Hatchite, a new (anorthic) mineral from the Binnenthal.[1]

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NEARLY ten years ago, in 1902, five small crystals were noticed by one of us on a crystal of a sulpharsenite of lead, probably rathite, which had been found in the Lengenbach quarry that summer. Although from their lead-grey colour they also appeared to belong to a sulpharsenite of lead, in habit and appearance they were unlike the crystals of any such species as yet known. The crystals were measured, and were shown at the anniversary meeting[2] of the Society, November 18, 1902, but the measurements were not published at the time in the expectation that further material would afterwards be found which would enable an analysis to be made and perhaps throw fresh light on the morphological characters of the crystals. Such hopes have not yet been realized, and, since it is uncertain how much sustained work may be done in the quarry in the future, it was felt desirable not to delay longer the publication of the results of the goniometrical examination.

Four of the crystals were sent to the British Museum last year (1911), and were measured on a three-circle goniometer. Only two of them (figs. 1 and 2) were sufficiently well developed to be of service in the determination of the morphological characters; the former of them

[1] Communicated by permission of the Trustees of the British Museum.

[2] Mineralogical Magazine, 1902, vol. xiii, p. xxxi. The following report appeared in 'Nature', 1902, vol. lxvii, p. 142: 'Mr. Solly also discussed the crystallography of a presumably new mineral from the Lengenbach, five minute but brilliant crystals of which were found on a crystal of rathite. In these crystals, no plane or axis of symmetry could be determined, and each crystal was grown in a different position.'

measured about 0·7 mm., and the latter about 0·5 mm. in greatest diameter. The crystals displayed the following combinations of forms:

Crystal 1 (fig. 1), *a b c m n l M d r u o v i q w p*.
Crystal 2 (fig. 2), *a b c m M g f r o i q j s*.
Crystal 3, *b c M r o*.
Crystal 4, *a b c M r s*.

The crystals are lead-grey in colour, and give a chocolate-coloured streak. They possess neither plane nor axis of symmetry, and belong therefore to the anorthic system; no signs of twinning were noticed. They have to some extent lost their original brilliance of lustre during the years that have passed since they were found, and the reflections of the goniometer-signal were correspondingly less distinct, but the values of the angles agreed closely with the earlier determinations.

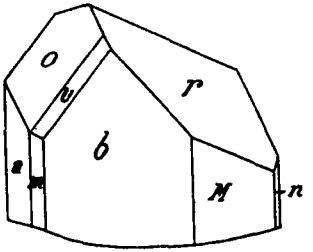

Fig. 1.

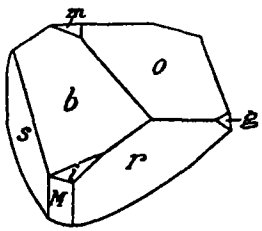

Fig. 2.

Crystals of Hatchite from the Binnenthal, Switzerland.

The following angles, which were the best of those measured, were used in the calculation of the axial ratios and angles:

Angle.	Observed Values.	Mean Value.
$ab = (100):(010)$	65° 45′, 65° 47′	65° 46′
$br' = (010):(\bar{1}1\bar{1})$	75° 59′, 76° 5′	76° 2′
$ar = (100):(1\bar{1}1)$	56° 10′, 56° 12′	56° 11′
$bc = (010):(001)$	62° 41′	62° 41′
$ao = (100):(11\bar{1})$	35° 55′, 36° 15′	36° 5′

$a:b:c = 0{\cdot}9787:1:1{\cdot}1575$; $\alpha = 116°\ 53\frac{1}{2}'$, $\beta = 85°\ 12'$, $\gamma = 113°\ 44\frac{1}{2}'$; $(010):(001) = 62°\ 41'$, $(001):(100) = 83°\ 4\frac{1}{2}'$, $(100):(010) = 65°\ 46'$.

Altogether twenty-one forms were observed: *a* (100), *b* (010), *c* (001), *m* (110), *n* ($\bar{2}10$), *l* (320), *M* ($\bar{1}10$), *g* (01$\bar{2}$), *e* (0$\bar{1}1$), *f* (0$\bar{2}1$), *d* (103), *r* (1$\bar{1}1$), *u* (2$\bar{2}1$), *o* (11$\bar{1}$), *v* (12$\bar{1}$), *i* (2$\bar{5}1$), *q* (25$\bar{6}$), *j* (13$\bar{6}$), *w* (32$\bar{1}$), *p* ($\bar{1}11$), *s* ($\bar{1}12$). Of these *a b c M o r* are the most prominent.

The observed and calculated values of the principal angles are stated in the following table, measurements being given from *b* (010):

Form.	Calculated Values.		Observed Values.	
	ϕ	ρ	ϕ	ρ
a (100)	0° 0′	65°46′	0° 0′	65°45′
			,,	65 47
			,,	65 52
			,,	65 55
m (110)	,,	31 14	,,	31 27
			,,	31 41
n ($\bar{2}$10)	,,	−81 30	,,	81 35
l (320)	,,	−70 45	,,	70 56
M (1$\bar{1}$0)	,,	−58 10	,,	58 35
				58 49
u (22$\bar{1}$)	23 35½	−63 15	23 14	63 18
i (25$\bar{1}$)	,,	−24 19½	23 46	24 21
			22 37	24 59
r (11$\bar{1}$)	42 12	−76 2	42 16	75 59
			41 48	76 6
d (103)	72 41½	56 22	73 22	56 19
c (001)	−85 12	62 41	85 0	62 41
			85 11	63 5
g (01$\bar{2}$)	,,	−79 6	85 0	79 15
e (01$\bar{1}$)	,,	−47 57½	84 5	48 8
f (02$\bar{1}$)	,,	−28 19	85 30	28 0
j (13$\bar{6}$)	−74 16	−74 48	73 38	75 0
q (25$\bar{6}$)	−64 56½	−52 48½	65 48	50 6
			65 56	54 40
s (1$\bar{1}$2)	−55 53	51 26		
o (11$\bar{1}$)	−38 12	−48 20	37 58	48 40
			38 2	48 40
v (12$\bar{1}$)	,,	−29 27½	37 58	29 39
p (1$\bar{1}$1)	,,	48 20	38 9	49 29
w (32$\bar{1}$)	−15 21	−43 52	15 34	44 9

s (1$\bar{1}$2) was an indistinct face lying in a zone with M (1$\bar{1}$0) and r (11$\bar{1}$), the observed value of the angle sr = (1$\bar{1}$2) : (11$\bar{1}$) being 90° 40′ and the calculated value 92° 30½′.

So far as we have been able to ascertain no mineral species with similar morphological characters has yet been described. Since it therefore appears to be a new species, it is convenient to give it a name, and we propose to call it hatchite after Dr. Frederick Henry Hatch.