VESUVIANITE AND FLUORESCENT APATITE FROM CENTER STRAFFORD, NEW HAMPSHIRE

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INTRODUCTION

During the excavation of a small gravel pit one mile east of the village of Center Strafford, N. H., a water-worn ledge was exposed in which vesuvianite is present in long, thin, lens-like masses three or four inches wide and ten to fifteen feet in length. A small lens-shaped mass of muscovite mica and fluorescent apatite in this ledge is also worthy of description. The formation in which the vesuvianite and associated minerals occur is, according to F. J. Katz (1917), the Rindgemere formation of Carboniferous (Pennsylvanian ?) age, consisting of slates, phyllites and schists with occasional interbedded argillaceous quartzites and limestones. At this locality the formation is primarily quartzitic with thin beds of very impure limestone. A granitic body outcrops about one hundred feet west of the vesuvianite deposit and is considered to be of post-Carboniferous age.

The writer wishes to express his appreciation to Mr. T. R. Meyers of the University of New Hampshire and to Mr. Wallace E. Richmond of Harvard University for their advice and criticism.

VESUVIANITE

The mineral occurs in radiating columnar masses locally replaced by orthoclase, and is brown in color. In an occasional pocket one or more distinct prismatic faces, $m\{110\}$, are usually present. Pyramidal faces are rare, with $p\{111\}$ occasionally present. No completely formed crystals were found. Most of the crystalline masses are slightly transparent and have a resinous luster. Striations are present on the prism faces and parallel the direction of the c-axis. The indices of refraction determined by the immersion method with white light are: $\omega = 1.710$, $\epsilon = 1.702$. Birefringence is 0.008.

Locally the vesuvianite is replaced by orthoclase (adularia) which forms subhedral crystals that range in size from one to fifteen millimeters in length. Small $c\{001\}$ faces and rather long $m\{110\}$ faces are recognizable on some of the crystals. All crystals show a distinct basal cleavage and the majority have a dull luster due to hydrothermal alteration. Occasionally a crystal has escaped this alteration and displays a brilliant vitreous luster. The mineral is biaxial negative, 2V = about 65°, and the indices of refraction are: $\alpha = 1.519$, $\beta = 1.525$, and $\gamma = 1.527$; B. = 0.008, dispersion is weak and Z = b-axis.

Fluorapatite

Of special interest is a small lens-shaped mass of fluorapatite and muscovite mica that lies about ten feet below the vesuvianite lenses and is parallel to them. The fluorapatite occurs in short prismatic crystals replacing the muscovite and ranges from one to five millimeters in width and from three to twelve millimeters in length. The mineral is pale blue to colorless, with a vitreous luster, and is translucent. Under the mercury vapor lamp the mineral displays a strong light orange color. The indices of refraction are: $\omega = 1.632$ and $\epsilon = 1.629$. Birefringence is 0.003.

Summary

From the study of four thin sections, vesuvianite was found to be confined to definite layers. The original calcareous beds have been almost entirely replaced by vesuvianite, orthoclase, epidote, diopside and interstitial calcite. In the quartzitic beds hornblende, biotite, and sphene are present. The vesuvianite and the associated minerals, together with the granitic body close by, suggests a contact metamorphic replacement of a calcareous sandstone.

References

Katz, F. J. Stratigraphy in southwestern Maine and southeastern New Hampshire: *U. S. Geol. Surv., Prof. Paper* **108,** 165–177, (1917).

WORLD DISTRIBUTION OF SERPENTINIZED PERIDOTITES AND ITS GEOLOGIC SIGNIFICANCE*

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The serpentinization of peridotites is considered to be caused by water present in the magma at the time of crystallization. Alteration of peridotites forms biotite, actinolite, chlorite, talc, carbonates, and is considered to be the result of later hydrothermal solutions commonly from granitic intrusions.

The serpentinized peridotites are regarded as products of an ultramafic magma having approximately the composition of the mineral serpentine. Certain other peridotites are undoubtedly formed by crystallization differentiation from basaltic magmas. (Kimberlites, biotite pyroxenites, etc., form a third group of ultramafic igneous rocks which, together with those from basaltic magmas, were not considered in the discussion.)

* Abstract of a talk given before the New York Mineralogical Club, New York, N. Y.