THE AMERICAN MINERALOGIST
JOURNAL OF THE MINERALOGICAL SOCIETY OF AMERICA
VOL. 9 OCTOBER, 1924 No. 10

A LOW IRON EPIDOTE FROM PORCUPINE

E. L. BRUCE AND C. W. GREENLAND, *Queen's University*

A fibrous mineral found in a vein in the Rochester mine at Porcupine was found, on optical examination, to agree closely with the rather rare variety of epidote to which the name fouqueite has been given.

The wall rock of the vein is a fine-grained dacite which is probably tufaceous, but the rock has been heavily impregnated by carbonates and so severely metamorphosed that its original features are completely obliterated. The vein has well-defined

VEIN AT 925 FOOT LEVEL, ROCHESTER MINE, PORCUPINE.
The fibrous mineral above the pick is epidote.

walls and the vein solutions have affected the walls and included fragments of it only to produce some induration and silicification for distances of an inch or less from the vein. The sample of epidote was taken from the vein at a depth of 925 feet. The same species occurs at the surface on the Moneta property and in diamond drill cores from beneath Gillies Lake.

The minerals associated with the epidote are quartz, calcite and chlorite, with some stains of hematite. Specimens from the Moneta occur with a pink mineral that is probably axinite. In the Rochester vein quartz and epidote seem to have crystallized almost simultaneously. Calcite is somewhat later since it fills the interstices of the others. The chlorite is light green in color and occurs in very fine scales so that it presents a granular appearance.

The epidote forms aggregates of coarse radiating fibers or needles from an inch to six inches in length, presenting an appearance somewhat similar to the striated, columnar habit of tourmaline. The color is greyish green. The mineral has a waxy lustre and is translucent. There seems to be one good cleavage as many of the fragments examined under the microscope had the same orientation and were probably resting on a good cleavage face. The hardness is above that of orthoclase but no effect could be observed on attempting to scratch quartz. The specific gravity is 3.23.

Pure material for chemical analysis was somewhat difficult to obtain for particles that appeared homogeneous to the naked eye were found under the lens to contain a considerable amount of calcite or quartz in the re-entrant angles between the needles. The material was, therefore, crushed coarsely and sorted under a lens.

The following results were obtained on analysis:

	Per cent	Combining ratio	
Loss on ignition	2.71	.150	.150 = 1.38
SiO_2	39.42	.653	.653 = 6.00
Al_2O_3	28.38	.278	.313 = 2.88
Fe_2O_3	5.59	.035	
FeO	.91	.012	
CaO	22.14	.395	.437 = 4.02
MgO	1.22	.030	
	100.37		

(Analyst G. D. Furse.)

The composition of the mineral, therefore, approximates that commonly accepted for epidote, $H_2O.4RO.3R_2O_3.6SiO_2$.

The absence of well developed crystals in the specimens examined makes the determination of the orientation uncertain. Some of the fragments, however, are lath-shaped with extinction parallel to the elongation. In some other fragments a good cleavage can be observed which is not parallel to the extinction direction.

The crystal system is evidently, therefore, monoclinic and the elongation of the fibres is probably parallel to the ortho axis. Assuming this to be the case, the best cleavage is in the zone parallel to this axis and may be assumed to be basal.

In the examination of crushed fragments of the mineral most of the fragments rest upon the good cleavage face. The interference figure for such a section is biaxial with one axis emerging nearly normal to the cleavage face. There is strong dispersion $\rho > \nu$. In fragments which show lath shapes, the optic axial plane is normal to the elongation and is, therefore, probably parallel to the 010 face. The mineral is negative and the mean index of refraction is 1.72.

Although the low index of refraction agrees with the index of the variety of epidote given the species name fouqueite by Lacroix,[1] comparison with his original description shows that there are marked differences. In the analysis of fouqueite no Fe_2O_3 is recorded, although FeO in one variety of fouqueite was found to be 4.4%. Lacroix found fouqueite to be positive, whereas the Porcupine mineral is negative.

The Porcupine mineral is probably more nearly like a white epidote from Tierra del Fuego, described by Lacroix,[2] although the analysis of that specimen shows a higher percentage of alumina and the iron is recorded as entirely ferrous. Lacroix remarks that the mineral resembles zoisite in appearance but that its crystallization and optical properties are those of epidote.

It seems likely that this low iron variety of epidote at Porcupine must have crystallized from vein forming material simultaneously with the quartz. Any inclusion of the basic wall rocks metamorphosed by solutions would seem necessarily to be higher in iron than the Porcupine epidote.

BORNITE AS A FURNACE PRODUCT

F. N. GUILD, *University of Arizona*

During the latter part of 1923, the writer's attention was called to some crystalline material obtained from the partly fused mass of one of the smelter furnaces of the International Smelting Co., Miami, Arizona. The material was found by Mr. Emrich, assistant superintendent, while engaged in dismantling one of the furnaces.

[1] Bull. Soc. franc. Min., **XII**, p. 327.

[2] Bull. Soc. franc. Min., **X**, p. 150.