Particles with holes similar to those in the New Plymouth clay are shown in electronmicrographs by Davis *et al.* (3) of a sample stated to be serpentine. Serpentine is the magnesium analogue of kaolin and this particular serpentine contained mainly tubes and rods, but also a few particles having a "life-saver" appearance considered by those authors to be tubular particles seen in cross-section. In the case of the hydrated halloysite sample described here the holes apparent through many of the particles were at first thought to be due to tubes seen end-on but close examination appears to indicate that the holes are either centres of toroidal shaped particles or more transparent zones of incomplete spherical shells.

The clay of less than 2 micron equivalent diameter had a cation exchange capacity of 22 milliequivalents per 100 g., SiO_2:Al_2O_3 molecular ratio of 2.09, Fe_2O_3 content of 5.1 per cent, and surface area by the *B E T* method of 137 sq. metres per gram.

Nomenclature used here for forms of halloysite is that of MacEwan (2).

References

1. Bates, T. F., Hildrbrand, F. A., and Swineford, A. (1950), Morphology and structure of endillite and halloysite: *Am. Mineral.*, **35**, 463–484.
2. MacEwan, D. M. C. (1947), Halloysite nomenclature: *Mineral. Mag.*, **28**, 36–44.
3. Davis, D. W. et al. (1950, Electron micrographs of reference clay minerals: *Preliminary Report No. 6. American Petroleum Institute Project* **49**, *Reference Clay Minerals.*

VAPOR PRESSURE GLYCOLATION OF ORIENTED CLAY MINERALS*

George Brunton, *Shell Development Co., Houston, Texas.*

The process of increasing the (00*l*) spacings of expanded clay minerals to facilitate their identification was introduced by Bradley (1945), MacEwan (1946, 1948), and others. They demonstrated that numerous organic substances would enter the expanded clay lattices along the (001) plane between the 2.1 sheets, replacing the water. The organic molecule is generally larger than the water it replaces and the result is that the *d* spacings of the (00*l*) reflection series are increased. The resulting increase in *d* spacings is easily recognized, and the presence of expanded clays can be demonstrated even in complex clay mixtures.

It has been the practice in the past to use ethylene glycol as the organic liquid because it is cheap, easily obtainable, and water-soluble, and because the large molecules expand the (001) spacing to approximately 17 Å for pure montmorillonites with divalent cations. Samples were prepared by mixing the clays with liquid glycol.

* Publication No. 43, Exploration and Production Research Division, Shell Development Co., Houston, Texas.

The use of x-ray geiger counter goniometers has increased in recent years for routine clay mineral identification. When this technique is used it is desirable to sediment a thin layer of minus-two-micron-size clay on a glass slide to obtain a maximum orientation of the individual clay plates. The orientation accentuates the (00l) reflections.

The same oriented slides are glycolated to identify expanded 2.1 clays in mixtures, but direct mechanical wetting of the slide with glycol

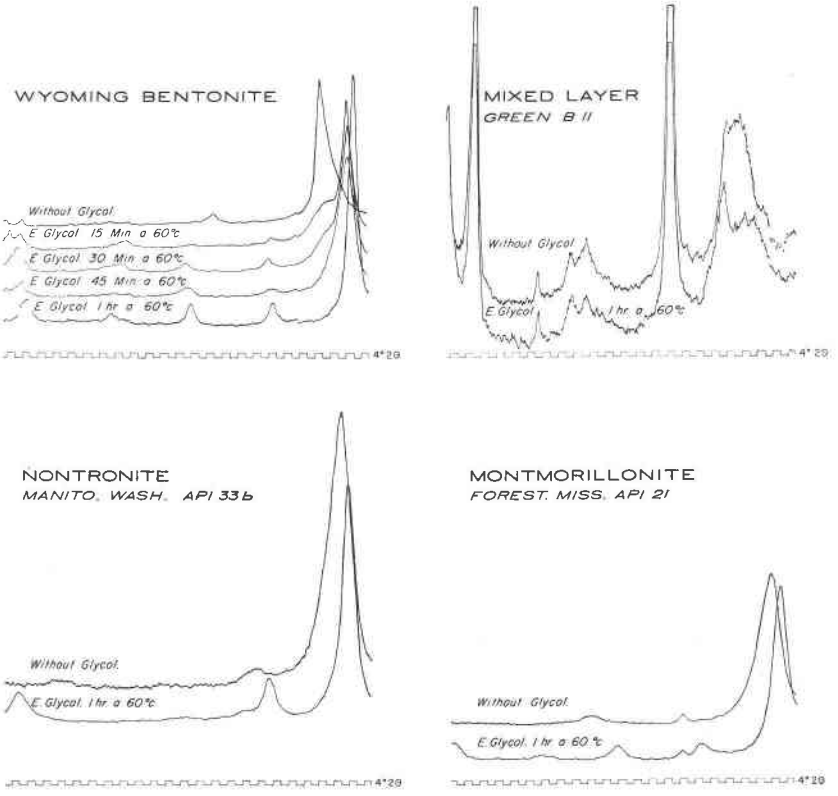

FIG. 1

often destroys the orientation, and the glycolation becomes ineffective. A simple technique for glycolating dry oriented samples has been developed which makes use of the vapor pressure of ethylene glycol at low temperatures. The vapor pressure of ethylene glycol is 39 mm. at 120° C. The glass slide on which an oriented layer of clay has been deposited is suspended in a closed vessel over a heated bath of ethylene glycol for a short time. The montmorillonite in the sample glycolates without a change in orientation and without the sample becoming wet.

It has been found that most samples glycolate satisfactorily within one hour over a bath at 60° C. For routine work an aluminum dessicator partially filled with ethylene glycol, to below the sample holder, has proved satisfactory as a glycolation vessel. A partially filled beaker containing an inverted petri dish, or some other arrangement to hold the sample above the glycol, and covered with an inverted watch glass serves equally as well. Figure one illustrates the effect of glycolation on the x-ray spectrometer traces at 60° C. of four dry oriented montmorillonite samples. The Wyoming bentonite sample was glycolated for $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and one hour to show the progressive shifts in the (00l) reflections. The other three samples were glycolated for one hour.

References

Bradley, W. F. (1945), Diagnostic criteria for clay minerals: *Am. Mineral.*, **30**, 704–713.

MacEwan, D. M. C. (1946), The identification and estimation of the montmorillonite group of minerals, with special reference to soil clays: *J. Soc. Chem. Ind.*, **65**, 298–305.

MacEwan, D. M. C. (1948), Complexes of clays with organic compounds: *J. Trans. Faraday Soc.*, **44**, 349–367.

A POINT COUNTER BASED ON THE LEITZ MECHANICAL STAGE

F. Chayes, *Geophysical Laboratory, Carnegie Institution of Washington, Washington, D. C.*

A point counter based on the stock model of the Leitz mechanical stage, which can be fitted to any Leitz petrographic microscope without retapping the table, may be of interest to many readers of this journal. The instrument was designed and built by the Baltimore Instrument Company[1] at my suggestion.

The rebuilt stage is shown in Fig. 1; numbers in parentheses in the following paragraph refer to the illustration. The stop mechanism consists of a large knob (1) in which 24 holes have been recessed from below. The stop pin (2) which engages these holes is pressed upward by a spring housed in the pin holder (3) which is fastened to the base of the stage. Rotation of the knob (1) brings successive holes into register over the pin. The stop mechanism functions admirably; point locations are firm and sure and, except at the highest magnification, the passage from point to point is accomplished without perceptible loss of focus. When the instrument is in use as a point counter the lock screws (4) are left loose. If it is to be used as a conventional mechanical stage the lock screws are pushed

[1] Interested readers should address inquiries to the Baltimore Instrument Company, 716–718 West Redwood Street, Baltimore 1, Md. The company is prepared to rebuild new stages, which it carries in stock. At the time of this writing it was also willing to adapt used stages, providing they are in good condition.