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Cooper Drabble, M.C.I.M.M.

305 Bank of Nova Scotia Building,
Vancouver, B.C.

10th Feb. 1928.

The Ladysmith Tidewater Smelters, Ltd.,
Pemberton Building,
Victoria, B.C.

Gentlemen:

I am forwarding the enclosed reports on three copper prospects, in which I am interested as part owner and agent, and trust you may find one or more of them sufficiently promising to consider further.

The Gun Creek deposit is handicapped by the distance from transportation, but you will note that if the great extent of the mineralized zones should prove to be ore of commercial grade, this factor would be of relatively minor importance, in view of the very large tonnage available. The fair silver values with a little gold are considered encouraging, while it may be suggested that the copper values are at least a very promising indication of ore, when it is considered that the surface rock is very highly oxidised and leached. The consistent fracturing of the zones would also suggest secondary enrichment at comparatively shallow depth. This is also suggested by the re-crystallization observable in the open vugs, which occur in the fractures at the bluffs about 500 feet up the face of the mountain, above the talus slope shown on the enclosed photo.

The property should perhaps be considered as a possible future reserve and from this point of view it might be a good business proposition to do sufficient drilling to prove it and if the results were sufficiently favorable, to Crown-grant it and so hold it as a definite reserve.

At the Boulder Creek deposits the main features are the width, persistence and heavy mineralization of the shear zones, which could easily be tested by drilling a few holes between the zones, and the lake shore at about 45 degrees into the hillside. The Britannia Co. have taken over the group of claims B.B. at the head of the lake adjoining the "Lake Group" to the south, and are now drilling the zone there.

Transportation facilities and the possibilities of large tonnage make this deposit attractive.

At the Owl Creek property several zones of 5% ore have been proved, upwards of five feet wide, as described in the report, in the vicinity of the tunnel; while the copper mineralization at other points in the porphyry looks most promising, notably in the creek bed at the dam site, about 800 yards below the tunnel, and also at a bluff on the west side of the creek upstream from the tunnel.

The heavy talus covering the slopes of the mountain, effectually covers the contacts where the best mineralization would be expected. By drilling two holes, to the east and west, 1000 to 2000 feet in length to cross-cut the contacts, at sufficient angle

to also explore the oxidation horizon, much valuable information would be obtained at comparatively small cost, probably enough to justify extensive development operations.

Will you kindly let me know on what lines your subsidiary development Co. proposes to operate as I have a number of prospects which might possibly be of interest to you. Perhaps I should explain that my business is to specialize in the examination of prospects with the object of acquiring an interest in anything of merit, and endeavouring to promote the early development by means of small syndicates, my ultimate object being to interest the larger operating companies or other financial groups in such properties. In this work I have spent upwards of 60 months in exploration and "scouting" during the past fifteen years, in the following areas:

between Lillooet and Chilco Lakes, east of the Coast range;
in the south Thompson valley;
the Tulameen district;
the Lillooet district;
north west of Barkerville on the head-waters of the Willow and Bear rivers;
Vancouver Island and main coast inlets, etc.

With regard to the Gun Creek property I may say that through Mr. Wayne Darlington, of New York, (to whom I originally reported on it) examination was made by Jas. Phillips, Jr. the Federal M.& S.Co. and the Anaconda Co. in 1917 to 1920. The reports were in each case favourable, but transportation difficulties proved too great a handicap. An option was taken later by Mr. A.B.Trites but was dropped without any work being done.

In 1917 I succeeded in interesting Mr. Gaskill (engineer for Jas. Phillips, Jr.) in the Owl Creek property and an option was taken up by him for his Principal, but annulled before the date work was to have commenced owing to disagreement between Mr. Darlington and Mr. Phillips in New York for reasons which are explainable.

The enclosed reports are for my personal use only and I shall therefore be obliged if you will kindly regard them as private.

Yours truly,

"Cooper Drabble."

THE GUN CREEK COPPER MOUNTAIN PROPERTY,

LILLOOET MINING DIVISION, B. C.

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Location:

The property is situated on Copper Creek at an elevation of 6700 feet above sea level, 1½ miles southeast of Green Lake, which lies at an altitude of 5400 ft. in the main valley of Gun Creek, about 22 miles north of the Bridge River wagon road.

Access:

Access to the property is obtained from Bridge River station at the 104 mile post on the Pacific Great Eastern Railway, by means of a wagon road over Mission Mountain to the mouth of Gun Creek, a distance of 30 miles and thence by trail, passing Pearson Ponds and up the east side of the creek to Green lake.

The altitude of the railway is 820 feet and the Mission Mountain pass 3900 feet. North of the mountain the road follows approximately the 2100 and 2200 foot contours to Gun Creek.

This part of the valley will be converted into a lake 21 miles long by the proposed storage dam of the B.C.Electric Company's contemplated power development at Mission Mountain .

The trail up the creek was built by the Provincial Government some years ago to provide access to the property. It is located on a wagon road grade and can be widened at comparatively small cost to permit the transportation of drilling machinery or other light plant.

A summary of distances and altitudes is given below:

	Distance	Altitude
Bridge River Station	-	820
Mission Mountain Pass	5	3900
Bridge over River north of mountain	9	2100
Road at mouth of Gun Creek	30	2200
Forks of Gun Creek	42	3800
Green Lake	53	5300
Basin of Copper Creek	54	6700

The trail leaves the main valley and crosses the head of Trigger Lake about two miles south of Green Lake following the west side of the valley here up to Copper Creek.

Physical Features;

The elevated lateral valley of Copper Creek in which the claims are located, is enclosed by a chain of peaks rising to 8000 feet altitude on the east, south and west sides, the creek flowing northerly into Green Lake.

The upper part of this valley is a bare, basin-like depression, devoid of timber, but more or less covered with talus from the steep slopes of the surrounding mountains, the formations, however, being fairly well exposed around the upper edge of the talus and where

cut by the creek.

Copper Mountain is situated on the southeast side of this basin with a vertical relief of about 1300 feet above the valley floor, the altitude of the latter being 6700 feet or 1300 feet above Green Lake.

Beyond the head of the creek to the south the neighbouring peaks project through the permanent snowfields.

Geology and mineralization:

The contact of the Coast Range granodiorite batholith with the volcanic and sedimentary rocks of the Lower Cretaceous follows a northwesterly course from the Forks of Gun Creek and is plainly evidenced by the belts of highly oxidized and red-stained rocks in the mountains bordering the valley to the west.

The upper part of the basin of Copper Creek valley lies in the granodiorite batholith, which is intrusive into the stratified volcanic and sedimentary rocks exposed in the lower part of the valley, the irregular line of contact striking roughly east and west about one mile south of Green Lake.

A later intrusion of diorite porphyry along the line of contact occurs as a belt about 1000 feet wide across the central area of the Basin and cuts through the ridge of the mountains to the west.

The diorite porphyry is intrusive into the granodiorite and is probably the origin of the later stage of the mineralization of the latter.

A factor of considerable economic importance is the occurrence of inclusions of crystals of Chalcopyrite in the quartz matrix of the granodiorite, suggesting a primary stage of mineralization prior to that accompanying the intrusion of the diorite porphyry.

The mineralization of the deposits occurs in a number of fractured zones which radiate outwards from the central mass of the diorite porphyry.

The principal fracture zone (a) occurs as an area of mineralization upwards of 600 feet wide and 2000 feet long in the granodiorite, striking about 15 deg. east of south from the diorite prophyry diagonally up the face of the mountain. From this main zone a branch about 200 ft. wide extends towards the south-east for several hundred feet where it is covered with slide rock and talus from the slopes of the mountain.

The B zone, about $\frac{1}{2}$ mile to the north of the mountain, is from 100 to 120 feet wide and is traceable for a length of 500 to 600 feet, striking S.E. in the granodiorite.

The C zone occurs in the diorite porphyry, cutting across the ridge of the mountains on the west side of the valley. It is about 140 feet wide and can be tranced for about 700 feet striking W.10°S. It is well exposed on the ridge at an elevation of 7400 feet and down the slope of the mountain into the adjoining valley to the west.

A number of other mineralized fracture zones have been discovered, but prospecting is rendered difficult by the excessive amount of talus covering the valley floor and the lower slopes of the mountains.

A well defined ledge of quartz outcrops up the hillside just north of the porphyry intrusion, on the west side of the valley. This ledge is 100 to 110 feet wide, striking W.15° S. and dips to the S.E.It can be followed over the ridge and down the steep slope of the mountain into the adjoining valley to the west.

West of the ridge a considerable mass of arsenical pyrites has been exposed which assayed 80¢ in gold where sampled.

North of the diorite porphyry intrusion the valley falls steeply to Green Lake, the grade in places exceeding 50%, the difference in elevation being about 1000 feet in a distance of about 4,000 feet, This part of the valley is well covered with talus and drift material and is difficult to prospect. For this reason it is not known whether mineralization also occurs in the stratified volcanic rocks to the north of the intrusion as would appear probable.

The principal fracture zone A is well exposed across the bluffs on the face of Copper Mountain for a height of about 1000 feet above the valley floor and a distance of 1000 to 1200 feet from the upper edge of the talus.

The extreme fracturing and brecciation of the granodiorite is well seen here and also the peculiar nodular structure which has been developed in the upper 300 to 400 feet of the mineralized zone. The lines of fracture along the zones are filled with quartz and calcite carrying pyrite, chalcopyrite and some magnetite, while the intervening more solid phases of the rock also carry both pyrite and chalcopyrite crystals in the quartz matrix as noted above.

The mountain face above the bluffs has the appearance of a massive conglomerate due to the inclusion of numerous nodules or spheres in a matrix of the altered granodiorite.

These nodules are spherical in shape, from 1 to 3 feet in diameter and of concretationary structure, being made up of successive layers of rock from 1 to 3 inches thich, with thin laminations of iron and copper sulphides between them.

From the region of the lower bluffs and upwards some of the fractures have not been completely filled and crystals, both of the gangue and included minerals have been formed in the open vugs.

The top of the mountain is capped with a layer of granoriorite of a distinctive grey colour about 200 feet thick, which apparently defines the vertical limit of the mineralization here. This would appear to be confirmed by the unfilled fractures referred to several hundred feet below it.

The nodular structure is not observable in the other zones, but with this exception the nature of the mineralization is the same, i.e. radial zones of fracture, caused by the intrusion of the diorite

porphyry on the contact, along which the mineralizing solutions were injected, together with some primary mineralization of the granodiorite prior to the intrusion,

Assays and Values:

The deposits are essentially of the low grade type with surface mineralization covering large areas.

The highly oxidized nature of the fractured and altered granoridoite, with excessive leaching of the copper sulphides is a notable feature, expecially on the flatter slopes of the zones.

In places less subject to weathering agencies on the steeper slopes, where tranching or open cut work has been done, a considerable amount of carbonates may be seen.

In view of this excessive leaching, surface sampling cannot be expected to give more than an indication of the values of the zones at depth. For the same reason a horizon of secondary enrichment might be expected at the oxidation level.

A further consideration of a theoretical nature, which may, however, have some connection with the economic possibilities of the deposits, is the occurrence of a high grade chalcopyrite in the fracture seams of zone A, on the steel bluffs of the mountain, at the extreme distance of mineralization observable, viz., 2500 feet from the intrusive porphyry. This consideration suggests the probability of similar ore occurring at depth in intermediate regions of the zone.

A selected sample of this chalcopyrite gave the following values: Gold 0.48 oz. Silver 67.20 oz. Copper 31.05%.

The following assays were obtained from selected samples of ore, taken from open cuts on the bluffs of zone A, to ascertain the relative gold and silver values per unit per cent of copper:

Sample No.	Gold Oz. per ton	Silver Oz.per ton	Copper %
1. Selected Ore	0.02	3.50	3.00
2 do	0.05	6.00	18.25
3 do	0.02	3.10	6.20
4 do	0.01	1.38	2.80
5 do	0.02	2.30	5.45
6 do	0.01	1.20	1.38

Independent sampling by the late C. S. Verril in the presence of the writer gave the following average results:

Averages of 6 samples taken over widths of 20 to 100 feet.

	Au..	Ag.	Cu.
From -	Trace	0.20¢	0.15%
To -	40¢	0.95¢	1.60%

A sample taken by the writer across 200 ft. of open cut work on the face of the bluffs on zone A gave the following values.

values:

Au.	Ag.	Cu.
0.02 oz.	1.80 oz	0.80%

A sample taken by R. W. Thompson, Provincial Resident Engineer for the district across 6 feet assayed as follows:

Trace	Trace	0.50%

Many other assays have been made from samples of ore but the above will suffice to give an approxinate idea of the values which may be expected by sampling the leached surface exposures of the deposits.

The development work done on the deposits, apart from trails, cabins, etc. has been confined to open cut trenching.

A cut was made about 700 feet long across the face of the bluffs on zone A, 3 to 5 feet wide in the base, which exposed some good ore in and adjacent to the fractures, from which samples No. 1 to 6 above were taken.

Similar trenches have been cut across zones B. and C. exposing ore over widths of 100 to 130 feet. Also across 110 feet of the quartz ledge on the west side of the valley which shows no sign of mineralization here, though on the west side of the ridge it carries much arsenical iron assaying about 80¢ in gold.

General remarks:

The deposits were examined by Camsell in 1918 (See Summary Report of the Geological Survey for that year, page 25 B) who gives his conclusions as follows:

> "The commercial value of these deposits as a source of copper has yet to be determined, and can only be determined by a great deal of development work. This must necessarily be an expensive undertaking owing to the distance at which the deposits are situated from the railway, and the lack of a good road over which to transport machinery and supplies. The nature of the deposits and large area over which sulphide mineralization extends would suggest the possibility that a large, low grade copper deposit might be developed which could stand the heavy expenses that must be incurred before the stage of actual production is reached." (Page 28-B).

In view of the pronounced surface leaching it is evident that the average value of the deposits can only be obtained by systematic drilling of the zones. The obvious method of working the property would be by the "glory hole" system with a main haulage tunnel from a mill situated on the south side of Green Lake, about 7000 feet long, which would tap the deposits at an elevation of about 5500 feet, or from 1200 to 1800 feet below the surface exposures For this reason deep holes would be desirable.

From a rough reconnaisance made by the writer it was concluded that a railway could be built from Green Lake down to the Bridge River valley on a 1.75% grade by keeping above the canyon below the Forks of Gun Creek and thence to the 2300 contour at the mouth

of Tyaughton Creek. From this point to connection with the P.G.E.Ry. about 3 miles below the mouth of the Bridge River, a water grade can be maintained. The total distance would be about 80 miles, and the cost of construction around $6,000,000.

The Hydro-electric power development of the B.C. Electric Company at Mission Mountain, which is now in hand would provide power both for the mine and railway,giveing the most economic operation of the latter, as the power is centrally situated on the route of the railway.

The distance from transportation is an adverse factor, but if the deposits should prove to be ore of commercial grade, this would be a matter of relatively minor consideration owing to the magnitude of the deposits and the facility with which they could be worked.

"COOPER DRABBLE,"M.C.I.M.M.

June, 1927.

G U N C R E E K

The writer describes a wide brecciated zone 600 ft. wide and 2000 ft. long lying between elevation of 6600 and 7400 ft. in which the mineralization is principally distributed along the fracture planes in the rocks, as pyrite and chalcopyrite, with which is associated a little magnetite.

Section sampling over widths of from 20 to 100 feet gave a general average of .015 Au., .80 Ag., 0.88% Cu.

This ore would have a gross value of $2.68 after deducting refining charges. Milling of such a grade would be in the ratio of 29 to 1 to produce a 23% copper concentrate. On a basis of 1000 tons per day a rough estimate of costs would be as follows:

Mining	.80
Tramming	.15
Mill Loss	.26
Milling	.60
Freight 120 miles on Concentrate	.21
Treatment and Marketing	.25
	2.27

From this it would seem that there is a slight margin. Nothing can be said as to whether the ore can be benefitted by sorting; from the description given this seems improbable. It will require about 60 miles of railway to provide an outlet for the concentrate shipments which would not amount to more than 40 tons per day.

There does not appear to be sufficient profit available to encourage the enormous capital expenditure required. In addition to that the elevation of the property in these latitudes would make economical large scale mining difficult.

"R. G. Mellin.