The ridges between the cups are devoid of these crystals and are apparently normal rock surfaces. These conditions imply that the cups are remnants of cavities in which the cristobalite and associated minerals were deposited. This implication is substantiated by the presence of small cavities which lie below the cups but are connected with them by means of constricted openings whose surfaces are covered with small cristobalite crystals. The rock on which these crystals occur is rather dense and shows no evidence of conduits to the cavities. It is possible that such conduits were present in the rock mass containing the other portion of the cavities but no specific evidence as to the method of introduction was observed.

Rogers[4] states that cristobalite is a characteristic mineral of spherulites and that it occurs frequently in cavities. Emmons and Larsen[5] also mention these same conditions of occurrence at Creede, Colorado. In both instances, the cristobalite is considered to have formed in volcanic rocks during the last stages of crystallization, but some occurrences are also possibly the result of conversion by high temperatures. The formation of cristobalite is generally accepted as associated with an abundance of mineralizers and the presence of gas cavities.

As a result of recent studies on the volcanoes of the Cascade Mountains, cristobalite is known to occur abundantly in this area but, except at Crater Lake, only spherulitic forms have been recognized.[6]

[4] Rogers, A. F., *Am. Mineral.*, vol. **13,** p. 82, 1928.

[5] Emmons, W. H., and Larsen, E. S., *U.S.G.S. Bulletin* **718,** pp. 47–48, 1923.

[6] Williams, Howell, Personal communication. (August 1936).

PROCEEDINGS OF THE SOCIETIES

NEW YORK MINERALOGICAL CLUB

The exhibition of the New York Mineralogical Club, celebrating the club's fiftieth year, took place in the Maxwell Hall of the American Museum of Natural History on Saturday afternoon and evening, March 13th. The display was well attended, with over 1100 visitors during the two sessions.

There were several notable exhibits, both among the commercial exhibitors and those of the club members. The Ward exhibit with the new G.E. No. H3 fluorescent lamp and a large number of showy specimens attracted much attention. Bausch and Lomb, and Spencer exhibited the latest models of petrographic apparatus, and Leitz showed photomicrographic equipment. Books were shown by several publishers. An exhibit of changing lights shining up through a specimen of rock crystal, shown by H. T. Strong, served as a center of attraction in the hall. The demonstration by John Vlismas of cutting and polishing objects composed of onyx and fluorite was very instructive for the amateur lapidaries. Microchemical test demonstrations by R. P. Cargille showed the practicability of the technique to many who had never before seen these tests actually made. A new refractometer giving accurate results, used in conjunction with an ordinary microscope, was demonstrated by Lyman Nichols. The instrument is simple, practical and inexpensive, and

has the additional advantage that the higher readings may be made with equal accuracy, beyond the limit of the ordinary Abbe refractometer.

Among the exhibits by the club members were a large number of locally collected specimens from the Paterson and Franklin districts. Some unusual specimens included crystallized greenockite from Paterson, fine crystallized zincite from Franklin, and some unusually excellent crystals of iolite from Guilford, Conn. Mr. F. I. Allen showed what is believed to be a new germanium bearing mineral from Franklin, as well as some fine minerals of the rare earths. Mr. O. I. Lee demonstrated the reversible color changes in hackmanite. A representative of Columbia University projected interference figures and demonstrated the use of the improved specific gravity balance. Students of the College of the City of New York had several exhibits. Mr. M. C. Bates showed transparent hexagonite crystals from Balmat, N. Y., a most unusual specimen of this mineral.

A large map was prepared showing the principal mineral localities within a 50 mile radius of New York City, with specimens and explanatory labels to show where the specimens were collected.

F. H. POUGH, *Secretary*

American Museum of Natural History, New York City, March 17, 1937

With President B. T. Butler presiding, the meeting was called to order, 65 members and guests being present. The plans for a club field trip to Amelia, Virginia, were announced.

The speaker of the evening, Dr. Lester W. Strock, then spoke upon the "Spectrographic Analysis of Minerals." The discussion of the manner of making accurate quantitative analyses was clearly presented by means of slides illustrating the various steps in the work. He then showed the results of some of his work on the distribution of lithium in the rocks of the earth's crust, with an explanation of his unexpected discovery of its concentration in the monoclinic pyroxenes.

In conclusion some interesting slides were shown by Dr. Strock of a trip to Vesuvius and a descent into the first crater.

F. H. POUGH, *Secretary*

American Museum of Natural History, New York City, April 21, 1937

With President Butler presiding, the meeting was called to order, 85 members and guests being present. The annual election was held, with the incumbent officers unanimously re-elected for another term. The business meeting was followed by an address by Prof. B. M. Shaub, of Smith College, upon the "Photographing of Minerals in Color."

The first few slides were pictures of the equipment used by Prof. Shaub in his work showing the arrangement of the apparatus and the lights. Some ingenious and inexpensive pieces of accessory equipment which greatly facilitate the manipulation of the apparatus have been developed through experience. Results have shown that a slightly different technique from simple black and white photography is necessary.

For greater magnifications, Prof. Shaub has developed a long extension tube in which the lens is placed, and by its use enlargements up to 14 diameters on the plate may be secured. The lens is used at a small opening to give a maximum depth of focus. For the lower magnifications photoflood or 500 watt projection bulbs are used; for the others, small arc lamps with a water-cell interposed and a 50 mm. condensing lens are very satisfactory. Exposures range from 20 to 90 seconds. The most important, and the most difficult part of the entire process is selecting the correct exposure, especially in small objects where a photoelectric exposure meter cannot be used. Correct color rendition is secured only with proper exposure, for the plates have little latitude and many attempts are some-

times necessary. The Finlay plates, with their greater freedom in manipulation are more satisfactory in this respect than the Agfa. The Agfa, on the other hand, appear to give a better rendition of some colors, especially yellow. As the Agfa plates can only be duplicated by making a new photograph, they are less satisfactory, and on the whole, more expensive than the Finlay process. Both have advantages and disadvantages that make neither entirely preferable. Many slides of both makes were shown, covering all phases from hand specimens through moderate enlargements to photomicrographs of thin sections and interference figures. When the process has been developed so that there is greater certainty about exposures, and consequently, results, color photography should become an important tool of the mineralogist.

F. H. POUGH, *Secretary*

PHILADELPHIA MINERALOGICAL SOCIETY

Academy of Natural Sciences of Philadelphia, January 7, 1937

Mr. Arndt presided at a stated meeting with 43 members and 26 visitors present. The death of Alexander Fleming, Jr. on January 3 was announced.

Dr. Edgar T. Wherry gave a talk on "Recollections of Past Mineral Collecting Trips." Excursions were reported by Louis Moyd, Albert Jehle and William C. Knabe.

Academy of Natural Sciences of Philadelphia, February 4, 1937

Mr. Arndt presided with 46 members and 38 visitors present.

Dr. Alfred C. Hawkins spoke on "A Collecting Trip in Georgia" illustrated with lantern slides and many specimens obtained in the Stone Mountain region, and in the Birmingham, Ala., iron and coal mines. Mr. Charles R. Toothaker spoke on some interesting "Reminiscences of Brazil," describing visits to the gem districts of Minas Geraes and Goyaz. Mr. Edwin Roedder exhibited some synthetic "kongsbergite," "atacamite," and mercuric iodide crystals."

Academy of Natural Science of Philadelphia, March 4, 1937

Mr. Arndt presided with 101 persons present—53 members and 48 visitors.

Dr. Hugh E. McKinstry addressed the society on "Gold Mining in Eastern Australia." The talk was illustrated with lantern slides, charts, maps and specimens. The geology of some of the important fields and their commercial development were described.

W. H. FLACK, *Secretary*

MINERALOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

MINERALOGICAL SOCIETY, *March 11*, DR. L. J. SPENCER, President, in the chair.

DR. F. COLES PHILLIPS: *On a universal ore-polishing machine.*

A short account of the construction and use of a two-lap polishing machine available both for the usual methods of polishing by hand and for the automatic method developed at Harvard University. A description was given of the method of mounting specimens in synthetic material.

MR. ARTHUR RUSSELL: *On the occurrence of turquois in Cornwall.*

A mineral assumed to be chrysocolla was collected from Bunny mine, Stenalees, St. Austell, many years ago when the mine was working. The best specimens came from the 80 fathom level in the main lode. In 1931 Mr. Herbert Thomas of Truro collected from the mine dump some of the same material which proved on chemical analysis to be turquoise. Another locality for turquoise has now been discovered at Castle an Dinas wolfram mine, St. Columb Major, Cornwall. It occurs in veins in tourmalinized slate with wolfram, scorodite, and wavellite.

MISS MARJORIE J. WHITEHOUSE (communicated by the President): *The deuteric mineral sequence in the Enoggera granite, Queensland.*

The minerals found in veins and vughs in this granite near Brisbane are described. The period of main magmatic consolidation was followed by pegmatite formation and the initiation of cavities in the rock. While the rock was still hot the deuteric period occurred beginning with the kaolinization of the felspars and the chloritization of the ferromagnesian minerals. Then followed the deposition of chlorite and epidote, the pneumatolytic minerals, some calcite, the zeolites (prehnite, laumontite, gismondite) and, finally, many vughs were completely filled with calcite.

MR. M. PERUTZ (communicated by Prof. C. E. Tilley): *On iron-rhodonite, pyroxmangite, and their relations to rhodonite.* Determinations of the unit-cell of iron-rhodonite and approximate measurement of the dimensions of pyroxmangite have been made. The similarity of the structures of iron-rhodonite and pyroxmangite is established. By comparison with Gossner's description of rhodonite the conclusion is arrived at that the structure of the former minerals is different from that of rhodonite. After a determination of the density, volume, and mass of the cell of iron-rhodonite, possibilities of relations with enstatite were suggested.

BOOK REVIEWS

DIE FEDOROW-METHODE. W. NIKITIN, University of Ljubljana. Published by Borntraeger, Berlin, **1936,** 109 pp. 41 text figures. 7 plates. Price, RM. 12.40.

Professor Nikitin has long been recognized as an outstanding authority on the Fedorov method of use of the universal stage. This volume gives a concise account of the stage and its use, and includes additions of recent years to the technique.

Forty-five pages are given to a summary of the general description and manipulation of the stage, emphasizing the four axis stage with which Professor Nikitin has dealt in earlier publications. Special refinements are described for the study of minerals of low birefringence, and for the study of dispersion. The use of convergent light on the universal stage is also described as a means of attaining greater accuracy.

A leading contribution of the book is the description of a method of determining the refringence of a crystal by measuring the angle at which total reflection is obtained on balsam filled cleavages. No great accuracy is claimed for this procedure but even an approximation is a welcome contribution in the study of grain mounts especially.

The methods of Boldyrew, Berek and Dodge for determining the relationship between the optic axial angle and birefringence are given together with the diagrams which these men have published.

A detailed description is given of the method of learning the orientation relationship between the indicatrix and the crystallographic elements of a mineral. The application of these principles is made to the determination of twin laws.

The last section deals with the study of feldspars according to the methods of Fedorov.

R. C. EMMONS

ATLAS DER ANALYSEN-LINIEN DER WICHTIGSTEN ELEMENTE, FRITZ LÖWE, 37 pp., 3 figs. 16 full page plates. Dresden and Leipzig, Th. Steinkopf, **1936** (RM. 10.00).

This book is a second edition of the author's "Atlas der Letzten Linien" (published in) 1928. Separate spectra of the following 46 elements are reproduced and arranged in alphabetical order. Ag, Al, As, Au, B,* Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs,* Cu, Fe, Ge,* Hg, Ir, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Pd, Pt, Rb,* Rh,* Sb, Si, Sn, Sr, Ta, Te, Th, Ti, Tl,