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

WILLIAM F. FOSHAG,[1] *United States National Museum*

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.

[1] Published with the permission of the Secretary, Smithsonian Institution.

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

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

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

The chemical composition as determinated by Goldsmith is entirely erroneous. For analysis the finest blue colored material was selected. Under the microscope the sample was found to be contaminated with about 1% of limonite and only a very few grains of erythrite.

ANALYSIS, RATIOS AND THEORETICAL COMPOSITION OF FREIRINITE FROM SAN JUAN, CHILE

	Per cent	Ratios		Theoretical Composition
CuO	29.62	.370	6	28.3
CaO	6.16	.110		4.9
Na_2O	14.36	.232	3	16.5
Fe_2O_3	0.76	.005		
As_2O_5	38.80	.169	2	40.7
H_2O	9.17	.509	6	9.6
Insol.	0.58			
	99.45			

These ratios lead to the formula $6(Cu, Ca)O.3\ Na_2O.2\ As_2O_5.6H_2O$. An exceptionally pure sample was selected for qualitative examination and this gave no reactions for cobalt, nickel or iron. The theoretical composition given is for a Cu:Ca ratio of 4:1. The specific gravity is higher than that of methylene iodide.

Freirinite is easily soluble in hydrochloric acid. Before the blowpipe it fuses easily with intumescence to a black mass, coloring the flame strongly yellow streaked with green. Near the assay the flame is tinged pale blue. Upon removal of the assay from the flame it gives off faint white fumes. In the closed tube it yields water and turns grayish blue in color. With borax the mineral gave a bluish green bead in the oxidizing flame.

That this mineral is not the lavendulan of Breithaupt can easily be seen by comparing the properties of the freirinite with that mineral. Plattner, who performed the blowpipe test for Breithaupt, states that the mineral is essentially a hydrous cobalt arsenate. The freirinite carries no cobalt whatever but a considerable amount of soda, a constituent not mentioned by Plattner and one not readily overlooked. In color, specific gravity and form these two minerals do not agree. Further, if the mineral from Joachimstal described in the preceding note is true lavendulan, as seems probable, then their optical constants are entirely dissimilar. The Chilean mineral is, therefore, distinct and is sufficiently well characterized to be accepted as a well defined species.