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### *Biographical notices of mineralogists recently deceased.* (Seventh series.)<sup>1</sup>

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Formerly Keeper of Minerals in the British Museum.

[Read March 9, 1939.]

IN the following list of thirty lives, with a range in ages from 32 to 93 years, the average age is 72·7 years. As shown in the table below, there has been a steady increase in the average age throughout the series.

Series.	Period.	Min. Mag. vol.	No. of lives.	Total years lived.	Average age.
—	1876-1919	1-18	210	13,271	63·2
I.	1919-21	19	43	2,738	63·6
II.	1921-24	20	49	3,317	67·7
III.	1924-27	21	42	2,858	68·0
IV.	1927-30	22	39	2,660	68·2
V.	1930-33	23	41	2,899	70·7
VI.	1933-36	24	36	2,556	71·0
VII.	1936-39	25	30	2,180	72·7
			490	32,479	av. 66·3

BOURGEOIS (Léon Zéphirin) [1856-1938], French chemist, was born in Paris on August 26, 1856, and died on March 22, 1938. Since 1880 he was chemical assistant in the Natural History Museum in Paris, retiring with the title of honorary sub-director. Since 1884 he was also assistant in the Polytechnic School. His doctoral thesis in 1883 was on the artificial reproduction of minerals, and in 1884 he contributed a long section (240 pp.) on this subject to Frémy's chemical encyclopaedia. The preparation of many other minerals and allied compounds was described

<sup>1</sup> Series I-VI in *Min. Mag.*, 1921-36, vols. 19-24. An index to earlier notices in vols. 1-18 (1877-1919) is given in vol. 19, pp. 259-262, and to later notices in series I-V in vol. 23, pp. 364-366. A mortality curve is given in vol. 20, p. 253.

in later papers. He was an original member of the French Mineralogical Society in 1878, and since 1896 its treasurer.

A portrait of him appears in P. N. Chirvinsky's book on artificial minerals (Kiev, 1903-6, p. 320).

**BRAUNS** (Reinhard Anton) [1861-1937], German mineralogist, and an Honorary Member of this Society since 1926, died at Bonn on January 28, 1937, after a week of suffering with a fractured skull. He had been



R. BRAUNS (in 1931).

knocked down by a tram-car when crossing the street. He was born at Eiterfeld near Kassel on August 20, 1861, and studied at the University of Marburg, taking his degree there in 1885. During 1883-94 he acted as assistant in the Mineralogical Institute at Marburg, the first year under F. Klocke and afterwards under Max Bauer. In 1894 he was appointed Professor of Mineralogy and Geology in the Technical High School at Karlsruhe; afterwards succeeding A. Streng at the University of Giessen in 1895, J. G. Lehmann at Kiel in 1904, and H. Laspeyres as Professor of Mineralogy and Petrography at Bonn in 1907. Due to retire in 1928, he was then

made Emeritus Professor, but continued to act until 1934, when he was succeeded by K. Chudoba. He was also Honorary Professor in the Agricultural Academy at Poppelsdorf from 1907 to 1929.

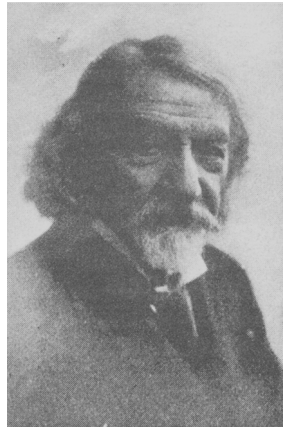
Brauns's first work was on the optical anomalies of crystals, commencing with a paper in 1883, his inaugural dissertation in 1885, and a prize essay in 1891, the last a classical work of 370 pages. Several other useful books were written by him. His small elementary 'Mineralogie', which appeared in 1893 and reached a seventh edition in 1936, had a circulation of more than 100,000 copies.<sup>1</sup> His 'Chemische Mineralogie' (1896) was the first book of the kind and was translated into Russian. 'Das Mineralreich' (1903-4), a large quarto volume written on popular lines and illustrated with 91 plates, many of them in colour, was translated into English ('The Mineral Kingdom', 1908-12), Italian, Russian, and Czech. Other books deal with the minerals and rocks of the Laacher

<sup>1</sup> The number 10,000, stated in *Min. Abstr.* 6-339, was of each edition and reprint.

See district, volcanoes and earthquakes, determination of minerals, and liquid crystals. From 1917 to 1934 he was one of the editors of the *Neues Jahrbuch* and *Centralblatt für Mineralogie*, to which he contributed numerous reviews and abstracts. Many of his original papers dealt with the Laacher See district, where he made a large collection of minerals and rocks which occupy a special room in the University at Bonn. He had paid annual visits to this locality, and his last wish was that his ashes should be scattered in the lake. A branch of mineralogy in which he was specially interested, ever since his first visit to Oberstein in 1883, was that of gemstones, and more particularly those produced by artificial means. On the day of his accident he had finished a note on the secret of zircon. He was one of the founders of the German Mineralogical Society in 1908, its President in 1921–4, and he was elected an honorary member in 1931.

A Festband Reinhard Brauns, *Neues Jahrb. Min., Abt. A*, 1931, Beil.-Bd. 64, contained a biography, bibliography, and portrait. The bibliography has been extended to 191 items by K. Chudoba, *Zentr. Min., Abt. A*, 1937, pp. 97–102, with portrait. Other notices by K. Chudoba, *Deutsche Goldschmiede-Zeitung*, 1937, no. 7, with portrait; and by E. H. Kraus, *Amer. Min.*, 1938, vol. 23, pp. 131–133, with portrait.

CESÀRO (Giuseppe Raimondo Pio) [1849–1939], Emeritus Professor of Crystallography and Mineralogy in the University of Liège, was born at Napoli (Naples) on September 7, 1849, and died at Comblain-au-Pont near Liège on January 20, 1939. His brother, Ernesto Cesàro [1859–1907] was Professor of Mathematics in the University of Napoli. At the age of sixteen he was sent to Liège to learn French and prepare for entry into the mining school of that university, but this not being to his taste and owing to illness and family misfortunes, he was obliged after two years to abandon this and to earn his living by private teaching. After several years, in 1891, he returned to the university, still without diploma, and was placed in charge of the course in crystallography and mineralogy, becoming extraordinary professor in 1895, ordinary professor in 1900, and emerited in 1919, but continuing to teach until



G. CESÀRO (in 1928).

1921, when he was succeeded by his pupil H. Buttgenbach. As honorary director of the mineralogical collection he continued working until the end. During the War he was a refugee in Cambridge, where he worked on the Vesuvian minerals in the collection, and he wrote, in French, three papers on mathematical crystallography for this Magazine (vol. 17). He had been an honorary member of our Society since 1909, and in 1917 was elected one of the very few honorary members of the French Mineralogical Society. He was a corresponding member of the Paris Academy of Sciences since 1930, and was twice President of the Belgian Academy of Sciences. He was naturalized as a Belgian citizen in 1888.

He was the author of numerous papers on the crystallography and optics of various minerals, mostly from Belgian localities, and later from Vesuvius. In the Royal Society's Catalogue of Scientific Papers 117 titles are listed under his name for the years 1883 to 1900. These papers were presented in a pedagogic style often at great length and with masses of working detail—even logarithmic calculations—quite camouflaging any original matter that they might contain. Some were merely recapitulations and criticisms of other authors' papers, as if correcting a pupil's exercise. He described as new minerals cornetite, fraipontite, koninckite, richellite, and valleite; and cesarolite bears his name.

A. Lacroix, *Compt. Rend. Acad. Sci. Paris*, 1939, vol. 208, pp. 397-399.

COLEMAN (Arthur Philemon) [1852-1939], Emeritus Professor of Geology in the University of Toronto, was born at Lachute, Quebec, on April 4, 1852, and died at Toronto on February 27, 1939. He was educated at Victoria University, Cobourg, Ontario (B.A., 1876), and Breslau University (Ph.D., 1881), and on returning from Germany was appointed Professor of Geology and Natural History in his old university at Cobourg in 1882. From there he passed to Toronto, where he was professor from 1901 to 1922, and during 1893-1909 he was also geologist to the Ontario Bureau of Mines. His first paper in 1887 gave a description with chemical analysis of the Iron Creek meteorite from Alberta. His work on the mineral deposits of Canada, especially of nickel in the Sudbury district, included petrographical studies, and the rock names sudburite and heronite are due to him. Much of his work, however, related to glacial geology and geography. He had been President of the Royal Society of Canada, the Canadian Institute, and the Geological Society of America, and was elected a Fellow of the Royal Society of London in 1910.

Award of Penrose medal, *Proc. Geol. Soc. Amer.*, 1937, for 1936, pp. 50-54, with portrait. T. C. Phemister, *Nature*, London, 1939, vol. 143, pp. 547-548.

COLLINS (William Henry) [1878–1937], Director of the Geological Survey of Canada, was born at Chatsworth, Ontario, on October 26, 1878, and died at Ottawa on January 14, 1937. After graduating in geology at the University of Toronto in 1904 he was for a year assistant under T. L. Walker in the department of mineralogy. He then continued his studies at Heidelberg, Chicago, and the University of Wisconsin, and in 1906 joined the Geological Survey of Canada, becoming Director in 1920. Important work was done in several of the mining districts, especially in the Sudbury nickel field. He was President of the Geological Society of America in 1934. The mineral collinsite was named after him.

E. S. Moore, *Canadian Mining and Metallurgical Bulletin*, 1937, no. 298, pp. 47–49, with portrait. A. Knopf, *Amer. Journ. Sci.*, 1937, ser. 5, vol. 33, pp. 397–398. T. T. Quirke, *Proc. Geol. Soc. Amer.*, 1938, for 1937, pp. 157–168, with portrait and bibliography.

THOMAS CROOK (1876–1937), a Vice-President of this Society, was born at Burnley in Lancashire on January 12, 1876. Starting life as a weaver, he attended evening classes at the Burnley Mechanics Institute, and in 1898, on the examination results of the old Science and Art Department, he gained a Royal Exhibition tenable at the Royal College of Science for Ireland. There, in Dublin, he took the associate-ship (A.R.C.Sc.I.) in natural science in 1901, and then became assistant in geology and mineralogy to the late Professor Grenville A. J. Cole. In 1905 he joined the scientific department of the Imperial Institute in London, and for six years (1919–25) was chief of the intelligence and publications section of the new Imperial Mineral Resources Bureau, which was afterwards amalgamated with the Imperial Institute. Since 1928 he was Principal of the Mineral Resources Department of the Imperial Institute.



T. CROOK (in 1922).

While in Dublin he described (with Cole) rocks dredged from the Atlantic; and worked on the mechanical analysis of soils for which he designed a special form of elutriator. Work of the latter kind was continued in London in connexion with the examination of sands and

concentrates collected by the mineral surveys in the colonies; and in addition to papers on the electromagnetic and electrostatic separation of minerals, he contributed to Hatch and Rastall's 'Petrology of the sedimentary rocks' (1913) a useful appendix on 'The systematic examination of loose detrital sediments'. Excellent mineralogical papers on geikielite, carnotite, strüverite, and ankerite in coal, on pleochroism and idiophany in mineral plates, and on the genetic classification of rocks and ore deposits were published in this Magazine. This promising scientific work, up to 1914, became eclipsed by a vast number of well-written articles and abstracts on the occurrence and possible uses of a great variety of mineral products, most of which appeared anonymously in the Bulletin of the Imperial Institute. With the foundation of the Imperial Mineral Resources Bureau in 1919 a still more intensive period followed, and then was issued a long series of useful pamphlets and books dealing with some fifty kinds of minerals and ores, each complete in itself and with several editions bringing statistics up to date. A useful text-book is his 'Economic Mineralogy' (1921), and another book, 'History of the theory of ore deposits' appeared in 1933.

Crook had been a member of this Society since 1907, and he was elected a Vice-President in November 1936. In the same year he had been awarded the O.B.E., and in December the honorary degree of B.Sc. was conferred on him by the National University of Ireland. He died on January 6, 1937, after an abdominal operation, at the early age of very nearly 61.

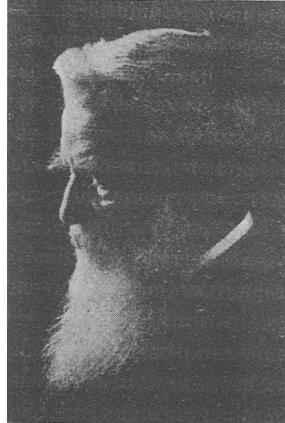
L. J. Spencer, *Nature*, London, 1937, vol. 139, p. 141. *Bull. Imp. Inst. London*, 1937, vol. 35, pp. 67-68. W. F. P. McLintock, *Quart. Journ. Geol. Soc. London*, 1937, vol. 93, pp. xcix-c. S. J. Johnstone, *Proc. Geol. Assoc. London*, 1938, vol. 49, p. 101.

DOLIVO-DOBROVOLSKY (Vadim Vladimirovich), Доливо-Добровольский (Вадим Владимирович) [1904-36], Russian crystallographer, was born at Krasnoye Selo near St. Petersburg on June 20, 1904, and died at Moscow on September 1, 1936. He graduated in 1926 at the Mining Institute in Leningrad, afterwards acting as demonstrator, and in 1927-30 was lecturer in crystallography in the University of Tashkent. Returning to the Mining Institute in Leningrad in 1930, he was first assistant and later (1934-6) professor of crystallography, with an interval (1932-4) as professor in the Leningrad Polytechnic Institute. He did intensive work on mathematical crystallography, publishing his first papers before graduation [M.A. 3-160, 240, 447], while his last papers appeared after

his early death [M.A. 7-167, 241]. Other important papers were published in collaboration with Professor A. K. Boldyrev [M.A. 6-79, 462]. The devising of a new notation and special names for each of the 230 space-groups must have involved some mental strain.

Mém. Soc. Russ. Min., 1936, ser. 2, vol. 65, pp. 466-469, with bibliography and portrait.

DUNN (Edward John) [1844-1937], Australian geologist, was born at Bristol, England, on November 1, 1844, and died at Melbourne, Australia, on April 20, 1937, at the advanced age of 92. He went with his parents to Australia in 1849, and at the age of sixteen he entered the Land Survey Office at Beechworth, Victoria. At that place he found stones enclosing water (enhydros), which were the subject of his first paper in 1870, and he presented specimens of these to the British Museum in 1865. In 1864 he joined the Geological Survey of Victoria, and continued in its service until it was abolished in 1869. In 1871 he went to South Africa, visiting first the newly discovered diamond fields of which he gave accounts before the Geological Society of London. His geological map of South Africa was published in 1875 and 1887, in which he predicted the extension of the gold-bearing reefs in the Transvaal. An interesting lilac-coloured mineral was found in 1883 and specimens sent to the British Museum, but unfortunately wrongly labelled *kämmererite*; it later proved to be *stichtite*, which was not described as a new mineral from Tasmania until 1910 [M.A. 1-47, 339]. He returned to Victoria in 1886, continuing his work as a consulting geologist; and in 1904 he was appointed Director of the Geological Survey of Victoria in succession to J. W. Gregory, from which post he retired in 1912.



E. J. DUNN (in 1927).

Dunn had collected pebbles so long ago as 1856, and he wrote a book 'Pebbles' (Melbourne, 1911) with 250 illustrations. This collection he presented to the British Museum in 1934. Other donations to the British Museum included his collection of australites. He was especially interested in these strange bodies and had propounded a theory to account

for their origin. In addition to numerous reports on mining properties, he published a book on 'Geology of Gold' (London, 1929) and one on 'The Bushman' (London, 1931). His ethnological collection of Bushman objects from South Africa was given to the Pitt-Rivers Museum at Oxford.

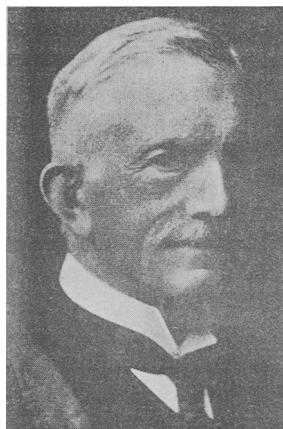
A chronological series of biographical notes and bibliography, compiled by his daughter Miss Lillian G. Dunn, has been published with an appreciation by J. V. Želízko, 'Geologist Edward John Dunn' (Prague, 1937, 19 pp., with portrait). Other notices of his life and work have appeared in *Industrial Australian and Mining Standard*, Melbourne, 1924, vol. 72, p. 634; *ibid.*, 1937, vol. 92, pp. 114–115. *Victorian Naturalist*, 1937, vol. 54, pp. 20–22, with portrait. A. W. Rogers, *Trans. Geol. Soc. South Africa*, 1937, annexure to vol. 39, pp. 88–96, with portrait.

GOSSNER (Balthasar) [1877–1937], German mineralogist, was born at Zaiertshofen, Bavaria, on January 3, 1877, and died at Krumbach, Bavaria, on November 7, 1937, after an operation for gall-stones. Studying at München, Würzburg, and Leipzig, he graduated at München in 1902 under P. Groth, and was assistant there in 1900–4 and 1907–8. During the interval he was engaged on chemical work in the soil laboratory of the Forestry Institute, and from 1908 was a teacher in a high school in München. In 1920 he was appointed Professor of Mineralogy, Crystallography, and Petrography in the University of Tübingen, and in 1925 he succeeded P. Groth as Professor of Mineralogy and Crystallography and Director of the Bavarian State collection of minerals in München. His earlier work consisted of crystallographic measurements of many organic and inorganic compounds made chiefly for the purpose of filling gaps in Groth's 'Chemische Krystallographie' (1906–19). A book on crystal calculation and drawing was issued in 1914. During his time in Tübingen he published a series of papers on the chemical constitution of silicates, regarding them as complex double salts, and the results were collected together in his 'Lehrbuch der Mineralogie' (1924). On his return to München intensive work was done on the silicates by X-ray methods, and a long series of papers was published, often as joint papers with several of his pupils. (Groth had inspired and directed the work of a long succession of pupils, but his name never appeared as joint author.) This work was extended to many other minerals, and analogies were drawn between silicates and phosphates and sulphates, but these relationships and the chemical formulae deduced are perhaps rather forced.

H. Steinmetz, *Sitzungsber. math.-naturwiss. Abt. Bayer. Akad. Wiss. München*, 1938, pp. 82–84. F. Mussgnug, *Zentr. Min., Abt. A*, 1938, pp. 61–62. A portrait appears in the group taken in 1926, *Min. Mag.*, vol. 21, pl. II.



HUTCHINSON (Arthur) [1866–1937], Emeritus Professor of Mineralogy in the University of Cambridge and a past-President (1921–4) of this Society, was born in London on July 6, 1866, and died in Cambridge on December 12, 1937. At the age of nine he lost his father, a London merchant, and his mother then returned to her native village of Culgaith in Cumberland; afterwards moving to Clifton for her son's education at Clifton College, and then to Cambridge. He entered Christ's College with a scholarship in 1884, and in 1888 obtained a first class in Part II of the Natural Sciences Tripos in chemistry, with mineralogy as a subsidiary subject. The following year a new cubic form of bismuth trioxide was discovered, a chemical analysis made of haematite pseudomorphous after pyrite (*Min. Mag.* 8–184), and a crystallographic description given of zinc oxide from a blast-furnace (*Min. Mag.* 9–5). Then at Würzburg under Emil Fischer he took the Ph.D. degree with a thesis on the reduction of aromatic amides, and also studied physics under Röntgen and mineralogy under Sandberger. Later, in 1895, he had also spent a few months in München studying crystallography under Groth.



A. HUTCHINSON (in 1929).

Returning to Cambridge in 1891 he was demonstrator and assistant lecturer in chemistry at Gonville and Caius College. As a student attending his first course of lectures I was impressed by the amount of mineralogical information that he imparted. (It is not fully appreciated by all chemists that all their inorganic materials are obtained from minerals.) In 1892 he was elected to a fellowship of Pembroke College with the duty of supervising the science students. After occupying various other college posts he eventually became Master (1928–37). He was also kept busy on several university boards and syndicates, on some of which he was secretary or chairman. In 1895 he was appointed demonstrator in mineralogy with promotion to the status of university lecturer in 1922. He was a very successful teacher and during this period most of the work of the department fell on him, but with a low salary. Eventually, in 1926, he was appointed to the professorship in which he had only a short run until 1931. His predecessor, W. J. Lewis, had hoped to create

a record in the length of tenure of office of Cambridge professors. Sedgwick and Hughes had sat tight in the geology chair for 99 years (1818–1917). Lewis's ambition to make, with Miller, a century for mineralogy fell short at 94 (1832–1926). This was very hard on Hutchinson, but he bore it philosophically, and in the end he had the satisfaction of being both Professor and Master of his college.

Hutchinson's published papers were relatively few in number, and what he considered worthy of being placed on permanent record was expressed clearly and concisely. He believed in quality rather than quantity. Specially noteworthy is his first mineralogical paper in 1899 (*Min. Mag.* 12–274) describing a new mineral, a silico-stannate of calcium which he named stokesite after Sir George Stokes. This he found in the Cambridge collection as one small crystal, which had been previously passed over as gypsum. Strenuous efforts to find more of this interesting mineral failed, and after a complete determination of the crystallographic, optical, and chemical characters there remains half of this unique crystal carefully preserved in the Cambridge collection. Other papers dealt with the diathermacy and optical characters of stibnite. He designed a universal goniometer and devised several ingenious graphical methods for use in crystallography, including the very useful 'Hutchinson Stereographic Protractor' and a crystallographic slide-rule. Lengenbachite from the Binn valley in Switzerland was analysed by him, and another mineral from this locality has been named hutchinsonite, one of the three known thallium minerals. In the first eleven volumes (1905–16) of the Annual Reports of the Chemical Society he contributed valuable reports on mineralogical chemistry.

He had been a member of this Society since 1890, often acting on the council, and as vice-president, president (1921–4), librarian, and foreign secretary (1931–7). He was elected F.R.S. in 1922 and was a vice-president of the Royal Society in 1933–4. After his retirement from the mastership of Pembroke College on September 30, 1937, he went to America, visiting his son at Yale University; returning ill, he died a few days after reaching his new home in Cambridge, where he had hoped to continue mineralogical work that had been delayed by administrative duties. In spite of his somewhat delicate health he was a great worker, and he had two serious breakdowns through overwork.

*Nature*, London, 1937, vol. 140, p. 1087. C. E. Tilley, *Quart. Journ. Geol. Soc.* London, 1938, vol. 94, pp. cxxiii–cxxiv. Sir William Bragg, *Proc. Roy. Soc. London*, Ser. A, 1938, vol. 169, p. 1. W. C. Smith, *Obituary Notices of Fellows of the Royal Society*, 1939, vol. 2, pp. 483–491, with portrait and bibliography. W. H. Mills, *Journ. Chem. Soc. London*, 1939, pp. 210–213.

JACKSON (*Sir Henry, Baronet*) [1875–1937], formerly a member of our Society (1899–1916), made chemical analyses of several of the lead sulpharsenite minerals from the Binn valley in Switzerland described by R. H. Solly in this Magazine. Born at Heywood in Lancashire on August 22, 1875, he was science lecturer and tutor of Downing College, Cambridge (1901–11), afterwards taking medical degrees at Edinburgh in 1914. After serving as major in the Royal Army Medical Corps during the War, he settled in Wandsworth as a medical practitioner, where he was afterwards Mayor and Member of Parliament. He was a Trustee of the London Passenger Transport Board and Chairman of the Standing Committee on Mineral Transport. He collapsed and died whilst addressing a political meeting in Battersea on February 23, 1937.

KALKOWSKY (Ernst Louis) [1851–1938] was born at Tilsit in East Prussia on September 9, 1851, and died at Dresden on February 13, 1938. A pupil of Zirkel, he graduated at Leipzig in 1874, and was afterwards assistant there. In 1886 he was appointed Professor of Mineralogy and Geology in the University of Jena, and in 1894 at the Technical High School in Dresden, and Director of the State Museum of Mineralogy, Geology, and Prehistory in the Zwinger at Dresden. His petrographical work included an account of silicification of rocks in the Kalahari Desert (1901), and a book 'Elemente der Lithologie' (1886). Mineralogical work was on nephrite occurrences and implements, struvite, tenorite, olivine twins, opalescent quartz, &c. The mineral kalkowskyn was named after him.

Zeits. Deutsch. Geol. Gesell., 1938, vol. 90, p. 173.

KARPINSKY (Alexander Petrovich), Карпинский (Александр Петрович) [1847–1936], Russian geologist, was born, the son of a mining engineer, at Bogoslovsky in the Urals on January 7, 1847 (old style, December 26, 1846), and died near Moscow on July 15, 1936. Graduating in 1866 at the Mining Institute of St. Petersburg, he joined the staff in 1869 and later (1877–96) was Professor of Geology. He had a hand in the foundation of the Russian Geological Committee (= Survey) in 1882, and was its first director, 1885–1903. Elected a member of the Russian Academy of Sciences in 1886, he was president for twenty years (1916–36). He was also president of the Russian Mineralogical Society. He was elected a Foreign Member of the Geological Society of London in 1901 and awarded the Wollaston Medal in 1916. Although best known for his work on stratigraphy, tectonics, and palaeontology, much of his early

work was petrographical, and he was one of the first in Russia to examine thin slices of rocks under the microscope. His first paper, in 1869, was on pyroxenites from the Urals, when he gave the rock-name *muldakaite*. Several of his papers also dealt with ore deposits and economic minerals. He visited London in 1935 on the occasion of the centenary celebrations of the Geological Survey and the opening of the new Geological Museum; and he had been elected honorary president for the XVIIth International Geological Congress which met in Russia in 1937.

A. Borissiak [A. A. Borisyak], *Nature*, London, 1936, vol. 138, p. 495. S. I. Tomkeieff, *Quart. Journ. Geol. Soc. London*, 1937, vol. 93, pp. xciii-xcv. I. P. Tolmachov, *Proc. Geol. Soc. Amer.*, 1937, for 1936, pp. 175-206, with portrait and bibliography. A. P. Gerasimov, *Mém. Soc. Russ. Min.*, 1936, ser. 2, vol. 65, pp. 215-218, with portrait. E. V. Milanovsky, *Bull. Soc. Nat. Moscou*, 1936, Sect. Géol., vol. 14 (8), pp. 475-486, with portrait. A. A. Borisyak, *Bull. Acad. Sci. URSS, Cl. Sci. Mat. Nat., Sér. Géol.*, 1937, pp. 591-598 (Russian), pp. 599-606 (French), with portrait. D. S. Belyankin, 'A. P. Karpinsky's petrographical heritage', *ibid.*, pp. 607-632 (Russian), pp. 632-636 (French). A series of 17 articles by various authors in *Природа* (*Prroda*, Acad. Sci. USSR), 1936, no. 10, pp. 5-63, with portraits. *Problems of Soviet Geology*, 1936, vol. 6, pp. 651-655, with portrait. A separate pamphlet Александр Петрович Карпинский, *Указатель основных работ* [Aleksandr Petrovich Karpinsky, *Indication of principal works*] has been issued by the Academy of Sciences (1936, 33 pp., with portrait and bibliography, price 1 ruble).

KITSON (*Sir* Albert Ernest) [1868-1937], geologist, was born at Manchester on March 21, 1868, and died at Beaconsfield, Buckinghamshire, on March 8, 1937. At the age of one year he was taken to India,

where his father, John Kitson, had a school, and at the age of six he was taken to Australia. In 1886 he entered the Land Department of the Civil Service of Victoria. Attending evening classes at the Melbourne Technical School, he became specially interested in geology and mining, and these subjects were further studied at the University and the School of Mines. In 1899 he was transferred to the Geological Survey of Victoria, on which he later became senior geologist and for a time acting director. The mineral surveys of the colonies instituted by the Colonial Office in connexion with the Imperial Institute afterwards developed



SIR ALBERT KITSON (in 1931).

into geological surveys, and Kitson was one of the first to enter this service. He gave a good account of the utility of such surveys in his presidential address to the geology section of the British Association meeting in South Africa in 1929. In 1906–11 he was in charge of the Mineral Survey of Southern Nigeria, where important deposits of black and brown coal were discovered. In the Gold Coast during 1913–30, first as Principal of the Mineral Survey and afterwards as Director of the Geological Survey, further discoveries of economic importance were made—large deposits of manganese ore in 1914, diamonds in 1919, and huge deposits of high-grade bauxite still to be developed. After his retirement from the Gold Coast survey in 1930 he reported on gold-fields in Kenya Colony. Kitson was a most energetic little man; his constant companion was a small prospecting pan. I well remember a journey with him in 1924 in the mining districts of northern Ontario: at every halt of the train he was out with his little pan in any ditch he could find. In recognition of his useful work in the colonies he was awarded C.B.E. in 1918, C.M.G. in 1922, and a knighthood in 1927. The Geological Society of London awarded him the Wollaston Fund in 1918 and the Lyell Medal in 1927. He became a member of our Society in 1917 and served on the council in 1930–3.

Bull. Imp. Inst. London, 1937, vol. 35, p. 68. W. Cullen, *Nature*, London, 1937, vol. 139, pp. 576–577. E. O. Teale, *Proc. Geol. Assoc. London*, 1938, vol. 49, pp. 104–105. J. F. N. Green, *Quart. Journ. Geol. Soc. London*, 1938, vol. 94, pp. cxxv–cxxvii.

KLOCKMANN (Friedrich Ferdinand Hermann) [1858–1937], German mineralogist, was born on April 12, 1858, at Schwerin in Mecklenburg, and died on November 17, 1937, at Aachen. Studying at the Clausthal Mining Academy and Berlin, he graduated at Rostock in 1881, and was then attached to the Prussian Geological Survey. In 1887 he was appointed Professor of Mineralogy and Geology in the Clausthal Mining Academy, passing in 1899 to the Technical High School at Aachen, where in 1922 he was succeeded by H. Schneiderhöhn and afterwards by P. Ramdohr. Minerals described by him include copper selenides from the Sierra de Umango in Argentina, one of which he named umangite, and another copper selenide from the same locality has since been named klockmannite. His 'Lehrbuch der Mineralogie', first published in 1891–2, passed through several editions, the eleventh by P. Ramdohr in 1936.

LAUNAY (Louis Alphonse Auguste de) [1860–1938], French geologist, was born in Paris on July 19, 1860, and died on June 30, 1938. Educated

at the *École Polytechnique*, in 1884 he entered the *Corps des Mines*, and worked on the geology and petrology of the crystalline rocks near Commeny, his first paper in 1888 being on the minerals from these rocks. This led to his long association with the Geological Survey of France, of which he eventually, in 1930, became director. In 1889 he was appointed professor of applied geology in the *École des Mines* at Paris, a post he held for 46 years. His work was on mineral-veins and ore-deposits, and he wrote many books on geology, mineral and thermal springs, on the gold mines of the Transvaal, diamond mines of the Cape, mineral resources of Africa and of Asia, &c. His 'Traité de métallogénie: gîtes minéraux et métallifères' appeared in three volumes in 1913. Of his forenames (also given as Louis Auguste Alphonse) he used only Louis, and curiously there was a Dutch mineralogist of the same name, Louis de Launay [1740–1805].

*Compt. Rend. Acad. Sci. Paris*, 1938, vol. 207, pp. 5–7.

LE CHATELIER (Henry Louis) [1850–1936], French chemist, was born in Paris on October 8, 1850, and died at Miribel-les-Echelles, Isère, on September 17, 1936. Educated at the *École Polytechnique* and the *École des Mines*, he was first a mining engineer, returning to the *École des Mines* as professor of chemistry in 1877. After a transfer to the *Collège de France*, he succeeded H. Moissan in 1907 at the Sorbonne. He was distinguished as a physical chemist and metallographer. The *Revue de Métallurgie* was founded by him in 1904. His earlier work was on cements, to the study of which he was the first to apply petrographic methods. Quartz and clays were studied in their relation to ceramics, and he wrote a book 'La silice et les silicates' (1914). Native silica-glass has been named lechatelierite.

C. H. Desch, *Obituary Notices of Fellows of the Royal Society*, 1938, vol. 2, pp. 251–259, with portrait; *Journ. Chem. Soc. London*, 1938, pp. 139–150, with portrait. Sir W. J. Pope, *Nature*, London, 1936, vol. 138, pp. 711–712. W. Kleber, *Zentr. Min., Abt. A*, 1937, pp. 57–59. *Compt. Rend. Acad. Sci. Paris*, 1936, vol. 203, pp. 551–552. *Revue de Métallurgie*, special number, January 1937, 160 pp., with portraits and bibliography.

LENK (Hans) [1863–1938], Emeritus Professor of Geology and Mineralogy in the University of Erlangen, was born May 17, 1863, at München and died on February 21, 1938, at Aschau near the Chiemsee in Bavaria. After graduating at Leipzig under Zirkel, two years were spent on a geological expedition to Mexico, and in 1889 he returned to Leipzig as assistant. In 1895 he was appointed to Erlangen, retiring in

1933. His few published papers were petrographical and on the geology of Mexico. The set of forty coloured plates that appeared some thirty years ago in popular books on minerals in English, Italian, and German were prepared under his supervision from specimens in the Erlangen collection.

*Zeits. Deutsch. Geol. Gesell.*, 1938, vol. 90, p. 173.

LOUIS (Henry) [1855–1939], Emeritus Professor of Mining in the University of Durham, was born in London on December 7, 1855, and died at Newcastle-on-Tyne on February 22, 1939. From the City of London School he entered the Royal School of Mines with a Royal Exhibition in 1873, and after taking the associateship in 1876 was assistant for a year to J. Percy. In 1895 he was appointed professor of mining and lecturer in metallurgy in the Durham College of Science (later Armstrong College and now King's College) at Newcastle-on-Tyne, resigning in 1923. Both before and after his term as professor he was a consulting mining and metallurgical engineer, travelling extensively in all parts of the world. He was the senior member of our Society, having been elected in 1879, and he contributed five papers to this Magazine (1884–97) on occurrences of massive garnet in Catalonia, bismutite in Transvaal, ruby and sapphire in Siam, altaite in Burma, and on the paragenesis of gold. His earliest papers, in 1879, gave chemical analyses of louisite (an incompletely determined mineral named after him) and ankerite from Nova Scotia. He was the author of several text-books on mining and metallurgy, including a second edition of J. A. Phillips's 'Ore deposits' (1896) and 'Mineral deposits' (1934). Of his many mining reports, mostly confidential, one on the possibilities of gold-mining in Merionethshire was published officially by the Mines Department in 1930. He had been president of the Iron and Steel Institute, the Institution of Mining Engineers, and the Society of Chemical Industry.

*Journ. Soc. Chem. Indust. London*, 1931, Jubilee no., p. 84, with portrait. *Mining Journ. London*, 1939, vol. 204, p. 136. J. A. S. Ritson, *Nature*, London, 1939, vol. 143, p. 461.

MELLOR (Joseph William) [1869–1938], distinguished for his work on ceramic and refractory materials, was born at Huddersfield and was taken to New Zealand at the age of nine. After graduating at the University of Otago, he went, in 1899, with an 1851 Exhibition Scholarship to the University of Manchester. His connexion with the ceramic industry at Stoke-on-Trent commenced in 1904, and he was the first Principal of the North Staffordshire Technical College. Many papers

were written on the constitution of clays, and he proposed the names clayite and keramite. A monumental work is his 'Comprehensive treatise on theoretical and inorganic chemistry' (16 vols., 1922–37), in which are given a vast number of bibliographical references including many to mineralogical literature. He died on May 24, 1938.

Nature, London, 1938, vol. 142, pp. 281–282. Sir William Bragg, Proc. Roy. Soc. London, Ser. A, 1938, vol. 169, p. 7. A. T. Green, Obituary Notices of Fellows of the Royal Society, 1939, vol. 2, pp. 573–576, with portrait.

PHILLIPS (Alexander Hamilton) [1866–1937], Professor of Mineralogy in Princeton University, New Jersey, was born at Lawrenceville near Princeton on May 15, 1866, and died at Princeton on January 20, 1937. All his life he was closely connected with Princeton. After graduating there in 1887 he was for 49 years on the teaching staff of the university, and in 1911–16 was Mayor of the borough. For some years he was instructor in biology and afterwards in analytical chemistry and mineralogy. He was appointed assistant professor of mineralogy in 1898 and full professor in 1903 (in succession to H. B. Cornwall), retiring in 1936, but acting as curator of minerals until the end. Of his few published papers, the earliest gave rock analyses, and later analyses have been published in posthumous papers. He described gageite as a new mineral, and zinc phosphates from British Columbia. His text-book 'Mineralogy', published in 1912, bears a close resemblance to Miers's well-known volume. He was chairman of the organizing committee for the foundation in 1919 of the Mineralogical Society of America, and its President in 1931. Since 1929 he was a member of our Society.

A. F. Buddington, Proc. Geol. Soc. Amer., 1937, for 1936, pp. 241–248, with portrait and bibliography; Amer. Min., 1937, vol. 22, pp. 1094–1098, with portrait.

SMITH (Bernard) [1881–1936], Director of the Geological Survey and Museum of Great Britain, was born at Grantham on February 13, 1881, and died from cancer at Hove on August 19, 1936, at the early age of 55. It was only in October of the preceding year, shortly after the centenary celebration of the Geological Survey and the opening of the new Museum of Practical Geology, that he had been appointed director in succession to Sir John S. Flett; and a promising career was abruptly and cruelly ended. With a school scholarship from King Edward VI School at Grantham he entered Sidney Sussex College, Cambridge, in 1900, and in 1904 was appointed university demonstrator in geology. He joined the Geological Survey in 1906, and a portion of his work was in connexion



with mineral resources, particularly the iron ores and coal of Cumberland and gypsum deposits. He was elected a member of this Society in March 1936.

W. G. Fearnside, *Obituary Notices of Fellows of the Royal Society*, 1938, vol. 2, pp. 239–249, with portrait. L. J. Wills, *Quart. Journ. Geol. Soc. London*, 1937, vol. 93, pp. cvii–cix. *Nature*, London, 1936, vol. 138, pp. 354–355.

SOLLAS (William Johnson) [1849–1936], Professor of Geology in the University of Oxford, a versatile and brilliant worker not only in all branches of geology, but also in zoology, mineralogy, and anthropology, was born in Birmingham on May 30, 1849, and died in Oxford on October 20, 1936. From the City of London School he passed to the Royal College of Chemistry, where his uncle, William Johnson, was registrar. In 1867 he gained a scholarship at the Royal School of Mines, and in 1870 a scholarship at St. John's College, Cambridge. After six years as Cambridge University extension lecturer in geology he was appointed curator of the Bristol Museum and Library, and in 1880 Professor of Geology and Zoology in University College, Bristol. From 1883 to 1887 he was Professor of Geology and Mineralogy in Trinity College, University of Dublin, and since then, for nearly fifty years, Professor at Oxford. During his time in Dublin he also acted as petrologist to the Geological Survey of Ireland, describing pleochroic haloes in the mica of the Wicklow granite, hybrid rocks from the mixing of granite and gabbro, zinnwaldite from the Mourne Mountains granite, the crystallography of riebeckite, &c. Descriptions of rocks were given in two volumes for the New Zealand survey, and he revised the section mineralogy in the Admiralty Manual of scientific inquiry. The well-known diffusion column of heavy liquids for the determination of specific gravity is due to him, and he published a series of papers on the atomic structure of crystals. He was a member of our Society from 1897 to 1912.

A. S. Woodward and W. W. Watts, *Obituary Notices of Fellows of the Royal Society*, 1938, vol. 2, pp. 265–281, with portrait and bibliography. E. J. Garwood, *Quart. Journ. Geol. Soc. London*, 1937, vol. 93, pp. cix–cxv. J. S. Flett, *Proc. Roy. Soc. Edinburgh*, 1937, vol. 56 (for 1935–6), p. 283; *Proc. Geol. Soc. America*, 1938, for 1937, pp. 203–220, with portrait and bibliography. W. W. Watts, *Nature*, London, 1936, vol. 138, pp. 959–960; *Proc. Geol. Assoc. London*, 1937, vol. 48, pp. 110–112.

ŠTĚRBA-BÖHM (Jan Stanislav) [1874–1938], Professor of inorganic and pharmaceutical Chemistry in the Charles University at Praha, was born at Sezemice in Bohemia on November 9, 1874, and died at Praha on

January 1, 1938. Graduating in pharmacy, he later studied the salts of the rare-earths cerium, scandium (which he extracted from wolframite and thortveitite), and germanium (extracted from argyrodite). He made chemical analyses of delorenzite, ultrabazite, thortveitite, and pisekite, new minerals described by other authors. He also studied the blue coloration of rock-salt.

J. H. Křepelka, *Chemické Listy*, 1938, vol. 32, pp. 41–42. S. Škramovský, *Coll. Czech. Chem. Comm.*, 1938, vol. 10, pp. 1–7, with portrait. *Nature*, London, 1938, vol. 141, p. 149.

STUTZER (Otto) [1881–1936], Professor of fuel-geology in the Mining Academy of Freiberg, Saxony, was born at Bonn on May 20, 1881, and died at Freiberg on September 29, 1936. Studying at Königsberg, München, Tübingen, and Heidelberg, he graduated in 1904, and the next year was assistant to C. R. Beck at Freiberg. For his work in 1905–6 on the iron ores of Swedish Lapland, a long account of which was published in English, he was awarded the Carnegie medal of the Iron and Steel Institute in London. In 1908–9 he travelled in Canada, Alaska, and the United States, visiting Klondike with the Geological Survey of Canada; and in 1911–13 he led a geological expedition to Belgian Congo and Rhodesia. In 1921–26 he acted as geologist to an oil company and the government in Colombia, publishing a long series of papers on the geology and mineralogy of that country, including accounts of the emerald mines and of the problematical Colombian tektites. In addition to many papers on the ore deposits of several countries, he produced a valuable work of reference on non-metallic minerals 'Nicht-Erze' (6 vols., 1911–35), the sixth volume dealing with precious stones. Since his appointment in 1927 as director of the new Institut für Brennstoff-Geologie at Freiberg, his papers dealt with coal and oil. But on his last visit to America, as president of the Society of Economic Geologists, he visited in February 1936 the Meteor Crater in Arizona, and his last three papers, published after his death, were on meteorite craters.

R. Schreiter, *Ber. Freiberg. Geol. Gesell.*, 1937, no. 16, pp. 6–9, with portrait and bibliography. J. T. Singewald, *Bull. Amer. Assoc. Petroleum Geol.*, 1937, vol. 21, pp. 139–141, with portrait.

SUTTON (John Richard) [1864–1937], distinguished as a meteorologist, was born at Wavendon, Buckinghamshire, on January 3, 1864, and died at Binfield, Berkshire, on October 11, 1937. He entered Sidney Sussex College at Cambridge in 1886 and graduated in the mathematical tripos in 1889, afterwards taking the Sc.D. degree in 1908. On leaving

Cambridge he joined the clerical staff of the diamond department of De Beers mines at Kimberley. In 1898 he was placed in charge of the company's new meteorological station at Kenilworth near Kimberley, from which he retired in 1928; and his scientific writings were mainly on meteorological subjects. But he also wrote several papers on diamond, one of which appeared in this Magazine (19–208), and his book 'Diamond, a descriptive treatise' appeared in 1928. These were mostly descriptive of curious formations and freak diamonds in his own collection with speculations as to their origin. He introduced the names framesite and stewartite for forms of impure diamond; and a supposed new mineral from Kimberley proved to be ferrosilicon.

Quart. Journ. Roy. Meteorological Soc., 1938, vol. 64, p. 127. Sidney Sussex College Annual, 1938, p. 18.

TAMMANN (Gustav Heinrich Johann Apollon) [1861–1938], Professor of inorganic Chemistry in the University of Göttingen, was born at Yamburg in Govt. St. Petersburg on May 28 (old style, May 16), 1861, and died at Göttingen on December 17, 1938. He graduated in 1885 at Dorpat = Yuriev (now Tartu in Estonia), where he was assistant and afterwards Professor of Chemistry. In 1903 he was appointed to Göttingen. Since 1904 he had acted as editor of the *Zeitschrift für Anorganische Chemie*, to which journal he contributed, in collaboration with his pupils, a vast number of papers, covering a wide range of physical chemistry. Many of these related to the phenomena of crystallization, the growth and corrosion of crystals, mixed crystals, polymorphism, recrystallization in metals, &c. Two of his books on these subjects have been translated into English.

*Zeits. Anorg. Chem.*, 1939, vol. 240, pp. 113–117, giving an extraordinary dialogue on his admission to the Hall of Spirits. *Nature*, London, 1939, vol. 143, pp. 291–292.

ALFRED EDWIN HOWARD TUTTON (1864–1938), President of our Society in 1912–15, was well known for his refined measurements of crystals and his treatise on crystallography. He was born on August 22, 1864, in the Cheshire portion of Stockport, where his father was a Venetian blind manufacturer. At the age of thirteen he entered the office of the Town Clerk of Stockport, and later attended evening classes at the Stockport Mechanics Institute and also evening lectures on chemistry by Roscoe at Owens College, Manchester. On the results of the examinations of the Science and Art Department he gained in 1883 a Royal Exhibition to the Normal School (later Royal College) of Science at

South Kensington, at a time when Huxley, Frankland, Guthrie, and Judd were the professors. There he gained the prizes in chemistry and physics and the Murchison medal in geology, and was afterwards appointed demonstrator and lecturer in chemistry. During his first research work, with T. E. Thorpe in 1886–92, on the oxides of phosphorus, he was so attracted by the brilliant crystals of these compounds that he sought the aid of H. A. Miers in the British Museum for instruction in crystal measurement.



A. E. H. TUTTON (in 1936).

After measuring crystals of some new organic compounds, he settled down to what may be regarded as his life's work in recording precise measurements for series of isomorphous salts, with the object of determining how far the various constants are affected by the replacement of different chemical elements. The largest of these series investigated in detail was that of the double sulphates and selenates,  $R_2M(SO_4)_2 \cdot 6H_2O$ , where  $R = K, Rb, Cs, Am, Tl$ , and  $M = Mg, Zn, Fe, Ni, Co, Mn, Cu, Cd$ , which came to be known as 'Tutton's salts'. During the period 1893–1928 the various constants of no less than 77 of these salts were determined with the

greatest possible accuracy, so affording valuable data for any future comparisons. He proved over and over again that all the characters of the rubidium salt are intermediate between those of the potassium and caesium salts. In connexion with this work elaborate pieces of apparatus were designed for cutting accurately orientated plates and prisms from crystals, producing a beam of monochromatic light, and for measuring the thermal expansion and elasticity constants of crystals. Since 1895 this enormous amount of careful work was done in his spare time in his private laboratory. In that year he was appointed an Inspector of Technical Schools and stationed successively in the Oxford, London, and Plymouth districts. During the period (1895–1905) at Oxford he was attached to New College, and took the degrees of B.Sc., D.Sc., and M.A. On his retirement from the Board of Education in 1924 his private laboratory was set up in Cambridge, and he lectured on crystallography in the university. A laborious piece of work, completed in 1931, with a modified form of his interferometer, was the evaluation of the Standard Yard in

terms of the wave-lengths of light, which he undertook for the Standards Department of the Board of Trade. He wrote a history of this department and of the national standards which is to be published posthumously. He was an enthusiastic Alpine climber, visiting Switzerland almost every year, and he wrote a book 'Natural history of ice and snow' (1927) besides giving many popular lectures on this subject. Leaving Cambridge in 1931, his fine collection of instruments was transferred to the department of physics and crystallography in Manchester University, and he settled at Dallington in Sussex, where he died on July 14, 1938. For fifty years he was a Fellow of the Chemical Society; he joined the Mineralogical Society in 1891, and was early elected a Fellow of the Royal Society in 1899.

J. R. Partington, *Nature*, London, 1938, vol. 142, pp. 321-322. Sir William Bragg, *Proc. Roy. Soc. London, Ser. A*, 1938, vol. 169, p. 9. Obituary Notices of Fellows of the Royal Society, 1939, vol. 2, pp. 621-626, with portrait.

UNGEMACH (Henri Léon) [1879-1936], French crystallographer, was an Alsatian born at Strasbourg on September 10, 1879, and he died there on June 11, 1936. Educated at Strasbourg and the Polytechnic School at Zürich as a chemical engineer, he graduated at the University of Strassburg (Strasbourg) in 1907, with a thesis on the mineral veins in the Weilerthal (Val de Villé). After travels in Canada, United States, and Mexico, he exploited the silver mines of St. Sylvestre in the Val de Villé and prospected in Morocco, Algeria, Madagascar, and Abyssinia. On these expeditions he collected minerals as well as other natural history materials. After his death the bulk of his mineral collection was acquired by the University of Liège. This collection had supplied him with material for careful goniometric measurements, and he published a series of papers on the crystallography of various minerals, recording many new crystal-forms. Discussing the sequence of face-indices along zones in relation to lattice structure, he proposed new orientations for the crystals of some minerals. In 1932 he was attached to the mineralogical



H. UNGEMACH.

laboratory of the University of Strasbourg, with the duty of rearranging the collection and revising the catalogue of minerals. There he came across a series of sulphate minerals from Chile, amongst which he discovered and described the new species amarillite, lapparentite, leucoglaucite, and paracoquimbite. For the regular intergrowth of dimorphous substances which show some crystallographic relationship, such as coquimbite and paracoquimbite and the different types of carborundum, he introduced the term *syntaxis*; and such substances were called *polytypes*. Two other sulphate minerals from Chile have, since his death, been named *ungemachite* and *clino-ungemachite*. Since 1919 he was the foreign secretary of the French Mineralogical Society.

R. Weil, *Bulletin de l'Association amicale des Ingénieurs-Chimistes diplômés de l'Institut de Chimie de Strasbourg*, June 1937. R. Hocart, *Bull. Soc. Franç. Min.*, 1938, vol. 61, pp. 142–173, with portrait and bibliography.

WALLERANT (Frédéric Félix Auguste) [1858–1936], French crystallographer and an honorary member of this Society since 1913, was born at Trith-Saint-Léger near Valenciennes on July 25, 1858, and died in Paris on July 11, 1936. Educated at the Lycée in Marseille and the École normale supérieure in Paris, he was successively assistant in Marseille, Professor of Geology and Mineralogy in the University of Rennes, and Maître de conférences in geology at the École normale. In 1903 he was appointed Professor of Mineralogy in the University of Paris, in succession to P. G. Hautefeuille, retiring in 1933 with the title of honorary professor. His first papers in 1888 were petrographical, and his doctoral thesis in 1889 was on the geology of Maures and Estérel. He also did some few sheets of the geological map of France. But his main work was on the symmetry and lattice structure of crystals in relation to twinning, regular grouping of crystals, so-called optical anomalies, and the problems of isomorphism and polymorphism. His volume '*Cristallographie*' (1908) dealing with these matters was really the completion of E. Mallard's '*Traité de cristallographie*' (1879–84), the third volume of which was never published. He also gave a '*Traité de minéralogie*' in 1891. He was elected a member of the Paris Academy of Sciences in 1907, and was President of the French Mineralogical Society in 1905 and 1916.

*Compt. Rend. Acad. Sci. Paris*, 1936, vol. 203, pp. 137–139.