MINERALS FROM TOPAZ MT., UTAH

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In the spring of 1933 Mr. Edwin Over, Jr. of Colorado Springs made a mineral collecting trip in the interest of the Harvard Mineralogical Museum. The largest part of his time was spent at Topaz Mt. in the Thomas Range, Utah, and he succeeded in obtaining a very fine suite of the well-known topaz of that locality. He also added several minerals to the paragenetic series there as hitherto recorded. These additions are pseudobrookite, beryl, fluorite and calcite.

TOPAZ: The topaz collected is nearly all of the pale wine-color long known from Topaz Mt. The crystals are in part in typical lithophysae in the rhyolite, in part in small gash veins or vein-like cavities more or less completely filled with late calcite. The finest specimen is a doubly terminated crystal of beautiful quality about 3 cm. in length. The walls are lined with minute quartz crystals and the quartz continued to form throughout the period of mineral formation, as crystals of it are included both in topaz and beryl. When calcite is present it is in snow-white masses, coarsely crystallized, massive, and completely filling the cavities. Again it projects from the walls in platy form, the crystals showing the outline of a hexagonal prism of first order and a rough basal plane, evidently modified to a rough surface by etching. The pale purple fluorite is intermingled with it and shows no definite crystals.

BERYL: This mineral, so unfamiliar in such surroundings, has been reported recently from this locality under the name of apatite. A considerable amount of blasting yielded only a small number of specimens. It is in the form of small crystals of rose-red color attached to the cavity wall or to topaz. The crystals are tabular, simple combinations of prism and base, and rarely reach a diameter of 5 mm. and a height of 3 mm. The color is a delicate pink and somewhat variable. Under the microscope the crystals show a zonal structure, the zones having slightly varying optical properties. They enclose tiny quartz crystals.

I am indebted to Mr. Harry Berman for the following optical data. The crushed crystals show a variation in refractive index from $\omega = 1.580\pm$ to $\omega = 1.570\pm$. This variation is due apparently to zoning. The average values are $\omega = 1.576$, $\epsilon = 1.570$. These values indicate a beryl low in alkalis. The specific gravity $2.67 \pm .01$ likewise indicates a low alkali content. It is hoped later to have a chemical analysis made of this rose beryl.

THE OXIDE MINERALS: The association of oxides in the rhyolite cavities is not without interest. They include hematite, Fe_2O_3,

pseudobrookite, $Fe_2O_3 \cdot TiO_2$, and bixbyite, $(Fe, Mn)_2O_3$. Hematite is in the form of tiny plates, attached to the cavity walls or to other earlier minerals by an edge and showing, besides the basal pinacoid, only the forms $r(10\bar{1}1)$, $e(01\bar{1}2)$, and $n(22\bar{4}3)$ as narrow facets. Bixbyite is included in Mr. Over's collection, but the new material adds nothing to the original description of the mineral by Penfield and Foote (*Am. J. Sc.*, **4**, 105, 1897). Pseudobrookite is new to the locality and is present in occasional cavities in tufts of minute needles, associated with hematite, with topaz and particularly with beryl. The minute, millimeter-long needles are of brilliant metallic lustre and proved measureable despite their minimal faces. The crystals are too few to yield material for chemical analysis, but the crystal form is conclusive as to their nature. They show the forms and habit of the figure. The following table contains the average measurements and range of angles for each form present and observed on five crystals. The elements at the head of the table were calculated from all the better angles and agree well with the best values previously obtained on crystals of this mineral. In another place the position and elements of pseudobrookite from this and other localities are discussed and a new angle table is given. Pseudobrookite has hitherto been observed from but one American locality, Crater Lake, Oregon, where it occurs with apatite and hypersthene in a cavity in basalt. It was described by the author in a note in Diller and Patton's monograph on that region (*U.S.G.S. Prof. Paper* **3**, 147, 1907).[1]

PSEUDOBROOKITE. MEASURED ANGLES AND LIMITS.

$a = 0.9791$ $p_0 = 0.3837$
$c = 0.3757$ $q_0 = 0.3757$

			ϕ	ρ	Limits ϕ	Limits ρ	Faces	Cryst.	Qual.
b	0∞	010	0°23′	90°00′	0°02′– 0°58′		6	4	good
a	$\infty 0$	100	88 51	90 00	88 05 –90 03		6	4	fair
n	$\frac{1}{2}\infty$	120	26 09	90 00			1	1	good
h	$\frac{3}{4}\infty$	340	36 51	90 00	36 28 –37 15		2	1	poor
m	∞	110	45 23	90 00	45 23 –46 06		6	4	fair
μ	2∞	210	63 48	90 00	63 32 –63 57		4	2	good
e	10	101	90 07	21 00	89 17 –90 45	20°54′–21°05′	9	5	excell.
q	1	111	45 37	28 11	45 17 –46 12	27 54 –28 15	11	5	good
s	12	121	26 53	40 23	26 14 –27 52	39 55–40 46	4	2	poor
p	13	131	18 35	49 57	17 09 –19 14	49 51 –50 10	14	4	poor

[1] Since writing this paper my attention has been called to the fact pink beryl was found in this locality by Mr. Bixby as long ago as 1905 and that an approximate analysis was made by W. F. Hillebrand showing that it was a beryl with an appreciable amount of manganese. The notice appeared in *Am. J. Sc.*, **19**, 330, 1905.