

are applicable in Nature, and it is difficult to see why the molecules of such acids occurring in natural fats and containing even numbers of carbon atoms should give rise to molecules present in petroleum which contain both odd and even numbers of carbon atoms. He has analysed many times the liquids obtained from coal by the Bergius method, and has found that their similarity to petroleum is very remote. How can the presence of benzene, toluene, and xylene in certain petroleum be explained? Is it not probable that there are several modes of origin? Light is required on the origin of the vast amounts of methane present in natural gas. What happens to the nitrogen and phosphorus contained in animal organisms? Why is iodine so scarce in petroleum? Mr. Dewhurst said that petroleum found in the Upper Silurian was much earlier than the earliest vegetation, and earlier than the coal found in the Late Devonian. Palæozoic oil was probably formed from any

organic matter available, and there were two distinct types of oilfield: the lignitic, of vegetable origin, which was deposited in areas where the climate was moist, and oilfields of marine animal origin, which are found associated with deposits of salt, gypsum, etc., and were formed in deltas that were cut off later from the mainland.

The discussion generally was suggestive and served its purpose in crystallising thought around important nuclei. If it did not bring nearer a definitive solution of the problem, it at least showed how far we have progressed since the time when a Polish cleric, named Kluk, traced the origin of petroleum to the Garden of Eden, which was so fertile that it must have contained fats; at the Fall this fat partly volatilised and partly sank into the earth, where it was finally transformed into mineral oil by the changes induced by the Flood. Truly, a science progresses by changing its points of view.

Obituary.

DR. HERBERT McLEOD, F.R.S.

DR. HERBERT McLEOD, who died on October 3, was born at Stoke Newington on February 9, 1841, and was the son of Mr. Bentley McLeod. He was educated at Stockwell Grammar School. In 1860 he became lecture assistant to Prof. A. W. Hofmann at the Royal College of Chemistry. Former students of this College never forget the brilliant way in which McLeod carried out the experiments shown at the lectures. Hofmann was so impressed by his ability that he arranged that, in addition to acting as his assistant, McLeod should take the entire College curriculum. He worked with Hofmann on aniline dyes and had a part in the discovery of magenta. McLeod accompanied Hofmann to Berlin. A little later he returned to the Royal College of Chemistry as assistant to Prof. Frankland. At this period he published papers on acetylene, on a new form of aspirator, and, in conjunction with Frankland, a Report to the British Association on the determination of the gases in well-waters.

In 1871 McLeod was appointed professor of experimental science (afterwards chemistry) at the Royal Indian Engineering College, Cooper's Hill. He held this post till 1901. In 1876 he published a description of "An Apparatus for Measurement of Low Pressures of Gases." The McLeod gauge described in this paper is now commonly used. A little later, in 1878, McLeod published, in conjunction with G. S. Clarke (now Lord Sydenham), a paper on "Some Figures exhibiting the Motion of Vibrating Bodies and on a new Method for Determining the Speed of Machines." The method, developed in this and in later papers on the subject, has since led to most important applications. He devised a sunshine recorder and took a keen interest in meteorology, making daily observations at 9 A.M. and 3 P.M. over a period of twenty years.

A visit paid by the late Lord Salisbury to the Royal College of Science led him to invite McLeod to co-operate with him in scientific experiments. Week-end visits to Hatfield House were frequent until Lord Salisbury became Prime Minister. Some account of these experiments was given in the obituary notice of Lord Salisbury which McLeod wrote for the Royal Society.

From 1888 onwards McLeod had been reading proofs of the Royal Society's Catalogue of Scientific Papers. After the death of Mr. George Griffith in May 1902, McLeod undertook the direction of this Catalogue. His chief work upon the Catalogue was the preparation of a subject-index to all scientific papers published between 1800 and 1900. All the index slips necessary for this work were prepared under his direction, and the volumes for mathematics, mechanics, and physics were published. The author Catalogue for 1883-1900 was also under his charge, and he had seen half of this through the press when, in 1915, he was obliged, through ill-health, to give up active work.

McLeod was honorary LL.D. of St. Andrews, was elected a fellow of the Royal Society in 1881, and was president of the Chemical Section of the British Association at Edinburgh in 1892. He became a fellow of the Chemical Society in 1868 and served on its council in 1871-74, and again 1880-84. He was vice-president of the Chemical Society in 1887-90, and again 1901-4. He served on the Council of the Royal Society in 1887-89.

DR. ARTHUR A. RAMBAUT, F.R.S.

ARTHUR ALCOCK RAMBAUT, Radcliffe Observer at Oxford, who died at a nursing home on October 14, after a prolonged illness, was born at Waterford on September 21, 1859, and was a son of the Rev. E. F. Rambaut. At Trinity College, Dublin, he won a first science scholarship in 1880 and took his degree the following year as senior moderator and gold medallist in mathematics and mathematical physics. Having spent some time as senior science master at the Royal School, Armagh (where he had been educated himself), he was in 1882 appointed assistant at the Dublin University Observatory at Dunsink under Sir Robert Ball. He had charge of the transit circle and observed regularly with it for about eight years, the results being published in Parts VI. and VII. of the "Astronomical Observations and Researches made at Dunsink." This work was laid aside when Mr. Isaac Roberts presented the observatory with a 15-inch reflector, with which some of his earliest work in astronomical photography had been made. Rambaut

commenced work with this instrument as soon as the clockwork had been somewhat improved, and a photographic survey was made of the great star cluster in Perseus and published in a paper by Ball and Rambaut in the *Trans. R. Irish Academy*. Soon after, in the autumn of 1892, Ball left for Cambridge and Rambaut was appointed to succeed him as Andrews professor of astronomy and Royal Astronomer of Ireland. During the next five years he continued his photographic work, but under great difficulties and with long interruptions, as the mounting, clockwork, and the dome under which the instrument was housed were all found to be useless and had to be replaced by others.

In 1897 Rambaut left Dunsink to take up the post of Radcliffe Observer at Oxford. Up to that time the Radcliffe Observatory had been devoted almost altogether to meridian work, and the observations made since 1839 had been regularly published. But a vast number of observations made in the years 1774 to 1838 had never been prepared for publication, and Rambaut spent a good deal of time examining them. He showed that they had been carefully made and would be worth printing, but he did not succeed in obtaining the necessary means for reducing and printing these old observations. In the meantime the Radcliffe Trustees decided to procure a first-class instrument for astronomical photography, and a tower was built in the grounds of the observatory, surmounted by a dome 32 feet in diameter. In this was, in 1902, erected a photographic instrument by Sir Howard Grubb, consisting of a photographic refractor of 24 inches aperture and an 18-inch refractor for visual work. In 1904 stellar parallax work was commenced, arranged according to the programme proposed by Kapteyn and in consultation with him, and this work has been continued ever since. A volume of the Radcliffe Observations published about a month ago contains the resulting parallaxes of 2400 stars in addition to full descriptions of the instrument and measuring apparatus.

More than a year ago Rambaut was attacked by illness, from which he never recovered. It was therefore very fortunate that the chief work of his life had been completed. He will be much missed by the many friends his cheerful and kindly disposition had won for him at Oxford. He leaves a widow and three sons to mourn his loss.

J. L. E. D.

DR. J. A. HARKER, O.B.E., F.R.S.

JOHN ALLEN HARKER was born at Alston, Cumberland, on January 23, 1870, and died at Highgate on October 10. He was thus only in his fifty-fourth year at the time of his death. The son of the Rev. John Harker, Congregational minister, he was educated at Stockport Grammar School, thence proceeding to the University of Manchester (Owens College), where he was elected Dalton scholar in chemistry in 1891 and a year later Berkeley fellow in physics, taking his M.Sc. A research course at Tübingen followed, where he took the Ph.D.

Harker spent some little time in France, working with Moissan on electric furnaces, and in collaboration with Chappuis carried out in 1900 a classic comparison of the gas and platinum thermometer scales. About this time the National Physical Laboratory was being brought into being at its first home at Kew Observa-

tory, and Dr. Harker was one of the little band of devoted workers whom Sir Richard Glazebrook gathered round him at the beginning of the great endeavour which resulted in the present institution at Teddington. Harker became chief of the thermometry branch of the Physics Department. His work over a period of the next ten years is largely reflected in a series of valuable papers, mostly on high temperature measurement, for which he received the F.R.S. in 1910. At the International Petroleum Congress at Vienna in 1912 he was the delegate of the British Government. His researches with W. F. Higgins on flash-points of oils enabled him to make valuable contributions to the discussions. In association with the present writer, Dr. Harker subsequently worked on the thermionics of high-temperature furnaces—a subject on which he gave a Friday evening discourse at the Royal Institution. In 1913 he went for several months to Eskdalemuir Observatory as temporary superintendent.

When the War broke out Harker was lent by the National Physical Laboratory to the Inventions Department of the Ministry of Munitions, and became director of the research laboratory and was responsible for the organisation of the work of the Nitrogen Products Committee. In this capacity he visited Canada and the United States in 1918, and was on board the Cunard liner *Andania* when she was torpedoed off northern Ireland. On that occasion a generous act of self-sacrifice undoubtedly aggravated the ill effects of the exposure on his constitution. Harker also went on similar missions to Norway, Sweden, and France. He received the O.B.E. in recognition of his valuable War services.

After the War, Harker returned to Teddington for a brief period before setting up as a consulting engineer with Dr. J. F. Crowley in Westminster. He was a vice-president of the Faraday Society, and had served on the Council of the Physical Society. He was a prominent member of, among others, the Oxygen Committee and the Gas Cylinders Committee of the Research Department.

Harker was a man of great scientific keenness and a highly strung and very likeable personality, who will be greatly missed by his friends. He possessed a great fund of scientific reminiscences. Though never of robust physique, he did not hesitate to make frequent inroads on his reserve of nervous energy. His devotion to his War duties doubtless served to undermine his constitution, and at the end his illness was only short in duration. He married Ada, the daughter of the late Thomas Richardson, of Alston, and had two sons and three daughters. The cremation took place at Golders Green on Saturday, October 13. Among those present were Sir Richard Glazebrook and Sir Robert Robertson. Dr. T. E. Stanton represented the Royal Society and Dr. E. Griffiths and Mr. F. H. Schofield the Director and staff of the National Physical Laboratory.

G. W. C. KAYE.

WE regret to announce the following deaths:

Rev. H. J. Bidder, a curator of the Botanic Garden, Oxford, on October 19, aged seventy-six.

Mr. R. A. P. Rogers, Donegal lecturer in Trinity College, Dublin, on October 17.