

ART. XLII.—*Mineralogical Notes on Brookite, Octahedrite, Quartz and Ruby*; by GEORGE FREDERICK KUNZ.

AN interesting discovery of minerals was made at Placer-ville, Eldorado Co., California, by Mr. James Blackiston, in a quartz ledge running north and south and dipping eastward about 45° to 50° . The rock of the ledge is partly decomposed and partly compact, and is traversed for perhaps a hundred feet by a vein of crystallized quartz varying from six to fourteen inches in width. This vein is also decomposed and filled in with a reddish earth and sand, and can be dug into with a stick or board. It is full of quartz crystals, of all sizes from that of a man's finger up to remarkable dimensions, some of them weighing as much as 80 or 90 pounds. Several of these, over fifty pounds in weight, were pellucid and free from flaws: while others have peculiar interest from remarkable inclusions of chlorite, three to five millimeters in thickness, at several depths in the crystal—thus marking successive stages of crystal-growth, and making very striking "phantoms," generally of green chlorite, or white quartz layers. Of still greater interest, however, are other quartz crystals, two to four inches long and half that amount in diameter, containing at and near their centers inclusions resembling groups or clusters of dolomite or siderite crystals, cream-white to brown in color, and consisting of many curved rhombohedra from two to four millimeters in diameter. On breaking the specimens, however, the curious fact appears that these groups are hollow cavities in the quartz, the spaces being lined with a layer of chalcedony, or when brown, occupied only by a brown siliceous material. This would indicate that the original mineral must have been siderite or ankerite, afterward covered up by successive growths of the quartz, and in some manner decomposed during that process.

After receiving some of these specimens, the present writer detected a small crystal of octahedrite adhering to one of the small quartz crystals. Search was then instituted at the locality, which resulted in the discovery of a number of crystals of both octahedrite and brookite, some loose and some attached to the quartz. The octahedrite is in splendid crystals, from two to five millimeters in length, and varying in color from brown to almost a dark blue. Their form is that of the unit pyramid slightly distorted by horizontal striation.

The brookite is similarly implanted on the quartz, and partly or wholly overgrown by it, so as in some cases to be a true inclusion. The crystals are tabular, about two millimeters broad and one-fourth of a millimeter in thickness. Their color

is a rich reddish or yellowish brown, and they are free from inclusions. In form and association they closely resemble brookites from the Tyrol and from Maderanantlal, Switzerland, lately described by P. Groth,* von Zepharovich† and Zimányi‡. The following planes were kindly identified for me by Dr. S. L. Penfield of Yale University.

<i>a</i> , 100, $i\bar{i}$	<i>t</i> , 021, 2- $\bar{1}$	<i>n</i> , 121, $\frac{1}{2}\bar{1}$
<i>c</i> , 001, <i>O</i>	<i>x</i> , 102, $\frac{1}{2}\bar{i}$	<i>ε</i> , 134, $\frac{3}{4}\bar{3}$
<i>l</i> , 210, $i\bar{2}$	<i>y</i> , 104, $\frac{1}{4}\bar{i}$	<i>Q</i> , 234, $\frac{3}{4}\bar{3}$
<i>m</i> , 110, <i>I</i>	<i>e</i> , 122, 1- $\bar{2}$	

The faces were small but gave him sufficiently distinct reflections for the identification of the forms; the pinacoid *a* is vertically striated. A distinct pleochroism was observed for vibrations parallel to *a* pale yellow, and parallel to *c* reddish yellow. Small crystals of an asparagus-green epidote 2^{cm} long and 2^{mm} in diameter were also observed partly enclosed in the crystals of quartz.

Among a quantity of minerals brought to me for sale by peasants at Ujakova, in the government of Perm, Ural Mountains, was a crystal weighing 25.4 grams, which was offered as garnet, but I at once recognized it as a monazite of remarkable size. This crystal measures 33 millimeters in breadth, 17 millimeters in length, and 11 millimeters in width, and presents a simple form, showing the planes *c* (001, *O*), *a* (100, $i\bar{i}$) and *m* (110, *I*). I was told that one of the Romanovskys, Russian mineralogists,—but which one I cannot ascertain—had purchased two of these so-called “garnets” implanted on crystals of albite, and one had been found at the same locality some time before.

Owing to the exploration at the ruby mines of Burma during the last few years a number of very large ruby crystals have been found in the ruby mines on the Moguk near Mandalay, Burma. Some of these have weighed from 300 to 2,000 carats—61 to 410 grams each; but they have all been translucent, or only transparent in small spots, affording but little fine ruby for cutting. They have, however, been cut up into very interesting ruby asterias and poor colored ruby gems. One crystal examined by the writer was a perfect hexagonal prism measuring 29^{mm} in height and 31 to 33^{mm} across the basal plane, which was broader than the length of the crystal. It was doubly terminated, and had trihedral rhombohedral markings on each basal plane, visible also on the prismatic faces. This crystal weighed several ounces and was valued at some £200.

My thanks are due to Dr. S. L. Penfield for his crystallographical determinations.

* Min. Samml. Strassburg, p. 110.

† Zeitschr. Kryst., vol. viii, p. 577.

‡ Földtany Közlöny, xxi, p. 1.