

preparative help, they elucidated the distribution and constitution of spermine and spermidine, two bases of unknown function present in mammalian tissues and fluids.

In 1925 Drummond, Rosenheim and Coward had shown that the precursor of the antirachitic substance found in foodstuffs on ultra-violet irradiation was in the fats, and in fact in the sterol fraction. With Webster, who in Leonard Hill's department had already devised a reliable technique for the testing of antirachitic substances on rats, he concentrated on the problem of the activatable sterol and arrived at the important discovery that the so-called pro-vitamin was ergosterol. This led, in the hands of Callow, Bourdillon and their collaborators, to the actual isolation of vitamin D.

In the vitamin A field, too, Rosenheim and Drummond found that the vitamin A content of cod liver oil was approximately proportional to the colour intensity produced by addition of arsenic trichloride, an observation which facilitated further advances.

In 1932 Rosenheim and I were fortunate in resolving the impasse reached in the problem of the structure of the sterols and bile acids by suggesting a revolutionary modification of the structures hitherto proposed. Great advances have flowed from the new formulæ, not only in the sterols and bile acids but also in the heart poisons, sex-hormones and constituents of the adrenals.

Rosenheim's contributions to medical science were many. He was a born investigator, meticulous and thorough in all he attempted. The usés to which he put colour reactions and mixed solvents in purification procedures were fascinating and entrancing. He was full of encouragement for the young worker. His remarkable memory and his encyclopædic knowledge were ever available and often called upon by his many colleagues. For many years he was a valued member of the Accessory Food Factors Committee of the Medical Research Council. He was a Fellow of the Linnean Society and was elected a Fellow of the Royal Society in 1927.

HAROLD KING

Dr. R. W. Boyle

THE sudden death of Robert William Boyle in London on April 13, at the age of seventy-one, has removed one of the last of that small band of pioneers who were responsible for establishing in Canada the importance of research during the early years of the present century. Born in Carbonear, Newfoundland, on October 2, 1883, the son of Dr. Albert D. Boyle and Sophie Madelock Boyle, he received his early education there and in St. John's College, from which he graduated with the award of the Newfoundland Government Jubilee Scholarship. He then entered McGill University, where he studied electrical engineering, graduating in 1905; but, stimulated by the influence of Rutherford, then Macdonald professor at McGill, he turned to a career in physics. He was awarded in 1909 the first Ph.D. granted by McGill and in the same year was chosen an 1851 Exhibition scholar, proceeding to Manchester, where he carried out research under Rutherford on the properties of radium and thorium emanations. Returning to McGill in 1911, he taught physics and mathematics, and in 1912, on the establishment of the University of Alberta, was appointed head of the Department of Physics at the new provincial institution. With his

drive and enthusiasm, he established an excellent department, both for instruction and emphasis on research.

Soon after the outbreak of the First World War, Boyle joined the staff of the Board of Invention and Research, later known as the Antisubmarine Division of the Admiralty. During this period, he developed the method of submarine detection using ultrasonics produced by oscillations of quartz crystals due to their piezoelectric properties. This was a very difficult investigation at a time when electronic amplifiers were not yet available; and when the simple triode tubes eventually were obtained, he established by his drive and vision the success of what later became known as the 'Asdic'. On returning to Alberta in 1919, he continued research on ultrasonics with a small band of enthusiastic research students, making numerous fundamental measurements in this field of physics. His appointment as dean of the Faculty of Applied Science in 1921 extended his influence on research to other fields, creating in western Canada an oasis of scientific interest in original investigation that has continued ever since. The establishment of the National Research Laboratories in Ottawa required a director with energy and vision for the Division of Physics and Electrical Engineering, and Boyle was appointed to fill this new post in 1929, which position he occupied until his retirement in 1948. During this period, his Division made notable contributions to Canadian industry and, especially during the Second World War, was responsible for the major development in radar and various other devices which the Council contributed to the war effort.

Boyle was a lovable character, an interesting and vivid conversationalist, and a kindly loyal friend to all his colleagues. Travel and fishing were his particular hobbies, which occupied his period of retirement. We looked forward to his periodic return to Canada from his travels, for we were assured of a most enjoyable evening hearing of his adventures in picturesque and lively descriptions of places and people he saw and met. He will be greatly missed by his many friends in Canada and abroad.

He received many honours. Elected to the Royal Society of Canada in 1921, he was president of Section III, 1924-25, received the Flavelle Medal in 1940, and was made LL.D. by the University of Alberta in 1933. He was a Fellow of the American Physical Society, the Acoustical Society, and a member of numerous engineering societies. He is survived by two sisters, Mrs. Mary E. Watts and Mrs. Margaret B. Horton, of Billerica, Mass., and three brothers, Dr. Hubert Boyle of New Bedford, Mass., George Boyle of Grand Falls, Newfoundland, and Albert S. Boyle of Edmonton; he never married.

D. A. KEYS

Mr. F. G. Simpson, C.B.E.

FRANK GERALD SIMPSON, who died on May 14, devoted a working life of fifty years to the study of Hadrian's Wall. By training an engineer, he was fired by the possibility of scientific study which the methodically designed Roman works seemed to offer to archaeological investigation. His excavations, undertaken with a precision and clarity which surpassed and surprised all professional contemporaries, reduced the apparent confusion that often attends new discoveries to problems which seemed either simple or insoluble; for they revealed that