Helium in Canada.

By Prof. J. C. McLENNAN, F.R.S., University of Toronto.

IN 1916, at the request of the Admiralty, and in collaboration with my colleagues, Profs. Satterly, Burton, and Dawes, I investigated the natural gases of Canada with the view of ascertaining the amount of their helium content. The gases with the highest helium content were found at that time to be in Ontario and in Alberta. In neither Province was any considerable supply of gas located that contained more than 0.36 per cent. of helium. During the years 1917-1920, with the assistance of Mr. John Patterson, of the Meteorological Office, Toronto, I designed and successfully constructed and operated a semi-commercial plant for extracting helium from natural gas. The gas we worked upon was obtained from an extensive field situated near Calgary, Alberta. During the operation of this plant we extracted in all from 15,000 to 20,000 cubic feet of helium having a purity of 90 per cent. When the Cryogenic Laboratory was instituted in the University of Toronto in 1922, the helium extracted at Calgary became available, and we succeeded in liquefying helium early in January 1923.

Since 1916 many new gas fields have been opened up in Canada, and about two years ago the Dominion Mines Branch decided to make a re-examination of the Canadian natural gases for helium. Mr. R. T. Elworthy was invited to undertake this task, and has carried it through most thoroughly and expeditiously. He found that in Alberta, while some of the natural gases contained less than 0.1 per cent. of helium, a number of them contained so much as 0.25 per cent. In some cases in this Province the helium content ran so high as 0.34 per cent. In New Brunswick none of the natural gases investigated was found to contain more than 0.064 per cent. In Ontario the natural gases varied considerably in their helium content. The gases of Lambton, Kent, and Essex Counties were found to contain not more than 0.15 per cent., while those in the counties of Brant, Haldiman, Lincoln,

and Welland were found to have a helium content of from 0.25 per cent. to 0.35 per cent. In the County of Norfolk considerable supplies of gas were produced which ran from 0.4 per cent. to 0.5 per cent. in helium. The gas richest of all in helium was found in Peel County, the content being slightly more than 0.8 per cent. In this field three wells have already been sunk, and the gas is drawn from a horizon approximately 600 feet deep. The wells are consequently shallow, and though the gas supply is only moderate in amount, it has been estimated that the three wells will provide at least 100,000 cubic feet of helium per year.

With the view of rendering the supply of helium permanently available for research work in the University of Toronto, the Hon. the Premier of Ontario recently announced that, under an Order-in-Council, the Government of Ontario had secured, for the Crown, the products of the three wells mentioned, and the natural gas rights as well over a large block of land in the immediate neighbourhood of the wells.

The National Research Council of Canada has endorsed the policy adopted by the Government of Ontario, and is co-operating with the University of Toronto and other organisations in a scheme to establish a helium extraction station in the Peel County gas field, with the object of providing helium for research workers requiring the gas in Canada and probably in other parts of the British Empire as well.

It is fortunate that a supply of helium has been found in such a convenient locality—only some thirty-five miles from Toronto—for although the Government of the United States has extracted enormous amounts of helium from the natural gases of the Western States, its export from the United States is prohibited by law.

If we succeed in making the financial arrangements we have in mind, we hope to be in a position to provide, in the near future, ample supplies of helium for scientific investigations within the Empire.

Obituary.

PROF. J. G. M'KENDRICK, F.R.S.

EMERITUS-PROFESSOR JOHN GRAY M'KENDRICK, who died in Glasgow on January 2, was born in Aberdeen in August 1841. By the death of his parents he was at a very early age thrown upon his own resources. When he was but thirteen years of age he was sent to spend a summer with his grandfather at Braco in Perthshire, where, herding sheep daily from 5 A.M. to 8 P.M., he learned to know and love the plants and the animals and Nature in all her moods. Zoology became M'Kendrick's first scientific study; and the youth of seventeen actually demonstrated his little marine aquarium at a conversation of the British Association which met in Aberdeen in 1859. Here he saw for the first time Faraday, Owen, Murchison and Huxley; science had begun to call him to herself.

Some one suggested that M'Kendrick should qualify for the medical profession, and so, while still apprenticed

to a lawyer in Aberdeen, he would rise at five and study until ten, when the duties of the desk claimed him for the day. After passing the "Medical Prelim." at Aberdeen, he went to Edinburgh in 1861 to enter upon the serious study of medicine. Here he heard Goodsir lecture; saw Turner and Joseph Bell ("Sherlock Holmes") demonstrate; listened to Simpson with his European reputation, to Laycock who was a psycho-analyst sixty years ago, and to Christison who was making toxicology a science. M'Kendrick took Goodsir's medal in 1863, and was a prizeman in medicine, obstetrics and surgery. In 1864 he graduated M.D. with distinction at the University of Aberdeen. Years afterwards he summarised his medical course:—"no laboratories, no apparatus, no histology, no bacteriology, and seven different theories of inflammation."

After a few months at the Chester General Infirmary, M'Kendrick obtained the position of surgeon to the

Eastern Dispensary in Whitechapel; and as he passed through London to take up his duties he saw the crowd witnessing the execution of Müller for the murder of Mr. Briggs in 1864. For the pain, squalor and vice of Whitechapel, M'Kendrick exchanged the purity and serenity of Glen Nevis, for he became surgeon to the Belford Cottage Hospital at Fort William in 1865. It was in Lochaber that he met Hughes Bennett accidentally, and soon became his assistant. From 1870 until 1873, when Bennett's ill-health compelled him to winter abroad, M'Kendrick had sole charge of the university classes at Edinburgh, which he conducted with marked success. Bennett resigned in 1873, and Rutherford was recalled from King's College, London, to fill the vacant chair, so that M'Kendrick applied for and obtained the lectureship in physiology at Surgeons' Hall, and that at the Dick Veterinary College, Edinburgh. Here it was that he met James Dewar, with whom was begun that joint research which resulted in the discovery of the electric current produced in the retina and optic nerve when a beam of light was allowed to enter the eye.

For the first time in the history of physiology a current of action had been demonstrated in a sensory nerve by the normal stimulation of its end-organ. That Holmgren in Upsala made the same discovery about the same time was, of course, unknown to the Scottish workers. Dewar and M'Kendrick also investigated the physiological action of chinoline and the pyridenes, becoming once more pioneers, this time in researches into the correlation between chemical structure and physiological effect. In 1872 M'Kendrick visited Germany, and met Schultze, Pflüger, Du Bois-Raymond, Ludwig and Helmholtz. His "Life of Helmholtz" is perhaps his best piece of writing; it is an admirable account of a life with little incident in it apart from the scientific discoveries.

In 1876 M'Kendrick was appointed to the chair of the Institutes of Medicine at the University of Glasgow; and here a Department of Physiology was created out of a lecture-room, a sphygmograph, a few microscopes and some diagrams.

M'Kendrick was one of the most agreeable scientific lecturers Scotland has produced: his discourse had all the charm of a tale pleasantly told. In 1871 he had been elected a fellow of the Royal College of Physicians of Edinburgh. In 1881 he was appointed Fullerian professor of physiology at the Royal Institution, in which capacity he delivered many Friday evening discourses, as well as Christmas lectures to the children, and a valuable series on the history of physiology. In 1882 he received the degree of LL.D. from his Alma Mater; and two years later was elected into the Royal Society on the Council of which he afterwards served. He had been president of the Royal Society of Edinburgh, of the Section of Physiology of the British Association, of the Glasgow Philosophical Society; and he acted as examiner in a large number of universities. He delivered two courses of Thomson lectures at the Free Church College at Aberdeen.

M'Kendrick wrote with ease; he was the author of the articles on ear, eye, senses, stereoscope, longevity and nervous system in the "Encyclopædia Britannica," as well as of "The Outlines of Physiology" published in 1878, and ten years later of a "Text-book" in two

volumes splendidly illustrated. In conjunction with his assistant, Dr. Snodgrass, he wrote an interesting volume on "The Physiology of the Senses."

From 1892 onwards M'Kendrick, who had always been interested in physiological acoustics, investigated the tracing on the surface of the wax cylinder of the phonograph by a photographic method. Later he devised an apparatus to eliminate the hissing sounds which mar the music reproduced by that instrument. M'Kendrick was very fond of music, of poetry and of animals. He published a volume of devotional verse. His disposition was that of a deeply religious and reverent man who, though enjoying fun, disliked frivolity. His sympathies were wide, his friendships many, his capacity for bringing the best out of every one conspicuous. He urged moderation in the use of strong drink; some of his best addresses are those dealing with this subject.

M'Kendrick married in 1867 a daughter of W. Souttar of Aberdeen, who died in 1898. He is survived by two sons—Dr. J. S. M'Kendrick of Glasgow, and Colonel Anderson M'Kendrick, I.M.S. (retired), director of the Laboratory of the Royal Colleges at Edinburgh—and by one daughter.

D. FRASER HARRIS.

WE regret to announce the following deaths:

Prof. E. G. Browne, Sir Thomas Adams professor of Arabic in the University of Cambridge and fellow and president of Pembroke College, known for his work on Persian literature and on the history and literature of oriental religions, on January 5, aged sixty-three years.

Dr. R. Caton, C.B.E., pro-chancellor and emeritus professor of physiology in the University of Liverpool, and vice-chairman of the Liverpool School of Tropical Medicine, on January 2.

Rev. George Henslow, lately professor of botany to the Royal Horticultural Society, and from 1882 until 1904 president of the Ealing Natural History Society, on December 30, aged ninety years.

Prof. Martin Kirchner, who was prominently associated with the anti-tuberculosis campaign and with the framing of the German laws relating to infectious diseases, on November 11, aged seventy-one years.

Mr. Frank Morey, honorary curator of the Prince Henry of Battenburg Memorial Museum at Carisbrooke Castle, Isle of Wight, and editor and joint author of "The Guide to the Natural History of the Isle of Wight," on December 29, aged sixty-seven years.

Dr. James Murie, formerly assistant-secretary and librarian of the Linnean Society, and naturalist to Consul Petherick's expedition of 1861 to Gondokoro, on December 21, aged ninety-five years.

ERRATUM.—Mr. Edgar R. Waite, the Director of the South Australian Museum, Adelaide, informs us that the details given in the obituary announcement referring to Mr. A. R. McCulloch, which appeared in NATURE of October 24, 1925, p. 620, are incorrect. Mr. McCulloch was zoologist at the Australian Museum, Sydney, where he devoted himself to research on fishes and crustaceans, and his death occurred on August 31, at the age of about thirty-eight years.