NOTES AND NEWS

POLLUCITE FROM LITHIA, MASSACHUSETTS

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The discovery of pollucite in western Massachusetts by the senior author in the autumn of 1940 adds another locality to the rather short list of known sources for this cesium-rich mineral. At the time the mineral was discovered he and Mr. Alvan Barrus, a son of the present owner, were engaged in blasting some of the loose boulders at the site of the well-known Barrus pegmatite in the town of Goshen.

The close similarity in appearance of pollucite to quartz, and especially to goshenite, probably accounts to some extent for the relatively few occurrences reported to date. The mineral is undoubtedly rather rare, but probably has been frequently overlooked. The usual association of pollucite is with lepidolite, spodumene, tourmaline—colorless and colored varieties, quartz and cleavelandite, together with a number of rare pegmatite minerals. This mineral association in sodium-lithium rich pegmatites may be taken as an indication of the possible presence of pollucite.

The initial discovery at the Barrus pegmatite yielded a relatively small amount of the pollucite which occurred in irregular grains several inches across. Although the large grains were usually intimately fractured in more or less rectangular pieces or relatively thin plates, parts of the grains were essentially clear and colorless. All of the fractured surfaces were bounded by good conchoidal fractures. Associated with the pollucite were quartz; colorless, pinkish, and greenish spodumene; colorless, blue, green, and pink tourmaline; cleavelandite; muscovite—often fringed with a pink color; cassiterite; columbite; goshenite; and several clay minerals. In this pegmatite, lepidolite is rare or absent which appears to be an exception for the associated minerals of pollucite.

In the spring of 1946, another boulder containing 25 to 50 pounds of pollucite was located and broken to free the pollucite masses. The surface of this boulder, about 2 to $2\frac{1}{2}$ feet in diameter, contained an exposed mass of pollucite occupying approximately $\frac{1}{2}$ square foot in area. The appearance of the pollucite on the surface of the boulder is so characteristic as to make its presence on the surface of other boulders readily recognizable. The specimen represented in Fig. 1 shows such a mass of pollucite weighing slightly less than 5 pounds. It is traversed by a series of veins following a somewhat irregular arrangement of roughly parallel or en echelon fractures as well as a few cross-cutting ones, all of which stand out sharply in strong relief. Most of the veins are filled principally with spodumene together with some mica and clay minerals. The spodumene grains are positioned normal to the veins walls. The smaller veins are composed in large part of halloysite. Microscopic examination of the spodumene in the veins shows it to be unaltered and to contain an intricate system of intergrown vermicular quartz. On the surface of the veins the minute quartz inclusions are exposed and present a multitude of hard, sharp points which easily abrade the pointed end of a small file and readily remove a dense streak of the metal when drawn across the grains.

FIG. 1. Weathered surface of pollucite exposed on the surface of a boulder. Note the irregular veins of spodumene with some mica which stand out sharply in relief.

In sections cut across the pollucite and veins, one sees a sharp contact between all of the vein minerals and the pollucite. There is no replacement of the pollucite by any of the vein minerals. In many of the broken pieces of pollucite, the thin clay films or veins, usually of halloysite, separate readily from the pollucite and clearly reveal the original conchoidal fractured surfaces. All such pieces have a matte surface instead of the vitreous to subvitreous luster of the freshly broken pieces. This matte surface may be caused either by a very slight etching or by a thin coating left by the clay.

During the centuries that the boulder was exposed to weathering, the badly fractured pollucite was gradually removed in small pieces by the many cycles of freezing and thawing. The vein minerals were, on the other hand, less susceptible to the same disintegrating action. None of the associated minerals show any appreciable alterations traceable to weathering. At a number of places the pollucite is intricately broken into small pieces and the fractures are filled with clay in a manner which gives the appearance that the pollucite was altering to clay. Again the conchoidal fractured surface of the pieces of pollucite and its freshness are evidence to the contrary. This is apparently the first instance where the effect of recent weathering on pollucite in a loose boulder has been noted.

The physical properties of the pollucite were determined with considerable care for comparison with those of the mineral from other localities. The specific gravity is 2.975 and the index of refraction is 1.520. The dimension of the unit cell as computed from *x*-ray diffraction data is 13.65 Å. These values check very closely with those for pollucite from both Hebron and the Tamminen pit in Maine.

Hardness of pollucite—The apparent low hardness of the pollucite from the Barrus pegmatite as compared with the published value of 6.5 which is given in several texts incited a further interest in this property. Since the pollucite could be easily scratched with a small pointed file while feldspar could not be scratched in this manner except under very heavy pressure, it was at once obvious that pollucite was much softer instead of harder than feldspar. The pollucite readily scratched the Durango, Mexico, apatite but could not be scratched by it. A polished surface of sanidine, on the other hand, could not be scratched by pollucite although the former readily scratched the latter. From these comparisons along with the relative ease with which pollucite and apatite can be scratched with a file, the hardness of the pollucite from the Barrus pegmatite was determined to be of the order of $5\frac{1}{4}$ to $5\frac{1}{2}$. Hardness tests were likewise made on pollucite from Uncle Tom's Mt., Greenwood, Maine, and from the Nevel mine, Newry, Maine. In both instances the hardness is close to $5\frac{1}{2}$. Hence, it appears that the published hardness of pollucite is at least a full scale division too high.

The low hardness of pollucite makes it possible for anyone to identify the mineral in the field with a piece of quartz, always at hand, as the latter will readily scratch the pollucite but will not scratch any of the minerals that could be mistaken for it.

In examining the data on pollucite from the principal localities as shown in Table 1, it is to be noted that the ones richest in cesium are also those having the highest index of refraction and specific gravity. The pollucite from the Barrus pegmatite has both a high index of refraction, 1.52, and a high specific gravity, 2.975, hence it would be expected that it contains a relatively high percentage of cesium.

Although the Barrus pegmatite appears to be relatively small at the surface, the presence of spodumene in considerable amounts together with pollucite in sizeable masses offers an inducement for further exploration to determine whether they are present in commercial amounts.

TABLE I

Locality	% Water	% Cs_2O	Index of Refraction	Specific Gravity	Hard-ness	Unit Cell in Å
Hebron, Maine (1)*	1.50	36.10	1.5247 (Na)	2.98		
Tamminen pit, Greenwood, Maine (2)	1.62	35.83	1.522	2.97		13.65
Mount Mica, Maine (2)			1.520	2.90		
Elba (2)	2.40	34.30	1.520	2.90		13.66
Buckfield, Maine (2)			1.520	2.90		
Greenwood, Maine, Small crystals (2)	3.80	24.48	1.507	2.68		13.64
Leominster, Massachusetts (2)	2.04	33.06	1.520	2.89		13.65
Karibib, South West Africa (3)	2.66	30.2	1.517	2.86		
Varutrask, Sweden (4)	1.80	30.77	1.5218	2.917		
Black Hills, South Dakota (5)	3.45	23.46				
Lithia, Massachusetts			1.520	2.975	$5\frac{1}{4}$–$5\frac{1}{2}$	13.65

* Numbers indicate the references from which the data were obtained.

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AN INEXPENSIVE MICROSCOPE ILLUMINATOR

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The lamp herein described was designed for use with the petrological microscope when an inexpensive source of both transmitted and reflected light is desired. As may be seen in the photographs, the illuminator has two units. The lower unit provides excellent illumination for all purposes requiring the use of transmitted light, while the upper one produces illumination permitting observation of articles on the stage by reflected light. By means of the switch at the right one may be simultaneously turned on and the other extinguished.

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