

NOMENCLATURE REVISIONS IN THE **APOPHYLLITE** GROUP: HYDROXYAPOPHYLLITE APOPHYLLITE FLUORAPOPHYLLITE

by

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INTRODUCTION

Apophyllite, $\text{KCa}_4\text{Si}_8\text{O}_{20}(\text{F},\text{OH})\cdot 8\text{H}_2\text{O}$, is a rather common mineral and is found in a variety of rock types, most commonly in volcanic rocks and limestones and marbles, but also as a late-stage deposition in ore deposits. The recent discovery of the (OH) analog of apophyllite (Dunn *et al.*, 1977) has resulted in a revision of the nomenclature. The IMA (International Mineralogical Association) Commission on New Minerals and Mineral Names has voted on this revision and the nomenclature approved by the Commission is as follows:

HYDROXYAPOPHYLLITE—for material with hydroxyl greater than fluorine.

FLUORAPOPHYLLITE—for material with fluorine greater than hydroxyl.

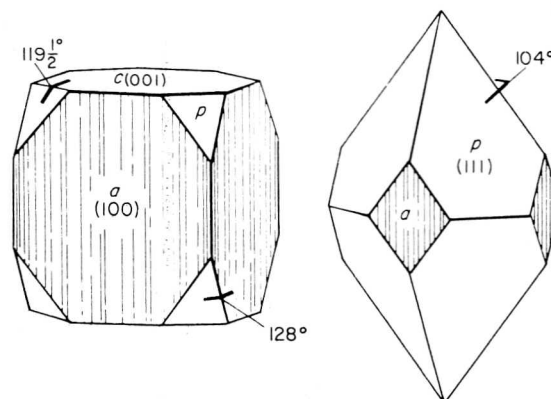
APOPHYLLITE—for undetermined members of the group.

This paper was written to acquaint the collector and curator with the correct nomenclature and to provide information on "apophyllite" specimens from specific and general localities.

NOMENCLATURE HISTORY

Apophyllite was apparently first mentioned by C. Rinman in 1784, as one of the "zeolites" (sic) from Hellesta, Denmark. It was again noted by Müller in 1791, as a "major lamellar zeolite" in his work, *De Zeolithus Suecicis*. The first name given it was *ichthyophthalmite* (Greek for "fish-eye rock") in reference to the pearly white luster which resembled that of a fish-eye after boiling. This name was applied by d'Andrada in 1800, to material from Utö, Sweden. In 1801, Haiüy gave the name *mesotype épointée* to apophyllite from Iceland, and four years later gave the name *apophyllite* ("leaf rock") to material from a different locality, in allusion to its tendency to exfoliate under the blowpipe.

Other names continued to be proposed for a few years. Werner called it *fischaugenstein* (German for "fish-eye rock") in 1808. In 1816 Fuchs and Gehlen showed that Haiüy's *mesotype épointée* was identical to his *apophyllite*. In 1817, Werner described a variety called *albin* ("white"), in small white crystals from Aussig, Bohemia; the material was partially decomposed and consisted largely of calcite. Brewster described in 1819 a variety he called *fish-eye stone tesselite*, from the Faeroe Islands,



because it exhibited a tessellated structure in polarized light. In 1820, Herschel read a paper before the Cambridge Philosophical Society describing a mineral he called *leucocyclite* ("white ring") because of the pattern formed by polarized light under the microscope; this also proved to be apophyllite. In 1827, Brewster described another variety, which he called *oxhaverite*, from Oxhaver Springs, near Husavic, Iceland. Still another variety, colored olive-green by a trace of iron, was described from Sicily by von Waltman in 1853; he called it *xylochlor* ("wood-green"). (See Dana's *System of Mineralogy*, 1904, sixth edition, p. 566-569, for full references.)

NEW NOMENCLATURE

HYDROXYAPOPHYLLITE

Hydroxyapophyllite, $\text{KCa}_4\text{Si}_8\text{O}_{20}(\text{OH})\cdot 8\text{H}_2\text{O}$, is the hydroxyl analog of fluorapophyllite, $\text{KCa}_4\text{Si}_8\text{O}_{20}(\text{F})\cdot 8\text{H}_2\text{O}$. The type locality for the new species is the Ore Knob mine, Jefferson, Ashe County, North Carolina. At this locality, the hydroxyapophyllite occurs as 1.0 cm thick druses of white crystals overlying a chalcopyrite-pyrrhotite assemblage. The mineral occurs as crusts on specimens up to 15 x 15 cm.

Hydroxyapophyllite is not distinguishable from fluorapophyllite by means of visual examination, X-ray studies or, in most cases, optical examination. For this reason, it is quite difficult for the collector to ascertain which species may be present on a given specimen. To assist the collector and curator, a large number of "apophyllite" specimens were analyzed with an electron microprobe to determine their fluorine content and, thus, their correct nomenclature.

In addition to the type locality, two other localities have produced specimens which are consistently hydroxyapophyllite. One of these, Kimberley, South Africa, has produced a number of specimens over the years, but not in any great quantity, to the best of the author's knowledge. The crystals occur up to 6 cm, although most are considerably smaller. They are white or colorless and not distinguishable from common "apophyllite".

A third locality for hydroxyapophyllite is, much to the mineral collector's delight, a locality which has produced, over the years, a considerable number of fine specimens of hydroxyapophyllite which are frequently associated with pale violet amethyst. This locality, Guanajuato, Mexico, produces both hydroxyapophyllite

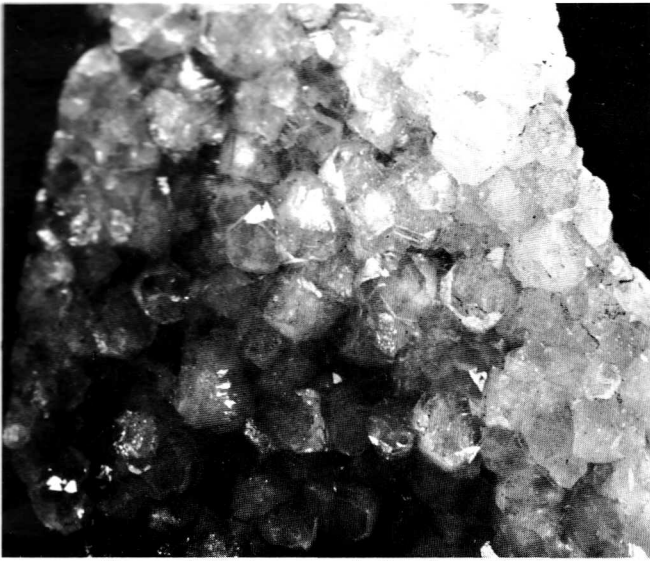


Figure 1. Hydroxyapophyllite from the type locality, the Ore Knob mine, Jefferson, Ashe County, North Carolina. The crystals are white and 5 to 6 mm in size. Smithsonian specimen #121689.

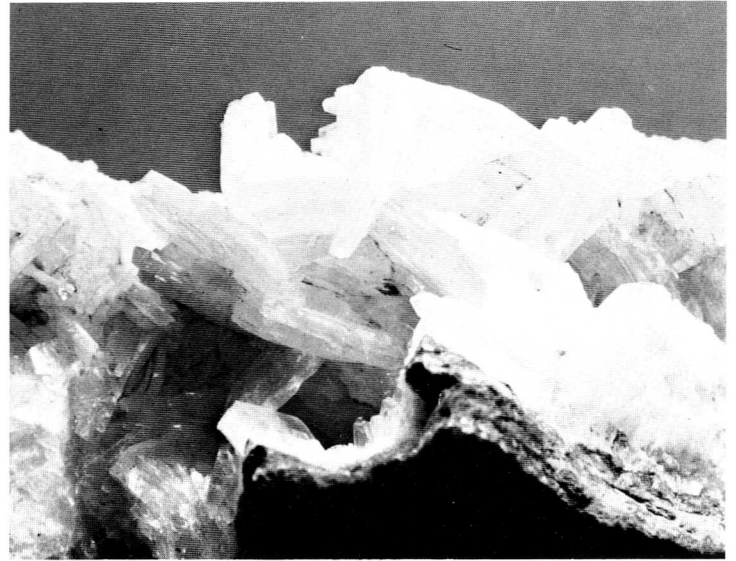


Figure 2. Hydroxyapophyllite from Kimberley, South Africa. The white crystals are up to 2 cm in size. Smithsonian specimen #93040.

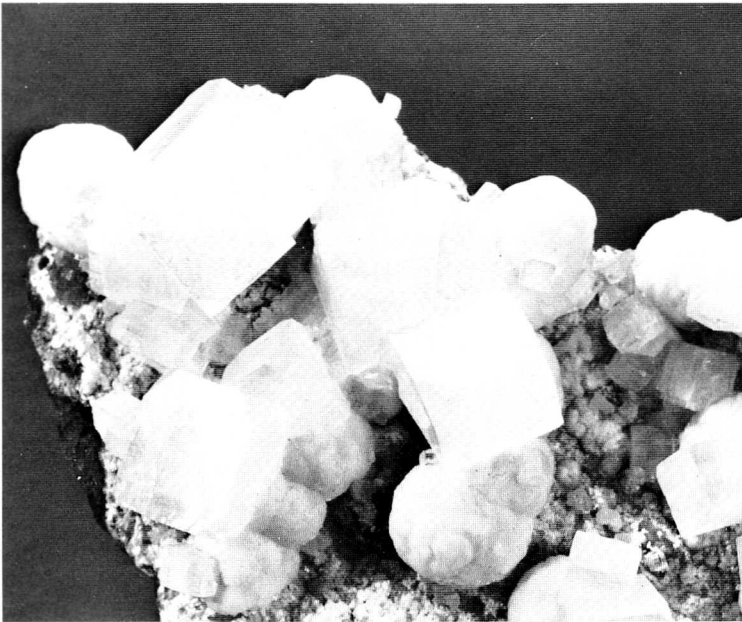


Figure 3. Hydroxyapophyllite (with gyrolite) from Khandivali, near Bombay, India. The crystals are white; the largest is 1.3 cm on an edge. Smithsonian specimen #136898.



Figure 4. Fluorapophyllite from West Paterson, New Jersey. The crystals are colorless and measure 1.7 cm on an edge. Smithsonian specimen #R14714.

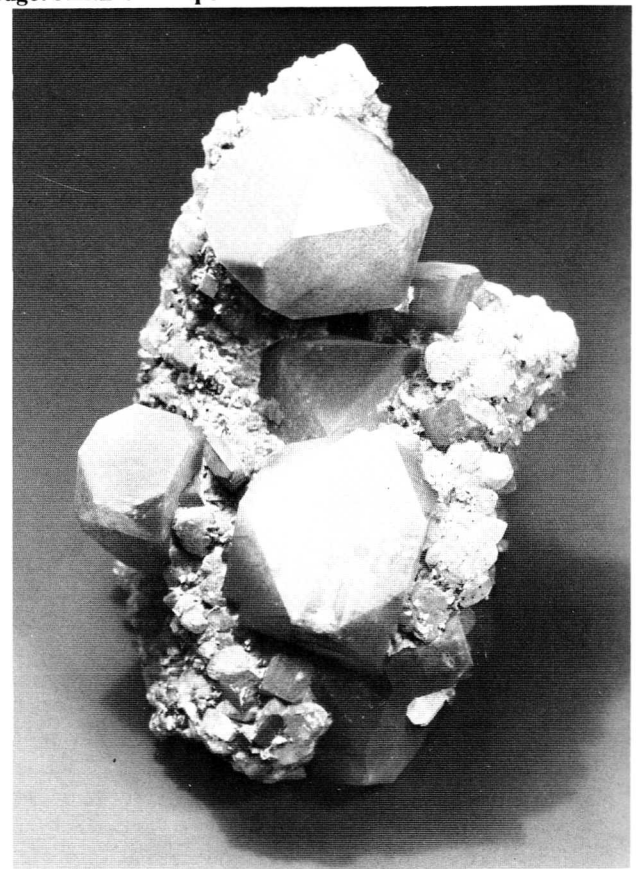


Figure 5. Fluorapophyllite from Paterson, New Jersey. The crystals have inclusions of a green fibrous mineral; the top crystal is 2 cm across. Smithsonian specimen #R4031.

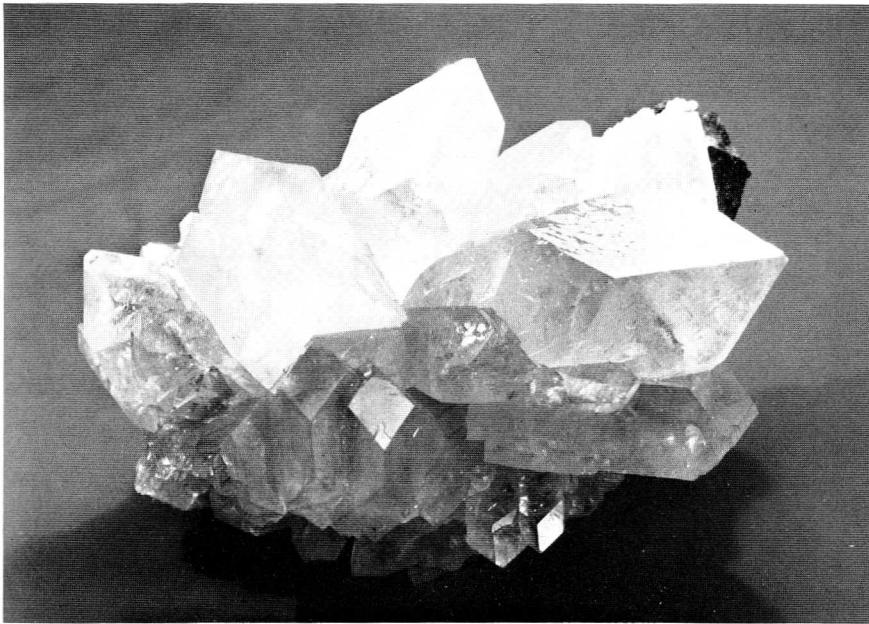


Figure 6. Fluorapophyllite from Khadakvasla, Poona district, India. The crystals are light green in color; the specimen is 7.5 cm wide. Smithsonian specimen #R18158.



Figure 7. Fluorapophyllite from Nasik, India. The crystal is colorless, 2.2 cm tall, on a matrix of pink stilbite. Smithsonian specimen #126692.

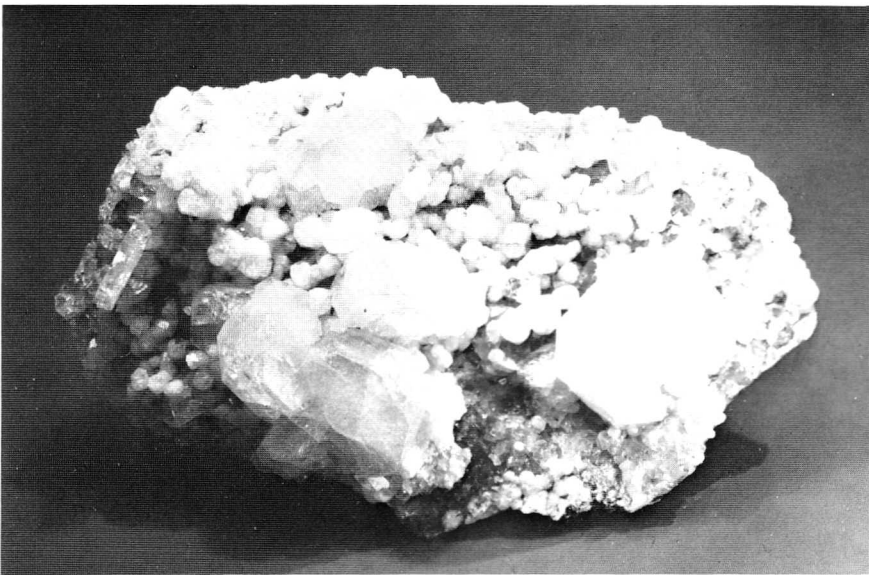


Figure 8. Fluorapophyllite from the Bergen Hill area, New Jersey. The crystals are colorless, up to 2.5 cm across, with analcime on datolite. Smithsonian specimen #116071.

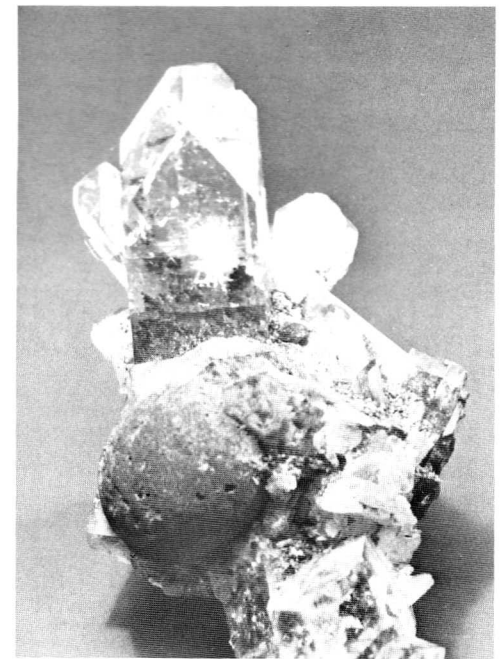


Figure 9. Fluorapophyllite from Ahmed Nagar, India. The crystal is a very pale green in color and about 2 cm tall. Smithsonian specimen #126691.

Figure 10. Apophyllite (in mixed crystals of translucent hydroxyapophyllite and fluora-pophyllite) from the Fairfax quarry, Centre-ville, Virginia. Both specimens are a very pale cream color; the crystal on the left is Smithsonian specimen #127843; the crystal on the right is Smithsonian specimen #R17088 and is 6 cm tall.

and fluorapophyllite, but hydroxyapophyllite is the more common on the specimens examined, and, for consistency, it is best that all Guanajuato specimens be labeled hydroxyapophyllite. This locality has produced many specimens with crystals up to 3 x 1 x 1 cm. Some are tinged with a pink or violet cast, but most are white. The pearly luster on {001} is well developed, and the crystals exhibit the characteristic morphology of common apophyllite with the prism {100} striated parallel to *c*, and the simple dipyrmaid {111} well developed. These are the most beautiful hydroxyapophyllite specimens known. Although the exact locality is not known with certainty, the material is still available in some dealers' stocks and frequently re-appears when old collections are broken up and redistributed.

A fourth locality for hydroxyapophyllite is Khandivali, near Bombay, India. Specimens from this locality, together with some from the Parvati Hills, near Bombay, proved to be the (OH) member. Inasmuch as this material is still available, collectors and curators seeking specimens of this species should be able to obtain them with little difficulty from leading mineral dealers and at mineral shows.

FLUORAPOPHYLLITE

Fluorapophyllite is herein defined as material with fluorine greater than hydroxyl. Analyses of many specimens in the search for the (OH) end-member resulted in the following general observations regarding the correct nomenclature for specimens from specific and general localities.

New Jersey. The preponderance of the specimens from the Paterson, New Jersey area are fluorapophyllite. Specimens from the Bergen Hill area, and Prospect Park, in New Jersey, are, for the most part, fluorapophyllite. Several opaque, white, chalky

crystals from the latter two localities are hydroxyapophyllite.

India. Specimens from the Poona district, from Nasik, and from the Ahmed Nagar district are fluorapophyllite. The specimens studied were all from material which has been imported during the last ten years.

Many other localities were briefly examined in the search for the (OH) end-member. However, one or two analyses are not necessarily indicative of the composition of all apophyllite from a given locality. The fine crystals from the Centreville, Virginia locality (Medici, 1972) are neither end-member but are, for the most part, physical mixtures, with both phases occurring within a given "crystal". These Centreville crystals, together with apophyllite from other localities not studied in detail, should be called apophyllite. Apophyllite is still a valid mineral name for all specimens which have not been determined to be either end-member.

It is neither possible, nor desirable, for the authors to examine specimens for collectors to determine their correct species names. The IMA Commission ruling clearly states that all unknown material should be called apophyllite. We sincerely hope that the information contained herein is of use to collectors and curators.

REFERENCES

- DUNN, P.J., ROUSE, R.C., NORBERG, J.A. (1977) Hydroxyapophyllite, a new mineral, and a redefinition of the apophyllite group. Part 1. Description, occurrences, and nomenclature. *American Mineralogist*, **62**, 196-202.
- MEDICI, J.C. (1972) Minerals of the Fairfax quarry, Centreville, Virginia. *Mineralogical Record*, **3**, 171-179. ☒

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