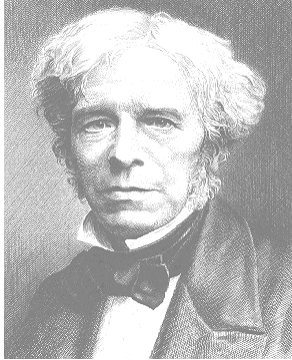


Michael Faraday

(Information provided by the [IEE Archives](#) department.)



Michael Faraday's scientific work laid the foundations of all subsequent electro-technology. From his experiments came devices which led directly to the modern electric motor, generator and transformer. Faraday was also the greatest scientific lecturer of his day, who did much to publicise the great advances of nineteenth-century science and technology through his articles, correspondence and the Friday evening discourses which he established at the Royal Institution. The Royal Institution Christmas lectures for children, begun by Faraday, continue to this day.

Michael Faraday was born on 22nd September 1791. At the age of fourteen he was apprenticed to a London bookbinder. Reading many of the books in the shop, Faraday became fascinated by science, and wrote to Sir Humphry Davy at the Royal Institution asking for a job. On 1st March 1813, he was appointed laboratory assistant at the Royal Institution. There Faraday immersed himself in the study of chemistry, becoming a skilled analytical chemist. In 1823 he discovered that chlorine could be liquefied and in 1825 he discovered a new substance known today as benzene.

However, his greatest work was with electricity. In 1821, soon after the Danish chemist, Oersted, discovered the phenomenon of electromagnetism, Faraday built two devices to produce what he called electromagnetic rotation: that is a continuous circular motion from the circular magnetic force around a wire. Ten years later, in 1831, he began his great series of experiments in which he discovered electromagnetic induction. These experiments form the basis of modern electromagnetic technology.

On 29th August 1831, using his "induction ring", Faraday made one of his greatest discoveries - electromagnetic induction: the "induction" or generation of electricity in a wire by means of the electromagnetic effect of a current in another wire. The induction ring was the first electric transformer. In a second series of experiments in September he discovered magneto-electric induction: the production of a steady electric current. To do this, Faraday attached two wires through a sliding contact to a copper disc. By rotating the disc between the poles of a horseshoe magnet he obtained a continuous direct current. This was the first generator.

Although neither of Faraday's devices is of practical use today they enhanced immeasurably the theoretical understanding of electricity and magnetism. He described these experiments in two papers presented to the Royal Society on 24th November 1831, and 12th January 1832. These were the first and second parts of his "Experimental researches into electricity" in which he gave his "law which governs the evolution of electricity by magneto-electric induction". After reading this, a young Frenchman, Hippolyte Pixii, constructed an electric generator that utilized the rotary motion between magnet and coil rather than Faraday's to and fro motion in a straight line. All the generators in power stations today are direct descendants of the machine developed by Pixii from Faraday's first principles.

Faraday continued his electrical experiments. In 1832 he proved that the electricity induced from a magnet, voltaic electricity produced by a battery, and static electricity were all the same. He also did significant work in electrochemistry, stating the First and Second Laws of Electrolysis. This laid the basis for electrochemistry, another great modern industry.

Faraday's descriptive theory of lines of force moving between bodies with electrical and magnetic properties enabled James Clerk Maxwell to formulate an exact mathematical theory of the propagation of electromagnetic waves. In 1865, Maxwell proved mathematically that electromagnetic phenomena are propagated as waves through space with the velocity of light, thereby laying the foundation of radio communication confirmed experimentally in 1888 by Hertz and developed for practical use by Guglielmo Marconi at the turn of the century.

In 1865, Faraday ended his connection with the Royal Institution after over 50 years of service. He died at his house at Hampton Court on 25th August 1867. His discoveries have had an incalculable effect on subsequent scientific and technical development. He was a true pioneer of scientific discovery.