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AUGELITE FROM PEGMATITES IN NEW HAMPSHIRE

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Augelite, $\text{Al}_2(\text{PO}_4)(\text{OH})_3$, has been found in granite pegmatite at two localities in New Hampshire: the Smith mine at Chandler's Mill near Newport, and the Palermo mine near North Groton. The Smith mine was worked for mica during the summer of 1952. Specimens were obtained from the dump heap showing transparent, pale aquamarine-blue crystals associated with lazulite, albite and quartz. The blue crystals were identified as augelite from their optical properties: biaxial positive, 2V medium, with $\alpha=1.574$, $\beta=1.576$ and $\gamma=1.588$. The identification was confirmed by an x-ray powder photograph. The crystals are embedded and poorly formed. Tiny blue inclusions can be seen under low magnification, and the color of the mineral apparently is due to disseminated particles of lazulite. Augelite crystals from the locality at Laws, California, show a similar feature. The Smith pegmatite shows a marked lithium and phosphate phase. Triphylite, lazulite and granular apatite are the most common phosphate minerals. The lazulite occurs in a heterogeneous manner throughout the pegmatite in small masses, and the augelite occurs immediately associated with it. Other less common phosphates that occur at the locality include hurlbutite, tiny beryllonite crystals, small twinned crystals of amblygonite and brazilianite as small single crystals and as aggregates of parallelly intergrown crystals up to an inch in length.

Augelite also occurs in the well known Palermo pegmatite near North Groton. The mineral was first identified by A. L. Mackay of the University of London, who found crystals on specimens of whitlockite that had been sent to him for study. A number of additional specimens were then recognized in bulk lots of Palermo material carrying whitlockite and brazilianite that had been collected in 1947 and 1948 and placed in stor-

age pending further study. The mineral occurs both as anhedral colorless masses up to 1 cm. in size embedded in a granular matrix of quartz, siderite and feldspar, and as small crystals associated with whitlockite, brazilianite, goyazite, quartz, siderite and apatite in drusy cavities. The granular matrix occasionally contains disseminated grains of dark blue lazulite. The augelite crystals, although monoclinic, usually have a markedly pseudo-rhombohedral habit, very similar to that figured by Prior and Spencer¹ for augelite from Bolivia. Such crystals are virtually indistinguishable on casual examination from whitlockite crystals that have the common $\{01\bar{1}2\}$ habit. The augelite crystals often have a white, frosted surface due to slight etching, but others are colorless and glassy. Optically, the crystals have α 1.573, β 1.576 and γ 1.587, with 2V medium.

A PROPOSED PETROGRAPHIC METHOD FOR THE RAPID DETERMINATION OF ILMENITE

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Recently, while studying crushed fragments of opaque minerals under the petrographic microscope, it was noticed that many ilmenite fragments could be easily distinguished from all other opaque fragments by a distinct orange-red color appearing on the very thin edges of the fragments. This effect was noticed only under crossed nicols and with the upper lens of the condenser swung into position. A rather strong source of light is necessary which the condenser aids in illuminating the thin edges of the fragments.

The fragments of the opaque minerals were mounted on slides with a few drops of Canada Balsam or immersed in oil ($n=1.545$) and then covered with a thin cover glass. The effect was seen in fragments from 1/4 mm. to less than 1/16 mm. sizes (50 to 150 mesh A.S.T.M. or Tyler Standard Screen Scale sieves 264 to 62). In the smaller sizes, minute particles often exhibit orange-red translucency throughout the grains.

Observations of ilmenite specimens from Norway, Maryland, California, Arizona, and three of unknown locality showed this distinct color effect on the thin edges. To date the writer has not found any other opaque mineral, that, when crushed, will give this distinct orange-red color. The closest mineral resemblance found under these conditions was that of specular hematite. However ilmenite can be readily distinguished from specular hematite as the latter has a more blood-red color which is visible also without the aid of the condenser lens. The color in specular hematite may also be seen in plane light. It was noticed that magnetite appeared as a light grayish yellow in a few of the thinnest

¹ Prior, G. T., and Spencer, L. J.: *Mineral. Mag.*, 11, 16 (1895).