

influence as a pioneer in electromagnetic science and testified to his priority in achieving a breakthrough in high-tension. electricity: (For a fuller account of the Irish school of electromagnetics see McLaughlin, P. J., "Some Irish Contemporaries of Faraday and Henry", Proceedings of the Royal Irish Academy, 1964.)

MODERN TRIBUTES

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A session of the British Association for the Advancement of Science was held on 10 September in the Great Lecture Theatre of the Science Buildings of University College, Dublin. The audience, which was large, included Prof. P. M. S. Blackett, president of the Association; Dr. Henry St. John Atkins, president of University College, Cork; the Rev. Prof. J. McConnell, of Maynooth; Dr. A. C. Williams, senior chief inspector of the Ministry of Education of Northern Ireland; Mr. P. McGown, inspector of the Department of Education in Eire; Prof. J. Doyle, Prof. T. Murphy and Prof. F. Hackett, of University College, Dublin. Prof. D. A. Webb, of Trinity College, Dublin, president of Section X, was in the chair.

The Rev. Dr. M. T. Casey, O.P., lecturer in general science at Maynooth College and senior science master at Newbridge, opened the session with an address on "Science in Our Irish Schools".

The first of the juvenile lectures was given by Mr. John D. Gallivan, of the sixth form at Newbridge College. He read a very interesting paper, illustrated by lantern slides, on "The Reverend Dr. Callan of Maynooth, pioneer of electrical research". Callan, born in Co. Louth in 1799, spent the greater part of his life in St. Patrick's College, Maynooth, where he held the chair of natural philosophy from 1826 until his death early in 1864. Attracted by the researches of Faraday and Sturgeon, he built a giant horse-shoe magnet, some 7ft. high and weighing 210lb. When supplied with current from his battery, this magnet could lift two hundred times its own weight. Before 1836, Callan had investigated the principle of the electric motor and had built three types. In the earlier forms, he employed a wheel having horizontal soft-iron bars attached to its rim. This was made to rotate by an intermittently energized electromagnet, the interruptions of current being effected by the rotating wheel. A later model using forty electromagnets was able "to propel at eight miles an hour a thirteenhundredweight carriage". Callan also experimented with various types of primary cell and eventually arrived at one which was manufactured commercially by E. M. Clarke, of the Strand, London, and called the "Maynooth Battery". The positive plate was a cast-iron container, holding a porous pot with the zinc plate enclosed.

Callan's most important invention was the induction coil. When repeating experiments on electromagnetic induction, Callan found that the shorter the interval at break, the higher the voltage of the induced current. From the escapement mechanism of an old clock, he constructed an interrupter which gave several thousand interruptions a minute. Using this apparatus coupled to an electromagnet on which he wound a secondary coil over the primary, he found that the machine would give prodigious shocks. He sent a replica of the whole apparatus to Sturgeon who demonstrated it at an electrical exhibition in London in 1837, where it attracted much

attention. Callan now constructed his "medium-sized" coil. This had a bundle of soft iron rods as core on which he wound the primary coil. Over this he wound a secondary coil of very fine wire very carefully insulated. The interrupter was of the trembler type devised by his contemporary, Prof. McGauley of Dublin. This apparatus gave considerable sparks. Callan still continued and made his giant induction coil, which was built on the same principle as the medium one. The core is 42in. long and the primary coil is made from copper wire, 1/4in. in diameter, insulated with thread and wound in three layers. The whole is enclosed in an insulating paste made from wax and gutta percha. The secondary consists of three coils each containing about ten miles of very fine wire all carefully insulated with his paste. Callan had a large condenser across the interrupter, and using three cells of his Maynooth battery to feed the primary coil, he got sparks 16 in. long from the secondary terminals.

For some time Callan's claim to the invention of the induction coil was in dispute, but it has long since been vindicated beyond all controversy. The principal evidence to be found in Callan's own papers published in *Sturgeon's Annals of Electricity* (1, 493: 11 September 1837), and also in the *Philosophical Magazine* (December 1836), where we have the induction coil. Noad's *Treatise on Electricity* and Prof. J.A. Fleming's *The Alternate Current Transformer* also pay tribute to Callan as the inventor of the induction coil. Furthermore, French writers no longer claim Ruhmkorff (who constructed his first coil in 1851, fifteen years after Callan's) as its inventor. Mr. Gallivan concluded his paper by paying a tribute to Prof. McLaughlin, vice-president of Maynooth, whose researches had rescued Callan from oblivion.

Among further tributes to Callan, with particulars about his induction coils, may be mentioned those of Gerald Molloy in the *Electrician* (26, 1891, 465); Francis Lennon, (*ibid.*, p. 554), O. Mahr in his *Die Entstehung der Dynamomaschine* (Berlin 1941); and R. C. Cuffe in his chairman's address to the Institution of Electrical Engineers, Irish Branch; October 1954: "Some Irish Contemporaries of Faraday".

TRIBUTES TO DR. CALLAN BY CONTEMPORARY SCIENTISTS

In the *Irish Monthly* (19, 1891, 304-6) appears a number of letters from distinguished scholars to Dr. Charles Russell on the occasion in January 1866 of a proposed memorial to Dr. Callan. The Earl of Rosse assigns him priority in inventing the induction coil and refers to the Callan cast-iron cell and goes on: "The largest batteries I ever saw were those of the Light & Colour Company, and they were Callan's. I never met a scientific man with more zeal and singleness of purpose, or who was more ready with a true philosophic spirit to encounter difficulties." Thomas Romney Robinson, inventor of the cup anemometer that bears his name, also speaks of Callan's coil and batteries, and refers to Callan as his valued friend whose scientific attainments had not received their full due. , Provost MacDonnell of Trinity College, Dublin, in endorsing the scheme for a memorial, mentions that Callan was "particularly attractive by his modesty and affability". Sir Robert Kane thinks the proposal would be a "very just tribute to the scientific devotion of Dr. Callan. On hearing of Callan's death, Dr. Robinson also wrote to Bishop Denvir of Down and Connor, Callan's predecessor in the Maynooth's physics chair, still alive, and mentions his experiences with Callan's cells, including with reference to Callan's " high inventive power and knowledge, sterling worth and kindly heart.