pendicular to that which joins the optic axes in a Nöremberg polarization-apparatus.

It may be worth while observing that the directions of the principal sections in a small plate can be determined with ease and with considerable accuracy by the method above described, since, if the point of maximum obscuration is difficult to be hit upon with precision, this determination can be much facilitated by a slight rotation of the analyzing prism to right or left; for then tints developed in the crystal assist in indicating a slight inclination of its principal section to the plane of polarization. Of course the relative directions of the principal sections of the crystal, and of the trace (or edge) of one of its faces perpendicular to the plane of symmetry, are readily determined either by the revolution of the crystal on the rotating stage till the trace of the plane is in contact with the wire of the eyepiece, or by bringing the rotating wire of the eyepiece into apparent contact with the edge of the face in question.

The method is available and chiefly useful in cases where it is almost impossible, or at least requires a refined lapidary's skill to form an artificial twin according to the elegant method of Des Cloizeaux.

VI. *Notice of Crystallographical Forms of Glaucodote. By* W. J. LEWIS, *M.A., Fellow of Oriel College, Assistant in the Mineral Department, British Museum**.

[Plate II.]

THE mineral from Häkansbo in Sweden is found in large crystals of metallic lustre and dull tin-white colour, imbedded in towanite and pyrites. The crystals are, for the most part, twins, most of them being twinned about the normal to the face (0 1 1), so far not described, some about the normal to the prism-face (1 1 0). The specific gravity and the prism-angle agree fairly well with those of Breithaupt's acontite.

	Glaucodote.	Acontite (Br.).
Sp. gr.	5·985–6·18.	6·008–6·059.
Prism-angle . . .	69° 32′	69° 31′
Brachydome-angle .	100 2	102 0

* Read December 15, 1876.

The one discrepancy consists in the value of the angle of the brachydome {1 0 1}, which from direct observation and a calculation by the method of least squares involving all the best angles measured, I make out to be 100° 2′. The angle of the prism varies considerably in different crystals—68° 57′, 69° 6⅔′, 69° 13′, 69° 32′, 69° 40′ having been obtained on fairly good specimens. The planes of the brachydome are much striated, and do not allow of such precise determination. Differences in the brachydome-angle, such as those found in the prism-angle, have been observed, though much more limited in extent. This variation of the crystallographic elements of the mineral is probably to be accounted for by a variation of the quantity of cobalt present. The angle of the prism (=67° 24′) and the cleavage *c*, given in Miller's 'Mineralogy,' seem to belong to some other mineral. They were not determined by Professor Miller himself; and I have been unable to find out whence they are taken. On the very large crystals are found the forms {0 1 0}, {1 1 0}, {1 0 1}, {1 0 2}, {0 1 1}; on smaller crystals have been found the additional forms, {1 1 1}, {1 2 2}, {2 0 1}. Fig. 1 (Plate II.) is a stereographic projection of these forms. Such simple crystals as I have observed were extended considerably in the direction of the edge of the brachydome, but were all broken at one end. On one of these, whose prism-angle measured 69° 19½′, a second prism {160} was observed. Its faces were small and not well developed. Assuming the measured angle 69° 19½′ for the fundamental prism, calculation gives the angle (1 1 0, 1 6 0)=27° 56¼′, which agrees very well with that obtained by measurement, 27° 54½′.

The elements and angles given below have been taken from measurements obtained on two good twin-crystals, each about the size of a cherry.

System prismatic:

D=(0 1 0, 0 1 1)=30° 12⅓′; E=(0 0 1, 1 0 1)=50° 1′;
F=(1 0 0, 1 1 0)=55° 14′.

$$a:b:c=1{\cdot}4406:1:1{\cdot}71784.$$

b{0 1 0}, *m*{1 1 0}, *y*{2 0 1}, *l*{1 0 1}, *s*{1 0 2}, *n*{0 1 1}, *o*{1 1 1}, *w*{1 2 2}, *p*{1 6 0}.

	Calculated.	Found.
$m m_{\prime}$	= 69° 32′	69° 32′
$l l_{\prime}$	100 2	100 1
$l s$	19 12¾	19 0
$l y$	17 14	17 13
$y y_{\prime}$	134 30	134 31½
$l y_{\prime}$	62 44	62 43⅔
$m y$	58 16½	58 15
$m l$	64 5½	64 4½
$n w$	16 42	16 43½
$w w_{\prime}$	33 24	33 27
$o w$	14 15⅔	14 7
$m n$	44 46	
$n l$	71 8⅓	
$m \mu$	89 32	89 36
$m \lambda$	26 22⅓	26 32

The observed angles agree fairly well with those obtained by calculation, with the exception of $l s$ and $m \lambda$. The observation of the latter was one of no great weight; but the former was repeatedly measured with great care. As moreover an increase of 5′ in the angle E involves an increase in $l s$ of ¾′ only, I have been obliged to regard the discrepancy as due to a distortion of the face *s* in the crystal on which the angle was measured. This face *s*, though large, is generally one of the worst on the crystal. The plane *n* is but poorly developed, and therefore does not serve for a direct determination of the element D. The plane *b* is deeply striated parallel to its intersection with *m*; the planes *l* and *s* are striated parallel to their intersections with one another, *s* being much the rougher. The planes *y* are pitted and rough. Figs. 2 and 3 are representations of simple crystals.

The twins about (0 1 1) are a fresh illustration of the tendency to twin about the face of a prism whose angle is near 60°. Fig. 4 is a representation of this twin, in which both members are shown approximately *in æquilibrio* with the twin-axis vertical. Fig. 5 represents somewhat closely the appearance of a moderately large twin of this kind. The principal crystal, denoted by Roman letters, is projected in the same way as in fig. 1; and to it are attached two smaller crystals twinned about

(1 1 0), the one represented by Greek letters, the other by barred Greek letters. The intersection of planes which correspond is straight and definite, of planes which do not correspond (as s and μ) is irregular and indefinite. The elements obtained by measurements on this crystal differ slightly from those given above, as is shown by the following Table:—

	Calculated.	Found.
D	$=30^\circ\ 14\frac{1}{2}'$	
E	50 $2\frac{2}{3}$	
F	55 10	
$m\,m_{\prime}$	69 40	$69^\circ\ 38\frac{1}{2}'$
$s\,s_{\prime}$	61 40	61 $34\frac{1}{2}$
$l\,s$	19 $12\frac{2}{3}$	19 $14\frac{3}{4}$
$m\,l$	64 2	64 $1\frac{1}{2}$
$m\,s$	72 $58\frac{1}{2}$	72 53
$m\,\mu_{\prime}$	48 $50\frac{1}{3}$	48 59

One specimen in the British Museum consists of a triple twin, resembling those of chrysoberyl, two of the members being twinned on adjacent faces of the form {0 1 1} of the third. Fig. 6 is an orthogonal projection on the plane (1 0 0) of this twin, in which an attempt has been made to show the appearance of the specimen and the relative magnitude of the members. Fig. 6 *a* shows the simple crystal in the same projection.

Twins about the face of the prism {1 1 0} have been already observed. These twins generally show the tendency to develop but slightly in the direction of the twin axis; and I was fortunate enough to get a specimen showing this to a remarkable degree. It is about the size of a penny-piece, and about the thickness of the thick penny of George III. One member is about half the width of the other, the remainder being apparently untwinned without an increase of its thickness. Close inspection, however, shows the existence of twin laminæ in this part.