

PROCEEDINGS OF THE MINERALOGICAL SOCIETY (1965)

EXCERPT MINUTES OF COUNCIL MEETING

Held in the Apartments of the Geological Society, Burlington House, London, W.1, 14 January 1965, at 3 p.m.

Prof. J. H. TAYLOR, President, in the Chair

The following were provisionally elected Ordinary Members of the Society: Ian Baker, John Edmund Crabtree, Peter Hadwen, Keith John Henley, Edward Francis Xavier Lyden, Robert Ansley Roach, and Frank Marcus Vokes.

The death of Dr. Arie Poldervaart was reported.

The resignations of Dr. D. L. Revnolds, Dr. M. Macgregor, and Mr. J. F. Wyley were accepted.

Reports were received from the Treasurer, the Editors, the Clay Minerals Group, and the Society's delegates to the meeting of the International Mineralogical Association at New Delhi in December 1964.

GENERAL MEETING

Held in the Apartments of the Geological Society, Burlington House, London, W.1, 14 January 1965, at 5 p.m.

Prof. J. H. TAYLOR, President, in the Chair.

The elections of Ordinary Members provisionally made by the Council were confirmed.

The following papers were read and discussed:

1. Layered structure in rocks of the Jotunheim Complex, Norway: by Dr. M. H. Battey (vol. 34, p. 35).
2. Mechanism of formation of forsterite and enstatite from serpentine: by Dr. G. W. Brindley and Mr. Ryozo Hayami (vol. 35, p. 189).
3. A meteorite of unique type from Western Australia: by Dr. G. J. H. McCall (vol. 35, p. 241).
4. A rational nomenclature for the calciferous and sub-calciferous amphiboles: by Dr. B. E. Leake.

The calciferous amphiboles are defined as containing Ca 1.50 and above in the unit

cell, calculated on the basis of 24(O, OH, F, Cl) while the subcalciferous amphiboles contain between 1.00 and 1.50 Ca in the unit cell. The naming of these amphiboles is at present highly confused, mainly because the limits to the ranges of composition to be covered by each of the many names proposed have never been given in a systematic way.

A system is proposed which is based on the well-known end members tremolite, richterite, tschermakite, edenite, pargasite, and hastingsite. Three important variables define the main name to be given to an amphibole, namely the amounts of Si, Ca + Na + K, and $Mg/(Mg + Mn + Fe^{3+} + Fe^{2+})$ in the unit cell. Prefixes then indicate the ranges of Na, Ca, Ti, Al^{vi}, Mn, Cr, K, Cl, OH, F, and Fe^{3+}/Fe^{2+} . This avoids making new names other than those obtained by prefixing adjectives; retains the traditional meaning of the well-known end members and such terms as actinolite and kaersutite; dispenses with the need for the more obscure names and enables the composition with respect to no less than 15 variables to be conveyed by the name.

Because prefixes are only added for the more unusual compositions, the system is effective without being unwieldy, and out of 923 published analyses which have been named, no less than 816 (or 88 per cent.) have at the most two adjectives.

The following papers were taken as read:

1. The identification, mode of occurrence, and quantitative determination of crystalline phases in granulated blast-furnace slag: by Dr. J. G. D. Steyn (vol. 35, p. 108).
 2. Mineralogy of certain pyrite concretions from Israel and their alteration products: by Dr. E. E. Sass, Dr. Y. Nathan, and Dr. A. Nissenbaum (vol. 35, p. 84).
 3. Intergrowths in ilmenites of the beach sands of Kerala: by Dr. N. K. Rao and Dr. G. V. U. Rao (vol. 35, p. 118).
 4. A study of uvarovite: by Dr. T. Isaacs (vol. 35, p. 38).
 5. A scheme of cation distribution in the amphiboles: by Dr. Subrata Ghose (vol. 35, p. 46).
 6. Alteration products of olivine and pyroxene in basalt lavas from the Isle of Mull: by Dr. J. J. Fawcett (vol. 35, p. 55).
 7. The crystal structure of sinhalite: by Dr. J. H. Fang and Dr. R. E. Newnham (vol. 35, p. 196).
 8. Gyrolite and reyerite from 'S Airde Beinn, northern Mull: by Dr. J. R. Cann (vol. 35, p. 1).
 9. Enhanced production of magnesium silicates from strained magnesia: by Mr. W. F. Bush and Dr. W. O. Williamson (vol. 35, p. 177).
 10. Italian meteorites: by Dr. Bartolomeo Baldanza (vol. 35, p. 214).
 11. An occurrence of phlogopite and its transformation to vermiculite by weathering: by Dr. W. W. Smith Aitken (vol. 35, p. 151).
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EXCERPT MINUTES OF COUNCIL MEETING

*Held in the Apartments of the Geological Society, Burlington House,
London, W.1, 11 March 1965, at 2.45 p.m.*

Prof. J. H. TAYLOR, President, in the Chair

The following were provisionally elected Ordinary Members of the Society: Thomas Keith Ball, Robert John Gilkes, Peter Mark Harris, Kost Andrij Pankiwskij, William Ian Ridley, Heinz Georg Scharbert, and Atso Ilmari Vormaa.

The resignations of V. L. Aspland, H. D. Glass, and J. Goodyear were accepted.

Reports were received from the Treasurer, the Editors, and the Clay Minerals Group.

GENERAL MEETING

*Held in the Apartments of the Geological Society, Burlington House,
London, W.1, 11 March 1965, at 5 p.m.*

Prof. J. H. TAYLOR, President, in the Chair

The following papers were read:

1. Some crystallographic studies in the system $\text{CaSO}_4\text{-CaSO}_4\cdot 2\text{H}_2\text{O}$.
I. The polymorphism of anhydrous CaSO_4 : by Dr. P. Gay (vol. 35, p. 347).
2. Some crystallographic studies in the system $\text{CaSO}_4\text{-CaSO}_4\cdot 2\text{H}_2\text{O}$.
II. The hydrous forms: by Dr. P. Gay (vol. 35, p. 354).
3. Calciostromianite in the basal Purbeck beds of Durlston Head, Dorset: by Dr. D. L. Salter and Dr. Ian M. West (vol. 35, p. 146).
4. Potash-trachytes and other ultra-potassic rocks associated with the carbonatite complex of the Toror Hills, Uganda: by Dr. D. S. Sutherland (vol. 35, p. 363).
5. Pandaite from the Mrima Hill niobium deposit (Kenya): by Mr. P. M. Harris (vol. 35, p. 277).

The following paper was taken as read:

A chlorite-corundum rock from Mount Painter, South Australia: by Dr. R. L. Oliver and Dr. J. B. Jones (vol. 35, p. 140).

JOINT MEETING WITH THE SOCIÉTÉ FRANÇAISE
DE MINÉRALOGIE ET DE CRISTALLOGRAPHIE

*Held in the Laboratoire de minéralogie et cristallographie, Sorbonne, 1 rue
Victor-Cousin, Paris 5^e, 29 and 30 April 1965*

The following papers were read and discussed:

1. Reflectivity standards and dispersion curves for selected minerals: by Mr. S. H. U. Bowie, Dr. N. F. M. Henry, Mr. J. H. Leow, and Mr. P. R. Simpson.

Reflectivity data for synthetic carborundum, pyrite, and silver-backed glass obtained by the National Physical Laboratory, using an *integrating-sphere* photometer, are presented. The principal reflectivities of six mineral species in air, over the visible range, using an amplified selenium-cell photometer and 'continuous-band' interference filter, are given. The minerals studied are: arsenopyrite, bournonite, chalcocite, covelline, pyrrhotite (hexagonal), and stibnite. Dispersion curves are also given for molybdenite in oil as well as in air, and values derived for the refraction and absorption coefficients.

2. The occurrence of platinoid bismuthotellurides in the Merensky Reef at Rustenberg platinum mine in the western Bushveld: by G. A. Kingston.

3. Measurement of reflectivity with the Reichert microphotometer: by D. Santokh Singh.

A description is given of the new Reichert reflex spectral microphotometer developed by Dr. Gabler of Vienna. The instrument is composed essentially of a dielectric strip monochromator, ranging from 400 to 700 $m\mu$, together with a photomultiplier circuit of high stabilization specifications, with dark current compensation. An ingenious mirror diaphragm optical system, of variable aperture, enables areas as small as one micron to be measured at half-height band widths of 2–5 $m\mu$. The instrument is mounted on a Reichert Zetapan reflecting microscope.

Experiments have demonstrated a high degree of reproducibility of results, together with a linear response of the photometer. Comparative measurements, at 18 wavelengths between 400 and 700 $m\mu$, are given of various standards that have been calibrated by the National Physical Laboratory, Teddington, and by Zeiss Ltd. These include pyrite and basal sections of hematite, carborundum, and quartz. Tabulated data are also given showing various differences in the spectral profiles of pyrite from various localities—some having a reflectivity at 400 $m\mu$ of 39.1% compared with the Atomic Energy Division (U.K.) standard of 37.8%, others with a reflectivity at 700 $m\mu$ of 53.9%, compared with 55.8%.

4. A new method for the absolute measurement of reflectivity: by P. M. D. Bradshaw, R. Phillips, and R. A. Smith.

5. A test of the linearity of a photomultiplier used for reflectivity measurement: by P. M. D. Bradshaw and R. Phillips (vol. 35, p. 756).

The following paper was taken as read:

Mass absorption coefficients and their relevance in electron-probe microanalysis: by Dr. J. K. Kelly.

A general assessment is given of absorption, overvoltage, atomic number, and fluorescence correction procedures in quantitative electron-probe microanalysis. The accuracy of certain commonly accepted mass absorption coefficients is shown to be in doubt, especially at long wavelengths, and an attempt has been made, by graphical and numerical methods, to establish the most consistent data for elements of Z number 6 to 92, over the wavelength range 0.6 to 15 Å. Formulae are presented that enable any mass absorption coefficient in this range to be calculated, and these formulae are especially suitable for incorporation in computer programmes. In view of the complexity introduced by absorption edges, the values have been incorporated in an *isomac* graph, which shows the position of all edges from K to Np, from which mass absorption coefficients can be obtained to a high order of accuracy.

The following papers were presented by members of the Société française de Minéralogie et de Cristallographie and by guest speakers:

1. Results obtained by the study in transmitted light (infra-red) of some minerals opaque in visible light: by MM. R. Caye, C. Lévy, and R. Picot.

2. A new apparatus for measuring reflectivity: by M. J. Prouvost.

3. Recording of decrepitation applied to the determination of the temperatures of deposition of minerals: by MM. R. Pulon and J. de Croizant.

4. Development of a balance for magnetic measurements: by M. J. C. Reithler.

5. Dispersion of the reflectivity and symmetry of normal stannite, 'yellow stannite', and 'orange bornite': by M. C. Lévy.

6. Measurement of the percentage reflectivity in polished sections with the equipment of Evans Electro-selenium Ltd., Belix Company, and Electronic Equipment Ltd., of England, with Carl Zeiss microscopes: by MM. M. Font-Altaba and J. M. A. Bosch-Figueroa.

7. The influence of light reflections at lens and plane-glass surfaces in reflectivity measurements with the microscope: by M. H. Piller.

GENERAL MEETING

Held in the Apartments of the Geological Society, Burlington House, London, W.1, 21 May 1965, at 2.30 p.m.

The following papers were read and discussed:

1. Kimberlites and the mantle?: by Dr. J. B. Dawson and Dr. C. F. Davidson.

Most geologists believe that the mantle is composed of either eclogite or garnetiferous peridotite, small amounts of which are found in diverse environments in the earth's crust. However, kimberlites and carbonatites, which also originate at great depth, contain considerable concentrations of volatiles. These, along with the volatiles released during volcanic activity, should be taken into account when attempting to assess the nature of the mantle.

2. The melting of upper mantle materials: by Dr. P. G. Harris.

The upper mantle is thought to consist either of basic material of eclogite mineralogy, or of ultrabasic material. For both these compositions, the stability fields of the mineral phases and the liquidus temperatures have been determined at a range of high pressures, in laboratories in U.S.A. and Australia. At low pressures, the partial fusion of peridotite can produce tholeiitic and picritic liquids. The role of pressure in controlling the formation of alkali basalt and of more alkaline magmas still awaits experimental verification, although recent work suggests that the crystallization of pyroxene is the controlling factor.

The mechanism and speed of ascent of a magma could affect its composition.

3. Deep-sea basalts and the constitution of the upper mantle: by Dr. G. D. Nicholls.

Basalts dredged from the ocean floor are generally tholeiitic in character, but types showing affinities with alkaline olivine basalts and high alumina basalt are now known. While the number of samples studied in detail is still too small to permit of any interpretation other than a most tentative hypothesis, there does appear to be some regularity in the distribution of the various types. Almost all the reported high alumina basalts have come from the mid-ocean ridge system where they are associated with tholeiites. The sub-surface structure under the mid-ocean ridge system is known to be different from that under the deep abyssal plains and the apparent restriction of the high alumina basalts to the ridge system, when they are found below the deep ocean, may be related to this difference in sub-surface structure. The distribution of basalt types supports the Hess hypothesis that the upper mantle below the mid-ocean ridge system is locally more hydrated than it is under the deep abyssal plains. This hypothesis is further supported by the dredging of serpentine from various localities on the deep ocean floor in recent years. On the basis of this hypothesis a tentative estimation of the chemical composition of the upper mantle in oceanic areas may be made.

4. Lead isotopes and the mantle: by Dr. A. G. Darnley.

A review is undertaken of some published and unpublished results concerning the isotopic composition of lead and the information that can be derived from these results. Attention is drawn to the conflicting interpretations that have been put upon them. Th/U and U/Pb ratios of galena source material are compared with similar measurements on various rock types. The significance of these results with respect to the mantle is discussed.

5. Strontium isotopes and the mantle: by Dr. S. Moorbath.

The abundance ratio ($^{87}\text{Sr}/^{86}\text{Sr}$) in meteorites, and probably in the earth 4.5×10^9 years ago, was 0.698. In modern oceanic and continental basalts, and in their source region in the upper mantle, the ratio has increased to an average value of 0.704, due to the radioactive decay of ^{87}Rb . The growth line joining these two values appears to be at least approximately linear with time and corresponds to an Rb/Sr ratio of

about 0.03 in the source region of basalt. This is quite close to the value actually measured in many basalts.

Very small variations in the initial $^{87}\text{Sr}/^{86}\text{Sr}$ ratio of basic igneous rocks have been observed in certain areas by a number of workers. Such minor variations have been attributed to various petrogenetic processes, or to local inhomogeneities in the Rb/Sr ratio of the upper mantle.

Recent work, by the M.I.T. group and others, on ultramafic rocks in both oceanic and continental environments (excluding obviously igneous cumulates) indicates that such rocks may have relatively high and variable initial $^{87}\text{Sr}/^{86}\text{Sr}$ and Rb/Sr ratios, sometimes quite outside the typical basaltic range. The reasons for this are discussed in the lecture. It is shown that these observations probably constitute a criterion for deciding whether a given ultramafic rock represents undifferentiated, primordial mantle, or 'barren' mantle, from which all extractable basalt had already been removed.

6. World-wide distribution of heat-flow and the upper mantle: by Dr. S. K. Runcorn.

The once generally accepted view of the geothermal history of the earth postulated that the radioactive elements had been concentrated in the sialic rocks of the continents. Cooling of the depths of the mantle by conduction was too slow to allow an appreciable radioactivity in the rocks of the mantle.

The agreement between the mean heat flow through the ocean floor and the continents shows that this old theory is wrong. Consequently the world-wide survey of the distribution of geothermal flux is an important piece of evidence concerning the physical and chemical processes in the upper mantle.

Some correlation exists between this distribution and that of the geoid, determined from satellite observations. Inferences may be drawn concerning the nature of convection in the mantle.

EXCERPT MINUTES OF COUNCIL

*Held in the Apartments of the Geological Society, Burlington House,
London, W.1, 3 June 1965, at 3 p.m.*

Prof. J. H. TAYLOR, President, in the Chair

The following were provisionally elected Ordinary Members of the Society: Alan Richard Date, Mohamed Abdel-Hamid El-Sharkawi, Ian Graham Gass, William Cecil Gregory, Stephen Edward Haggerty, Christopher Halls, Muhammad Nawaz Nawaz, Joan Marion Rooke, Andrew Stott, Paul Ross Van Loan, Ian Michael West, and Mahmood Ali Khan Yusufi.

The death of Mr. A. E. Vann was reported.

The resignations of Mr. D. J. Greenland and Dr. G. Nagelschmidt were accepted.

Prof. T. Barth was provisionally elected an Honorary Member of the Society.

Reports were received from the Treasurer, the Editors, the Clay Minerals Group, the Publications Committee, and the Committee on Geochemistry.

GENERAL MEETING

Held in the Apartments of the Geological Society, Burlington House, London, W.1, 3 June 1965, at 5 p.m.

Prof. J. H. TAYLOR, President, in the Chair

The elections of Prof. T. Barth as an Honorary Member and of 12 Ordinary Members, provisionally made by Council, were confirmed.

The following exhibits were shown:

1. 'Harrisitic' mineral orientation in a banded dyke in northern Skye: by Dr. H. I. Drever.

2. A continuous, laboratory-size density separator for granular materials: by Mr. M. P. Jones (vol. 35, p. 536).

The following papers were read and discussed:

1. The pyroxenes of the alkaline igneous complexes of eastern Uganda: by Miss R. C. Tyler and Dr. B. C. King.

Chemical analyses, some optical data, and specific gravities are given for 57 pyroxenes from the alkaline rocks of Uganda. They are members of the diopside-hedenbergite-acmite series, the more diopsidic varieties occurring in rocks of the ijolite series and the more acmitic in syenites and carbonatites. TiO_2 is highest in those pyroxenes from rocks that do not contain melanite. The refractive indices and specific gravities are controlled by the Fe^{2+}/Mg ratio in the diopsidic pyroxenes and by the Fe^{3+} content in the acmitic members. Paragenesis is discussed briefly.

2. Stability and relations of the Al-Fe epidotes: by Dr. R. G. J. Strens (vol. 35, p. 464).

3. On the distribution of strontium in some dolomitized and dedolomitized limestones from the French Jura: by Dr. N. H. Shirmohammadi and Dr. D. J. Shearman.

The distribution of strontium in a series of Upper Jurassic limestones from the southern part of the French Jura shows that strontium was lost from the rocks as a result of dolomitization and that a further loss of Sr occurred when these dolomites were subsequently dedolomitized. The calcite of the unaltered limestones carries an average of 230 ppm Sr, the dolomite approximately 110 ppm Sr, and the calcite after dolomite only 30 ppm. The strontium content of any sample of limestone is proportional to the extent to which the rock has been dolomitized and dedolomitized.

The following papers were taken as read:

1. Tin-containing andradite from Plavno mine in the Krušné Hory, Czechoslovakia: by Dr. V. Dadák and Dr. F. Novák (vol. 35, p. 379).

2. An improved water-cell for the Emmons double-variation procedure: by Dr. J. Tarney and Dr. E. D. Lacy (vol. 35, p. 418).
3. Determination of optic axes and $2V$: electronic computation from extinction data: by Dr. N. Joel (vol. 35, p. 412).
4. Porphyroblastic adularia from Shimabala, Zambia: by Dr. D. I. J. Mallick (vol. 35, p. 401).
5. Solubility of basalt under atmospheric conditions of temperature and pressure: by Dr. Beryl Nashar and Mr. Ralph Basden (vol. 35, p. 408).
6. Garnets from the Eilat area, southern Israel: by Dr. Y. Nathan, Dr. A. Katz, and Dr. M. Eyal (vol. 35, p. 386).
7. The high-temperature behaviour of beryl melts and glasses: by Dr. R. P. Miller and Dr. R. A. Mercer (vol. 35, p. 250).
8. The mineralogy of metamorphosed basic rocks from the Willyama complex, Broken Hill district, New South Wales. Part I. Hornblendes: by Dr. R. A. Binns (vol. 35, p. 300).

EXCERPT MINUTES OF COUNCIL

Held in the Apartments of the Geological Society, Burlington House, London, W.1, 9 September 1965, at 2.30 p.m.

Prof. J. H. TAYLOR, President, in the Chair

The resignation of Dr. J. R. Butler as General Secretary was accepted with regret. Dr. R. A. Howie was appointed to fill this vacancy until the Anniversary Meeting (Rule 28).

GENERAL MEETING

Held in the Geology Department, Durham University, South Road, Durham, 23 September 1965, at 2.30 p.m.

Prof. J. H. TAYLOR, President, in the Chair

The following papers were read and discussed:

1. The mineralogy of metamorphosed basic rocks from the Willyama complex, Broken Hill district, New South Wales. Part II. Pyroxenes, garnets, plagioclases, and opaque oxides: by Dr. R. A. Binns (vol. 35, p. 561).

2. Amphibole compositional space: by Dr. R. Phillips.
3. Observations on the applicability of the pyrrhotine geothermometer in the light of the composition and crystal structure of pyrrhotine in differing ore deposits: by Dr. A. Horrell Clark.
4. A note on the $\bar{2}01$ spacing of some lime-rich alkali feldspars from Kangerdlugssuaq, east Greenland: by Dr. D. R. C. Kempe (vol. 35, p. 704).
5. The appinites and associated rocks of Cnoc a'Ghriama, Sutherland: by Dr. D. R. Bowes, Dr. T. S. Ghaly, and Dr. A. E. Wright.
6. The nature and genesis of the plutonic intrusions of Colonsay, Argyll: by Dr. T. S. Ghaly.
7. On the constitution of the mineral delafossite: by Dr. D. S. Buist, Dr. A. M. M. Gadalla, and Dr. J. White (vol. 35, p. 731).

The following papers were taken as read:

1. Plagioclase twins in some mafic gneisses from Broken Hill, Australia: by Dr. R. H. Vernon (vol. 35, p. 488).
2. New material from, and a reconsideration of, the Dalgara meteorite and crater, Western Australia: by Dr. G. J. H. McCall (vol. 35, p. 476).
3. Isotopic ages of the basic charnockite and khondalite from Kondapalli, Andhra Pradesh, India: by Dr. R. L. Grasty and Dr. C. Leelanandam (vol. 35, p. 529).
4. Transformation of ankerite during thermal treatment: by Dr. D. R. Dasgupta (vol. 35, p. 634).
5. Mineralogical and radiometric studies of monazite and sphene occurrences in the Namib desert, South-west Africa: by Dr. A. J. Burger, Dr. O. von Knorring, and Dr. T. N. Clifford (vol. 35, p. 519).
6. The mineralogy of the potassium-barium feldspar series: I. The determination of the optical properties of natural members: by Dr. N. N. Roy (vol. 35, p. 508).

EXCERPT MINUTES OF COUNCIL MEETING

Held in the Apartments of the Geological Society, Burlington House, London, W.1, 4 November 1965, at 3 p.m.

Prof. J. H. TAYLOR, President, in the Chair

The following were provisionally elected Ordinary Members of the Society: Malcolm Joseph Abbott, Roger George Burns, Richard Clarkson Erd, Fergus George Ferguson Gibb, Denis Charles Goldring, Jeremy

John Tertius Harvey, David Nixon Holt, David Ronald Charles Kempe, Gordon Andrew Kingston, Chervela Leelanandam, Derek Lawrence Searle, Michael Alan Smith, John Knox Sutherland, Adriaan Hendrik Van der Veen, and John Nicholas Walsh.

The deaths of Prof. Arthur Holmes and Mr. G. E. Howling were reported.

The resignation of Dr. W. R. Jones was accepted.

Reports were received from the Treasurer, the Editors, the Clay Minerals Group, and the Publications Committee.

ANNIVERSARY MEETING

Held in the Apartments of the Geological Society, Burlington House, London, W.1, 4 November 1965, at 5 p.m.

Prof. J. H. TAYLOR, President, in the Chair

The elections of Ordinary Members provisionally made by the Council were confirmed.

The General Secretary then read the following:

ANNUAL REPORT 1964-65

Membership. The total membership on 31 October 1965 was 887 against 861 on 31 October 1964. Forty new Ordinary Members and one Honorary Member have been elected during this year, eleven members have resigned, and the Society has lost by death three Ordinary Members. On 31 October 1965 the membership consisted of 9 Honorary Members and 878 Ordinary Members, of whom 72 are Life Members. 239 members, including 21 Life Members, are also members of the Clay Minerals Group.

Meetings. During the session 1964-65 there have been four General Meetings in London, one General Meeting in Durham (with a field excursion), one special meeting in London on a geochemical topic (sponsored by the Committee on Geochemistry), and one joint meeting in Paris with the Société Française de Minéralogie et de Cristallographie. Attendance at the joint meeting was approximately 60 members and guests of the two societies; and averaged 61 members and guests at the other meetings. At these meetings 39 papers were read, 31 papers were taken as read, and 5 exhibits shown. A technical discussion on X-ray Fluorescence techniques, organized by the Committee of Geochemistry, was held at Swansea.

At two meetings of the Clay Minerals Group held in London and Liverpool 15 papers were read: the average attendance was 32.

Publications. During 1965 a special volume of the Magazine was issued in honour of Professor Tilley (vol. 34) containing 46 papers in 541 pages. Three numbers of volume 35 have been issued during the year, and the fourth should be issued in December. By resolution of Council, the March and June issues were double-size in order to catch up with arrears in the publication of papers, and the four numbers (269-272) will contain the Bye-laws and List of Members in 48 pages, proceedings for 1964 in 16 pages, 57 papers, 18 short communications, 28 book reviews in 672 pages, with 9 plates and 191 text-figures.

Four numbers of *Mineralogical Abstracts* have been published during the year 1965. They include the Index to volume 16 (1963-64), which contains an Author Index in 55 pages and a General Index (Topographic and Subject) in 62 pages. The three issues of volume 17 (1965) contain 2840 items (abstracts, citations by title, and book notices) in 342 pages. The December 1965 number (vol. 17, no. 4) is in the press.

The final issue (no. 32) of the *Clay Minerals Bulletin* together with no. 1 of *Clay Minerals*, its successor, have been issued during the year.

Financial. Sales of publications so far during 1965 are as follows: *Mineralogical Magazine* £3,467. 19s. 7d. (excluding Tilley volume £1,118. 1s. 7d.); *Mineralogical Abstracts* £2,309. 16s. 0d.; *X-ray Monograph* £795. 11s. 8d.

The Tilley volume and three numbers of volume 35 of the *Mineralogical Magazine* have appeared, the Tilley volume and the March issue together costing £4,628. 5s. 4d.; also three numbers of the *Mineralogical Abstracts*, one of which (the March issue) has cost £1,182. 15s. 0d.

A grant of £700 from the Parliamentary Grant in Aid for Scientific Publications was received from the Royal Society to assist the publication of the double-size March and June numbers of the *Mineralogical Magazine*.

The balances of the Society's Bankers and in the Post Office Savings Bank on 31 October 1965 were General Fund £2,927. 18s. 8d., Miers-Spencer Memorial Fund £125. 2s. 11d., and *Mineralogical Abstracts* Fund £2,563. 13s. 0d.

General. Dr. J. R. Butler resigned as General Secretary on 8 July 1965, and the Council recorded their appreciation of the services he had given the Society during his tenure of office. Dr. R. A. Howie was appointed General Secretary to hold office until the Anniversary Meeting in November.

After the adoption of the Annual Report, a vote of thanks to the Geological Society for the use of their rooms was proposed and was carried with acclamation.

The following alterations to the Bye-Laws, proposed by the Council, were put to the meeting and carried *nem. con.*

Bye-Law 5 now reads:

5. Ordinary Members shall pay an entrance fee of £1 and an annual subscription of £5 entitling them to *Mineralogical Magazine* and *Mineralogical Abstracts* other than special volumes. Members elected before they reach the age of 23 shall be exempt from an entrance fee and need pay only £2 (entitling them to *Mineralogical Magazine* and *Mineralogical Abstracts*) for each of their first two annual subscriptions. Members shall be entitled to compound for the annual subscription by a single payment of £90, but Members who have paid their annual subscriptions for fifteen years shall be entitled to compound for £75, and those who have paid such subscriptions for twenty-five years shall be entitled to compound for £60, provided always that no Member shall be entitled to compound who is in arrear with his annual subscription for the preceding calendar year. Members who have paid forty-five annual subscriptions are exempt from further annual subscriptions.

Bye-Law 8 now reads:

8. At the first Meeting of the Council in each calendar year the name of any Ordinary Member who is in default with his annual subscription for the preceding two years shall be brought before the Council, and an intimation that this action has been taken shall be communicated to the Member in writing at his last known address. If at the next meeting of Council the Member be still in default for the two

preceding years, the Council shall be empowered to erase his name from the list of Members.

Bye-Law 9 now reads:

9. Twelve persons, non-resident in Great Britain or Ireland, may be elected Honorary Members. They shall pay neither entrance fee nor annual subscription. They shall not be entitled to vote on any question relating to the management or business of the Society, nor to serve on the Council of the Society, nor to fill any Office in the Society, but subject to these restrictions shall be entitled to every other privilege accorded to Ordinary Members.

The President then read the list of Officers and Council elected for the session 1965-66:

President: Dr. G. F. Claringbull, B.Sc., Ph.D.

General Secretary: Dr. A. C. Bishop, B.Sc., Ph.D.

Treasurer: Dr. A. F. Seager, B.Sc., Ph.D., A.K.C.

Editor of Mineralogical Magazine: Dr. M. H. Hey, M.A., D.Sc.

Editor of Mineralogical Abstracts: Dr. J. Phemister, M.A., D.Sc., F.R.S.E.

Publications Manager: Mr. E. A. Jobbins, B.Sc.

Vice-Presidents: Professor W. A. Deer, M.Sc., Ph.D., F.R.S.; Professor F. Coles Phillips, M.A., Ph.D.

Foreign Secretary: Dr. W. Campbell Smith, C.B.E., M.C., T.D., M.A., Sc.D.

Ordinary Members of Council

Dr. M. H. Battey, M.Sc., Ph.D.

Dr. B. E. Leake, B.Sc., Ph.D.

Dr. G. M. Brown, M.A., D.Phil., B.Sc.

Dr. D. G. Murchison, B.Sc., Ph.D.

Mr. T. Deans, M.A.

Dr. R. W. B. Nurse, D.Sc., F.Inst.P.

Dr. P. Gay, M.A., Ph.D.

Prof. F. H. Stewart, B.Sc., Ph.D., F.R.S.

Dr. P. G. Harris, M.Sc., Ph.D.

Dr. B. A. Sturt, B.Sc., Ph.D.

Dr. R. A. Howie, M.A., Ph.D.

Prof. E. A. Vincent, M.A., B.Sc., Ph.D.,
F.R.I.C.

The retiring President, Prof. J. H. Taylor, M.A., B.Sc., Ph.D., F.R.S., is entitled to remain on the Council for a further two years and Past-President Dr. W. Campbell Smith, C.B.E., M.C., T.D., M.A., Sc.D., is a Life Member of the Council (Bye-law 11).

The Managing Trustees, Prof. C. E. Tilley, B.Sc., Ph.D., F.R.S., and Prof. J. H. Taylor, M.A., B.Sc., Ph.D., F.R.S., are ex-officio members of the Council (Bye-law 11).

Prof. J. H. Taylor welcomed Dr. G. F. Claringbull to the Chair with warm good wishes for a happy and successful term of office.

A vote of thanks to the retiring Officers and Members of Council was proposed and carried with acclamation.

The following exhibits were shown:

1. An occurrence of native silver in Derbyshire: by Mr. R. J. King.
2. Galena-baryte mineralization in the Golconda mine, Brassington, Derbyshire: by Dr. T. D. Ford and Mr. R. J. King.
3. A model for illustrating the principle of stereographic projection: by Dr. J. Zussman.

**MINERALOGICAL
INCOME AND EXPENDITURE ACCOUNT
A. GENERAL**

18 months
to 30.6.64

| £ | INCOME | £ s. d. | £ s. d. |
|------|--|------------|-----------|
| | Members' subscriptions— | | |
| | Annual subscriptions | 1109 3 9 | |
| 2075 | Entrance fees | 31 0 0 | 1140 3 9 |
| | <i>Mineralogical Magazine—</i> | | |
| | Advertisement fees | 123 12 3 | |
| 6832 | Sales—Current Nos. | £3013 11 6 | 4258 13 3 |
| | Back Nos. | 1245 1 9 | 4382 5 6 |
| | Investment revenue— | | |
| | Interest on investments | 250 6 5 | |
| 399 | Post Office Savings Bank interest | 22 4 0 | 272 10 5 |
| 77 | Sundry income | | 1 3 0 |
| | Royal Society Parliamentary Grant-in-Aid | | 700 0 0 |
| | Clay Minerals Group— | | |
| | <i>Clay Minerals:</i> | | |
| | Subscriptions | 715 5 1 | |
| 1544 | Sales, including authors' reprints. | 381 8 0 | 1096 13 1 |
| | <i>Clay Minerals Monographs:</i> | | |
| | Sales—2nd ed. <i>X-ray Identification and Crystal</i> | | |
| | <i>Structures of Clay Minerals</i> | 1386 16 8 | |
| 2365 | <i>The Differential Thermal Investigation of Clays</i> | — | 1386 16 8 |
| 2 | <i>Glossary of Clay Trade Names</i> , sales | | — |
| 1 | Interest on Bank Accounts (Harpenden and Cambridge) | | 3 1 4 |
| 41 | Advertisements | | 57 8 0 |
| 2 | Other income | | — |
| — | Excess of expenditure over income for the year | | 4661 8 8 |

£13338

£13701 10 5

B. MIERS-SPENCER

| | | |
|------------|------------------------------|-----------------|
| £ | | £ s. d. |
| 39 | Investment revenue | 32 18 2 |
| <u>£39</u> | | <u>£32 18 2</u> |

C. CLAY MINERALS GROUP

| | | |
|------------|---|------------------|
| £ | | £ s. d. |
| — | Income from Mineralogical Society | 100 0 0 |
| 23 | Interest | 6 10 5 |
| <u>£23</u> | | <u>£106 10 5</u> |

SOCIETY

FOR THE YEAR ENDED 30 JUNE 1965

FUND

18 months
to 30.6.64

| £ | EXPENDITURE | £ s. d. | £ s. d. |
|---------------|--|------------|--------------------|
| | <i>Mineralogical Magazine</i> | | |
| | Nos. 266, 267, 269, and 270 } Printing | {4758 8 3 | |
| | No. 268 (Tilley volume) } | {2883 14 9 | |
| | Distribution to members | 182 17 4 | |
| 3882 | Distribution to subscribers | 266 13 8 | |
| | | ----- | 8091 14 0 |
| | Reprinting Nos. 209-11 inclusive | | 593 14 0 |
| 37 | Editorial Expenses | | 107 3 6 |
| 185 | Contribution to <i>Mineralogical Abstracts</i> for Life and Honorary Members | | 123 0 0 |
| 65 | Subscription to <i>International Mineralogical Association</i> | | 32 9 5 |
| | Meeting expenses— | | |
| | Notices of meetings | 277 11 8 | |
| 487 | General expenses in connexion with meetings | 39 2 6 | |
| | | ----- | 316 14 2 |
| | General expenses— | | |
| | Office rental and house expenses | 341 0 1 | |
| | Clerical assistance | 2128 7 4 | |
| | Printing and stationery | 84 5 9 | |
| | Postage and telephone | 219 7 5 | |
| 3666 | Sundry office expenses | 285 0 9 | |
| | | ----- | 3058 1 4 |
| | <i>Clay Minerals Group</i> | | |
| | <i>Clay Minerals</i> | | |
| | Printing Nos. 31, 32, circulars, and authors' reprints | 904 2 5 | |
| 1215 | Editorial expenses | 15 0 0 | |
| | | ----- | 919 2 5 |
| | Commission to publisher | | 221 11 1 |
| 512 | Monograph expenses | | 5 3 6 |
| | General expenses: | | |
| | Cost of meetings | 9 6 6 | |
| | Office and clerical expenses | 217 9 3 | |
| | Secretary's expenses | 5 11 3 | |
| 446 | Treasurer's expenses | 10 0 | |
| | | ----- | 232 17 0 |
| 2843 | Balance, being excess of income over expenditure for the year | | — |
| <u>£13338</u> | | | <u>£13701 10 5</u> |

MEMORIAL FUND

| £ | | £ s. d. |
|------------|---|-----------------|
| | Bank charges | 9 4 |
| | Balance, being excess of income over expenditure for the year | 32 8 10 |
| <u>£39</u> | | <u>£32 18 2</u> |

FOREIGN DELEGATES EXPENSES FUND

| £ | | £ s. d. |
|------------|---|------------------|
| 23 | Balance, being excess of income over expenditure for the year | 106 10 5 |
| <u>£23</u> | | <u>£106 10 5</u> |

R. A. HOWIE }
B. R. YOUNG } Auditors

A. F. SEAGER, Hon. Treasurer

**MINERALOGICAL
BALANCE SHEET AS AT
A. GENERAL**

18 months
to 30.6.64

| £ | LIABILITIES | £ s. d. | £ s. d. | £ s. d. |
|------|--|-----------|-----------|------------|
| | Fund Account— | | | |
| | Balance per Balance Sheet at 30 June 1964 | 7975 17 8 | | |
| | Add Composition fees received | 110 0 0 | | |
| | | 8085 17 8 | | |
| | Less Depreciation on office furniture and equipment | 88 14 4 | | |
| 7976 | Transfer to <i>Mineralogical Abstracts</i> Fund | 1000 0 0 | | |
| | Excess of expenditure over income for year ended 30 June 1965 | 4661 8 8 | | |
| | | 5750 3 0 | | |
| 1178 | Publications Fund | | 2335 14 8 | |
| | Sundry creditors— | | 1177 13 9 | |
| | Oxford University Press for Magazine No. 269 | 1870 6 2 | | |
| | Oxford University Press (estimated) Maga- zine No. 270 | 1485 0 0 | | |
| | Royal Entomological Soc. for house ex- penses | 38 19 2 | | |
| | Editorial travelling and other expenses | 52 3 6 | | |
| | Royal Society for loan (Parliamentary Grant-in-aid for scientific publications) | 750 0 0 | | |
| | Clay Minerals Group—sundry items | 11 15 0 | | |
| 2717 | Miscellaneous creditors | 66 12 8 | | |
| | | 4274 16 6 | | |
| | | | | £7788 4 11 |
| | | | | £11871 |

B. MIERS-SPENCER

| £ | LIABILITIES | £ s. d. | £ s. d. |
|-----|--|----------|----------|
| | Fund account— | | |
| | Balance per Balance Sheet at 30 June 1964 | 884 19 9 | |
| 885 | Add Excess of income over expenditure for the year ended 30 June 1965 | 32 8 10 | |
| | | 917 8 7 | |
| | | | £917 8 7 |
| | | | £885 |

C. CLAY MINERALS GROUP

| £ | LIABILITIES | £ s. d. | £ s. d. |
|----|---|----------|-----------|
| | Fund Account— | | |
| | Balance per Balance Sheet at 30 June 1964 | 93 19 7 | |
| 94 | Add Excess of income over expenditure | 106 10 5 | |
| | | 200 10 0 | |
| | | | £200 10 0 |
| | | | £94 |

SOCIETY
30 JUNE 1965
FUND

18 months
to 30.6.64

| £ | ASSETS | £ s. d. | £ s. d. |
|------|---|-----------|----------|
| | Office furniture and equipment— | | |
| | Original cost | 1055 9 10 | |
| 212 | Less depreciation | 926 19 1 | |
| | | | 128 10 9 |
| | Investments (at cost or as valued on 31 December 1951)— | | |
| | £1700 0s. 0d. 3½ % War Stock 1952 | 1370 2 6 | |
| | £606 4s. 6d. 4 % Funding Stock 1960-90 | 598 5 0 | |
| | £250 0s. 0d. 3 % Savings Bonds 1960-70 | 216 17 6 | |
| | £1013 9s. 6d. 3 % Savings Bonds 1965-75 | 916 7 0 | |
| | £173 6s. 6d. 3 % British Transport Stock 1978-88 | 127 1 3 | |
| | £261 12s. 6d. 3½ % Treasury Stock 1977-80 | 244 8 3 | |
| | £1120 16s. 7d. 4½ % British Electricity Stock 1967-69 | 1065 17 3 | |
| 5655 | 954 units Equities Investment Fund for Charities | 1116 5 3 | |
| | | | 5655 4 0 |
| | Note:—The total market value of the above investments at 30 June 1965 was £4888 14s. 8d. | | |
| | Deposits— | | |
| 888 | Balance with Post Office Savings Bank | | 910 12 7 |
| | Sundry debtors— | | |
| 1100 | <i>Mineralogical Abstracts</i> , for loan from Mineralogical Society of Great Britain | | — |
| | Cash— | | |
| | Coutts & Co., London | 756 16 5 | |
| | Barclays Bank, Harpenden | 280 7 8 | |
| | Cambridge & District Trustee Savings Bank | 16 17 6 | |
| | Cash in hand, London | 20 0 0 | |
| | Cash in hand, Harpenden | 4 11 0 | |
| 4016 | Cash in hand, Cambridge | 15 5 0 | |
| | | | 1093 17 |
| | Note:—The value of the Society's library and stock of publications is not included in the above assets. | | |

£11871

£7788 4 11

MEMORIAL FUND

| £ | | £ s. d. | £ s. d. |
|-----|--|----------|-----------|
| | Investments (at cost)— | | |
| | £9 18s. 4d. 3½ % War Stock 1952 | 8 12 0 | |
| | £208 11s. 0d. 4½ % Brit. Electricity Stock 1967-69 | 200 0 0 | |
| | £200 0s. 0d. 5½ % Esso Petroleum 1st Debenture Stock 1979/83 | 198 0 9 | |
| 799 | 309 units Equities Investment Fund for Charities | 392 0 11 | |
| | | | 798 13 8 |
| | Note:—The total market value of the above investments at 30 June 1965 was £742 3s. 1d. | | |
| 86 | Cash—Coutts & Co., London | | 118 14 11 |

£885

£917 8 7

FOREIGN DELEGATES EXPENSES FUND

| £ | | £ s. d. |
|-----|--------------------------|-----------|
| £94 | Cash—Cambridge | £200 10 0 |

R. A. HOWIE } Auditors
B. R. YOUNG }

A. F. SEAGER, Hon. Treasurer

MINERALOGICAL SOCIETIES OF MINERALOGICAL INCOME AND EXPENDITURE ACCOUNT

18 months
to 30.6.64

| | INCOME | £ s. d. | £ s. d. |
|-------|--|-----------|------------|
| | Subscriptions— | | |
| | Mineralogical Society of America | 1658 0 5 | |
| 2438 | Mineralogical Society of Great Britain | 944 10 0 | 2602 10 5 |
| 4995 | Sales—Current Nos. | 2302 17 6 | |
| | Back Nos. | 409 11 6 | 2712 9 0 |
| 74 | Sundry income | : : : | 723 16 0 |
| 1085 | Balance, being excess of expenditure over income | : : : | |
| £8592 | | | £6038 15 5 |

BALANCE SHEET AS AT

| | LIABILITIES | £ s. d. | £ s. d. | £ s. d. |
|-----|---|-----------|-----------|-------------|
| | Fund Account— | | | |
| | Balance per Balance Sheet at 30 June 1964 | 41 14 5 | | |
| | Add Capital contribution from Mineralogical Society of America | 1000 0 0 | | |
| | Capital contribution from Mineralogical Society of Great Britain | 1000 0 0 | 2041 14 5 | |
| | Less Depreciation on office furniture and equipment | 17 4 4 | | |
| | Repayment of loan from Mineralogical Society of Great Britain | 1100 0 0 | | |
| 42 | Excess of expenditure over income for year ended 30 June 1965 | 723 16 0 | 1841 0 4 | |
| | Sundry creditors— | | | 200 14 1 |
| | Royal Entomological Society for house expenses | 19 9 7 | | |
| | For printing and distributing <i>Mineralogical Abstracts</i> , Vol. 17, No. 2 | 1132 16 2 | | |
| 29 | Miscellaneous creditors | 79 13 0 | 1231 18 9 | |
| £71 | | | | £1432 12 10 |

AMERICA AND GREAT BRITAIN

ABSTRACTS

FOR THE YEAR ENDED 30 JUNE 1965

18 months
to 30.6.64

| £ | EXPENDITURE | £ s. d. | £ s. d. |
|--------------|--|-----------|-------------------|
| | <i>Mineralogical Abstracts—</i> | | |
| | Vol. 16, Nos. 6 and 7, Vol. 17, Nos. 1 and 2: Printing | 3569 19 8 | |
| 6459 | Distribution | 491 19 5 | |
| | | ----- | 4061 19 1 |
| | Editorial expenses— | | |
| | Editor's Honorarium | 600 0 0 | |
| | Assistant Editor's stipend and clerical assistance | 1033 7 0 | |
| 1696 | General editorial expenses | 69 10 8 | |
| | | ----- | 1702 17 8 |
| | Office expenses— | | |
| | Office rental and house expenses | 164 15 7 | |
| | Printing and stationery | 77 0 6 | |
| | Postage | 31 14 7 | |
| 437 | Sundry office expenses | 8 0 | |
| | | ----- | 273 18 8 |
| | | | ----- |
| <u>£8592</u> | | | <u>£6038 15 5</u> |

30 JUNE 1965

| £ | ASSETS | £ s. d. | £ s. d. |
|----|--|---------|----------|
| | Office furniture and equipment— | | |
| | Original cost | 172 3 4 | |
| 71 | Less depreciation | 87 12 6 | |
| | | ----- | 84 10 10 |
| 0 | Cash—Courtts and Co., London | | 1348 2 0 |

£71

£1432 12 10

R. A. HOWIE } Auditors
B. R. YOUNG }

A. F. SEAGER, Hon. Treasurer

The following papers were read and discussed:

1. The alkali feldspars of the Ardara pluton, Donegal: by Dr. A. Hall, (vol. 35, p. 693).
2. Studies of natural pyrrhotine: pyrrhotine, troilite, and mackinawite in the Ylöjärvi Cu–W deposit, south-west Finland: by Dr. A. Horrell Clark.
3. The petrographic use of the spindle stage and focal-plane screening in the determination of the optical variation of some zoned minerals: by Mr. H. G. Wright (vol. 35, p. 656).
4. Electronic spectra of orthopyroxenes: by Dr. R. G. Burns (vol. 35, p. 715 (in part)).
5. Kamacite plate-width estimation in octahedrites: by Dr. M. J. Frost (vol. 35, p. 640).

The following papers were taken as read:

1. A note on varlamoffite and associated minerals from the Batang Padang district, Perak, Malaya, Malaysia: by Dr. J. B. Alexander and Mr. B. H. Flinter (vol. 35, p. 622).
2. The origin of accessory garnet in the Donegal Granite: by Dr. A. Hall, with chemical analyses by Miss R. C. Tyler (vol. 35, p. 628).
3. Crystallography of psilomelane: by Dr. Bibhuti Mukherjee (vol. 35, p. 643).
4. Electron-probe microanalysis of the iron–titanium oxides in some New Zealand iron-sands: by Dr. J. B. Wright and Dr. J. F. Lovering (vol. 35, p. 604).
5. Studies on natural pyrrhotine: the composition, crystal structure, and conditions of formation of pyrrhotine in the Nigadoo deposit, New Brunswick: by Dr. A. Horrell Clark.
6. Minor element chemistry of leucite and pseudoleucite: by Dr. C. M. B. Henderson (vol. 35, p. 596).
7. The crystal structure of kalsilite: by Dr. A. J. Perrota and Dr. J. V. Smith (vol. 35, p. 588).