

NOTES AND NEWS

X-RAY STUDY OF PUCHERITE

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Investigations have been carried out recently on the structure of pucherite from Schneeberg, Saxony. Using rotating crystal photographs (Fe K_{α} & β radiation) it has been possible to determine the following values for the crystallographic axes:

$$a = 5.38 \text{ \AA}; b = 5.04 \text{ \AA}; c = 11.98 \text{ \AA}. (\text{Accuracy } \pm 0.03 \text{ \AA}.)$$

$$a:b:c = 1.069:1:2.379 \text{ (macroscopic: } a:b:c = 0.5327:1:2.3357).$$

Assuming the mineral to be rhombic and the cell containing 4 mol. BiVO_4 , the specific gravity would be 6.57, which value differs considerably from the one known in mineralogical literature (6.25).¹

Owing to lack of suitable material the authors have not been able to carry out specific gravity determinations (by direct method) with satisfying accuracy. Also owing to the rarity of well crystallized single crystals we have not been able to determine the space group with certainty.

CALCITE TWINS FROM NORTH PLAINFIELD, NEW JERSEY

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In the basalt quarry, operated by the Somerset Trap Rock Corporation, in the First Watchung Mountain, located on Somerset Street, between North Plainfield and Watchung in Somerset County, calcite occurs in considerable quantities as a filling in the breccia of nearly vertical fault zones. Crystals showing complex combinations of rhombohedral and scalenohedral forms, very commonly twinned, line the walls of occasional open cavities in the breccia. Among these, probably the most remarkable are two heart-shaped twins which were obtained by the writer in the summer of 1935. These occurred together in a cavity about 8 inches deep and 4 inches wide; the walls of this cavity were completely covered with smaller calcite crystals of more ordinary scalenohedral and rhombohedral habits, the majority of which were twinned according to the same law as the two larger crystals, but not exhibiting the heart-shaped form.

The larger of the twinned crystals measures $4 \times 4 \times 2$ cm. in size, and is transparent, with a light yellow color due to a slight trace of iron. The smaller crystal is $2 \times 2 \times 1$ cm., and is in every way similar to the larger one, except that it exhibits several small faces which are poorly developed. In the case of each there is also a development, on the side and base of the main twinned crystal, of subsidiary crystals composed

¹ Frenzel, A. *Neues Jahrbuch*, p. 515, 1872.

of the scalenohedron ($21\bar{3}1$) and a steep rhombohedron whose faces are rounded; these latter crystals are in parallel position with respect to the main twin.

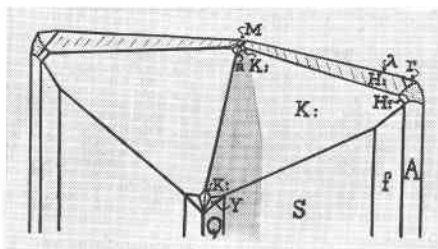


FIG. 1

The faces of these calcite crystals are sharp and lend themselves readily to either the contact or reflection methods of angle measurement. Faces of the scalenohedron ($21\bar{3}1$) are nearly perfect, there being a slight etching in the form of microscopic, irregular pits. Faces in the minus rhombohedron zone ($04\bar{4}3$ to $07\bar{7}1$) are translucent, due rather to crystal overgrowth than to actual pitting. Faces of the scalenohedron ($31\bar{4}2$), which are narrow bands along the upper edges of each crystal, are rough and are striated parallel to the edge ($31\bar{4}2 \wedge 10\bar{1}1$). The faces of the unit plus rhombohedron ($10\bar{1}1$) are very rough and poorly developed.

The crystallographic forms, most of which are designated by their Roman letters in the drawing (Fig. 1) are as follows:

Prism:

<i>Gdt.</i>	<i>Dana</i>	
<i>a</i>	<i>a</i>	($11\bar{2}0$)

Scalenohedrons:

<i>Gdt.</i>	<i>Dana</i>	
<i>K:</i>	<i>v</i>	($21\bar{3}1$)
<i>H:</i>	λ	($31\bar{4}2$)
<i>Y:</i>	—	($12 \cdot 32 \cdot \bar{4}\bar{4} \cdot 13$)

Rhombohedrons (+)

<i>Gdt.</i>	<i>Dana</i>	
<i>p'</i>	<i>r</i>	($10\bar{1}1$)
<i>m'</i>	<i>M</i>	($40\bar{4}1$)
<i>R'</i>	—	($20\bar{2}1$)

Rhombohedrons (—)

<i>Gdt.</i>	<i>Dana</i>	
ξ'	<i>A</i>	($04\bar{4}3$)
ϕ'	<i>f</i>	($02\bar{2}1$)
Ξ'	<i>s</i>	($05\bar{5}1$)
<i>Q'</i>	—	($07\bar{7}1$)

The twin plane ($01\bar{1}2$) is shaded in the figure.

Quarrying operations now in progress in the vicinity of this vein of calcite may uncover other interesting crystals for study.

Grateful acknowledgment is hereby made to Mr. Herbert P. Whitlock, whose experience with the forms of calcite enabled the writer to start correctly with the solution of this crystallographic problem.

ADAMITE FROM CHLORIDE CLIFF, CALIFORNIA

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Specimens of an undetermined mineral collected at Chloride Cliff, Inyo County, California, were submitted to the writer for identification and proved to be the rather rare zinc arsenate, adamite. This mineral was originally discovered at Chañarcillo, Chile in 1886, and first found in the United States in 1916, in the Tintic district, Utah,¹ later at Cedar Mountain, Mineral County, Nevada,² and more recently at Gold Hill, Tooele County, Utah.³

At Chloride Cliff the mineral occurs as small crystals, scattered or closely packed, on the surface of fragments of crystalline limestone, in the oxidized zone of workings in this locality. It is the latest mineral to be formed here, overlying crusts of associated limonitic material, crumbly, secondary calcite, and a green mineral which was not identified, but which appears from chemical tests to be one of the hydrous arsenates of copper. This green mineral is quite closely associated with the adamite, and even in some cases causes the latter to appear green on casual inspection. The adamite, however, is perfectly colorless, and where it appears green, closer examination shows it to be superimposed on cores of the other mineral, which show through, and seem to color the whole. There is no transition between the two, and the line of demarcation is perfectly sharp. Much of the adamite is entirely free from the green substance and it is material of this type which was used in the tests.

The blowpipe, physical and optical properties of the mineral identify it as adamite, and the crystal measurements confirm the identification. Owing to the small amount of pure material available it was unfortunately not possible to make a quantitative analysis, but qualitative tests, made for the writer by Professor W. R. Crowell of the Chemistry Department of the University of California at Los Angeles, indicated the absence of all bases except zinc. This, with the lack of coloration in the mineral, renders it reasonable to assume that it approaches closely to the theoretical formula for this species: $4 \text{ZnO} \cdot \text{As}_2\text{O}_5 \cdot \text{H}_2\text{O}$. The spe-

¹ Means, A. H., *Am. Jour. Sci.*, (4) vol. 41, p. 125, 1916.

² Knopf, A., *U. S. Geol. Surv.*, Bull. 725, p. 372, 1921.

³ Staples, L. W., *Am. Mineral.*, vol. 20, p. 371, 1935.