ate is $CaU_2O_7 \cdot xH_2O$. The natural mineral is essentially a Na-Ca uranate. K and Pb are considered "impurities" in the sense that their ions are too large to occupy Ca or Na positions. They could, however, be in the H_2O positions if these are more or less fixed. The formula would be $(Na, K)_{2-2x}(Ca, Pb)_xU_2O_7 \cdot yH_2O$. The material of Ross, Henderson, and Posnjak indicates that they probably had a mixture of U-minerals. Also, the dark brown color of their material as compared with the lighter colored synthetics suggests this.[2] Such mixtures are almost the rule instead of the exception in U-minerals, as more recent work has indicated. Ross, Henderson, and Posnjak state that clarkeite is of hydrothermal origin, that is, of a late stage in pegmatite formation. Our synthesis at 258° C certainly supports this claim. In many experiments which we have made below 100° C we have never obtained the mineral.

The following recent paper dealing with synthetic diuranates has come to the writer's attention too late to be included in the discussion (Hoekstra, Henry R., and Katz, Joseph J., Studies on the alkaline earth diuranates: *Jour. Am. Chem. Soc.*, **74**, 1683 (1952)).

References

Ross, C. S., Henderson, E. P., Posnjak, E. (1931), Clarkeite, a new uranium mineral: *Am. Mineral.*, **16**, 213–220.

Hintze, Carl (1938), Handbuch der Mineralogie: Ergänzungsband, p. 117.

Dana's System of Mineralogy (1944), 7th Edition, p. 624.

Gruner, J. W. (1952), New data of syntheses of uranium minerals: *Atomic Energy Commission* **RMO-983**, Part I. Annual Report July 1, 1951, to June 30, 1952, page 9.

[2] As the minerals are extremely fine grained, indices are difficult to obtain. Ca-clarkeite after heating has a mean index above 2.00 while that of Na-clarkeite is around 1.84.

THE INDIRECT DETERMINATION OF β AND 2V

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The following method is suggested for the indirect determination, using the polarizing microscope, of β and 2V for crystals capable of being mounted so that they can be rotated around the β direction. β and 2V are determined concurrently with the indirect determination of α and γ by the method of Wood and Ayliffe (*Phil. Mag.* (1936) (7) **21**, 324). Hippuric acid is cited as an example.

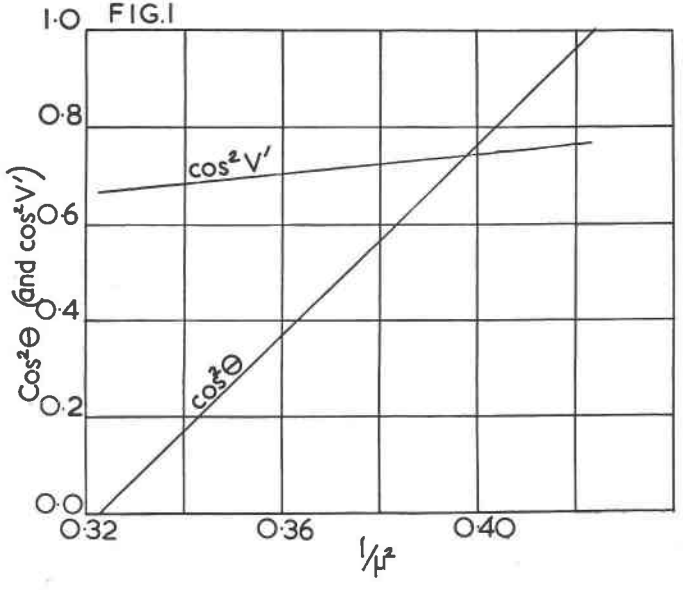
The apparatus used was a rotation apparatus in which the crystal, 0.5–2 mm. long, mounted on a needle with β lying in the direction of the needle, could be rotated through 360° while immersed in a liquid held in a glass cell (see Hantshorne and Stuart, Crystals and the Polarising Microscope, p. 214). The crystal was observed through an 8 mm. objective

TABLE 1

	from Fig. 1	from Winchell
α	1.537	1.535
β	1.594	1.592
γ	1.762	1.760
2V	65° 45′±15′	65° 49.5′

with β at right angles to the vibration direction of the polarizer and the four angular positions found in which the refractive indices of liquid and crystal were matched, as in Wood and Ayliffe's method. The stage was then turned to the 45° position, the interference figure observed using the Bertrand lens, and the four angular positions were found at which the optic axes were apparently vertical. This gives the apparent optic axial angle 2V in the liquid used, of refractive index μ. This apparent optic axial angle is determined for each liquid used.

In Wood and Ayliffe's method, $\cos^2\theta$ is plotted against $1/\mu^2$, to give a straight line, θ being the angle between the position in which α is horizontal, and the position in which the refractive index of the crystal is matched by that of the liquid. When $\mu=\beta$, $2\theta=2V$, the true optic axial angle. Thus if $\cos^2V^1$ (for positive crystals: for negative crystals plot $\sin^2V^1$) is plotted against $1/\mu^2$ on the same axes as $\cos^2\theta$ vs $1/\mu^2$, $1/\beta^2$



and $\cos^2 V$ are given by the point of intersection of the two curves. $\cos^2 V^1$ vs $1/\mu^2$ is not in general far from being a straight line, particularly if points lying at either end are neglected in favor of those lying nearer the intersection. Figure 1 gives the curves obtained for hippuric acid, and Table 1 the values for α, β, γ, and 2V obtained from this figure and as given in Winchell's Optical Properties of Organic Compounds.

The Institute of Silicate Research at the University of Toledo was dedicated on May 15. The Institute is a center for basic research in physical chemistry, colloid chemistry, *x*-rays, microphotography, microscopy, refractometry and interferometry. It is supported by the University, Libbey-Owens-Ford Co., Owens-Corning Fiberglas Corporation, Owens-Illinois Glass Co., Pittsburgh Plate Glass Co., and Columbia-Southern Chemical Corporation. Dr. Wilhelm Eitel is the director of the Institute.

The Twelfth Annual Pittsburgh Diffraction Conference will be held at the Mellon Institute, Pittsburgh, Pennsylvania, on Nov. 3, 4, and 5, 1954. This will be a joint meeting with the American Crystallographic Association. Technical sessions are being arranged on Instrumentation and Methods, Metals, Neutron Diffraction, Small-Angle Scattering, and Silicates and Related Structures. Titles of papers should be submitted to Professor G. A. Jeffrey, University of Pittsburgh, Pittsburgh 13, Pennsylvania, before Sept. 1, 1954. Abstracts should be submitted by Sept. 20, 1954.

The Society for Experimental Stress Analysis will hold its annual meeting and exposition in conjunction with The First International Instrument Congress and Exposition on Sept. 21, 22, and 23, 1954, at the Bellevue-Stratford Hotel, Philadelphia, Pennsylvania. Information regarding this meeting may be obtained by writing to General Chairman, Mr. Frank G. Tatnall, P.O. Box 4034, Chestnut Hill, Philadelphia, Pennsylvania.

The 8th Annual Midwestern meeting of the Society of Exploration Geophysicists will be held November 18 and 19 at the Adolphus hotel in Dallas, Texas. Registration will begin November 17 for exploration scientists from Texas, Louisiana, Oklahoma and New Mexico. Meeting committees are headed by members of the Dallas Geophysical Society, assisted by members of five other participating SEG local sections in Fort Worth, Midland, Shreveport, Oklahoma City and Tulsa.

Corrections

The word *ferroan* in the title of the note starting on p. 676 of the July–August issue of this journal should read *ferro;* the same change should be made just above the *Note* near the middle of p. 680. In Table 2 on p. 677 the gravity values are reversed.
