

Michael Faraday (1791-1867)

The Father of the Electric Motor

One of the great names in the history of man's work in electricity is that of Michael Faraday. He was born in a small village near London on September 22, 1791 in a poor family. His father, a blacksmith, could feed his family with difficulty, and could not even dream of an education for his boy.

As a boy Michael did not have much schooling. He had to work, and he had to learn a trade. So in 1804, when he was thirteen, he went to work in a bookbinder's shop. The work was not very interesting. At first he delivered the ready books. Later he learnt how to bind books.

He lived among books. Some of the scientific works which passed through his hands aroused his interest in science and he started to read. The boy could not read every book in the shop because he was busy and had not much time. He began to take home the books which he liked best. Once he ran across an article on electricity. When Faraday began to read it he knew nothing of the subject, but it struck his imagination. Soon his chief interest was in science, and especially in electricity and chemistry. He read as much as he could on these subjects. He made careful notes from the books that interested him most.

To learn a science well it is necessary not only to read, but to experiment as well. Like all true scientists, Faraday wanted to make experiments. He had very little money, but he saved his few pennies and bought a cheap and simple apparatus and some materials. The more he studied, the more interested he became. Lectures on scientific subjects were at that time being given in London. Faraday wanted to go to these lectures, but he had to pay a shilling for this and at first he could not go. He told his brother about his difficulty. Although his brother was a working man in London and not at all rich himself he gave Michael the shilling.

Davy's Pupil

Faraday also heard of other talks on science which were being given by an outstanding scientist and the most popular lecturer in London at that time, Sir Humphry Davy. He was able to go to these too, and as he sat and listened, he took notes and made drawings to illustrate them.

Davy was interested in many fields of science. He had already discovered the value of laughing gas as an anaesthetic, and he showed his listeners how to make a lamp which was safe in coal-mines.

As Faraday learnt more about electricity, he grew discontented with his work at the bookbinder's shop. He wanted to devote his life to science, but he could not see how he could do this. At last, in his poor room, he wrote a letter to Humphry Davy. He told him of his great interest in science and his desire to do scientific work and asked for his help. In the letter he put some of the notes which he had made when he was listening to Davy, and also some of his drawings.

Davy wrote Faraday a kind reply. He asked Faraday to come to see him, and offered to give him an opportunity to do scientific research. Faraday was delighted, but he had to start at the bottom. His work at first was to wash apparatus and prepare what Davy and the other scientists used in their experiments. But Faraday could now work in the company of scientists. He could hear what they said when they talked together; and he could watch them at work.

Davy sometimes took trips to Europe, where he met great scientists of other countries, and one day he asked Faraday if he wanted to go with him. Faraday, of course, was glad. He had never been more than a few miles from London in his life, and now he would meet some of the great men of science. The journey lasted a year and a half. It was a wonderful experience and the educational value of Faraday's trip to Europe was great. Faraday learned much during the trip and he met, among other people, Volta and Ampere, who had already made a name for themselves in the history of electricity.

Work and Experiments

When Faraday returned to London he resumed his work and experiments. He helped Davy in his research and started to write articles for a scientific magazine. For five more years he studied electricity and various sciences, and then he himself began to teach.

Faraday's scientific interests were varied. He made a new kind of steel and a new kind of glass. He studied flying. He did many kinds of work, and he did most of it alone. He was of those people who liked to do everything themselves.

Faraday had not much time for pleasure. He drew and sang, and he took his wife to the river sometimes. But he often worked fourteen hours a day. He began to get work from other people who had heard of his cleverness as a scientist. Men who wanted to know the answers to scientific questions asked him to make experiments to find out the truth.

World Famous Scientists

Because of this work he could not do his own research in electricity. Time was his enemy, as it is the enemy of many hard-working men. He always had something to do for other people, and his own research progressed slowly. However, when he found that such work took too much of his time, he decided to give all his attention to scientific research.

During his lifetime, Faraday made more than two thousand difficult experiments and made countless valuable discoveries in chemistry and physics. What we are most interested in here is just one discovery of his – the generation of electricity from magnetism.

It was known at that time that an electric current could magnetize iron. Ampère had shown that if a piece of iron was placed inside a coil and a current was passed along the wire, the iron became a magnet. Faraday was wondering whether a magnet could in some way be made to give an electric current.

Other scientists in other parts of the world were working on the same problem, but no one had yet been able to make an electric current by using a magnet. Today almost all the electricity that we use is generated by great machines which have magnets in them, but in those days no one knew how to do this. In Russia, France, and Germany scientists were making experiments, but they all failed.

Faraday felt sure that a current could be produced in this way, but he too was at first totally unable to generate an electric current with his magnets. He placed wires near magnets in different ways. He made coils of wire and put them round magnets. He arranged the wires and magnets in every possible way and did not stop trying to get an electric current.

At last he got a bright idea: he would move the magnet near wire. And then he got what he wanted: an electric current in the wire! He was already forty years old at the time, but his age did not stop him from dancing with delight on a table.

The Wonderful Machine

This was a great moment in the history of man's electrical experiments. But Faraday did not stop at this. He tried different ways of producing the electric current. He got a current when he moved the wire instead of the magnet.

Ampère had shown how to make a magnet by passing a current through a coil round a piece of iron. Faraday placed two separate coils round the iron (he also put two coils together without the iron) and passed a current through one coil. He found that when he started the current, or when he stopped it, or when he changed it, he got another current in the other coil.

If nothing moved, and if there was no change in the current in the first coil, he found no current in the other.

After some more experiments of this kind, he made a machine. He placed a round plate of metal between the ends of a magnet. The plate was so arranged that it could be turned round with a handle. He fixed two wires which touched this turning plate. One of the wires touched the outside part of it and the other touched the middle. When the metal plate was turned, the machine gave Faraday a current of electricity in these two wires.

This was the beginning of all the great machines that make our electricity today. They light and heat our houses; they make our radio-sets work; they give the necessary power to drive our electric trains. It was a way of changing one form of power (perhaps from coal or from a waterfall) into another. It was the beginning of the electrical age, which has changed the face of the earth.

Questions

1. What did Faraday learn from reading books?
2. How long did he study electricity?
3. What are scientific interests of Faraday?
4. How many experiments did Faraday make?
5. What famous electrical experiment did Faraday make?
6. What struck the imagination of Faraday?
7. What steps are necessary to make in order to learn a science well?
8. Describe the style the author uses. Find metaphors in the text.