Biographical Notice of Sir Lazarus Fletcher (1854–1921).

With Portrait (Plate V) and Bibliography.

By Sir Henry A. Miers, D.Sc., F.R.S.

Vice-Chancellor of the University of Manchester.

LAZARUS Fletcher, the eldest son of Stewart Fletcher, was born in Salford on March 9, 1854, in humble circumstances.

His remarkable talents must have attracted attention in early boyhood when Dr. F. W. Walker, the High Master of Manchester Grammar School, interested himself in the promising lad, and admitted him to the school in September, 1865, at the age of eleven. Here he worked his way up from the First Form to the Classical Sixth, and entered the newly established Mathematical and Physical Sixth in January 1869. Dr. Marshall Watts and Mr. Francis Jones were his teachers in Chemistry, Mr. Angell in Physics, and the Rev. J. Chambers in Mathematics. For a time, while a senior boy, he acted as assistant to Mr. Jones in the Chemical Laboratory. In 1872, while in the Mathematical Sixth, he won the Science and Art Department Gold Medal for Mechanics, and the Bronze Medal for Mathematics: and in the same year he obtained an open Brakenbury Scholarship in Science at Balliol College, Oxford.

He had a brilliant University career, gaining a First Class in Mathematical Moderations (1873) and First Class Honours in both Final Schools, Mathematics in 1875, and Natural Science (Physics) in 1876. He was 'distinguished' in the University Junior Mathematical Scholarship in 1874, and won the Senior Scholarship in 1876. From 1875 to 1877 he was Demonstrator in Physics in the Clarendon Laboratory under Professor R. B. Clifton; in 1877 he gained a Fellowship at University College, and was appointed Millard Lecturer in Physics at Trinity College.

A young man of such brilliant promise had clearly a distinguished career before him; and there was some idea of an opening in Astronomy;

https://doi.org/10.1180/minmag.1921.019.93.04 Published online by Cambridge University Press

but at this juncture, Professor Story-Maskelyne, Keeper of Minerals at the British Museum, who was losing the services of William J. Lewis (subsequently Professor at Cambridge), and was himself contemplating political life, invited Fletcher to be a candidate for an Assistantship in the Mineral Department, with the prospect of succeeding to the Keepership. The following is Fletcher's own account of this episode:

'In the year 1876, when I was Demonstrator in Physics for Professor Clifton at Oxford, I saw a new book lying on his study table: it was Groth's 'Physikalische Krystallographie', then just published. I was so much interested in scanning its pages that I ordered a copy and read it slowly and carefully at my leisure. Professor Clifton mentioned my interest in crystals to his Oxford colleague, that enthusiastic crystallographer, Professor Maskelyne, and I was invited to call at the British Museum: the visit had for result a brief official connexion with him in the Mineral Department, and what was still more important, a long-continued friendship that ended only with his life thirty-four years later.'

Arrangements were at this time being made for the transference of the Natural History collections to the new Museum in South Kensington. Fletcher joined the Museum staff, was Maskelyne's chief assistant from 1878 to 1880, and in June of that year succeeded him as Keeper.

In the same year he vacated his Fellowship at University College on his marriage to Agnes Ward Holme, daughter of the Rev. Thomas Holme, Vicar of Moorside, Oldham.

A month after his promotion to the Keepership, Fletcher was confronted by the task of moving the mineral collections from Bloomsbury to South Kensington. This was a task of considerable magnitude, and occupied the small staff till April, 1881, when the new Museum was opened to the public. Great care was needed in the handling of the vast number of valuable and fragile specimens and their rearrangement in new exhibition cases.

The scientific staff at that time consisted, besides Maskelyne and Fletcher, of Thomas Davies who had been in the Museum since 1862 and had obtained all his scientific training and knowledge in the Department; Dr. Walter Flight the Chemist, who worked in a Laboratory adjoining the Museum; and H. M. Platnauer, who was a member of the staff only from 1880 to 1883.

The rooms at Bloomsbury were singularly ill-adapted for goniometric and microscopic work, no artificial light being allowed except padlocked

lanterns. Fletcher's earliest crystallographic work was begun under these unfavourable conditions. His first measurements on copper, silver, gold, and bismuth, were of the nature of routine work and part of a scheme, initiated by Maskelyne, for a detailed descriptive catalogue of the collections. But at the same time he was engaged upon an important theoretical paper on the Dilatation of Crystals which was published in 1880. This paper introduced the conception of Atropic Lines in a crystal, such that the difference of configuration of the crystal structure between two temperatures may be regarded as due to a simple linear dilatation along these lines; whereas, if the change of configuration is referred to any other lines the dilatation along them must be accompanied by a rotation: and Fletcher was led to the conclusion that Neumann's Thermic Axes (of greatest, least, and mean expansion), unlike the Atropic Lines, do not remain at right angles to one another.

Beckenkamp, working in Groth's Laboratory at Munich, was led by this paper to submit the question to an elaborate experimental investigation in 1881 and 1882; and found in the case of anorthite not only that these axes do not persist as rectangular axes, but also that the axis of least expansion for the interval 20°—80° C. differs by as much as $26\frac{1}{2}°$ from that for the interval 20°—200° C. The unexpected magnitude of this difference led Fletcher to criticize the method by which the results had been calculated, and with his usual thoroughness he set himself to investigate the whole problem afresh, and in particular to replace Neumann's complicated formulae by a simpler mathematical treatment. The progress of the lengthy calculations was interrupted by one of those attacks of illness by which he was occasionally prostrated (he was never strong in constitution, and was obliged to take great care of himself). This gave the present writer the opportunity of collaborating in the task, and thus of becoming intimately acquainted with the accuracy, patience, and completeness which characterized all Fletcher's work.

He intended to supplement this paper by an experimental investigation of the problem, and made a number of preliminary measurements with a goniometer reading to seconds. It was the sort of research which appealed to him; but his time soon became more occupied by what seemed to him a primary duty to the great National Collection, and especially to the unrivalled collection of meteorites.

From the very beginning of his tenure of office he had taken up the task of making the exhibited collections useful to the ordinary visitor

by setting out selected specimens to illustrate the general principles of systematic classification and study, and by providing corresponding guide-books. The first of these was the 'Guide to the Study of Meteorites' (1881); this was followed by the 'Introduction to the Study of Minerals' (1884), and the 'Introduction to the Study of Rocks' (1895). These Guides were masterpieces of lucid and precise exposition; and, together with the carefully selected and well labelled specimens to which they refer, constitute the best possible introduction for the non-scientific student. Fletcher devoted an immense amount of time and thought to these guide-books, and they have been continued in successive editions to the present day.

But he did not abandon crystallographic work, and in 1882 published a paper of considerable importance on 'Twins of copper pyrites', which cleared up difficulties in the previous statements of Haidinger and Naumann, and established the true law of the twin growth. The investigation required extremely accurate measurements, and it was characteristic of him that he withheld publication for two years until he could satisfy himself by further observations that his conclusions were correct.

But the meteorites gradually claimed his attention. Dr. Flight had devoted much of his time to the analysis of meteorites, and his death in 1885 left this important and difficult branch of research unprovided for: no other collection contained such valuable material for investigation. Fletcher then took up the work on his own account, and by degrees more and more of the time that he could spare from official duties was spent in the laboratory upon chemical research. To this, as to everything that he undertook, he brought unbounded patience and accuracy, and a keenly analytical intellect which made him a more exacting critic of his own work than any one else could possibly be.

A typical example of his accuracy is given by the very first of these investigations, that of the iron which had been recently found at Youndegin in Western Australia. In three milligrams of a residue insoluble in aqua regia he established the presence of minute particles of graphitic carbon, cubic in form, and identified them with material previously found by Haidinger in the Arva meteorite, and described by him as pseudomorphous after iron-pyrites. These minute crystals Fletcher named cliftonite after his old Oxford teacher. They are now generally regarded as pseudomorphs after diamond.

Of the care and patience exercised in the analysis of the more difficult meteorites, that of the stone found in 1879 at Makariwa in New Zealand

may be taken as a good example. In this it was necessary to take special precautions on account of the iron rust present. A careful magnetic separation was needed in the first instance; the rust of the unattracted material was reduced in a current of hydrogen; both the reduced metal and the attracted material were treated with mercuric ammonium chloride, and constant precautions were taken throughout the analysis to separate and determine the rusted and unrusted nickel-iron. Having entered upon the task of analysing this partly decomposed stone, he spared no pains to make the analysis as accurate as possible, though the paper concludes with the confession that, with the present knowledge of the microscopic characters of minerals, the examination of a thin section by the petrologist is more complete and expeditious than a chemical analysis.

The same methods were employed in the elaborate analysis of the stone which fell in 1899 near Zomba in Central Africa, and very full details are given of the observations and calculations 'so that future investigators of meteoric stones may know the kind of difficulty which presents itself in such an inquiry, and may form an estimate of the weight to be assigned to the numerical results'. This paper is a model of what such an investigation should be.

In 1908 Fletcher returned to the results of these analyses and that of the Youndegin iron, and came to the conclusion that more could be established by them than he had originally thought possible, and that they really indicated the presence of a nickel-iron constituent Fe_5Ni_3.

His studies of meteorites also led him into the critical examination of the evidence relating to the recorded falls and localities. As conspicuous examples of the searching criticism which he brought to bear upon such evidence may be cited the papers on the supposed showers in the Desert of Atacama, on the so-called Chartres stone, on the Mexican meteorites, on the Namaqualand, Cape of Good Hope, and the Great Fish River meteorites. These papers represent a vast amount of geographical inquiry and research.

Fletcher rarely undertook any investigation without extracting from it important results, so thorough and searching was his work. For example, the examination of ore specimens from Atacama, on which he found the rare minerals percylite and caracolite, led to the discovery of some minute needles which were with the greatest difficulty measurable on the goniometer, and could not be identified with any known mineral. He determined them to be oxychloride of lead, and named the mineral daviesite, after his old colleague Thomas Davies.

Again, a very notable achievement was the discovery of a new mineral which he found to be native zirconia, and named baddeleyite; the whole determination was made upon a single small black fragment which he noticed among some specimens of the recently-discovered geikielite, and the result was a triumph of mineralogical and chemical skill.

But, perhaps, the paper which is to be regarded as the highest achievement of his scientific life is the remarkable memoir on 'The Optical Indicatrix and the Transmission of Light in Crystals' (1891). The results of this work have now become a part of physical crystallography recognized and adopted by all teachers and students of the subject, and are so well known that it is unnecessary to give a detailed description of the paper, which was subsequently issued in book form and also published in Germany.

Fletcher found himself unable to believe that Fresnel's wave-surface was deduced from the properties of an incompressible elastic ether, and came to the conclusion that it was really arrived at by a geometrical generalization of the Huygens ray-surface for uniaxial crystals. He therefore proceeded to develop the optical characters of crystals from the geometrical properties of the ellipsoid which he named the Indicatrix, and this was done in so simple and elegant a manner that his methods have taken their place as the best possible educational treatment of the subject. This paper alone is sufficient evidence that he possessed unrivalled powers of elucidation and exposition which would have placed him in the front rank of teachers if the course of events had led him to continue in academic life.

The Mineralogical Society owes him a great debt. In December, 1883, the Crystallological Society, a small group of men (of whom Fletcher was one) devoted to the strictly scientific aspects of crystallography and mineralogy, became incorporated in the Mineralogical Society. He was President from 1885 to 1888, and for the following twenty-one years acted as its General Secretary. In this office he devoted himself with great zeal to the interests of the Society and did more than any one to make and keep it a Society of high scientific standing.

In 1898 Sir William Flower retired from the Directorship of the Museum, and it was expected by most of Fletcher's friends that he would succeed to the post for which he was eminently fitted by capacity and experience. Professor Ray Lankester was, however, appointed, and eleven years elapsed before Fletcher became Director. When he succeeded to the post at the age of fifty-five he had been much affected

by illness and anxiety (he had suffered from a bad breakdown in 1907), and it is not surprising that he found his official duties as Director more than enough to absorb all his energies, and that little time was left for the prosecution of scientific work. In 1911 an Exhibition of Animals, Plants, and Minerals mentioned in the Bible was arranged under his direction in connexion with the Tercentenary of the Authorized Version; and to the guide-book to this exhibition he himself contributed a valuable essay on Biblical Minerals, a subject in which he had long been much interested (see under dates 1893 and 1915 in the appended bibliography).

As Director, he brought to the duties of the office the same patience, care, and consideration that had characterized his tenure of the Keepership; and when he retired in 1919 he carried with him the affection and respect of all his colleagues, and of all who had been brought into personal relations with him.

In spite of his retiring disposition, Fletcher was, of course, called upon to occupy many official positions, and received many honours. Elected a Fellow of the Royal Society in 1889, he served on the Council from 1895 to 1897, and was Vice-President from 1910 to 1912: he was President of the Geological Section of the British Association at the Oxford meeting in 1894: Vice-President of the Geological Society 1890–92: and of the Physical Society 1895–97. In 1912 he was awarded the Wollaston Medal of the Geological Society. He was a corresponding member of the K. Gesellschaft der Wissenschaften of Göttingen, of the K. bayerische Akademie der Wissenschaften of Munich, and of the New York Academy of Sciences, and Honorary Member of the Sociedad Científica Antonio Alzate of Mexico, Hon. LL.D. of St. Andrews, and Hon. Ph.D. of the University of Berlin. He was knighted in 1916.

But in addition to the work that was published in his own name he did much unrecognized and valuable work on behalf of others. He was largely responsible for the issue of the posthumous volume of Dr. Walter Flight's papers which appeared in 1887 under the title 'A Chapter in the History of Meteorites': and Professor Maskelyne's book 'The Morphology of Crystals' published in 1895 owed much of its final form to Fletcher's advice and assistance, and could scarcely have appeared without his help. A considerable part of the book had been in print for years, but owing to Maskelyne's desire to make it a complete treatise on the physical as well as the geometrical properties of crystals, and in consequence of his political duties, publication was continually delayed till

Fletcher was able to devote himself to the work of seeing it through the Press. The present writer remembers several visits with Fletcher to Maskelyne's charming country seat at Basset Down, and recalls strenuous discussions prolonged into the early hours of the morning over the successive chapters of this book, and the geometrical and physical problems raised by them.

During the latter part of his life his holidays were mostly spent quietly with his wife and daughter at the seaside; but in his younger days he went farther afield, and those with whom he travelled found him a delightful companion. Chief among these expeditions was the visit to Russia with the International Geological Congress in 1897, when Samuel Bewsher and Henry Palin Gurney were his fellow-travellers. They visited together Moscow, Petrograd, Nijhni Novgorod, and Kazan, and voyaged down the Volga; and with this trip was combined a visit to Baron Nordenskiöld at Stockholm. Other noteworthy expeditions were a journey with Professor W. J. Lewis to Switzerland in 1902, followed by a visit, in which he travelled alone, to Italy; and in 1896 he made a journey to the Scotch Highlands and to Lewis and Skye in company with his brother Ernest. His intense enjoyment of all that he saw revealed an innate love of the country and of beautiful scenery. But the claims of his family, and the risk to himself of any excessive fatigue, prevented him from indulging his taste for travel. Mrs. Fletcher was for many years an invalid, and for a considerable time was almost wholly dependent upon the loving care of her daughter and sister; consequently their life at Ealing was a quiet one, and their holidays were usually spent on the English coast.

He was a man of deeply affectionate nature, and his chief happiness was in his family life: duty to the family was always paramount with him, and as a young man, when he could ill afford it, he made himself wholly responsible for the school and university education of a young brother. His simplicity and consideration for others gave him a charm of character which made him beloved by all who knew him. Nothing could exceed his sympathy and loyalty in friendship. He possessed a quiet and kindly humour which helped him to bear troubles with a cheerful spirit, and which would peep out under even the most discouraging circumstances.

He took no pleasure in ceremonies or formalities or in oratorical displays, but when obliged to take part in them he generally relieved the situation by some droll comment. His speeches, which were rare, always revealed this aspect of his character by some quaint and humorous

touch. Those who heard the speech which he made when his portrait was presented to him by a body of subscribers cherish a pleasant recollection of his gravely uttered jests.

Himself the soul of truth and honour, he could not bear dishonesty or lack of straightforwardness on the part of others, and any contact with unscrupulous or underhand action caused him intense pain and distress.

His intellectual powers were of a very high order: he had a habit of critical analysis which caused him to erect and to surmount difficulties that would hardly occur to another critic, and prevented him from relinquishing a problem until he had satisfied himself that he could do no more with it.

In 1916, not long after the death of his first wife, he married her sister Edith, and on his retirement from the Museum in 1919 the family migrated to the remote village of Ravenstonedale among the hills of Westmorland. Here he looked forward to the enjoyment of a quiet life with his wife and daughter. It was his intention to complete a treatise on the classification of minerals, a subject to which he had devoted much thought in his early days at the Natural History Museum, but which he had put aside because he was at that time unable to devise a system that should satisfy his own critical judgement. But the plans which he had formed were not to be fulfilled. His wife and daughter had accompanied him to Grange-over-Sands on the Lancashire coast in the hope that a few weeks spent there would benefit his health: but on the 6th of January, suddenly, and without warning, he died from heart failure. Five days later, he was borne to his last resting-place in the churchyard at Ravenstonedale.

Bibliography of Sir Lazarus Fletcher's Works.

1880 (1) The dilatation of crystals on change of temperature. Philosophical Magazine, ser. 5, vol. 9, pp. 81–96; (reprint), Proceedings of the Crystallological Society, 1882, part 2, pp. 66–84; (translation), Ueber die Ausdehnung der Krystalle durch die Wärme. Zeitschrift für Krystallographie und Mineralogie, vol. 4, pp.5 37–352.

—— (2) Crystallographic notes. [I. Copper; II. Silver; III. Gold; IV. Bismuth; V. Sulphur; VI. Nagyagite; VII. Realgar.] Phil. Mag. vol. 9, pp. 180–191, plate V; Proc. Cryst. Soc., 1882, pt. 2, pp. 85–97, pl. V.

—— (3) [Crystallography of triparatolylene triamine] in W. H. Perkin, Journ. Chem. Soc. Trans., vol. 37, pp. 548–549.

—— (4) [Crystallography of acetylorthoamidobenzoic acid] in P. P. Bedson and A. J. King, Journ. Chem. Soc. Trans., vol. 37, pp. 754–755.

1881 (5) [Crystallography of coumarin derivatives] in W. H. Perkin, Journ. Chem. Soc. Trans., vol. 39, pp. 446–452.
—— (6) Crystallographic notes. [VIII. A twin of zircon.] Phil. Mag., vol. 12, pp. 26–27; Proc. Cryst. Soc., 1882, pt. 2, pp. 97–98; (translation with additions), Ueber einen Zirkonzwilling, Zeits. Kryst. Min., vol. 6, pp. 80–81.
—— (7) A guide to the collection of meteorites in the department of mineralogy in the British Museum (Natural History). 39 pp.; 2nd edit. 1882, 40 pp.
—— (8) Index to the collection of minerals in the British Museum (Natural History). 23 pp.; another edition, The student's index to the collection of minerals. 1885, 27 pp.; 25th edit. 1914, 33 pp.
1882 (9) Crystallographic notes. [IX. Skutterudite.] Phil. Mag., vol. 13, pp. 474–480, plate X; Proc. Cryst. Soc., 1882, pt. 2, pp. 98–105, pl. VI; (translation), Ueber Skutterudit. Zeits. Kryst. Min., vol. 7, pp. 20–25.
—— (10) Crystallographic notes. [X. On twins of copper pyrites.] Phil. Mag., vol. 14, pp. 276–291, pl. VI; Proc. Cryst. Soc., pt. 2, pp. 114–131, pl. VIII; (translation), Ueber die Zwillingsverwachsungen des Kupferkieses, Zeits. Kryst. Min., vol. 7, pp. 321–336, pl. VI.
1883 (11) The dilatation of crystals on change of temperature. (Second paper.) Phil. Mag., vol. 16, pp. 275–300, 344–350, 412–429, pl. III; (translation), Ueber die Ausdehnung der Krystalle durch die Wärme. II. Abhandlung. Zeits. Kryst. Min., vol. 8, pp. 455–503, pl. X.
1884 (12) A guide to the mineral gallery of the British Museum (Natural History), with an introduction to the study of minerals. 120 pp.; An introduction to the study of minerals, with a guide to the mineral gallery. 3rd edit., 1887, 120 pp.; 15th edit., 1918, 123 pp.
1886 (13) An introduction to the study of meteorites, with a list of meteorites represented in the collection. British Museum (Natural History), 77 pp.; 11 edit., 1914, 125 pp.
1887 (14) Cubic crystals of graphitic carbon. Nature, vol. 36, pp. 304–305.
—— (15) On a meteoric iron found in 1884 in the sub-district of Youndegin, Western Australia, and containing cliftonite, a cubic form of graphitic carbon. Mineralogical Magazine, vol. 7, pp. 121–130; (translation of a part), Cliftonit, eine reguläre Form des Graphit-Kohlenstoff. Zeits. Kryst. Min., vol. 13, pp. 383–384.
—— (16) (With H. A. Miers) Supplementary note on felspar from Kilima-njaro. Min. Mag., vol. 7, pp. 131–132; (translation), Ueber Feldspath von Kilima-njaro, Zeits. Kryst. Min., vol. 13, pp. 384–386.
—— (17) On a meteoric iron seen to fall in the district of Nejed, central Arabia, in the year 1863. Min. Mag., vol. 7, pp. 179–182.
—— (18) On a meteoric iron (containing crystallised chromite) found about the year 1880 in Greenbrier County, West Virginia, U.S.A. Min. Mag., vol. 7, pp. 183–186.
—— (19) On crystals of cuprite and cerussite resulting from the slow alteration of buried coins. Min. Mag., vol. 7, pp. 187–188.
—— (20) On the crystalline form of creatine. Min. Mag., vol. 7, pp. 189–190.
—— (21) [W. Flight, A chapter in the history of meteorites, London, 1887, edited, with a preface and an obituary notice of the author, by L. Fletcher and H. Woodward].

1889 (22) A guide to the mineral gallery, British Museum (Natural History). 33 pp. ; 12 edit., 1914, 32 pp.
—— (23) The renaissance of British mineralogy. [Presidential address.] Min. Mag., vol. 8, pp. 138–145.
—— (24) On the supposed fall of a meteoric stone at Chartres, Eure-et-Loir, France, in September 1810. Min. Mag., vol. 8, pp. 146–148.
—— (25) On crystals of percylite, caracolite, and an oxychloride of lead (daviesite), from Mina Beatriz, Sierra Gorda, Atacama, South America. Min. Mag., vol. 8, pp. 171–180, pl. VIII.
—— (26) On the meteorites which have been found in the desert of Atacama and its neighbourhood. Min. Mag., vol. 8, pp. 223–264, pl. X.
—— (27) On the supposed enormous showers of meteorites in the desert of Atacama. Nature, vol. 41, pp. 108–109.
1890 (28) The meteoric iron of Tucson. Min. Mag., vol. 9, pp. 16–36.
—— (29) On the Mexican meteorites, with especial regard to the supposed occurrence of wide-spread meteoritic showers. Min. Mag., vol. 9, pp. 91–178, 2 pls. ; (translation), Los meteoritos mexicanos y las lluvias meteóricas. La Naturaleza, Mexico, 1898, ser. 2, vol. 3, pp. 57–124, 1 pl.
1891 (30) The supposed occurrence of wide-spread meteoritic showers. Nature, vol. 43, pp. 295–298.
—— (31) The Optical Indicatrix and the transmission of light in crystals. Min. Mag., vol. 9, pp. 278–388. Also issued in book form with some additional matter, London, 1892, xii + 112 pp. German translation by H. Ambronn and W. König. Die optische Indicatrix. Eine geometrische Darstellung der Lichtbewegung in Krystallen. Leipzig, 1893, ix + 69 pp.
1892 (32) Geikielite and baddeleyite, two new mineral species. Nature, vol. 46, pp. 620–621.
1893 (33) The occurrence of native zirconia (baddeleyite). Nature, vol. 47, pp. 283–284.
—— (34) On baddeleyite (native zirconia), a new mineral, from Rakwana, Ceylon. Min. Mag., vol. 10, pp. 148–160.
—— (35) Obituary. Thomas Davies, F.G.S. Min. Mag., vol. 10, pp. 161–164 ; Nature, vol. 47, p. 371.
—— (36) The Williams collection of minerals. Nature, vol. 48, pp. 357–358.
—— (37) Bemerkungen zu dem Verzeichnisse der Meteoriten-Sammlung der Universität Göttingen. Nachrichten Gesell. Wiss. Göttingen, 1893, pp. 340–341.
—— (38) [Article] Precious stones of the Bible. Helps to the study of the Bible. Oxford, 1893, pp. 270–275.
1894 (39) [Recent progress in mineralogy and crystallography.] Presidential address, Section C.—Geology, British Association, 64th (Oxford) meeting, Report, pp. 631–643 ; (reprint) Nature, vol. 50, pp. 353–359.
—— (40) Chemical analysis of the meteoric stone found at Makariwa, near Ivercargill, New Zealand, in the year 1879. Min. Mag., vol. 10, pp. 287–325 ; (abstract), Proc. Roy. Soc., vol. 55, pp. 142–146.
1895 (41) An introduction to the study of rocks [and guide to the museum collection]. British Museum (Natural History), iii + 118 pp. ; 5th edit., 1918, viii + 155 pp.
1898 (42) [Obituary of] Alfred Louis Olivier Le Grand Des Cloizeaux. Proc. Roy. Soc., vol. 63, pp. xxv–xxviii.

1899 (43) On a mass of meteoric iron from the neighbourhood of Caperr, Rio Senguerr, Patagonia. Min. Mag., vol. 12, pp. 167–170.

—— (44) On the cliftonite and tænite of the meteoric iron found in 1884 in the sub-district of Youndegin, Western Australia. Min. Mag., vol. 12, pp. 171–174.

1901 (45) On the meteoric stones which fell near Zomba, British Central Africa, on January 25th, 1899; with notes on the chemical analysis of such bodies. Min. Mag., vol. 13, pp. 1–37, 1 pl.; (reprint), Chem. News, vol. 84, pp. 4–6, . . . 103–104.

—— (46) Instructions for collecting rocks and minerals. The Antarctic Manual, London (Roy. Geogr. Soc.), pp. 202–204.

1902 (47) Fall of a meteoric stone near Crumlin (Co. Antrim) September 13. Nature, vol. 66, pp. 577–579. Another account, reprinted from the 'Globe' newspaper, in Geol. Mag., 1902, pp. 521–522.

—— (48) (With G. T. Prior) Rocks and mineral specimens from the Uganda Protectorate. Sir Harry Johnston, The Uganda Protectorate, London, vol. 1, pp. 304–308.

—— (49) Notes on collecting minerals. Handbook of instructions for collectors, issued by the British Museum (Natural History), pp. 132–134; 4th edit., 1913.

1904 (50) On various masses of meteoric iron reported to have been found in Great Namaqualand and the adjacent region. Min. Mag., vol. 14, pp. 28–36.

—— (51) Historical note relative to the meteoritic fragments labelled 'Cape of Good Hope' and 'Great Fish River'. Min. Mag., vol. 14, pp. 37–40.

—— (52) Note relative to the history of the mass of meteoric iron brought by Dr. F. P. Moreno from Caperr, Patagonia. Min. Mag., vol. 14, pp. 41–42.

—— (53) [Obituary of] Henry Palin Gurney (1847–1904). Min. Mag., vol. 14, pp. 61–64; Geol. Mag., 1905, pp. 93–96.

—— (54) The Department of Minerals. The History of the Collections contained in the Natural History Departments of the British Museum, vol. 1, pp. 348–442.

1906 (55) A search for a buried meteorite. Nature, vol. 74, pp. 490–492.

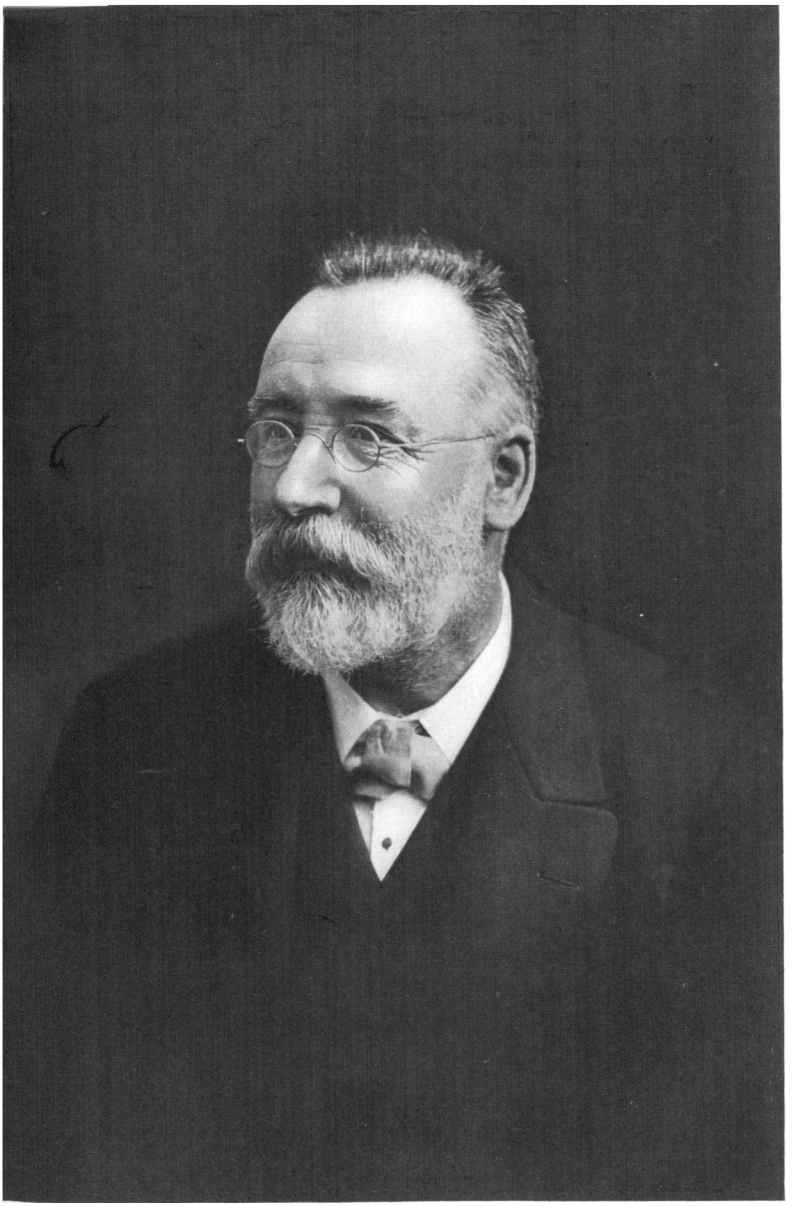
1908 (56) On the possible existence of a nickel-iron constituent (Fe_5Ni_3) in both the meteoric iron of Youndegin and the meteoric stone of Zomba. Min. Mag., vol. 15, pp. 147–152.

1911 (57) [Essay on Biblical Minerals in] Guide to the exhibition of animals, plants, and minerals mentioned in the Bible. Special guide No. 5, British Museum (Natural History), vii + 74 pp.; 3rd edit., 1913, vii + 78 pp.

—— (58) [Article] Meteorite. Encyclopaedia Britannica, 11 edit., vol. 18, pp. 262–264.

1915 (59) [Article] Precious stones. International Standard Bible Encyclopaedia, Chicago, 1915, vol. 5, pp. 2856–2862.

1921 (60) The meteoric stone seen to fall near Crumlin, Co. Antrim, on September 13, 1902. With chemical analysis by G. T. Prior. Min. Mag., vol. 19, pp. 149–162, pl. III.



Lazarus Fletcher

Sir Lazarus Fletcher (1854–1921).

(From a photograph, by Lafayette, taken in 1912.)

https://doi.org/10.1180/minmag.1921.019.93.04 Published online by Cambridge University Press