

# Michael Faraday

Thomas Smith

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Michael Faraday was a very important figure in the development of electromagnetic theory. This fact is well-known. However, he also contributed to numerous other areas of science, such as electrochemistry[2]. When he died, on 25 August 1867, he left behind him a legacy of engaging science lectures, groundbreaking experimentation, and theory that forms the underpinnings of much of science today.

Faraday was born on 22 September 1791. Little is known about his early years, other than that he attended a day school. When he was fourteen, he was apprenticed as a bookbinder. He could read what he bound, so he had a virtually endless supply of books to keep himself busy. He developed an interest in chemistry while binding books. In 1812, he was given tickets to see Sir Humphry Davy's last four lectures at the Royal Institution. He went to them and took notes, which he presented to Davy asking for a job. Eventually, he was hired as Chemical Assistant. Davy soon left the Royal Institution. From 1813 to 1815, he toured Europe with Faraday as his assistant, having been given a passport by Napoleon.[3]

In 1820, Hans Christian Oersted discovered electromagnetism. In 1821, Faraday, now Superintendent of the House of the Royal Institution, discovered electromagnetic rotation,

which is the principle behind the modern electric motor. He discovered benzene in 1825. His major achievement in electromagnetism, though, came in 1831, when he discovered electromagnetic induction.[3]

His major contribution to the field of chemistry came in 1834, when he formulated his Theory of Electrolysis. This theory is still useful today, and has been modified to fit the modern Atomic Theory. When electrolysis is used upon a compound, the amount of current used is proportional to the number of atoms of the products that are released, not the weight of products released.

During all this time, he had been giving lectures to the public, and to children. His series of lectures are still available today, and are still quite engaging and interesting. He started the series of Christmas Lectures for Children at the Royal Institution, which is still being continued to this day. His lectures covered such topics as Gravitation, Cohesion, Chemical Affinity, Heat, Magnetism, Electricity, and the Correlation of the Physical Forces.[3]

In the 1840s, Faraday's scientific output declined somewhat, due to a breakdown in health, as well as an increase in work for his church. In 1844, he proposed a new theory of the atom, as the previously-dominant Daltonian theory could not explain the fact that, under some circumstances, electricity could be transmitted across space, while under others it could not.[3]

In 1845, after speaking with William Thomson, later Lord Kelvin, Faraday experimented with passing light through magnetic fields. Soon, he discovered the magneto-optical effect: when polarized light was passed through a glass sheet in the presence of a strong magnetic field, the polarization of the light changed.[3]

Later in that same year, he concluded that magnetism is an inherent property of matter, after experiments involving hanging items between the poles of a powerful electromagnet and changing the alignment of the magnet, always causing the hanging item to turn. In 1846, he delivered a lecture on this subject, which laid the ground-work for modern field theory. James Clerk Maxwell mathemetized this theory eventually, giving a cornerstone for much of modern physics to be built upon.[3]

Faraday died about twenty years later, on 25 August 1867. Once, Sir Humphry Davy was asked what his greatest discovery was. “Michael Faraday,” he replied[1].

## References

- [1] F. E. Compton and Company. *Compton's Pictured Encyclopedia*, volume 3, page 1224. F. E. Compton and Company, Chicago, 4th edition, 1925.
- [2] Encyclopaedia Britannica Inc. *Encyclopaedia Britannica*, volume 7, page 7:173. Encyclopedia Britannica, Inc., Chicago, 15th edition, 1983.
- [3] Dr. Frank A. J. L. James. *Michael Faraday*. The Royal Institution of Great Britain (online), <http://www.ri.ac.uk/History/M.Faraday/>, 1995.