

*Francolite, a Variety of Apatite from Levant Mine, St. Just, Cornwall.*

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[Read June 22nd, 1886.]

THE three varieties of apatite at present known to occur in Cornwall are the sea-green limpid crystals from St. Michael's Mount and other places, the dirty-white, semi-opaque, hexagonal prisms associated with axinite from Botallack Head, and the thin hexagonal plates, described and analysed by Prof. Maskelyne and Dr. Flight as coming from a new locality, now known, however, to have been obtained by the late Mr. Talling from Fowey Consols, and previously noted from this mine by Greg and Lettsom. To these must now be added a new variety which was lately brought to me as chalybite from the deep workings of Levant Mine, St. Just. The specimens are closely analogous to those analysed by Dr. Flight, but differ slightly in chemical composition and mode of occurrence.

The crystals are in the form of small hexagonal plates, rarely more than  $\frac{1}{4}$ th of an inch in diameter and less than  $\frac{1}{8}$ th thick, vitreous lustre, limpid and slightly iron-stained, associated with curved white vitreous crystals of calcite on iron-stained quartz with a little copper pyrites. They are aggregated in a very confused manner; some are apparently twinned about the plane  $x$ , but the measurements obtained are not sufficiently satisfactory to establish a new twin law. The crystals usually consist of three or more individuals grown parallel to the  $a$   $\{10\bar{1}\}$  plane.

When the aggregations are broken up a "face of junction" is obtained, lying a little out of the zone  $a, o$ . A definite reflection could not be obtained on account of the curvature of the face. Approximate angle  $40^\circ$ . No crystal was found exhibiting more than one of these faces, and since the position, shape and curvature of the face, and the approximate angle obtained, was similar in a number of crystals examined, I have ventured, for want of a better name, to call this face "a face of junction," as I cannot show that it is parallel to a possible plane of the crystal.

A crystal placed between crossed nicols in a Norremberg polariscope gave the familiar broken cross, with widely separated and highly coloured rings of apatite, and with the aid of a mica plate the sign of double refraction was found to be negative.

The specific gravity was found to be 3.186.

I am indebted to Mr. Robinson, who has sent me the following account of the analyses he kindly undertook for me of the crystals of apatite. It will be seen that the  $\text{Ca CO}_3$  is present in very similar proportions in the two analyses he made. But whether we are to consider the  $\text{CO}_2$  as chemically combined, and therefore replacing either the  $\text{P}_2\text{O}_5$  or F, or merely as a mechanical mixture of  $\text{Ca CO}_3$ , such as is found in varying and microscopic quantities in the apatites from Canada, is a question which cannot be settled satisfactorily, since no simple chemical formula can be given for the proportions found by Mr. Robinson.

As, however, the amount of  $\text{CO}_2$  in these two analyses from crystals broken from various specimens agrees so closely, I feel inclined to accept Dr. Flight's view, and consider that  $\text{CO}_2$  sometimes replaces the other acids in this mineral.

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