

arrive at such dissimilar results for so many elements. It is more probable that the idocrase specimens collected by Mr. Bauer and thought to be the same were actually different and the difference is reflected in the analyses.

From Table 2 it appears that there is no correlation between the percentage of BeO and the refractive indices and that the difference in index is probably due to variation in the other elements.

The dimensions of the unit cell of the Franklin idocrase (crystals of analysis No. 3) determined by Weissenberg photographs are: $a_0 = 15.59 \text{ \AA}$, $c_0 = 11.81$. These dimensions are in fair agreement with $a_0 = 15.63 \text{ kX}$, $c_0 = 11.83$ given by Warren and Modell (1931) for idocrase from Sanford, Maine; and $a_0 = 15.63 \text{ kX}$, $c_0 = 11.93$ given by Kakané (1933) for idocrase from Miho, Japan.

Conclusion. From a consideration of the chemical and spectrographic analyses of the Franklin idocrase, one must conclude that either the original analysis was in error in reporting too high a percentage of BeO or that the specimen on which the analysis was made was unique.*

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DEMONSTRATION POLARISCOPE

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In teaching optical crystallography, frequently it is necessary to demonstrate and explain certain optical phenomena seen through the polarizing microscope. In a large class this can be very time consuming if the in-

* After the manuscript of this note was sent to the Editor of *The American Mineralogist*, the mineral collection of Mr. Bauer was purchased by the National Museum and Harvard University. There were several specimens labeled "Be-vesuvianite" and a tube of powdered material labeled "Be-vesuvianite—analysed." Some of the powdered mineral was sent to Dr. W. T. Schaller of the U. S. Geological Survey. A spectrographic analysis made at the Geological Survey by Mr. Harry Dies gave 0.17 per cent BeO. From this analysis of the original material, one must conclude that the percentage of BeO reported in Mr. Bauer's analysis is in error.

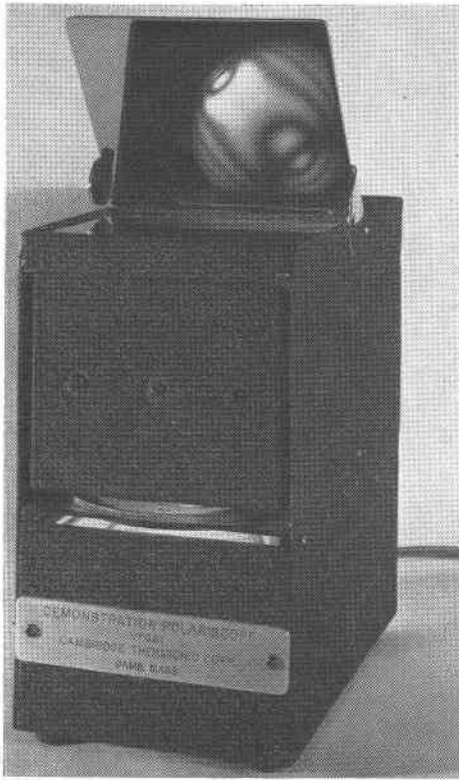


FIG. 1. Demonstration Polariscope showing interference figure of muscovite.

structor must proceed from one student to the next giving separate explanations to each individual. A further drawback with this method is that the student and instructor are not observing the phenomenon at the same time. The *demonstration polariscope* makes it possible to carry out explanations to a class of 10 to 15 students at one time.

The instrument illustrated in Fig. 1 is 7" long, $4\frac{1}{4}$ " wide and $7\frac{1}{2}$ " high and is constructed from sheet metal. Two 4-inch-square polarizers in crossed position are used, one at the top of the instrument and the other four inches below. Just above the lower polarizer is a rotating stage with a three-inch opening covered by ground glass. Illumination is provided by a 60-watt lamp at the bottom of the instrument. Crystals placed on the stage can be viewed by looking directly down through the upper polarizer. However, for demonstrating to a group, a mirror can be swung into position at 45° as shown in Fig. 1.

Winchell* has called attention to the use of a similar arrangement of

* Winchell, H., Demonstration of interference figures: *Am. Mineral.*, 32, 588-589 (1947).

polarizers for the demonstration of interference figures using polished spheres of various crystals. He states that such a sphere held in the hand between the polarizers can be rotated and the student can "observe the position of the uniaxial or biaxial figure, and determine by experiment the effect of crystal orientation on the interference figure." Such experiments can be carried out with the *demonstration polariscope*. In addition thin plates can be placed on the rotating stage, and interference colors, extinction angles, twinning and other phenomena can be observed.

One of the chief virtues of the *demonstration polariscope* is that interference figures can be obtained on cleavage plates or on oriented sections of minerals. Between the stage and upper polarizer is a frame carrying a polished glass sphere 3 inches in diameter (a clear plastic sphere is equally suitable). The frame is mounted on tracks and can be pushed to the back of the instrument when not in use. With a properly oriented mineral slice and the sphere in position, an interference figure can be seen to completely fill the sphere as in Fig. 1.

The interference figures appear much the same as they would using a plate of the mineral of the same thickness with a microscope. For example, by using successively thicker cleavage plates of muscovite, one can see a sharpening of the isogyres and an increase in the number of isochromatic bands. By rotating a biaxial acute bisectrix figure to the 45° position, one can show how the optic sign is obtained with a quarter wave plate or red of the first order by placing these plates over the crystal section. Because the interference figure is seen on the surface of the sphere rather than in a plane, the emergence of both optic axes in a centered acute bisectrix figure can be seen at the same time in a crystal that has a $2V$ as large as 75° .

UNUSUAL FORMS OF HALLOYSITE*

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Kaolin type clay mineral is a common constituent of the clay of volcanic ash soils of advanced weathering stage. Electron micrographs of such clays usually show much of the kaolin to have the characteristic cylindrical form of halloysite described by Bates (1). X-ray diffraction patterns of the glycerol clay show basal spacings mainly between 7.2 and 7.4 Å, indicating that the form of kaolin is mainly metahalloysite, with only minor amounts of the 11 Å spacing of glycerol halloysite corresponding to hydrated halloysite.

In the course of an investigation of the clay fraction of a subsoil derived from volcanic ash at New Plymouth, it was found that the clay,

* Soil Bureau Publication No. 61.