NOTE ON LAVENDULAN FROM JOACHIMSTAL, BOHEMIA

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Under the name lavendulan, Breithaupt[2] described a mineral from Annaberg in the Erzgebirge. The mineral formed thin crusts of a lavender blue color and botryoidal structure. Sufficient material apparently was not available for a quantitative analysis but the blowpipe characteristics were determined by Plattner. The collection of Colonel Washington A. Roebling contains a specimen of lavendulan from Joachimstal which probably represents the same mineral described by Breithaupt. It is entirely similar in general appearances and blowpipe characteristics to the Annaberg material.

The lavendulan forms very thin crusts with botryoidal surface upon a seam of quartz in a mica schist. Its color is patent blue (Ridgeway) with a vitreous to waxy lustre. Although the crust appears amorphous, under the microscope it is seen to be made up of minute radiated fibers or plates. They are slightly pleochroic, the colors being patent to oxide blue. The plates are so small that the optical properties could not be determined with exactness. The following constants were measured: $\beta = 1.715 \pm 005$; $\gamma = 1.725 \pm 003$. Z is in the direction of the length of the fibers. The extinction is inclined to the length of the fibers. The mineral is distinctly made up of bands of varying composition and the indices of refraction show a corresponding variation.

Breithaupt's mineral was essentially a hydrous cobalt arsenate with some copper and nickel. Before the blowpipe the mineral colored the flame light blue (arsenic) and fused easily to a mass that assumed crystalline form upon cooling. These crystals were at times a dark hyacinth red in color. The mineral from Joachimstal fused easily before the blowpipe coloring the flame first blue, then green. With borax the mineral gave a smalt blue bead. The fused mass was dark red in color and apparently crystalline.

The lavendulan from Joachimstal was associated with the alleged cobalt molybdate, pateraite, and small rose colored crystals of erythrite. A large part of the lavendulan crust is underlain by a layer of erythrite, and the two minerals are very closely associated.

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[2] *Jour. Prakt. Chem.*, **10**, 505, 1837.

The optical properties of the lavendulan are similar to those of erythrite, but with somewhat higher indices. Lavendulan is therefore, probably, the copper analogue of erythrite or simply a cupriferous erythrite. It is so poorly characterized, however, and its homogeneity so uncertain that any definite conclusion as to its relationships is unwarranted.

FREIRINITE: A NEW MINERAL SPECIES

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The cobalt deposits of San Juan, Chile, have provided a number of specimens of a turquois blue arsenate of copper that have been referred by Goldsmith[2] to the mineral lavendulan. Examination of this mineral and of the lavendulan from Joachimstal[3] has shown that the Chilean mineral is well defined both chemically and physically and entirely distinct from the lavendulan. It does not correspond to any known mineral and the name *freirinite*, from the locality at which it is found, Department of Freirini, Chile, is proposed for it.

The mineral is found in the Blanca Mine, San Juan, Department of Freirini, Chile. It occurs in a tourmalinized igneous rock as thin, roughly parallel veinlets with scaly, granular or columnar structure. Erythrite is abundantly associated with the freirinite in similar veinlets or coatings on cracks. Other associates are cobaltiferous wad, cuprite and malachite. The original sulphide mineral is cobaltite[4] but none now remains in the specimens carrying the freirinite.

The freirinite is greenish blue in color (centre blue Ridgeway) with a calamine blue streak. It is made up of fine flakes that give the coarser material a satiny lustre. Under the microscope the mineral is seen to be composed of small plates or columns. The plates are uniaxial with negative optical character. The indices and pleochroism are as follows:

$\epsilon = 1.645$, light greenish blue; $\omega = 1.748$, deep greenish blue.

The plates have an excellent basal cleavage and an imperfect prismatic one. The mineral is apparently tetragonal or orthorhombic with a very small optic axial angle.

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[2] *Proc. Acad. Phila.*, **192**, 1877.

[3] *Am. Min.*, **9**, 29, 1924.

[4] O. Stutzer, *Zeit. Prakt. Geol.*, **14**, 294, 1906.