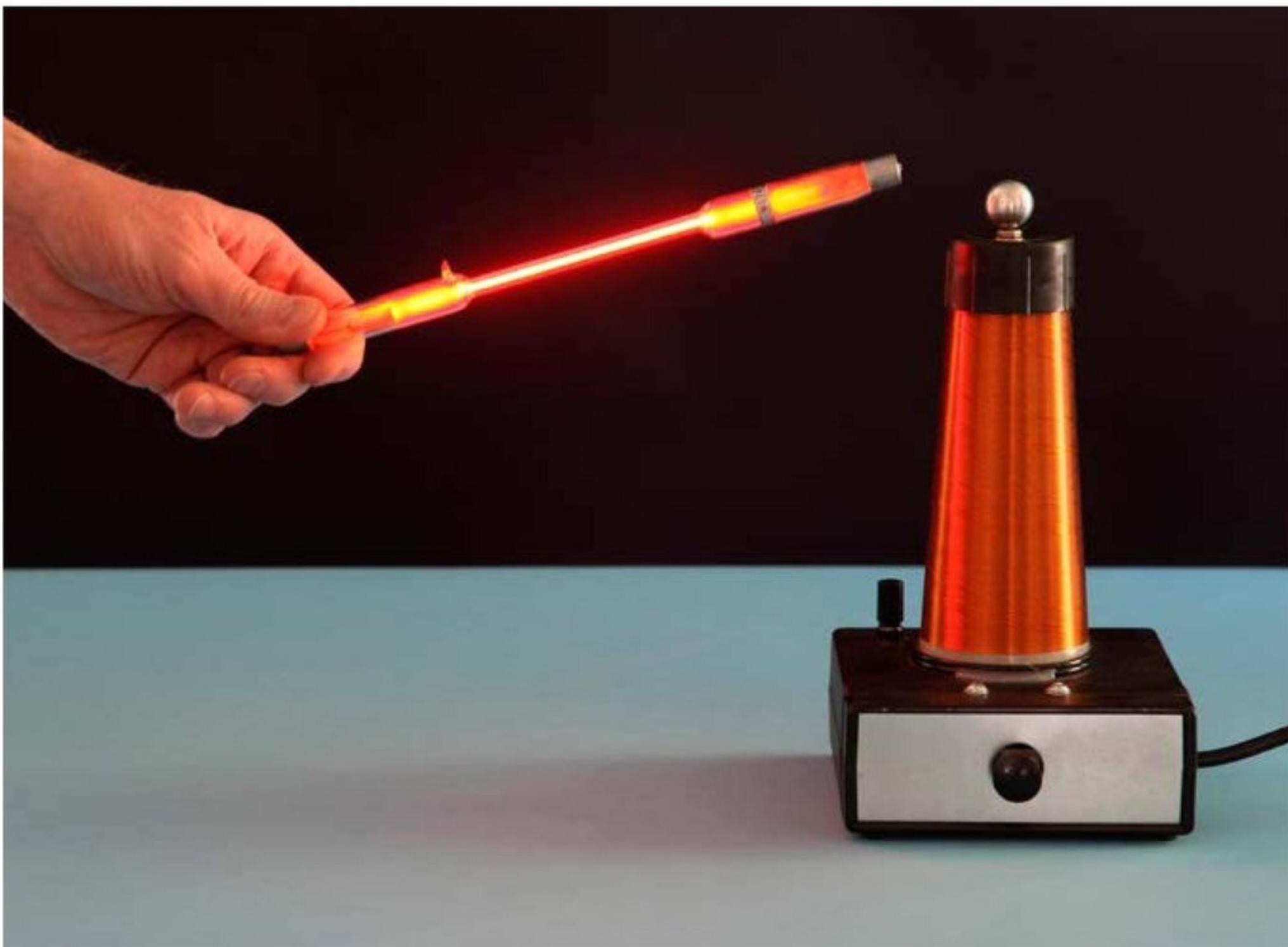
When opening day arrived, U.S. President Grover Cleveland pushed a button. One hundred thousand lightbulbs turned on, to the delight of the crowd.

The "City of Light" showed that AC power was better than DC power and not as dangerous as Edison had claimed.

Unfortunately, Westinghouse's company had almost run out of money after years of fighting with Edison. To save the company, Tesla tore up the **contract** he had signed with Westinghouse. Tesla's kindness cost him millions of dollars over the years.



Tesla designed large AC generators for Westinghouse, such as the ones shown here.



A modern Tesla coil sends electrical power through the air to light up a neon tube.

Radio Days

Tesla had won the war of the electric currents. He now began exploring ways to send electricity through the air without wires. To that end, he built a special wire **coil**. Tesla used the coil to develop new kinds of lightbulbs and to take the first X-ray photographs.

In November 1890, Tesla used the coil to do what many people thought was impossible. He sent an AC current through the air to light up a lightbulb.

Soon afterward, he began experimenting with radio waves. In early 1895, Tesla was ready to send a radio signal fifty miles from New York City to West Point, New York. Years of work were lost, however, when an accidental fire destroyed his laboratory.

In 1901, an inventor in England, Guglielmo Marconi, used many of Tesla's ideas to send a radio signal across the Atlantic Ocean. The achievement made Marconi a huge star. People—including Tesla's rival, Thomas Edison—gave Marconi money to start a radio company.

Marconi, not Tesla, got the credit for inventing the radio.



Guglielmo Marconi sits surrounded by early radio equipment in 1901.

A Lasting Influence

In 1943, Tesla died at age eighty-six while living in a hotel room that had been paid for by Westinghouse. After his death, the U.S. government finally decided that radio was Tesla's invention, calling him the "father of radio."

Tesla had spent his riches on failed project after failed project and never received the credit he deserved for his research and inventions. Still, the inventor had a huge effect on **technology** and the shape of the modern world.

His use of alternating current powered modern cities and completely changed life in rural areas that had been without electricity. His experiments with robots, radio, radar, X-rays, and wireless technology pointed the way to the future.

Tesla's love of creating things made him a giant among modern-day scientists. His favorite thing in life was the "thrill" of seeing an invention work for the first time.

Glossary

coil (<i>n.</i>)	a loop or series of loops in a length of something, such as rope or wire (p. 13)
contract (<i>n.</i>)	a formal or legal, written agreement between two or more people (p. 12)
current (<i>n.</i>)	the flow of electrical energy (p. 5)
electricity (<i>n.</i>)	energy created by moving charged particles (p. 6)
engineer (<i>n.</i>)	a person who designs, builds, or repairs machines, buildings, bridges, or other structures (p. 7)
experiments (<i>n.</i>)	scientific tests or trials (p. 4)
generator (<i>n.</i>)	a machine that turns motion into electricity (p. 4)
inventing (<i>v.</i>)	creating, designing, or building something that did not exist before (p. 6)
technology (<i>n.</i>)	the use of scientific knowledge or tools to make or do something (p. 15)

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Front cover: Tesla sits in his Colorado Springs laboratory while his “magnifying transmitter” sends electricity arcing around the room in 1899.

Back cover: Portrait of Nikola Tesla with his invention, the induction motor. The induction motor became the most widely used type of electrical motor and led to the adoption of alternating current as an electrical standard.

Title page: A memorial statue of Tesla sits in a park at Niagara Falls, Ontario, Canada. Tesla and his business partner, George Westinghouse, built the first hydroelectric power station at Niagara Falls—the first large-scale power-producing dam in the world.

The Genius of Tesla
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