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AND

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(Instituted February 3, 1876.)

JUBILEE CELEBRATION

(September, 1926.)

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A COMMITTEE consisting of the President, Treasurer, General Secretary, Foreign Secretary, Editor, Prof. A. Hutchinson, Sir Henry A. Miers, Mr. W. Campbell Smith, Dr. G. F. Herbert Smith, and Dr. H. H. Thomas was appointed by the Council of the Society on November 3, 1925, to consider how the Jubilee of the Society should be celebrated. This Committee, to which Dr. A. Brammall and Mr. Arthur Russell were afterwards added, held several meetings. The General Secretary (Dr. G. T. Prior) had charge of the general arrangements, the Treasurer (Mr. F. N. Ashcroft) of the financial arrangements, the housing

of the official guests, and the Dinner, Mr. W. Campbell Smith of the *Conversazione*, Prof. A. Hutchinson of the Northern Excursion, and Mr. Arthur Russell of the Southern Excursion. The special thanks of the Council and of the Society are due to these gentlemen for their work, which resulted in an unqualified success.

An informal dinner was held in London on February 2, 1926, the last day of the fiftieth year of the Society's existence. Seventeen members and two visitors were present. During this dinner the proposed arrangements for the celebration in September were discussed informally, and a guarantee fund was opened to meet the general expenses and for the entertainment of guests. The thanks of the Society are due to those who contributed so generously to this fund and so enabled the celebrations to be carried out.

A preliminary notice was circulated in January, 1926, and a provisional programme in April. The final programme, issued in September, is reprinted below.

During the celebrations in London the majority of the delegates and guests were entertained by the Society at Bailey's Hotel, Gloucester Road, South Kensington; and others were provided for by the private hospitality of the President and Mr. Ashcroft. The visitors to Cambridge were entertained in Pembroke College by Professor Hutchinson.

Programme.

Head-quarters: Mineral Department, British Museum
(Natural History), South Kensington, London, S.W. 7.

General Secretary: Dr. G. T. PRIOR, F.R.S.

September 12-18.—Excursion to Devon and Cornwall: Director, Mr. Arthur Russell [p. 124].

Tuesday, September 21.—11 a.m. Informal meeting in the Mineral Gallery, British Museum (Natural History), South Kensington, S.W. 7.

12 noon. Imperial College of Science (Geological Department), Prince Consort Road, South Kensington, S.W. 7. [p. 104].

2.30 p.m. Royal Institution, 21 Albemarle Street, W. 1. Sir William Bragg's laboratories [p. 105].

3.30 p.m. Museum of Practical Geology, Jernyn Street, S.W. 1 [p. 105].

8.30 p.m. *Conversazione* (by kind permission) in the Rooms of the Geological Society of London, Burlington House, Piccadilly, W. 1.

Reception by the President of the Mineralogical Society, Prof. W. W. Watts, F.R.S., 8.30-9.0 p.m. President's Address at 9.15 p.m. [p. 106].
Exhibition of apparatus and specimens [p. 101].

Wednesday, September 22.—11 a.m. to 1 p.m. University College, Gower Street, W.C. 1. The Johnston-Lavis collection of Vesuvian minerals and rocks [p. 105].

Exhibition of apparatus and specimens in the Rooms of the Geological Society of London, Burlington House, W. 1.

2 p.m. Imperial Institute, South Kensington, S.W. 7. Mineral Collections from British Dominions and Colonies. Reception by Sir Richard Redmayne, K.C.B. [p. 105].

3 p.m. British Museum (Natural History), South Kensington, S.W. 7. Reception on the Grand Staircase by the Trustees and the Keepers of Geology and Mineralogy. Visit to the Mineral Gallery. Photograph taken of the party in the Museum Forecourt at 4.15 p.m. Tea provided at 4.30 p.m. in the Board Room [p. 106].

7.30 for 7.45. Dinner at the Connaught Rooms, Great Queen Street, W.C. 2 [p. 103].

September 23-30.—Excursion to North of England: Director, Prof. A. Hutchinson, F.R.S. [p. 128].

October 1.—Visit of Northern Excursion Party to Cambridge: University Mineralogical Department and Dr. Tutton's Laboratory [p. 133].

Reception and Conversazione.

The Conversazione was held on the evening of Tuesday, September 21, in the rooms of the Geological Society of London in Burlington House, by kind permission of the Council of that Society, the arrangements being under the direction of Mr. W. Campbell Smith. The company, numbering 130, was received by the President and the General Secretary, and the President afterwards delivered an address in the Meeting Room [p. 106]. Refreshments were provided in the Council Room and the following exhibits of apparatus and specimens were displayed in the Upper Library.

1. *Professor W. L. Bragg, F.R.S., The University, Manchester.*—

The Crystal-structures of some well-known Minerals. The exhibit showed the structures of a number of minerals which have been analysed by means of X-rays. The models were constructed to scale—in most of them one centimetre corresponding to an Ångström unit (10^{-8} cm.) in the actual crystal-structure. Interesting features of some of the minerals were described more fully in the labels which were attached to the models.

2. *The Director of H.M. Geological Survey of Great Britain.*—

Polarizing Microscope with rotating nicols, 'Dick' pattern. Designed in its earlier form by the late Mr. Allan B. Dick [Min. Mag., 1889, 1910].

Stage Goniometer, for use with 'Dick' Petrological Microscope. Designed in its earlier form by Sir Henry A. Miers [1892].

Universal Goniometer. This apparatus, designed by Professor Arthur Hutchinson, can be used: (1) as a goniometer for the measurement of crystal-angles; (2) for the measurement of optic axial angles; (3) as a Kohlrausch total-reflectometer; (4) for the measurement of refractive indices by the prism method [Min. Mag., 1911].

Crystal Grinding Apparatus, for the grinding and polishing of accurately orientated crystal plates or prisms. Designed and described by Dr. H. H. Thomas and Mr. W. Campbell Smith [Min. Mag., 1914].

Tank Refractometer, for determining the refractive indices of liquids. Designed by Dr. H. H. Thomas and Mr. A. F. Hallimond [Min. Mag., 1920].

Magnetic Separator, electrically driven. Designed by Mr. A. F. Hallimond.

3. *Professor H. L. Bowman, Mineralogical Dept., University Museum, Oxford.*—

Early Apparatus for the Examination of Crystals under the Microscope.

Dr. H. B. Leeson's Double Refracting Goniometer and Adjusting Stage.

The Goniometer is intended for the measurement under the microscope of the plane angles of a crystal face. It consists of a double-image prism of calcite or quartz mounted in a rotating eyepiece and provided with a graduated circle.

The Adjusting Stage fixed to the stage of a microscope provides for the rotation of the crystal in three planes at right angles. It was intended primarily for supporting a crystal so that one of its faces could be set at right angles to the axis of the microscope, for measurement with the double refracting goniometer. It could also be used for determining the inclination of an optic axis to a crystal face. This apparatus may thus be regarded as an early form of the universal stage. It was designed and described by Dr. H. B. Leeson in 1848 [Mem. Proc. Chem. Soc., 1848].

Small Adjusting Stage for inclining sections at small angles to the stage of a microscope. Probably made for Professor N. Story-Maskelyne. This apparatus, which is arranged to take ordinary microscope slides, is capable of inclination about two axes at right angles to each other.

Crystallonome, designed by Dr. H. B. Leeson. An instrument for studying the laws and properties of crystalline form, allowing for variation in position and length of wires representing crystal axes. It could be used also with the compass points for the solution of various problems of spherical trigonometry.

4. *Professor Arthur Hutchinson, F.R.S., Mineralogical Laboratory, Cambridge.*—

Total Reflectometer, designed by William Hyde Wollaston about 1802.

Two-circle Goniometer, used by Professor W. H. Miller in 1874. A small Wollaston goniometer was fixed in an upright position on a graduated horizontal circle of a large goniometer so that the crystal lay at the intersection of their axes. This apparatus was devised to measure the facets on a small bead of platinum.

A Protractor for use in constructing stereographic and gnomonic projections of the sphere. Designed and described by Professor Hutchinson in 1908. In a later paper it was explained how the protractor could be used for the interpretation of Laue crystal photographs [Min. Mag., 1908, 1926].

A Stereographic Net 12 inches in diameter and graduated to degrees.

Alignment Charts for use in crystal-optics; intended to facilitate the solution of problems involving such equations as:

$$n = \frac{\sin i}{\sin r}; \quad n = \sin \frac{A+D}{2} / \sin \frac{A}{2}; \quad n' = n \sin \theta \quad [\text{Min. Mag., 1925}].$$

Chart for the graphical correction of specific gravities [Min. Mag., 1924].

5. *Dr. G. F. Herbert Smith.*—

The 'Herbert Smith' Refractometer, particularly for the discrimination of faceted gem stones. Designed by Dr. Herbert Smith in 1907 [Min. Mag., 1905, 1907].

A Students' Goniometer, described and designed by Dr. Herbert Smith in 1919 [Min. Mag., 1919].

Protractors: (a) for stereograms, in particular for the drawing of circular arcs; (b) for graphs in general and gnomonic projections in particular [Min. Mag., 1903, 1913].

6. *Mr. Bristow J. Tully.*—

The 'Tully' Refractometer, for determining the refractive indices of gem stones.

Verneuil's Inverted Blowpipe, for the manufacture of crystallized corundum, together with a series of 'boules' and cut gems produced by artificial means.

A Series of Precious Stones illustrating variations of colour found in each species.

7. *Mr. J. C. Taylor.*—

A Selection of Crystals of Quartz, Calcite, &c., illustrating various phenomena of crystal-growth.

8. *Mr. F. N. Ashcroft.*—

A Selection of Minerals from Swiss localities.

9. *Professor A. Liversidge, LL.D., F.R.S.*—

Sections of Gold Nuggets to show their crystallized structure.

10. *Colonel Sir Henry G. Lyons, F.R.S.,* Director of the Science Museum, London.—

Minute-book of the British Mineralogical Society (1799-1806) [p. 109].

Dinner.

The Dinner was held in The Connaught Rooms, Great Queen Street, London, at 7.45 p.m. on Wednesday, September 22. Seventy Members, Delegates, and Guests were present. The Menu card showed a portrait,

here reproduced [p. 112], of Henry Clifton Sorby, the first President of the Society. The toasts were :

The King.

Heads of Foreign States.

The Mineralogical Society. Proposed by Dr. Harry von Eckermann (Sweden) and Prof. Paul Niggli (Switzerland), and responded to by the President.

Academies and Scientific Societies. Proposed by Sir Henry A. Miers, F.R.S., and responded to by Prof. F. W. Clarke (U.S.A.) and Prof. J. L. H. Borgström (Finland).

The Delegates and Guests. Proposed by Sir Thomas H. Holland, K.C.S.I., K.C.I.E., F.R.S., and responded to by Prof. F. Rinne (Germany) and Dr. H. Ungemach (France).

Finally, Sir John S. Flett, K.B.E., F.R.S., proposed a vote of thanks to the President, who in his reply referred to the work of the Entertainment Committee. The interesting and inspiring speeches were in all cases delivered in English.

Addresses from the Royal Geological Society of Cornwall and the Polish Geological Society were read by the delegates (Mr. E. H. Davison and Prof. S. Krentz) of those Societies, and the President mentioned various letters and telegrams of congratulation [p. 134].

Greetings were dispatched by telegram to the older Honorary Members—Prof. G. Tschermak, Prof. P. Groth, Prof. E. S. Dana, and Prof. Victor Goldschmidt—and to some of the early Ordinary Members of the Society who were unable to be present—Mr. Benedict Kitto, Prof. A. Liversidge, Dr. Richard Pearce, and Mr. C. J. Woodward.

Visits to Museums and Institutions.

Imperial College of Science and Technology (Royal School of Mines).—The party was received by the President of the Society, who is Professor of Geology in the College. An instructive demonstration was first given by Prof. H. C. H. Carpenter, F.R.S., in the lecture theatre of the Metallurgical Department on large single crystals of aluminium, copper, silver, and gold. The party was then conducted through the Geological Department by Prof. W. W. Watts, Prof. C. G. Cullis, Dr. J. W. Evans, Dr. A. Brammall, and Mr. H. B. Milner. Several interesting exhibits illustrating teaching and research had been set out for the occasion. A number of the visitors were afterwards entertained to luncheon by Prof. Watts in the College Union.

The Royal Institution of Great Britain.—A fine series of models and apparatus illustrating recent X-ray work on crystals was displayed in the Library. These were explained by Sir William Bragg, K.B.E., F.R.S., and members of his staff—Dr. G. Shearer, Dr. A. Müller, Mr. W. T. Astbury, Dr. W. A. Caspari, Dr. I. E. Knaggs, Miss K. Yardley, and others. Small groups were conducted through the rooms and workshops of the Davy-Faraday Laboratory. Items of historical interest connected with Count Rumford, Davy, Faraday, Tyndall, and Dewar were pointed out.

Museum of Practical Geology.—The party was received by Sir John S. Flett, K.B.E., F.R.S., Director of the Geological Survey of Great Britain and of the Museum. Groups were shown round by members of the staff—Mr. J. Allen Howe, Dr. H. H. Thomas, Dr. W. F. P. McLintock, and Mr. A. F. Hallimond. A series of special exhibits had been arranged for the occasion by Mr. Hallimond. Tea was afterwards kindly provided by Sir John Flett in the Library.

University College.—The visitors were received by Sir Gregory Foster, Provost of the College, and the Johnston-Lavis collection of Vesuvian minerals and rocks was demonstrated by Mr. K. W. Earle. The Collection was formed during many years by the late Dr. Henry James Johnston-Lavis (1856-1914), formerly Professor of Vulcanology in the University of Naples. It was bequeathed by him to the University of London, for the purpose of forming a geophysical section of the geological museum of University College. The collection is temporarily housed at 134 Gower Street, close to University College, where it was formally opened in 1925.

Imperial Institute.—The party was received in the Conference Room by the Director, Lieutenant-General Sir William Furse, K.C.B., and by Sir Richard Redmayne, K.C.B., Chairman of the Advisory Council on Mineral Resources. The aims and scope of the newly reorganized Institute, especially of the Mineral Resources Department, were explained. Various minerals of economic importance were displayed, and the mineral publications of the Institute were freely given to members of the party. The new arrangement of the Exhibition Galleries was explained in the New Zealand Court, and Mr. T. Crook took a portion of the party a rapid tour through some of the other galleries.

British Museum (Natural History).—On the morning of September 21 in the Mineral Gallery there was an informal gathering at which the Delegates, Guests, and Members became known to one another. Names were signed in the Society's Signature Book. General information, circulars, and tickets were given out.

On September 22 a reception was held on the Grand Staircase by the Trustees (Lord Rothschild, F.R.S., Lord Ullswater, G.C.B., Sir David Prain, F.R.S., and Sir Henry A. Miers, F.R.S.), the Keepers of Geology and Mineralogy (Dr. F. A. Bather, F.R.S., and Dr. G. T. Prior, F.R.S.), and the Assistant Secretary (Dr. G. F. Herbert Smith). The visitors were then shown round the Mineral Department by members of the staff (Dr. Prior, Dr. L. J. Spencer, F.R.S., Mr. W. Campbell Smith, and Mr. E. D. Mountain), and some few were taken to the Geology Department by Dr. Bather. A photograph [plate II] of the party, numbering 60, was taken in the forecourt of the Museum, and tea was afterwards provided by the Museum in the Board Room.

Address of the President.

Fifty Years' Work of the Mineralogical Society.

WILLIAM WHITEHEAD WATTS, Sc.D., LL.D., F.R.S., F.G.S.

Professor of Geology at the Imperial College of Science and Technology.

My first duty, and it is indeed a pleasant one, is to offer, on behalf of the Council and the Membership of the Mineralogical Society, the warmest and most cordial of welcomes to the Delegates of Foreign Mineralogical Societies, and to all our Guests, Foreign and British, not forgetting those from Overseas, and to thank them in no measured terms for the distinguished honour they have conferred upon us by sharing in the celebration of the first fifty years of our Society.

Coming from all parts of the world, from Finland to South Africa, 'from China to Peru', it is a great delight to welcome those distinguished workers whose names we have for long held in honour. But now that we have grasped their hands and talked with them on all kinds of subjects, we know them as human beings, more human perhaps than we could have guessed from their papers.

Others there are who from age or illness or mischance have not been able to be present in person, but have sent their cordial greetings either in formal addresses or in personal and charming letters.

We wish to preserve a signed record of all those who have honoured us with their presence, and we ask those who attend the jubilee to sign their names in what will be kept for posterity as our golden book.

The Mineralogical Society of Great Britain and Ireland is one of the few scientific societies that does not make a practice of asking its

Presidents to deliver an annual address. As a matter of fact only five such addresses have been delivered—one by the first President, Henry Clifton Sorby, in 1877, one of purely formal character by W. H. Hudleston in 1883, two by Professor T. G. Bonney (1884 and 1885), and one, the last, by Sir Lazarus Fletcher in 1888. They have varied in character from purely scientific papers to accounts of the work and position of the Society, but they have generally tended towards a hortatory or disciplinary tone in relation to the scope of the Society's work or the nature of the papers submitted to it. Two Presidents, Dr. Sorby and Mr. W. Barlow, in 1879 and 1915, followed up the formal business of annual meetings with papers, but these were not intended to be of the nature of addresses, and the former of them was, with other papers, taken as read. Dr. Sorby and Professor W. J. Lewis read papers after the business of the annual meetings at which they resigned.

Sir Lazarus Fletcher, surely one of the most genial and kindly of men, and withal one of the most humorous, discussed the question of annual addresses in 1888, and a few of his words are well worth quotation. After pointing out that a communication on a specific subject is better presented as a paper, when the investigation is completed and full discussion is possible, than as an address on a set occasion, he continues :

‘The simplest permanent arrangement of this kind is that which makes it deal with the progress of the society or of the science during the interval which has elapsed since the delivery of the next preceding address.’

But having said this, he makes it clear that in the case of the Mineralogical Society an address of the kind advocated could hardly become an annual event, for :

‘To set aside annually one-third or even one-fourth of the time of the Society for consideration of the views of the President or of the progress and past work of the Society would seem to be wanting in regard to proportion. A few minutes spent by the members in turning over the pages of the Magazine will give a better idea of the work of the Society, and be at the same time more exhilarating, than any summary a President can make.’

The conclusion is admirable, but it depends a little too much upon an inverted hyperbole. I do not think that ‘turning over the pages’ even ‘for a few minutes’ of those parts of the Magazine, for instance, which tell about the Optical Indicatrix, or Mr. Barlow's paper ‘On Homogeneous Structures and the Symmetrical Partitioning of them, with application to Crystals’, would give even a member of the Society a very complete

conception of the Society's work or the expression of it. Indeed, in almost the next sentence he says :

'It may be cast in our teeth that the volume is small, but we can proudly and truly retort that few volumes of the same size furnish so vast an amount of heavy reading. The density, indeed, is prodigious—not that of lead, but of gold, refined gold. The volume is intended for transmission to all posterity, and not as a mere addition to the ephemeral literature and scientific gossip of a too prolific century. The present generation, by its careful use of the volume, will doubtless help it to reach its destination.'

It is noteworthy that Fletcher's successor in the Chair, Dr. R. H. Scott, famous as a Meteorologist no less than as a Mineralogist, and for seven years Secretary, gave no address during his three years of office, although he is stated to have been responsible for urging Professor Bonney to write the address with which he closed each year of his presidency ; it may be fairly suspected that he had some influence with Fletcher as well.

Since the date of the last address delivered to the Society, that of Fletcher from which I have been quoting, thirty-eight years have slipped away and the Society has attained its fiftieth birthday. It may be, therefore, that I shall not be consuming an undue proportion of the Society's time if I venture to give an account, however brief and inadequate, of the leading features of the Society's progress and work during the first fifty years of its life.

The British Mineralogical Society (1799–1806).

At the outset, it has to be stated that our Society was not the first of its kind in this country. It had a predecessor over a century and a quarter ago. There are two references to it, as Dr. Spencer has kindly pointed out to me, in the *Mineralogical Magazine* ; but the best account is to be found in the charming history which Mr. H. B. Woodward prepared for the Centenary of the Geological Society, from which I extract the following (p. 7) :

'Among the books formerly in the Library of the Museum of Practical Geology, and since transferred to the Science Library of the Victoria and Albert Museum, was the MS. Minute Book of the Proceedings of the British Mineralogical Society. From this we learn that at a meeting held in the Askesian Society's room at Plough Court on April 2, 1799—present : William Allen, W. H. Pepys, Alexander Tilloch, Richard Knight, and Wilson Lowry—it was "Resolved that those present do form themselves into a society under the denomination of the British Mineralogical Society". Laws and regulations to the extent of twenty-seven were framed at a subsequent meeting held on April 30. The number of members was not to exceed twenty. For the present none were to be admitted members

“but such as were able and willing to undertake a chemical analysis of a mineral substance”.’

The Minute-book referred to is still preserved in the Science Library, and, by the kind permission of the Director of the Science Museum and Librarian, Sir Henry G. Lyons, is exhibited on this occasion.

Allen and Pepys were both members of the Society of Friends. The former was founder of the firm of Allen and Hanbury, the latter a descendant of Sir Richard Pepys, Lord Chief Justice of Ireland. Arthur Aikin (spelt in the Minute-book Aiken) appears to have been President and Pepys Secretary from 1801 till December 1806. The proceedings were reported, and some of the papers read were published, in the *Philosophical Magazine* (1798–1813), and among its other work the Society circularized ‘Farmers and other Persons engaged in Experiments in Agriculture’ offering to

‘examine, free of expense, all specimens of earths or soils, with a view to determining the nature and proportion of their different contents, with as much accuracy as shall seem requisite’.

Indeed, it is evident that the main function of the members was to analyse mineral substances and to communicate their findings to each other for discussion. Their interests lay with general science and hardly with mineralogy as it would now be defined. Accordingly we find that the Society amalgamated with the Askesian Society (in whose room it had continued to meet) in 1806, and from the strength of the combined societies was drawn the group of thirteen remarkable men who on November 13, 1807, formed the ‘little talking Geological Dining Club’ which grew so rapidly into the Geological Society of London.

In addition to those mentioned already, the founders of the Geological Society who were Mineralogists included Davy, de Bournon, and Parker, with R. and W. Phillips. These men, and their successors, contributed the results of their mineralogical and petrological work to the publications of the Geological Society for many years; but as those publications became more and more taken up with other branches of geology, palaeontological, stratigraphical, physical, and so forth, it eventually became advisable to found a new society more exclusively devoted to mineralogy.

Foundation of the Mineralogical Society of Great Britain and Ireland.

Much preliminary work was done, especially by J. H. Collins and his associates, and on February 3, 1876, a meeting was held at the Scientific Club, 7 Savile Row, London, with Henry Clifton Sorby in the Chair, at which it was resolved to found a society to advance the study of Minera-

logy and Petrology, to be called 'The Mineralogical Society of Great Britain and Ireland'.

Bye-laws and Meetings.

A code of Rules was drawn up and the Society was to consist of Ordinary Members, Associates, and (Overseas and Foreign) Corresponding Members. Officers and Council were elected, many of whom remained closely associated with the Society for many years, four of them serving as Presidents. H. C. Sorby was elected President and J. H. Collins Secretary, his duties including the editing of the Magazine.

Four other meetings were held in 1876, and the Society gradually expanded, until, at the second annual meeting held on August 15, 1877, the Report of the Council was able to announce that the printed list contained the names of 13 Life Members, 112 Annual Ordinary Members, 12 Associates, and 4 Corresponding Members, a total of 141, a figure which approximately represents the fluctuating strength of the Society for many years. At the present time the total is 47 Life Members, 130 Annual Members, and 12 Honorary Members, in all 189. No new Associates seem to have been elected after 1891, and by 1894 the class had died out.

Slight modifications were made from time to time, but there was only one systematic revision of the bye-laws. New ones were made and adopted at the 25th annual meeting in November 1900. Further alterations were made in 1902 and 1916, but the slightness of the changes on each occasion is a tribute to the vision and imagination of the earliest draftsman, who can hardly have been other than the first Secretary, Collins. To this it may be added that it has been unnecessary to introduce any important modification in the procedure at meetings or to make any drastic change in the form and plan of the Magazine, which have been found sufficiently elastic to admit of the additions and improvements rendered necessary by the lapse of time and the advance of science.

While, during the first twelve years, a certain number of meetings were held in London, the Society at that time was peripatetic in its habits. The meetings held outside London were sometimes merely of local members, but in the majority of cases they were full General, and even Council, Meetings. Indeed, the first five Annual Meetings were so held. Five of the meetings were called Local and were held at Redruth, Camborne, Liverpool, Dundee, and Skye, the last being also a Field

Meeting. The second, third, fourth, fifth, and sixth Annual General Meetings were held at Plymouth, Dublin, Sheffield, Swansea, and York, severally, and other General Meetings were held in Glasgow (2), Edinburgh (3), Dundee, and St. Andrews. In 1881, at the Annual Meeting in York, it was resolved that 'all expenses incurred at Local Meetings are to be defrayed by the Members who take part in them'. Possibly, as Hudleston remarks in his address, owing to the natural gravitation towards the capital, or it may be as a result of this resolution, we find that external meetings became much fewer. Only four were held after 1881, all in Scotland, but it is remarked that they were highly successful, no less than thirteen papers being read at one of the Edinburgh meetings. The last of all, at which nine papers were read, was also at Edinburgh on June 28, 1888. Since the Field Meeting at Talisker Bay in Skye in 1880 the Society has never held any formal excursions till this year.

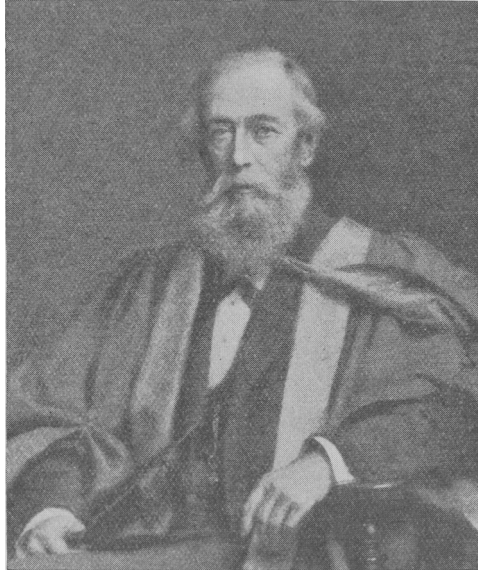
The Officers.

The Society was singularly fortunate in securing as its first President one of the most gifted and eminent scientific men of his day, Henry Clifton Sorby, to whom we owe the application of the microscope to the study of metals, minerals, and rocks. He was not only an ingenious designer of apparatus and methods, but possessed a great knowledge of the principles of physics and chemistry, and the ability to apply even the most recondite of them to his special problems. Moreover, though charmed by the ingenuity and beauty of his own methods, he always regarded them as means to an end, and took little further interest in them unless they led to advance in some problem of physical geology, such as the deposition of sediment and the elucidation of ancient physiographies, or helped to explain the characters or conditions of origin of rocks or minerals. He loved to work out new methods, make proof of their value for research, and, then, pass them on to others to whom he imparted some of his own energy and enthusiasm, while he himself turned to a new problem. It was in this way that he started Zirkel and through him the German school of petrology, and Judd and the English school. He has well earned the title of the 'Father of Petrology' bestowed on him recently at Sheffield University.

After three years in office Sorby retired and was succeeded by one who was more strictly a Mineralogist, Professor M. Forster Heddle. Since then there have been fourteen Presidents, their normal tenure being three years. Three, however, have been only able to serve two years each,

while one other served for five and Professor Story-Maskelyne for seven years.

Secretaries have of course been fewer than Presidents and there have been but four in the history of the Society. J. H. Collins acted from the beginning till 1881, R. H. Scott till he became President in 1888, and was replaced by the then retiring President L. (afterward Sir Lazarus)



HENRY CLIFTON SOREY (1826-1908).
First President of the Society.

Fletcher, who held the office for twenty-one years till 1909, when he gave place to Dr. G. T. Prior, the present Secretary, who has served in this capacity for seventeen years.

In the early years finance seems to have depended at least as much upon the Secretary as upon the Treasurer. We learn that in these years strict economy was essential, and the Council frequently complained that it was unable to publish all that it wished to do. Financial matters were taken in hand very seriously by Scott, and improvement is noted year by year under his skilled and generous guidance until, before he relinquished the Secretaryship, he had given the Society freedom from anxiety on this score. Even now, however, with the Society's small

invested capital, it would be impossible to carry on our present programme of publication without special help from a source that will be indicated later, supplemented by a great amount of voluntary labour on the part of the Editor and his band of abstractors.

The Mineralogical Magazine.

At first the Secretary was charged with the task of editing the Magazine, and J. H. Collins acted as Editor till 1881. On his resignation to take up an important appointment at Rio Tinto an Editorial Committee of five, including President and Secretary, was appointed. Apparently the chief burden still fell upon the Secretary, and indeed Scott's services in editing the Magazine are once referred to with gratitude in a Council Report and coupled with an acknowledgement of his success in stabilizing the Society's financial position. Fletcher served in the same capacity for three years and then, though remaining Secretary, he passed on the editing to Sir Henry Miers, who acted for ten years till 1900. Since that date the Magazine has been directed by the firm and competent hand of Dr. L. J. Spencer, who has thus been responsible for half the life of that publication, and has devoted a vast amount of work to it and to the kindred tasks that followed in its train. The name of the Editor was ordered to be printed on the wrapper of the Magazine in 1891.

As has already been said, the Magazine has varied little in form and plan since its initiation, the only revolutionary change coming in 1920 with volume 19. Reviews and Notices occur in every volume but one (vol. 6) and are now continued as part of the 'Abstracts'. Discussions at meetings were not reported after the first volume, and correspondence ceased with vol. 4. Biographical notices and an index to previously published obituaries occur in vols. 19 and 20. In 1883 Sir Henry Miers began a series of 'Lists of Mineralogical Papers' which were published in the Magazine for six years (1883 to 1888), the last one being joint work with Dr. Prior. Their place was to some extent taken by the 'Lists of New Mineral Names' which Dr. Spencer has drawn up for each completed volume from 11 to 20, ten volumes in all. Dr. Spencer has also published at intervals useful and justified criticisms of certain attempts, not always on the soundest or most instructed lines, to regulate mineral nomenclature.

It is evident, from these lists and other features, that from the beginning the Society has been keenly alive to the importance of aiding its members to keep in touch with workers in other countries and in

kindred sciences, and that it could thus be as truly an instrument of research as in the publication of papers. This is further emphasized by the publication of abstracts of papers and other works.

Mineralogical Abstracts.

Abstracts are given in every volume from vol. 6 (1884) up to vol. 14 (1907), in which, however, there are not many. They are selective and in no way profess to give an exhaustive account of contemporary Mineralogical literature. From 1908 to 1919 strength was gathering for a massed attack on this particular problem. It was then resolved to make a serious attempt at the systematic abstracting and indexing of all Mineralogical and Petrological literature. The scheme was organized by Dr. Spencer, who got together a troop of hard-working abstractors, and the first results appeared in volume 19, the work thus making its start in 1920. Although issued with the Magazine the abstracts were paged separately, the material being classified under a number (33) of headings. This may be regarded as a new and separate publication, and it is certainly a valuable contribution to the science and a great service to the workers in it.

In making the abstracts the important subject of indexing has been kept steadily in view. Two indexes have so far made their appearance. Most wisely, as I think, they are not classified, but have a purely alphabetical arrangement, although a supplementary topographical index is appended, localities being grouped under continents, countries, and districts. The latest issued alphabetical index alone fills nearly a hundred pages, which gives some indication of the amount of work which is being done. The designing and carrying out of the project is a great achievement on the part of the Editor, who underwent a hard apprenticeship for many years in preparing slips on Mineralogy and Petrology for the International Catalogue of Scientific Literature, now extinct.

The Society could not by itself have faced the expense of this new venture, and it is a pleasure to record that the Royal Society has made grants to the extent of £385 for the purpose from the sum entrusted to it by the Government in aid of scientific publications.

To any one studying a series of the volumes it is clear that the indexes have been made not only thoughtfully but with intelligence and imagination. The same may be said of Dr. Spencer's author and subject index to the first ten volumes, with its lengthy and portentous list of 'additional errata'. A second period index is now in hand to the second decade of volumes.

Other activities

It should be mentioned that volumes 2 and 4 were accompanied by coloured mineral maps of Shetland and Sutherland, illustrating Professor Heddle's papers on those areas. An uncommon accompaniment to mineralogical papers will be found in volume 2 (p. 271) in an effusion signed with the well-known initials A. G.

The Society's Library was moved to Cambridge in 1890, and in 1925 it was overhauled by Professor Hutchinson and a Committee. It was decided to dispose of works not specially relating to Mineralogy by gift or sale, and to concentrate on those germane to the Society's work.

Outside its regular work the Society took part during the war in protesting against the proposal to utilize the British Museum for any purposes but those which it could best fulfil, whether in peace or war.

The Society joined the Geological Society in nominating a Committee in 1920 on British Petrological Nomenclature, and published the Committee's Report in volume 19. It also sent representatives to take part in the discussion on 'The physical chemistry of igneous rock formation' in 1924 initiated by the Faraday Society, and contributed its quota towards the publication of the papers and discussions thereat.

A fair idea of the history in matters of membership, finance, meetings, and publication can be obtained from the series of reports presented annually by the Council to the Society. In the first half of the period under review the relative importance of the chief papers printed in the Magazine was estimated, but the practice broke down under its own weight, and was dropped.

The Crystallological Society.

Very soon after the Mineralogical Society had got into its stride a new society was founded (on June 14, 1876) under the name of the 'Crystallometric Association', afterwards changed to the 'Crystallological Society', a name apparently intended to imply that special attention was to be paid by it to the geometrical and other properties of crystals in distinction to the wider scope of the older society. W. H. Miller was the first President, W. J. Lewis Secretary, and N. Story-Maskelyne Treasurer. It published two small parts or volumes of 'Proceedings', one in 1877 and one in 1882, with continuous pagination. The earliest papers printed were read in June, 1876, and those published deal with pure crystallography, pure mineralogy, crystallography of artificially prepared substances, apparatus, and to a small extent with rocks.

Except that at first the Mineralogical Society did little purely crystallographic work, there now seems to have been small reason for the existence of a second society so closely allied to the other. Certainly twenty out of the twenty-two published papers would have found themselves quite at home in the Magazine as it was then. Internal evidence, however, seems to indicate that, while the Mineralogical Society was founded and run by those interested in mines as well as minerals, by geologists, and by unofficial mineralogists, the other was more academic and official in outlook and was supported by the Universities and the great Museums. Only two Officers of the British Museum were among the original members of the Mineralogical Society. One of them, Walter Flight, was also a member of the other society, and T. Davies assisted at times and during a good many years in editing our own Magazine.

Negotiations took place between W. J. Lewis and R. H. Scott in 1883 and were so successful that the President, Hudleston, was able to announce that the 'basis of a treaty had been outlined' and confirmed by the Council. A Special General Meeting of our own Society held on December 11, 1883, elected all the members of the Crystallogical Society and dispensed with the entrance fee in their case. At the next Council Meeting (February 12, 1884) the Corresponding Members were similarly taken over. In this way the Mineralogical Society gained such men as Story-Maskelyne and Lewis, Fletcher and Miers, 'a small body—mostly men who are likely to be workers and of high repute', and the amalgamation proved to be, as Hudleston had anticipated, 'highly beneficial to both parties, the resultant being perhaps a society more purely mineralogical than that which now exists'.

The lists of Members from that date onwards mark with a 'C' the names of the gentlemen who thus joined us, but this letter occurs only three times in the 1926 list, and now Sir Henry Miers and Mr. C. J. Woodward are the only members of the Crystallogical Society that still remain.

Sir Lazarus Fletcher questioned whether a combination of the titles of the two might not have been useful in widening the scope of the amalgamated societies, but I think that it will now be conceded that it would have been a mistake to destroy the compactness and cogency of the present title, so long as nothing which would be of interest to mineralogists, or would tend to advance the science, is excluded from the publications by narrow-minded formalists. In the past we have had no scruples in publishing papers dealing with the theoretical sides of crystallography as well as of mineralogy, and with artificially prepared

substances; and there seems no reason why our usefulness should be cramped in the future by any arbitrary conventions as to scope and limits.

Published Papers.

The Mineralogical Magazine does not give a complete picture of the progress of mineral science in Britain, owing to the fact that certain papers find publication elsewhere. Many petrological papers go to one or other of the Geological Societies, and papers on artificially prepared substances to the Royal or Chemical Societies. Papers on mathematical and structural crystallography also find themselves in increasing numbers in the Royal Society's publications.

When an attempt is made to classify mineralogical papers on lines broadly following those adopted for 'Mineralogical Abstracts', it is surprising how many of the classes are represented even in the first volume of the Magazine, though in many cases only by short papers.

Petrology.—Naturally, with Sorby in the Chair we begin early to find work on petrology, and especially on the microscopic side of it, as well as on crystal-optics. The first paper of the first number is a 'Note upon a portion of Basalt from Mid-Atlantic', a rock dredged up by a cable ship. The paper is the first of several by Marshall Hall, and there is an appendix to it by Clifton Ward on the microscopic character of the rock. A very ingenious paper by Sorby on fluid and other cavities in the minerals of granite draws the conclusion that the felspar crystallized before, and the quartz after, the critical temperature for water had been reached. In the same volume we have Bonney's first paper on the Cornish luxullianite.

The microscopic petrology of igneous rocks forms the subject of many other papers by Bonney, who devotes special attention to ultrabasic rocks and those bearing tourmaline and glaucophane. Riebeckite is noted by the same author, and by Teall and Cole, and its occurrence described at Ailsa Craig and Mynydd Mawr, with the remarkable and almost romantic conclusions to be drawn as to the distribution of the rocks as boulders, a subject on which, however, the last chapter is still to be written. The same mineral from Abyssinia engages the attention of Prior and, from the Sudan, of Campbell Smith. Arctic and Antarctic rocks come up for description by Holmes and by Prior, and while the former deals with collections from Angola, the latter describes alkali rocks and others from such localities as Fernando Noronha, Abyssinia, and British East Africa. Tilley investigates the density of natural glasses, Brammall and

Harwood present a series of results on the Dartmoor granites, and Richardson studies the frequency-distribution of igneous rocks. Geologists are indebted to Miss Kelly for her discovery and description of conchite.

Sediments, and especially the occurrence of detrital andalusite and anatase, are dealt with by Scrivenor and by Thomas, 'cone-in-cone' is discussed by Cole and by Bonney, and septarian concretions and gypsum by Richardson. Teall's discovery of rutile needles in clay should be mentioned here, and a paper on clays by Collins, and also papers by the same writer and Allan Dick on kaolinite. Metamorphism and its minerals are the subject of papers by Teall and by Barrow and Thomas in the west of England, and McMahon in a paper on cordierite-bearing rocks ushers in the modern development of this subject.

Crystal-Optics.—Sorby at a very early meeting read his paper 'On a simple method for determining the index of refraction of small portions of transparent substances', and followed this up in his first Presidential address in 1877, giving at the end tables of indices of refraction and of 'absolute refracting powers'. But except so far as his methods may have been used in mineral determination, no further communications on this subject were made for many years, not indeed until Fletcher flashed out his epoch-making paper on 'the Optical Indicatrix and the Transmission of Light in Crystals' which revolutionized current conceptions and future teaching as to the method of regarding the optical behaviour of minerals.

Many other papers on crystal-optics followed, among which may be mentioned two by Harker on extinction-angles in cleavage-flakes and H. G. Smith's later paper on the same subject, Evans's papers on the determination of optic axial angles and on skiodromes and isogyres, papers by Kôzu and by Tsuboi on problems of dispersion, by Crook on pleochroism and idiophany, and by Cesàro on a formula for the birefringence of a plate. Sorby's last paper, revised by himself shortly before his death and published afterwards, reverted to the subjects of his earlier papers on which he had at intervals continued to work.

Other physical properties and characters.—References to the use of Sonstadt's solution by Heddle and Church occur early, and there is of course plenty of evidence of mineral separation by density and by magnetic and electrostatic means, including a paper on the last by Crook in volume 15. The Earl of Berkeley described in 1895 an accurate method of determining the densities of solids. In volume 3, J. Milne made some experiments, not very conclusive, on the elasticity of crystals. There are two important papers by Professor J. W. Judd: one 'On the

Development of a Lamellar Structure in Quartz-crystals by Mechanical means', accompanied by beautiful illustrations, and another 'On the Structure-Planes of Corundum'.

Descriptive and Topographic Mineralogy.—As these subjects constitute the main business of the Society it is to be expected that the great majority of papers will belong to this category and deal with the discovery of new minerals and new localities. The chief contributions to the first volume are by J. H. Collins and J. B. Hannay. Their papers and those that follow in the long series relate to crystal measurement, chemical composition, optical and other physical qualities and quantities, and discuss relationships and classification. They thus constitute a vast storehouse of fact with regard to British Mineralogy, rendered easily accessible through the thorough indexing of the volumes. The more important of these mineral papers take a monographic form on either a mineralogical or a topographical basis. Examples of important members of the former class follow :

- Vol. 6. H. A. Miers, The Crystallography of Bournonite.
- Hj. Sjögren, On the Physical and Geometrical Properties of Graphite.
- „ 8. H. A. Miers, Contributions to the Study of Pyrrargyrite and Proustite.
- „ 10. H. A. Miers, Xanthoconite and Rittingerite, with remarks on the Red Silvers.
- „ 11. O. A. Derby, Monazite and Xenotime in European Rocks.
- „ 12. L. J. Spencer, Plagionite, Heteromorphite, and Semseyite as Members of a Natural Group of Minerals.
- „ 12 et seq. R. H. Solly, Sulpharsenites of Lead from the Binnenthal.
- „ 13. L. J. Spencer, Mineralogical notes on Western Australian Tellurides : the non-existence of 'Kalgoorlite' and 'Coolgardite' as mineral species.
- „ 14. C. O. Trechmann, Crystallography of Sartorite from Binn.
- „ 15. L. J. Spencer, On Hopeite and other zinc phosphates and associated minerals from the Broken Hill mines, North-Western Rhodesia.
- „ 18. G. F. H. Smith and R. H. Solly, On Sartorite and the problem of its crystal-form.

Papers on Mineral Topography are more abundant in the earlier volumes, and typical examples are those of Professor M. Forster Heddle. Although his papers begin in the first volume, they reach their climax from the second to the fifth. We are not told when or whether they were read, but, if they were, the members of the Society must have been the auditors of one long and continuous Presidential address. Under the title of 'The Geognosy and Mineralogy of Scotland' they treat not only of the minerals with great thoroughness but of the geology (including the rife geological controversies of the time) and other features of Shetland,

Orkney, Caithness, and Sutherland, occupying at least half of the volumes concerned and illustrated with coloured maps in the text or issued as supplements. In addition to this, there is a series of lengthy 'reviews' of his 'Chapters on the Mineralogy of Scotland' classed mineralogically, and published elsewhere. Side by side with these activities there were papers on new Scottish minerals, minerals new to Britain, ill-determined minerals, and many descriptions of mineral species, including haughtonite. Surely no President ever took so liberal a view of his duties as leader of a society; and long after he ceased to be President the stream of his papers continued to flow till his death in 1897.

Some of the topographical papers are limited to British areas, like those by Foster and by Collins, the last a series on Tin-stones and Tin-capels, or by G. F. H. Smith on Antrim zeolites. Others went farther afield like the earlier papers on Alpine minerals, Milne on Japanese minerals, How on Nova Scotia, Howley on Newfoundland, Bowman on minerals at Haddam Neck, Connecticut, and Spencer on Bolivia.

If it be merit to add to the list of known minerals it is perhaps hardly less meritorious to reduce duplication, and there are a number of papers on the identity of minerals described under different names and regarded as different from one another. Readwin, for instance, started the campaign by giving a six-page list of 'Doubtful Minerals' in volume 1.

Meteorites.—Much space in the Magazine is worthily given to papers on meteorites, generally of considerable length, but of very high value from the accuracy and detail of the work, often effected on very small quantities of material. The earliest, 'Contributions towards a History of British Meteorites', by Townshend Hall, includes falls from the year 1360 down to 1876.

Volume 7 begins the magnificent series of papers by Fletcher with one 'On a Meteoric Iron found in 1884 in the Sub-district of Youndegin, Western Australia, and containing Cliftonite, a cubic form of Graphitic Carbon, from which we learn the wonderful skill which the author was capable of displaying in dealing with the most difficult conditions of research. This series runs from 1887 till 1908 and comprises sixteen papers, but there is one published posthumously in 1921 on 'The meteoric stone seen to fall near Crumlin, Co. Antrim, on September 13, 1902', the chemical part of which was added by G. T. Prior.

In volumes 15 and 16 the tale is taken up by Professor H. L. Bowman and H. E. Clarke, and then follow the important series by Prior, comprising fourteen papers beginning in 1910 with one 'On a meteoric stone from Simondium, Cape Colony', and including two on a proposed

classification of meteorites, for which his own and Fletcher's comprehensive investigations provided a broad basis of fact.

In 1922 W. F. P. McLintock and F. R. Ennos give an account of the structure and composition of the Strathmore meteorite. In the early volumes sometimes important foreign papers were translated or abstracted and placed among the original contributions. This is the case, among others, with a paper by Steenstrup and Lorenzen on the nickel-iron showing Widmannstätten figures in the basalt of north Greenland, once thought to be of meteoritic origin.

Chemical Mineralogy.—Chemical analysis being so largely practised by mineralogists and an essential part of their papers, it is natural that we should occasionally meet in the Magazine with useful guidance on methods specially suitable for mineral analysis. This proves to be the case in Foster's papers in volume 1, Burghardt's in volume 9, McMahon's useful notes and tables on the microchemical analysis of the rock-making minerals in volume 10, and Prior's method of estimating nickeliferous iron. Other chemical papers include Carrington Bolton on the action of organic acids on minerals, Church's chemical study of arsenates and phosphates, and Prior and Spencer on the chemical composition of fahlerz. There is a suggestive paper by Carnelley on the application of the periodic law to mineralogy, one by Prior on the connexion between the molecular volume and chemical composition of some similar minerals, and one by Barlow on 'Crystallographic relations of allied substances traced by means of the law of valency-volumes'. Sorby published an interesting note in volume 3 on variations in shape of artificially formed crystals, and from the Oxford University Laboratory came a series of papers, on the characters and growth of crystallized salts, by numerous authors, among whom may be mentioned Barker, Bowman, Drugman, and Kreutz. Finally may be mentioned the important paper by A. E. H. Tutton and Mary W. Porter on the 'Crystallographic constants and isomorphous relations of the double chromates of the alkalis and magnesium'.

There are a few papers on minerals prepared experimentally or artificially. For example, Sorby exhibited artificial pseudomorphs at the first meeting, but does not seem to have described them. Other papers deal with minerals in slags, crystals of iron grown in pig-iron, artificial pyrolusite, agate-like artificial silica, crystalline gypsum, and with synthetic corundum and spinel.

Growth, &c., of minerals.—The growth, repair, and destruction of minerals has been the subject of many papers. Readwin exhibited and described the growth of mineral substances under conditions of ordinary

temperature and pressure, Miers dealt with British pseudomorphs, Rutley with crystallites, and Spencer with the curvature of crystals. On the other hand, Judd paid attention to solution-planes in crystals and their relation to schillerization, the conversion of feldspar into scapolite, and the relations between the gliding and solution-planes of augite.

Allied to this is a subject on which we have too few papers, though they are now increasing, namely the physiology of minerals or the conditions regulating their formation under natural conditions. Under this head may be placed Harker's notes on hornblende as a rock-forming mineral, Samoilov on the organic origin of some minerals occurring in sedimentary rocks, Brammall and Harwood on reconstitution processes in shales, slates, and phyllites, Belaiew on the genesis of Widmanstätten structure, Edmondson Spencer on albite in limestone, and Tilley on some mineral transformations in crystalline schists.

Classification.—Again, there are but few papers on classification. They comprise Collins's classification of minerals in volume 2, Taylor on hydrocarbons, Prior on meteorites already alluded to, and Hallimond's classification of the mica group.

Economic mineralogy.—There are not a great number of papers on gems, but the Maxwell-Stuart topaz, the largest cut precious stone then known, and the Cullinan diamond are described. Inclusions and impurities in diamonds have been described, and Hudleston discussed theories as to the origin of the diamond and its parent rock in South Africa. Ruby or sapphire or both are described from localities in New Zealand, Siam, and North Carolina, and Louis sets out the general modes of occurrence of gold, a problem on which new light has recently been thrown by Brammall and Harwood. There are still fewer papers on ores and other substances of economic importance. H. M. Cadell dealt with the age and origin of the veins of the Upper Harz, and Crook had an important paper on the genetic classification of rocks and ore-deposits. There are also some papers on diatomite.

Apparatus and Methods.—Naturally there are a fair number of papers on apparatus, beginning with blowpipe lamps and portable chemical apparatus. Goniometers of novel or convenient pattern, or suitable for students, are brought to notice by Hannay, Miers, G. F. H. Smith, and Hutchinson. The types become increasingly efficient, the series being at present closed by an X-ray goniometer by Greenwood. Allan Dick described his admirable petrological microscope in 1888, and Grabham made improvements on it in 1910. A microscope with rotating stage was described by Richardson in 1920. With these come rock- and

mineral-slicing apparatus dealt with by Ady, G. F. H. Smith, and Thomas with Campbell Smith.

Refractometers are described by G. F. H. Smith in a first and final form, and by Thomas and Hallimond. The quartz-wedge was improved by Evans, who also pointed out extended uses of the slit in microscopic investigation. Many devices for drawings and projection, and for the simplification of calculation, are described by G. F. H. Smith, Richardson, and especially by Hutchinson.

Projections.—Mineral projections are frequently considered, the gnomonic by Miers, G. F. H. Smith, Hilton, and Evans, and the orthographic by Hilton. An ingenious method of making models by 'plaiting' was devised by Gorham, and models of crystal-structure have become more frequent as this line of study has been further developed.

Crystallography.—Pure and mathematical crystallography comes late in the Magazine, the first important paper being that by Barlow 'On Homogeneous Structures and the Symmetrical Partitioning of them, with application to Crystals'. Later came Lewis on Grassmann's method of axial representation and Hudson on the determination of the position of points and planes after rotation about a known axis. Hilton and Evans both dealt with the thirty-two classes of symmetry, and Cesàro's paper on a numerical property of axes of symmetry is especially interesting in calling for the only contribution made directly to the Magazine by Fedorov. Evans dealt with the laws of twinning, and G. F. H. Smith endeavoured to give a theoretical explanation of the structures required to explain the crystallographic anomalies of certain minerals investigated by him.

X-rays and Crystal-structure.—Finally, there are papers on crystal-structure chiefly as revealed by X-ray or X-ray spectroscopic analysis. In this group comes one paper by Sir William Bragg, and there are others by Miss Knaggs, Miss Yardley, and S. I. Tomkeieff.

Conclusion.

From this recital it may be concluded that the Mineralogical Society has justified its existence. Whether we look to the discoveries made in Britain or abroad, at those made among the plutonic rocks below or the meteorites from the heavens above, we cannot fail to be struck by the thoroughness and exactitude of the observations made, by the deduction from them of principles guiding form, structure, or occurrence, and by the presentation of results to an educated public. At no time has the science been more active or the outlook more promising than at present.

Those who will attend the centenary of the Society are to be envied in the wealth of discovery and correlation which the coming years will bring forth not only within our science itself but in the sister sciences with which its relations grow closer every day.

Southern Excursion.

Report by the Director, Mr. ARTHUR RUSSELL.

This excursion to Devonshire and Cornwall was under the leadership of Mr. Arthur Russell assisted by Captain G. M. Puckle. The party included Sir Charles Russell, Bart. (Swallowfield Park), Sir John S. Flett (London), Prof. T. L. Walker and Mr. James Walker (Toronto), Prof. J. L. H. Borgström (Helsingfors), Dr. R. L. Parker (Zürich), Dr. J. Drugman (Brussels), Mr. James Broadhead (Darlington), Señor J. Folch y Girona (Barcelona), Señor H. Buschor (Barcelona), Prof. B. Gossner (Munich), Dr. H. Steinmetz (Munich), Mr. W. Maucher (Munich), Mr. H. Heertz (Frankfurt a. M.), Mr. S. I. Tomkeieff (Newcastle-on-Tyne), and Mr. W. Campbell Smith (London). The main party travelled from London on Sunday, September 12, and was met by the director at Okehampton. From there the party was conveyed in four motor-cars, the tour, ending at Penzance, covering 281 miles.

Monday, September 13.—Starting from Okehampton, the following localities on the northern fringe of Dartmoor, at or near the junction of the Culm-measure shales with the granite, were visited. Belstone Consols (or Mid Devon) mine, Belstone (formerly worked for copper and arsenic); here excellent specimens of brown to greenish grossular, axinite, and an opal-like mineral were found on the old waste-heaps. The Ramsley mine, South Tawton (copper, abandoned), yielded grossular, axinite, heulandite on Culm-measure shale, and chabazite from an exposure of altered greenstone on the old dressing-floors. At Ford Farm quarry (a locality for andalusite) the actual contact of the granite and Culm-measures was examined. The extensive Meldon quarry, worked by the Southern Railway Company, showed a wonderful section of the contact-rocks, and excellent specimens of wollastonite and pyrrhotine were collected. The old dumps of the Meldon limestone quarry were carefully searched and yielded wollastonite, crystallized apophyllite, and one specimen of garnet showing the rare cube face. The well-known Meldon aplite quarries, now unfortunately abandoned, were also examined and specimens obtained of green and pink tourmaline, wollastonite, petalite, and a single specimen showing two well-defined colourless crystals of an

undetermined mineral. On this day the party was fortunate in having the attendance of Dr. E. H. Young, of Okehampton, who for many years has been an enthusiastic local geologist and petrologist.

Tuesday, September 14.—Again starting from Okehampton and travelling along the Tavistock road, good views were obtained of Brent Tor, concerning which and the general geological features of the district Sir John Flett gave an interesting account. West Wheal Crebor, Tavistock (copper, abandoned), yielded many specimens of childrenite, a mineral which few members of the party had previously collected. Thence, via Tavistock and Callington, to the Cheesewring quarry, Linkinhorne, good views of many of the principal east Cornish mines being obtained along the road. At Callington mineral specimens formerly the property of Mr. Jehu Richards were purchased by several members of the party. The Cheesewring quarry yielded on this occasion several excellent specimens of the rare bertrandite, associated with orthoclase and fluorite. The night was spent at Liskeard.

Wednesday, September 15.—Proceeding to Lostwithiel, Terrace Hill quarry was visited and the interesting exposure of calc-silicate rocks, traversed by what appears to be a small mineral-vein, was examined. Specimens of grossular, axinite, datolite, galena, and pyromorphite were obtained. At Mulberry mine, Lanivet (abandoned), the remarkable open-cast on a tin stockwork in killas was examined, and the dumps yielded specimens of cassiterite and topaz. Tremore quarry, Withiel, which has latterly been somewhat extensively worked, proved specially interesting. Here a fine example of an elvan dike exposed for its full width shows the effects of marginal cooling, and the contact-altered slate contains axinite and fluorite. A crystal of axinite found here by one of the party is probably the largest known from Cornwall. At Belowda Beacon, Roche, north of the old mine, some comparatively recent trial pits afforded good specimens of topaz, gilbertite, and quartz-tourmaline-rock. Castle-an-Dinas wolfram mine, St. Columb Major (abandoned), yielded wolframite, scorodite, and wavellite, the last a mineral known from only one other locality in Cornwall. On this day Lady Molesworth, St. Aubyn, Mr. Henry Dewey, and Mr. E. H. Davison joined the party. The night was spent at Truro.

Thursday, September 16.—From Truro the party proceeded to St. Stephen-in-Brannel, where they were met by Mr. W. Boxhall, of St. Austell, Mr. A. Davies, Manager of the English China Clays, Limited, and Mr. Bun, a representative of the local newspaper press. The Tregargus china-stone quarry, the property of Messrs. Olver & Co.,

was first visited, Mr. Boxhall explaining the varieties, characters, and commercial applications of the stone. The process of grinding was also seen. A comprehensive tour was then made of the china-clay district, this having been made possible by the special facilities afforded by the English China Clays, Limited, which company, in addition to allowing a detailed inspection of two of their most representative pits (Hendra



At the Roche Rock, Cornwall.

[B. Gossner, W. Maucher, J. Broadhead, T. L. Walker, Sir John Flett, S. I. Tomkeieff, J. W. Walker, J. Drugman, J. Folch, Sir Charles Russell, G. M. Puckle, Arthur Russell, W. Boxhall, H. Steinmetz, Mr. Bun, H. Heertz, H. Buschor, driver of the car, R. L. Parker, W. Campbell Smith, E. H. Davison.]

and Dorothy), also kindly provided an excellent lunch at which one of the directors, Mr. R. Large, presided. The members of the party were able to see both the old system of washing out the clay as well as the latest high-pressure monitors, and also the entire process of preparation and drying. To any one unfamiliar with the district, the magnitude of the operations affords an impressive sight, and the foreign guests in particular were much impressed by the importance of the industry. The remainder of the day was occupied at Hensbarrow Beacon, Roche Rock, and the felspar quarries at Tresaize (Glass mine) with a fine example of a pegmatite vein. The night was again spent at Truro.

Friday, September 17.—The morning was spent at Truro visiting the County Museum of the Royal Institution of Cornwall, where the party was met and courteously conducted by Canon H. Holroyd Mills and the curator, Mr. George Penrose. Members were allowed to handle and examine in detail many of the remarkably fine specimens in the Philip Rashleigh collection, notably the magnificent examples of liroconite and clinoclase. In the afternoon the party proceeded to Perranporth, and was joined by Mr. C. H. Trenerry, who most kindly conducted the members to Cligga Head, remarkable for its fine exposures of tin and wolfram veins, old cliff workings, and beautiful examples of greisenization. Many of the members descended the rather awkward cliff, and specimens of cassiterite, wolframite, scorodite, and topaz were collected. The night was spent at Perranporth.

Saturday, September 18.—On this last day the party proceeded to Tresavean mine, Gwennap, which proved one of the most interesting items of the tour, thanks largely to the courtesy of the manager, Mr. J. Faull. A portion of the party stayed above ground viewing the surface plant, the process of tin dressing being lucidly explained by Mr. Faull. Seven of the party went underground with the underground manager, Mr. Lawry, and at the 395-fathom level had a good general view of the main features and conditions prevailing in a deep Cornish mine. A new lode recently discovered in a south cross-cut afforded an excellent example of a tin vein with well-defined walls; while visits to several ends and a rise above the 395-fathom level gave some idea of the high temperatures that have to be contended against in deep workings. Mr. Lawry's guidance and his fund of information made memorable this visit to a remarkably interesting mine. In the afternoon, proceeding to Camborne, a visit was paid to the School of Mines, where the party was met by Mr. E. H. Davison and Mr. H. R. Beringer, who showed the mineral collection and many of the fine recent acquisitions. From Camborne the cars proceeded to Great Work mine, Breage (tin, abandoned), where specimens of apatite, tourmaline, and greenish muscovite were found on the dumps. Thence to Penzance, via Germoe and Marazion, a short halt being made opposite St. Michael's Mount. At Penzance the party was met at the museum of the Royal Geological Society of Cornwall by the president, Mr. F. J. Stephens, and members of the council. After being entertained to tea, a most cordial address of welcome was given by Mr. Stephens, who reminded the visitors of the long series of illustrious mineralogists who had in the past been presidents of this the oldest scientific society in Cornwall. In replying

on behalf of the visitors, Sir John Flett thanked the Society for its welcome and declared that mineralogists, and in particular the foreign visitors, could not but be greatly impressed by the splendour and variety of the minerals of Cornwall. Mr. Arthur Russell, adding a further tribute of thanks, deplored the fact that there are nowadays so few collectors of minerals in the county, and that through the breaking up of estates, nearly every one of which had been the home of a mineral collection, these had been scattered and there were now few in Cornwall. Thus ended a week crowded with something of interest, one ventures to hope, to every member of the party; successful, too, from the point of view of the actual finding of minerals, rare and otherwise, which it was hoped would be found at the localities visited.

Northern Excursion.

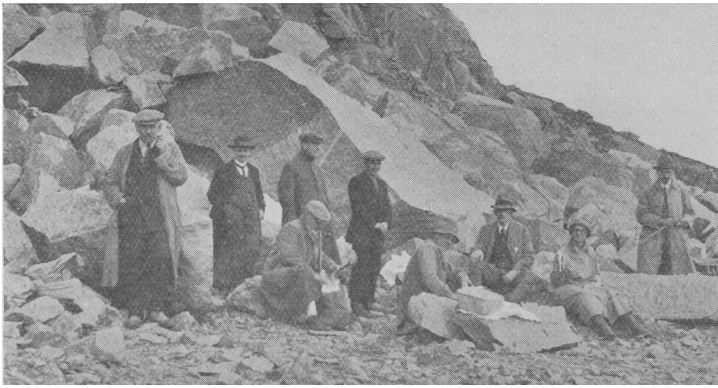
Report by the Director, Prof. A. HUTCHINSON, F.R.S.

The members of the Northern Excursion left London (Euston station) on the morning of Thursday, September 23, for Cumberland. The party consisted of Professors R. Brauns (Bonn), S. Kreutz (Cracow), P. Niggli (Zürich), and F. Rinne (Leipzig), Drs. J. Drugman (Brussels), L. L. Fermor (Calcutta), L. J. Spencer (London), Messrs. J. W. Gruner (Minneapolis, Minnesota), A. F. Hallimond (London), W. Maucher (Munich), Lady Rachel Workman McRobert (Tarland, Aberdeenshire), and Professor A. Hutchinson (Cambridge), the leader of the party. The George Hotel, Penrith, was reached in the evening after an uneventful journey.

Friday, September 24.—Much rain fell in the night and we awoke to a wet and unpromising-looking morning. However, after breakfast the sky began to clear and, with the exception of Professor Brauns, who unfortunately felt obliged to return to London, we all started for Patterdale to examine the Greenside lead mine at Glenridding, Westmorland. On the way, a detour was made to visit Aira Force and an exposure of igneous rock in a road-metal quarry on the Troutbeck road just above the Fall. At the mine we were joined by one of our local members, Dr. W. Goodchild of the Threlkeld Sanatorium, and were welcomed by the manager, Mr. E. Borlase, who very kindly offered to take underground all those who wished to see the vein in situ. The majority of our party took advantage of this offer, and entering the mine by the Lucy Tongue level descended by shafts to the 120-fathom level, whence they brought fine specimens of crystallized galena from a strong vein

well exposed in the lowest workings. In the meantime, the rest were shown the dressing-plant and were busy on the dumps, where specimens of witherite, baryte, and blende were obtained. After tea at the Milcrest Hotel, Patterdale, some time was spent in admiring the scenery at the head of Lake Ullswater, seen to great advantage on a beautiful evening, and a quick run back to Penrith brought a pleasant day to a conclusion.

Saturday, September 25.—This morning we were joined by Mr. F. N. Ashcroft and Dr. H. von Eckermann, who had travelled up by the night



In the Shap Granite quarry, Westmorland.

[Dr. H. von Eckermann, Mr. W. Maucher, Dr. L. J. Spencer, Mr. A. F. Hallimond, Mr. J. W. Gruner, Dr. L. L. Fermor, Professor A. Hutchinson, Lady R. W. McRobert, Professor S. Kreutz.] *Photograph by Mr. F. N. Ashcroft.*

train, and our first objective was the Acorn Bank gypsum mine near Temple Sowerby, Westmorland. Here we were met by the owner, Mr. K. Boazman, who kindly took us over the mine and showed us grey massive gypsum some 20 feet thick with a layer of anhydrite about 2 feet thick at its base. We next visited another deposit, about a mile to the south-east, at Kirkby Thore, where the mineral was observed in an open working lying with an eroded and dissolved surface below a thin cover of glacial drift. Leaving the Eden valley and its Permian and Triassic red sandstones, we proceeded west over Carboniferous strata by Morland and Newby to Shap, Westmorland, to visit the famous Wasdale Crag quarry. Here we collected characteristic specimens of Shap granite, some showing pyrite and molybdenite on the joint-planes. Specimens of bismuthinite and baryte were also obtained. The so-called 'blue stone'

quarry, lying between the Wasdale Crag 'pink' quarry and the granite works, was also examined. The very extensive workings are in highly metamorphosed volcanic rock and afforded specimens showing garnet, epidote, actinolite, calcite, and pyrite. The return journey to Penrith was made by Bampton (to enable us to visit Hawes Water), Askham, and Lowther Park. In the evening Mr. and Mrs. C. S. Garnett joined the party.

Sunday, September 26.—A pleasant drive on a lovely morning took us to Grainsgill under Carrock Fell, Cumberland, by way of Mosedale and Mungrisdale, where a short halt was made to see Mr. J. Hemingway's collection of the local rocks. The morning was spent in examining the produce of the open workings in quartz veins in Grainsgill, and good specimens of wolframite, molybdenite, mispickel, and blende were obtained. Scheelite, tetradymite, bismuth, and apatite were also observed and specimens of granite and greisen collected. After lunch the majority of the party, under the guidance of Dr. W. Goodchild, who had joined us at Grainsgill, walked up Brandy Gill and down to the old workings in Dry Gill, where a find of some good campylites rewarded their exertions. A short climb, followed by a rough scramble down a stream bed, brought us to the head of Roughton Gill, but only a few poor specimens of pyromorphite could be seen on the old dumps. After an easy walk down the valley the cars were reached at Fell Side, and a direct run back to Penrith ended a profitable day made particularly enjoyable by perfect weather. In the evening we said good-bye to Dr. H. von Eckermann, who had to keep an appointment in Sheffield, and the next morning Mr. Hallimond was obliged to return to his duties in London.

Monday, September 27.—An eighteen-mile drive along the Eden valley brought us to the foot of the Pennine escarpment a little south of Roman Fell. At the works of the Long Fell Barytes Mines, Warcop, Westmorland, we were met by the manager, Mr. Craig, who showed and explained the process of preparing the flour barytes for the market. An hour's climb up the hill to an elevation of 1,750 feet found us at the mines, where five parallel veins ranging from 2 to 6 feet in width have been exploited by means of levels driven along their course. Into one of these we penetrated under the guidance of Mr. Brown, the underground manager, and although the deposit of large crystals which was discovered a few years ago was found to be exhausted, a number of typical specimens of baryte were collected. We next made our way over the fell to the head of the Hilton valley, where on the dumps of the old Scordale

mines yellow fluorite was found in abundance, though now unfortunately much weathered. After being photographed by Mr. Ashcroft, we rejoined the cars which had ascended the old mine track to meet us, and following a road running along the foot of the escarpment enjoyed on our homeward journey a splendid view of the sun setting behind the Lake District hills. Approaching Penrith, a detour was made to Eden Hall, 'Das Glück von Edenhall' being well remembered by the German members of the party.

Tuesday, September 28.—Before leaving Penrith we said good-bye to Professor Rinne, Mr. Gruner, and Mr. and Mrs. Garnett, who were unable to accompany us to Alston, but our diminished party was reinforced by Dr. Goodchild, who had come over from Threlkeld to join us. This morning we moved our head-quarters to Alston, Cumberland, travelling by way of the stone-circle known as 'Long Meg and her Daughters' near Little Salkeld to Melmerby, where the long ascent of the Pennine escarpment begins. Here a short halt was called to enable us to examine an igneous (doleritic) intrusion at the north end of the Cross Fell inlier, now being quarried for road-metal. Unfortunately the summit (Hartside Height) was shrouded in mist and we had no opportunity of enjoying the famous view, so pushing on to Alston we deposited our luggage at the Hill Crest Hotel. Our first destination in the Alston region was the Ayle Burn mine, where, by following directions kindly communicated to us by Mr. Arthur Russell, we were successful in finding excellent specimens of barytocalcite. Our next halt was called for lunch at the Nentsbury or Haggs mine near Nenthead, where, by the kindness of the manager, Mr. A. Treloar, we were able to visit the workings under the guidance of Mr. Liverick, the underground manager, and Mr. P. Blight. A trip of some two miles in the ore-wagons along a narrow level enabled us to see blende and witherite in situ, and these and specimens of epsomite and of baryte as small crystals (at first in the artificial light underground thought to be possibly hemimorphite) were collected. Very brilliant small black crystals of blende were abundant on the ore heap stacked outside the mine. The return journey to Alston was made by Blagill to enable us to visit the original barytocalcite locality, and further specimens of this mineral were obtained.

Wednesday, September 29.—Our final excursion necessitated an early start in the morning to enable us to reach the Boltsburn mine at Rookhope in Weardale, co. Durham, some twenty miles away, by 10 a.m. The route taken was by Nenthead (Cumberland), Coalcleugh and Allenheads (Northumberland), and in spite of the long and steep ascents which

had to be negotiated and some delay caused by a punctured tire we were only a few minutes late in arriving. At Boltsburn we were received by Mr. H. S. Willis, the general manager of the Weardale Lead Company, and were conducted to the workings by Mr. Thomas Maddison, the manager of the mine. After descending the shaft, a journey of over two miles was made in the ore-wagons along a level driven on the vein. A further descent followed by a short walk brought us to no. 3 Flat, one of the remarkable deposits of galena for which this mine is famous, which lie in the Great Limestone on either side of the vein and appear to be the result of metasomatic replacement. Here we found ourselves in a large room-like excavation, some 10 to 15 feet high, in which work was busily in progress. An examination of the walls revealed a mass of lenticles and strings of galena and also numerous cavities lined with brilliant cubo-octahedra of this mineral with which were associated cubes of fluorite and saddle-shaped crystallizations of chalybite or ferruginous dolomite. Much excellent collecting was done here, and it was with reluctance we tore ourselves away to follow our guide to other similar excavations in which we were rewarded by the sight of cavities lined with great cubes of fluorite measuring up to 6 or even 10 inches along their sides. The visit to these flats marked the culminating point of our excursion, and we could only regret that circumstances did not permit us to linger longer in this mineralogical treasure house. On leaving the mine Mr. Maddison kindly allowed us to inspect his beautiful collection of the local minerals. The return journey was made by St. John's Chapel and Wearhead, and the great dumps of fluorite stacked outside the Sedling mine were visited on the way. Alston was reached in ample time to pack our specimens and arrange for our several journeyings.

Mr. Ashcroft and Professor Kreutz returned to London the same evening. Early the next morning Lady McRobert and Dr. Fermor started for the Leadhills mines in Scotland, and Mr. Maucher for Frizington in west Cumberland. The four remaining members of the party, Professors Niggli and Hutchinson, Drs. Drugman and Spencer, set out for Cambridge, via Newcastle.

So ended an excursion rendered pleasant by the almost uniformly fine weather we enjoyed and made successful in its main object by the kindness of all the gentlemen who so readily allowed us to visit the mines and quarries under their control and assisted us with guidance and information.

Visit to Cambridge.

The final function in connexion with the Jubilee Celebrations was a visit to Cambridge undertaken by certain of the Society's guests and members on the invitation of Professor Hutchinson. During the course of Thursday, September 30, the following party assembled at Pembroke College, where the night was spent: Professors Kreutz, Niggli, and Rinne, Drs. Drugman, Burri, and Spencer, Messrs. Ashcroft, Melmore, and Tully. The next morning (October 1) the party attended in the Senate House to hear the valedictory address of the outgoing Vice-Chancellor, Dr. Seward, and to witness the installation of the new Vice-Chancellor, Mr. Weekes. The rest of the morning was occupied in visiting the University Library, the Library of the Cambridge Philosophical Society, and the Mineralogical Department and Museum. Here were shown the Sir Abraham Hume collection of diamonds (catalogued by de Bournon and presented by Viscount Alford in 1841), the H. J. Brooke collection, and many other treasures, including the only known crystal of the mineral stokesite. The Library of our Society, which has recently been completely overhauled by the new Librarian, Professor Hutchinson, was also inspected.

After lunch in the Old Library of Pembroke College, at which Dr. A. Harker and Dr. A. E. H. Tutton joined the party, the former conducted the members round the Sedgwick Museum, where they were received by Professor J. E. Marr, the Woodwardian Professor of Geology. Here, amongst many other things, they were shown the interesting and valuable old collection of Dr. John Woodward, a portion of which was bequeathed by him in 1728 to the University, the remainder (comprising the 'Foreign Fossils') being purchased in 1729. This collection is reverently preserved in the old cabinets in its original state. An adjournment was then made to the private laboratory of Dr. Tutton, recently built by him in the grounds of his house, where the party was kindly entertained to tea by Mrs. Tutton. Dr. Tutton afterwards demonstrated the unique collection of crystallographic apparatus contained in the laboratory.

During the brief but pleasant stay in Cambridge every chance opportunity was taken of pointing out to the foreign visitors the sights of the old University. This brought the proceedings to a conclusion, and the party dispersed to London and elsewhere in the evening.

Addresses and Letters of Congratulation.

Formal addresses were not expected, and they are consequently few in number. Delegates had been invited only from closely allied foreign societies, of which there are but few. The Mineralogical Societies of France, Germany, Switzerland, and America each sent one or two delegates, the only other publishing Mineralogical Societies not represented by delegates being those of Russia and Vienna (messages from these two are given below). Delegates were also sent by the Geological Societies of Sweden, Poland, and Cornwall. Most of the invitations had been sent to individuals, but owing to the distance and, in some countries, to the difference of monetary exchange, the number of acceptances was not large. These include distinguished mineralogists from Finland, France, Germany, Spain, and the United States of America, and to them special thanks are due. Some others (from Norway, Hungary, and Portugal) who had intended to come were unfortunately detained at the last moment. Cordial letters regretting inability to attend, and in most instances conveying congratulations and good wishes to the Society, were received from the following gentlemen :

- Prof. Charles Barrois, University of Lille.
- Prof. F. Becke, University of Vienna.
- Señor Antonio Maria de Oliveira Bello, Lisbon.
- Prof. O. B. Bøggild, Copenhagen.
- Prof. P. N. Chirvinsky, Novochoerkassk, Russia.
- Prof. G. D'Achiardi, University of Pisa.
- Prof. E. S. Dana, New Haven, Connecticut.
- Dr. H. V. Ellsworth, Geological Survey of Canada, Ottawa.
- Prof. G. Friedel, University of Strasbourg, Alsace.
- Prof. Victor Goldschmidt, Heidelberg.
- Prof. V. M. Goldschmidt, Oslo, Norway.
- Prof. R. P. D. Graham, McGill University, Montreal, Canada.
- Prof. F. Grandjean, President of the French Mineralogical Society.
- Prof. P. von Groth, Munich.
- Prof. J. E. Hibs, Vienna.
- Prof. J. Koenigsberger, Freiburg, Baden.
- Dr. L. Kulik, Mineralogical Museum, Academy of Sciences, Petrograd.
- Dr. G. F. Kunz, President of the New York Mineralogical Club.
- Prof. A. Lacroix, Natural History Museum, Paris.
- Dr. H. Michel, Natural History Museum, Vienna.

Prof. J. Morozewicz, Director of the Geological Survey of Poland, Warsaw.

Prof. V. Rosický, Masaryk University, Brno, Moravia.

Dr. W. T. Schaller, President of the Mineralogical Society of America, Washington, D.C.

Prof. F. Slavík, Bohemian University, Prague.

Dr. S. Stevanović, Belgrade.

Prof. G. von Tschermak, Vienna.

Prof. W. Vernadsky, Petrograd.

Prof. L. Weber, Freiburg, Switzerland.

Prof. F. Zambonini, University of Naples.

Dr. K. Zimányi, Hungarian National Museum, Budapest.

Telegrams received during the meeting include the following :

From Prof. P. von Groth, Munich.—

Der Mineralogischen Gesellschaft sendet zum 50. Jubiläum herzliche Glückwünsche und Grüsse, bedauernd an der Feier nicht teilnehmen zu können, P. Groth.

From Prof. František Slavík, Prague.—

I beg to greet all my British friends and tender my best congratulations to the Society for glorious past and future.

From Prof. V. M. Goldschmidt, Oslo.—

The Mineralogical Institute congratulates and sends the best wishes.

From Prof. G. Aminoff and Dr. N. Zenzén, Stockholm.—

G. Aminoff and N. Zenzén of the Mineralogical Department of the State Natural History Museum at Stockholm send their best congratulations to the Jubilee of the Mineralogical Society.

From the Russian Mineralogical Society, Petrograd.—

Russian Mineralogical Society send Mineralogical Society, London, sincerest wishes further progress successful activity.

President Karpinsky.

Secretary Gerassimov.

Formal addresses and extracts from letters are as follows :

The Royal Geological Society of Cornwall.—

The Royal Geological Society of Cornwall sends greetings to the Mineralogical Society and hearty congratulations on the occasion of its Jubilee. The science of mineralogy has always attracted Cornishmen and the Society can claim many members who were mineralogists of repute. The two Societies can also claim the late Mr. J. H. Collins, who was in turn Secretary and President of the Royal Geological Society of Cornwall, and one of the founders of the Mineralogical Society. It is therefore with special pleasure that the Society congratulates the Mineralogical Society on the great value of the work it has done during the past

fifty years, and expresses the hope that its efforts towards the advancement of the science may be still more successful in the future.

Ernest H. Davison, Hon. Sec.

Francis J. Stephens, President.

Polskie Towarzystwo Geologiczne (The Polish Geological Society),
Kraków.—

To the President and Council of the Mineralogical Society.

The Polish Geological Society behold, with sincere admiration, the results of half a century's work of the Mineralogical Society, which has achieved success not only in working on the mineralogical investigation of its native country, but also in collaborating fruitfully towards the solution of worldwide problems in the field of crystallography, mineralogy, and petrology. In all these domains, the Mineralogical Society has been in the first rank of the workers of many nations, in harmonious fellowship of common effort with them all.

With the help of its excellent organ, the Mineralogical Magazine, the Society is rendering most valuable services to scientific research by registering accurately all notable facts which are taking place in mineralogical work throughout the world. It gives us particular pleasure to acknowledge on this occasion that the efforts and achievements of Polish mineralogists also receive their share of notice in the pages of the Magazine.

The Polish Geological Society joins in the jubilee celebrations of the Mineralogical Society with all the greater ardour because the Mineralogical Society has always remained mindful of the close connexion between the sister sciences of mineralogy and geology. Best proof of this is furnished by the publication of the geological and mineralogical maps issued in the volumes of the Magazine.

The Polish Geological Society, which comprises in its ranks also all the research workers in the field of mineralogy in Poland, begs to give expression to its warmest and most sincere feelings at the moment of the jubilee of the Mineralogical Society, and it offers the Society its best wishes for further prosperous progress in its meritorious work.

The Secretary, Dr. Bieda.

The President, Jan Nowak.

Magyar Nemzeti Múzeum (Hungarian National Museum), Budapest.—

To the President and Council of the Mineralogical Society in London,
Gentlemen.

The Magyar Nemzeti Múzeum (Hungarian National Museum) desires to offer its best wishes and heartiest congratulations on the occasion of the Semi-centennial Jubilee of the Mineralogical Society.

The Hungarian Mineralogists highly appreciate the progress and value of the research work accomplished by the British members of the Society.

The Mineralogical Magazine, this standard periodical, is well known wherever Mineralogy is cultivated.

It is a great pleasure to us to express our best wishes for future prosperity and further successful progress of the Mineralogical Society.

Zimányi Károly,

Prof. Dr. Hóman,

Director of the

Director of the

Mineralogical Department.

Magyar Nemzeti Múzeum.

Wiener Mineralogische Gesellschaft (Vienna Mineralogical Society).—

An die Mineralogical Society, London.

Mit reger Teilnahme erhielt die Wiener Mineralogische Gesellschaft die ehrenvolle Einladung zu der Jubiläumsfeier der Gründung der Mineralogical Society im September 1926. Leider erlaubten die Umstände nicht einen Vertreter zu der Festfeier nach London zu entsenden. Doch möchten wir nicht versäumen wenigstens auf schriftlichem Wege unsere herzlichen Glückwünsche dar zu bringen.

Durch ein halbes Jahrhundert hat die Mineralogical Society dank dem Scharfsinn und dem unermüdlichen Eifer ihrer Mitglieder, unterstützt durch den Reichtum der Sammlungen und die über den ganzen Erdkreis ausgespannten Beziehungen des Grossbritannischen Weltreichs, die Mineralogie mit reichen Ergebnissen gefördert.

Die Wiener Mineralogische Gesellschaft beglückwünscht die Mineralogical Society zu dieser glanzvollen Vergangenheit; sie ist überzeugt, dass die Gesellschaft auch in den kommenden Decennien sich nicht minder segensreich für die Mineralogen des ganzen Erdkreises bewähren werde und begrüsst die Mineralogical Society für alle Zukunft mit dem alten deutschen Bergmanns-Spruch: 'Glück auf!'

Dr. Arthur Marchet,
Schriftführer.

Friedrich Becke,
Präsident.

From Prof. Victor Goldschmidt, Heidelberg.—

An den Präsidenten der Mineralogical Society, London. Verehrter Herr Präsident:

Sie hatten die Güte, mich zu dem schönen Fest Ihres 50jährigen Jubiläums einzuladen, wofür ich aufrichtig danke. Leider kann ich persönlich nicht erscheinen, möchte aber meine besten Wünsche senden für das weitere Blühen der Gesellschaft, die zur Förderung unserer Wissenschaft so viel beigetragen hat.

Mit der Mineralogical Society bin ich aufs engste verbunden, da sie mir 1912 die Ehre erwiesen hat, mich zu ihrem Ehrenmitglied zu machen.¹

Mein wissenschaftlicher Lebenslauf geht parallel mit dem der Gesellschaft. Als sie 1876 gegründet wurde, habe ich meine erste wissenschaftliche Arbeit geschrieben, die 1877 in Fresenius Zeitschrift erschienen ist und heute, nach 50 Jahren, stehe ich noch arbeitsfreudig im Dienst unserer geliebten Wissenschaft.

Unsere Wissenschaft hat zur Entdeckung grosser Gesetze geführt, die nicht nur die Krystallformen beherrschen, sondern der Mannigfaltigkeit in der gesamten Natur ihre Wege vorschreiben. Wenn es mir nun vergönnt war, die Gesetze der Entwicklung der Krystallformen bei den Farben der Kunst und den Tönen der Musik sowie in anderen Gebieten wiederzufinden, so verdanke ich dies unserer hohen Wissenschaft.

Mir will scheinen, als ob, wie früher die Astronomie, heute die Krystallographie berufen sei die Führung unter den Naturwissenschaften zu übernehmen. Um so hohem Ziel zuzustreben, reicht die Kraft und Lebensdauer des Einzelnen

¹ Also an Ordinary Life Member since 1886.

nicht aus und es ist ein grosses Verdienst der Begründer der Mineralogical Society, dass sie unter Verschmelzung mit der Crystallogical Society vor 50 Jahren die Kräfte Englands vereinigt und die des Auslands zur Mitarbeit herangezogen hat. Bald darauf entstand die französische Mineralogische Gesellschaft, später die Wiener und die Deutsche Mineralogische Gesellschaft. Nun sind auch die Amerikaner auf dem Platz erschienen. Die anderen Länder werden folgen. Zwischen diesen Gesellschaften besteht ein internationaler Verband, der, unbekümmert um die leidige Politik, alle vereinigen soll, die den gleichen Zielen zustreben.

England aber mit seiner Mineralogical Society darf sich rühmen, den Weg eröffnet zu haben, wofür die Welt ihm dankbar ist.

Genehmigen Sie als Zeichen der Verehrung ein Exemplar der von mir herausgegebenen „Beiträge zur Krystallographie und Mineralogie“ zu überreichen (soweit erschienen), sowie meine erste Publikation (1877) und die letzte (1925), mit der Bitte dieselben Ihrer Bibliothek einzureihen.¹

In alter Ergebenheit

Dr. Victor Goldschmidt.

From Prof. F. Zambonini, Istituto di Chimica Generale, R. Università di Napoli.—

J'apprécie dans toute sa valeur votre invitation, et j'aurais été bien heureux de me rendre à Londres pour rendre hommage à la Société Minéralogique Anglaise, qui a tant de titre de gloire et peut justement être fière d'avoir eu et de compter encore aujourd'hui des savants à qui nous sommes redevables de bien de progrès dans nos études. Il m'eût été très-agréable aussi de connaître personnellement les minéralogistes anglais, dont j'apprécie les travaux, dans lesquels j'ai appris beaucoup: ces minéralogistes qui sont les dignes successeurs de Whewell, de Wollaston, de Brewster, de Miller, pour ne nommer que ceux qui nous ont appris la cristallographie, nous ont donné les moyens de mesurer exactement les cristaux, et ont bâti les fondements de l'optique des cristaux.

Mais avec un très-grand regret, dans les conditions actuelles de la monnaie italienne, je pense que c'est un devoir de bon citoyen, de suivre le désir du Gouvernement italien, c'est-à-dire que l'argent italien ne doit être dépensé à l'étranger qu'en cas de nécessité.

Je suis sûr que vous sauriez apprécier ma décision de ne pas me rendre à Londres et que vous comprenez parfaitement mon regret de ne pas pouvoir exprimer personnellement à mes collègues anglais mes sentiments d'admiration pour leur œuvre scientifique, mes vœux les plus sincères pour l'avenir de la Mineralogical Society. Je vous prie de vouloir bien vous rendre interprète de mes sentiments.

¹ Beitr. Kryst. Min., vol. 1 (1914-19), vol. 2 (1919-24), vol. 3, pt. 1 (1926).

V. Goldschmidt (Assistent a. d. Königl. Bergakademie zu Freiberg), Ueber Bestimmung des Gewichtes kleiner Silber- und Goldkörner mit Hülfe des Mikroskopes. Zeits. analyt. Chem., 1877, vol. 16, pp. 434-448.

V. Goldschmidt, Materialien zur Musiklehre (2 vols., Heidelberg, 1925).

These volumes were specially bound for the occasion and supplied with a printed dedication: Der Mineralogical Society London zu ihrem 50jährigen Jubiläum 1876-1926 überreicht von Victor Goldschmidt, Heidelberg.

From Prof. G. D'Achiardi, University of Pisa.—

Sono grato dell'invito e spiacente di non potere intervenire alla celebrazione del 50° anniversario della Mineralogical Society.

La prego quindi volere scusare la mia assenza e gradire i più vivi auguri di lunga e prospera vita per la Società, così meritoria del progresso degli studii mineralogici.

È con particolare commozione che io ricordo che il compianto mio genitore ricevette la nomina a membro onorario della Min. Soc. pochi giorni prima della sua morte, e che questo insigne riconoscimento dei suoi meriti consolidò gli ultimi giorni della sua vita!

From Prof. P. N. Chirvinsky, Dean of the Mining Faculty, Don Polytechnic Institute, Novocherkassk, South Russia.—

Г-ну Президенту Британского Минералогического Общества, профессору В. В. Ватсу.

Глубокоуважаемый господин Президент!

По поручению Совета Горного Факультета Донского Политехнического Института имею честь приветствовать Вас и Британское Минералогическое Общество по поводу 50-ти летнего юбилея его славного существования. За пятьдесят лет кристаллография, минералогия и петрография шагнули далеко вперед и в общем еще теснее связались с такими основными науками, как математика, физика и химия. Просматривая работы, собранные в томах печатного органа Общества на протяжении десятков лет, можно ясно проследить эту эволюцию. Не все старое однако стареет—фактическая основа, точный эксперимент или наблюдение, точная цифра и число не теряют никогда своего значения. К такого рода точности в своих работах стремились всегда члены Британского Минералогического Общества. Девизом журнала *Mineralogical Magazine* было всегда: не много по количеству, но много по качеству или как кратко говорили римляне *non multa, sed multum*. Это громадная заслуга Британского Минералогического Общества, дух которого неизменно поддерживается в суровой простоте, оно, как наездник, умеющий держать горячего коня на мундштуке, чтобы ровно и верно идти к цели. Нельзя не приветствовать далее того этапа эволюции научной жизни Общества, который выразился в расширении рефератной части его печатного органа: так можно шире взглянуть на весь ход близких всем нам наук в разных странах, так можно лучше каптировать отдельные струи творчества, чтобы со временем сливать их в один общий неудержимый поток, долженствующий двигать человечество к лучшему будущему. Процветания Вашему Обществу желает горячо Горный Факультет Донского Политехнического Института.

С своей стороны я тем более рад исполнить волю возглавляемого мною Горного Факультета и его Совета, что сам имею честь сотрудничать в журнале Британского Минералогического Общества и тем могу внести свою лепту в дело сближения русской и английской науки.

Да здравствует Британское Минералогическое Общество на многие лета!

Примите, господин Президент, уверение в моем глубоком к Вам уважении и преданности,

П. Чирвинский, проф. и декан Горного Факультета ДПИ.

Translation of Prof. P. N. Chirvinsky's letter (kindly supplied by Colonel N. T. Belaiew).—

To the President,
The British Mineralogical Society,
Professor W. W. Watts.

Dear Mr. President,

On behalf of the Senate of the Faculty of Mining of the Donskoy Polytechnic Institute, I have the honour to greet you and the British Mineralogical Society on the occasion of the fiftieth Jubilee of its glorious existence.

During the span of fifty years crystallography, mineralogy, and petrography have made great strides forward, and in general have come into yet more intimate contact with such bed-rock sciences as mathematics, physics, and chemistry. When one is looking through the publications gathered in the volumes of the Journal of the Society for tens and tens of years, it is easy to see this evolution. But not everything of the past is becoming old—for instance, the facts, the accurate experiments or observation, the accurate figures or ratios never lose their meaning. It is such kind of accuracy which the members of the British Mineralogical Society have been striving for in their works. The motto of the Mineralogical Magazine has been always: 'Not too much in quantity, but rather much in quality', or as the Romans put it concisely: 'Non multa, sed multum.'

It is a tremendous service which is rendered by the British Mineralogical Society, whose spirit is always kept in an austere simplicity. It is like a rider who understands how to master his spirited steed and guide it straight and calmly to its goal.

We cannot refrain from praising also the recent step in the development in the scientific life of the Society, which manifested itself in enlarging the review part of the journal. That enables one to have a wider outlook on the progress of the neighbouring sciences in different countries. It enables one also to capture better the different rivulets in order to bring them together in time into one irresistible stream which ought to take humanity towards its better future.

The Faculty of Mines of the Donskoy Polytechnic Institute most heartily wishes prosperity to your Society. On my own behalf I am the more glad to fulfil the request of the Faculty of Mines and of its Senate over which I am presiding, as I have myself had the honour to be a contributor to the Journal of the British Mineralogical Society, and thus I was able to contribute my mite to the work of bringing together Russian and English sciences.

Live the British Mineralogical Society for ever and ever.

I beg, Mr. President, to ask you to accept my expressions of my highest esteem.

From Prof. W. Vernadsky, Petrograd.—

I beg you to express my best wishes to the Mineralogical Society whose work is so important for the progress of science. I am sorry that it is impossible for me to come and take part with my English friends in the meetings of these historical days.

From Dr. L. Kulik, Meteorite Dept., Mineralogical Museum, Academy of Sciences, Petrograd.—

Circumstances having prevented me from profiting by this kind invitation I beg you to forward my hearty wishes of further prosperity to the Society which has been honourably carrying on the scientific work for the use of all humanity in the course of half a century.

Prof. Gustav von Tschermak, Vienna.—

I am very much indebted for the cordial invitation to attend the celebration of the Jubilee of the British Mineralogical Society of which I am proud to be Honorary Member. I thank you for this honour as also for the kindly offered hospitality during the celebration in London. Therefore I am very sorry to be hindered by my age of ninety years to attend the celebration which as I wish will take a very satisfying course.

Prof. F. Becke, The University, Vienna.—

Leider gestatten die Verhältnisse mir nicht der Einladung Folge zu geben. Um so mehr fühle ich mich gedrängt der Mineralogical Society nebst meinem ergebensten Dank meine herzlichsten Glückwünsche für die zukünftige erfolgreiche Wirksamkeit zum Ausdruck zu bringen, die sich vereint mit der aufrichtigen Bewunderung und Anerkennung des im abgelaufenen halben Jahrhundert von Ihr Geleisteten.

From Dr. H. Michel, Natural History Museum, Vienna.—

Indem ich nochmals herzlichst danke, erlaube ich mir die besten Wünsche zu der Feier des 50jährigen Bestandes Ihrer Gesellschaft, sowohl im Namen der Mineralogisch-Petrographischen Abteilung des Naturhistorischen Museums in Wien sowie im eigenen Namen zu übermitteln.

List of Delegates, Guests, and Members

taking part in the Jubilee Celebration.

R. Allen, Imperial Institute, London.

Dr. H. M. Ami, Ottawa, Canada.

F. N. Ashcroft, London.

W. T. Astbury, Royal Institution, London.

T. V. Barker, University Museum, Oxford.

George Barrow, London.

Dr. F. A. Bather, F.R.S., British Museum (Natural History), President of the Geological Society of London.

Colonel N. T. Belaiew, C.B., London.

*Prof. J. L. H. Borgström, University of Helsingfors, Finland.

Prof. P. G. H. Boswell, University of Liverpool.

Prof. H. L. Bowman, University of Oxford.

Sir William H. Bragg, K.P.E., F.R.S., Royal Institution, London.

* Delegates and Invited Guests.

Dr. A. Brammall, Imperial College of Science, London.

*Prof. R. Brauns, University of Bonn, Germany.

J. Broadhead, Darlington.

A. J. Bull, President of the Geologists' Association, London.

Dr. C. R. Burri, Freiburg, Baden.

Henry Buschor, Barcelona, Spain.

F. H. Butler, London.

Dr. W. A. Caspari, Royal Institution, London.

*Prof. Frank Wigglesworth Clarke, Washington, D.C., U.S.A. (Honorary Member).

H. Collingridge, Romford, Essex.

T. Crook, Imperial Institute, London.

Prof. C. G. Cullis, Imperial College of Science, London.

Dr. H. H. Dale, F.R.S., Secretary of the Royal Society, London.

*E. H. Davison, Camborne, Delegate of the Royal Geological Society of Cornwall.

H. Dewey, Geological Survey of Great Britain, London.

*Dr. J. Drugman, Brussels, Delegate of the French Mineralogical Society.

*Prof. L. Duparc, University of Geneva, Delegate of the Swiss Mineralogical Society.

Dr. A. R. Dwerryhouse, Caversham, Oxfordshire.

*Dr. H. von Eckermann, Delegate of the Geological Society of Sweden.

Dr. J. W. Evans, F.R.S., Imperial College of Science, London.

Dr. L. L. Fermor, Geological Survey of India, Calcutta.

Sir John S. Flett, F.R.S., Director of the Geological Survey of Great Britain, London.

*Joaquin Folch y Girona, Barcelona, Spain.

C. S. Garnett, Derby.

Mrs. C. S. Garnett, Derby.

Dr. W. Goodchild, Threlkeld Sanatorium, Cumberland.

H. S. Gordon, London.

*Samuel G. Gordon, Delegate of the Academy of Natural Sciences of Philadelphia, U.S.A., and of the Mineralogical Society of America.

*Prof. B. Gossner, University of Munich, Germany.

J. F. N. Green, London.

G. Greenwood, University of Manchester.

A. G. F. Gregory, London.

J. W. Gruner, University of Minnesota, Minneapolis, U.S.A.

A. F. Hallimond, Museum of Practical Geology, London.

Dr. A. Harker, F.R.S., Cambridge.

- Dr. H. F. Harwood, Imperial College of Science, London.
 Dr. F. H. Hatch, Mines Department, London.
 H. Heertz, Frankfurt a. M., Germany.
 Prof. H. Hilton, Bedford College, London.
 Sir Thomas H. Holland, K.C.S.I., K.C.I.E., F.R.S., Rector of the
 Imperial College of Science, London.
 J. A. Howe, Geological Survey of Great Britain, London.
 Prof. A. Hutchinson, F.R.S., University of Cambridge, Director of
 the Northern Excursion.
 R. W. James, University of Manchester.
 S. J. Johnstone, Imperial Institute, London.
 A. E. Kitson, Director of the Geological Survey of the Gold Coast.
 Dr. I. E. Knaggs, Royal Institution, London.
 *Prof. Stefan Kreutz, Delegate of the Polish Academy of Sciences, and
 of the Polish Geological Society, Cracow.
 Prof. A. Liversidge, F.R.S., Kingston, Surrey.
 A. D. Lumb, London.
 C. McDermid, Secretary of the Institution of Mining Engineers, London.
 Dr. W. F. P. McLintock, Curator of the Museum of Practical Geology,
 London.
 Lady Rachel Workman McRobert, Tarland, Aberdeenshire.
 G. S. W. Marlow, Secretary of the Faraday Society, London.
 W. Maucher, Munich, Germany.
 Dr. E. T. Mellor, Johannesburg, Transvaal.
 S. Melmore, York.
 Sir Henry A. Miers, F.R.S., Trustee of the British Museum, London.
 H. B. Milner, Imperial College of Science, London.
 E. D. Mountain, British Museum (Natural History), London.
 *Prof. P. Niggli, University of Zürich, Delegate of the Swiss Minera-
 logical Society.
 B. Orelkin, Royal Institution, London.
 Dr. R. L. Parker, Mineralogical Institute, Zürich, Switzerland.
 Dr. John Parkinson, London.
 Dr. G. T. Prior, F.R.S., Keeper of the Mineral Department, British
 Museum (Natural History), London.
 G. M. Puckle, Eversley, Hampshire.
 Dr. W. A. Richardson, Principal of the School of Science and Art,
 Newark-on-Trent.
 *Prof. F. Rinne, University of Leipzig, Delegate (President) of the
 German Mineralogical Society.

- Sir Robert Robertson, F.R.S., Government Laboratory, London.
 A. Russell, Swallowfield Park, Reading, Director of the Southern Excursion.
 Dr. G. F. Herbert Smith, British Museum (Natural History), London.
 W. Campbell Smith, British Museum (Natural History), Secretary of the Geological Society of London.
 Dr. L. J. Spencer, F.R.S., British Museum (Natural History), London.
 *Dr. H. Steinmetz, University of Munich, Germany.
 *F. J. Stephens, Camborne, Delegate of the Royal Geological Society of Cornwall.
 W. E. Swinton, British Museum (Natural History), London.
 J. C. Taylor, London.
 Dr. H. H. Thomas, Geological Survey of Great Britain, London.
 S. I. Tomkeieff, Armstrong College, Newcastle-on-Tyne.
 B. J. Tully, London.
 Dr. A. E. H. Tutton, F.R.S., Cambridge.
 *Dr. H. Ungemach, Paris, France.
 J. W. Walker, Toronto, Canada.
 *Prof. T. L. Walker, University of Toronto, Delegate of the Mineralogical Society of America.
 Prof. W. W. Watts, F.R.S., Imperial College of Science, London.
 Kathleen Yardley, Royal Institution, London.

Officers of the Mineralogical Society (1876-1926).

Presidents.

1876-79	Henry Clifton Sorby, <i>F.R.S.</i>
1879-81	Matthew Forster Heddle, <i>M.D.</i>
1881-83	Wilfred Hudleston Hudleston, <i>F.R.S.</i>
1883-85	Thomas George Bonney, <i>F.R.S.</i>
1885-88	<i>Sir</i> Lazarus Fletcher, <i>F.R.S.</i>
1888-91	Robert Henry Scott, <i>F.R.S.</i>
1891-98	Mervyn Herbert Nevil Story-Maskelyne, <i>M.P.</i> , <i>F.R.S.</i>
1898-1901	<i>Sir</i> Arthur Herbert Church, <i>K.C.V.O.</i> , <i>F.R.S.</i>
1901-04	Hugo Heinrich Wilhelm Müller, <i>F.R.S.</i>
1904-09	<i>Sir</i> Henry Alexander Miers, <i>F.R.S.</i>
1909-12	William James Lewis, <i>F.R.S.</i>
1912-15	Alfred Edwin Howard Tutton, <i>F.R.S.</i>
1915-18	William Barlow, <i>F.R.S.</i>
1918-21	<i>Sir</i> William Phipson Beale, <i>Baronet</i> , <i>K.C.</i> , <i>M.P.</i>

- 1921-24 Arthur Hutchinson, *F.R.S.*
 1924- William Whitehead Watts, *F.R.S.*

Vice-Presidents.

- 1876-97 Samuel Haughton, *F.R.S.*
 1876-79 Matthew Forster Heddle, *M.D.*
 1879-83 Thomas George Bonney, *F.R.S.*
 1883-88 Wilfred Hudleston Hudleston, *F.R.S.*
 1888-1901 Hugo Heinrich Wilhelm Müller, *F.R.S.*
 1897-1898 Sir Arthur Herbert Church, *K.C.V.O., F.R.S.*
 1898-1908 George Downing Liveing, *F.R.S.*
 1901-04 Sir Henry Alexander Miers, *F.R.S.*
 1904-09 William James Lewis, *F.R.S.*
 1908-12 Alfred Edwin Howard Tutton, *F.R.S.*
 1909-24 Herbert Lister Bowman, *D.Sc.*
 1912-21 Arthur Hutchinson, *F.R.S.*
 1921-25 Herbert Henry Thomas, *Sc.D.*
 1924- Harold Hilton, *D.Sc.*
 1925- Sir Thomas Henry Holland, *K.C.S.I., K.C.I.E., F.R.S.*

Treasurers.

- 1876-85 Robert Philips Greg.
 1885-91 Thomas George Bonney, *F.R.S.*
 1891-1901 Frederick William Rudler.
 1901-02 Charles Alexander McMahon, *F.R.S., Lieutenant-General.*
 1902-18 Sir William Phipson Beale, *Baronet, K.C., M.P.*
 1918-24 John William Evans, *F.R.S.*
 1924- Frederick Noel Ashcroft.

General Secretaries.

- 1876-81 Joseph Henry Collins.
 1881-88 Robert Henry Scott, *F.R.S.*
 1888-1909 Sir Lazarus Fletcher, *F.R.S.*
 1909- George Thurland Prior, *F.R.S.*

Foreign Secretaries.

- 1876-84 Sir Clement Le Neve Foster, *F.R.S.*
 1884-92 Thomas Davies.
 1892-1906 John Wesley Judd, *F.R.S.*
 1906-1924 William Whitehead Watts, *F.R.S.*
 1924- John William Evans, *F.R.S.*

Editors of the Journal.

1876-81	The General Secretary [J. H. Collins].
1881-88	„ „ „ [R. H. Scott].
1888-91	„ „ „ [Sir L. Fletcher].
1891-1900	Sir Henry Alexander Miers, <i>F.R.S.</i>
1900-	Leonard James Spencer, <i>F.R.S.</i>

Trustees.

1876-89	William Bernard de Blaquiére, <i>5th Baron de Blaquiére.</i>
1876-94	Patrick Dudgeon.
1889-1911	Mervyn Herbert Nevil Story-Maskelyne, <i>M.P., F.R.S.</i>
1894-1916	Robert Henry Scott, <i>F.R.S.</i>
1911-	Sir Henry Alexander Miers, <i>F.R.S.</i>
1911-	Friedrich Noel Ashcroft Fleischmann, <i>afterwards</i> Frederick Noel Ashcroft.

Librarians.

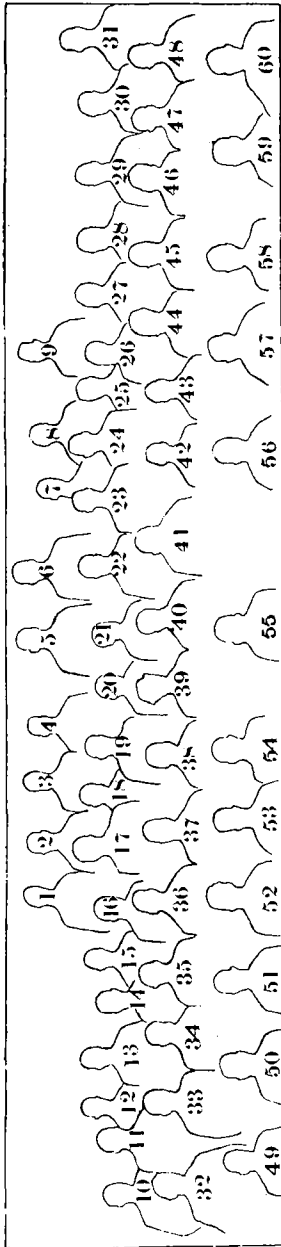
1876-81	The General Secretary [J. H. Collins].
1881-89	Frederick William Rudler.
1889-1925	William James Lewis, <i>F.R.S.</i>
1925-	Arthur Hutchinson, <i>F.R.S.</i>

Honorary Members* (1877-1926).

- Baumhauer, Heinrich, *Freiburg, Switzerland* (1905-26).
 Becke, Friedrich Johann, *Vienna* (1909-).
 Bertrand, Émile, *Paris* (C-1909).
 Brezina, Maria Aristides, *Vienna* (1895-1909).
 Brøgger, Waldemar Christofer, *Christiania = Oslo* (1895-).
 Brush, George Jarvis, *New Haven, Connecticut* (1879-1912).
 Calderón y Arana, Salvador, *Madrid* (1909-11).
 Cesàro, Giuseppe, *Liège* (1909-).
 Clarke, Frank Wigglesworth, *Washington, D.C.* (1913-).
 Cotta, Carl Bernhard von, *Freiberg, Saxony* (1879).
 D'Achiardi, Antonio, *Pisa* (1902).
 Dana, Edward Salisbury, *New Haven, Connecticut* (1897-).
 Dana, James Dwight, *New Haven, Connecticut* (1877-95).

* Termed Corresponding Members until 1900. C denotes Corresponding Member of the Crystallogical Society; these (three) were elected Corresponding Members of the Mineralogical Society on February 12, 1884, following the amalgamation of the two Societies on December 11, 1883.

- Daubrée, Gabriel Auguste, *Paris* (1879-96).
 Delesse, Achille Ernest Oscar Joseph, *Paris* (1879-81).
 Des Cloizeaux, Alfred Louis Olivier Legrand, *Paris* (1879-97).
 Esmark, *Pastor, Christiania* (1877-82).
 Fedorov, Evgraf Stepanovich, *St. Petersburg* (1910-1919).
 Fouqué, Ferninand André, *Paris* (1898-1904).
 Geinitz, Hanns Bruno, *Dresden* (1879-1900).
 Goldschmidt, Victor, *Heidelberg* (1912-). [Also an Ordinary Life Member since 1886.]
 Groth, Paul Heinrich von, *Munich* (1877-)
 How, Henry, *Windsor, Nova Scotia* (1877-79).
 Johnstrup, Johannes Frederik, *Copenhagen* (1877-94).
 Kjerulf, Theodor, *Christiania* (1877-88).
 Klein, Johann Friedrich Carl, *Berlin* (1895-1907).
 Kobell, Wolfgang Xaver Franz von, *Munich* (1879-82).
 Lacroix, Antoine François Alfred, *Paris* (1900-).
 Lang, Victor von, *Vienna* (C-1921).
 Lévy, Auguste Michel, *Paris* (1898-1911).
 Liebisch, Theodor, *Berlin* (1903-22).
 Ludwig, Ernst, *Vienna* (1883-1915).
 Moissenet, Vivant Léon, *Paris* (1877-1906).
 Nordenskiöld, Baron Nils Adolf Erik, *Stockholm* (1877-1901).
 Penfield, Samuel Lewis, *New Haven, Connecticut* (1904-06).
 Rammelsberg, Carl Friedrich August, *Berlin* (1879-99).
 Rath, J. J. Gerhard vom, *Bonn* (1879-88).
 Renard, Alphonse François, *Brussels* (1879-1903).
 Romanovsky, Nikolai Maximilianovich, *Grand Duke of Leuchtenberg, St. Petersburg* (C-1891).
 Rosenbusch, Karl Harry Ferdinand, *Heidelberg* (1879-1914).
 Sandberger, Karl Ludwig Fridolin von, *Würzburg* (1879-98).
 Sella, Quintino, *Rome* (1879-84).
 Steenstrup, Knud Johannes Vogelius, *Copenhagen* (1877-1913).
 Struever, Johannes Karl Theodor, *Rome* (1903-15).
 Tschermak, Gustav von, *Vienna* (1879-).
 Viola, Carlo Maria, *Parma* (1912-25).
 Waage, Peter, *Christiania* (1877-1900).
 Wallerant, Frédéric, *Paris* (1913-).
 Wiik, Fredrik Johan, *Helsingfors* (1880-1909).
 Zirkel, Ferdinand, *Leipzig* (1879-1912).



KEY TO GROUP (Plate II).

- Back row.*
1. Mr. W. Campbell Smith.
 2. Dr. H. H. Thomas.
 3. Dr. G. F. Herbert Smith.
 4. Prof. H. L. Bowman.
 5. Mr. F. N. Asheroff.
 6. Dr. C. R. Burri.
 7. Mr. J. Broadhead.
 8. Mr. J. A. Howe.
 9. Mr. C. S. Garnett.
- Second row.*
10. Mr. A. J. Bull.
 11. Mr. J. W. Gruner.
 12. Mr. A. F. Hallimond.
 13. Dr. W. F. P. McLintock.
 14. Mr. S. G. Gordon.

15. Mr. B. J. Tully.
16. Col. N. T. Beliew.
17. Dr. H. von Eckermann.
18. Dr. H. Steinmetz.
19. Dr. L. J. Spencer.
20. Dr. F. H. Hatch.
21. Dr. F. A. Bather.
22. Prof. A. Hutchinson.
23. Mr. E. H. Davison.
24. Dr. L. L. Fermor.
25. Mr. W. Maucher.
26. Dr. A. E. H. Tutton.
27. Sir T. H. Holland.
28. Sir J. S. Flett.
29. Mr. J. Foley y Girona.
30. Mr. W. J. Anderson.
31. Mr. J. C. Taylor.

Third row.

32. Dr. A. R. Dwerryhouse
33. Prof. S. Kretz.
34. Prof. J. L. H. Borgström.
35. Prof. B. Gossner.
36. Prof. T. L. Walker.
37. Prof. P. Niggli.
38. Sir H. A. Miers.
39. Sir David Prain.
40. Lord Ullswater.
41. Lord Rothschild.
42. Prof. W. W. Watts.
43. Dr. G. T. Prior.
44. Prof. F. Rinne.
45. Prof. R. Brauns.
46. Prof. L. Dupare.

47. Dr. H. Ungemach.
48. Dr. J. Drugman.

Front row.

49. Mr. T. H. Withers.
50. Mr. H. Heertz.
51. Mr. W. E. Swinton.
52. Mr. J. W. Walker.
53. Mr. E. D. Mountain.
54. Mr. G. Greenwood.
55. Mr. A. T. Hopwood.
56. Mr. S. I. Tomkeiff.
57. Prof. C. G. Cullis.
58. Prof. P. G. H. Boswell.
59. Mr. H. Buschor.
60. Dr. R. L. Parker.



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MINERALOGICAL SOCIETY, JUBILEE CELEBRATION, LONDON, 1926