

ART. XXVIII.—*On Crystals of Crocoite from Tasmania;*
by R. G. VAN NAME.

A RECENT addition to the Brush Mineral Collection of the Sheffield Scientific School consists of a series of specimens of crocoite from near Dundas, Tasmania, purchased from the Foote Mineral Company of Philadelphia. These specimens, which are interesting on account of the diversity of development of the crystals and the unusual habit which many of them show, include both separate crystals and groups attached to the gangue. The latter is a cellular limonite more or less coated and intermixed with a black oxide of manganese (wad), but showing no trace of lead or chromium minerals other than the crocoite. In the cavities of this material, which has evidently come from a zone of oxidation, the crocoite crystals occur in irregular groups or loosely adherent masses.

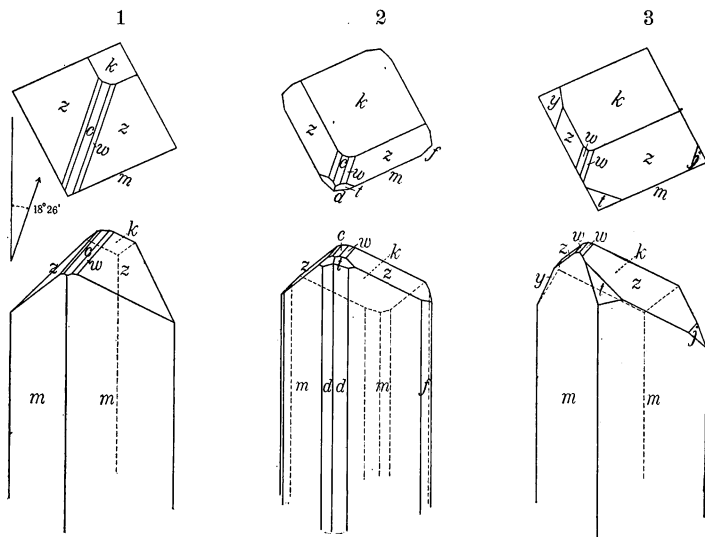
Two distinct types of development are shown by the crystals. The habit exhibited by the detached crystals, and by a number of smaller individuals still in position upon the gangue, is quite different from that illustrated by Palache* for crocoite from this locality, and is not mentioned by Daubert† in his detailed description of crocoite from Brazil, Siberia and the Philippines. Typical specimens of this habit are characterized by a remarkable elongation of the prismatic faces, the unit prism being the predominant form, and giving the crystals a nearly square cross-section, since $m \wedge m' = 93^\circ 41'$. Four of the crystals of this type are from 40 to 64^{mm} in length, with a diameter measured across one of the prism faces of from 1 to 2^{mm}, and a number of others, including several fragmentary crystals, have a relative length only slightly less. The faces of the unit prism are lightly striated longitudinally, but are in other respects smooth and even with sharp and well-defined intersections, the whole development of the prism being generally surprisingly regular. In all cases, as far as was observed, the crystals are of uniform diameter throughout and show no tendency to taper. The terminal faces upon the crystals of this type usually show a high polish and give excellent reflections. They are chiefly domes, but the base $c(001)$ and the pyramid $t(111)$ are often present though rarely prominent. No doubly terminated crystals of this type were observed.

With one exception all the faces observed were known forms, of which the orthodome $k(\bar{1}01)$ and the clinodome $z(011)$ are the most persistent. The new form is a clinodome $j(032)$, which was found on but one crystal.

* This Journal, i, 389, 1896.

† Ber. Akad. Wien., xlii, 19, 1860.

A typical specimen of the habit above described is represented by figure 1.* The faces present are the prism m (110), the clinodomes z (011) and w (012), the base c (001), and the orthodome k ($\bar{1}01$). The crystal from which this drawing was made is 64^{mm} in length and unusually symmetrical. Its diameter across a prism face is 1.6^{mm}. To represent this crystal



therefore in its true proportions the figure should be more than seventeen times the length here shown. Still simpler crystals of this type are terminated by the domes z and k alone.

Figure 2 was drawn from a slightly more complex crystal which shows, in addition to the forms present on the specimen just described, the prisms d (210) and f (120), and the pyramid i (111).

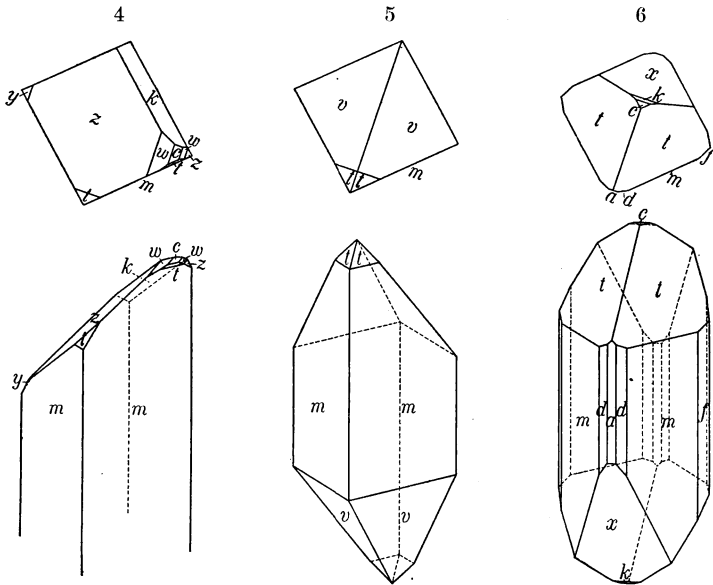
The crystals represented in figures 3 and 4 are unsymmetrically developed, and the relative size of the faces has been as far as possible preserved in the drawings. Figure 3 shows the crystal upon which the new clinodome j (032) was observed. It appears on only one side of the crystal, but the face is well defined, gives a good reflection and can be accurately measured. From the measurements to the two z faces, which

* In this and all the following figures the plan is rotated through an angle of $18^{\circ} 26'$, as shown by the arrow, thus preserving the vertical relation between corresponding points in the plan and the clinographic projection below. This mode of representation has been used in a previous article from this laboratory by Robinson (this Journal, xii, 180, 1901), where its object is further explained.

varied very little upon repeated trial, the position of the base c was interpolated and the angle $c \wedge j$ ($001 \wedge 032$) was thus found to be $53^\circ 10'$, calculated $53^\circ 18'$. On the opposite side of the crystal the clinodome y (021) takes the place of j .

Another crystal of very similar habit but still more distorted is represented by figure 4. Here again the y face appears on one side only.

Dauber,* among many previously unrecorded forms for crocoite, mentions but one new clinodome (085), and this he designates as doubtful. Although this index differs but little from (032), the calculated angle upon c ($001 \wedge 085$) is $55^\circ 3'$, which is nearly two degrees larger than the measured value of $c \wedge j$. The index (085) can therefore hardly be assigned to the face j . Moreover, several other forms whose indices contain the 3 to 2 relation are known to occur upon crocoite.



The other type of crystal referred to above is the one generally associated with this mineral, short prisms terminated chiefly by the simple pyramids $t(111)$ and $v(\bar{1}11)$ with various modifications. These crystals are usually small and not infrequently doubly terminated. Two examples are illustrated by figures 5 and 6. Figure 5 represents a very common habit terminated by the pyramids $t(111)$ and $v(\bar{1}11)$, and figure 6

* Loc. cit.

shows a more highly modified crystal which has the prisms m (110), d (210) and f (120), the pinacoid a (100), the pyramid t (111), the base c (001), and the orthodomes k ($\bar{1}01$) and x ($\bar{3}01$).

This type of crystallization is shown by two of the specimens in the Brush collection, both of which consist of an aggregate of small, rather loosely intergrown crystals. A little of the limonite gangue is attached to each of them, and as far as can be judged the occurrence of the crystals of this type is the same as that of the slender prismatic crystals, although in no case were individuals of both types observed upon the same specimen.

A list of all the forms observed is given below. It should be noted that no attempt was made to identify any but the most prominent prismatic forms, on account of the tendency to striation which seems almost invariably to accompany any modification of the unit prism.

a , 100	c , 001	t , 111	z , 011
m , 110	k , $\bar{1}01$	v , $\bar{1}11$	w , 012
d , 210	x , $\bar{3}01$		y , 021
f , 120			$*j$, 032

These Tasmanian crystals of crocoite with their superb color, high luster and remarkably perfect crystallization, are most beautiful natural objects, scarcely surpassed by crystals of any other known mineral.

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