

explanation of the presence of amber in the Baltic. Large quantities of this submarine deposit are constantly being washed ashore by the waves and tide, particularly after the heavy storms of November and December.

At the time when the amber trees grew, Europe seems to have existed as a great archipelago. Some of the fairest countries we know were at that time covered by the sea, which spread over the southeast of England, a great part of France, Belgium, Holland, Holstein, northern Germany, Bavaria, Hungary, and Italy. A vast continent existed in the north, however, which, it is believed, embraced not only the present Norway and Sweden and a large part of Russia, but also extended into the Arctic zone beyond Spitzbergen, where it was connected with Greenland and North America. Prof. Boyd Dawkins (*Early Man in Britain*) says that the existence of such a continent is the only satisfactory explanation of the presence in Europe in the Eocene and Miocene ages of the Tertiary Period of plants and animals whose nearest allies belonged to North America. To the south and eastward this continent was joined with Iceland and the British Isles and northwest France.

(To be continued)

SIR WILLIAM CROOKES

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The death of the great physicist, Sir William Crookes, on April 5, 1919, at the ripe old age of eighty-seven years, removes from our midst one of the most noted of British scientists. His long life, spent in the cause of scientific progress, enabled him to accomplish much highly important work in various directions, so that his memory will endure as long as the history of science.

From an autobiographical sketch which he prepared in his own hand-writing and presented to the writer, the following account of his life has been prepared.

He was born in London, June 17, 1832, and became, in 1848, a pupil of the noted chemist, Dr. Hofmann, at the Royal College of Chemistry. A year later, when but seventeen, he won the Ashburton Scholarship, and after studying two years longer,

was appointed junior assistant of Dr. Hofmann and soon thereafter senior assistant. In 1854 he left this position for the Radcliffe Observatory at Oxford, where he superintended the meteorological department. The following year found him professor of chemistry in the Training College at Cambridge. From 1859 dates his long editorship of the *Chemical News*, which he founded in that year. Under his able direction this journal has given perhaps the most complete record of chemical progress of any in the world.

The bent of his mind was rather toward the discovery of new laws governing matter, and new aspects of material evolution, than toward a painstaking systematization of results already attained. That this tendency was shown early in his career is proved by his discovery, in 1861, by chemical and spectroscopic tests on a residue obtained in the manufacture of sulfuric acid, of the new element thallium. Its atomic weight was reported by him to the Royal Society in 1872. His close study of the relation of the elements to one another culminated in 1887 in his theory of their genesis. The results here attained had been rendered possible by his success in producing extreme vacua, thus nearly realizing the ideal conditions of space, so that he could observe the passage of gases into the form of radiant matter. The production of this extreme tenuity of matter was also utilized for the incandescent lamp, and the experiments carried on by Crookes paved the way for the discovery of the Röntgen rays, and led up to the use of the "X-rays" in the investigation of diseased human tissue, as well as to the therapeutic use of the cathode rays. His construction of the radiometer (1875) and of the spinthariscopes (1903), had much to do with the elaboration of the electronic theory of matter.

It may be worth noting that in 1905, when addressing a meeting of the British Association at Kimberley, South Africa, on the phosphorescence of the diamond, Crookes¹ exhibited there, as an altogether exceptional example of this quality, a diamond belonging to the wife of the present writer.

For his investigations and discoveries Crookes was rewarded with many honors. He received the degree of Doctor of Science from Dublin (1904), Oxford (1904), Cape of Good Hope (1905),

¹ "Diamonds," a lecture delivered before the British Association at Kimberley, South Africa, Sept. 5, 1905, London, 1905, p. 37; also "Diamonds," London and New York, 1909, p. 101.

Cambridge (1908), Sheffield (1910) and Durham (1913), and that of LL.D. from Birmingham in 1909. Many medals were awarded him; in 1862, from the International Exhibition, London, for the discovery of thallium; 1875, the Royal Medal of the Royal Society; 1880, Gold Medal and a prize of 3,000 francs from the Académie des Sciences, for discoveries in molecular physics and radiant matter; 1885, a Gold Medal, International Inventions Exhibition, for the invention of the radiometer; 1885, the Ferguson Medal, Soc. of Arts; 1888, the Davy Medal, Royal Soc.; 1889, a Medal of the Exp. Universelle, Paris; 1889, the Albert Medal, Soc. of Arts; 1904, the Copley Medal, Royal Soc.; 1912, the Elliott Cresson Medal, Franklin Institute, Phila., Pa. The highly-prized decoration of the Order of Merit was bestowed on him in 1910. To enumerate his memberships in scientific societies, at home and abroad, would be about equivalent to giving a list of such societies. In 1877-9, 1894-6, and 1907-14, he was member of the Council of the Royal Society, and in 1906 he was elected corresponding member of the Académie des Sciences.

The writer had excellent opportunity to become personally acquainted with Sir William. He was a graceful, courtly gentleman of the old school, kindly in manner, with bright sparkling eyes, intense in a quiet way. I well remember the glee with which he showed us some natural diamond crystals of various colors, and also several diamonds set in brooches belonging to Lady Crookes, the surfaces of which had been entirely altered into graphite by the bombardment of electrons, and altho both Lady Crookes and the collector who owned the unset diamonds objected most strongly to the change operated in the stone, Sir William was delighted to know that he could produce such a change in natural crystals of carbon. In another direction, it is a great satisfaction for me that I was able to present him with a quantity of samarskite, from which he obtained a number of the rare elements with which his name is connected.

Sir William Crookes had an exceptionally keen insight into the mysteries of chemistry and physics. Had it not been for a trip made to the Cape to examine the African gold mines, he might have been the discoverer of what are now named the X-rays, for the discovery of which he had blazed the path.

His two famous lectures on diamonds at the Royal Institution

in 1896, and more particularly the lecture he delivered at Kimberley in 1905—for which the British Association for the Advancement of Science awarded him £ 600 for excess expenses, all of which sum he employed in furthering his experiments,—were so popular that tickets of admission sold freely for £ 5 apiece.

In the last letter I received from him, dated October 19, 1918, the depth of his love for his wife was tenderly and strikingly expressed. He wrote, "Evidently you have not heard of the terrible calamity that fell upon me in 1916, when I lost my dear companion, Lady Crookes, which has eclipsed anything that has happened, or that can happen in the future." They had just celebrated the Diamond Wedding, the sixtieth anniversary of their marriage.

NOTES AND NEWS

Dr. Victor Ziegler has resigned from the position of professor of geology and mineralogy in the Colorado School of Mines.

Dr. Joseph E. Pogue has been appointed curator in the Division of Mineral Technology, U. S. National Museum, and will carry on investigations in industrial economics, with special reference to the mineral industries.

Alexis A. Julien, a member of the geological department of Columbia University, New York City, and author of a number of contributions to mineralogy, especially the genesis of minerals, died on May 7 at the age of 79 years.

The death is also announced of George F. Becker, the geophysicist, on April 20, 1919, in his seventy-third year.

From German journals recently received we learn of the death on September 22, 1918, at the age of 68, of Dr. Friedrich Berwerth, director of the mineralogic-petrographic division of the Museum of Natural History in Vienna, known to mineralogists especially for his work on meteorites.

Rudolf Fuess, proprietor of the firm of crystallographic instrument makers in Steglitz, Berlin, died on November 21, 1917, at the age of 79 years.

Robert Marc, author of many articles on mineralogic subjects, especially on the application of physical-chemical methods to mineralogic problems, was killed in action on May 1, 1918. An account of his life appears in *Centr. Min. Geol.*, 1918, 229-231.

The following new books on mineralogical subjects have appeared during the past year or two, but have not been heretofore noted in our columns:

BAYLEY, W. S. *Descriptive Mineralogy*. 542 pp. Appleton, 1917.

BURDICK, A. J. *Chemical Tests for Minerals*. 93 pp. Gateway Publishing Co., Beaumont, Calif., 1917.