PROCEEDINGS

OF THE

CRYSTALLOLOGICAL SOCIETY.

X. *Crystallographic Notes.*

By W. J. Lewis, *M.A., Fellow of Oriel College, Oxford**.

Dr. Hugo Müller had the goodness, some time ago, to send me some crystals of the isomerous compounds Quercite and Inosite, which he had obtained from new sources—the former from the leaves of the dwarf-palm (*Chamærops humilis*), and the latter from cochineal.

Quercite.—The crystallography of Quercite has been already determined by Sénarmont (Rammelsberg's *Die neuesten Forschungen in der Krystall-Chemie*); but it was a matter of interest to determine whether any difference either in habit or angles could be found in the crystals obtained from the new source. The crystals belong to the oblique system, and were found to show the same hemimorphous habit (fig. 1) observed by Sénarmont; but a slight change has been made in the elements, which seemed justified by the fact that the crystals obtained by Dr. Müller were very perfect.

The crystal is positive; the optic axes lie in the plane of symmetry; the mean line lies between c and g, and makes an angle of about 20° with the normal to g, the dispersion (*inclinée*) being considerable, $v > \rho$. The angles of the optic

* Read October 26, 1877.

axes in air for the red and blue rays were found to be 55° 17′ and 58° 20½′ respectively.

Fig. 1.

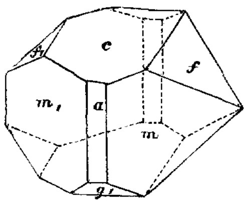
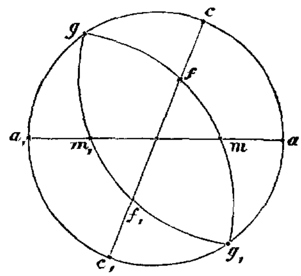


Fig. 2.



The forms observed are $a\{100\}$, $m\{110\}$, $c\{001\}$, $f\{011\}$, $g\{\bar{1}01\}$ (fig. 2). The faces of the prism are striated parallel to their intersection with a; and there is a good cleavage parallel to $g\{\bar{1}01\}$. The following are the elements and principal angles observed and calculated.

$$(100, 101) = 35° \; 32'{\cdot}2, \; (101, 001) = 33° \; 30'{\cdot}8,$$
$$(010, 111) = 66° \; 1'.$$
$$a : b : c = 1 : 1{\cdot}241 : 0{\cdot}95.$$

	Calculated.	Observed.	Sénarmont. Calculated.	Sénarmont. Observed.
	° ′	° ′	° ′	° ′
ac	*69 3	69 5	68 57	68 57
cg	53 20⅓	53 16⅓		53 22 about
$ga_{,}$	*57 36⅔	57 35		57 20
cf	*35 33½	35 32	35 34	35 32
$ff_{,}$	108 53	108 49½	108 52	109 5
am	36 57⅔	36 56¾		36 45
$mm_{,}$	106 4⅔	106 6½	106 30	106 29
$g_{,}m$	64 39½	64 43		
mf	54 24⅙	54 21¼		
fg	60 56⅓	60 59		
af	73 5⅓	73 8		
$fa_{,}$	106 54⅔	106 59½		

Inosite.—This substance crystallizes in colourless, much striated prisms, attached by one end to the mass of the substance. The striations on the planes lying in the prism-zone rendered it impossible, even in the most delicate needles, to get reliable measurements of the angles in this zone. The prisms were terminated by four small planes, $\{1\,0\,\bar{1}\}$, $\{1\,0\,1\}$, and $\{0\,1\,2\}$, of which the former was most largely developed, sometimes even to the exclusion of the other planes. The crystals were extremely friable, and lost a portion of their water very readily—properties which rendered the examination difficult and prevented the determination of their optical character. The opposite faces in the zones were in all cases considerably displaced, so that there was always a divergence from the zone and from 180° in the sum of the angles between them. The following elements and measurements can therefore only be regarded as approximate.

Fig. 3.

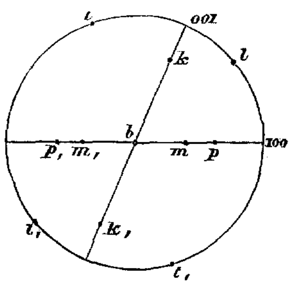
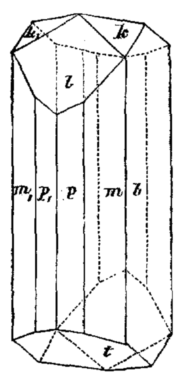


Fig. 4.



The system is oblique. The forms are $b\{0\,1\,0\}$, $m\{1\,1\,0\}$, $p\{2\,1\,0\}$, $\{4\,1\,0\}$, $l\{1\,0\,1\}$, $t\{\bar{1}\,0\,1\}$, $k\{0\,1\,2\}$ (fig. 4).

$(100, 101) = 40° 51\frac{3}{4}'$, $(101, 001) = 28° 27\frac{3}{4}'$,
$(010, 111) = 62° 45\frac{2}{3}'$;

$$a : b : c = 1{\cdot}0802 : 1 : 0{\cdot}7869.$$

	Calculated.	Observed.
$l\,t$	71° 0′	70° 34½′ to 70° 27′
$l\,k$	34 24½	34 36 „ 34 14
$t\,k$	46 15	46 11 „ 45 54
$b\,m$	44 42	44 50 „ 44 36
$b\,p$	63 11½	63 13 „ 62 52
$b\,(410)$	75 49½	76 0 „ 75 45
$m\,m_{,}$	89 24	89 37
$m\,l$	57 51⅔	57 56
$\bar{m}\,l$	122 8⅓	121 49½
$m_{,}\,t$	74 49	74 58 „ 74 52
$\bar{m}_{,}\,t$	105 11	105 6 „ 105 10
$m\,k$	61 24⅓	61 52 „ 61 34
$\bar{m}\,k$	118 35⅔	118 10
$m_{,}\,k$	89 17	
$b\,l$	90 0	89 53½
$b\,k$	69 47½	69 32 „ 70 3½
$k\,k_{,}$ (over 001)	40 25	40 13

Jordanite.—The British Museum collection possesses a crystal of blende from the Binnenthal on which two small crystals, the one of Jordanite, the other of Binnite, are implanted. The former, on measurement, was found to be a combination of the forms $\{001\}$, $\{119\}$, $\{113\}$, $\{225\}$, $\{112\}$, $\{110\}$, $\{013\}$, $\{025\}$, $\{012\}$, $\{023\}$, $\{011\}$, $\{312\}$, $\{311\}$, $\{310\}$. Of these the forms $\{225\}$, $\{025\}$, $\{023\}$, $\{312\}$, $\{310\}$ are, I believe, new. The middle index in these symbols corresponds to the brachydiagonal usually denoted by the letter y and the parameter b. This arrangement is not to be confounded with that of Professor vom Rath, in which b corresponds to the makrodiagonal and a to the brachydiagonal. The angles between some of these planes observed and calculated from the elements, $c : \frac{1}{2}o = 65° 0'$; $\frac{1}{2}o : \frac{1}{2}o = 50° 49'$, given by Prof. vom Rath are:—

	v. Rath's notation.	Calculated.	Observed.
		° ′	° ′
001 : 013	$c : \frac{1}{3}d$	51 33	51 33
001 : 025		56 $30\frac{1}{3}$	not determined.
001 : 012	$c : \frac{1}{2}d$	62 $6\frac{1}{6}$	62 6
001 : 023		68 $20\frac{2}{3}$	68 23
001 : 011	$c : d$	75 $10\frac{1}{2}$	75 6
001 : 312		74 $24\frac{1}{2}$	74 15
001 : 311	$c : u$	82 $3\frac{1}{2}$	81 47
001 : 310		90 0	89 55
312 : 112		29 32	29 30
112 : 012	$\frac{1}{2}o : \frac{1}{2}d$	25 $24\frac{1}{2}$	25 27

The plane (1 1 2) was the largest plane on the crystal, (0 0 1) the next. All the other planes were small; and some thin twin laminæ were observed intersecting the zones [0 0 1, 3 1 0] and [0 0 1, $\bar{1}$ 1 2].

Binnite.—This mineral has occupied the attention of several mineralogists, a summary of whose work on it is given by Hessenberg in his *Min. Notizen*, ix., where he describes a very beautiful specimen in his possession. Kenngott, after an examination of the crystals in Wiser's collection, came to the conclusion that the mineral was hemihedral, a conclusion combated by von Waltershausen. After a careful study of the distribution of the faces on his crystal, Hessenberg comes to a conclusion opposed to that of Kenngott; for although the forms {1 1 1}, {2 1 1}, {3 2 1}, {4 1 1}, and {10 1 1} were incomplete, he found that the faces of {1 1 1}, {2 1 1}, and {3 2 1} were present in an irregular manner. He has made no remark, however, on the fact that the faces of {4 1 1} and {10 1 1} are present in adjacent octants only.

In the examination of the specimen in the British Museum, especial attention was paid to the distribution of the faces of the different forms. It consists of two crystals united together in parallel positions, or possibly of one crystal whose free development has been prevented at one point by the presence of some body, and has the forms {1 1 0}, {2 1 1}, {1 0 0}, {1 1 1}, {3 2 1}, κ{4 1 1}, κ{6 1 1}, κ{7 1 1}, κ{10 1 1}, and κ{2 3 3}, of which κ{7 1 1} is new. The forms {1 1 0}, {2 1 1} are well and about equally developed; the others are subordinate. The number of octants which could be examined was six; so that the question of the hemihedrism could be more thoroughly tested than it was by Hessenberg, who was only able to examine four. The forms {1 1 0}, {2 1 1} were well developed in adjacent octants, and are therefore holohedral. The forms {4 1 1}, {6 1 1}, {7 1 1}, {10 1 1}, and {2 3 3} were found in alternate octants only, and are consequently hemihedral. The faces of {3 2 1} were for the most part badly developed, and did not permit of any certain conclusion being drawn. Hessenberg found a plane of the form in each of two adjacent octants which excludes a hemihedrism with inclined faces. I believe it, from my observations, to be holohedral. A further examination of such crystals as are to be found in the various collections might possibly set the question of the hemihedrism of the mineral at rest, and would certainly be interesting.

XI. *Crystallography of the Nitrosoterpenes of* Dr. Tilden. *By* N. S. Maskelyne, *F.R.S.*

[Plate IV. figs. 1–6.]

The varieties of nitrosoterpenes obtained in crystals by Dr. Tilden belong to two crystalline types. The first includes the substances formed (*a*) from ordinary turpentine, (*b*) from French turpentine, (*c*) from juniper turpentine. To the second type belong the substances obtained from the oils of orange, of bergamot, and of caraway. The crystals of both types belong to the monosymmetric system.

I. *First group.*—The crystals of nitrosoterpene produced in different ways from the American oil of turpentine have already been described in connexion with Dr. Tilden's notice of the substances in the Journal of the Chemical Society, June 1875. They were of two kinds, differing in habit—the one being twinned on the plane 0 0 1, and the other not evincing any twin habit. The crystals obtained from French oil of turpentine and from juniper oil are very dissimilar in appearance to those made from the American oil; but a goniometrical study of them proves that they belong to the same crystalline type with those previously investigated. The crystals of the latter kinds furnished me by Dr. Tilden presented considerable difficulty under measurement, since certain of the