BABINGTONITE AND EPIDOTE FROM WESTFIELD, MASSACHUSETTS

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In 1932 I read a paper on babingtonite before the Mineralogical Society[1] describing several new occurrences of this rare mineral. Concerning one of these, Holyoke, Mass., I stated "In abundance and beauty it far surpasses any previously described occurrence of babingtonite." This statement is no longer true, at least as regards the beauty of specimens, since the babingtonite from Westfield, Mass., far surpasses that of Holyoke in attractiveness.

A group of students of mineralogy from Harvard University, visiting the well-known trap quarry at Westfield in the spring of 1935, brought back a number of specimens which proved to contain babingtoni e, hitherto not reported from this locality.[2] The specimens consist of veins in the diabase, narrow for the most part but expanding to a width of three or four inches. The veins appear, from the hand specimens collected, to be of no great lateral extent and vary widely in paragenesis as revealed by the following partial list of mineral sequences.

Quartz, calcite
Calcite only
Datolite only
Calcite, datolite, apophyllite
Quartz, chlorite, calcite, prehnite
Quartz, chlorite, epidote (iron-rich), prehnite
Calcite, epidote (iron-poor), datolite
Quartz, chlorite, sphalerite, chalcopyrite, calcite
Chlorite, calcite, babingtonite
Calcite, babingtonite
Quartz, prehnite, babingtonite, calcite
Ring structures, epidote, datolite, epidote, prehnite, datolite

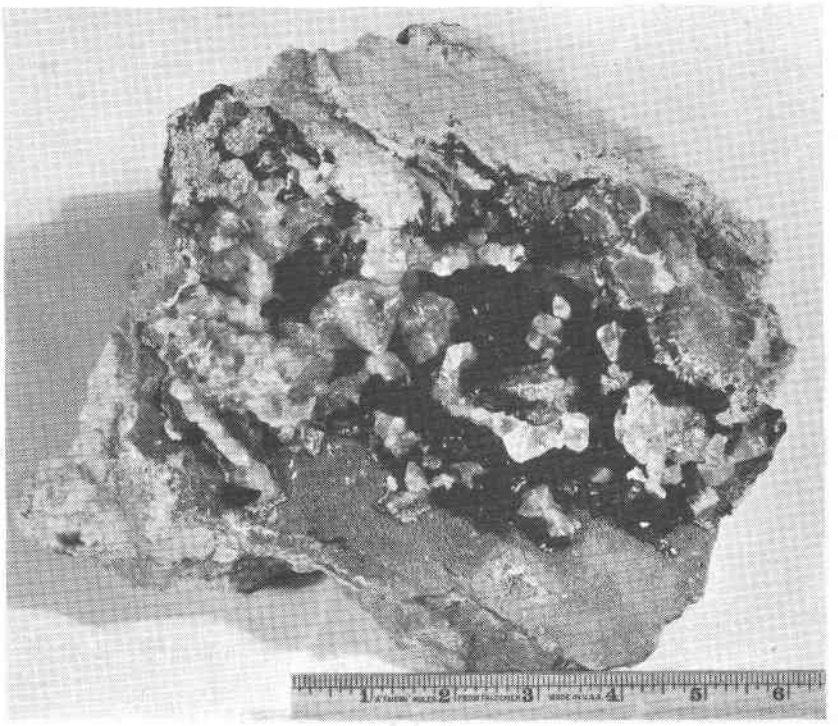
It is clear from this list that the sequence generally begins with either quartz or calcite, and calcite is the most abundant mineral, in many cases completely filling the vein in coarse granular aggregates. All the minerals present except datolite being little attacked by acid, it was possible to remove the calcite with dilute hydrochloric acid, thus revealing the earlier minerals.

The most striking specimen, shown in the photograph, is a vein sec-

[1] Palache, C., and Gonyer, F. A., On babingtonite: *Am. Mineral.*, vol. **17**, p. 295, 1932.

[2] Shannon, Earl V., Famous mineral localities. The datolite locality near Westfield, Mass.; *Am. Mineral.*, vol. **4**, p. 5, 1919.

tion about nine inches square. After treatment with acid it showed a thin wall-coating of granular quartz upon which rests prehnite of a rich green color, coarsely crystallized in rudely cone-shaped aggregates an inch across. Upon the prehnite the babingtonite stands in clusters of rough crystals, velvety black in color and measuring from a half to three-quarters of an inch in diameter. The color contrast produces a specimen of most uncommon beauty.



Babingtonite and Prehnite from Westfield, Massachusetts

The babingtonite crystals are curved and indistinct, but a study of some of the smaller ones by Mr. W. E. Richmond, Jr. established the presence of the forms:—$c(001)$, $b(010)$, $a(100)$, $h(110)$, $g(2\bar{1}0)$, $f(3\bar{2}0)$, $o(011)$, $s(0\bar{1}1)$, and $d(101)$, all known from the Holyoke specimens and in similar development.[3]

Analysis of a sample of very fresh crystals by F. A. Gonyer yielded the composition of column 1.

[3] *Loc. cit.*, p. 297 and Fig. 3.

ANALYSIS OF BABINGTONITE

	1.	2.
SiO_2	52.32	52.44
TiO_2	0.15	abs.
Al_2O_3	0.95	0.23
Fe_2O_3	13.42	14.43
FeO	10.65	10.12
MnO	0.31	1.03
MgO	0.50	0.65
CaO	19.88	19.67
Na_2O	0.27	0.08
K_2O	abs.	abs.
H_2O+	1.36	1.27
	99.81	99.82

1. Westfield, Mass., Analyst, F. A. Gonyer
2. Holyoke, Mass., Analyst, F. A. Gonyer

Comparison of the two analyses shows how closely the two occurrences conform in chemical nature. Once more we have strong evidence of the essential constancy in composition of this complex silicate.[4]

The associated minerals except epidote present little that is noteworthy. The chlorite, sparsely present in a few specimens, is in the form of bronzy scales. It is probably the same chlorite as described by Shannon[5] under the name chalcodite.

Datolite is in part massive, in part in water-white, glassy crystals of great complexity of development.

Epidote is in two generations, but as they do not occur together their relative age is unknown. The one is of an ordinary yellowish green color and shows no distinctive features. The other is deep black in color, simulating babingtonite closely. This epidote was analyzed by Mr. Gonyer and studied optically by Dr. Berman, to whom I am indebted for the data presented below.

ANALYSIS OF EPIDOTE FROM WESTFIELD, MASS.

SiO_2	36.52
TiO_2	abs.
Al_2O_3	20.97
Fe_2O_3	17.22
FeO	0.45
MnO	abs.
MgO	abs.
CaO	23.05
H_2O+	1.98
	100.19

D. = 3.49 (Berman)

[4] *Loc. cit.*, p. 299.

[5] Shannon, E. V., Diabantite, stilpnomelane and chalcodite from Westfield: *Proc. United States Nat. Mus.*, **57**, p. 397, 1920.

Discussion of the analysis yields the formula:

$$Ca_2(Al, Fe)_3Si_3O_{12}(OH) \text{ with } Al/Fe = 1.91$$

The optical data obtained by Dr. Berman are:—$\alpha = 1.751$, $\beta = 1.784$, $\gamma = 1.797$; all $\pm .002$. $Bx\,(-)$, $2V = 64° \pm 2°$, $r > v$. X = colorless; Y = green; Z = olive green.

As this epidote is high in iron, an attempt was made to determine how it would modify the published curves relating iron content and refractive indices. It was found, however, that the data in this region of the curve were too few and too contradictory to permit the drawing of a curve with any real meaning. It is evident that more data obtained from analyzed material are necessary not only in the iron-rich epidotes but throughout the series.