REFERENCES

HURLBUT, C. S., JR., (1950) Childrenite-Eosphorite Series: *Am. Mineral.*, **35**, 793–805.
STRUNZ, H. AND FISCHER, M. (1957) *Neues Jahrbuch fur Mineralogie*, Monatshefte, p. 78.

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ADDITIONAL DATA ON BIKITAITE

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A new mineral, *bikitaite*, $LiAl_2O_6 \cdot H_2O$, was described in the November-December, 1957 *American Mineralogist.** The description was made on fine grained material interstitial to granular eucryptite and quartz. The largest fragments of single crystals were measured in tenths of millimeters.

Shortly after the manuscript on bikitaite was submitted for publication, Mr. George H. Nolan sent the writer another specimen from his mine in Southern Rhodesia. This specimen, measuring $25 \times 15 \times 15$ centimeters is largely granular eucryptite and quartz as in the original material. However, one surface is covered by bikitaite with individual crystals measuring up to six centimeters in length, and one centimeter across (Fig. 1). In addition, massive bikitaite forms a layer beneath the crystals two to five centimeters thick.

The bikitaite crystals are coated with a thin crust of stilbite so that, although the crystal habit is well displayed, there are no faces visible. Two other minerals, formed later than the stilbite, are present on the specimen. These are calcite, in scalenohedral crystals; and allophane, filling voids between some of the bikitaite crystals.

When the stilbite crust is removed, the bikitaite crystals are seen to be colorless and transparent. They are elongated on [010] (Fig. 2); and the faces in this zone are of high quality. The faces of the [001] zone, that terminate the elongated crystals, are deeply etched and thus give poor measurements on the reflecting goniometer. At the end of some crystals etching has produced slots several millimeters deep parallel to (100).

All the crystals are of the same habit with $c\{001\}$ and $t\{\bar{1}01\}$ the dominant forms in the [010] zone. Because these two forms have nearly equal development and similar rho angles, the crystals have a pseudo-orthorhombic appearance. Three etched forms, $b\{010\}$, $m\{110\}$ and $n\{210\}$, terminate the crystals. Of these, the faces of $\{210\}$ are the largest and also the most deeply etched. $o\{\bar{1}12\}$ was noted on only one

* C. S. Hurlbut, Jr., Bikitaite, $LiAlSi_2O_6 \cdot H_2O$, a new mineral from southern Rhodesia. *Am. Mineral.*, **42**, p. 792–797, 1957.

crystal as small faces of poor quality. From the faces that can be measured on the two-circle goniometer are obtained angular measurements that show a remarkably close agreement with the angles calculated for these forms using x-ray measurements. For example, $(100)\wedge(001) = 65°28'$, measured; whereas the calculated angle is 65°26′. Because of

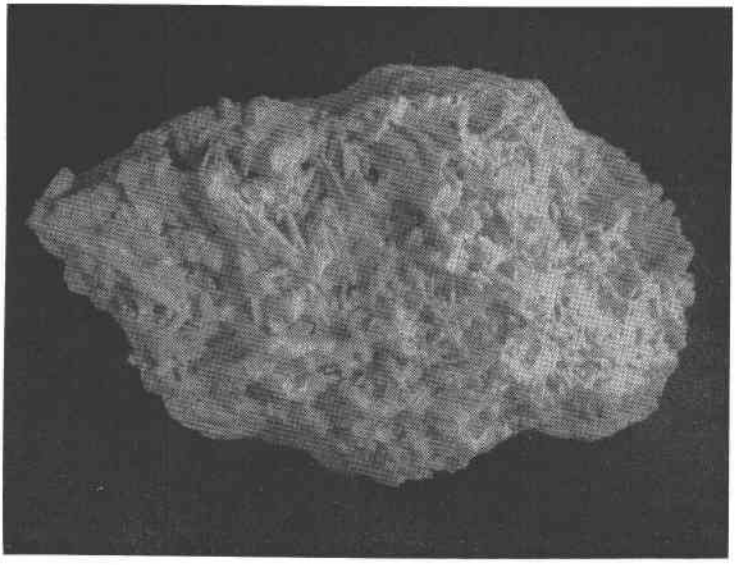

FIG. 1. Specimen coated with bikitaite crystals. Surface 25×15 centimeters.

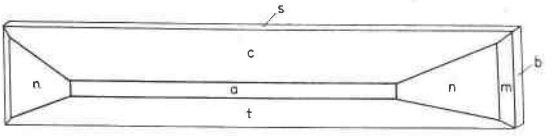

FIG. 2. Bikitaite crystal.

this good agreement and because of the poor angular readings of the etched terminal faces, the angles given in Table 1 are calculated from x-ray measurements.

In the original description it was noted that, when examined microscopically, some grains show parallel extinction with positive elongation. Since two different optical orientations were observed in these grains, it was argued that there might be poor $\{001\}$ and $\{100\}$ cleavage. This conclusion is supported by examination of the larger crystals which show

TABLE 1. BIKITAITE: ANGLE TABLE
Monoclinic: prismatic—2/m

$a:b:c=1.7434:1:1.5434$ $\beta=114°34'$ $p_0:q_0:r_0=0.8853:1.4033:1$
$r_2:p_2:q_2=0.7126:0.6309:1$; $\mu=65°26'$ p_0' 0.9734, q_0' 1.5434, x_0' 0.4571

Forms	ϕ	ρ	ϕ_2	$\rho_2=B$	C	A
c 001	90°00′	24°34′	65°26′	90°00′	—	65°26′
b 010	0°00′	90°00′	—	0°00′	90°00′	90°00′
a 100	90°00′	90°00′	0°00′	90°00′	65°26′	—
m 110	32°16′	90°00′	0°00′	32°16′	77°11′	57°44′
n 210	51°36′	90°00′	0°00′	51°36′	70°59′	38°24′
s $\bar{1}02$	−90°00′	1°42′	91°42′	90°00′	26°16′	91°42′
t $\bar{1}01$	−90°00′	27°18′	117°18′	90°00′	51°52′	117°18′
o $\bar{1}12$	− 2°12′	37°38′	91°42′	52°18′	44°48′	91°21′

a perfect {100} cleavage and a good, though less easily developed, {001} cleavage. Across these cleavages there is a conchoidal fracture.

The specific gravity, determined by suspension in bromoform, was reported earlier as 2.34 ± 0.04. The calculated specific gravity is 2.29. The specific gravity redetermined with the Berman balance using larger fragments is 2.29.

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THE APPLICATION OF A MULTIPLE GUINIER CAMERA (AFTER P.M. DE WOLFF) IN CLAY MINERAL STUDIES

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The type of Guinier camera used by us for an x-ray investigation of clay minerals is characterized by a combination of four cameras in a compact unit, using a single focusing monochromator and a single film, and by an asymmetric disposition of the camera relative to the monochromator. According to GUINIER (1945, p. 147.) and DE WOLFF (Delft 1948, p. 207.) we can enumerate the following advantages:

1. An exceptionally high resolving power in the 2θ-range for which the camera is suited, i.e. $2\theta < 70°$. The resolving power ($1° 2\theta = 4$ mm.) is essentially much better than with a Debye-Scherrer camera of the same dispersion, because the focusing property eliminates to a large extent the influence of the thickness of the specimen. In addition, pairs of diffraction lines corresponding to both wavelengths of the α-doublet can be made to coincide for any desired value of 2θ, while their separation is much reduced in a region extending considerably on both sides of this value.