

FAMOUS MINERAL LOCALITIES: THE PELHAM  
ASBESTUS MINE, MASSACHUSETTS.

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The old asbestos mine in Pelham, Mass., is worthy an examination no less for its historic interest than for its unique geologic and mineralogic features. Being within reasonable walking distance of Amherst College, this locality was one of the favorite haunts of Prof. Shepard, and during its exploitation it was visited by many prominent mineralogists of the last century.

It is rather difficult to accurately direct others to the location of the mine. The collector seeking the locality will no doubt be supplied with Emerson's geologic map of Massachusetts<sup>1</sup> and a copy of the Ware topographic sheet. Upon the former there are shown, in the south of Pelham township, three red spots which indicate peridotite outcrops. The Ware sheet will serve as a road map to take one to the location of these areas, and then exact directions must be sought at farmhouses. The Pelham car line, out of Amherst, terminates just south of Mount Orient and gives one a good start in the right direction. The middle peridotite area is the asbestos mine.

The geology of the mine has been described by Emerson, the main features being that a reaction rim, containing unusual minerals, has formed between an intrusion or inclusion of very basic rock—peridotite—and the enclosing, highly acid Pelham gneiss, the whole reproducing, on a grand scale, the microscopic rim commonly seen surrounding olivine phenocrysts in certain igneous rocks. Only the main pit was examined by the writer, the smaller pits being largely concealed by brush and dead leaves. The mass of rock exposed in the bottom of this quarry is dark gray in color and fine-granular in texture. This granular material, which is olivine colored dark by magnetite or chromite dust, contains scattered square phenocrysts of bronzy enstatite up to 3 cm. in length, the whole forming a typical fresh saxonite and hence being of considerable interest to a petrographer. The gray olivine was analyzed by Shepard who, believing it to be a new species, named it "pelhamine." This makes it somewhat of a mineralogic curio and as such it should find place even in a strictly mineralogical collection. In the outer portion the sax-

<sup>1</sup> Accompanying U. S. Geol. Survey *Bull.* 597.

onite is changed completely to fibrous anthophyllite, many masses tons in weight being almost pure anthophyllite of pearl gray color and silky luster, which makes handsome specimens. In places these confused masses of fibrous anthophyllite are traversed by gray aphanitic veins, a few centimeters in thickness, of a mineral which may be massive anthophyllite but which has not yet been investigated. In places the masses of anthophyllite have straight fibers 3 or 4 dm. long, such masses constituting the asbestos mined. This material was also analyzed by Shepard, and given the name "asbestite." Between the anthophyllite rock and the feldspar zone is a biotite layer. In the wall now exposed, the zones are not everywhere in the same orderly sequence, the biotite layer, especially, being branching and compound. Below the plagioclase feldspar there is, at the base, a thin layer of a brown clay, probably the "dillnite" of Shepard, above which is a layer of friable granular biotite 5 to 15 cm. thick, composed of more or less distinct tabular crystals, somewhat hydrated and altered. Above this biotite is a 4 or 5 cm. layer of a saponaceous silvery blue green material in fine scales, which become opaque pale olive green when dry. These scales exfoliate upon ignition, and leave silvery plates of silica when dissolved in acids. Two samples, both of which were slightly contaminated with biotite and actinolite, gave, upon analysis, the results under 1 and 2 in table 1. That this is the vermiculite named pelhamite by J. P. Cooke<sup>1</sup> is shown by comparison with his average analysis, no. 3; this is classed by Dana as a variety of jefferisite.

TABLE 1. ANALYSES OF PELHAMITE

	1	2	3
SiO <sub>2</sub> .....	40.08	38.88	41.27
Al <sub>2</sub> O <sub>3</sub> .....	21.65	19.27	15.19
Fe <sub>2</sub> O <sub>3</sub> .....	3.59	3.99	4.14
CaO.....	0.58	—	—
MgO.....	20.12	22.66	28.25
H <sub>2</sub> O - 105°.....	3.79	3.56	—
H <sub>2</sub> O + 105°.....	7.83	9.54	11.32
	97.64	97.90	100.17

Above the vermiculite layer is an interrupted layer from 3 to 20 cm. in thickness of friable grass-green actinolite, succeeded upward by the main band of schistose golden-brown biotite

<sup>1</sup> *Proc. Am. Acad. Arts Sci.*, 1875, 454.

which reaches 6 dm. in thickness in places. This biotite, where seen in place, contained round nodules of gray corundum, up to 500 grams in weight, streaked and spotted with deep blue; grass green nodules of fibrous actinolite, and disseminated perfect terminated crystals of black tourmaline up to 3 cm. in length. Masses of biotite loose on the quarry floor contain bladed black hornblende crystals and granular masses of black hornblende. Above the biotite is the great mass of reaction-rim plagioclase, granular in texture and grading in composition from anorthite next the biotite, to acid oligoclase nearest the gneiss. Within this layer, which is several dm. in thickness, are large masses of imperfectly crystallized black tourmaline. The plagioclase is separated from the gneiss by another thin band of bronzy biotite.

During an afternoon's visit there were obtained many good specimens of olivine (saxonite), anthophyllite, granular and crystallized hornblende, fibrous actinolite, biotite, corundum, vermiculite and plagioclase. The additional minerals villarsite, rutile, apatite, zoisite and allanite, mentioned from here by Emerson and others, were not found by the writer but may easily have been overlooked in the short time spent at the mine. The mineral collector in New England will find that a day spent at this locality is well invested.

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### NOTES AND NEWS

A soft blue-white diamond weighing 388  $\frac{1}{2}$  carats has been found at the Jagersfontein mine, Orange River Colony. This promises to become one of the diamond fields' historic gems. It is said to be the largest stone unearthed since the Cullinan diamond was discovered in 1905. In the rough the latter weighed about 3,000 carats; the famous Koh-i-noor weighs about 100 carats. (*Eng. and Min. J.*, 107, (5), 248, 1919.)

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Sir Lazarus Fletcher, whose contributions to mineralogy are well known, retired from the directorship of the Natural History Museum, (London), under the age limit, on March 31.

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The increase in the number of pages per issue of this magazine, forecasted in our January editorial, goes into effect this month. This has been made possible by generous financial assistance extended to us by friends, whose names we list here that subscribers may know to whom they are indebted for the additional reading matter thus made available to them:

Mr. Clarence S. Bement, of Philadelphia; Mr. Albert C. Burrage, of Boston; Dr. George F. Kunz, of New York; Mr. James G. Manchester, New York; Col. Washington A. Roebling, of Trenton; Mr. Gilman S. Stanton, of New York; and Col. William B. Thompson, New York.