

# A BRIEF HISTORY OF ELECTRICITY AND MAGNETISM



**600BC** Thales, a Greek philosopher, found that when amber was rubbed with silk, it became electrically charged and attracted other objects. Thales had discovered static electricity.

**1175** Alexander Neckem, an English monk first described the workings of a compass.

**1600** William Gilbert, an English physician and scientist, first spoke of electricity and was the first person to research the properties of the lodestone. Gilbert wrote about the electrification of many substance and he was also the first person to use the terms electric force, magnetic pole and electric attraction. Controversially he disregarded the common belief that the Earth was fixed at the centre of the Universe and suggested magnetism was the soul of the Earth. Gilbert published his findings in his book De Magnete.

**1660** Robert Boyle, an Irish philosopher, chemist and physicist discovered that electric force could be transmitted through a vacuum and observed attraction and repulsion.

**1675** Englishman Stephen Gray, a dyer and chemist, distinguished between conductors and non-conductors of electrical charges.

**1742** Homas Le Sueur and Francis Jacquier published an edition of Isaac Newton's Principia which included a note to the text that demonstrated the inverse-cube law of the force between two magnets.

**1750** John Michell, an English geologist, published A Treatise on Artificial Magnets, which describes how to make strong steel magnets and gave an account of the law for the attractive and repulsive forces of magnets.

**1752** The connection between lightning and electricity was proven by Benjamin Franklin when his plan to collect the charge from a storm cloud using a Leyden jar with a key attached to a kite was successfully completed.

**1800** Italian physicist Alessandro Volta invented the first electric battery. The term volt is named in his honour.

**1809** Sir Humphry Davy, an English chemist and inventor, created the first electric lamp. The arc lamp was a piece of carbon that glowed when connected by wires to a battery.

**1820** Separate experiments by Hans Christian Ørsted (Denmark), Andre-Marie Ampere (France), and Francois Arago (France) confirmed the relationship between electricity and magnetism.  
Hans Christian Ørsted's accidental discovery that an electrical current moves a compass needle rocked the scientific world and a spate of experiments followed, immediately leading to the first electromagnet and electric motor.

**1821** Michael Faraday, one of the most influential English scientists, published his work on the principle of electro-magnetic rotation that would later be the key to developing the electric motor. His inventions of electromagnetic rotary devices made the electric motor possible.

**1826** German physicist and mathematician George Ohm defined the relationship between power, voltage, current and resistance in Ohm's Law.

**1831** Using his invention the induction ring, Michael Faraday, proved that electricity can be induced by changes in an electromagnetic field. Faraday wasn't alone in his endeavours, American scientist Joseph Henry separately discovered the principle of electromagnetic induction but Faraday was first to publish his work. Faraday also described an electric motor and carried out numerous experiments in his attempt to prove that electricity could be generated from magnetism.

**1832** The first magneto, an electrical generator that uses permanent magnets to produce periodic pulses of alternating current, was built by French instrument-maker Hippolyte Pixii just one year after Michael Faraday's discovery of the principles of electromagnetic induction. Pixii's hand-crank operated magneto was the first practical generator of electrical current.

**1834** Thomas Davenport, an American blacksmith and inventor, invented the electric motor, an invention that is used in most electrical appliances today.

**1860's** The mathematical theory of electromagnetic fields was published by Scottish theoretical physicist J.C. Maxwell and created a new era of physics when he unified magnetism, electricity and light. Maxwell's four laws of electrodynamics (Maxwell's Equations) eventually led to electric power, radios and television.

**1876** American inventor Charles Brush invented the open coil dynamo, or generator, that could produce a steady current of electricity.

**1878** English physicist and chemist Joseph Swan invented the first incandescent light bulb (also called an electric lamp). His lightbulb burned out quickly.  
American Thomas Edison was also working to develop the same device and founded the Edison Electric Light Co. in New York City. He bought a number of patents related to electric lighting and began experiments to develop a practical, long-lasting light bulb.

**1879** After many experiments, Thomas Edison (United States) invented an incandescent light bulb that could be used for about 40 hours without burning out. By 1880, his bulbs could be used for 1,200 hours.

**1882** Thomas Edison opened the Pearl Street power station in New York City. The power station was one of the world's first central electric power plants and could power 5,000 lights. It used a direct current (DC) power system, unlike the power systems that we use today which use alternating current (AC).

**1883** Nikola Tesla an American immigrant from the Austrian Empire invented the Tesla coil, a transformer that changed electricity from low voltage to high voltage, making it easier to transport over long distances.

**1884** Nikola Tesla invented the electric alternator for producing alternating current (AC). Until this time, electricity had been generated using direct current (DC) from batteries.  
Sir Charles Algernon Parsons, an English engineer, invented a steam turbine generator, capable of generating huge amounts of electricity.

**1888** Nikola Tesla demonstrated the first alternating current (AC) electrical system. His AC system included all units needed for electricity production and use: generator, transformers, transmission system, motor (used in appliances) and lights. George Westinghouse, the head of Westinghouse Electric Company, bought the patent rights to the AC system.  
Also in 1888, Charles Brush was the first to use a large windmill to generate electricity. He used the windmill to charge batteries in the cellar of his home in Cleveland, Ohio.

**1895** The Niagara Falls hydropower station opened. It originally provided electricity to the local area. One year later, when a new alternating current (AC) powerline was opened, electric power from Niagara Falls was sent to customers over 20 miles away in Buffalo, New York.

**1897** English physicist Joseph John Thomson discovered the electron.

**1900 - 1909** Albert Einstein publishes his special theory of relativity and his theory on the quantum nature of light, which he identified as both a particle and a wave. Electricity begins to transform everyday life with every new appliance introduced.

**1903** The world's first all turbine station opened in Chicago.

**1930** The first alnico magnets are produced. German scientist Hermann Kemper studied the use of magnetic fields in conjunction with trains and airplanes.

**1943** The first programmable electronic computer was built by British mathematician Professor Maxwell H. A. Newman and British engineer Thomas H. Flowers.

**1952** The first commercial ceramic/ferrite magnets are produced

**1966** K. J. Strnat and G. Hoffer from the US Air Force Materials Laboratory begin to develop rare-earth magnets.

**1968** Hewlett-Packard began marketing the first personal computer. The HP9100A, was actually marketed as a calculator as the market would not have accepted it as a computer because the belief was that to be a computer a machine had to be large.

**1969** American scientists James R. Powell and Gordan T. Danby patented the first design for magnetic levitation (maglev) trains.

**1982** Neodymium magnets were developed by General Motors and Sumitomo Special Metals.

**1991** Germany's government certified the operation of first maglev train for public use.



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