

IDOCRASE AND SCAPOLITE FROM MANCHESTER, NEW HAMPSHIRE

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INTRODUCTION

During the excavation for the National Guard Armory at Manchester, New Hampshire, in the spring of 1939, bedrock was exposed in several places. In one of the outcrops on the south side of the property, John E. Warren, of Manchester, found some interesting and colorful minerals which were identified as idocrase, scapolite, and garnet. This deposit was visited by Dr. George W. White, of the Geology Department at the University of New Hampshire, and the author during the summer of 1939.

The bedrock is a biotite schist with small and narrow calcareous bands interbedded with lenses of coarse granite and simple pegmatites. The schistosity of these rock units has a regional east-west dip. Some of the calcareous bands, in which the idocrase and garnet are located, display alternating red and brown colors. Frequently, a green band is present due to abundant diopside. Hitchcock (1) in his discussion of the bedrock of the Manchester area states that, "I have occasionally seen limestone seams two inches wide in the gneiss."

The author wishes to express his appreciation to Mrs. G. I. Hopkins, of Manchester, New Hampshire, for the use of several excellent specimens collected from this deposit.

IDOCRASE AND GARNET

Idocrase usually occurs in irregular masses and bands throughout the calcareous seams, but an occasional crystal is found embedded in calcite or in small cavities where it is associated with garnets. The idocrase crystals that are present with the garnets are developed in columnar aggregates ranging from two to four millimeters in diameter, and have a greenish-brown color. Growth along the *c*-axis seems to have been suppressed somewhat and many of the crystals are rather stubby, six millimeters in length or less. Figure 1 illustrates a crystal of this type.

In contrast to the idocrase of the cavity a small isolated crystal of idocrase embedded in calcite has well developed *m*{110} and *e*{101} faces and a small elongated base, *c*{001}. The crystal was not removed from the calcite, but it appears to have duplicate faces on the other side. This crystal is illustrated in Fig. 2 and is six millimeters along the *c*-axis.

The indices of refraction for this unanalyzed idocrase determined by the immersion method with white light are: $\omega = 1.730 \pm .001$, $\epsilon = 1.719 \pm .001$.

Garnet, variety grossularite, $n = 1.755 \pm .002$, is rather abundant in the crystalline masses and in the cavities described above where their habit is dodecahedral. The individual reddish-brown crystals range from two to twenty millimeters in diameter. Several of the smaller crystals display both dodecahedral and trapezohedral faces.

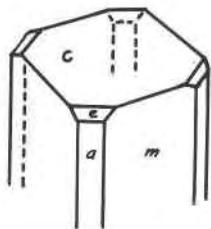


FIG. 1. Idocrase.

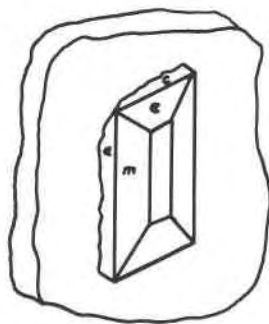


FIG. 2. Idocrase embedded in calcite.

One prism of dark green diopside was found which shows prominent $m\{110\}$ and $a\{100\}$ faces. Masses of diopside crystals are abundant and occur in green bands associated with the idocrase and garnet.

SCAPOLITE (MIZZONITE)

Scapolite occurs in irregular columnar masses and is usually found replacing quartz. No complete crystals were found, but crystalline aggregates suggest a tetragonal form and prismatic $m\{110\}$ faces can be seen. The mineral is white, has a subvitreous to vitreous luster, and a specific gravity of 2.69. 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: $\omega = 1.591 \pm .001$, $\epsilon = 1.557 \pm .001$.

The chemical analysis by G. Barthauer, of Purdue University, shows a Ca/Na ratio of 73.4/26.6. This ratio, along with the indices of refraction, seem to place the mineral in the mizzonite range of the scapolite series. The spectroscopic analysis showed traces of iron, titanium, and manganese.

ANALYSIS OF SCAPOLITE (MIZZONITE)

| | |
|--------------------------------------|-------|
| SiO ₂ | 46.78 |
| Fe ₂ O ₃ | 0.22 |
| CaO..... | 17.98 |
| Al ₂ O ₃ | 28.53 |
| MgO..... | 0.25 |
| K ₂ O..... | 0.06 |
| Na ₂ O..... | 6.50 |

Total (dry basis)..... 100.32

SUMMARY

This deposit of idocrase is very similar in its general appearance, mineral association, and structural relationships to that of Center Strafford, New Hampshire, described by the author (2). Most of the minerals occur in the same proportions except that there is abundant scapolite in the Manchester deposit and none at Center Strafford. This contrast might possibly be due to larger calcareous seams which would furnish calcium for the scapolite. There seems to be little evidence of an introduction, or presence, of potash at Manchester as compared to the orthoclase (adularia) at Center Strafford.

The mineral associations and adjoining granitic lenses are suggestive of local contact metamorphism of calcareous sediments, probably calcareous sandstone.

REFERENCES

1. HITCHCOCK, C. H., *The Geology of New Hampshire*: 2, 554 (1874-1878).
2. STEWART, GLENN W., Vesuvianite and fluorescent apatite from Center Strafford, New Hampshire: *Am. Mineral.*, 24, 274-275 (1939).