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Hon. E. C. CARSON, *Minister* JOHN F. WALKER, *Deputy Minister*

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(REVISED)

Tungsten Deposits of British Columbia

by

JOHN S. STEVENSON
and Staff of Department of Mines
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THE GOVERNMENT OF
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PREFACE

This Bulletin is a complete revision of one published in 1941 under the same title. Expansion and revision of Bulletin No. 10 was made necessary by the many new discoveries of scheelite made during the last two years, discoveries which have shifted the emphasis on certain sections of the Province and on certain types of deposit. The various data are brought as much as possible up to date of March 1st, 1943, although it has been impossible to keep abreast of all current development.

Tungsten is perhaps the most important strategic metal in Canada and production has increased tremendously during the last two years. The primary reason for the increase is naturally the expanded need for the metal in war industry, coupled with the gradual cutting off of pre-war sources of supply, as a consequence of which the price has increased. Secondary reasons for increased production include improvements in technique of prospecting and improvements in milling methods that have on the one hand brought to light deposits long overlooked and on the other hand have permitted the marketing of formerly sub-marginal ores.

Two general chapters are included prior to the descriptions of British Columbia properties and occurrences. The first, "General Discussion of Tungsten" deals with the mineralogy, geology, and physical attributes of tungsten and its minerals, as well as the testing, assaying, milling and marketing of its ores. The second chapter "World Distribution of Main Tungsten Deposits" outlines the pre-war sources of the metal and brings the subject as nearly as possible up to date.

Chapter III, "Description of British Columbia Tungsten Deposits" describes all the more important deposits in the Province and most, though not all, known occurrences, many of which are of mineralogical interest only. Of these, the following three properties are mining tungsten ore at the present time: Red Rose in the Hazelton area and the Tungsten Queen and Bralorne in the Bridge-River area. In conclusion a section entitled "Hints to Prospectors" is included in the hope that it may prove helpful in the search for new deposits, particularly those of high-temperature replacement type.

The original Bulletin was entirely the work of John S. Stevenson, with the exception of one description by D. Lay. The revision is the work of the same writer, but certain sections have been contributed by other members of the Department of Mines staff.

An information circular dealing with the specifications of tungsten ores and concentrates is published with permission from the Department of Mines and Resources. The Director of the Geological Survey has given permission to print the otherwise unpublished report by Dr. W. E. Cockfield on the Consolidated Nicola Goldfields.

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tungstic oxide (WO_3) per foot of depth over 7 1/2 inches may be expected for the 17-foot length.

Suggested Development.

The writer submits the following suggestions for further work, should any be contemplated on the property, namely that:

(1) Efforts should be directed towards the exploration of only the scheelite-bearing pyrite lenses. Although it is doubtful if these will carry any large amounts of economically mineable ore, still a small tonnage of scheelite could be obtained from them.

(2) The pyrite lens in the west end of No. 5 vein on No. 10 level be drifted on to the north-west.

(3) The cross-cut that extends north-easterly on No. 9 level from a point 220 feet east of raise A, be extended north-easterly to intersect the south-easterly extension of No. 5 vein across the main fault. To pick up a point corresponding to one on the north side of the fault at this level it would be necessary to go down the dip of the fault for 50 feet on the south side of the fault.

(4) In general, raising and sinking could be done from the drift-sections of the scheelite-bearing pyrite lenses to their extremities.

LARDEAU AREA

Scheelite has been found at two properties in the Lardeau, one at a new prospect, the United Victory, on the Incomappleux (Fish) River and the other on a silver-lead property, the Lucky Boy, near Trout Lake.

UNITED VICTORY

The United Victory group is 17 miles up the Incomappleux (Fish) River between Boyd and Kelly Creeks at an elevation of about 3,000 feet. It is reached from Beaton by road for 12 miles, thence by trail for 5 miles to the property.

The claims were located in 1942 on showings of scheelite by Bert Oakey and Henry Gunterman, both of Beaton. The ground is being prospected and the showings developed by Bralorne Mines Ltd., 555 Burrard Street, Vancouver.

The scheelite is found in a bed of lime-silicate or skarn rock* which is 5 feet wide and is exposed by a few natural outcrops for

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* For usage in this bulletin see pp. 11-12.

1,000 feet. A sill of granite rock lies in the foot-wall and limey schist and limestone lie in the hanging-wall.*

In the summer of 1942 scheelite and tin were found by a Department of Mine's Engineer, in Incomappleux River, at the mouth of McDougall Creek and also at the junction of the 3rd creek flowing into McDougall Creek from the west. Bert Oakey accompanied this engineer.

LUCKY BOY** This group consists of a number of Crown-granted and located claims held by C. H. Tillen of Trout Lake and Lethbridge. Six Crown-granted claims and two located claims constituting the original Lucky Boy group are held by Tillen on lease and bond from George Yuill of Trout Lake. The Horseshoe adjoins the Lucky Boy on the west and is owned by Lance Hillman of Ashcroft.

The property, due west of Trout Lake, is reached by 3 1/2 miles of pack-horse trail on an easy grade. It is at an elevation of 4,500 feet on the north-westerly facing slope of Trout Mountain. The mountain slope is deeply covered with overburden and supports a heavy growth of timber. Camp consists of three buildings adequate for 6 men. Water is obtained from a small spring 1,000 feet away.

The property was worked originally for silver-lead ore. Prior to 1906, 400 tons of sorted ore was shipped assaying: silver, 200 to 300 oz. per ton; lead, 20 to 35 per cent. In 1912, after six years of inactivity, 28 tons, assaying about the same, was shipped.

The vein strikes slightly north of east, dips 20 to 30 degrees southward and crosses the steeply north-dipping formation almost at right angles. The host rock is predominantly schist, but on the lowest level a bed of limestone forms the walls. The vein ranges from 6 inches to 6 feet in width and throughout probably averages between 1 foot and 2 feet. The gangue is white drusy quartz; sulphide mineralization consists of galena, tetrahedrite, sphalerite, chalcopyrite and pyrite; a little native silver occurs locally. Scheelite is present in the vein in small grains and masses up to several square inches in area.

The vein was traced on the surface for about 500 feet by several open cuts and two old caved adits. The underground working on the Lucky Boy is an incline shaft close to the Horseshoe line sunk on the dip of the vein for 190 feet. From it three levels have been driven as drifts on the vein at distances of 65, 85 and 155 feet respectively from the collar of the shaft.

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* H. L. Hill, personal communication

** Report by S. S. Holland, British Columbia Department of Mines.

The highest, No. 1, level is driven westerly from the shaft and a small stope put in above it. The vein as exposed is narrow and contains little sulphide. There is little or no scheelite in the vein on this level.

The No. 2 level was driven east and west from the shaft; the east drift, for a distance of 230 feet with several short raises up the dip; the west drift for 120 feet and most of the ground up to No. 1 level was stoped. At 57 feet from the shaft scheelite mineralization is present in the remaining pillars along the drift and extends westerly for about 40 feet. It shows in the backfill in a raise 85 feet west, and on the west side of a second raise 100 feet west of the shaft. The scheelite mineralization makes an attractive display on the west side of this raise from 5 to 14 feet up from the level. Four samples in this section averaged 3.67 per cent tungstic oxide across an average width of 29 inches.

On the lowest level, No. 3, a drift has been driven east for 130 feet and a raise put through to No. 2 level but most of the vein remains unmined. At the corner of the shaft and the No. 3 level scheelite mineralization extends 23 feet east on both walls of the drift on the No. 3 level and extends 30 feet up the shaft from the bottom level. Six samples from the No. 3 level east of the corner averaged 0.41 per cent tungstic oxide across 33 inches and seven samples up the shaft on the east wall for 30 feet averaged 0.63 per cent tungstic oxide across 35 inches.

No. 3 level is driven 140 feet west of the shaft and most of the vein up to No. 2 level has been explored or mined. Scheelite occurs in the vein in a raise 70 feet west of the shaft as well as in pillars and unmined vein between No. 2 and No. 3 levels. There is no scheelite in No. 3 level in the west end.

Scheelite also occurs in the same vein on the Horseshoe claim in a surface exposure between the two shafts, also along the wall of the eastermost shaft and for a length of 12 feet in a drift driven east from the same shaft.

The distribution of the scheelite mineralization falls within the limits of a shoot raking eastward from the surface exposure on the Horseshoe through the raise on the west end of No. 2 level to the area between No. 2 and No. 3 levels. The exposure of scheelite on the east side at the intersection of the shaft and No. 3 level appears to be separated by a barren section suggesting that it is the apex of another shoot. No faulting was observed that would displace the vein were it part of the same shoot.

There is no development below the No. 3 level. At that depth the vein fracture crosses a limestone bed but its persistence through, and mineralization within the limestone are not proven by the present workings.

Most of the scheelite-bearing shoot was mined in the course of the earlier work. There is about 4,000 tons of material on the dump which at the time of examination (September 20, 1942) was being sorted at night under an ultra-violet light for scheelite. Up to that time 25 tons of ore had been sorted and sacked for shipment. A grab sample of the rough sorted ore assayed 1.41 per cent tungstic oxide and 0.63 per cent phosphorous. In spite of the fact that much of the scheelite-bearing vein has been mined it is estimated that above the third level there is possibly 200 tons in pillars and unmined sections of the vein, an unknown but small amount of broken material as backfill in stopes, and an unknown tonnage (possibly 100 tons or more) in the section west of the high-grade spot on the westermost raise on the second level and extending to the Horseshoe workings.

The complete extraction of the underground material is probably impossible owing to the poor condition of the workings and not economic owing to the amount of rehabilitation work necessary. However, several underground sections which could be reached easily and safely could produce a small tonnage of scheelite ore.

For further references to this property see The Annual Report, Minister of Mines, British Columbia, 1914, p. 317, 1933, p. 216; and Geol. Surv. of Canada, Mem. 161, p. 83.

NELSON AREA*

The Nelson area as used in this report includes the region between Kootenay Lake and the Arrow Lakes, north of the International Boundary. It includes the Slocan, Sheep Creek, Nelson, Rossland mining areas, and is well served by roads and by the Kettle Valley Branch of the Canadian Pacific Railway.

There has been no tungsten production from the area to date but the Emerald mine, discovered in 1942, will be in production in the spring of 1943 and other recent discoveries are in process of development. Scheelite has been known for years to occur in many of the gold-quartz veins but there has been no production, either as scheelite ore or as a by-product from gold-mining. In addition to scheelite, tungstite was encountered in gold ore from the Reno mine during the course of early milling operations and small quantities of wolframite occur in other gold-quartz properties in the Sheep Creek camp.

Scheelite occurs in the quartz veins as scattered grains and in stringers, lenses and pods. The largest known shoot, in the Venango vein, is reported to have contained an estimated several tons of relatively massive scheelite, but this was shipped as gold

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* Report on the Nelson area, excepting section on minor occurrences, by M. S. Hedley, British Columbia Department of Mines.