TETRADYMITE FROM HACHITA, NEW MEXICO

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A specimen of ore from the Little Mildred mine near Hachita, New Mexico, was sent by Mr. Albert E. Bader to the U. S. Geological Survey for identification. A polished section of the ore was made and studied microscopically by Mr. Short. The ore mineral is homogeneous with the exception of a little native gold. The material was crushed and a preliminary separation of the heavy minerals was made by panning. The concentrate was screened and that part between 40 and 60 mesh was further concentrated with the aid of bromoform solution of sp. gr. 2.85. The concentrate was then analyzed by Mr. Henderson and found to be tetradymite.

Mr. Bader has kindly furnished some notes on the geological occurrence of the ore. The Little Mildred mine is situated in the Little Hatchet Mountains in the extreme southwestern corner of New Mexico, and about 18 miles southwest of Hachita. The altitude of the mine is about 5500 feet. The geological formations consist of a series of tilted and faulted Paleozoic sediments which have been invaded by stocks, sills, and dikes of monzonite, diorite and syenite. The Little Mildred quartz vein is in the metamorphic zone adjacent to one of these intrusions. The outcrop of the vein is about an inch wide and can be traced for about a mile. It strikes northeast and dips southeast. The width in the bottom workings of the mine, 115 feet below the outcrop, is about three feet. The vein is well defined and shows two inches of gouge on the foot wall and one-half inch on the hanging wall. Tetradymite when first discovered in the Little Hatchet Mountains in 1908 was pronounced to be sylvanite.

The gangue is almost pure quartz with which is associated a little black tourmaline. Some angular fragments of dark gray wall rock showing more or less replacement by quartz occur in the vein. The tetradymite occurs as small blebs and in seams scattered through the quartz. The mineralization was evidently a little later than the deposition of the quartz.

The analysis is as follows, a 0.6 gram sample being available for this purpose.

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	Percent	Insoluble Deducted	Ratios	
Insol. in HNO_3	3.66			
Te	43.66	45.33	.351	.373=3×.124
S	0.69	0.71	.022	
Se	None			
Bi	50.94	52.90	.254	.254=2×.127
Fe	0.50	0.52	.009	—
Mg	Trace	Trace		
	99.45	99.46		

This checks closely with the theoretical formula Bi_2Te_3. No pyrite was observed; the iron may have been derived from a silicate.

Under the microscope the mineral is galena white, very soft and has moderately strong anisotropism. Etching tests gave the following results:

1 : 1HNO_3 —effervesces vigorously and stains brown to black.
1 : 1HCL —stains light brown to iridescent; in some areas the action is very slow.
KCN (20%)—negative.
$FeCl_3$ (20%)—immediately tarnishes iridescent.
KOH (40%)—stains differentially to dark gray.
$HgCl_2$ (5%) —negative.

These results vary markedly from those given in Davy and Farnham's tables. Inspection of the analyses given in Dana's System of Mineralogy shows that the sulphur in tetradymite varies in different localities from zero to over 5 per cent. This variation in composition probably accounts for the difference in etching behavior of different specimens.

Geologically this occurrence of tetradymite is unique and the fact that it does not occur with other sulphides and tellurides is noteworthy.

PIGEONITE FROM THE TRIASSIC TRAPS OF THE CONNECTICUT VALLEY

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In the diabase from West Rock, New Haven, Connecticut, specimen 106 of the Educational Series of rocks prepared by Diller,[1] Pirsson[2] noted the presence of a white "augite" in addition

[1] Diller, J. S.: The educational series of rocks. *U. S. Geol. Survey Bull.* **150** (1898).

[2] Pirsson, L. V.: *Idem*, p. 268.