OLIVER HEAVISIDE—1850–1925.

Oliver Heaviside was born in London on May 13, 1850. He was a nephew of Sir Charles Wheatstone. After leaving school he was appointed to a post with the Great Northern Telegraph Company at Newcastle-on-Tyne. In 1874, in consequence of increasing deafness, he retired from business life and went to live in Devon. Between the years 1873 and 1892 he communicated a number of papers, some of great importance, to various societies and journals. Their value, however, was not at first recognised. In some respects his mathematical methods were novel; in consequence, he frequently had difficulty in getting his work published, and the rejection of some of it by the Society of Telegraph Engineers was for long a source of bitter grief.

In 1892 he collected these papers into two volumes; they became readily accessible, and the fact that the reader could study his investigations in a connected form led to a fuller appreciation of their value. His paper "On Duplex Telegraphy" (vol. i, p. 18) was originally published in the 'Philosophical Magazine' for June, 1873. In it he shows for the first time that quadruplex telegraphy is practicable, and considers it highly probable that multiplex telegraphy will come into everyday use. In 1881 he communicated a paper to the Society of Telegraph Engineers (now the Institution of Electrical Engineers) on the theory of the electrostatic and electromagnetic induction between parallel wires. This paper has recently come into importance in connection with the interference produced by induction between electric railway lines and telephone circuits.

Heaviside was the first (1884) to solve the problem of the high-frequency resistance and inductance of a concentric main. It was hardly known until Kelvin gave some of his results in his Presidential Address to the Institution of Electrical Engineers in 1889. In the two volumes of "Electrical Papers," Heaviside's most important practical work was laying the foundation of the modern theory of telephonic transmission, a theory which has proved of the utmost value to the telephonist. He points out that the difficulties which arise in telephony are due to the different attenuations and the different velocities of the various component waves which carry the necessary currents. His theory of the distorsionless circuit (vol. ii, pp. 123–155) shows clearly the method on which long-distance telephony can be developed. Working on similar lines some ten years later, Professor Michael Pupin, in the United States, developed his loading coils (a method which Heaviside also invented) and long-distance telephony became practicable. Continuous loading of the cable was subsequently introduced, and Heaviside's simple theory became immediately applicable.

All his work proves conclusively the value of a knowledge of physics, and particularly of mathematical theory to the electrical industry. His methods of using a differential galvanometer and also of measuring mutual inductance are of great value in themselves. Like most of his work, also, they have been most fruitful in suggesting similar methods to others.

After the publication of 'Electrical Papers' in 1892, the importance of his work was recognised by electrical engineers. In the following year, 1893, the first volume of his 'Electromagnetic Theory' appeared, to be followed by a second in 1899. The third and concluding volume was published in 1912. The contents of this work are a sufficient indication of his contributions to electrical science.

Heaviside was the first to give the theory of the steady rectilinear motion of an electric charge through the ether, a theory which has been developed by others with important results. He was one of the first to predict the increase of mass of a moving charge when its speed becomes very great. In June, 1902, Heaviside wrote the article on the "Theory of the Electric Telegraph," in the 'Encyclopædia Britannica.' It is reprinted in 'Electromagnetic Theory,' vol. iii, p. 331. He gives a radiational theory founded on Maxwell's theory of light, and points out that experiment has verified all its essential points. Some of the theorems given in this article have been frequently quoted by the writers of text-books. In particular, his suggestion of a conducting layer in the upper atmosphere, by means of which electromagnetic waves are bent round the earth, is now well known and generally accepted.

He became a Fellow of the Royal Society in 1891; in 1908 he was elected an Honorary Member of the Institution of Electrical Engineers, and when the Faraday Medal of the Institution was founded in 1921, he was the first recipient. He died at Torquay on February 5, 1925.

A. R.