Sir James Alfred Ewing, K.C.B., M.A., D.Sc., LL.D., F.R.S.

JAMES ALFRED EWING, a great engineer, scientific man, and charming Scot, was distinguished in many fields of activity. Born in 1855 at Dundee, where his father was a minister of the Free Church of Scotland, he grew up in an intellectual and spiritual atmosphere in which his early education was greatly influenced by his mother, whose critical taste in letters was passed on to her children.

From Dundee High School Ewing proceeded in the early seventies to the University of Edinburgh, where his great ability soon manifested itself in the classes of Tait and Fleeming Jenkin, the latter of whom brought him into touch with Sir William Thomson (afterwards Lord Kelvin), then engaged in the development of submarine telegraph cables, an introduction which led to Ewing taking part in three cable-laying voyages to Brazil and the River Plate. Fleeming Jenkin was a man of wide culture, and his literary and scientific circle included Ewing and another young student, Robert Louis Stevenson, then at the commencement of an engineering training, soon to be abandoned for a literary career of the greatest distinction, the beginnings of which have been happily described by Ewing in "The Fleeming Jenkins and Robert Louis Stevenson."

In 1878, at the early age of twenty-three, Ewing went to Japan as Professor of Mechanical Engineering in the University of Tokyo, a post which he occupied for five years, and there he made his classical researches in the widely different fields of magnetism and seismology.

While in Tokyo he married his first wife, Miss Washington, a great-great-grand-niece of the first President of the United States of America. Their two children, born in Japan, reached mature years before their mother's death.

In 1883 he returned to Scotland, becoming Professor of Engineering at University College, Dundee, where he continued his research work, the great value of which was recognised by his election into the Royal Society in 1887.

At this period the importance of engineering science as a suitable field of activity within a university was becoming recognised by the older English universities, and at Cambridge a school of engineering, somewhat thinly disguised under a non-committal name, had been brought

into being by the activities of James Stuart, who later, becoming more interested in politics than engineering, resigned his Chair. By great good fortune Ewing was appointed to succeed him, mainly on the advice of John Hopkinson, the eminent electrical engineer and mathematician. Up to that time (1890) only a pass degree was available for students of engineering, and it says much for the tact and organising ability of Ewing that, within a very short time, he was able to persuade the University to establish a Mechanical Sciences Tripos and also to obtain funds to build an engineering laboratory next door to that great centre of physical science, the Cavendish Laboratory.

The new tripos proved a great attraction to men who, with a year to spare, had already taken the Mathematical or Physical Sciences Tripos examination, while the number of students who came to devote three years to an organised course of study of engineering science began to grow steadily and continued to do so throughout the thirteen years during which Ewing continued as Professor in Cambridge; and so well was the course planned that it continued to attract increasing numbers until it is now the largest University School of Engineering in this country.

A good deal of administrative work fell necessarily on Ewing, but he had a very sure instinct in the selection of assistants who could give material help, among the early ones being Dalby, Lamb, and Peace, and he found time to build up a research school and to contribute much himself to applied science by researches either alone or in collaboration with his pupils, especially on magnetic hysteresis and the crystalline structure of metals in the plastic state, described in a Bakerian Lecture with Rosenhain as co-author and subsequently developed in other papers.

This period marks the development of many new instruments of precision for use in engineering laboratories, and even more notably the writing of text-books for undergraduate students of engineering, distinguished for their clarity and literary style. Probably the best known of these works is a text-book on the steam-engine and other prime movers, which has passed through many editions and translations. His *Thermodynamics for Engineers* was another fine contribution for more advanced study.

In addition, his help and advice were much sought after by eminent engineering firms and also by the Government. It was mainly on his advice that a new scheme of naval education was drawn up, and this ultimately led to his becoming the first Director of Naval Education under the Selborne scheme, whereby engineering training became an integral part of the education of all naval officers.

This was a great loss to the Cambridge School of Engineering, although

fortunately a man was available in Bertram Hopkinson to carry on its programme and to extend it. The new Admiralty scheme, involving great changes, was a complete success owing to Ewing's administrative gifts combined with a tactfulness which disarmed some opposition to the considerable alterations then made. The commencement of the War found Ewing still Director of Naval Education and brought him an opportunity which he described as a wonderful piece of good fortune, but might equally well be described as a happy inspiration on the part of the authorities in choosing the right man for a post of singular delicacy. He was asked to undertake the deciphering of enemy cipher, a task which he and the staff he gathered round him brought to great perfection.

Readers of tales of mystery may well imagine the veil of secrecy in which the now famous "Room 40" was enshrouded. One pictures an almost inaccessible chamber approached through locked doors and past armed guards. In reality it was quite an ordinary room, near the Admiralty entrance, opening into a main corridor, with the door wide open. In it Ewing and three or four others were seated at desks of a pattern used by the humbler members of the Civil Service and covered with bundles of papers. No doubt the means of ensuring secrecy were there, but there were no traces of this. It was all part of the great war game then being played out.

It was while carrying on this work that Ewing was invited to return to his *alma mater* as Vice-Chancellor and Principal, and although somewhat reluctant to commence so great a task at the age of sixty-two he was persuaded to do so.

During his twelve years in Edinburgh he strove with great success to adapt and widen the University for the many new duties which the post-War era brought with it. Many chairs and lectureships were founded for which new buildings were required on an extensive scale, but Ewing's zeal and persuasive tongue carried through a scheme involving an expenditure of more than three-quarters of a million sterling, most of which was contributed by private benefactors and public trusts without impairing the general finances of the University.

In the no less important social activities of the University he and his second wife, a daughter of John Hopkinson, were a great accession to Edinburgh, but even all this did not complete the tale, for Ewing found time to engage in a good many outside activities such as the Chairmanship of the Bridge Stress Committee, and another on the testing of timber. Perhaps the most notable of these was his Presidency of the British Association at York in 1932, where in a masterly survey of the progress of physical science during the last century, and especially in the latter

half of it, he sounded a note of warning and expressed a feeling that man was ethically unprepared for the bounty bestowed upon him.

Ewing was the recipient of many honours. He became a Knight Commander of the Order of the Bath in 1911, and held honorary degrees of many universities. His retirement from the University was marked by the conferment of the freedom of the City of Edinburgh, and later by that of his native city, Dundee, on the occasion of a visit of the Institution of Mechanical Engineers, of which body he was an honorary life-member.

Many other distinctions were showered upon him, and it is of especial interest here to note that his connection with the Royal Society of Edinburgh was long and intimate, for he became a Fellow in 1878, was a frequent contributor to its *Transactions* and *Proceedings,* served as Vice-President from 1920 to 1923, and finally became its President from 1924 to 1929.

He died in Cambridge on January 7, 1935. (See also *Obituary Notices of Fellows of the Royal Society*, No. 4, 1935, p. 475.)

E. G. C.