NOTES AND NEWS

MINERAL OCCURRENCES IN WESTERN CANADA

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These notes continue the series, the last of which appeared in *Am. Mineral.* **35,** 451, 1950. All identifications were established or confirmed by *x*-ray powder photographs. The writer wishes to acknowledge the helpful assistance of Dr. H. V. Warren and the following students who cooperated by collecting and/or examining ores: R. J. Charles, E. Livingston, G. A. Noel, C. Rennie, R. A. Stuart, and A. Sutherland-Brown.

Berthierite. $FeS \cdot Sb_2S_3$. Clearwater Lake, Alice Arm, Portland Canal M.D., B.C. This lake lies at the head of the Kitsault River about 40 miles north of Alice Arm. Specimens collected by R. W. Goranson but not closely identified with respect to prospect or locality, consist of a 1 inch quartz vein with slender needles of berthierite ("stibnite") with a marked iridescent tarnish lying perpendicular to the walls. This is believed to be the first recognized occurrence of this mineral in British Columbia.

Boulangerite. $5PbS \cdot 2Sb_2S_3$. Silver Key Group, near Canal Flats, Golden M.D., B.C. This property also known as the Key Group is situated at the head of the east fork of Doctor Creek about 25 miles west of Canal Flats (*Minist. Mines, B.C., Ann. Rept.*, 1935, p. E 28). Lenses and wedges of sulphides occurring along the bedding planes of highly metamorphosed, sericitized, and contorted quartzite consist of galena, pyrite, and minor amounts of chalcopyrite, sphalerite, and possibly an antimonial sulphide.

Samples provided by Dr. P. H. Sevensma and Mr. A. C. Taplin, vary from massive gneissic galena intimately mixed with boulangerite to mixtures of quartzite with siderite containing needles of and vugs lined with boulangerite. Assays of over 200 oz. of silver per ton are believed to be due to argentiferous tetrahedrite but none was seen in the samples examined.

Mastadon Property, Revelstoke M.D., B.C. Meneghenite and associated minerals have already been described from this property (Warren, *Univ. Toronto Studies*, Geol. Ser., **51,** 75, 1947). A recent hand specimen supplied by Dr. D. F. Kidd and thought to contain meneghenite consists of a narrow band of fibrous boulangerite with galena and sphalerite adjacent to a mass of quartz and sericite.

Braunite. $(Mn, Si)_2O_3$. Iron King, near Olalla, Osoyoos M.D., B.C. (*Minist. Mines, B.C., Ann. Rept.*, 1949, 132). This prospect is on the south side of the ridge separating the north and middle forks of Olalla

Creek, about 3½ miles by trail from the highway at Olalla, and at elevations from 3,800 to 5,300 feet. Here a bedded deposit of manganiferous chert is traversed by a network of minute veins containing rhodonite, which merge laterally into zones of hard black siliceous manganese ore (braunite) containing small irregular masses of rhodonite and chert.

Specimens supplied by Dr. W. H. White and Mr. Kennedy show massive pinkish chert traversed by thin streaks of braunite and rhodonite while others vary from a mixture of quartz, rhodonite, rhodochrosite, hematite, and braunite, to almost solid braunite. The braunite appears to be an alteration product of the rhodonite and is cut by many tiny stringers of rhodochrosite and quartz. This mineral has not been recorded previously in British Columbia.

Cobaltite. CoAsS. Laverdiere Group, Atlin M.D., Atlin, B.C. This property is situated about 2 miles from Atlin Lake on the west side of Hoboe Creek at the contact of early Paleozoic amphibolites, schists and limestone and a granitic intrusive which is part of the Coast Range Batholith (Cairnes, *Geol. Surv. Canada, Mem.* **37,** 117, 1913).

Samples collected by Mr. E. Livingston are mainly greenish-black serpentine with a heavy erythrite coating. Fresh surfaces show disseminated or massive granular magnetite, and minor amounts of chalcopyrite, specularite, pyrite, and cobaltite which was apparently overlooked in the earlier work.

Hedleyite. Bi_7Te_3. Oregon Property, near Hedley, Osoyoos M.D., B.C. This property is situated between Sixteen Mile and Eighteen Mile Creeks about 3 miles east of Hedley. The mineralization here is similar to that of the Good Hope Claim (Warren and Peacock, *Univ. Toronto Studies,* Geol. Ser., **49,** p. 55–69, 1945), about 2 miles north, and consists of massive garnet, hedenbergite, wollastonite, calcite, and minor quartz with sparsely disseminated sulphides.

Hedleyite and Joseite B are seen together in polished sections as rounded grains with smooth boundaries. When the two minerals are in contact, hedleyite is distinguished by its slightly lighter colour. Native bismuth, molybdenite, and gold are closely associated with the tellurides while bornite, chalcopyrite, cobaltite, and safflorite occur apart and are locally abundant.

Meneghenite. $Cu_2S \cdot 26PbS \cdot 7Sb_2S_3$. Silver Bell Claim of the California Group, Chikamin Mountain, Whitesail Lake, Omineca M.D., B.C. This property is situated on the south facing slope at the west end of Chikamin Mountain at an elevation of 6,500 feet. Samples collected from the dump consist of limonite stained granular to vuggy quartz and minor siderite with bands of galena, yellow sphalerite, tetrahedrite, and silvery gray needles and prisms of meneghenite ("stibnite") up to 1 cm. in

length. Polished sections show small rounded areas of bournonite in contact with tetrahedrite, and associated with galena, sphalerite, and chalcopyrite, while the meneghenite laths are usually free.

Durango (Howard) Mine, near Ymir, Nelson M.D., B.C. This property is located on the east side of Active (South Fork of Porcupine) Creek, about 9 miles south-east of Ymir. Investigation of a specimen of steely galena kindly supplied by the B.C. Department of Mines showed blebs of chalcopyrite, lenses of covellite and a few beaded stringers of a gray anisotropic mineral which proved to be meneghenite.

Silver Standard Mine, near New Hazelton, Omineca M.D., B.C. This mine is situated about 6 miles by road northwest of New Hazelton on the west side of Glen Mountain between 1,200 and 2,000 feet elevation. Meneghenite was discovered during a detailed mineralographic examination of this ore. It occurs in close association with argentiferous tetrahedrite, galena, pyrargyrite, and polybasite as fine laths and fibrous masses. It is less white than galena and shows prominent cleavage along which alteration to anglesite is taking place. Traces of bournonite are present as isolated blebs associated with the meneghenite which association has been noted in three of the four occurrences of meneghenite in British Columbia. Sphalerite, pyrite, pyrrhotite, marcasite, arsenopyrite, chalcopyrite, covellite, and limonite are also present.

Parkerite. $Ni_3Bi_2S_2$. Near Gros Cap, N.W.T. This rare mineral was reported by Stockwell (*Geol. Surv. Canada*, Summ. Rept., 1932, Part C, pp. 60–61) as an unknown soft bluish-gray anisotropic mineral in niccolite from a prospect containing nickel and cobalt-bearing minerals at a point 2 miles north of Great Slave Lake and 3 miles east of Francois River, N.W.T. Specimens collected from this prospect by Mr. G. A. Dirom in 1932 were recently examined by the writer and found to consist of closely spaced compact masses of botryoidal niccolite and rammelsbergite cemented by a carbonate gangue and covered with much earthy annabergite. A small amount of native bismuth was noted in gangue at one corner of a specimen.

Polished sections show rounded areas of niccolite often bordered by a narrow band of rammelsbergite and sometimes areas of niccolite containing irregular to rounded areas of rammelsbergite. In one section, laths of niccolite are seen radiating from the centre of crudely star-shaped areas of rammelsbergite. The more massive areas of niccolite carry a series of bluish-gray dots and blebs of parkerite (0.01 mm.) along an arc parallel to its outer botryoidal surface. Rarely, somewhat larger areas of parkerite (0.02 mm.) are seen with distinct multiple twinning. The quantities of parkerite present however were insufficient to determine the position of

this mineral in the parkerite ($Ni_3Bi_2S_2$)-shandite ($Ni_3Pb_2S_2$) series (Peacock and McAndrew, *Am. Mineral.*, **35,** 425–439, 1950).

Polybasite. $8(Ag,Cu)_2S \cdot (Sb,As)_2S_3$. Torbrit Silver Mines Limited, Portland Canal M.D., B.C. The Torbrit (Toric) Mine is loacted on the east bank of the Kitsault River, 17 miles by road from Alice Arm. Samples examined were taken from a zone of high grade silver ore and consist of a mixture of calcite, barite, jasper, hematite, quartz, and altered greenstone fragments impregnated with grains of pyrite, galena, irregular patches of fine grained ruby silver, and a minor amount of native silver. The overall effect is a mottling but some specimens show a crude banding.

Polished sections show pyrargyrite as disseminated grains and as 1 mm. veinlets with polybasite. Complications in milling may be expected due to the fineness and brittle nature of the silver minerals.

Rammelsbergite. $NiAs_2$. Nix Property, Great Slave Lake, N.W.T. This property is located about 10 miles S.W. of the Taltheilei Narrows in the N.E. arm of Great Slave Lake and is approximately 50 miles northeasterly from the Gros Cap property described above.

Specimens kindly supplied by Dr. H. C. Gunning (which are almost identical to those from the Gros Cap) consist of solid compact masses of niccolite and rammelsbergite in a minor amount of ankeritic gangue and partially coated with anabergite.

Polished sections show small botryoidal areas of niccolite bordered by narrow bands of rammelsbergite; also somewhat feathery areas of niccolite in a groundmass of rammelsbergite. No parkerite was observed in these specimens.

Stephanite. $5Ag_2S \cdot Sb_2S_3$. Elsa Mine, near Mayo, Y.T. This mine is located on the north facing slope of Galena Hill, 27 miles north of Mayo. A specimen kindly supplied by Mr. H. Gabrielse from the 200 foot level consists of a narrow limonite stained $\frac{1}{4}$ inch quartz vein sparsely mineralized with pyrite and covered on one side with small flat areas of massive black stephanite suggestive of a secondary origin. This mine is well known for its high silver values which are contained in freibergite, galena (with myriads of dots and blebs of unidentifiable ruby silvers), argentite, and native silver. The first occurrence of this rare silver sulphosalt in recognizable quantities in Western Canada is of interest.

Tellurbismuth. Bi_2Te_3. Fil-Mil Mine, Deep Inlet, Alberni M.D., B.C. This property is on the south side of Deep Inlet, about 2 miles from its entrance into Kyuquot Sound and 15 miles by boat from Kyoquot (*Minst. Mines, B.C., Ann. Rept.*, 1947, 177). A number of narrow fissures and shear zones in granodiorite are filled with quartz and aplitic material

and sparsely mineralized with pyrite, sphalerite, chalcopyrite, and gold. A small sample supplied by the B.C. Chamber of Mines shows a coarse aggregate of quartz crystals cemented by gold and plates of tellurbismuth. Bismuth tellurides are becoming common accessory minerals in a number of gold occurrences in this province.

Tetrahedrite-Tennantite. $(Cu, Fe)_{12}(Sb,As)_4S_{13}$. Taylor Windfall Mine, Battlement Creek, Clinton M.D., B.C. This property is on Battlement Creek adjoining its junction with the Taseko River about 9 miles easterly from Taseko Lake (*Minist. Mines B.C., Ann. Rept.*, 1935, F 19). Included in a number of specimens kindly supplied by Mr. R. H. Stewart is a 6×4×3 inch solid compact mass of silvery-gray sericite which contains disseminated crystals and masses of tetrahedrite and pyrite. The tetrahedrite shows poor to fairly well developed tetrahedral crystals up to $\frac{1}{4}$ inch in size. A number of crystals were carefully selected and specific gravity measurements made on each. A chemical analysis was made by Mr. R. N. Williams on a sample with an average specific gravity of 4.68. A polished section of a portion of the material used for analysis showed only tetrahedrite while a section of fragments with a specific gravity below 4.68 showed chalcopyrite as the main impurity. This analysis (A) is given below together with the values calculated to 100 per cent (B).

	A	B
Cu	35.03	35.12
Fe	2.65	2.66
Zn	8.50	8.52
Pb	2.05	2.06
Sb	12.54	12.57
As	12.48	12.51
S	26.49	26.56
	99.75	100.00

This analysis would tend to confirm the suggestion in Dana (1944, p. 375) that Sb-As apparently form a complete series from tetrahedrite to tennantite, respectively, with the above mineral occupying the mid position in this series.

Uraninite. UO_2. Emerald Mine, near Salmo, Nelson M.D., B.C. The Emerald property is located 6 miles south-east of Salmo and extends across the height of land between Sheep and Lost Creeks. During the last war this mine became an important producer of tungsten and for a full account the reader is referred to *B.C. Department of Mines*, Bull. **10,** p. 135, 1943.

In the spring of 1948 the Metallurgy Department of this University requested the writer to identify a fine black powder which came off a

Wilfley Table ahead of the scheelite from this mine. A binocular inspection showed a black finely crystalline powder which was later determined to be uraninite at the University of Toronto. On receipt of this information the company made a thorough search of the mine and provided a suite of ore which was considered to be the most likely for the occurrence of radioactive minerals. This material which consists largely of quartz, pyrrhotite, pyrite, chalcopyrite, and minor molybdenite, failed unfortunately to produce further amounts of uraninite. From the above it would appear that the uraninite was a local accessory mineral but its occurrence warrants a close watch on further developments at this mine and in the surrounding area.

THE CHILDRENITE-EOSPHORITE PROBLEM

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On the basis of an exhaustive optical study of the childrenite-eosphorite series, Professor C. S. Hurlbut (*Am. Mineral.*, **35,** 793–805, 1950) concludes that these minerals should be classified in the monoclinic system. Previous morphological (*Dana's Textbook of Mineralogy*, 732, 1932) and x-ray diffraction (Barnes, *Am. Mineral.*, **34,** 12–18, 1949) examinations have placed childrenite in the orthorhombic system.

Professor Hurlbut has found the same x-ray extinctions for a single and for a twinned crystal of Newry eosphorite as those previously reported by one of us (Barnes, *Am. Mineral.*, **34,** 12–18, 1949) for Tavistock childrenite. Through the kindness of Professor Hurlbut we have been able to examine crystals of his Newry eosphorite optically and have confirmed the twinning and extinction angle. We have also observed his fourlings in a crystal of childrenite ground parallel to (010). There is thus no conflict regarding the experimental data which, on the basis of x-ray diffraction symmetry alone, leads to the space group *Bba*2 or *Bbam* but apparently must be reduced to $B2_1/a$ (with $\beta = 90°$) to accommodate the optical data.

The essential difference between the diffraction symmetry of the monoclinic space group $B2_1/a$ (with $\beta = 90°$) and that of the orthorhombic space group *Bba*2 (or, *Bbam*) is the b glide plane perpendicular to a in the latter. This can readily be observed by comparing the reciprocal lattice nets for the zero and upper levels of crystals belonging to the two space groups (see, for example, Figure 5 of a previous paper (Barnes, *Am. Mineral.*, **34,** 166, 1949) on lindgrenite $B2_1/c$ where the c glide is equivalent to an a glide and β may be visualized as 90°, and Figure 7 of a previous paper (Barnes, *Am. Mineral.*, **34,** 16, 1949) on childrenite *Bba*2).