

form, quartz, is indefinitely postponed. The transformation of tridymite or cristobalite to quartz has never been accomplished in the dry state in the laboratory. The inversion from tridymite has been performed in a water solution of sodium carbonate or by use of a sodium tungstate flux; the inversion from cristobalite in a water solution of sodium carbonate.³ In the area here described, it was doubtless the presence of alkaline waters carrying silica which facilitated inversion. Both rocks in which the paramorphic quartz is found are considerably altered, silicified and sericitized.

Although the stability ranges of tridymite and cristobalite as determined in the laboratory are 870–1470°C. and 1470–1710°C., respectively, it must be emphasized that their formation does not necessitate such high temperatures. In the words of Larsen, "The presence of tridymite or cristobalite in a rock gives no indication of the temperature of crystallization as these forms can, and commonly do, form below 870°."⁴

³ Sosman, R. B., Properties of Silica, Chemical Catalog Co., *New York*, pp. 76–77, 1927.

⁴ Larsen, E. S., The Temperature of Magmas: *Am. Mineral.*, vol. 14, p. 87, 1929.

PROCEEDINGS OF SOCIETIES

PHILADELPHIA MINERALOGICAL SOCIETY

Academy of Natural Sciences of Philadelphia, June 6, 1935

Dr. Joseph L. Gillson presided at a stated meeting of the society, 41 members and 35 visitors being present.

Mr. Arndt reported the results of the Rocks and Minerals Association National Outing of the Philadelphia district, held Sunday, May 19th, to Vanartsdalen's quarry, Perkiomenville, and Phoenixville.

Dr. Gillson described the Fifth Annual Field Conference of Pennsylvania Geologists, held on May 31, June 1st and 2nd, with headquarters at the Academy of Natural Sciences. Nearly 100 persons were registered as participating in the excursions described in a 43-page guide book.

Other excursions described, and specimens obtained were: by Louis Moyd to Howellville, Bridgeport (malachite), and the Perkiomen mine (ankerite); Albert Ackoff to Mauch Chunk (carnotite); Alexander Fleming, Jr., to Blue Ball (chalcopyrite, quartz, calcite), Beartown (caxoxenite); Leonard A. Morgan to Bedford, N.Y. (stibnite, beryl, smoky quartz) and Prospect Park, N.J. (chabazite and natrolite).

Mr. Henry E. Millson demonstrated a few of the new micro-chemical methods of mineral analysis developed by Dr. J. Adam Watson of Edinburgh University and

described in the *Mineralogical Magazine* (London, March 1935). Dr. William S. Newcomet exhibited an apparatus, an adaptation of the Geiger tube, which gave visible (by use of a neon tube) and audible (through a loud speaker) evidence of radium emanations.

W. H. FLACK, *Secretary*

MINERALOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

MINERALOGICAL SOCIETY, *June 6*, The President, SIR THOMAS H. HOLLAND in the chair. DR. L. J. SPENCER opened a discussion on Mineralogical Nomenclature. The following papers were read:

PROF. C. E. TILLEY: *Metasomatism associated with the greenstone-hornfelses of Kenidjack and Botallack, Cornwall*. Within the contact-zone of the Land's End granite greenstone-hornfelses can be traced through intervening stages of cumingtonite-plagioclase, and anthophyllite-cordierite assemblages to a common end-product of biotite-cordierite-hornfelses simulating sedimentary hornfelses. The metasomatism effected has been a consistent removal of lime partly compensated by additions of silica, iron oxides, and alkalies, more particularly potash.

MR. J. D. BERNAL and MR. F. A. BANNISTER: *The chemical composition and crystal-structure of ettringite*. An optical, chemical and x-ray study of ettringite from Scawt Hill, Co. Antrim. The hexagonal unit cell containing $\text{Ca}_{12}\text{Al}_4(\text{OH})_{24}\text{S}_6\text{O}_{21} \cdot 52\text{H}_2\text{O}$ has the dimensions $a = 11.24$, $c = 21.45\text{\AA}$, and the symmetry of the space-group $D_{4h}^{26} = C6/\text{mmc}$. The crystal-structure possesses channels parallel to the c -axis within which are located 48 water molecules, zeolitic in type. On heating to 110°C . this structure partially collapses leaving an oriented pseudomorph of cell dimensions $a = 8.45$, $c = 10.2\text{\AA}$ and the same space-group.

The Rev. A. F. SMETHURST: *Anomalies in the analytical determination of water in epidote*. Analyses of two epidotes from the Malvern Hills (Herefordshire) gave for "total water" only 0.06% and 0.35%, and totals of only 98.46 and 98.52 for all constituents. Epidote separated from these rocks gave similar results. The mineral has the composition and structure of normal pistacite. Examination of three specimens of typical epidote from other localities revealed similar abnormal retentiveness of combined water and a study of recorded analyses of epidote shows that in about 10% of them the behaviour of the combined water is anomalous. The cause of these anomalies is discussed.

MR. N. F. M. HENRY: *Some data on the iron-rich hypersthènes*. New chemical and optical data are given for three iron-rich hypersthènes. One of these from Mansjö, Sweden, contains 84% FeSiO_3 . Refractive index and 2V curves are extended for the MgSiO_3 - FeSiO_3 series, and a new name is proposed for the pure iron silicate end-number.