

gests, however, that the cut-off is fairly abrupt, leading to the conclusion that transmission through the ionosphere in the two directions, from below and from above, appears to be different. Such lack of reciprocity could arise from the effect of the earth's magnetic field.

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OBITUARIES

Dr. F. H. A. Marshall, C.B.E., F.R.S.

BORN at High Wycombe on July 11, 1878, Francis Hugh Adam Marshall died suddenly after an operation in a Cambridge nursing home on February 5. He was the younger son of Thomas Marshall, and was educated at St. Mark's School, Windsor, and privately. After a short time at University College, London, he went up to Christ's College, Cambridge, in 1896 and took the Natural Sciences Tripos. Inspired by the work of Walter Heape in Cambridge on sex physiology, he then accepted an invitation to work in Edinburgh with Prof. Cossar Ewart, who at that time was conducting his well-known experiments on telegony in farm animals at Penicuik. Here he started his research career and worked in conjunction also with the distinguished group of research physiologists centred around Sir Edward Sharpey Shafer. During this time he published many valuable papers on the oestrous cycle in the sheep (1903), the ferret (1904) and the dog (1905); but perhaps one of the most important was that on "The Ovary as an Organ of Internal Secretion", for it led to large developments in this field later. The University of Edinburgh honoured him with a D.Sc. and later with an LL.D. degree, and he was elected a fellow of the Royal Society of Edinburgh.

In 1908 Marshall returned to Cambridge, where he became lecturer in agricultural physiology in the newly formed School of Agriculture. He was also elected a fellow of Christ's College and lectured to medical students in the Department of Physiology on reproduction. It was during these years that he gathered the materials for and wrote his classical book on "The Physiology of Reproduction", which was first printed in 1910, a second edition appearing in 1922. This book appeared at an opportune time, for during that period research work was expanding rapidly in the United States and elsewhere, and the book, giving complete references to the literature on the subject, formed a background for the spectacular advances made later on the internal secretions of the reproductive organs, a subject to which much of Marshall's earlier work was devoted. At the time of his death he was busy with proofs of the third edition of this book, chapters for which had been contributed by many of his former pupils and associates whom he had inspired by his passionate devotion to his subject.

In the period of some thirty-five years during which he was lecturer, and afterwards reader, in agricultural physiology at Cambridge, he also laid the

foundation for this subject as a basis for training in animal husbandry, and his book on the "Physiology of Farm Animals" is widely used and has run through several editions. In conjunction with the late Prof. T. B. Wood, the first director, he helped to develop the Institute of Animal Nutrition at the School of Agriculture, Cambridge, and became director himself for a short time after Wood's death. For his work for agricultural science he was made a C.B.E.

Marshall's literary talents were well developed and he wrote with a clarity and ease of style which held the attention of his readers. These powers he put to good use not only in his books but also as editor of the *Journal of Agricultural Science* and as a founder member of the editorial boards of the *British Journal of Experimental Biology* and the *Journal of Endocrinology*.

In 1920 he was elected a fellow of the Royal Society and served on the Council from 1933 until 1935. In the following year he delivered the Croonian Lecture on "Sexual Periodicity and the Causes which Determine it", in which he stressed the exteroceptive factors, especially of light, a subject on which he did much experimental work in his later years. He was awarded a Royal Medal in 1940.

At Cambridge Marshall played his part, too, in academic affairs, becoming tutor, dean and finally, in 1940, vice-master of Christ's College. He was a proctor during 1911-12 and afterwards served on the Council of the Senate. His kindly and gentle manner endeared him to his students and to the many aspiring research workers who came to seek his advice from far and wide.

JOHN HAMMOND

Prof. L. Farkas

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THE death of Ladislav Farkas, at the age of forty-four, removes from our midst a relatively young physical chemist of singular charm and undoubted ability.

Ladislav Farkas was the younger son of a Hungarian pharmacist living at Dunaszerdahely, and, like his elder brother, revealed a particular aptitude for physical chemistry. He attended the Technische Hochschule in Berlin, and then worked with Prof. Fritz Haber at the Kaiser Wilhelm Institut in Berlin-Dahlem at the period when the possible participation of atoms and radicals in chemical reactions had been recognized and demanded intensive investigation. His work here was so effective that he was promoted to 'assistant'. As the Nazi regime in Germany became more definitive, he found his position becoming more difficult, and he emigrated to work in the Department of Colloid Science at the University of Cambridge.

Deuterium, at that time, was scarcely obtainable in Britain, and its obvious utility, on account of the mass and zero point energy differences, in throwing light on the detailed mechanism of homogeneous, heterogeneous and catalytic reactions, suggested a promising field for inquiry. Farkas prepared deuterium compounds by the orthodox electrolytic and diffusion processes, and in addition elaborated a number of ingenious partition and chemical methods for its separation. The results of the investigation of a number of chemical and catalytic reactions, in which hydrogen and hydrogen-containing compounds were replaced by deuterium, were presented in a series of papers. His experimental work was characterized by elegance in design and execution, while his theoretical insight, already appreciated by Haber, was confirmed by his British co-workers.