URALOLITE FROM THE DUNTON GEM MINE, NEWRY, MAINE: A SECOND OCCURRENCE

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Uralolite, **a hydrated calcium-beryllium phosphate**, was first described from the Ural Mountains, U.S.S.R., as concretions of radial fibrous spherulites 2-3 mm in diameter. The occurrence was in kaolin-hydromuscovite rocks containing fluorite, beryl, apatite, crandallite, carbonate-apatite, moraesite and glucine (= beryllonite) (Grigor'ev, 1964).

This second occurrence is in the Dunton Gem mine, atop Newry Hill in Newry, Oxford County, Maine. This uralolite, discovered in 1972 by John Stewart of Boston University and Palmer Sevrens of Woburn, Massachusetts, occurs as white, fibrous aggregates, 1-10 mm in size, composed of smaller 0.1 mm semi-spherical aggregates of minute radiating bladed crystals (see Fig. 1). These are associated with albite and elbaite (Dunn, 1975), lepidolite, hydroxyl-herderite, beryllonite and roscherite. The most common sequence of deposition is elbaite, followed by albite and beryllonite, coated by a thin (0.2 mm) botryoidal layer of light brown hydroxyl-herderite overlain by a thin (0.2 mm) deposition of fibrous dark brown roscherite with a botryoidal surface. The uralolite was deposited contemporaneously with, and after, the roscherite. Part of this deposition sequence, shown in Figure 2, consists of corroded crystals of colorless beryllonite partially altered to light brown hydroxyl-herderite and dark brown roscherite and ensconced in a final deposition of a matte granular aggregate of massive white uralolite.

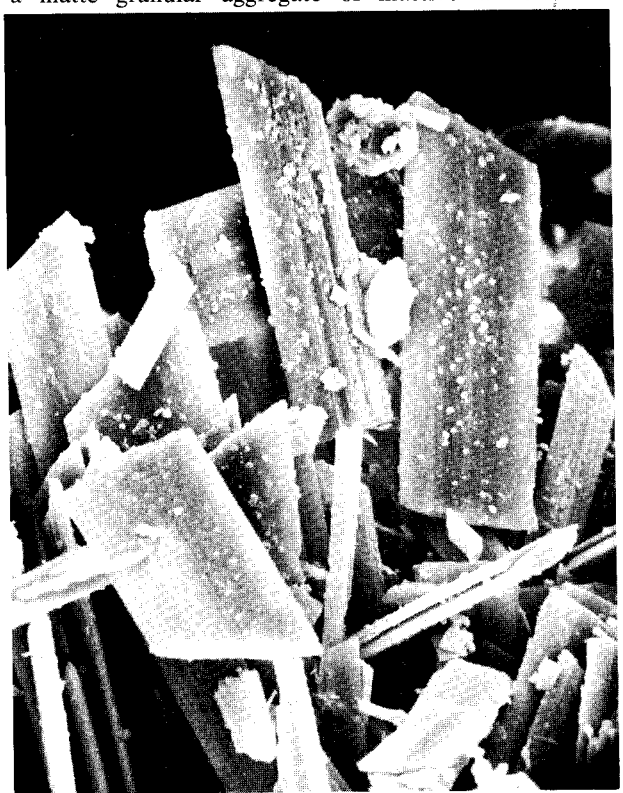

Figure 1. **Uralolite crystals 0.01 - 0.02 mm wide, from Newry, Maine. NMNH Specimen #R17942 (SEM photograph by Pete J. Dunn).**

Figure 2. **A corroded crystal of colorless beryllonite partially altered to light-brown hydroxyl-herderite and dark-brown roscherite, and finally to granular white uralolite, from Newry, Maine. (NMNH Specimen #128053) (Width of field - 1.0 cm). Photograph by Pete J. Dunn.**

Roscherite is present as minute blebs throughout the uralolite, as can be seen in Figure 1. Isolated spherulitic aggregates of uralolite on hydroxyl-herderite from Newry present esthetically beautiful specimens.

The Newry uralolite is white, occasionally discolored by iron stains. Optical data for the Newry uralolite are in good agreement with those of Grigor'ev (1964). The multi-twinned crystals are in matted, micro-fibrous aggregates with $\gamma = 1.536$, and $\beta = 1.526$ (± 0.004). The crystals are optically negative, and multiple twinning results in a wavy extinction. The Newry uralolite responds to ultraviolet radiation with a light yellowish green fluorescence in longwave, and a vivid rich green fluorescence in shortwave ultraviolet radiation. No phosphorescence was observed.

Table 1 Chemical Analysis of Newry Uralolite

	Atomic Proportions	Ratios
Be = 6.6%	.732	4.1
Ca = 14.4%	.359	2.0
P = 16.7%	.539	3.0

	Newry Uralolite	Theoretical $Ca_2Be_4(PO_4)_3(OH)_3 \cdot 5H_2O$
BeO	18.31	18.45
CaO	20.15	20.69
P_2O_5	38.26	39.27
H_2O	21.17*	21.59
	97.89	100.00

*average of two determinations of 21.15 and 21.19%.

Figure 3. **An isolated spherulitic aggregate of uralolite on hydroxyl-herderite, from Newry, Maine. (NMNH Specimen #R17943.) (Width of field - 1.0 cm). Photograph by Pete J. Dunn.**

It should be noted that both uralolite and moraesite occur at Newry, in similar parageneses, and are identical on visual examination. A tentative identification of Newry uralolite by ultraviolet irradiation may be possible as no Newry moraesite examined exhibits any fluorescence.

The X-ray powder pattern of the Newry uralolite is identical to that of uralolite from the Ural Mountains (NMNH #126065). Several weak lines were observed in the diffraction patterns of both Newry and Ural Mountains uralolite which were not noted in the original description, and which are not major lines of associated minerals. Unfortunately, no crystals suitable for single crystal work were found.

The chemical analysis of Newry uralolite is presented in Table 1. This analysis indicates that the formula might be $\mathbf{Ca_2Be_4(PO_4)_3(OH)_3 \cdot 5H_2O}$ instead of the $CaBe_3(PO_4)_2(OH)_2 \cdot 4H_2O$ proposed by Grigor'ev.

URALS URALOLITE

The four analyses of Grigor'ev demonstrate a considerable variance in the homogeneity of the Urals uralolite. The original proposed formula, $CaBe_3(PO_4)_2(OH)_2 \cdot 4H_2O$, is based on a theoretical cell calculated from a proposed three-line analogy between the X-ray powder patterns of uralolite and moraesite, and an observed density of 2.14 on porous material.

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