

REPORT OF MINISTER OF MINES

1917

It is interesting to note that Dr. George M. Dawson, in the Reports of Progress published by the Geological Survey of Canada for 1876-1877, refers to the fact that Copper Ore had been discovered in the mountains in this vicinity in the following language: "The most Promising locality at present is situated among the mountains between Howe Sound and Jervis Inlet at a height of about 3000 feet above sea level. Very fine specimens of purple copper ore, associated with quartz, mica and molybdenite are brought from this place, which is now in course of development. The country rock is granite or diorite of the Cascade Crystalline Series".

In the Annual Report, Vol. 3 Part 2. of the Geological Survey for 1877 - 1888, Dr. Dawson again refers to the occurrence of copper ore in this section, as follows: "In the vicinity of the coast the copper deposit which has received most notice is situated at the head of Salmon Arm of Jervis Inlet and between that Inlet and Howe Sound. This is owned by the Howe Copper Mining Company. The ore is chiefly bornite or purple copper ore and the deposit is not far from the coast, but at an elevation of 3,000 feet above sea level. It was discovered about 1874 and was worked at intervals between the years 1877 - 83, though rather with the view of developing the property than for the actual extraction of the ore for shipment. Three levels have been driven on the veins which are reported to be from 2 feet 6 inches in width to three feet 6 inches.

Assays have shown 50 oz. of silver to the ton and 58% copper. An assay of an average specimen in the laboratory of the Geological Survey showed 40% copper. The veins traverse granite rocks like those generally met with in the Coast Range."

COPY OF REPORT OF DOMINION GOVERNMENT GEOLOGICAL SURVEY

This property is situated about three miles inland from the east side of the head of Salmon Arm, and is at an elevation of 4,500 feet above the sea. It was first located in 1878 and was reported on at that time by Mr. R. B. Harper for the Provincial Government. The original locations have recently been increased to eighteen claims, which cover all the known outcrops on and around Mount Donaldson.

The country rock is granite, and the ore occurs in fissure veins. They are nine in number, one of which has been traced along the strike for 500 feet. The veins are parallel and strike east and west with dip of 65 degrees to the north. On the surface they vary in width from three to twenty-five inches. The extreme veins are 1000 feet from each other. Five hundred feet below the main outcrops a tunnel was driven on the main vein for thirty feet. This vein is three and three quarters feet wide on the roof, and four and a sixth feet wide at the floor. The ore is massive bornite with a little chalcocite and cuprite in quartz gangue.

An assay of the massive ore made by Mr. J. O'Sullivan gave 0.4 oz. of Gold, 35 oz. of Silver, and 53 per cent Copper.

The property is about 65 miles from Vancouver by way of Sechelt. The country is rugged, but the veins on development prove extensive ore bodies, an aerial tram line could be built from the Mine to Salmon Arm, whence the transportation to the smelter offers no difficulties.

Dr. O. E. LeRoy
DOMINION GOVERNMENT MINING ENGINEER.

MOUNT DONALDSON COPPER & SILVER
SALMON ARM, JERVIS INLET, B. C.

EXTRACT FROM THE REPORT OF THE MINISTER OF MINES

FOR BRITISH COLUMBIA

1874

Copper ore, in situ, has been found in various parts of the Province, notably at the entrance of Howe Sound. Here a well defined lead of excellent copper pyrites, giving some 30 per cent of Copper was discovered in 1865, and worked for some time, with excellent prospects of success. Want of capital has caused the operation to be suspended, if not abandoned.

John Ash,
Provincial Secretary &
Minister of Mines.

FROM REPORT OF 1876

An important discovery of copper was made two years ago on Salmon Arm, a branch of Jervis Inlet, by Mr. Alexander Donaldson. Competent judges have declared the lode to be a true fissure vein, for the following reasons:

The blossom of quartz on the surface or hat of the lode indicates that the matter has been injected into the fissure and not separated from the mass of adjacent formation by chemical action as in the case of a separated vein; also the smoothness of the walls showing attrition by injection of the solutions.

The profile of the lode can be examined to a depth of 200 feet from the surface, as it crops out in the face of the cliff, having doubtless been laid bare by some convulsion of nature. The lead is thus clearly defined from the base of the precipice to the top and may still further be traced along the surface of the ground for at least a mile from where it first makes its appearance. The vein is wedge shaped, being thickest at its base, where the ore is also the richest.

A company has been organized for the purpose of working this extensive deposit and a test tunnel has been run into the hill for about 30 feet on the vein. At the end of the tunnel the seam or vein of mineral is 3 feet 9 inches at the roof and 4 feet 2 inches at the base. Assays of the ore show that it contains 61 per cent Copper; 91 ounces of Silver to the ton.

The Mine is situated about 2 and one half miles from the shore of the Inlet, and the facilities for shipping ore are excellent. The water is deep enough along the side of the rocks to float a vessel of 4,000 tons. Experienced quartz miners from California, Nevada and Cornwall have pronounced the Mine the richest they have ever seen, the ore being so easily got out, and wood for smelting purposes being plentiful and convenient. There is also good water power on the ground, sufficient to run a mill of any capacity.

C. C. Elliot
Provincial Secretary & Minister of Mines

To The Honourable,
The Minister of Mines.

Sir:

I have the honour to inform you that, in pursuance of instructions received by me, I proceeded to visit and inspect the Howe Sound Copper and Silver Mine, and beg to report as follows:

In consequence of a considerable depth of snow on the summit of the mountain where the mine is situated, I was not able to follow the lode continuously for any great distance, but on the south-east side there was about three hundred feet of the lode exposed. I examined it and found it to be about two and one half feet wide, running nearly east and west. The lode, which I pronounce to be a true fissure vein, has a perpendicular foot wall. There are stringers further south which, at a lower level, will run into the lode.

The ore is of a rich character, made up of what are known as Peacock and Grey Ore and Oxide of Copper. It carries also a large percentage of Silver. It is the richest ore of this character I have seen on this Coast or in England.

The formation is granite. In Cornwall, England, the richest copper mines are in granite. In Nevada the richest silver mines, with the exception of the Comstock, are in granite. I firmly believe that the lode will, at a great depth from the surface, prove to be richer in silver than in copper. I can, with confidence recommend it to mining capitalists.

I beg to inform you that there is no road to the Mine, which, is in consequence, at present difficult of access. I would recommend that a competent person be sent to examine the country between the Mine and the salt water, with a view to laying out a road in the most eligible location. Not only may the Mine I have made particular reference to be thus opened, but that the ground on the east and west may be worked also.

I believe, in time, the country between Howe Sound and Jervis Inlet will be a great mining district.

(signed) R. B. Harper,
Government Mining Engineer.

REPORT OF MR. JOSIAH JAQUES

The Mine is situated between Howe Sound and Jervis Inlet at an altitude of 4,500 feet above sea level.

There is plenty of good timber at and below No. 7 tunnel. All along the mountain there are a number of small veins crossing ridges running east and west dipping north about 65 degrees.

The side of the mountain looking N.E. is very steep; it is cut up by 9 or 10 ravines each of them containing one or more mineral veins, from one to 27 inches wide.

There is a belt of porphery 600 feet wide on north side of vein which does not show itself on opposite side of Lake.

There are large bodies of quartz, 200 feet across, on north side of vein. Also on top 200 feet above tunnel. This vein can be reached 500 feet lower by driving from No. 7 tunnel, toward which it is dipping, where I think a large body of ore will be found.

The direction of mineral belt is N.W. and S.E. in which direction ore has been picked up for a distance of from 2 to 3 miles. The country rock from Burrard Inlet is granite of different kinds.

Josiah Jaques

February 27, 1881.

EXTRACTS OF A MINING REPORT ON THE MOUNT DONALDSON COPPER & SILVER
MINING PROPERTY SITUATED AT THE HEAD OF SALMON ARM, SECHELT INLET,
B.C.

by

ROLAND CAMPBELL CAMPBELL-JOHNSTON
MINING AND METALLURGICAL ENGINEER

Vancouver, B.C.

October 27th, 1916.

SITUATION OF MINE

AND TRANSPORTATION: The property lies in longitude 123-30', West of Greenwich, by latitude 49-45' North of the equator. The magnetic variation of the compass is 25-15' East of Astronomical or true north. As the Mine is near deep water, carriage of ore or refined metals out from the Mine, and supplies in, present no difficulties. As heavy material can be brought to the head of Salmon Arm without breaking bulk by ship or scow through Jarvis Inlet and down Sechelt Inlet up to the head of Salmon Arm. From the Mine to the Lake, and from the lake to salt water offers no engineering or expensive difficulties to overcome, the distance from the mouth of Copper Creek down the lakes roughly six miles.

WORK DONE: Work was first concentrated in a tunnel eighty (80) feet long started from the shore of a small lake, 4500 feet about in elevation above sea level. The whole cap, for many hundred feet down of Mount Donaldson is closely speckled with spots and splashes, in green and brown stains of copper ore, although the granite altered and silicified into Syenite and other forms, and further into a quartzite through the excessive solutions caused by cooling of the molten magma, focussing to this outlet at the summit under extreme pressure, and therefore pouring over under the caprock of the over-lying uplifted sedimentary strata. For this reason at this particular point the mineral bearing quartz gives the examining engineer no direct clue as to the normal strike and dip of the mineral bearing fissure veins. The same tunnel shows copper as bornite and also chalcopyrites; molybdenite; copper oxide as cuprite; cobalt bloom as a rose oxide and crystals of quartz, spa, and tourmalines. The outside of the copper and other lenses are heavily coated to over an inch thick mostly with crystallized flakes of moscovite (potash mica) leading to the conclusion that the ore in its deposition replaced the mica solution. The strike of the tunnel is east and west along the fissure with a dip to the south.

CHARACTER OF
THE ORE:

The character of the ore so far exposed is bornite in lenses

ASSAYS

By reading the attached certificates of assays of the five (5) hand samples taken of shipping ore, but representing no tonnage in any way as yet blocked out, from the different locations marked on the map, yet proving mineralization from the dividing ridges between Mount Donaldson and Mount Sayward, by aneroid reading 5200 feet above sea level to 3000 feet down the slope to Copper Creek, showing a width of area amounting to at least a mile across laterally, fissured by eight known veins. These samples vary in copper contents from 51 to 64 per cent, an abnormally rich tenor of copper averaging from the five (5) assays given, nearly fifty-nine per cent (59%). The gold contents of forty cents (40¢) per ton was constant, corresponding to surrounding mines, while in bulk when concentrated in the furnace into blister copper anodes of ninety-nine per cent (99%) copper tenor, will help towards defraying the fixed charges to be deducted from the cost of production.

The Silver contents vary from nine and seven tenths ounces per ton to twenty-seven and three quarter ounces, averaging among the five samples taken nearly twenty (20) ounces per ton.

The prorata between copper and silver percentages in ounces cannot yet be correctly ascertained till the real carriers of the silver becomes known, and the effects in weathering of surface influences are overcome by driving the tunnels deeper into the mountain.

The exact commercial value of the ore is carried out in extenso from the assay certificate under the heading of "average values".

The occurrence of the copper ore is a replacement of muscovite (potash mica) by copper, since both the hanging and foot walls carry a considerable seam of small plates of mica along the flanks of the pegmatite dykes, cutting the normal country rock, this consisting of micaceous granite. These dykes of pegmatite quartz dykes are from a few inches as bands to over a hundred (100) feet in width.

A tunnel, now 80 feet long was driven from the shore of a small lake (Smythe Lake) 4500 feet about in elevation above sea level. Sample one (1) representing shipping ore, as a hand sample from the tunnel, but not typical of any commercial ore properly blocked out into definite tonnage, gave the following:

Copper 51.11% - - Gold .02 oz.
Silver 9 7/10 oz. Gross value \$293.21

At an elevation still higher than this tunnel, of 5200 feet above sea level, a long open cut four (4) feet wide, in a direction along the true trend of the fissure of N. 80 E and S 80 W and sloping down the true dip, namely to north; at an angle here of thirty (30) degrees from the horizon, has been dug for 150 feet along its course and for six (6) feet on the dip. This cut lies on the dividing ridge between Siwach Creek basin and that of Copper Creek, halfway between Mts. Donaldson and Sayward. Sample two (2) taken here, typical however of only lenses of bornite, and not of any considerable tonnage of commercial ore blocked out, gave the following.

Copper 62.15% Gold .020 oz.
Silver 15.74 oz. Gross value \$359.15

Again another open cut is started on a similar fissure vein on the same dividing ridge, only a few hundred feet north-west of the first one, and nearer to Mt. Sayward. This is just a small outcrop about a foot wide of well mineralized rock running nearly parallel to the first one, only having a slightly steeper pitch of N. 55'

Sample four (4) taken from here as a hand sample only, gave the following:

Copper 61.90% - Gold .02 oz;
Silver 27.70 ozs; Gross value \$375.87

Returning now easterly from the mountain side toward the head of Copper Creek Valley, directly below the Lake having the eighty (80) foot tunnel, but at an elevation of 1000 feet lower down is a tunnel driven 160 feet into the mountain easterly, along a fissure running east and west, with a dip to the north. Sample three (3) taken as a hand sample from this tunnel gave the following:

Copper 55.57%; Gold .02 oz;
Silver 27.75 ozs; Gross value \$330.46
per ton.

Next at an elevation of 3000 feet below the outcrops uncovered along the divide, and on one of these identical fissures mentioned as being opened there, or a similar one close by or parallel thereto, an opening has been made to prove that they go to depth, and that their characteristics have not changed as they descend. The strike and dip in this working resemble the big cut above giving N. 80' E. by S. 80' W. and dip N. 30'. This opening has proven that in this short distance down the mountain side this fissure had widened to feet where inches first ruled.

Sample five (5), a hand sample taken from this opening gave results as follows:

Copper 64.20% - Gold .02 oz;
Silver 18.00 ounces
Gross value \$372.16 per ton.

The highest percentage of Copper than any
so far found beneath the top of the mountain.

All the workings now mentioned represent those points where the most active attack has been made in the way of development work. However eight (8) distinct parallel fissures were carefully examined along the mountain side, both on the lower part and also below Lot 353.

To the north-west in a precipitous gully traversing the "Mary" and other mineral claims, passing down the whole mountain side to Copper Creek is exposed an immense quartz fissure vein, measuring across more than one hundred feet between foot and hanging walls, while still dipping northerly. The pegmatite mica lenses are plentifully lying all along the gully as float rock, clearly indicating the same characteristics in features as belong to the smaller veins; and bornite float as well as been found along the gully.

Standing in the bed of Copper Creek while looking up along the bare cliffs comprising the property, it plainly revealed to those who study such matters, these large quartz veins are parent stems, while the little ones are branches shooting out, beginning at very deep levels. Their angles of dip are different in each case, and the cliffs show their general conjunction, so that their common origin is unmistakable.

To open this property to its best advantage, an attack should first be made on the big quartz vein, as near Copper Creek as possible but above the talus, preferably on the (Luck Jack claim active development by tunneling for several hundred feet with occasional cross cutting should tell the tale of the ore and amply justify the careful comparison made and the sifting of evidence completed.

CERTIFICATES OF ASSAYS - - - 5 Samples of Ore

<u>SAMPLE</u>	<u>GOLD</u>	<u>SILVER</u>	<u>COPPER</u>
1.	0.02 oz.	9.70 oz.	51.11 per cent
2.	0.02 oz.	15.75 oz.	62.15 " "
3.	0.02 oz.	27.75 oz.	55.57 " "
4.	0.02 oz.	27.70 oz.	61.90 " "
5.	0.02 oz.	18.60 oz.	64.20 " "

For Mr. R. C. Campbell-Johnston

October 14th, 1916.

P. W. Thomas, For Estate of

J. O'Sullivan, F.C.S.

London

COPIES OF ASSAY REPORTS

State Assay Office,
San Francisco,
January 10th, 1877

No. 3391
W. H. Herriks Esq.

Sir:

Sample No. Mark 1 Sk. Copper Ore "Howe Sound"	
Assayed: Moisture	None
Copper	34.40 per cent
Silver per ton	19.32 ozs.
Gold	Traces

(Signed) Falkenau & Reese

Henry Bath & Son
Swansea & Liverpool
Assay of Samples of Howe Sound Ore.

Copper	36 per cent
Silver	10 $\frac{1}{2}$ ozs. per ton

The Copper is worth about 12 s. 3 d. per unit, or 17-3/4 per ton cwts. delivered. The ore if crushed and dressed would be very similar to the "Cape" ore, and some of the pieces would range from 40 to 60 per cent Copper.

Huhn & Luckhardt Metallurgical Works,
San Francisco, California.

- Sample No. 1 - Gave \$95.67 in Silver and 58.4 per cent in Copper
Value per ton Frisco \$217. 14
- Sample No. 2 - Gave \$43.98 in Silver and 51.1 per cent in Copper
Value per ton Frisco \$179.53
- Sample No. 3 - Gave \$23.56 in Silver and 14.62 per cent in Copper
Value per ton Frisco \$44.00

MINISTER OF MINES REPORT FOR BRITISH COLUMBIA YEAR 1876.

At the end of a 30 foot tunnel driven on the vein of mineral 3 feet 9 inches at the roof and 4 feet 2 inches at base gave:

Copper	60 per cent to the ton
Silver	91 ozs. to the ton.

Dr. G. M. Dawson in his Geological Survey for 1887 - 1888 reports three levels being driven on veins from 2 feet 6 inches in width, to 3 feet 6 inches. Assays have shown:

Copper	- 58 per cent to the ton
Silver	- 50 ozs. to the ton

Assay of average specimen gave Copper - 40 per cent to the ton

Dr. O. E. LeRoy (Mining Engineer for Dominion Government).

Assayed by J. O'Sullivan gave:

Gold - 0.04 ozs. to the ton
Silver - 35.00 ozs. per ton
Copper - 43 per cent (wet)

Sample assayed by J. R. Williams & Son of Vancouver, B. C.

Gave:	Gold	- 0.10 oz. per ton - value	\$3.80
	Silver	- 18.0 oz. per ton - value	14.40
	Copper	- 49.80% per ton - value	<u>219.12</u>
		Total value	\$237.32
