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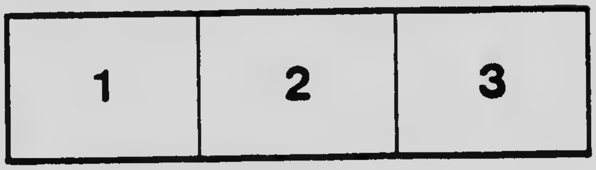
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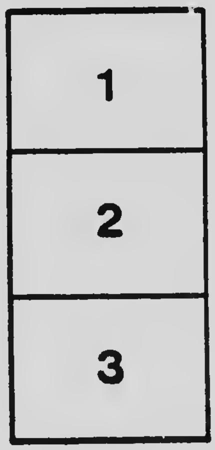
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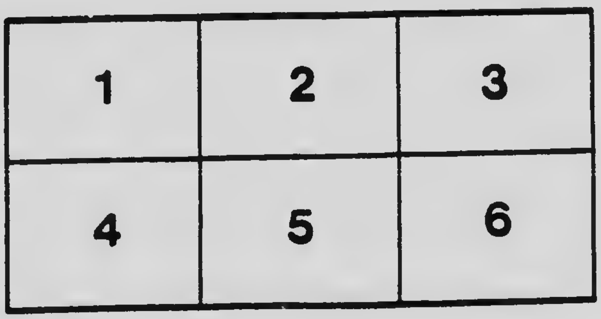
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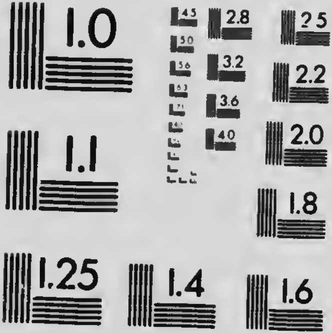

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EUGENE HAANEL, PH. D., DIRECTOR.

LODE MINING IN YUKON:

AN INVESTIGATION OF QUARTZ DEPOSITS IN THE KLONDIKE DIVISION

BY

T. A. MacLean, M. E.

OTTAWA
GOVERNMENT PRINTING BUREAU
1914

No. 222

Frontispiece. PLATE I.

Track at main entry, chute, and ore pocket, Venus mine. When in operation the ore is conveyed from this pocket by aerial gravity tram to the mill, which is located on the shore of Windy Arm, about 1,100 feet below.

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LETTER OF TRANSMITTAL.

DR. EUGENE HAANEL,
Director Mines Branch,
Department of Mines,
Ottawa.

SIR,—In accordance with a commission issued by you on May 17, 1912, I immediately proceeded to Yukon for the purpose of examining the more important quartz deposits in the mining districts of Dawson, Duncan creek, and Conrad; with a view to ascertaining their gold content, and reporting upon their probable economic value. At the request of claim owners, I visited several properties in the Whitehorse copper belt, and now beg to submit my report.

I was fortunate in securing the assistance of Mr. D. MacLachlan, of North Mountain, N.S., whose experience in prospecting, sampling and mining in Nova Scotia gold mines rendered his services of great practical value.

I have, moreover, to acknowledge my indebtedness to the various staff members of the Mines Branch, and the Geological Survey, for assistance received during the preparation of this report; and particularly to the various writers referred to, for data used throughout.

The report is accompanied by 6 maps, 36 sketches, and 40 photographs. The sketches are designed, primarily, with a view to their being of use to prospectors in the field: by indicating the points sampled on their various properties.

The criticism may be offered that too much attention and space has been given to deposits, or properties, which, on examination, have not shown values to warrant the hope that they are even prospects. My answer to this is, that in places, deposits have been heralded and advertised in such a manner that the public might well be in doubt as to their nature; and further, the men who have spent and are still spending their time and money on the ground, are entitled to all the detailed information obtained during the progress of this work.

I have the honour to be, Sir,
Your obedient servant,
(Signed) **T. A. MacLean.**

MONTREAL, March 31, 1913.

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LODE MINING IN YUKON:

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LODE MINING IN YUKON:

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CHAPTER I.

INTRODUCTORY.

Lode mining in Yukon has for some years past been attracting considerable attention.

As early as 1899, quartz claims were staked over considerable areas throughout Klondike district, but development work has, generally, been carried on in a desultory fashion, and little real mining has been done. Staking continued, however, hence, at the present time, quartz claims are located over wide areas throughout the mining districts of Dawson and Duncan creek in northern Yukon: Conrad and Whitehorse in the south; besides extensive areas in the White river and other outlying portions of Yukon territory. The last mentioned, however, do not come within the scope of this report, except in so far as the latter incidentally touches upon White River copper.

Historical.

A comparatively detailed history of gold production in Yukon may be found in various reports of the Geological Survey, issued during the last twenty-six years[1].

Briefly, placer gold was found on the Yukon as early as 1869[1]. This river was further prospected between 1873 and 1878, and from 188: to 1886. Bar mining on the Big Salmon, Lewes, Pelly, and Stewart rivers was conducted with increasing profit, until 1886, when coarse gold was first discovered in Fortymile region—the greater part of which proved to be in Alaska—and later on Sixtymile and its tributaries: the latter being the chief producers of Yukon until 1896, when the Klondike creeks were discovered, and in 1898 and the following years, poured forth their wonderful stream of gold, which by the end of 1912 will have reached a total output valued at more than $140,000,000.

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[1]Dawson, Dr. G. M., Geol. Surv. Can., Ann. Rept., Vol. III, Part I, 1887-88, pp. 178-183B.
McConnell, R. G., Rept. on Klondike Gold Fields, Ann. Rept., Geol. Surv., 1905, Part B, Vol. XIV.
Brock, R. W., Sum. Rept. Geol. Surv., 1909, pp. 16-23.
Cairnes, D. D., Quartz Mining in Klondike, Geol. Surv., 1911, and others.

Quartz mineral claims were first staked in 1899, about which time the Lone Star mine, situated at the head of Victoria gulch, came into prominence. Some development work was then undertaken; but this was over-shadowed by the rich placer finds, and little was accomplished in connexion with quartz.

The population of Yukon in 1900 was about 30,000, and the gold production $22,275,000. In 1912, the population was estimated at 8,500, and the gold production at slightly over $5,500,000; $9,500 being produced by gold lode mining operations.

With the decrease in the production of placer gold, the hopes of the residents have for some time been directed to lode mining, and a certain amount of desultory work and development have been undertaken over a large area, but with only indifferent results. This is due, in part, to the following facts: (1) that prospectors were generally unfamiliar with lode mining; (2) that little or no high grade ore had been located, and consequently, capital for development of low grade was difficult to secure; and (3) that some considerable expenditures have been inadvisedly made on a number of properties, particulars of which are dealt with later in this report.

Mr. McConnell writing in 1905, says[1]: "Lode mining has so far made little progress in the Klondike district, although a great number of claims have been staked, and some development work has been done on a few of them. The veins are usually small and non-persistent, although they occasionally swell out into considerable lenses of quartz. They often give fair assays, and, in places show free gold, but, except in rare instances, are too small individually to make mines. They occur in great abundance and in some sections constitute a considerable proportion of the whole rock mass".

The local government gave, from time to time, some assistance, notably in the form of roads and trails to the properties. Indeed the extent of road-making has been quite remarkable, indicating that the authorities realized the absolute necessity of good roads in any attempt to develop this extensive territory.

The Dominion government also gave aid in the form of a sampling mill[2] and assay office, and sent a couple of diamond drills into the district; but in 1905 the mill was abandoned or dismantled; the assay office closed; and the drills allowed to remain idle until the latter part of this season, when one of them was being set up at the Pueblo mine near Whitehorse.

In 1911, Dr. D. D. Cairnes reported, in part, as follows[3]: "Considerable interest has of late been displayed concerning the quartz of the Klondike, and special efforts are being made to develop the lode mining

[1] Report on Klondike Gold Fields (McConnell), Part B, Ann. Rept., Vol. XIV, p. 64.

[2] Appendix to the Rept. of the Supt. of Mines. Part VI, Ann. Rept., 1902.

[3] Sum. Rept. Geol. Surv., Dept. Mines, 1911. Quartz Mining in Klondike District, by D. D. Cairnes. Introduction

of this district in the hope that a revenue may eventually be derived from this source that will continue to foster the mining industry of this portion of Yukon when the placer deposits have become exhausted, which it is thought, however, will not be for many years to come".

The situation at the beginning of 1912 was such that, on Feb. 2, the Yukon Miners' Association, by resolution, appealed to the Dominion Government for assistance in the development of their lode mines and specifically, for the placing in operation of the government diamond drills then in the Territory, and for the establishment in Dawson of a testing mill and laboratory for the treating of ore.

Dr. Cairnes, who had very recently made a cursory examination of a few of the quartz properties, wrote the Mines Branch, Feb. 11, 1912, as follows[1]:

"For a number of years past and particularly since 1905 when the government mill and assay office in Dawson were closed, relatively very few assays of the quartz of the Klondike have been made and as new deposits are being discovered each year but little [illegible] concerning the probable value of the bulk of the quartz now k[illegible] [illegible] in the district".

[illegible] Dominion Government responded to the a[illegible] the Yukon Miners' Association by making a generous approp[illegible] [illegible] purpose of carrying on the work described in this report.

Transportation.

In the case of the traveller, facilities for getting [illegible] and fr[illegible] [illegible] are now of the best. Either parlour car or stateroom acco[illegible] [illegible] provided clear to Dawson: distant from Vancouver via Sk[illegible] [illegible] 1,440 miles. But operators of mines are seriously handicap[illegible] [illegible] to the very heavy transportation charges on all equ[illegible] [illegible]

Climate.

With regard to climate there is still a gener[illegible] impress[illegible] [illegible] the Yukon is a land of almost perpetual ice and snow; whereas [illegible] more delightful climate in all Canada than in Yukon, between [illegible] of June and September; with their long sunlit days, prev[illegible] [illegible]erate temperature, and rainfall.

This is of great advantage to prospectors who may be act[illegible]ly covering ground during the summer season. It is quite possible, also, [illegible] prosecute work underground throughout the whole winter season.

[1] Letter to Dr. Haanel, file No. 460.

As the soil in many places is economically adapted to agriculture, (See Plate II) and particularly to the raising of vegetables, it will be seen that climatic conditions are generally favourable to the promotion of successful mining operations.

Timber.

Some good timber doubtless exists inland, a few miles distant from the more settled portions of the district; but apart from comparatively small stretches on the upper Stewart and McQuesten rivers, and in the valley of the Wheaton, where some good straight timber, from 12 and 15 inches up to 2 feet diameter, on the stump, was seen, nothing but small growths chiefly of spruce, poplar, and birch were found in the greater portion of the district traversed.

Necessary small timber, for mining operations, is generally available, however, though some of the prospects are located above timber line; and until these are equipped with gravity tramlines or other conveyer systems, it is impossible to secure for them a supply of timber at reasonable cost.

Procedure.

The chief difficulties in the way of an effective prosecution of the contemplated investigation of Yukon quartz deposits were confronted on arriving at Dawson, on June 6, 1912, immediately after opening of navigation. The main obstacles were as follows:

(1) The great extent of the field as compared with the limited available time and means.

(2) The differentiating of known deposits.

(3) The mapping of an itinerary that would embrace examination of the more promising properties, with minimum loss of time due to unnecessarily retracing ground.

Through the courtesy of Dr. Alfred Thompson, M.P., and the Hon. George Black, Commissioner for Yukon, quarters were secured in the government administration building at Dawson; and the public were advised, through the columns of the local press, that all persons interested in lode mining properties should get in touch with the Mining Engineer, specially commissioned by the Dominion Government, to investigate the quartz deposits of the region.

A prompt general response was the result. Within a week, many persons interested had furnished data on which it was possible to plan an itinerary, subject to such modification as might later be deemed necessary.

As a number of the properties in the immediate vicinity of Dawson are located up the creeks, at varying distances, and in different directions, that city was naturally selected as a base for operations, and a workroom was established there.

PLATE II.

Oat field, on the right limit of Hunker creek, opposite the mouth of Last Chance creek

Arrangements were made with Mr. Wm. C. Sime, assayer, of Dawson—now Territorial Government assayer, with headquarters at Whitehorse—for the prompt assaying of samples. This was considered imperative, in order to prepare data for immediate advice to prospectors on their own ground; the latter being informed that advice as to comparative values or methods of work would be given free.

Duplicates of all samples were, at the same time, forwarded to the Mines Branch, Ottawa. The results of both local and departmental assays will be found tabulated on assay sheets 1 to 45 of this Report.

Itinerary.

Below is a list showing the order in which different properties were examined, together with a general outline of the routes adopted. Details as to distances, etc., appear in the Report in connexion with each individual property, hence, need only be casually referred to at this stage.

The first property examined and sampled was the Lone Star mine at Victoria gulch. This selection was made without hesitation on account of its comparative accessibility, and owing to the fact that it is the only producing lode mine in the Dawson mining district. The property is one of several mentioned by both Mr. McConnell and Dr. Cairnes, as among the more promising deposits; others being The Mitchell, The Violet, and The Lloyd Groups, Bear Creek, and Dublin Gulch—the latter in the Duncan Creek mining district.

The Lone Star was reached via the Klondike railway, from Dawson to Grand Forks, at the junction of Eldorado and Bonanza creeks, and from there by team, a further distance of six miles, via Bonanza creek and Victoria gulch, to the mine. The party—which consisted of the writer; Mr. D. MacLachlan as first assistant; and Mr. R. B. Esnouf as helper—reached the mine on Friday, June 14; and having brought the sampling outfit, remained until Saturday evening, June 22; on which date a brief visit was also made to the Eldorado Dome—an adjoining property.

Bear creek on the Klondike was next visited, June 25 to 29, where three different properties were examined, namely: Gordon M. C., Virgin M. C., and Jean t M. C. On the last date mentioned a preliminary visit was made to the properties of Mr. John Fawcett on the right fork of Hunker creek.

On July 3, the party, accompanied by David Cullen, left Dawson by stage coach to inspect properties on Eldorado; namely, Golden Gulch and The Violet; remaining until July 12, then proceeded, by means of Alex. Ayers team-wagon, to MacKinnon creek, where ten days were spent in the examination of the properties of Messrs. MacKinnon Bros. and associates at this place.

The properties of Mr. Chris. Fothergill and associates on Indian river and Conglomerate creek were also inspected.

On July 30 the party proceeded by team from Dawson up Hunker creek to the King Dome and Gold Run properties, and there examined the following:

Lloyd group.
Green Gulch group.
W. D. Mackay's property, head of Gold Run.
Patterson group.
Box Car group.
The Mitchell group.
Portland group, on Portland gulch.
W. D. Mackay's group, Hunker.
John Fawcett's claims, Hunker, Right Fork.

together with the claims of Jos. Fournier, Jas. Cameron, and others, including the Dome Lode property. While in this vicinity the local government road camp near the King Dome which we found vacant served as a convenient camp for the party; with adequate accommodation for sampling outfit, stabling for horses, etc. The above-mentioned extensive field, covering a distance of over fifteen miles east and west was traversed by team, or on horseback, samples being generally crushed and worked up in camp. On Saturday Aug. 10, we returned to Dawson with several hundred pounds of samples which had accumulated during the rush of field work, and there completed them.

On Aug. 16 Dr. Wells being an additional member of the party a visit was made to properties of the Wells Quartz Mining Co., on Lapine creek, a tributary of Rock creek. This was reached by driving over the mountains back of Dawson, a distance of some 12 miles, by a very rough and steep road.

On Aug. 21 we left Dawson by S.S. "Vidette" for Mayo, 240 miles distant on the Stewart river, en route for Dublin gulch. Arrived at Mayo Saturday night, Aug. 24, and proceeded next day by team wagon and pack horses, reaching Dublin gulch about 50 miles inland from Mayo and over a very heavy trail Wednesday Aug. 28.

The properties visited extended over a length of about 8 miles, and were as follows:

Stewart and Catto group.
Independence group.
Potato Hill group.
Shamrock group.
Olive group.
Blue Lead group.
Eagle group.

On Sept. 5, after about eight days on this ground, left for Mayo, and from thence on the 10th for Dawson; taking small boat from Mayo, rowed down the Stewart and Yukon, calling at mining property of Pickering

PLATE III.

Town of Grand Forks, looking down Eldorado from a point on the main road. A portion of the famed white channel is seen in the background.

PLATE II

On the trail to Dublin gulch. Engineer's party at Look-out cabin, foot of Mt. Haldane. The horsemen are D. Maclachlan (white) and Dr. Wm. Catto (black). Dr. Catto is an enthusiastic mining man, who has done much to assist the lode mining industry in Southern Yukon.

and associates on the right limit of the Yukon, about 18 miles above Dawson, reaching the latter city on Friday evening, Sept. 13.

The property of J. A. Anderson on Excelsior creek was next visited by Mr. D. MacLachlan; and on Sept. 21 a second visit was made to the Lone Star and Eldorado Dome properties.

On Sept. 23, accompanied by Mr. Pickering, we visited properties on Hunker creek: including California Girl, and Unexpected Mineral Claim, 11 and 13 miles from Dawson, respectively; and on Sept. 24, made a second visit to Bear creek, including an inspection of the properties of Mr. W. O. Smith, on the left limit of Klondike, about half-a-mile below the mouth of Bear creek.

Sept. 28, embarked for Whitehorse and Carcross, where it was arranged that some properties in the Wheaton, Watson, and Windy Arm, should be visited[1].

At this stage the appropriation for the work being almost exhausted, it was impossible to do more than look over the ground, and secure a few trial samples in the shortest possible time.

A brief visit was made to the Pueblo copper mine of the Atlas Mining Company, near Whitehorse, also to the Valerie, Grafter, and Best Chance; controlled by the same company[2].

The Anaconda copper property, a few miles from Whitehorse, was next visited, and sampled.

Oct. 5, drove to Wheaton via Robinson, en route to the Buffalo Hump group owned by Geo. Stevens; Tally Ho group; and The Whirlwind group of Becker and Cochrane. Arriving at Carcross on Oct. 17, we proceeded by motor boat through lakes Nares Tagish, and Marsh, to Fifty-mile river, in the vicinity of which are situated Golconda and Florence mineral claims.

Subsequent to this, a visit was made by motor boat to Windy Arm; and samples taken from the Micmac group of P. Kennedy, the Humper group of Dail and Fleming, and The Venus mine one of Col. Conrad's properties; the trip being completed on Oct. 28.

After leaving this field, a stop-over was arranged for purposes of observation and comparison at the Alaska Treadwell mine on Douglas island.

To the initiated, it will be readily seen by a glance over the above itinerary, that anything like an exhaustive examination of this field was impossible; since many of the individual properties visited, would, alone, require weeks of thorough sampling, to accurately determine their value.

The choice, however, lay between a complete sampling of several deposits, with possibly negative results—to the exclusion of all others,

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[1] Cairnes, D. D., Rept. on a Portion of Conrad and Whitehorse Mining Districts, Yukon, Geol. Surv. Can., 1908.

See also Memoir No. 31, Wheaton District, by Cairnes, Geol. Surv. Canada, 1912.

[2] McConnell, R. G., Whitehorse Copper Belt, Yukon Ter. Geol. Surv. Can., 1909.

See also Sum. Rept. Geol. Surv., 1909 p. 15

on the one hand; and on the other a somewhat preliminary examination of the greater portion of the field, with sufficient sampling to indicate the promising portions, in the hope that means might be found later for their thorough investigation. The latter plan was adopted, as being the only practicable method, and the one best calculated to afford the greatest amount of information for the least expenditure of time and money.

Equipment.

This consisted of an ordinary sampling outfit as follows:

1 simplex hand ore crusher (weight 175 lbs.)
1 large mortar and pestle.
1 set of screens 8-10 mesh.
1 set (3) cold chisels.
1 hammer and 2 prospecting picks.
1 smooth rubber mixing cloth.
1 spatula and 1 camel hair brush.
1 chamois skin and bottle of quicksilver.
1 leather ore sampling sack (18" × 25").
About 500 necessary duck sampling sacks (6" × 10").
1 prospector's gold pan.
1 chatillon circular spring balance, graduated from 2 ozs. to 60 lbs.
1 field balance (weighing to 10 mg.)
1 pocket compass and clinometer.
1 surveyor's compass.
1 50 ft. steel tape.
1 field glass (stereo binoculars 8 power).
Pocket magnifying glasses.
1 3A kodak with tripod.
1 aneroid barometer.
1 blow-pipe set with sundries.

Blankets and sundry small cooking utensils were also included, together with such supplies as were required from time to time, when moving through the more isolated portions of the field.

Method of Sampling.

Owing to the great variety as regards character, extent, and development of the deposits visited, it became necessary to adapt the method of sampling to local conditions.

As a general rule the crusher and sampling outfit were taken to the field or to a central location in the vicinity of a number of adjacent properties, and samples collected, assembled, and worked up.

The samples varied in weight from a few pounds up to 1,250 pounds, the greater number, however, being, approximately, 6 pounds.

Plate V

Sampling quartz at the Violet, Eldorado, Y.T.

In case of a definitely exposed deposit, samples were generally taken from the entire width of the lode if not over 4 feet wide; but in the case of greater widths, two or more samples were taken to represent a section. The longitudinal intervals at which samples were taken, varied, but wherever convenient, ten or twelve, up to fifty feet, along the strike, would be adopted. As much sampling was done over outcroppings and other irregular exposures it will be seen that any fixed rule as to intervals could not be rigidly followed.

Many of the workings of prospects were inaccessible, owing to water and ice or other obstruction, in which event sa nples were taken from excavated vein matter. Indeed the latter was freely sampled to furnish trial or indicator samples, and, in some cases, to check samples taken from the workings.

All samples were carefully guarded, being immediately sacked and removed to the workroom, dried, if necessary, broken and crushed through eight mesh, or at times forty mesh screens, then mixed by rolling on a sm oth rubber sheet, coned, and quartered down, until two half-pound duplicates were secured the fines from discards being carefully brushed off the sheet. The final samples were then numbered, by means of a folded paper tag inside the sack, sealed with private seal from the Mines Department, and locked in the leather sack, until such time as one set could be delivered to the assayer in Dawson, and the duplicates forwarded to Ottawa.

The discards were then panned and examined for minerals, and, where necessary and as time permitted, tested by means of the blow-pipe.

In the case of the largest samples, these were broken with hammers, first to about small egg size, mixed and quartered, the quarters being re-broken smaller, and again quartered down to seventy or seventy-five pounds, then crushed and reduced in the usual manner.

Samples, taken at Dublin gulch, were generally smaller than others, and the final duplicates were quarter, instead of half pound weight. This was considered advisable in view of the necessity of packing them twenty-five or thirty miles over rough and wet trails.

A few words in anticipation of possible criticism as to usefulness of samples, referred to above, as having been taken from piles of excavated material.

These samples may, by some parties be designated as "grab" samples, which are characterized by Mr. Rickard[1] as "The last resort of incapacity."

Mr. T. Lane Carter, writing for the Engineering and Mining Journal[2], while agreeing with Mr. Rickard in his condemnation of "grab" samples says: "The only place where the 'grab' may be employed is in testing waste rock leaving the sorting house." The question may be asked, t

[1] Sampling and Estimation of Ore in a Mine, p. 33.

[2] Quot. from Rickard on Sampling and Estimation of Ore in a Mine, p. 137.

is the use of it even there, unless to determine whether or not values are being discarded with the waste.

The opposite side is taken by W. M. Courtis of New York, Albion S. Howe of San Francisco[1], and others, who maintain that a useful check may thus be secured on other perhaps more systematic sampling.

The opinion is here hazarded and cannot, it is thought, be successfully controverted, that samples may be judiciously selected from any rock pile which are fairly representative of the whole mass; and while, in case of free milling quartz particularly, neither one, nor several samples, are likely to represent an average value, yet valuable information may be secured as to whether any values are to be found. Indeed, such a sample may well serve as an indicator, especially in the event that good values are shown.

If a considerable number of such samples be taken from any pile, or dump, without showing favourable results, the conclusion may be drawn that, though values might possibly occur in the deposit from which the dump was excavated, they would not be at all uniformly distributed, and the chances are that, if present, some at least of the assayed samples would show them up.

For purposes of this Report, as mentioned above, the plan of taking trial samples from dumps, etc., was frequently followed as being the best, in fact the only possible, under the circumstances, and the absence of assay results is regarded as either negative evidence or again as a check on other sampling.

Calculations after Sampling.

The ultimate object of sampling is, of course, to get a true average value over a definite tonnage, of an ore body.

This would be a very simple matter indeed, if the ore body were rectilinear, and readily accessible.

If a number of samples of the same width be taken, equidistantly, along an outcrop, or a drift, an average value is obtained by simply adding together the values either in ounces, or dollars, per ton, obtained from the assay, and dividing this sum by the number of samples.

If, on the other hand, the samples be not of the same width they cannot all be allowed to have the same influence on the result. Again, if, in addition to the samples being of different widths, they are also not equidistant, another variable factor enters the calculation.

Rickard[2], in discussing this question, introduces a formula, based on a set of integrations, suggested by Mr. Ross Hoffman, which is useful in solving the following two problems:

[1] Discussion, Rickard on Sampling and Estimation of Ore in a Mine, pp. 130-131.
[2] Sampling and Estimation of Ore in a Mine, pp. 31-38.

PLATE VI.

Sampling quartz pile near the Violet shaft, Eldorado, Y.T.

"Problem 1. To determine the average value of the section of vein A between the samples whose widths are W_1 and W_2 and values V_1 and V_2, respectively, under the a[illegible]umption that the values vary gradually over the area from V_1 to V_2 in the direction d. (then at any distance X from W_1) the value

$$v = \frac{x}{d}(V_2 - V_1) + V_1 \qquad (1)$$

also $$\frac{d}{W_1 - W_2} = \frac{d - x}{y - W_2}$$

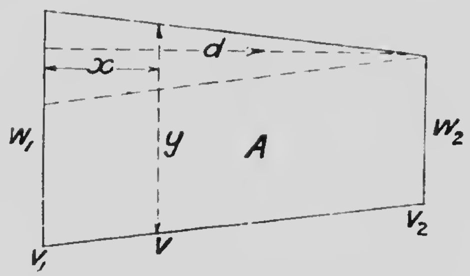

FIG. 1. Diagram to illustrate formula.

$$\text{or } y = \frac{x(W_2 - W_1)}{d} + W_1 \qquad (2)$$

$$A = \frac{(W_1 + W_2)\,d}{2} \qquad (3)$$

$$\int_{x=o}^{x=d} v\,y\,dx \div A = \text{average value of the section A.}$$

From (1) and (2) $$vy = \frac{x^2}{d^2}(W_1V_1 + W_2V_2) + \left(\frac{x}{d} - \frac{x^2}{d^2}\right)\left(W_2V_1 + W_1V_2\right) + \left(1 - \frac{2x}{d}\right)W_1V_1$$

$$\therefore \frac{2}{(W_1+W_2)\,d_o}\int_0^d vy\,dx = 2/3\,\frac{W_1V_1 + W_2V_2}{W_1 + W_2} +$$

$$1/3\,\frac{W_2V_1 + W_1V_2}{W_1 + W_2} = \frac{W_1V_1 + W_2V_2}{W_1 + W_2} + 1/3\,\frac{(W_1 - W_2)\,(V_2 - V_1)}{W_1 + W_2}$$

The last term = O when $W_1 = W_2$ or $V_1 = V_2$ and is generally small enough to neglect (see by substitutions). Hence

$\dfrac{W_1 V_1 + W_2 V_2}{W_1 + W_2}$ can be taken as the average value for section A."

The above is termed the foot-oz or foot-dollar method, by which the value of each of a group of samples is multiplied by its width, and an average secured by adding these results for all samples in the group, and dividing this sum by the sum of all the widths.

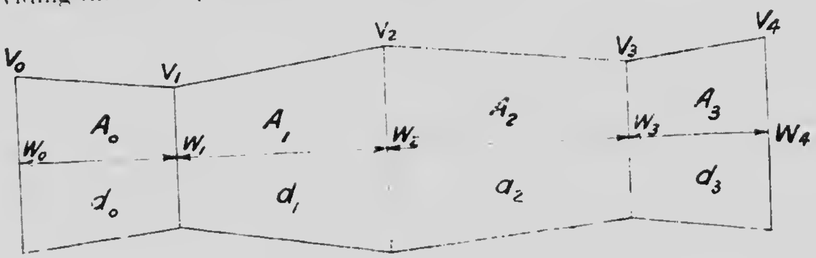

FIG. 2. Diagram to illustrate formula.

"Problem 2. To find the average value from a number of samples taken as above, where W equals width of sample, V equals value, d equals distance between samples and A the area of various sections of vein between samples:

$$A_0 = (W_0 + W_1)\frac{d_0}{2} \quad \text{average values for } A_0 = \frac{W_0V_0 + W_1V_1}{W_0 + W_1}$$

$$A_1 = (W_1 + W_2)\frac{d_1}{2} \quad \text{"} \quad \text{"} \quad A_1 = \frac{W_1V_1 + W_2V_2}{W_1 + W_2}$$

$$A_2 = (W_2 + W_3)\frac{d_2}{2} \quad \text{"} \quad \text{"} \quad A_2 = \frac{W_2V_2 + W_3V_3}{W_2 + W_3}$$

$$A_3 = (W_3 + W_4)\frac{d_3}{2} \quad \text{"} \quad \text{"} \quad A_3 = \frac{W_3V_3 + W_4V_4}{W_3 + W_4}$$

(See Prob. 1.)

$$\frac{\Sigma\,(A \times \text{average value for } A)}{\Sigma\,A} = \text{average value over the}$$

$$\text{whole area sampled} = \frac{(W_0V_0 + W_1V_1)\dfrac{d_0}{2} + (W_1V_1 + W_2V_2)\dfrac{d_1}{2} + (W_2V_2 + W_3V_3)\dfrac{d_2}{2} + (W_3V_3 + W_4V_4)\dfrac{d_3}{2}}{\dfrac{W_0\,(d_0)}{2} + \dfrac{W_1\,(d_0 + d_1)}{2} + \dfrac{W_2\,(d_1 + d_2)}{2} + \dfrac{W_3\,(d_2 + d_3)}{2} + \dfrac{W_4\,(d_3)}{2}}$$

$$\frac{V_0\frac{W_0d_0}{2}+V_1\frac{W_1(d_0+d_1)}{2}+V_2\frac{W_2(d_1+d_2)}{2}+V_3\frac{W_3(d_2+d_3)}{2}+V_4\frac{W_4d_3}{2}}{\frac{W_0d_0}{2}+\frac{W_1(d_0+d_1)}{2}+\frac{W_2(d_1+d_2)}{2}+\frac{W_3(d_2+d_3)}{2}+\frac{W_4d_3}{2}}$$

The above is equivalent to giving each sample value an importance (or weight) proportional to its sample width multiplied by half the sum of the distances to the two adjacent samples.

Averaging in this manner assumes, as in problem 1, that the values between various adjacent samples change gradually.

If the samples are taken equidistantly, the above average becomes

$$\frac{V_0\frac{W_0}{2}+V_1W_1+V_2W_2+V_3W_3+V_4\frac{W_4}{2}}{\frac{W_0}{2}+W_1+W_2+W_3+\frac{W_4}{2}}$$

which, with the exception of the two end samples, is simply giving each value an importance in the general average proportional to the width of its sample. The two end samples are shown to have half this importance, though in practice it is customary to give the two end samples the full importance proportional to their respective widths."

The above formulae have been used in connexion with working out a number of the average values given throughout this report, hence, it was thought best to incorporate the above discussion, for the benefit of readers of this report, who may not have access to the original text.

Though based on the integrations shown, it is not necessary that the man in the field should worry over his inability to understand the integral calculus, as, by simple substitution of values, for the various factors, e.g. widths, assay values, distances, he may readily make use of the formulae.

Assay Sheets: Explanation.

For a proper understanding of the assay sheets, it should be noted that the assay results, used in most of the calculations, are those conducted by Mr. Wm. C. Sime, of Dawson[1]. This is necessary since at the time of writing the text, results of many of the check assays are not available. The latter are being conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, of the Division of Chemistry, Mines Branch, Ottawa. Where these differ materially from the local assays, a comparison has been instituted by foot-notes in the text.

[1] Mr. Sime assayed the first 375 samples taken. Mr. Robert Smart, Territorial Government assayer at Whitehorse up to Oct. 1912, assayed samples from Whitehorse and Wheaton properties visited.

Money values are generally calculated on the basis of gold at $20, and silver at 60 cents per ounce[1], respectively, and copper at 17½ cents per lb. As must be expected, in dealing with over 150 samples, a few instances will be found in which a considerable variation occurs between the original and the check assays, notably in case of Nos. 10, 18, 22, 57, 182, 171, 209, 270, 277, 288, 308, 317, 318, 331, 376, 377, 379, 381 and 386. This simply confirms the well recognized fact, that a true estimate of any deposit can only be arrived at after a sufficient number of samples have been taken to eliminate the effect of exceptional, or freak results; and, in dealing with free gold in quartz, it must always be borne in mind that the final pulp of the assayer is reduced to such a small quantity that either the inclusion or the exclusion of the smallest grain of gold must greatly affect the result. There is, therefore, safety only in averages, based on a large number of carefully checked samples.

General Extent of the Field.

Reference has been made to the great extent of the field. More explicitly, the Klondike gold fields embrace that portion of Yukon lying between and within the valleys of the Yukon river on the west, Klondike river on the north, Indian river on the south, and extend to Flat and Dominion creeks on the east, covering about 800 square miles.

While most of the detail work of this examination was carried on within the above area, prospects at Dublin gulch, which is a portion of the Duncan Creek mining district, and as already mentioned is distant some 290 miles, by land and water, from Dawson, came in for some attention; as did also certain sections of Whitehorse and of Conrad mining districts. The latter district includes portions of Wheaton and Windy Arm sections, all of which lie within an area of about 1,000 square miles.

In order, therefore, that this report may be quite clear, the whole field traversed is here divided among the four mining districts of Dawson, Duncan creek, Whitehorse, and Conrad.

[1] These standard values have not been rigidly followed. Mr. Robert Smart calculated gold and silver values on the basis of $20.67 and $0.55 per ounce respectively, and the variation in standards adopted by the different assayers was not at first noticed. The difference is, however, unimportant.

CHAPTER II.

DAWSON MINING DISTRICT.

Geology.

Much of the geology of Klondike, and adjoining regions, has been described in detail, by Messrs Dawson, McConnell, Cairnes, Keele, Camsell, and others, and may be found in reports issued by the Geological Survey during the past fourteen years[1].

Briefly, the geology of the Dawson district is complicated, and rock formations are found ranging in age through the greater part of the geological scale, and exhibiting varied structure and composition.

In many instances it is practically impossible to absolutely classify certain of the rock formations on account of gradual alteration of massive igneous rocks into schists, and clastic rocks into the appearance of igneous rocks.

The following table of formations has been adopted as applicable:

TABLE OF FORMATIONS BEGINNING WITH THE OLDEST.[2]

1 Schists	Stratified and foliated rocks, mostly Palæozoic	Nasina Series Metamorphic origin	Quartzites Quartz mica schists Chlorite schists Crystalline limestone
		Klondike series Igneous origin	Sericite and chlorite schists. Dykes of quartz porphyry Andesites, rhyolites
		Moose Hide Diabase	
2 Unaltered Sedimentary		Early Tertiary	Sandstones, conglomerates, clays, shales, carbonaceous shales and lignites
3 Eruptive rocks		Tertiar	Granites with biotite, hornblende, orthoclase, oligoclase. Later Eruptives: Serpentines, Diabase, Porphyrites, Andesites, Rhyolites

Some of the later Eruptive rocks are intruded through the older schists and sedimentary rocks, in the form of dykes, stocks and sheets. Rocks of the Nasina Series occur both to the south and to the north of the main auriferous area, and are, probably, the oldest in the district.

[1] 1900 McConnell, R. G., Klondike Gold Fields.
1905 McConnell, R. G., Klondike Gold Fields.
1906 Keele, J., Upper Stewart River, and Camsell, C., Peel River and tributaries, Yukon and Mackenzie.
1908 Cairnes, D. D., Conrad and Whitehorse Mining Districts, Yukon.
1909 McConnell, R. G., Whitehorse Copper Belt, Yukon.
1910 Cairnes, D. D., Lewes and Nordenskiold River Coal District, Yukon.
1912 Cairnes, D. D., Wheaton District, Yukon Territory, Memoir No. 31.

[2] Adapted, in part, from McConnell's Klondike Gold Fields, above cit.

The Klondike and allied series are the most important, as they comprise the principal gold bearing rocks and occur in the form of a wide band which strikes generally N. W. and S. E. and extends clear across the central portion of Klondike district, carrying an average width of upwards of sixteen miles.

The principal rock of the series consists of a white, or light green coloured, sericite schist whose principal constituent minerals are sericite (mica), chlorite, quartz, with smaller percentages of orthoclase and plagioclase. This schist, according to Dr. A. E. Barlow[1], originated chiefly from the deformation and alteration of quartz porphyries and allied rocks.

Practically all the gold producing creeks occur within the area occupied by these schists, while the quartz veins, so far discovered, lie generally along the slopes and ridges of the hills, which constitute the summits, or divides, between the different water courses.

With reference to the origin of Yukon gold, the opinion has been expressed by such authorities as Brock[2], McConnell[3], Cairnes, Tyrrell, MacLaren[4], and others that the bulk of the alluvial gold, found so abundantly, had its origin, locally, in quartz and schists, which had been eroded and washed down the creeks.

That the greater part of the Klondike gold is detrital in character, and local in origin, is the most reasonable explanation of its occurrence. This was abundantly substantiated in case of Victoria gulch gold; which, during this examination, was found both in the quartz and schist of the Lone Star ridge and also in the rim-rock exposed on placer claims now being operated in the gulch below, as well as in the gravels where it was found angular and but slightly worn.[5]

It is very probable that many billions of tons both of quartz and schists have been ground down and their gold content concentrated in the creek beds. This opens up an avenue for discussion as to whether the gold was originally distributed throughout the matrix in such quantities as to be economically valuable. The fact of large grains and muggety gold occurring in the creeks, would seem to have warranted the hope of the prospector that rich deposits might yet be lying in wait for the miner's pick and drill.

QUARTZ VEINS.

These quartz veins, which, as stated, occur widely distributed throughout the old schistose rocks of the Klondike, are prevailingly of the lenticular variety, and are found sometimes interbedded with the schists and again cutting the latter both in strike and dip. Bunches and stringers of quartz and sheet-like veins also occur, the latter generally interleaved with the folia of the schists. In size the veins vary from fractions of an inch

[1] Part B, Ann. Rept. Geol. Survey, Vol. XIV, 1905., p. 19B.
[2] Sum. Rept. Geol. Surv. Can., 1903, p. 19.
[3] Ann. Rep. Geol. Surv., Vol. XIV, Part B, p. 61B.
[4] MacLaren, Dr. M., "Gold," Its Geological Occurrence and Geographical Distribution, pp. 482 83.
[5] Compare McConnell, Ann. Rept. Geol. Surv., 1905, above quot. pp. 39B 40B.

in width, and a few inches in length, up to several feet wide. They are, in places, several hundred feet long: usually, however, the individual lenses are considerably less.

Typical or extensive fissure veins are rare, and, on account of the decidedly schistose and fractured character of the enclosing rocks, readily pass into the types above referred to as being prevalent throughout the district.

Dr. Cairnes concludes this to be due to the frequent diversion, in whole or in part, of the quartz-bearing solutions, from the particular channels, along which they might, at any time, be travelling.

In contrast with the above it may be here noted, in passing, that, in case of quartz deposits, both at Dublin gulch and at the southern end of Yukon district, fissure veins occur in comparatively regular form, carrying widths which vary from several inches up to a few feet, for hundreds of feet along the strike, and, at Dublin gulch, the fissured belt extends many thousand feet in the same direction and contains a number of fissure veins which have every indication of continuity at depth.

Methods of Prospecting.

Reference has been made to lack of systematic prospecting. In this connexion a mistaken idea has been abroad among lode miners or prospectors in this district to the effect that surface trenching and sampling are a useless waste of time. Many prospectors consider that, when an outcrop of quartz occurs, a shaft must first be sunk on it, or, if the outcrop occurs on a summit, that a cross-cut should be started from the foot of the hill to tap the lead at depth. Either of these methods of prospecting may consume much time and money before any information as to the probable extent or value of the deposit is secured.

The proposition for the prospector or miner is simple and may be enunciated somewhat as follows:

Learn most about your property with the least possible expenditure.

One foot of sinking, or of tunnelling costs as much as 25 to 50 feet of surface trenching, in shallow work, and while the information acquired is doubtless worth more per foot of depth than per foot of surface, both must ultimately be obtained, *and for the lone prospector* the knowledge of his surface outlines and values is, as a rule, readily obtainable. If these are promising money can usually be found to assist him for developing at depth.

It is not the intention of this Report to question the value of sinking or of drifting, each in its proper place, nor to pass severe strictures upon the method, or lack of method, employed by many owners of quartz claims. It is the intention, rather, to emphasize advice given in the field, to wit: that, when an ore body is discovered, it is good policy to stay with the ore, avoiding long and expensive cross-cut tunnels driven for the purpose of tapping the lead at depth, since it may not be there. And again, to sample systematically and thoroughly, all workings during their progress.

Neglect of the above simple principle has cost this district dear, and the lack of exact information with regard to numbers of deposits on which thousands of dollars have been spent is truly lamentable.

Mines and Prospects.

Of the forty-eight properties visited, the majority exhibited no more development than actual assessment work required. A number evidenced large expenditures with but meagre results in the shape either of knowledge acquired or available, and lamentable ignorance of the first principles both of mining and economy.

A few were, during the season of 1912, undergoing legitimate development, notably the Lone Star mine, at Victoria gulch, several properties at Dublin gulch, a couple in Wheaton River section, including the Whirlwind group of Becker and Cochrane; the Humper group of Dail and Fleming on Windy Arm, besides several copper properties in the Whitehorse copper belt, and other lesser properties throughout the whole district visited.

THE LONE STAR.[1]

Location. Th[illegible] roperty, known as the Lone Star group, is situated on the eastern sl[illegible] [illegible]ictoria gulch, a tributary of Bonanza creek.

It consists of four crown-granted claims and seven ungranted claims, augmented by three creek claims, the mine, at present, being located on the Lone Star and Bonanza mineral claims, distant about six miles from Grand Forks, at the junction of Bonanza and Eldorado creeks—the nearest railway station, the latter being about twelve mil[illegible] by rail from Dawson.

The Klondike Railway Company ran a train with passenger accommodation up to 1911, but this has been discontinued, and it is now necessary to drive fourteen miles by road from Dawson.

A stage coach leaves the latter city daily for Grand Forks, and there is a government road clear to the mine, the latter having been built, at a cost of $7,000, in 1909. It is a comparatively good, though very steep road, rising some 1,500 feet in the last two miles. It takes three to four hours for a heavy team to journey fr[illegible] Grand Forks, and the cost of freighting to the mine is one cent per pound.

History. The history of the Lone Star mine dates back to 1899, when these claims were first staked by Messrs. Chute, Corthay, and Stewart; but it was not until 1909 that the Lone Star Company, Limited, was organized by Dr. Wm. Catto. It is registered at Ottawa and has its head office in Dawson.

Between 1909 and 1912 about $42,000, in round figures, have been spent in purchase, equipment and development.

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[1] McConnell, Ann. Rept., Geol. Survey, Pt. B. Vol. xiv; pp. 64-65. Cairnes, Sum. Rept. Geol. Survey, 1911, p. 36

PLATE VII.

Open cut, Lone Star mine, Victoria gulch, showing quartz lenses in the schists.

The chief officers are: Dr. Wm Catto, president, Dawson; J. Henry, secretary-treasurer, Dawson; E. H. Searle, manager, Lone Star mine.

Equipment. This consists chiefly of: Mess and bunk house, a frame building, 20′ × 35′, 1½ stories; blacksmith shop, 16′ × 20′; lowering gear for 3,500′ gravity tram, to handle 3,000 lbs. net in car; One Joshua Hendy 4-stamp mill, with crusher; 50-h p. General Electric motor attached to power transmission line, connecting with power plant of the Northern Light and Power Company.

Nature of Deposit. The outstanding feature of the deposit is that it consists of a mineralized zone or mass formation, called by the owners "The Boulder Lode."

So far as shown by present development the so-called Boulder Lode is made up of a large number of quartz lenses, or kidneys, sheet-like veins, bunches and stringers of quartz, ramifying through a mass of micaceous or sericitic and chloritic schists, which are much crushed, folded and metamorphosed.

The individual quartz lenses are very irregular and possess but little continuity. They occur in a zone or belt having, in most places, a west-northwesterly strike.

This "Boulder Lode" has, heretofore, been confined to a narrow belt, which, when visited in June, was being worked by an open-cut about 10 to 15 feet wide, 12 to 18 feet deep, and having a general strike N. 85° W.[1] i.e., leading somewhat into the contours of the hill and thus gradually increasing the height of the working face.

There was, however, no apparent reason for confining the workings to a width of 10 or 15 feet, as no defined walls were apparent, and general indications pointed to the probability of the lode extending westward, broadening towards the summit, where heavy exposures of quartz occurred at intervals along the strike for a distance of more than a thousand feet from the present open cut.

In the opposite direction, and distant from the workings about 1,000 to 1,500 feet, a section of the formation is disclosed by Thirteen Pup,[2] which cross-cuts the slope to Victoria gulch, in a direction N. 20° E., and exposes quartz and schists similar to the occurrence at the mine. This condition was noted, at intervals, clear down the pup to Victoria gulch, where specimens carrying free gold were taken from the rim rock by Mr. Fred. Maier during placer operations on his claims below the Lone Star.

A conservative estimate of the proportion of quartz, as compared with the whole mass, would be from 20 to 25 per cent.

[1] All bearings given in this report are magnetic, the average variation being as follows: for Dawson mining district 35° E.; for Duncan Creek district 34° 25′ E.; Whitehorse 31° 45′ E.

[2] Thirteen Pup takes its rise in the side hill, about a thousand to fifteen hundred feet easterly from the mine, and runs N. 20° E. into Victoria gulch, near placer ground of Mr. Fred Maier; Victoria gulch here running N.W. and S.E.

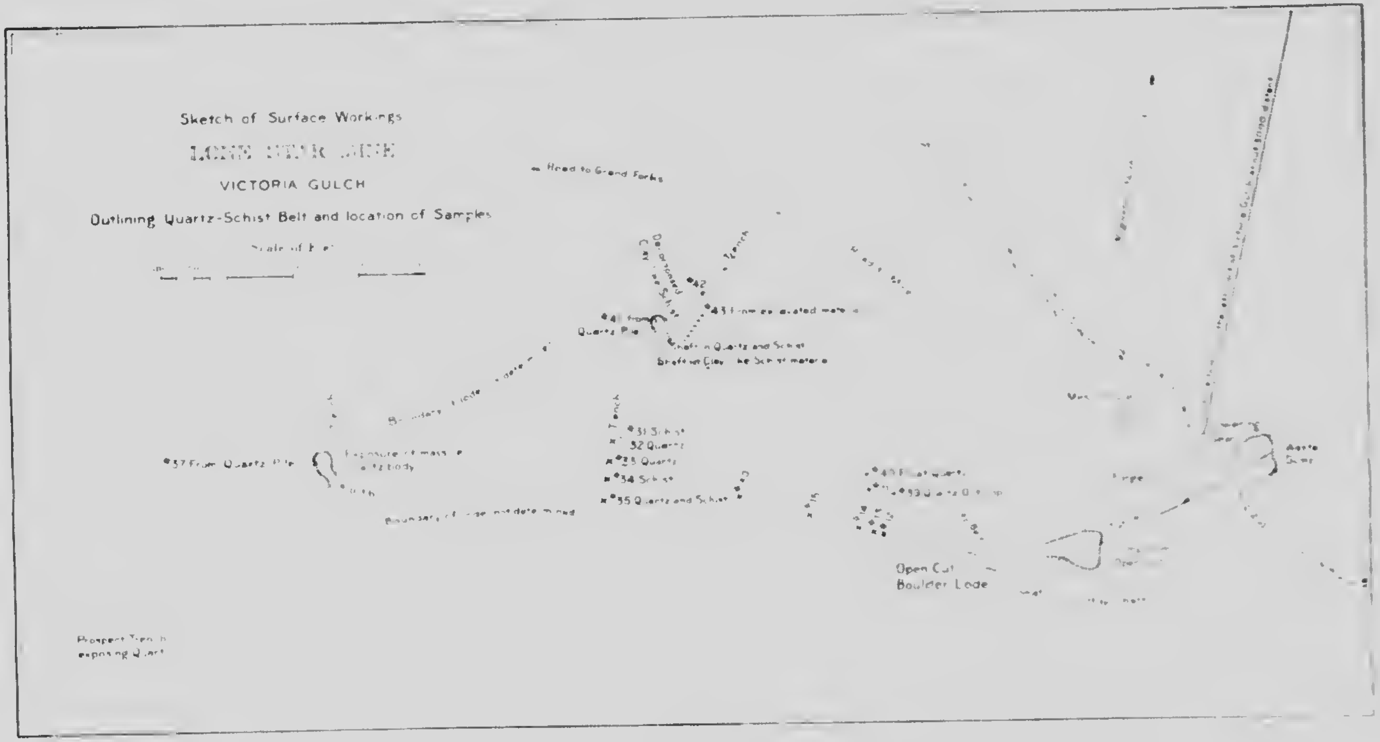

Sketch of Surface Workings
VICTORIA GULCH
Outlining Quartz-Schist Belt and location of Samples
Road to Grand Forks
#42
#43 From excavated material
Quartz Pile
Shaft in Quartz and Schist
#31 Schist
#32 Quartz
#33 Quartz
#34 Schist
#35 Quartz and Schist
#37 From Quartz Pile
Open Cut
Boulder Lode

FIG. 3

At a depth of 60 to 70 feet below the surface of the open-cut a more compact and less metamorphosed condition of the formation is exhibited in crosscut and drifts. As it has been found that the excavated material, on exposure to the atmosphere, rapidly softens and crumbles, the weathering or oxidation near the surface readily accounts for the variation from that at depth.

Quartz. The quartz is generally white, to grey, with rusty stain on seams, or fracture faces, due to oxidation of sulphide minerals, which are found sparsely distributed in the quartz and schists. A darker quartz is occasionally found, as well as a reddish variety.

Comparatively little mineralization occurs, but the quartz and schists are both found to carry small percentages of iron and, occasionally, copper pyrites, together with gold. The gold occurs, generally, free and very fine, but coarse masses, scales and small nuggets are found, both in quartz and on contact faces, while small, wheat-like grains are sometimes found in the crushed schists. Small values occur associated with the sulphides.

Method of Working the Deposit. The ore, which is much fractured to the depth worked in open-cut (approximately 18 feet) is easily mined. It is loaded into a dump car at the face of the cut, trammed to the raise which had been made from the drift below; dumped there into a chute, and withdrawn by cars located in the lower level whose capacity is about 1,500 lbs.

It is then trammed about a hundred and fifty yards to the head of the incline and there dumped into a car of double the mine car's capacity. The latter, on receiving the two carloads from the mine, is lowered 1,500 feet, or about halfway on the incline, and dumped into another car, which is in turn lowered by a second gear to the mill, situated about a thousand feet vertically below the mine and distant 3,500 feet along the tramline.

It had been the practice to sort the ore, and about one car in three went to the mill, two going to the waste dump. This practice maintained until August, when the management, acting on suggestions as to the possibility of milling the mine run, and of extending the width of the workings, closed the mill from August 8 to 12, inclusive, for the purpose of making necessary changes and adjustments to increase the mill capacity, and restarted on August 13, since which date, until October 1, when the mine closed for the winter, Mr. Searle states not a single car was sent to the waste dump.

At the same time, the working face was widened, and, instead of 10 or 15 feet, was found to be 35 feet across the top, in September, when visited during part of a day. The net result, as stated by the manager, was, that the mill output was multiplied by three; average values recovered only fell about 20 cents per ton, and loss in operating of approximately $1 per ton was converted into a gain, or profit, of like amount.

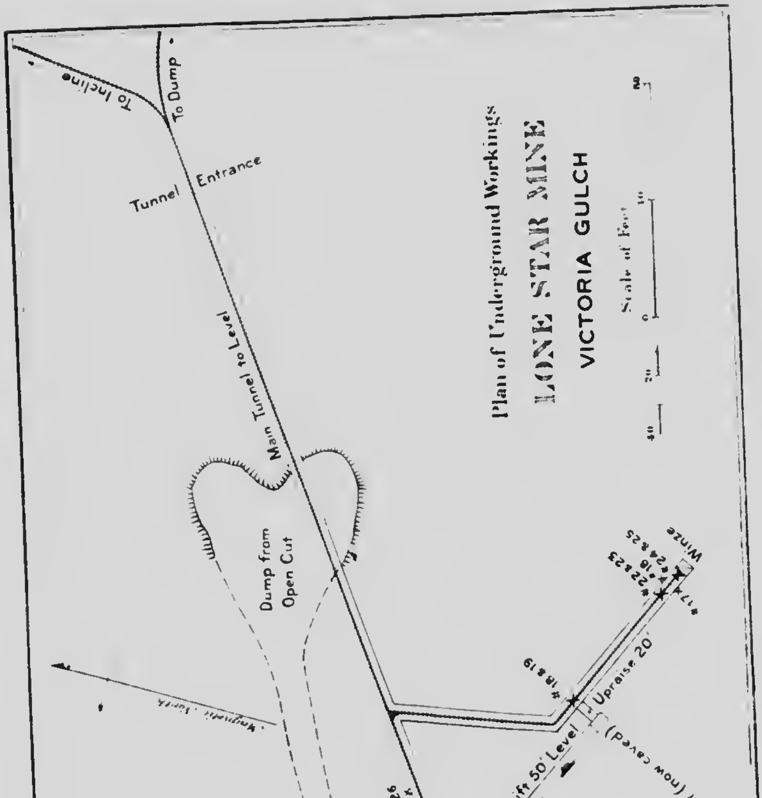

Plan of Underground Workings
LONE STAR MINE
VICTORIA GULCH
Scale of Feet
To Incline
To Dump
Tunnel Entrance
Main Tunnel to Level
Dump from Open Cut
#26
Ore Chute and Upraise to Open Cut
#27
#28
#29
Drift 50' Level
Shaft (now caved)
Upraise 20'
#18 & 19
#22 & 23
#18
#24 & 25
#17
Winze
Note: Dotted line shows position of Surface Workings relative to underground

Fig. 4.

Loading ore at the face in open cut. Lone Star mine, Victoria gulch.

Dumping ore from open cut into chute, through upraise from lower level, Lone Star mine.

PLATE X.

Head of incline Lone Star mine.

PLATE XI.

Ore car on gravity tramway, Lone Star mine, Y. T.

Placer claims of Fred. Maier on Victoria gulch. Lone Star mill and gravity tramline also shown in the background.

Sampling. Of the 49 samples taken from the Lone Star property, very few have shown even fair values.

The deposit is an unusual one, and presented peculiar difficulties, in view of the brief time available for the work.

It was not known, definitely, whether the quartz contained all the values, or whether these were distributed through the quartz and schists. While a system of sorting was in vogue, under the direction of the foreman, it was quite empirical.

It was, therefore, with a view to define these points, that the samples were taken of quartz lenses alone, of schists alone, and of both together, as well as average sectional samples.

The assay returns, however, as will be seen by referring to accompanying assay sheets 1-4,[1] were so uniformly low, that an average value of the deposit, worked out on any basis possible, would show it between 50 cents and $1 per ton.

The mill returns, on the other hand, show an average which varies by the month, but slightly, from $3.694 to $3.90, over a period of more than four months, and a tonnage of 2,495 tons milled.[2]

Taken alone, the assay results would practically condemn the property, but, from observation, it can be definitely stated that rich bunches of quartz frequently occur.

A somewhat parallel case is that of the Argentine lode of the Tomboy Mining Company, at Telluride, Colorado; where, according to Rickard, a careful sampling of a block of ground, at intervals of 10 feet, yielded an average of $7 per ton, all rich spots carrying visible gold being avoided. The work was done by an inspecting engineer of recognized capacity; nevertheless, the actual mill returns were $28 per ton.[3] The usual tendency is the reverse of the above, however, and mill returns generally underrun estimates based on sampling and assaying.

Open-cut, Boulder Lode: Explanation of Sectional Samples.—So few of these samples assayed any values, above traces, that an extended calculation is scarcely necessary. The following is given, however, as illustrating (1) the method of sampling this portion of the workings, and (2) applying the formula given on page 13 to work out the resultant average.

In the accompanying figure:

AB = face of cut, whose width

[1] For assay sheets see pp. 32-37.

[2] See statement of mill run by the manager, p. 29 forward. This is confirmed by the annual statement of the Company.

[3] Rickard, "Sampling and Est. of Ore," p. 12.

W_5 = 14 feet, from which a section sample, in three parts, has been taken as follows:

					Foot-dollars.
No. 353	– 2′ wide,	assaying	$0 42	=	84
" 354	– 10′	"	" 83	=	8 30
" 355	– 2′	"	"		
	14′				$9 14

$$\frac{9\ 14}{14} = 65\ 3c = V_5$$

No. 353, " 354, " 355	– W_5	= AB	= 14′,	assay value (1)	$0 653	= V_5
" 10	– W_4	= CD	= 8′,	" "	nil.	= V_4 (2)
" 356	– W_3	= EF	= 7′	" "	4 65	= V_3
" 8	– W_2	= GH	= 7′	" "	nil.	= V_2
" 7A	– W_1	= IJ	= 2′	" "	nil.	= V_1
" 4, " 5, " 6	W_0	= KL	= 7′ 6″	" "	nil.	= V_0

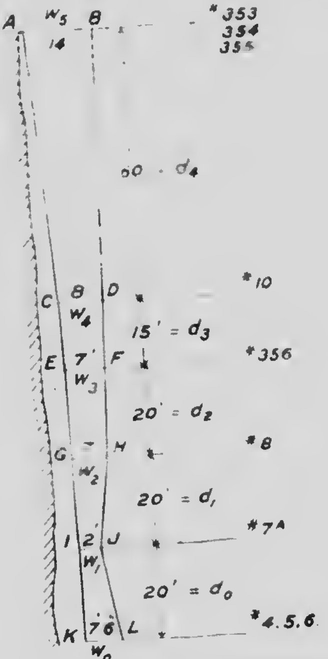


Fig. 5. Diagram to illustrate sampling of open-cut, Lone Star mine.

(1) By substituting the values given under check assays on Sheets Nos. 1 and 2, the resulting average is found to be $23.92, which is more favourable to the property. This value is, however, due almost entirely to one high assay, e.g., No. 10 = 4·25 oz., equivalent to $85 per ton; hence it errs in the opposite direction to that exhibited in the text.

(2) Mr. Sime's assay of this sample resulted in no value, but when the discarded portion of the sample was panned, gold to the value of 80c. per ton was recovered, while the Ottawa duplicate gave an assay return of 4·25 ounces, or $85 per ton (Assay Sheet No. 1).

Average value over the whole area sampled (135′ long and an average of 7.6′ wide):

$$\frac{V_1 W_1 \frac{d_1}{2} + V_2 W_2 \frac{d_1+d_2}{2} + V_3 W_3 \frac{d_2+d_3}{2} + V_4 W_4 \frac{d_3+d_4}{2} + V_5 W_5 \frac{d_4+d_5}{2} \cdots V_n W_n \frac{d_n}{2}}{W_1 \frac{d_1}{2} + W_2 \frac{d_1+d_2}{2} + W_3 \frac{d_2+d_3}{2} + W_4 \frac{d_3+d_4}{2} + W_5 \frac{d_4+d_5}{2} \cdots W_n \frac{d_n}{2}}$$

Substituting values as above:

$$\frac{0 + 0 + 0 + \frac{1.65(7 \times 35)}{2} + 0 + \frac{.653(11 \times 60)}{2}}{\frac{7.5 \times 20}{2} + \frac{2 \times 40}{2} + \frac{7 \times 40}{2} + \frac{7 \times 35}{2} + \frac{8 \times 75}{2} + \frac{11 \times 60}{2}}$$

= 0.769, or say 77¢ per ton.

This average of 77 cents per ton is somewhat less than the arithmetic mean, which will be found to be 80.88¢.

In addition to the above sectional samples, a couple of trial samples, No. 7, from the north wall, and No. 9, from the south wall of the cut, gave values of 26 cents and trace respectively.

Fig. 6.—Skeleton diagram to illustrate sampling of Corthay drift.

Again, investigating samples from the Corthay tunnel or drifts below, and using a skeleton diagram to indicate the approximate position of the samples, we have:

	Width.		Assay.		
No. 24	= 6″	quartz	= \$1.28	Sample — $W_0 = 2'$-$6''$, assay \$0.256 = V_0	
" 25	= 2′	schist	= nil.		$d_0 = 40$

Nos. 16 and 17 are indicator samples from the walls near 22 and 23, and No. 20 is a trial from the upraise: omitting these:

" 22	= 5″	quartz	= 21.44	Sample — $W_1 = 1'$-$5''$, assay 6.31 = V_1	
" 23	= 12″	schist	= nil.		$d_1 = 50$
" 18	= 1″	quartz	= 0.83	" — $W_2 = 1'$-$4''$ " 0.68 = V_2	
" 19	= 12″	schist	= 0.63		$d_2 = 60$
" 26	= 10″	quartz	= nil.	" — $W_3 = 10''$ " nil. = V_3	$d_3 = 105$
" 27	= 3′	stope	= 2.49	" — $W_4 = 3'$ " 2.49 = V_4	$d_4 = 40$
" 28	= 3′	drift	= tr.	" — $W_5 = 3'$ " 0 = V_5	$d_5 = 40$
" 29	= 3′	drift	= tr.	" — $W_6 = 3'$ " 0 = V_6	

Substituting the above values for V_o, W_o, d_o; V_1, W_1, d_1, etc., in the formula, and reducing, we find the average value to be \$1.33.

In addition to this average, sample No. 16 indicates values of 83 cents in the schist walls, while on the opposite side No. 17 gives only a trace.

Sample No. 20, taken from the raise, near Nos. 18 and 19, gives no value.

The assays of this level have, on the whole, a slightly better average than those of the open-cut, but this has no special significance, as it is due entirely to the one high assay, No. 22.[1]

Other assays taken over the surface prospects and exposures, as shown in Fig. 3, numbered consecutively 12-15, 21, 30-43, show an approximate average of 50 cents per ton, (omitting No. 38, which is an average sample of pulp discarded from 30 samples.)

Of the above eighteen samples, only seven assayed values above traces, but these are widely distributed, showing that such values as are found are not confined to any small zone.

Mill-run. Following is an abstract showing results of the mill-run. This is supplied, and certified substantially correct, by the manager, Mr. E. A. Searle.[2]

[1]By substituting the values given on assay sheets 1 and 2, under check assays, this comparison would be reversed, and for the same reason, *i.e.*, the high assay shown by sample No. 10 (1·25 oz = \$85.00 per ton). See also footnote [1] p. 26. These conflicting results confirm the necessity of more detailed sampling.

[2]This statement is further vouched for by the annual statement of the company for 1912.

Gold extracted from open-cut on Lone Star, Ltd., mine, during summer of 1912, as per Bank of British North America certificates.

May, June and July....	\$3,880.42,	from	991	tons;	average,	\$3.904	per ton,
August,..	2,146.22	"	581	"	"	3.694	"
September.......	3,440.94	"	920	"	"	3.74	"
	\$9,467.58		2,495	"		3.79	"

Operating costs. According to the management, September operations resulted in a net profit, over all charges, of about one dollar per ton, thus demonstrating that, even with the handicaps consequent upon working a small plant with insufficient funds for necessary improvements, ore can here be mined and milled at a cost of \$2.75 per ton. This cost would be materially reduced if the number of stamps could be increased, and improvements which the manager has in view provided.

The present mill is well equipped. As mentioned above, it is a 4-stamp Joshua Hendy, with stamps arranged in two batteries, having automatic feed and triple discharge, and two $1\frac{1}{2}' \times 9'$ plates for amalgamating.

Tailings are carried over about 15 feet of sluice box, with wooden riffles, and two sets of blankets, where concentrates are retained. The concentrates assay \$12 and upwards, per ton, but the percentage of concentration has not been checked up.

A 50 H.P. General Electric motor furnishes power from the transmission line attached to power line of the Northern Light and Power Company, and, with this equipment, the power cost (at 4 cts. k.w.) in June was about \$1 per ton of ore crushed. With the increased output[1] of the mill in August and September, this would be almost cut in half.

The present mill (shown on Plate XII) is conveniently situated on the left slope of Victoria gulch, but the site offers facility for extension, up to eight or ten stamps only.

Detail costs:

Manager's salary[2]	at present,	\$150.00	per	month	and board.
Foreman's salary	"	150.00	"	"	"
Millman's pay	"	5.00	"	day	"
Miner's pay	"	4.00	"	"	"
Cook's pay	"	4.00	"	"	"

[1] In June the mill tonnage was about 12 tons in 24 hours; while in September it was raised to about 30 tons in 24 hours.

[2] Owing to the manager's personal interest in the property this is a nominal amount

Number of men in the mill: by day, 2, by night, 1.
" on tram-line and incline: 2.
" in and about the mine: 5.

Following are prices of a few of the more staple articles of provisions. To them must be added the freight of 1c. per pound:

Flour	$ 8.00 per cwt.	Bacon	10 per lb.
Tea	.50 " lb.	Eggs (case)	.75 " doz.
Butter	.40 " lb.	Eggs (fresh)	$1.50 " doz.
Sugar	$12.00 " cwt.	Kerosene oil	.75 " gal.
Salt	.10 " lb.	Gasolene	.90 " gal.
Potatoes	.6 .10 " lb.	Canned fruits	$4.00 -$4.75 case of 2 doz.
Beef	.40 " lb.		

Summary. This property has been described at considerable length, and the above details furnished, for the reason that, throughout the whole Klondike, they have a vital bearing on the situation as it relates generally to lode mining.

As already stated, this is the only producing gold lode mine in the Klondike. Speculation had been rife as to the possibility of its developing into a great mine. Data has been lacking as to the probable cost of mining and milling in the district.

As a result of examination herein described, the conclusion reached, with regard to this property, is that a more thorough sampling should be undertaken, or, better still, extensive mill tests made of material, not only from the present workings, but from other sources on the property, in order to demonstrate whether the mill values recovered from the open-cut, as reported by the management, occur over the extensive area outlined in this report.

As already noted, so far as development has shown this may be a mountain of auriferous quartz and schists, carrying workable values; with the possibility of occasional very rich zones, due to leaching or other processes of secondary or surface enrichment. Additional colour is given the hypothesis of an extensive deposit, from the fact that the adjoining property, to the south and west, to wit, the Eldorado Dome, exhibits the same general characteristics as those of the Lone Star deposit, and, though comparatively little development work was done on the latter, some rich quartz and schists were seen in a prospect trench on the Robin mineral claim, several thousand feet southwest of the Lone Star workings, details of which will be given later in connexion with description of the Eldorado Dome property.

The Lone Star Company is handicapped for money with which to prospect its property. Absolutely dependent, as it is, on the recovery of the mill, to meet current expenses, the Company cannot undertake systematic development. Yet this must be done before any great expectations can be realized.

There is little question but that such a property as this, if located in the Porcupine district of Northern Ontario, would be amply supported, and financed *for extensive prospecting.*

It is not the purpose, or intention, of a Governmental report to boost a proposition of this kind. The situation with regard to this particular property is here in fairly set forth, together with all the data available at time of writing.

In a few words then, the deposit is probably extensive. The above sampling has, on the whole, disclosed poor values, but the mill returns would indicate the possibility of a future for the property.

One good lode mine in Klondike district would put new heart into the business, and would afford sufficient encouragement to induce active prospectors and miners to take the field, when a new era in connexion with the lode mining industry might thus be inaugurated.

LONE STAR SAMPLES—ASSAY SHEET NO. 1.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
1	Quartz......	White with rusty stain ...	4	6	Pyrites...	Main dump mouth of tunnel	trace		–	–		0·05	nil	
1A	Concentrates pyrites	Yellowish ..	0	0·7568	–	Pannings from 54 oz. of sample No. 1 ...	1·248	1·465	25 80			not conducted..		This represents a value of 36·3 cents per ton of original ore.
2	Schist	Greyish brown ..	–		Pyrite...	Main dumps in contact with No. 1	nil		–	–		trace	nil	Micaceous or Sericite (soft).
3	Schist.	Green ...			Pyrite...	Main dump	nil		–	–		trace	nil	Chloritic and harder than No. 2.
4	Quartz and schist	White rusty green	21	11	One small colour of gold and pyrites.	S.E. end of open cut...	nil		–	4	0	trace	nil	Quartz was 1'6" wide Schist was 2'6" wide. 4,5 and 6 combined constitute a sectional sample.
5	Quartz......	White to rusty.	10	0	–	Centre east end open cut	nil		–	1	6	trace	nil	
6	Quartz and schist	Greyish and rusty	25	0	–	N.E. end of open cut	nil		–	2	0	trace	nil	
7	Quartz.. ...	Rusty	5	0		North wall of open cut	0·0125	·02	0·26	–		·01	nil	Adjoining No. 7A.
7A	Schist.		4	0	–	20' North of No. 6 .	nil		–	2	0	·01	nil	Sectional sample.
8	Quartz and schist	White grey greenish. ..	8	0	–	20' North of No. 7A	nil		–	7	0	·08	nil	Sectional sample.

9	Quartz	–	17 – 6	Little pyrite..	South wall of open cut about centre	trace	–	2	0	·01	nil	
356	Quartz and schist	–	4 – 4	Colours of gold . .	20' N. of No. 8 . .	0·28 – 0 16	5 69	7	0	0·9		Sectional sample.
10	Quartz......	White to rusty. .	4 – 8	Little pyrite..	15' N. of No. 356 .	nil	–	8	0	4·25	nil	Sectional sample

(*a*) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(*b*) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G Wait, Division of Chemistry, Mines Branch, Ottawa.
(1) Values are calculated on the following basis:—Gold $20.00 per oz., Silver 60c per oz., Copper, 17½c. per lb. The results in dollars and cents, given above, are obtained by using the first column of assays, which were conducted by Mr. Wm. C. Sime, of Dawson.

LONE STAR SAMPLES ASSAY SHEET NO. 2.

Sample No.	Material	Colour	Weight. Lbs.	Weight. Oz	Minerals in pa..	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
353	Quartz and schist	Rusty to dark bluish	3	14	Pyrite...	N. Face open cut.	·02	·04	0·42	2	0	trace		
354	Quartz and schist	–	8	0	–	Face open cut.	·04	·06	0·83	10	0	0·05		
355	Schist	–	3	10	Pyrite	S. Face open cut	nil		–	20		trace		
11	Quartz	White to rusty	1200 – 0 broken and quartered to 13 – 0		Pyrites and gold.	Large sample from face of open cut	trace		–	–		0·01	nil	12 lbs. discarded from sample, panned 10 mg. of gold =80c. per ton.
12	Quartz	White	9	0	Pyrite	Trench (See sketch)	nil		–	3	0	trace	nil	
13	Quartz	White	10	12	Small show of dark sulphides	2nd trench west of open cut	trace			2	0	trace	nil	
14	Quartz	White	10	4	Small show of sulphides.	3rd trench west of open cut	·02	·04	0·42	2	0	0·01	nil	
15	Quartz	White to rusty	10	4	Pyrites and colours of gold	4th trench west of open cut	trace			1	0	0·02	nil	
16	Schist	Greenish	8	0	Slight show of minerals.	North wall of south drift near Corthay winze	·01	·06	0·83	2	0	trace	nil	Indicator sample from walls.

17	Schist	–	7	0	Pyrites	South wall opposite No. 16	trace		2	0	0·01	nil	Indicator sample from walls.
18	Quartz	White ...	9	0		Adjoining Corthay raise	·01 – ·06	0·83	0	4	1·30	nil	
19	Schist	Grey to green	12	9		In contact with quartz of 18....	·03 – ·05	0·63	1	0	trace	nil	
20	Quartz and schist	White to green	3	8	A little pyrite	Corthay upraise.....	nil				trace	nil	"Grab" sample.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

LONE STAR SAMPLES—ASSAY SHEET No. 3.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
21	Quartz and Schist	White to grey...	6	13	5 lbs. contained 10 mg. gold = $1.92 (a)	About 225 feet N 65 W from zero at open cut	·08	·10	1 66	2	0	0·01	nil	Note the value in pannings.
22	Quartz	Rusty	7	0	–	10 ft. from winze in Corthay tunnel	1·06	·43	21 44	0	5	4·18	nil	Assay contained metallics.
23	Schist	Brown grey green.	8	0	–	Adjoining quartz of No. 22........	nil		–	1	0	0·01	"	
24	Quartz	White to grey	8	7	–	Bottom of drift near Corthay winze ..	0·06	0·14	1 28	0	6	0·01	"	
25	Schist.	Light green	6	9	–	Adjoining quartz of No. 24....	nil		–	2	0	0·10	"	
26	Quartz......	White	8	0	–	West side of main tunnel.......	nil		–	0	10	0·005	"	
27	Quartz and schist.	–	7	0	–	Drift below open cut	0·12	0·16	2 49	3	0	0·65	"	
28	Quartz and schist.		7	8	–	Drift below open cut	trace		–	3	0	0·01	"	
29	Quartz ..	White	7	5	–	North end of drift below opencut ..	trace		–	3	0	trace	"	
30	Quartz	Rusty	7	5	–	Sta 4+10 trench	trace		–	0	8	0·02	nil	
31	Schist		6	10	–	Adjoining quartz of No. 32	nil			2	0	trace	"	
32	Quartz ...		9	1	–	Trench at sta 6+25	trace		–	1	0	"	"	
33	Quartz	White	9	1	–	Sta 6+17	nil		–	1	0	"	"	Quartz is crushed lean looking.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.
(a) The value of free gold from pannings has been calculated on the basis of $15 per oz.

LONE STAR SAMPLES—ASSAY SHEET No 4

Sample No.	Material.	Colour	Weight.		Minerals in pan.	Location[1].	Assay in ounces (a) per ton of		Value per ton.	Width of sample.		Check assay (b)		Remarks.
			Lbs.	Oz.			Au.	Ag.	$ c	Ft.	In.	Au.	Ag.	
34	Schist	Rusty to greenish	8	13		Adjoining quartz of No. 33 at sta 6+17	trace		–	2	0	trace	nil	
35	Quartz and schist.	White to greyish	7	0	–	80 ft South of sta 6+17 in trench	trace		–	3	0	"	"	
36	Quartz	Red to brown	9	12		Trench at sta. 10+07	·08	·12	1 67	2	0	0·005	nil	
37	Quartz	Rusty	10	1		Quartz pile from trench sta. 10+07	·03	·05	0 63			trace	"	
38	Quartz and schist.	Rusty	–			Average sample from discards of 30 previous samples	07	·11	1 46			"	"	
39	Quartz	Light to dark brown	7	5	–	Sta 2+00 on so-called Corthay lead	07	·11	1.46	1	0	"	"	From boulder cropping.
40	Quartz	White grey greenish	7	7	–	Sta 3+50 on Corthay lead	trace					"	"	Quartz float
41	Quartz	White grey greenish	9	8		Sta. 6+00 from shaft dump	·10	16	2·09	–		0·94	"	
42	Quartz	White grey greenish	7	9		Trench sta. 6+00.	trace		–	2	0	trace	"	
43	Quartz and schist.	Rusty	6	12	nil	Average of material from trench at sta. 6+00	·03	·05	0 63			"	"	

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.
[1]See Fig. 3.

ELDORADO DOME

The Eldorado Dome Quartz Mining Co., Ltd., controls 31 mineral claims which, as mentioned above, adjoin the property of the Lone Star Company, Ltd., and occupy the area which forms the southern and western slopes of the divide between Bonanza and Eldorado creeks on the one side, and Victoria, Oro Grande and Gay gulches on the other. These are among the richest creeks of Klondike.

The claims are ungranted, but are in good standing.

The company is capitalized at $1,000,000, consisting of 100,000 shares of common stock at $10.

The chief officers are:—

N. J. Donohue, President, Dawson.

M. S. Eads, Vice-President, Dawson.

T. A. Firth, Secy.-Treasurer, Dawson.

Mr. W. D. Mackay, formerly of Dawson, now of Vancouver, is financial agent, and Mr. Fred. Kennedy was in charge on the ground during a portion of the season.

Deposit. As already stated, this deposit resembles in general characteristics that of the Lone Star, so much so that any detailed description would be largely a repetition.

Over such an extensive area, local variations naturally occur, with reference to colour, hardness, stage of metamorphism of the schists, and percentage of the quartz. Developments, so far, exhibit the green chloritic and paler sericitic schists, with decomposed or crushed, ochreous, oxidized, quartzose material, also white and darker quartz stringers, which in places bulge into larger masses.

Development. The workings visited consisted of a shaft $4' \times 6' - 50$ feet deep, located near the summit of the divide, on the Victoria gulch side, and about 2,000 feet in a southeasterly direction from the Lone Star workings.

No work was in progress at the time of this examination, and the bottom and sides of the shaft were largely covered with ice.

The dump, however, showed a much smaller percentage of quartz than prevailed in the Lone Star workings.

One sample taken assayed 83 cents.

The only other work visited on this property was an open-cut on the Robin mineral claim, situated on the southwestern slope of the divide, and probably 5,000 feet southwesterly from the open-cut at the Lone Star mine.

This was some 16 feet in greatest width, 18 feet greatest length, and from 6 to 8 feet deep.

The quartz occurs as a floor, partially covering the bottom of the excavation; its thickness, exposed by trenching, was found to be 15". Numerous stringers also occur. Sufficient work has not been done to define the nature or the extent of this occurrence, but the crushed and irregular condition of the schists would seem to indicate a slide. The proportion of quartz was estimated as about 35 per cent of the whole rock mass.

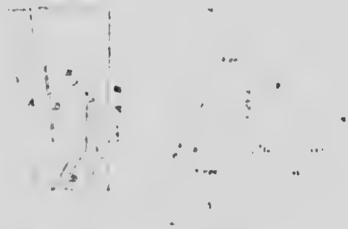


FIG. 7. Open cut, Robin M.C.

A, Quartz and schist gravel. B, Crushed schists; C, Quartz; D, Rich stringers

The quartz is translucent, or white to grey in colour, with patches of dark iron stains, varied by rusty oxidized portions.

In places, limonite is found in the quartz, sometimes occurring in cube form as a pseudomorph of pyrite.

Four samples were taken as indicated on above sketch of the cut.

Two of these, namely 358 and 360, assayed 80 cents per ton, and other two only traces.

Near sample 358, some rich stringers of quartz, 2" to 3" in thickness, exhibited a number of good specimens with free gold, of crystalline character, in the quartz, while very fine gold was seen disseminated through the associated schists, which are of green chlorite and sericite much crushed and decomposed. A small proportion of pyrites was noticed.

The assays, as in the case of the Lone Star, have not demonstrated values which were actually seen, in place, in this particular opening, and this deposit should certainly be further explored, and a mill test made of a number of tons of the material.

Conditions are so closely allied to those of the neighbouring property that little farther need be said, except that the company would do well to concentrate its efforts on development of this promising showing, in such a manner as to avoid the pitfalls encountered by so many of the lode miners of Yukon and elsewhere; and when funds are supplied for purposes of development, let them be expended towards acquiring a reasonably exact knowledge of the deposit, rather than in the placing of elaborate machinery, which it may become necessary to scrap before installation is complete or in other surface ornamentation.

ELDORADO DOME SAMPLES ASSAY SHEET No. 5

Sample No.	Material.	Colour	Weight Lbs.	Weight oz	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag	Value per ton. $	Value per ton. c.	Width of sample Ft.	Width of sample In	Check assay (b) Au.	Check assay (b) Ag	Remarks.
41	Quartz	White	8	0	Slightly mineralized with pyrite	From dump of 50 ft. shaft	.04	[illegible]		83			trace	nil	
357	Quartz with a little schist	White to greyish	4	0	nil.	From open-cut Robin M. C. Sketch p.44	trace				1	3	[illegible]1	nil	
358	Quartz	White to grey	3	10		From vein which showed numerous particles of free gold	.04			80	1	3	0.02	nil	Quartz is associated with crushed schists. Both carry free gold
359	Quartz	Translucent	3	12		Centre of Cut Fig. 14	trace				0	4	nil	nil	
360	Quartz	White	4	4	A little iron pyrite.	Open-cut, p. 44	.04			80	1	3	0.02	nil	

(a) Assays conducted by Mr. Wm. C. Stone of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

BEAR CREEK

Claims visited here in company with John Whitelaw of Dawson were: Gordon, Virgin and Jem 1.

GORDON MINERAL CLAIM.

This claim is held by Mr. John Whitelaw of Dawson, and is ungranted.

It is situated on the north slope, or right limit, of Discovery pup half a mile up the pup from the right limit of Bear creek, the pup joining Bear creek two miles above the latter's entry into Klondike river.

Development. A tunnel is here driven into the side hill, for a length of some 40 feet, in a N. W. direction, the entry being about half a mile distant from, and elevated 300 feet above the mouth of the pup, and an estimated distance of 500 feet from its bed.

A small open-cut is located about 150 feet N. W. from the entry and 100 feet higher in elevation.

Topography. The ground rises rapidly on both sides of the pup, and at a distance of some 3,000 feet northwesterly from its bed, in line with the tunnel, the rise in elevation is about 750 feet, the summit being much better wooded than the lower slopes. Poplar and stunted spruce from 2 in. to 6 in. on the stump prevail together with some white birch.

Quartz. For several hundred feet up this slope, outcroppings of quartz are seen for a width of over 50 feet, indicating its wide distribution over the property, but aside from the tunnel and one small open-cut, nothing has been done to prospect it.

N[illegible]f Deposit. So far as could be learned by the meagre development [illegible] deposit consists of a mass of micaceous or sericitic schists [illegible]schistose quartzites, the latter generally of an ochreous colour, [illegible]ng red oxide and darker iron stains.

[illegible] non-persistent stringers of quartz were observed in the tunnel, [illegible] or two inches in thickness and much broken; the largest [illegible] not exceed $2\frac{1}{2}$ in. Veins of decomposed talcose material up to 4 inches in thickness occur cutting the schist mass in a more or less regular manner. The schists have, here, a prevailing dip of 30° north northeasterly.

The quartz is milky to greyish in colour.

The whole mass appears mineralized with sulphides, and stains of carbonates prevail, the schists generally being much spotted with green of malachite and bright blue of azurite, also with brown of iron oxide-

The schists are soft and crumble when exposed to the atmosphere. Those from the dump at the tunnel present characteristics almost identical with some found in the open-cut at the Lone Star mine, Victoria gulch, with the difference that here was noted the green and blue spotted appearance referred to above.

Both quartz and schists carry minerals; those observed being iron and copper pyrites, decomposed or partially oxidized carbonates of copper, and some galena.

Sampling.—Five samples numbered 45—44 were taken from the above-mentioned tunnel, and two others, Nos. 63 and 64, from surface exposures on the hillside. (See assay sheet No. 6.) Only one of the lot assayed over a trace in value, e.g. No. 45, located 5 feet from the mouth of the tunnel, assayed 75 cents per ton.

Conclusion.—From the facts outlined above and the absence of free gold in any of the pannings, it may be inferred that, so far at any rate, this prospect has not disclosed anything of economic value.

VIRGIN MINERAL CLAIM, BEAR CREEK.

This claim is now owned by Mr. Gus Ericson, who acquired it from Mr. John Whitelaw. During the time of examination in June, Mr. Ericson was not on the property, and no work was being done. At his request it was again visited by appointment on September 24, but his cabin was closed and he was absent.

Location.—It is situated on the left limit and near the mouth of Discovery pup where the latter enters the left limit of Bear creek.

It may here be remarked that there are really two pups designated as Discovery, one entering from the right and the other, opposite it, entering from the left limits of Bear.

Topography.—The ground rises quite steeply, at an angle probably of 60°, from the creek to a secondary plateau, or bench, elevated some 300 feet higher than the creek bed at the mouth of the pup, and over a portion of this plateau placer mining operations had been conducted by Messrs. Barril and Sauterre, and some 10 or 12 feet in depth of surface, consisting of quartz and schist gravels, and soft schist bed rock, were thus removed over an area of some 600 feet east and west by 100 to 225 feet north and south.

The gravel dump from these workings shows prevalence of chlorite schists interbanded with sericite, and again with quartzose material; a proportion of finely ground up quartz was also noted. The schists of the dumps being comparatively soft, are considerably worn. In size they vary from a couple of inches in diameter, or width, and 1 inch thick, to 6 and 8 inches in greatest diameter, and 2 or 3 inches thick.

Discovery Pup, looking in a N.W. direction up the pup from Bear creek. Keystone drill, in the foreground, is testing the gravels on the right limit of the creek.

Quartz found on the dump is not much worn and the proportion is small. This is a typical example of a characteristic feature of the district, thus appropriately described by Mr. McConnell[1]:—

"A section across the valley of any of the gold bearing streams entering the Klondike shows a comparatively narrow trough-like depression below, from 150 to 300 feet deep bordered on one or both sides by wide benches beyond which the surface rises in easy, fairly regular slopes up to the crests of the intervening ridges. The benches represent fragments of older valley-bottoms partially destroyed by the excavation of the present valley."

Auriferous gravels occur on the portions of the old valley bottoms still remaining.

Previous Work. Detailed information as to the result of placer operations referred to above are not available, but the work thus performed has assisted materially in later prospecting of the area for the purpose of developing lode values.

A trench cutting this area for a length of 225 feet in the direction S. 80° W cross-cuts the bed rock and exposes light coloured laminated, and partially decomposed, sericite schists, which strike, generally, in a northwesterly and southeasterly direction.

With these schists occur bands of reddish brown and amethystine coloured schists, in conjunction with quartz stringers and lenses, of similar colourings, probably due to the presence of iron protoxides. The quartz bodies have the general strike of the schists.

Usually, the quartz individuals, though lacking in continuity, occur within a narrow belt of the schists which appears to strike in an easterly direction clear across the pup, as outcroppings are found on the opposite side and at intermediate points for a distance of several hundred feet.

Development of Quartz. Present workings in addition to the placer operations above noted comprise:

(1) A shaft.
(2) A trench 50′ S. E. from the shaft.
(3) A tunnel driven 10′ into the hill.

(1) The shaft is sunk near Discovery post to the depth of about 20 feet. The first eight feet contain but little quartz; with increasing depth stringers and bunches were encountered, and, for the last ten feet the

[1] Part B, Ann. Rept. Geol. Survey, Vol. XIV, p. 28B. McConnell on Klondike Gold Fields.

excavation is largely in quartz. For the whole depth the proportion of quartz excavated would be about 40 per cent. A sample, No. 369, taken clear across the bottom, (4′ wide) panned good colours of gold.

(2) The prospect trench is 50 feet E. by S. E. from the shaft. It contains bunches of quartz with but little definite form.

The quartz is characteristic of the district as so far described, that is to say, on seams or fracture faces it is generally rusty, though this is, at times, varied by pale to darker brownish, and again reddish colours. The lighter coloured variety usually exhibits a greasy lustre.

Two samples, Nos. 50 and 57, both panned good colours of gold, and a small proportion of iron sulphides.

(3) The tunnel is driven on a system of partially interlacing veins and stringers of quartz, dipping generally N. E., through the schists, at angles of 30° to 60° and having a northwesterly strike.

The face of the tunnel comprises about 25 per cent quartz.

The whole mass of quartz and enclosing schists is much disturbed, broken and crushed, so that little regularity may be counted upon. Schists are of chlorite with lighter bandings of sericite.

The quartz is white and lean looking, except where fissured or fractured, when it is coated with the usual rusty stain, due to the oxidation of sulphide minerals. At times it occurs "frozen" to the schists at the contact.

Minerals noted are pyrites, galena and gold. Four samples were taken from the tunnel, and all showed colours of gold in the pan. The assays are not so uniformly favourable, but sample No. 65, taken from quartz in the face of the tunnel, assayed $16.58, which, in conjunction with the favourable show from pannings, would indicate that promising results might follow further opening up of this prospect.

Of ten samples taken from the Virgin claim, all but one showed colours of gold in the pan, and while it would be useless to attempt to work out an average value of the deposit from assay results which mostly show only traces, it may be asserted that a mill test of quartz from either of the openings referred to might be expected to demonstrate workable values.

In this connexion it was stated by parties supposed to be in Mr. Ericson's confidence, that he had ordered a mill and expected to have it in operation next season.

JEAN I MINERAL CLAIM.

This claim is controlled by Mr. John Whitelaw. It lies along Discovery pup, adjoining the Virgin claim on the south or southwest.

Development work consists of one prospect trench, or open-cut, 40 feet into the side hill, on the left limit of, and about 300 feet from the pup bed. It is about 1,000 feet southerly from the shaft on the Virgin claim, and the elevation is 25 feet below that of the said shaft.

This trench cross-cuts a portion of a ledge of quartz, of an ochreous colour which is much fractured. It strikes northerly and southerly, through the enclosing schists and is illustrated in Fig. 8.

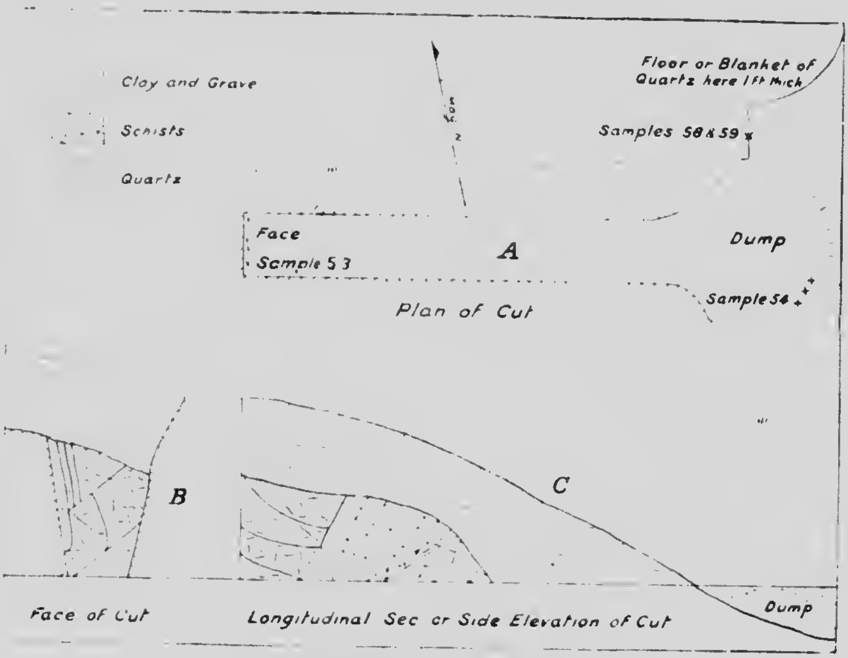


FIG. 8. Sketch showing work on Jean I M.C.

Finely banded quartz schists occur interbanded with chlorite schists and a 2″ stringer or sheeted vein of quartz cuts the schists and parallels the main ledge, but dips towards it as shown in sketch. The whole mass shows numerous fracture seams at right angles to the bedding planes or schist folia.

Near the entrance, and a few feet northward of the trench, a small showing of quartz is uncovered. This is characterized by horizontal bedding and is 1′ thick. Sufficient work has not been done to properly uncover this ledge so that its probable extent could not be gauged.

One sample was taken from the dump and panned a small show of colours of gold, with assay a trace. Three other samples taken gave only traces when assayed and nothing but a slight show of pyrite minerals in the pan.

(See Samples 53, 54, 55, 59 on assay sheet No. 7.)

CREEK SECTION.

About 400 yards up Bear creek, beyond the mouth of Discovery pup, and on the right limit of the creek, occurs an outcrop of 'country' which was reported locally as being a likely prospect. A section is here shown as typical, and indicating some regularity of formation. On examination, however, nothing was seen in the nature of a gold prospect.

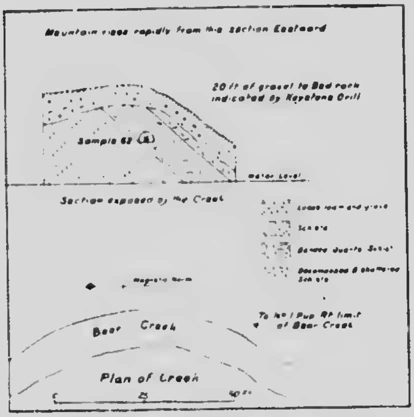


FIG. 9. Outcrop of schists, Bear creek.

This cross-section is exposed as a result of the creek having cut its way through the bed rock. It is characterized by micaceous or sericitic schists, similar to those described as occurring at Victoria gulch, and here thrown up at an angle of 40° to 50°, the dip being S. E. and the strike about N. 80° E., the schist folia running regularly with the dip. This micaceous schist rock is overlain conformably by a bed of either banded quartz schists, or laminated schistose quartzite firm and regular for a thickness of 8 feet, an additional 2 feet on the upper side being decomposed and crushed. This upper schist is interbanded with thin sheets and stringers of quartz. About 6 feet of loose gravel and loam form the surface overburden. The southern end of the section is adjacent to No. 1 pup at its entry on the right limit of Bear creek.

A small prospect opening had been started about the centre of the above section, and from this, one sample, No. 62, was taken, which proved of no value.

BEAR CREEK SAMPLES—ASSAY SHEET No. 6.

Gordon and Virgin Mineral Claims.

Sample No.	Material.	Colour.	Weight Lbs.	Weight Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $	Value per ton. c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
45	Schist	Grey to brown..	8	2	Copper and iron pyrites	5 ft. in from tunnel mouth	·02	·60	0	75	3	0	trace	nil	Gordon Mineral Claim.
46	Schist	White to grey	8	14	Pyrite	15 ft. from tunnel mouth.	nil			-	3	0	trace	nil	Gordon Mineral Claim.
47	Quartz and Schist.	White to tan	8	13	Pyrite and galena and some carbonates .	25 ft. from mouth	trace				3	0	trace	nil	Gordon Mineral Claim.
48	Quartz and Schist.	Pale green to reddish	10	7	Pyrite	30 ft. from mouth	trace				3	0	trace	nil	Gordon Mineral Claim.
49	Schist	Rusty or grey with brown spots ..	7	10		Face 40 ft. from mouth	nil				4	0	trace	nil	Gordon Mineral Claim.
63	Quartz	White	6	15		Trench above tunnel	trace						trace	nil	Gordon Mineral Claim.
64	Quartz	White	8	10		Outcrops on summit of claim	nil						trace	nil	Gordon Mineral Claim.
50	Quartz	White to rusty	9	15	Good colours of gold	Trench 50 ft. S.E. from shaft	nil				2	0	trace	nil	Virgin M. C.
57	Quartz	White to rusty .	7	0	Good colours of gold	Trench 50 ft. S.E. from shaft...	trace				2	0 0	·88	nil	Virgin M. C.

BEAR CREEK SAMPLES—ASSAY SHEET No. 6—*Continued*

Gordon and Virgin Mineral Claims.

Sample No.	Material	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $	Value per ton. c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
51	Quartz ..	White to reddish..	8	8	Several fine colours of gold ..	Shaft dump ..	trace						0·005	nil	Virgin M. C.
58	Quartz ...	White to rusty	6	13	Several fine colours ...	Shaft dump	nil		–		–		0·07	nil	Virgin M.C.
369	Quartz	Rusty	6	6	Good colours of gold	Shaft bottom ...	trace				4	0	trace		Virgin M. C.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

BEAR CREEK SAMPLES ASSAY SHEET No. 7

Virgin Mineral Claims, (cont.), Jean I and Creek Section Mineral Claims.

Sample No.	Material	Colour	Weight Lbs.	Weight Oz.	Minerals in pan	Location	Assay in ounces (a) per ton of Au	Assay in ounces (a) per ton of Ag.	Value per ton. $ c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
56	Quartz	White to violet	4	4	Gold colour	Excavated material from tunnel	·03	·05	0 63			0·01	nil	Virgin M. C.
60	Quartz	White	7	11	Colour of gold	Tunnel	trace			1	0	trace	nil	Virgin M. C.
61	Quartz and schist	White to grey	7	9	Colour of gold	Tunnel	trace			2	6	0·02	nil	Quartz 2' Schist 6" face of tunnel.
65	Quartz		3	12	Very fine colours of gold and some pyrites	Face	0·82	·32	16·58	0	6	0·53	4·80	Virgin M. C.
52	Schist and a little quartz	Grey to green	8	9	nil	Open cut 400' S.W. of shaft	nil					trace	nil	Virgin M. C.
53	Quartz	Rusty	6	0		Face of open cut	trace			5	0	trace	nil	Jean I M. C.
54	Quartz	Rusty	5	10	Colour of gold	Dump of cut	trace					trace	nil	Jean I M. C.
55	Quartz and schist	White to grey	9	9	nil	Quartz floor north of dump	trace			2	0	trace	nil	Jean I M. C.
59	Quartz	White to grey	7	0		Quartz floor north of dump	trace					trace	nil	Jean I M. C.
62	Schist	White to grey	8	3	Small show of pyrite	Rock exposure shown in section Fig. p. 46	nil			2	0	trace	nil	See Fig. 9 outcrop of schists

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

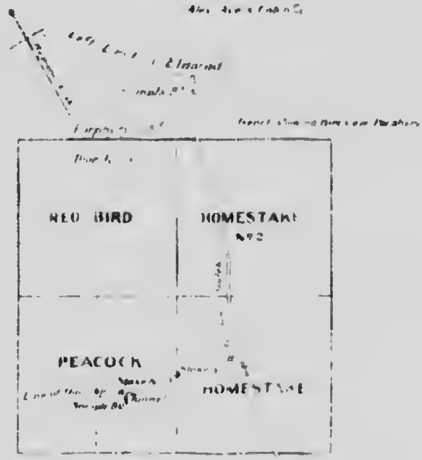
GOLDEN GULCH.

Golden gulch or 41 pup, may be described as situated on the left limit of Eldorado creek, four miles distant from Grand Forks.

CULLEN GROUP.

The property here visited consists of four crown-granted claims, owned by Mr. David Cullen and associates, of Dawson.

The claims are Red Bird, Peacock, Homestake, and Homestake No. 2.



"A" Shaft 4' x6' 55' down and an 8' tunnel up the hill, eastward.
"B" 15' from surface to drift which is 54' and at right angles to the pup.

Fig. 10. Four Crown-granted claims owned or controlled by David Cullen of Dawson.

General Description. The country rock is sericite and chlorite schist, dipping 20° to 25° to the east and fairly regular. Quartz masses, sheets, lenses and stringers are intruded into the schists, the latter being in places bent or bulged to permit of the intrusion. Finely interbanded quartz and schist is also found, the whole being cut by interlacing veins and stringers of quartz. Generally there is a close similarity to the formation described as occurring at Victoria gulch, but here the quartz shows in heavier bodies and the schists are less crushed and metamorphosed

The quartz is characteristic of that found in previous deposits visited, being of a hard and light coloured variety, stained by iron oxides which give it a rusty appearance on fractured or cleavage faces. A variety also was seen characterized by the presence of reddish feldspar.

The quartz is widely distributed throughout the country rock, being found both on the hill slopes and in the bed of the gulch.

Minerals noted are iron pyrite, chalcopyrite, and some bornite, occasionally partially decomposed copper carbonates (azurite and malachite).

Of the four claims referred to, the Peacock and Homestake are the two which evidence some little development work.

Peacock Mineral Claim. Work here consists of (1) a tunnel situated about as shown (Fig. 10) and driven N. 65° W. into the hill, the mouth of the tunnel facing the gulch; (2) a cross-cut trench at the mouth of the tunnel.

The elevation here is approximately 2640 feet, being 160 feet above the mouth of Golden gulch, and 910 feet above Grand Forks, the elevation of which is 1730 feet.

This tunnel cross-cuts a number of lenses and stringers of quartz in the manner illustrated in Fig. 11.

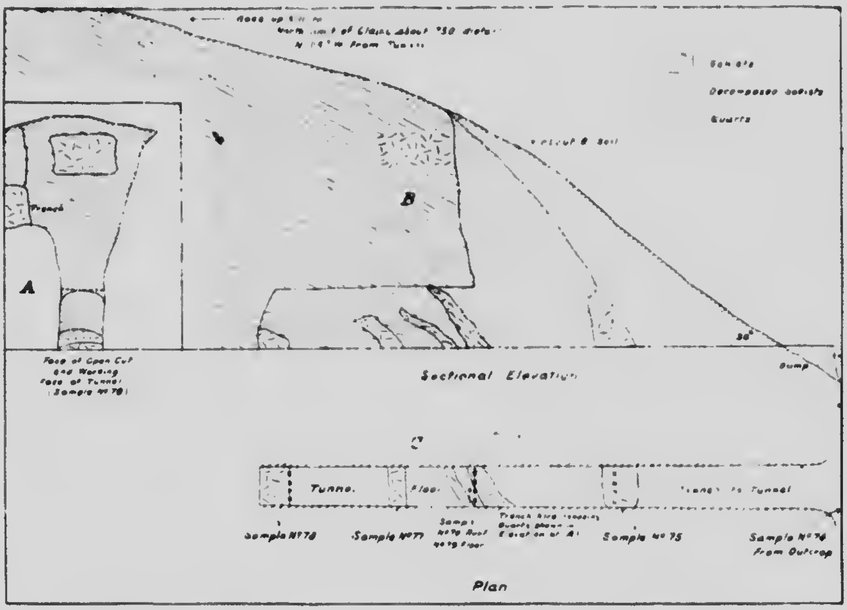


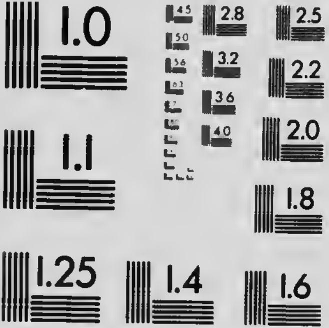
FIG. 11. Sketch illustrating occurrence of quartz in tunnel on Peacock M.C. Golden gulch.

Fully one-third the excavation is in quartz.

A line of quartz outcroppings was noted extending along a ridge back from the tunnel N. 65° W. for several hundred feet. Sample 80 was taken from one of these croppings, about 150 feet from the tunnel.

MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



Indications are that a cross-cut trench on this belt would expose a condition similar to that found at the entrance of the tunnel, where heavy masses of quartz reach to within a foot of the surface, thus exhibiting a series of lenses and stringers which strike in a N.W. and S.E. zone, and dip easterly.

Of six samples from the tunnel, one from the face, No. 78, assayed 42 cents; the other five gave no values. Seven samples in all were taken from this claim and none of these showed any gold either in pannings or in the assay, except No. 78 above mentioned.

Homestake Mineral Claim, Golden Gulch.—Formation is here exposed by the creek, and is found to consist of the usual sericite and chlorite schists, with the addition of some talcose material.

Finely banded schists occur intersected by lenses and stringers of quartz crossing the gulch E. and W., and varying from fractions of an inch to 18 inches in thickness. Forty feet of trench, which runs along the bed of the gulch from shaft B (Fig. 10) exhibits a large proportion of quartz, the individuals occurring at intervals of a couple of feet.

Work on this claim consists of the two shafts A and B (Fig. 10), and the prospect trench referred to above, running from shaft B in the creek.

On account of the workings being filled with water, they were not accessible, but according to Mr. Cullen, shaft A, 4 × 6—55 feet deep, has an eight foot drift from the bottom in an easterly direction. The dump from this shaft shows chiefly sericite schists, with a very small percentage of quartz, the whole containing small quantities of pyrites. The mouth of the shaft is 25 feet above the bed of the gulch.

One sample of quartz and schist from the dump (No. 84) gave no values.

Shaft B is located in the bed of the gulch. It is 15 feet deep, and from it a drift was made 54 feet in length, at right angles to the gulch.

The dump consists largely of a green banded rock together with stringers of quartz and feldspar and some green schists highly mineralized with copper pyrites. Samples 82 and 83 were taken from the dump, and, though neither showed gold in the pannings, the latter assayed $1.16.

GOLDEN GULCH SAMPLES*—ASSAY SHEET NO. 8.

Peacock and Homestake Mineral Claims, etc.

Sample No.	Material	Colour	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
74	Quartz	White to grey...	7	12	–	Colleries tunnel dump	nil					trace	nil	Peacock M. C. trial sample.
75	Quartz	White to rusty...	6	14	Iron.. . .	15′ in on cut Fig. 11 p. 51	trace		–	4	0	trace	nil	Peacock M. C.
76	Quartz	Dull white.... .	8	6	Pyrite crystals	Present tunnel entry	nil		–	4	0	trace	nil	Taken on roof.
77	Quartz and schist	White grey green..	7	14	Iron and copper pyrite....	10′ from tunnel face	nil		–	4	0	trace	nil	
78	Quartz and some schist.	White grey....	9	0	Iron.	Quartz in face of tunnel	·02	·03	0·42	4	0	trace	nil	
79	Quartz......	–	9	0	–	Present tunnel entry	nil		–	4	0	trace	nil	Taken on floor below No. 76.
80	Quartz......	White.... . .	6	11	Pyrite ...	Outcrop on hill 150′ beyond tunnel	trace		–	2	0	trace	nil	
81	Quartz....	White reddish	7	6	Considerable iron and copper pyrite ..	Creek bed 150′ S. 80 W. from Alex. Ayers' cabin...	trace		–	1	0	trace	nil	Trial sample of quartz in bed rock. See Fig. 10.
82	Quartz and schist	White........	7	6	–	Material from Shaft B.	nil		–			trace	nil	Homestake M. C. Shaft is in the bed of the Gulch.

GOLDEN GULCH SAMPLES* ASSAY SHEET NO. 8—*Continued.*

Peacock and Homestake Mineral Claims, etc.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c	Width of sample. Ft. In.	Check assay (b) Au. Ag.	Remarks
83	Quartz and schist	Greenish	10	0	Speckled with copper pyrites...	Also from Shaft B	·04 –	·63	1·16	–	trace nil	This is a green banded rock with quartz stringers.
84	Quartz and a little schist....	Cream to yellow	7 –	0	Pyrite...	Material from Shaft A.	nil		–		trace nil	Homestake M. C.

*See Figures 10 and 11.
(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

VIOLET GROUP.[1]

This group consists of four claims and a fraction, all crown granted, as follows:—

"Big Jim," "Violet," "Violet and Ruth Fraction," "Ruth" and "Lady Gay," situated about 5 miles from Grand Forks, on the divide between Eldorado and Ophir creeks, the latter a tributary of Indian river.

It is reached from Grand Forks by driving around the head of Eldorado, crossing on the divide between Eldorado and Caulder creeks, and back along the ridge overlooking Eldorado, left limit; the whole distance being about 10 miles, and the elevation, in the vicinity of the mine, varies between 3,400 and 3,500 feet.

History.—It was not learned when these claims were first staked, except that it was previous to 1905. Mr. T. G. Wilson, then resident in Dawson, promoted a company to open up the mine. Operations began on a considerable scale, and the equipment and works, described more in detail below, were established.

Work continued under this regime up to 1907, when it is said that the expenditure of $60,000 had been made. The funds then became exhausted, and the property was sold by public auction, in September, 1910, and acquired by the present owner, Mr. H. H. Honen, of Dawson. The latter has, so far, done nothing with it. Little information is now available as to the results obtained for the above considerable expenditure.

The shafts, and underground workings, are filled with water, or frozen up, and very little surface work, by way of exposing the deposit, was done, and most of it is now partially filled with debris.

The remnant of an assay plant was found in the shaft house.

A gravity tramway was partially constructed, of native timber, for a distance of some 3,500 feet, descending on a slope of 10° to 15°, and terminating in a high trestle, at Ophir creek. This was to have been the mill-site, where a small stream of water flows—continually it is said—in the creek. The above was an ill-advised undertaking, as the money was needed to prospect and prove the value of the ore bodies.

If, as mentioned above, $60,000 had been expended, it may justly be said at this time that it should have furnished much more reliable information as to the true status of this deposit than appears now available from any source.

Description of Deposit.—As a r   of their prospecting operations, the owners came to the conclusion that this deposit consisted of three

[1] McConnell, Part B, Annual Report Geological Survey, 1905, Vol. XIV, p. 65B.
Cairnes, Sum. Rep. Geological Survey, 1911, pp. 37-38.

quartz veins, one of which strikes easterly[1] with the enclosing schists, but dips across them.[2] This had been uncovered by an open-cut for a length of 50 feet and found, by Dr. Cairnes[3], to vary from three to six feet in width. McConnell also describes it as broken by several small faults.

At the time of examination this open-cut was partially filled by debris. As a result of this, and the inaccessibility of the shafts, little could be learned at first hand from the development previously carried on. As a result of some surface trenching, however, in addition to outcroppings, it was learned that the quartz occurs plentifully in a belt, which varies in width from a few feet, to upwards of a hundred feet, striking easterly and westerly for several thousand feet, and embracing the vein referred to above.

The quartz occurs, generally, in individual masses, from a few inches up to six feet in width, and ten feet or more in length, and while there may be lack of regularity and continuity to the individual quartz bodies there is decided continuity to the belt, which may be traced through, and beyond the property easterly towards Glacier pup.

Considerable detail work would be necessary to absolutely define the width of the quartz zone, but, on outcroppings along the ridges and exposures at different places, it is evident that there is a close similarity to conditions found at Victoria gulch, and that the quartz is here also very widely distributed throughout the schists. The quartz is crystalline, of a rusty or ochreous colour, and contains reddish feldspar, giving it a pegmatitic appearance.

Minerals noted were iron and copper pyrites and galena.

Development.—Workings consist of main shaft, $4' \times 6' - 150'$ deep, with shaft house about $12' \times 30'$; head sheave, etc. A power hoist had been in use, but at present nothing but a hand windlass remains.

Some drifting had been done,[4] but, as stated, this could not be seen.

A quartz pile of about 150 tons was made near the shaft, and the waste dumps carried perhaps 10 per cent of quartz, the balance being schist. Probably one-third of all material excavated would be quartz. This shaft is located towards the western limit of the Violet claim. (See plate VI, p. 12.)

Two other shafts, 35′ and 55′ respectively, are located westerly from the main shaft, and are on the Ruth claim.

A number of open-cuts or trenches have exposed some quartz, both easterly from the main shaft on the Violet claim, and westerly on Ruth and Lady Gay.

[1] Bearings given throughout this report are magnetic, the variation being 35° east. The above would, therefore, be about southeasterly, Astron.
[2] McConnell, R. G., "Report on Klondike Gold Fields," An. Rep. Geol. Survey Can., 1905, Vol. XI, p. 65B.
[3] Cairnes, D.D., "Quartz Mining in Klondike District," Sum. Rep.Geol. Survey, 1909, pp.16-22.
[4] Cairnes, D. D., "Quartz Mining in Klondike," Sum. Rep. Geol. Sur., 1909, pp. 16-22.

It was decided that, in addition to sampling outcrops and exposures, a liberal sampling of the quartz pile would afford most valuable information. Six samples were, therefore, taken from the latter, one of which (No. 90) was quartered down from 1,250 lbs. This assayed $2.51; No. 89 assayed 98c. while four others gave only traces.

It may be noted, by referring to samples tabulated on Assay Sheet No. 9, page 58, that not one colour of gold was panned in some 25 samples from Nos. 85-109, and, further, that of the six samples (Nos. 85-90), from the 150 ton quartz pile, only the last two assayed over a trace, and only five samples in twenty-five assayed any values.

It is not pretended that the assay results here given are conclsiuve or that they represent an average of this deposit; an analysis of results leads to the same conclusion as in the case of the Lone Star, namely, that a thorough mill test is the best means of deciding definitely as to whether this property is workable. There is no question about a very large tonnage of quartz being available. Results of the above sampling are, however, only moderately encouraging.

VIOLET GROUP SAMPLES—ASSAY SHEET No. 9.

Sample No.	Material.	Colour.	Weight. Lbs. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au. Ag.	Value per ton $ c.	Width of sample. Ft. In.	Check assay (b) Au. Ag.	Remarks.
85	Quartz	Rusty	6 - 14	Pyrite.	From 150 ton quartz pile at main shaft	trace	–	–	0·01 nil	
86	Quartz	Rusty	8 - 2	Pyrite	From 150 ton quartz pile at main shaft	trace	–		0·02 nil	
87	Quartz	White to rusty	8 - 2	Pyrite	From 150 ton quartz pile at main shaft	trace	–		trace nil	
88	Quartz	White to rusty	8 - 0	Pyrite	From 150 ton quartz pile at main shaft	trace	–	–	trace nil	
89	Quartz	White to rusty	8 - 9	Galena and Iron	From 150 ton quartz pile at main shaft	·04 - ·32	0 98	–	0·01 nil	
90	Quartz	White to rusty	1,250 lbs.	Galena and Iron pyrite	From 150 ton quartz pile at main shaft	·10 - ·08	2 51	–	0·07 nil	This sample was broken by hammers, and quartered down.
91	Quartz	White to rusty	8 - 3	Pyrite	Boulder outcrop 420′ s 75 W. from main shaft	trace		3 0	trace nil	
92	Quartz	Greyish	7 - 8	Pyrite	Trench 15′ SW from No. 91	nil		0 6	trace nil	
93	Quartz	White to rusty	7 - 9	nil	Dump of 35′ shaft	trace	–	–	trace nil	
94	Quartz	White	9 - 7	nil	Open-cut 1,500 W of main shaft	nil	–	3 0	trace nil	Section on lead 6′.
95	Quartz	Rusty	10 9	nil	Adjoining sample No. 94	nil		3 0	trace nil	

96	Quartz	White to rusty	8	6	nil	Crushed quartz in contact with outcrops of No. 91......	nil		2	0	trace	nil
97	Quartz ..	Grey to rusty	7	8	Iron and copper pyrite, galena and malachite...	Trench 150' SW from 35' shaft.....	·09 – ·59	2 14	2	0	trace	nil

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

VIOLET GROUP SAMPLES (*Cont.*)—ASSAY SHEET No. 10.

Sample No.	Material.	Colour.	Weight. Lbs.	Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Ag.	Value per ton $ c.	Width of sample Ft.	In.	Check assay (b) Au.	Ag.	Remarks.
98	Quartz	Grey to rusty	7	8		Same trench as No. 97	·13	·55	2 91	2	9	0·11	nil	Crushed and ground up stringers.
99	Quartz	Greyish	8	0		Trench about 250' S.E. from main shaft	nil			1	0	trace	nil	Quartz stringers
100	Quartz	White grey dark	7	12	A few particles of pyrite	Trench about 165' N. 20 E. from road and 700' W. from main shaft	nil			0	6	trace	nil	Vein of 6" width
101	Quartz	White grey	7	8		Trench 15' west of No. 100	nil			2	0	·005	nil	Quartz stringers
102	Quartz	Milk white	6	2	Some galena	Outcrops on roadside 400' S.E. from large cut sampled by No. 94	nil			1	0	trace	nil	
103	Quartz	Rusty	8	1	Some galena	1,500' W. from main shaft same as No. 94 and 95	trace	·55	0 31	6	0	0·01	nil	Trial of excavated material.
104	Quartz and reddish feldspar	White to reddish	5	7	A little pyrite	Trench 15' S. of road 1,250' west of No. 94	trace					trace	nil	About 300' west of mill site at foot of gravity tram.
105	Quartz	Reddish brown	4	3	A little pyrite	Dump of shaft on other creek								About 300' west of mill site at foot of gravity tram.

106	Quartz and schist	Dull white to black.	3	6		Trench about 500 w. of tramline and 2,000 down hill	nil			Trial sample.
107	Schist	Pale green to reddish	7	9	Considerable pyrite	Trial sample from dump of 150' shaft	trace		trace	nil Banded schists.
108	Schist	Grey to reddish brown	8	1	Copper and iron pyrite and galena	Trial sample from dump of 150 shaft	trace		trace	nil
109	Quartz					Trench on road 5,000 E. from shaft	trace		trace	nil

Note.—The above must all be regarded as merely trial samples, over a large area exhibiting quartz widely distributed.

a. Assays conducted by Mr. Wm. C. Simo of Dawson, Y.T.

b. Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

INDIAN RIVER TERTIARY ROCKS.[1]

Some fifteen claims are here staked, presumably on conglomerate. The claims extend generally easterly and westerly, or somewhat northeasterly and southwesterly, in line with Britannia, or Discovery claim, which was staked by Donald MacKinnon, and is located on the right limit of MacKinnon creek, between three and four miles from its mouth, at Indian river.

FIG. 12. Group of claims on MacKinnon creek.

This property was reached by driving, with Alex. Ayers' team, from the Violet mine, over the divide at the head of Eldorado creek, thence down Calder creek to Quartz, down Quartz to Indian river, up Indian river, passing the Indian river roadhouse, to the mouth of MacKinnon creek, thence, as noted above, three to four miles up the creek, the whole distance from the Violet being about fifteen miles, and, by direct stage road from Dawson, thirty-three to thirty-four miles.

[1] Compare McConnell, R. G., Ann. Rep. Geol. Survey, Can., 1905, part B, Vol. XIV, pp. 65B and 66B.

Britannia claim is the only one crown-granted. The principal owners are Messrs. Donald and Archibald MacKinnon, brothers who kindly placed one of their cabins, fully equipped, at the disposal of the examining party.

This deposit had been much in the public eye, locally, for some years, and, on account of its rather exceptional character, considerable attention was given it, with a view to ascertaining its extent, as well as the gold content, in the immediate vicinity of the creek.

Nature of Deposit. It is a conglomerate, which consists, generally, of well rolled, oval shaped, white, quartz pebbles, varying in size from a fraction of an inch to several inches in greatest diameter, the average being probably under an inch; together with a less percentage of smaller schist pebbles, the whole conglomerated or cemented together by a white, or light grey, siliceous paste, the latter composed of the more finely ground up particles, or grains, of quartz and schist.

Mr. McConnell, writing in 1905, says:[1] "Assays of several dollars to the ton are reported from this conglomerate, and a mill test of two tons, at the government stamp-mill at Dawson, gave $2.24 per ton. The gold is detrital, occurring in the matrix, and the deposit may be considered an ancient placer, probably of beach origin."

By comparison of typical specimens of this mass, and material from the Barnes mines, which is in a portion of the White channel at Lovett gulch, it cannot but be noticed that the two are almost identical, except in the matter of hardness.

It is altogether likely that there is a close genetic relation between the two, the present difference being due to the fact that the White channel so-called, is found generally overlying schist bed-rock; while the conglomerate is associated with igneous andesites, and a variety of volcanic rocks, as trachytes, porphyries, phonolites, etc., the latter probably accounting for agencies which produced the cementing together of the gravels.

Some portions of the deposit are very firmly conglomerated, while others again are found but weakly bonded, and easily reduced to condition of loose gravel.

This cementing action has taken place over a comparatively wide area, embraced in that section south of Indian river, which extends from a point opposite Quartz creek, eastwardly, across MacKinnon to and beyond Montana creek, a distance of some eight or ten miles; and is now represented by the conglomerates found in the vicinity of MacKinnon and Conglomerate creeks, the latter a tributary of Montana creek.

Throughout this area, however, sandstones and shales are also widely distributed, and igneous masses, referred to above, have cut into the con.

[1] Part B. Ann. Rep. Geol. Survey Vol. XIV p. 66B.

glomerate, to such an extent, that, in the case of each claim, it becomes practically necessary to define the extent of the conglomerate, by trenching and prospecting; more especially, as the portions of conglomerate, presumed to have originally overlaid areas now occupied by the igneous masses, have been eroded and washed down the creeks, resulting in a pockety condition of the remaining portions.

Distribution. The most important individual deposit, so far exposed, is on Britannia claim, owned by Messrs. MacKinnon Bros. It is some 300 feet in width, north and south, and extends from the foot of the hill, on the right limit of the creek, up the face, which slopes at 30° to 35° for the first few hundred feet, then gradually falls to about 10°, or less, towards the rear of the claim, the elevation there being about 1,850', or 275' above the creek bed.

The contact, both north and south, as exposed by surface trenching, is sandstone and carbonaceous shales, which, however, are narrow, being cut off by andesite hills, rising on either side of, and beyond the conglomerate, to elevations between 2,400 and 3,000 feet.

Plate XVI shows an outline sketch, and Plate XVII a photograph, representing the deposit as it appears in elevation, looking east, from the opposite limit of the creek.

A cross-section of the creek valley, looking south, covering portions of Britannia and Thistle claims, shows prophyry underlying the creek and extending in the direction of its left limit, for about a thousand feet westwardly, where conglomerate again occurs.

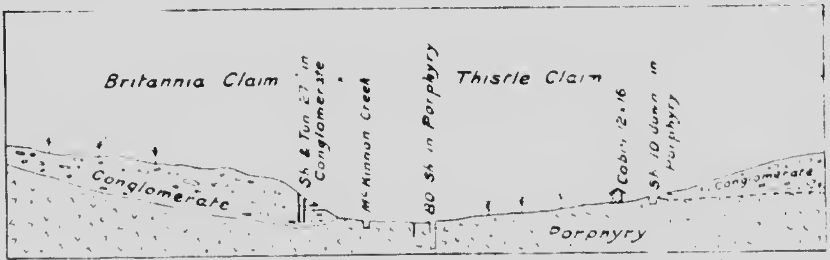


Fig. 13. Ideal cross-section of MacKinnon creek, looking south.

In the latter case, however, its character is considerably altered, the resultant rock being conglomerate of more compact form, darker in colour (a dark bluish shade being prevalent) and, indeed, having its constituent individuals so closely squeezed together as to form a solid crystalline mass; but this, again, grades back to the prevailing type, after a width which, though not well defined, appears to vary from a few feet up to a hundred or more feet.

While it was not possible, in the time available, to absolutely define the limits of the conglomerate found in the vicinity of MacKinnon creek, it was traced, by means of outcrop and trench exposures, easterly and westerly,

The Barnes mine, Lovett gulch. Note the depth of the pay gravel, also the excellent condition of the gobbed boulders. A model little mine. Mr. Barnes is shown in the picture.

Mouth of tunnel, exposing conglomerate, Britannia mineral claim, MacKinnon creek. The group comprises (left to right) Chris. Fothergill, Donald MacKinnon, Archd. MacKinnon.

PLATE XVI.

Britannia mineral claim. Face of conglomerate hill (cut off at creek level) as it appears from the cabin (showing tunnel entrance.)

Face of conglomerate hill, Britannia minera claim. Cabin on Thistle mineral claim in the foreground.

or, as already mentioned, somewhat northeasterly and southwesterly, for a distance of about 4,000 feet, 1,000 feet of porphyry intervening in the creek valley.

As to depth, this has not been proven.

DEVELOPMENT.

Britannia claim. Work on this claim consists of an open-cut, followed by a tunnel, 27 feet into the side hill, as shown in Fig. 14, and a little to

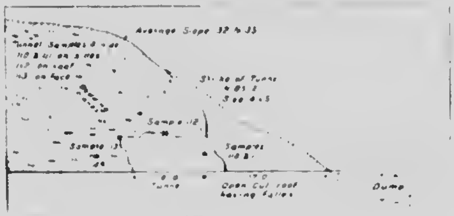


FIG. 14. Section through tunnel of Britannia M.C.

the north of this a shaft, 4′ × 6′ — 60 feet down, now filled with water. Both are in conglomerate. Some trenching was done, at the time of this examination, for the purpose of defining the limits of this deposit.

A two-stamp battery, of steam piston type, was found, dismantled, on the ground. A test had been made with it, by Messrs. MacKinnon, Clarke, and Chris. Fothergill, in 1911, by running through a few tons of the material from the tunnel and shaft dumps. About 50 cents a ton were reported to have been recovered; the small values being due, according to Mr. MacKinnon, to the fact that the gold occurs in too fine a form for amalgamation.

Thirty-one samples were taken from Britannia claim, four being from the tunnel, two from the shaft dump, and others distributed at intervals of 30 to 50 feet, clear across the deposit, in rows, B C, D, E, as shown in Fig. 15.

Of the whole lot, not one assay over a trace was obtained, but three samples (122, 130, and 140), distributed at intervals over the length of the deposit adjacent to the southern contact, showed a few very fine colours of gold in the pan.

Other minerals noted were dark iron sulphides and carbonates (siderite).

For full details of samples see assay sheets 11 12 and 13.

A comparison was instituted above with the deposit of White channel gravels, worked as a placer mine, on Lovett gulch, where values, according to Mr. Barnes, are practically all found in the 6 or 7 feet adjacent to, and including about 18 inches of bedrock. This is illustrated in Plate XIV above. For the year 1911 the average tenor was \$2 per cubic yard. Granting the hypothesis of somewhat similar origin, and condition, for the conglomerate deposit, it would appear probable that prospecting at depth might uncover somewhat similar values. Further prospecting at the contact would demonstrate this.

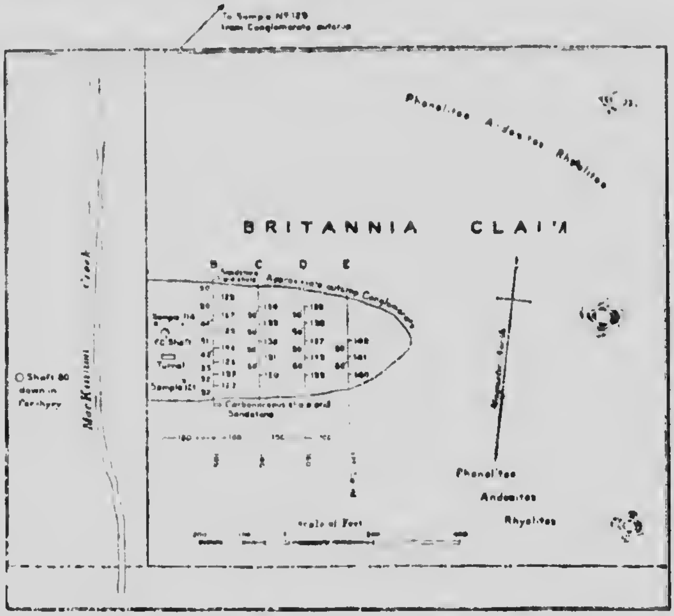


FIG. 15. Sketch to illustrate method of sampling conglomerate on Britannia M.C.

The present shaft, in conglomerate, might, also, be driven to bedrock, which, it is thought, would be reached at no great depth below its present bottom.

Thistle and Adjoining Claims.—On the Thistle claim prospecting consists of an 80-foot shaft, situated 200 feet from the bed of the creek, a shallow shaft about 10 feet deep, near the cabin, and a little surface scratching. These are all in porphyry.

Passing westerly, out of the porphyry, conglomerate is found, extending from the Thistle, into the Canadian mineral claim. The latter is controlled by Mr. Chris. Fothergill; it has a shaft 10 feet down, in conglomerate. Outcrop of conglomerate was also found about 600 feet westerly from the shaft. See sketch of claims (Fig. 12, p. 62). Samples 156 and 155 were taken from the above exposures, respectively, but showed no values.

The Arctic claim was visited in company with Mr. Fothergill, but no exposures could be found for purposes of sampling.

MACKINNON CREEK SAMPLES—ASSAY SHEET NO. 11.

Sample No.	Material	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton $ c.	Width of sample Ft	Width of sample In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
110	Quartz conglomerate	White to grey ..	8	4		Entrance tunnel ..	trace			2	0	0.02	nil	Britannia claim
111	Quartz conglomerate	White to grey ..	8	6		Adjoining No. 110 ..	nil			2	0	trace	nil	Britannia claim
112	Quartz conglomerate	White to grey ..	8	1		Roof of tunnel 5' from face	trace			4	0	trace	nil	Britannia claim
113	Quartz conglomerate	White to grey ..	10	5		Face of tunnel..	trace			4	0	trace	nil	Britannia claim
114	Quartz conglomerate	White to grey ..	8	0		Side of hill 50' north of tunnel	trace			2	0	trace	nil	Britannia claim.
115	Quartz conglomerate	White to grey ..	6	9	—	75' north of conglomerate shaft and 40' up the shaft	nil			2	0	trace	nil	Britannia claim.
116	Quartz conglomerate	White to grey ..	6	15		Same place as No. 115 above	nil			2	0	trace	nil	Britannia claim
117	Quartz conglomerate	White to grey ..	7	15	A very little siderite..	75' south of tunnel in conglomerate	trace			2	0	trace	nil	Britannia claim.
118	Quartz conglomerate	White to grey ..	8	9	—	Dump of conglomerate shaft	trace		—	—		trace	nil	Britannia claim.

MACKINNON CREEK SAMPLES ASSAY SHEET NO. 11 (*Continued*)

Sample No.	Material	Colour	Weight Lbs.	Weight Oz.	Minerals in pan.	Location	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton $	Value per ton c.	Width of sample Ft.	Width of sample in.	Check assay (b) Au.	Check assay (b) Ag.	Remarks
119	Quartz conglomerate	White to grey	8	11		Same as No. 118 above	trace						trace	nil	Britannia claim
120	Chalcedonic quartz	Brownish	6	5		Quartz excavated from 15' shaft	nil						trace	nil	Drumkinnon M. C.
121	Quartz conglomerate	White to grey	8	12	Siderite	50' south of conglomerate tunnel and 60' higher up	trace				1	6	trace	nil	Britannia claim
122	Quartz conglomerate	White to grey	5	0	Siderite	105' level Row B. Fig.	nil				1	6	0.01	nil	Britannia claim

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

MACKINNON CREEK SAMPLES (*Cont.*) ASSAY SHEET NO. 12

Sample No.	Material	Colour	Weight Lbs.	Weight Oz.	Minerals in pan.	Location	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton $	Value per ton c.	Width of sample Ft.	Width of sample in.	Check assay (b) Au.	Check assay (b) Ag.	Remarks
123	Conglomerate	White grey	8	2	Dark sulphides	105' level Row B. Fig.	trace				1	6	0.02	nil	Britannia claim
124	Conglomerate	White grey	7	8		105' level Row B. Fig.	nil				1	6	trace	nil	Britannia claim
125	Conglomerate	White to rusty	8	1		105' level Row B. Fig.	trace				1	6	.005	nil	Britannia claim
126	Conglomerate	White grey green	7	12		105' level Row B. Fig.	trace				1	6	0.01	nil	Britannia claim
127	Conglomerate	Rusty	8	2		105' level Row B. Fig.	trace				1	6	trace	nil	Britannia claim

128	Conglomerate..	White rusty..	6	12		105' level Row B near shale contact	trace	1	6	trace	nil	
129	Conglomerate..	White to rusty.	6	10		About 1500' north of conglomerate tunnel	nil	2	0	trace	nil	Conglomerate outcrop north of Britannia claim
130	Conglomerate..	White to grey .	8	7	Small show of dark iron sulphide and carbonates .	140' level near south contact Row C ..	trace	1	6	·01	nil	Britannia claim
131	Conglomerate..	White to grey .	8	4		Row C. 50' N. of No. 130	trace	1	6	trace	nil	Britannia claim
132	Conglomerate..	White to grey .	9	8	Trace of g i and dark iron sulphide and carbonates ..	Row C. 50' N. of No. 131	trace	1	6			Britannia claim
133	Conglomerate..	White to grey .	8	1		Row C. 50' N. of No. 132	trace	1	6	trace	nil	Britannia claim
134	Conglomerate..	White to grey .	8	13		Row C. 50' N. of No. 133	trace	1	6	trace	nil	Britannia claim.
135	Conglomerate..	White to grey .	0	4	Iron carbonate siderite)	160' level, Row C near south contact	nil	1	6	trace	nil	Britannia claim

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa

MACKINNON CREEK SAMPLES (*Cont.*) ASSAY SHEET NO. 13.

Esperanza and Raven Mineral Claims.

Sample No.	Material	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $	Value per ton. c.	Width of sample Ft.	Width of sample In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
136	Conglomerate..	White to grey .	8	9		Row D. 50′ N. of No. 135	nil				1	6	trace	nil	Britannia claim.
137	Conglomerate..	White to grey .	8	2		Row D 50′ N. of No. 136	nil				1	6	trace	nil	Britannia claim.
138	Conglomerate...	White to grey .	6	8		Row D. 50′ N. of No. 137	trace				1	6	trace	nil	Britannia claim.
139	Conglomerate..	White to grey .	6	12	Dark sulphide and carbonates .	Row D. near N. contact ...	nil				1	6	trace	nil	Britannia claim.
140	Conglomerate..	White to grey .	9	0	Trace of gold.	175′ level Row E	trace				1	6	trace	nil	Britannia claim.
141	Conglomerate..	White to grey .	10	0		Row E	nil				1	6	trace	nil	Britannia claim.
142	Conglomerate..	White to grey..	8	4	—	Row E	nil				1	6	trace	nil	Britannia claim.
143	Quartz and schist	Rusty.	5	13	Large showing of iron and copper pyrites...	6′ in from mouth of tunnel	trace				2	0	trace	nil	Raven M. C. Rock shows speckled appearance, due to minerals noted.

Sample No.	Material	Colour	Weight Lbs.	Weight Oz.	Minerals in pan.	Location	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c.	Width of sample Ft.	Width of sample In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
144	Quartz and schist	Rusty	5	10	Large showing of iron and copper pyrites	6' in from mouth of tunnel	nil		–	2	0	trace	nil	Raven M.C. Rock shows speckled appearance, due to minerals noted.
145	Quartz and schist	Brown	4	12		Stringer at face of tunnel	nil		–	4	0	0·01	nil	Esperanza M. C.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

CONGLOMERATE CREEK SAMPLES ASSAY SHEET NO. 14.

Sample No.	Material	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c.	Width of sample Ft.	Width of sample In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
146	Conglomerate..	White	4	10		Trench Eclipse mineral claim ..	nil			2	0	trace	nil	
147	Conglomerate..	White	6	12		Outcrop on Bull Moose claim..	nil			2	0	trace	nil	
148	Conglomerate..	Dull white to grey	6	0		Trench Goldleaf mineral claim	trace		–	2	0	trace	nil	
149	Conglomerate..	White to bluish	4	15	Minute colour of gold..	Dump of shaft Dolly M. C.	trace			–		0·01	nil	
150	Conglomerate..	White to grey	6	2	Minute colour of gold...	Bottom Eclipse shaft.	nil		–	4	0	trace	nil	

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

CONGLOMERATE CREEK SAMPLES ASSAY SHEET NO. 14—*Continued.*

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au. Ag.	Remarks.
151	Conglomerate	Cream to rusty	1	13		Trench Snowflake M. C	nil			2	0	trace nil	
152	Conglomerate..	Grey	1	9	Couple of fine colours of gold	Bottom of shaft Dolly M. C	nil			4	0	trace nil	
153	Conglomerate..	Cream..	6	15		Trench Alice M. C.	trace			2	0	trace nil	
155	Conglomerate	White	7	12		Outcrop on Canadian M. C	trace			2	0	trace nil	Canadian M. C is on MacKinnon Creek. Samples 155 and 156 should therefore have been so listed.
156	Conglomerate	White to grey	8	8	A little pyrites..	Dump of shaft Canadian M. C	nil					trace nil	
154	Iron and copper ore	Brown	1	15	Pyrite - Bornite.	12 mile	·02	trace	0·40			trace nil	Samples 154, 157 and 232 were submitted by Capt. Miller, as indicators. There was not sufficient time to visit the property, hence it does not appear in the text.
157	Iron ore ..	Dark Brown	1	5		12 mile	nil					0·04 nil	
232	Oxide and carbonate ore..	Green and blue ..				12 mile	nil					trace nil	

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

CONGLOMERATE CREEK.

This creek runs into Montana creek, on its left limit, and the latter, some two miles below, joins the left limit of Indian river.

It was reached by driving from MacKinnon creek, on the Indian River road, 8 or 9 miles to Montana, up Montana 2 miles to the mouth of Conglomerate creek—these are fairly good roads—thence up Conglomerate creek about $3\frac{1}{2}$ miles, over a very rough road, to Fothergill's cabin, on the Eclipse mineral claim.

The climb from the mouth of Conglomerate creek is 380 feet.

Some 18 mineral claims are staked in this vicinity; those visited, in company with Mr. Fothergill, being: Eclipse, Dolly, Bull Moose, Snowflake, Alice, and Gold Leaf.

Distribution. The conglomerate occurs widely distributed; it is found on both sides of the creek, over a width of some hundreds of feet, intersected, however, with slides of porphyry, and igneous intrusions, the latter forming the main mass of the summits.

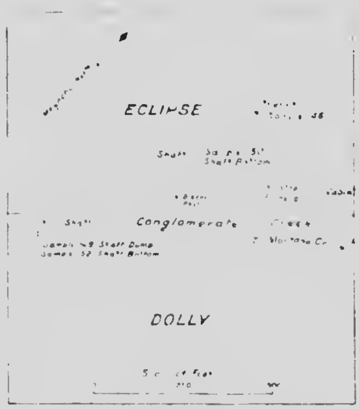


FIG. 16. Sketch showing workings by Christopher Fothergill, on Eclipse and Dolly claims.

This deposit has the characteristics already noted in connexion with the conglomerate at MacKinnon creek, and need not be more particularly described.

Development. Work consists of a couple of prospect shafts, and a number of surface trenches. One shaft, on the left limit of the creek, near Fothergill's cabin on Eclipse claim, is sunk 30′ in conglomerate.

Sample 150 was taken from the bottom of this shaft; it panned a few very fine colours of gold, but assayed no value.

A trench, 150 feet northerly, is dug 4′ deep, in conglomerate, and sample No. 146 was here taken, but, when assayed, gave no value.

On the right limit, about 400 feet from the first mentioned shaft, and farther up the creek, is a 50 ft. shaft on the Dolly claim. This shaft is sunk very close to the stream. For a depth of 44 feet, this exhibits frozen black muck which overlies 6 feet of conglomerate. The upper 2 ft. section of the latter consists largely of a grey sandstone conglomerate, having a few pebbles of quartz and of schist scattered throughout the sand matrix, while the lower 4 ft. section is conglomerate, already described as typical of the district. Sample No. 149, from the dump, and No. 152, from the bottom of the shaft, were here taken, and both panned a few fine colours of gold, but assayed no values.

On the other four claims visited, namely, Bull Moose, Snowflake, Alice, and Gold Leaf, outcrop and trenches have exposed the conglomerate at various places.

Trenches have been sunk at intervals of about 1,000 to 1,200 feet, for a distance of two to three thousand feet in a N.W. direction, all being in conglomerate. The surface material consists of gravel to the depth of a foot or two, which then becomes more compacted, and, finally, at a depth of 4 to 6 ft. assumes the condition of conglomerate. Eight samples were taken from six claims, and are numbered 146-153, inclusive. None of these assayed over traces and all were very slightly mineralized with sulphides and carbonates of iron.

Considerable trenching would be required to define the contacts, as the deposit is spotty. Depth is unknown. There is, however, no doubt that a very large body may be outlined on this creek.

ESPERANZA AND RAVEN MINERAL CLAIM.

In addition to the conglomerate properties noted above, 2 claims, situated on Indian river, belonging to Mr. Chris. Fothergill, were visited in company with the owner.

These were Esperanza and Raven mineral claims.

Esperanza Mineral Claim.—This claim is situated on the right limit of Indian river, about $1\frac{1}{4}$ mile above the Indian River roadhouse, which is on the opposite, or left, limit.

The formation consists of country schists, which outcrop in a large exposure, at the edge of a slough, formed here by the river. A rocky bluff rises, at a steep angle, to a height of 110 feet at this place.

Near the water level, an open-cut, succeeded by a short tunnel, each measuring 12 feet in length, has been driven N. W. into the bank.

The whole rock mass is a much decomposed schist, probably of chlorite and sericite, together with talcose material. Small stringers or lenses of quartz, up to several inches wide, but non-persistent, occur in the schist. The latter have a uniform dip of about 30° to 35° S. W., and the quartz appears to bed with the laminæ of the schists. The colour of these schists varies between ochreous and pale greenish. The quartz is rusty. There is no quantity of the latter, and the prospect did not appear inviting.

Sample No. 145, composed of quartz and schist, taken across the face of the tunnel, gave no value on being assayed. See assay sheet No. 13.

Raven mineral claim.—About a mile above the Esperanza mineral claim, and on the same limit of Indian river, is the Raven mineral claim. The location of this claim may also be described as on the right limit of Indian river, about $2\frac{1}{4}$ miles above the Indian River roadhouse. It is controlled by Mr. Fothergill.

A high outcrop of schists extends along the bank of the river, for several hundred feet, and at the point where a 75-foot tunnel enters the bank, the slope is about 40°, and reaches an elevation 130 feet above that of the tunnel, the latter being a few feet above the water level.

This tunnel strikes N. W. through yellowish and soft, decomposed talcose material together with schists of quartz and sericite, which dip S. W. at 50° to 60°. Rusty quartz is found in bunches or stringers and, in places, the whole mass is mineralized with pyrites.

The schists become much firmer as the tunnel is followed from the mouth of the entry, and a few feet in, copper pyrite is found over the cleavage, or fractur . ces of the quartz schists, giving it a speckled appearance.

The tunnel has so caved and fallen that it is very unsafe, and any extensive sampling was impossible. Two samples, Nos. 143 and 144, taken across the roof about 6 feet in from the mouth, gave assay results of trace and nil respectively. (Assay sheet N. 13.)

The deposit is in the nature of a "mass" of some considerable extent, but apparently of no economic value.

KING DOME PROPERTIES.

The King Dome is the highest point in the Klondike gold district, having an elevation of 4,250 feet, and forming a central elevated hub surrounded, as it were, by somewhat lesser eminences. From this centre radiate practically all the important gold bearing creeks of the district, including Bonanza, Gold Bottom and Hunker, flowing northwesterly and northerly into Klondike river; Dominion, Gold Run and Sulphur, flowing easterly and southeasterly, and Quartz, flowing southwesterly into Indian river.

This whole section evidences upheaval, and folding action, with subsequent erosion. The present summits exhibit a larger proportion of quartz than the lower levels. This doubtless accounts for their greater resistance to the action of eroding elements.

As mentioned in the itinerary, properties in this vicinity, within a radius of ten to fifteen miles, were worked from a central camp near the Dome. The buildings here comprise a large five-roomed cabin with outbuildings for stable and storeroom, which were built by the Yukon Government for the accommodation of its employees during construction of the roads. This offered ample accommodation for the crusher, and a sampling workroom was fitted up, similar to that maintained in Dawson. Occupation of these quarters lasted from July 31 to August 10.

This portion of the district is best reached by driving from Dawson up Klondike to the mouth of Hunker creek, thence up Hunker by the present stage route, passing Gladwin's roadhouse at the mouth of Gold Bottom creek, 20 miles distant from Dawson. Fournier's roadhouse at the head of Hunker, is 7 miles farther, and at this point a road turns to the right, and extends in a southerly direction for a distance of 3 miles, to the intersection of the ridge road (from the Dome to Gold Run) where the above camp is situated. The whole distance from Dawson is about 30 miles and the climb approximately 3,000 feet. Properties here visited are mentioned in the itinerary above and described in detail below.

LLOYD GROUP.[1]

This property is situated at the head of Green and Caribou gulches, tributaries respectively of Sulphur and Dominion creeks. It consists of 17 crown-granted claims, owned by Messrs. James Lloyd, J. A. Segbers and Wm. Nolan.

Dr. Cairnes thus appropriately describes the conditions: "A number of exposures of quartz, 2 to 6 feet in width, occur on this property, but in only a few places could the thickness of the veins and their relations to the wall rocks be determined: the other known occurrences of quartz were either still more or less covered with superficial materials, or the various shafts, cuts, etc., that had at one time exposed the veins, contained considerable water or other materials that had drained or fallen in since the work was performed."

The above is typical of conditions found last August.

Of the 17 claims, 4 were visited in company with Mr. Lloyd, *e. g.*, Cousin Jack, Blueberry, Mary Fraction and Primrose.

Deposit. One large vein, reaching 4′ in width, has been partially defined by two shafts, each about 30′ deep, sunk on Cousin Jack claim, on either side of Lloyd's cabin, and distant about 250 feet from each other.

[1] Quartz Mining in Klondike, by D. D. Cairnes, Summary Report Geol. Survey 1911, p. 39.

PLATE XVIII

View of quartz outcropping near the Fox Car station, vicinity of The Dome, Y. T. This illustrates greater resistance of the quartz to the action of eroding elements, which have affected the surrounding country.

PLATE XIX.

Mr. Jas. ("Jimmy") Lloyd at his cabin, Lloyd group, near Caribou creek, The Dome, Yukon, Y.T. Direction from the cabin to the hill in the background is about north.

This vein strikes about E. and W. and dips northerly. The shafts, being full of water, were inaccessible, but, according to Dr. Cairnes, the vein cuts across the foliation planes of the schist wall-rock, dipping at angles of 60° to 70°, and having every appearance, in the shaft at least, of being a typical regular fissure vein. The country rock is schist of sericite and chlorite. Outcrop of float in line with the above shafts was followed into the Blueberry, Mary Fraction, and Primrose mineral claims, affording strong presumptive evidence that a more or less continuous vein might be exposed by surface trenching at intervals along the strike. The shafts referred to are, for purposes of reference, numbered (1) and (2), on accompanying sketch, Fig. 17 A.

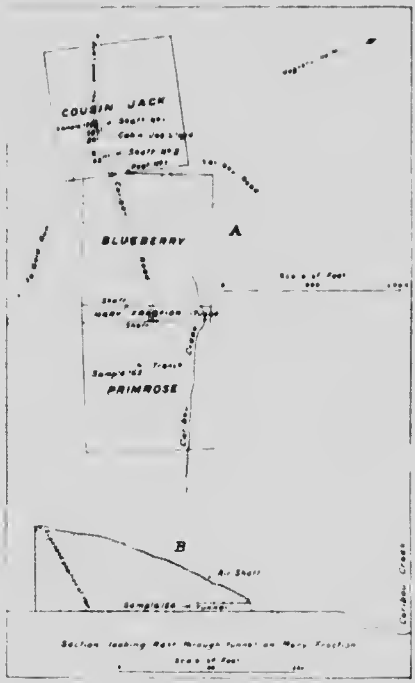


FIG. 17. Lloyd group in part, to illustrate location of samples.

Mr. Lloyd is of opinion that several approximately parallel veins occur throughout the deposit, and, while float outcroppings and sundry trenches would indicate a liberal distribution of the quartz in an easterly and westerly direction, the work is insufficient to establish the existence of a number of well defined veins.

Development. In addition to the shafts above noted, a tunnel has been driven S. 45° W., some 70′ into the side hill, on the right limit of Caribou creek: its entry being something over a hundred feet from the creek bed. Mr. Lloyd's intention was to cross-cut the vein an additional 130 feet should accomplish this, providing the vein regular and persistent. (See Fig. 47 B.)

This tunnel is 6′ high, 5′ wide at the base, 4′ at the top, and is well timbered.

A dump car is run on wooden rails, throughout the length of the tunnel. The rock is here a compact, fine banded schist, closely approaching a quartzite, with interbeddings of quartz and sericite schist. Occasionally small stringers and lenses of quartz are found bedded with the schists, which strike N.E. and S.W., and dip S.E.

Sample No. 164, across the face of the tunnel, showed no value.

In a southerly direction from the above entry, and about 700 feet distant, a shaft 4′×5′ said to be 50′ deep, has been sunk, also on the Mary Fraction. The excavation is, chiefly, in schists as is evidenced by the dump.

Quartz. Quartz found on the dump was partially white, and partially rusty, and contained pyrites and galena; a trial sample, No. 165, assayed $1 in gold and 48 cents in silver.

Another shaft was sunk, in schist, on the Mary Fraction, to a depth of 20 or 25 feet. This is situated about 400 feet S.W. from the above 50′ shaft. Some quartz, of a greyish-brown colour, was taken from the dump, for sample No. 166, and a few fine colours of gold were panned. The assay showed only 13 cents value.

On the Primrose claim is a partly caved pit, 3′ × 10′ — 14′ deep, distant some 500 feet S.E. from the tunnel on the Mary Fraction.

Quartz of a grey, semi-translucent character, is found here in sericite schist, but a sample of it, No. 163, gave no value.

The advisability of having these various workings cleaned and bailed out, so that they might be examined, was suggested to Mr. Lloyd, who was, however, apparently unable to accomplish the work.

Summary. The outcrop on this property is practically all float, and though well defined in an easterly and westerly direction, is insufficient in itself to prove the existence of a number of defined veins. This might readily be done by cross-trenching the hill, which slopes from the right limit of Caribou creek, at intervals of a few hundred feet, say, until both the position and strike of any veins that may exist are well exposed, when sections of them might be stripped and sampled.

Lloyd's tunnel on Mary Fraction, right limit,
Cariboo creek, Y.T.

On the whole there is evidence of an extensive belt carrying large quantities of quartz, which, in addition to the proven vein between shafts (1) and (2), should constitute a prospect worth further investigation.

A small showing of free gold was noted in several specimens from the dump of No. 2 shaft, and colours of gold were panned from a sample. Quite a few tons of quartz have been piled out at both Nos. 1 and 2 shafts, and mill tests of this would afford valuable information as to its true character.

Out of nine samples taken, only three assayed any values, the highest, No. 165, being $1.48.

(See assay sheet No. 15).

GREEN GULCH GROUP.

This property is situated at the head of Green gulch, a tributary of Sulphur creek, and adjoins the Lloyd group on the west. It comprises about 30 claims and 4 fractions: 10 of the claims, in the vicinity of the ridge road, are surveyed.

The chief owners are: Mrs. Jane Summers Orrell, and Miss Summers of Dawson. Mr. Sam. Thurbur is resident on, and in charge of the property.

Nature of the Deposit.—The formation is similar to that found in the Lloyd properties, but systematic prospecting is required to locate and outline the veins, as the present workings are scattered and insufficient to correlate them, or to afford information on which to base an estimate of the probable quantity of quartz.

Of six samples taken from this property, all but one assayed values, several being fair, and one reaching as high as $12.30 (see assay sheet No. 18).

Development.

Work has been confined to Tiger No. 1 and Yellow Jacket claims.

Tiger No. 1.—The former embraces a knob-like summit, 60 to 75 feet above the road at the head of the gulch, on which is located a shaft, $4' \times 6'$, said to be 50 feet deep. This, however, was partially filled with water and ice to a point 20 feet from the surface. At that level a lense of quartz was exhibited, striking E. and W., and having a perpendicular attitude. It varied from 1 to 2 feet in width, and was 6 feet deep, in dark green chloritic schist walls. A 3″ to 4″ gouge of talcose material was found at the northern contact.

LLOYD GROUP SAMPLES ASSAY SHEET No. 15.

Sample No.	Material.	Colour.	Weight. Lbs.	Oz.	Minerals in pan	Location.	Assay in ounces (a) per ton of Au.	Ag.	Value per ton. $	c.	Width of sample. Ft.	In.	Check assay (b) Au.	Ag.	Remarks.
158	Quartz	Rusty	7	1		Shaft No. 1	nil						trace	nil	
159	Quartz	Rusty	6	11		Shaft No. 1	nil						trace	nil	Trial samples from pile at head of shaft No. 1 Cousin Jack claim
160	Quartz	Rusty				Shaft No. 1	trace						trace	nil	
161	Quartz.	Rusty	7	8	Pyrite	Shaft No. 2	nil								Trial samples from quartz piled at head of Shaft No. 2
162	Quartz	Rusty	6	6	Colour of gold, galena and pyrite	Shaft No. 2	·02	trace	0	40			trace	nil	
163	Quartz and schist	Grey to white	4	9	Pyrite	Trench on Primrose claim	nil						trace	nil	This trench is about 500' S.E. from the tunnel. It is on the general strike of the quartz.
164	Quartz and schist	Pale green to white	6	12		Face of tunnel Cariboo creek.	nil					4	trace	nil	
165	Quartz	White to rusty	6	8	Galena and pyrite	Dump of 50' shaft on Mary Fraction	·05	·80	1	48			0.06	0.78	Trial sample.
166	Quartz	Greyish to brown	5	1	Galena and several colours of very fine gold	Dump of 25' shaft 400' S.W. from 50' shaft	·02	·06	0	43			0.01	nil	Trial sample.

1. These samples must be regarded as mere indicators. Little could be learned from the prospect work done, because of water and debris, which covered the workings.

(a) Assays conducted by Mr. Wm. C. Sime of Daw[illegible] Y.T.

(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

The quartz is here typical of the district, being white to grey, and at times rusty, containing copper pyrites, galena and some gold.

Sample No. 180, across 2 ft. of this vein, assayed \$2.24, while a trial sample, No. 179, from excavated quartz on the dump, gave an assay return of \$1.84.

A sample, No. 231, was taken, also, from quartz in a small prospecting trench in the vicinity of the shaft, which gave an assay value of \$1.30.

About 225 feet east from this shaft is an opening 6 ft. in diameter and 8 ft. deep, exposing a vein 12″ wide, dipping slightly northerly, through the schists. A sample (No. 181) here panned colours of gold, and assayed \$3.59.

Yellow Jacket Mineral Claim. Adjoining the Tiger No. 1, and on the lower side of the ridge-road, is the Yellow Jacket mineral claim. Work on this claim consists of a number of surface cuts or trenches, and a tunnel. The quartz occurs irregularly in lenses, sheets and stringers; in places cutting the schists both in strike and dip, and again interbedded with them.

About the centre of this claim is an open-cut, 25 feet into the side hill, which exposes a vein of quartz 18″ wide, striking northwest and dipping 60° N.E. with the schists. The face of the cut is 10 feet high and 1 to 6 feet wide. The quartz is white to greyish, and contains some galena.

Sample No. 182, taken across this vein, at the face of the cut, assayed \$12.30.

There is not sufficient work to indicate the exact nature or probable extent of the vein. It offers an ideal opportunity for drifting.

Near the southern boundary, and some 300 feet from the western boundary of this claim, a tunnel enters the side hill. The elevation would here be some 500 feet below the road. This tunnel, which is about 75 feet in length, in a direction N. 10° E., was being driven by Mr. Thurbur for the purpose of cross-cutting the formation, which here consists of greenish sericite and quartz schists. Dykes of decompos[illegible] material also occur, and quartz is found irregularly distributed i[illegible] [illegible]m of stringers. While the dump exhibits a very small percentage o[illegible] quartz, the present face of the cross-cut contains about 75 per cent. in the form of stringers.

Sample No. 183, taken clear across this face, assayed only 23 cents.

As already pointed out, this is a very slow and expensive method of prospecting, where no definite vein has been located.

One other opening, between the tunnel and the road, was sampled, but gave no values. The occurrence was indeterminate.

Summary. It will be noticed that the assay results are sufficiently promising to warrant further prospecting. (See assay [illegible]et No. 16). (Samples Nos. 231 and 179-184).

GREEN GULCH GROUP SAMPLES—ASSAY SHEET No. 16.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
231	Quartz......	Rusty.	6	12	Galena and good colours of gold....	Trench vicinity of shaft	0·05	0·51	1 29	–		trace	nil	Tiger M.C.
179	Quartz......	Grey to rusty	7	0	Galena, copper pyrites and ? colours of gold	Trial sample from excavated material at shaft ..	0·08	0·40	1 84	–		0·13	nil	Tiger No. 1.
180	Quartz......	Rusty...	5	0?		Vein in shaft at 20' depth	0·10	0·40	2 24	2	0	0·01	nil	Tiger No. 1.
181	Quartz	Rusty..	6	12	Good showing of fine gold.	Pit 225' E. from shaft.	0·15	0·99	3 59	1	0	0·23	nil	Tiger No. 1.
182	Quartz......	White to grey....	7	12	Galena	10' open-cut centre of claim and below the road....	0·61	0·18	12 30	1	6	trace	nil	Yellow Jacket M.C.
183	Quartz and Schist.	White to greenish.	5	0?		Face of tunnel 75'	0·01	0·05	0 23	5	0	trace	nil	Yellow Jacket M.C. Quartz is in stringers.
184	Quartz......	White to rusty....	7	2		Trench 300' below the road on way to tunnel	nil		–	2	0	trace	nil	Yellow Jacket M.C.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

GOLD RUN GROUP. (W. D. MacKay and Others.)

This property, which, according to Mr. MacKay, comprises nine claims, is situated at the head of Gold Run, and along the ridge on the right limit of Portland gulch. It is traversed by the government wagon road between the Box Car station near the Dome and Gold Run creek, the distance from the former being about ten miles. The property is also adjacent to Joe Joe roadhouse, now vacant.

Deposit.—Generally, the condition here is almost identical with that found on the Lone Star ridge, Victoria gulch. Quartz is distributed, in the various forms described[1] throughout the schists, which in places are highly metamorphosed.

Development.—A number of surface cuts made at intervals along the ridge in a northerly and southerly direction, exposes lenses of quartz, which occur irregularly, and vary in width from a few inches up to 2′ - 6″. On being sampled, these did not show any values.

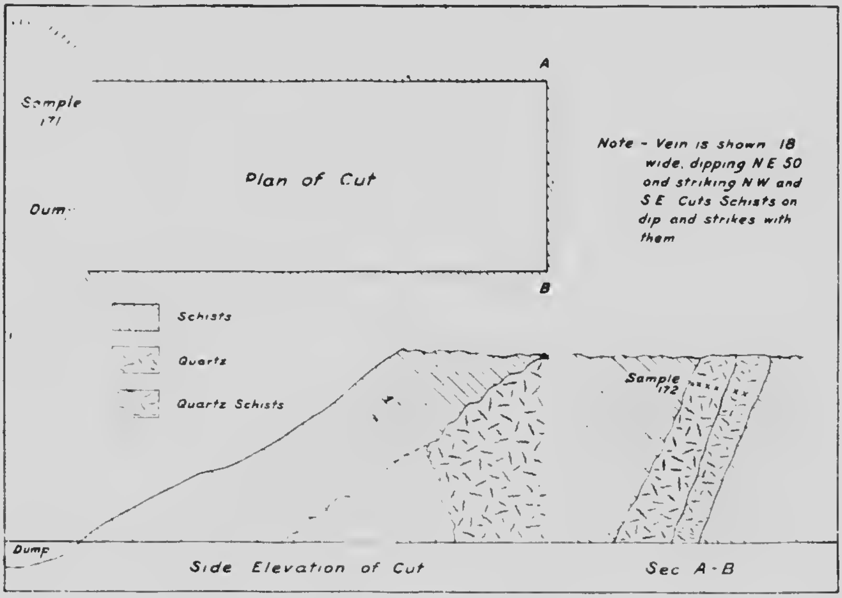


FIG. 18. Plan, elevation of cut and section A-B on vein, Pioneer M.C. Gold Run group, Portland gulch.

On the Pioneer mineral claim, however, outcroppings of white quartz occur for a distance of several hundred feet in a southeasterly–northwesterly direction from the ridge towards Portland gulch, where the vein is uncovered by an open-cut, which is at an elevation about 300 feet above

[1] P. 21 this report

the bed of the gulch and distant 1,200 to 1,500 feet from its right limit. This open-cut is 8 feet long, 4 feet wide and 6 feet in depth at the face. It is made into the side hill and uncovers a vein 18″ wide, which dips 50° N.E., cutting the schists, but striking with them

This vein has the appearance of a regular fissure, but the general lack of continuity of the quartz veins in this vicinity causes one to hesitate in pronouncing it a persistent one without more proof than present development affords. It is altogether likely, however, that it will be found to follow the line of outcroppings referred to above as occurring for a distance of several hundred feet.

A small showing of free gold was here found in the quartz. Some galena was also noted. The quartz is generally very white, though occasional stains, due to iron oxides, were seen.

Three samples of quartz were taken from this lead. One of them, No. 170, from an outcrop, and two, Nos. 171 and 172, from the above open-cut, all panned colours of gold, and the two latter assayed $34.90 and $3.42 respectively.

This deposit should be further investigated by drifting on the lead, and carefully sampling. The prospect is quite encouraging.

(See samples Nos. 167–172, on assay sheet No. 17.)

GOLD RUN GROUP AND PATTERSON GROUP SAMPLES. ASSAY SHEET NO. 17

Sample No.	Material.	Colour.	Weight Lbs.	Weight Oz.	Minerals in pan.	Location	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks
167	Quartz..	White with rusty seams ..	8	0		Prospect trench 1200 N.J.J. road house	nil		nil			trace	nil	Gold Run group. Little mineralization.
168	Quartz	White to brownish	5	10		2,600 north of J. J. road house	trace		trace			trace	nil	
169	Quartz and schist	Brown.	6	3		Trench about 3,700' north J. J. road house	nil					trace	nil	This trench exposed bunches of quartz in metamorphosed schists, similar to that of Lone Star, Victoria gulch
170	Quartz.	Milk white	6	10	2 colours of fine gold .	Outcrop 150 west of discovery post ..	nil			2	0	trace	nil	
171	Quartz		6	8	Several colours of gold.	Trial sample from dump of open cut	1.70	1.50	34 90			2.18	0.22	
172	Quartz and some schist.	White to brownish	10	0	Fine colours of gold.	Section of vein open cut Pioneer claim	0.16	0.38	3 42	2	0	2.18	0.22	Free gold was seen in the vein at the face. See Fig. 18.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa

GOLD RUN GROUP AND PATTERSON GROUP SAMPLES—ASSAY SHEET NO. 17—*Continued.*

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $	Value per ton. c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
173	Quartz......	White........	8	0	nil	Large exposure at Discovery Post Flora M. C	nil		–		4	0	nil	nil	Patterson group
174	Quartz......	White........	4	3	nil	Large exposure at Discovery Post Flora M. C	nil		–		4	0	trace	nil	Patterson group.
175	Quartz	Very white.	5	12	nil	Large exposure at Discovery Post Flora M. C	nil		–		4	0	trace	nil	Patterson group.
176	Quartz	Milk white....	5	12	nil	Section on south branch of vein 350′ E. of discovery .	trace		–		3	0	trace	nil	Patterson group.
177	Quartz	Milk white ...	7	0	nil	Section on middle branch of vein 350′ E. of discovery	nil		–		3	0	trace	nil	Patterson group.
178	Quartz .	Milk white.	7	0	Galena and 2 colours of gold iron ..	Section on north branch of vein 350′ E. of discovery	nil		–		3	0	nil	nil	Patterson group.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

PATTERSON OR QUEEN DOME GROUP.

This group, comprising 16 claims and 3 fractions, is located on the divide between Portland and Lion gulches, both tributaries on the right limit of Dominion creek.

The property is controlled by Dr. S. J. Faulkner, who is associated with other parties in Dawson. Mr. Sam. Thurbur is in charge on the ground.

Only one of the above claims was visited. It was originally staked by Frank Wilson Arnold, June 26, 1909, when it was called Jennie Mineral Claim, but this name has since been changed, and it is now known as Flora Mineral Claim.

Development.—Two exposures of quartz occur at a distance of about 350 feet E. and W. from each other. The eastern exposure, on the summit of the divide, is made by a cross-cut trench, 45 feet long, N. and S., and 4 feet deep, while the western exposure consists of a massive outcrop of quartz fully 12 feet wide. The supposition is that a vein occurs striking easterly and westerly, and that in case of the first mentioned trench, this vein has trifurcated, the three resultant branches being each about 3 feet wide, and separated by schist, 6 feet and 9 feet in width respectively.

The quartz is milky and opaque with rusty cleavage faces, apparently lacking in minerals, but, when crushed and panned, it exhibited small percentages of galena and pyrite, and in one sample (No. 178) of quartz from the trench colours of gold were seen.

Six samples, numbered 173-178, were taken, but, when assayed, they gave no values. (Assay sheet No. 17.)

From the above data, it may be noted that, though the quartz may contain some little gold in spots, as demonstrated by the colours found in one pan, yet the prospect has, thus far, not been particularly encouraging.

BOX CAR GROUP.

The property, known generally under the above name, comprises 14 claims. These are not, strictly speaking, grouped under joint ownership, but six of the claims are controlled by Mrs. Jane Summers Orrell and her sister, Miss Summers, and the other eight claims by Mr. Murphy, Mrs. O'Brien, and others of Dawson. Mr. Sam. Thurbur looks after the assessment work.

The property is situated on the divide between Bonanza and Soda creeks, the latter a tributary of Gold Bottom, and it adjoins the Box Car station on the Klondike railway.

Nature of the Country.—The country consists of Klondike schist, chiefly sericite, of a grey to greenish colour, and having pearly lustre on cleavage faces. Quartz occurs in the form of veins, lenses, bunches and stringers.

The strike of the veins over the greater part of this whole area is prevailingly northwesterly, but exceptions were noted, and on the Keynote claim, a heavy ledge of quartz, which strikes about N. 30° E. is exposed.

One apparently well defined vein, which outcrops at intervals along the summit of the divide for several thousand feet, in a direction N. 22° W., was noted. This, where exposed, carried a width of 2 feet and, near the surface at any rate, dipped about 60° west, and cut the schists which, here, have a flat dip to the east.

A couple of outcroppings of this vein, near the Box Car station, are shown in plate XVIII (p. 76 herewith). These have resisted the action of eroding elements to a greater extent than the schists and stand out between 4 and 5 feet in height, exhibiting a clean, hard, quartz vein, carrying a width of 2 feet. It is characterized by absence of any minerals.

The quartz is generally milk-white and opaque but, in places, shows a rusty to brown colour, due to the various oxides of iron.

In places, oxidized zones of mineralized country occur, and the minerals found are iron oxides, pyrites, galena, malachite, and azurite; more rarely, colours of gold, and in the assays, some good values in silver may be noted.

Development. Only two of the above claims exhibit any development, e.g., the Jack Pot and the Keynote claims.

On the former, a shaft 5 ft. × 7 ft. was sunk to a depth of 65 feet. Adjoining the shaft is a trench 25 ft. long, 2 ft.-3½ ft. wide, and 6 ft.-7 ft. deep.

Fig. 19. Plan and sectional elevation of shaft and trench on Jack Pot M.C. A, Quartz. B, Sericite schists with quartz material; C, Oxidized mineral zone

The shaft is, for the most part, filled with water. The dump comprises schist and other oxidized material, the whole exhibiting green and blue stains, due to copper carbonates, also brown oxidized and decomposed iron ore, probably hematite, siderite, etc. The portion of trench adjoining the shaft, for a length of 8 ft. exhibits similar conditions, while the remaining 17 feet comprises a number of small quartz lenses, intruded throughout the ordinary country.

PLATE XXI

Shaft and trench on Jack Pot mineral claim, Box Car group. Mr. Sam. Thurbur at the windlass.

The quartz here is brownish and ochreous in colour, having what is known as a 'kindly' appearance; it contains bunches of galena. The proportion of quartz to schist is not great, however, and the occurrence may be characterized as a mineralized zone, whose boundaries are not very well defined, but depend upon assays to determine where pay ore exists.

Of the 4 samples taken from the above trench, No. 185 was a trial sample from near the surface of the oxidized zone, adjoining the shaft. It assayed ·02 oz. of gold and 26·93 oz. of silver, or a value[1] of $16.55 per ton.

The average of the three other sectional samples, taken across the bottom of the trench, is as follows:

No.	186	(assay of)	2 75 – 3	feet	=	8 25		
"	187	"	4 08 – 2½	"	=	10 20		
"	187 A	"	0 64 – 2	"	=	1.28		
			7½	feet		19.73	=	$2.63

(See assay sheet No. 18.)

Present development does not afford any idea of the probable lateral extent of this zone.

[1] Calculated on the basis of $20 per oz. for gold, and 60c. for silver.

BOX CAR GROUP SAMPLES ASSAY SHEET NO. 18.

Sample No.	Material.	Colour.	Weight Lbs.	Weight Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
185	Iron ore, &c.	Brown, green and blue	6	8	Galena and 1 colour of gold	S. E. end of trench adjoining shaft...	0.02	26.93	16.55	3	0	trace	20.84	Jack Pot M. C.
186	Iron and quartzose	Brown, green and blue	6	12		S. E. end of trench adjoining shaft	0.04	3.26	2.75	3	0	trace	nil	Jack Pot M. C.
187	Quartz	Rusty	5	0		Centre of trench	0.04	5.48	4.08	2	6	trace	5.23	Jack Pot M. C.
187A	Quartz	Rusty	5	0		N. W. end of trench	0.03	0.07	0.64	2	0	trace	nil	Jack Pot M. C.
188	Quartz and schist	White to rusty.	4	12	Galena and pyrites	Tunnel cut south end of Leavy ledge	trace			3	0		nil	Keynote M. C.
189	Quartz and schist.	White to rusty.	5	0	Galena and pyrites	South end open cut at ridge at high bluff.	nil			4	0	trace	nil	Keynote M. C.
190	Quartz	White to rusty.	6	12	—	15' north of No. 189	nil			4	0	trace	nil	Keynote M. C.

NOTE.—Samples 179–190 are all regarded as merely trial samples.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

PLATE XXII

Quartz ledge on Key Note mineral claim, Box Car group, vicinity of The Dome, Y.T.

The above results warrant further prospecting of the deposit. This would best be carried on by means of surface trenches and by careful sampling.

Even though the values should not persist, at any great depth, it is possible a considerable tonnage of ore may exist in the oxidized surface zone.

On the Keynote mineral claim, a heavy ledge of quartz has been exposed by a trench and an open-cut, which are some 40 feet apart.

The open-cut extends some 20 feet along the face of a bluff, overlooking a draw at the head of Carmack Fork, a tributary of Bonanza. This ledge is 4 feet wide, strikes N. 30° E., and dips 40° to the S.E. into the hill. It consists of white, lean looking quartz, with rusty seams, and is comparatively extensive, but does not appear to carry any minerals.

Three samples, Nos. 188, 189 and 190 (assay sheet No. 18), taken at intervals across the ledge, gave no values when assayed.

THE MITCHELL GROUP [1]

This group compris[illegible] [illegible] mineral claims, which extend over the summit of the divide betw[illegible] [illegible] Bottom and the right fork of Hunker. The King Dome summ[illegible] [illegible]thin half a mile, south, of the Mitchell cabin, on Portland Fair m[illegible]ral claim.

The owner is Mrs. Margaret J. Mitchell, of Dawson, known as the "Quartz Queen of the Klondike." She has, however, given an option on this property to Mr. A. E. Garvey, of Vancouver, who intends to actively prosecute development during the season of 1913. Work has been confined mainly to four of the claims, e.g., Portland Fair, Egan, Castle and Arctic.

Nature of the Deposit.—The country is the usual sericite schist of the district. A number of quartz veins occur, which have a general direction N. 40° W., though minor occurrences, having a northeasterly strike, were noted. In both cases, however, the quartz appears to cut the schist folia along both dip and strike.

The veins range from a few inches to upwards of 6 feet in width, and one vein, striking about N. 40° W., has been almost, if not quite, proven continuous for over 2,000 feet of its length.

This may be either a fairly regular fissure vein, or a connected line of quartz lenses, the exposures leading rather to the latter conclusion, in which event, some of the lenses are quite massive and persistent.

Development.—Most of the development work has been done on the above-mentioned vein. It consists of cross-cut trenches, at intervals of 100 feet, and upwards, together with stripping of various portions, as much as 400 feet of the vein being uncovered in the vicinity of the cabin. Here it is found to be from 2 to 6 feet wide, dipping about 60° easterly.

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[1] See also Quartz Mining in Klondike, D. D. Cairnes, Sum. An. Rep. Geol. Survey, Canada 1911, p. 38.

and cutting the schists both in dip and strike. The schists have a dip of about 40° westerly.

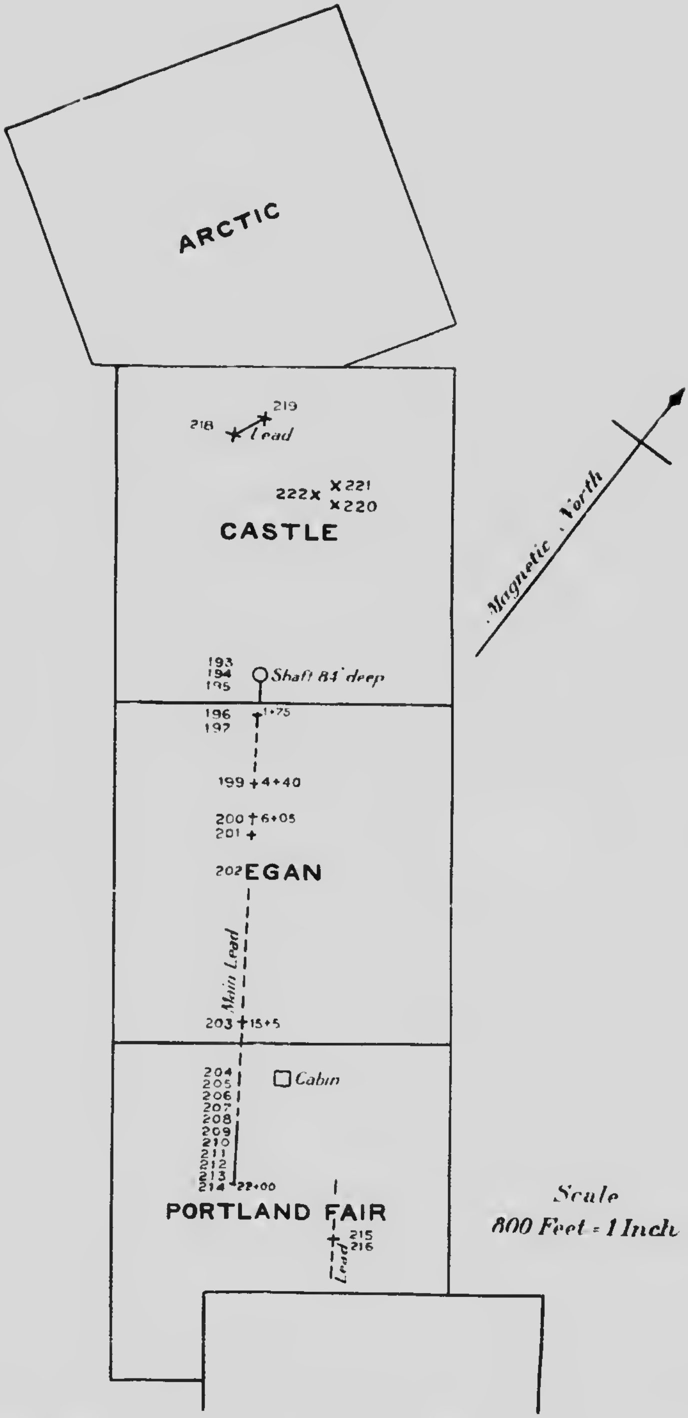
An outline of this vein is shown on Fig. 20.

This is intended to illustrate the method of sampling which was conducted at intervals over the whole length of the lead (about 2,200 feet with the exception that one interval of 650 feet on the strike was not exposed and could not be sampled).

At the northwesterly extremity of these workings, a shaft was sunk to a depth of 84 feet. This was full of water at the time the property was examined. Some drifting at the bottom of the shaft is said to have been done.

From evidence furnished by the dump, it would appear that the excavation was largely in schists, the quartz forming from 20 to 25 per cent of the whole rock mass. The quartz was, however, piled out separately on the dump.

Three trial samples of quartz from this pile (Nos. 193, 194 and 195) gave the following assay results: $2.43, $10.47, and nil, respectively. All showed galena and pyrite, when crushed and panned, and No. 194 exhibited fine colours of gold in the pan.



39485 –10½

FIG. 20. Portion of Mitchell property, near the Dome,

Twelve samples (Nos. 196-208,) inclusive, No. 198 being omitted, were taken where trenches occurred at the intervals shown on Fig. 20. When assayed, these gave no values. From the fact that the discards from some of the samples panned colours of gold, it is thought the assays here may not have done full justice to the property. The following samples, referred to, gave colours of gold in the pan: Nos. 196, 202, 204, 205, 206 and 208.

No. 209 assayed $22.72 over a width of 4 feet, and also exhibited good colours of gold in the pan.

Nos. 210, 211, 213, and 214 gave no values when assayed, but all except No. 210 showed colours of gold, when panned.

From the above explanation it will be seen that an average value of this deposit worked out from the few preliminary samples that gave assay values, would do an injustice to the property.

The above may be considered a concrete illustration of the oft noted fact that a few small samples of free-milling quartz do not afford a true measure of value,[1] and that only an average value based on a large number of samples should be considered as reasonably conclusive.

The above quartz lead is an extensive one, and preliminary sampling indicates the occurrence of at least a small percentage of gold, it may be in a somewhat 'spotty' manner; nevertheless, this portion of the deposit well deserves thorough investigation.

A greater number of samples should be taken from the stripped portion of the vein, and, if possible, these should be large samples, the originals being upwards of half a ton, and these should be cut down in the manner described in this report under the general head of sampling.

A trench about 650 feet, S. 50° E. from the Mitchell cabin, cross-cuts a vein, which appears about 4 feet wide. This vein strikes in a direction parallel with the main lead, described above, and dips easterly, also. The schists are here considerably crushed and metamorphosed, and are characterized by lack of definite bedding. The trench has partially caved and affords little opportunity for a careful investigation of the occurrence.

The quartz is very white and lean looking, but crushed samples are seen to contain a little galena and pyrite. No gold was found in samples Nos. 215-216 taken at this opening.

On the Castle mineral claim a number of other openings, besides the shaft, were examined.

One of these exposed a vein of quartz 1 foot wide, 30 feet long, cross-cutting the schists, striking northeasterly, and having a perpendicular attitude. No values were here found in samples Nos. 217 and 218.

[1] Compare Hardman on Examination and Valuation of Mines, Trans. Can. Soc. C.E., Vol. XVII, 1903, Part II, pp. 522-530; also Rickard, Sampling and Estimation of Ore in a Mine, pp. 54-55.

PLATE XXIII.

Quartz pile at the Mitchell shaft, Castle mineral claim.

Samples Nos. 219-222, inclusive, taken at openings shown in the above Fig. 20, gave no values, except that No. 220, from trench A, panned a very small showing of gold.

Summary.—A number of quartz veins occur on this property. In the case of one of them, at least, development has shown a strong lead, with promising indications, and several good values. As already intimated, this should be further sampled. If possible, a few tons, taken at points here shown to carry some gold, should be subjected to careful mill tests.

There is also ample opportunity for prospecting at depth. As trial samples, taken from the dump of the shaft, have indicated the presence of some fair values, the shaft should be cleaned out and sampled. If the vein is there found to be regular, and persistent, at depth, the outlook for this property is fairly promising.

HUNKER MINERAL CLAIM, AND MITCHELL GROUP SAMPLES—ASSAY SHEET No. 19.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.[1]	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton $	Value per ton c.	Width of sample Ft.	Width of sample In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
191	Quartz..........	Rusty..........	–		Galena and Iron.....	Face of cut...	nil		–		1	0	trace	nil	Hunker M.C.
192	Quartz and a little schist.......	Brownish.	6 –	8	Colour of gold and considerable pyrite.	Adjoining No. 191...	trace		–		2	0	trace	nil	Hunker M.C.
193	Quartz......	–	–		–	Dump of 84' shaft...	0·12 –	0·06	2	43	–		0·25	nil	Castle M.C. of Mitchell group.
194	Quartz..........	Rusty....	7 –	8	Fine colours if gold, galena and pyrite.....	Dump of 84' shaft...	0·52 –	0·12	10	47	–		0·73	nil	Castle M.C. of Mitchell group...
195	Quartz.. ...	White....	6 –	8	Galena. ...	Dump of 84' shaft....	nil		–		–		nil	nil	Castle M.C. of Mitchell group.
196	Quartz.....	Brownish.	7 –	0	Good showing of gold colours and pyrites.	Trench at sta. 0+50 S. E. of 84' shaft	nil		–		2	0	nil	nil	Vein not well exposed here.
197	Quartz..	Brownish.........	5 –	0	A little pyrite	Sta. 1+75 on lead......	nil		–		2	0	trace	nil	
199	Quartz...	White....	4 –	7	–	Sta. 4+40	nil		–		0	6	trace	nil	
200	Quartz..	White..	6 –	0	A little iron	Sta. 6+05.....	nil		–		4	0	trace	nil	

201	Quartz..	White to grey...	5 – 11	–	Sta. 6 95..	nil	–	2	0	trace	nil
202	Quartz...	White to rusty.	6 – 8	1 colour of gold, some pyrites....	Sta. 8 70..	nil	–	3	0	0·01	nil
203	Quartz..	White....	5 – 12	–	Sta. 13 50..	nil	–	1	6	0·01	nil

(*a*) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(*b*) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.
[1]. Distances given in this column are approximate only. Samples being generally taken at trenches. See Fig. 20.

MITCHELL GROUP SAMPLES (*Cont.*)—ASSAY SHEET No. 20.

Sample No.	Material.	Colour.	Weight.		Minerals in pan.	Location.[1]	Assay in ounces (a) per ton of		Value per ton		Width of sample		Check assay (b)		Remarks.
			Lbs.	Oz.			Au.	Ag	$	c.	Ft.	In.	Au.	Ag	
204	Quartz	White..	6	0	1 colour of gold	Stripped vein at sta. 17 +75	nil				1	6	trace	nil	See also Fig. 20 page 93
205	Quartz..	White and rusty	5	1	Galena and 1 colour of gold	Stripped vein at sta. 18 +11	nil				2	0	trace	nil	
206	Quartz..	Rusty	5	5	Several colours of gold	Stripped vein at sta. 18 +28	nil				1	6	trace	nil	
207	Quartz..	White to grey	12	13		S.E. end of trench at sta. 18+63	trace				1	6	trace	nil	
208	Quartz..	White to rusty.	6	11	3 fine colours of gold...	N.E. end of stripping sta. 19+32	nil				2	[illegible]	trace	nil	
209	Quartz..	White..	5	12	Galena and several colours of gold	Sta. 19+72	[illegible]	[illegible]			[illegible]	6	trace	nil	This sta. 19+72 [illegible] the [illegible] main [illegible] S.E. of the cabin. See Fig. 20
210	Quartz..	Dull white to rusty	7	15	Galena and pyrite	Sta. 20+02	nil				3	6	trace	nil	
211	Quartz..	White to rusty.	5	5	Galena, pyrite and colours of gold..	Sta. 20+50	[illegible]				2	0	0.01	nil	

213	Quartz	White to rusty.	4	7	Galena and colours of gold ...	Sta. 21+25	nil	–	4	0	trace	nil	
214	Quartz..	White to rusty.	7	13	Considerable galena and pyrite ..	Sta. 22+00..	nil		6	0	trace	nil	Sta. 22+00 at the most S.E. end of stripped portion of the main vein on Portland Fair M.C.
215	Quartz..	White..	10	0	Galena and pyrite	Trench 250' S.E. of cabin..	trace		3	0	nil	nil	
216	Quartz..	Very white	6	10	Galena and pyrite	Adjoining No. 215	nil				nil	nil	
217	Quartz.	White to grey	3	3		N.E. end of Cross vein on Arctic M.C.	nil	–	1	0	nil	nil	

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.
[1] Distances given in this column are approximate only, samples being generally taken at trenches. See Fig. 20.

MITCHELL GROUP SAMPLES (*Cont.*)—ASSAY SHEET No. 21.

Jos. Fournier and Summit Mineral Claims Samples.

Sample No.	Material.	Colour.	Weight. Lbs. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au. Ag.	Value per ton. $ c.	Width of sample. Ft. In.	Check assay (b) Au. Ag.	Remarks.
218	Quartz	White to grey...	4 – 13	Pyrite....	S.W. end of cross vein 30′ from No. 217	trace	–	1 0	trace nil	On Arctic M.C.
219	Quartz	White	6 – 9	A little galena and pyrites..	Trench about 300′ S.E. of No. 218	nil	–	–	trace nil	Castle M.C. Trial sample.
220	Quartz	Dull white ...	7 – 9	Minute colours of gold and a little pyrite	Trench A	trace	–	–	trace nil	Castle M.C. Trial
221	Quartz	Rusty	6 – 1	–	Trench B ..	nil	–	–	trace nil	Castle M.C. Trial sample.
222	Quartz	White	3 – 3	Little pyrite.	Trench C....	nil	–	–	trace nil	Castle M.C. Trial sample.
239	Quartz	White to grey ...	7 – 4	Galena	Trench about 340′ N. of main shaft	trace	–	–	trace nil	Castle M.C. Trial sample.
223	Porphyry	Grey	6 – 5	–	Excavated material from trench	nil	–		trace nil	Trial sample, J. Fournier M.C.
224	Quartz	White to rusty	7 – 7	Galena and pyrite.	Trench	nil	–	–	trace nil	Summit M.C. Merely stringers of quartz in trench.
225	Quartz	Rose	6 – 5	–	Outcrop.	nil	–	1 0	trace nil	

(*a*) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(*b*) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

PORTLAND GROUP.

This property is located on the divide, between Portland gulch and Robinson pup, tributaries of Dominion creek. It adjoins the right limit of the latter creek, and extends to the right limit of Portland gulch.

The group comprises 5 mineral claims, named: Jumbo, Good Faith, Clara, Baker, and Huron, which were examined by Mr. MacLachlan, who found the owner, Mr. W. R. Mitchell, at work on the property.

Mr. Mitchell's cabin is situated on Good Faith mineral claim, about 1,500 feet from Dominion creek. The route taken from the headquarters of the party, on the Dome, was along the ridge road, a distance of 10 miles to the head of Gold Run, thence along the ridge, above the right limit of Portland gulch, over the MacKay properties, and down the slope towards Dominion creek, a further distance of 5 miles, the last few miles traversed being practically without a road.

General Statement.—Some prospecting, in the form of surface trenches, has been done on all the claims.

Good Faith Mineral Claim.—A few hundred feet N. E. from the cabin, a trench exposes quartz, which occurs in the form of a 'barrel lead', striking S. 60° E. and dipping 26° N. E. This lead consists of 5 barrels, 3 being one above the other, and 2 lying side by side, immediately to the south.

Of the first 3 barrels, the lower 2 are each 18 inches in diameter, and the upper one is 24 inches, while those, at the side are each 14 inches in diameter, and include a few inches of schist between the quartz.

The extent of the trench exposure is about 30 feet.

A more accurate impression of these barrel leads is conveyed by comparing the component parts of the vein to trunks of trees lying side by side.

Barrel leads occur in the Waverly gold district of Nova Scotia, the origin of which has been discussed at some length by Dawson,[1] Packard,[2] Faribault,[3] Woodman,[4] MacLaren,[5] and others. The three first quoted maintain that they are caused by a folding and crumpling of the strata, as, for example, in the case of the crown of an anticlinal fold, which has been crumpled by great lateral pressure. Woodman, on the other hand, believes these veins take their form as a result of the sinuous course of the fissures in which the quartz has been deposited. The latter view would appear to fit the conditions in the case of this Portland gulch lead, as the lamination of the enclosing schists does not appear to follow the corrugations of the quartz veins.

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[1] Dawson's Acadian Geology, p. 628.
[2] Min. & Sci. Press, October 5, 1907.
[3] Guide Book No. 1 of the International Geol. Congress, 1913, Part I, The Gold-bearing Series of Nova Scotia, pp. 174-176.
[4] Proc. and Trans. Nova Scotia Inst. Sci., XI, 1903, p. 67.
[5] Gold: Its Geological Occurrence and Geographical Distribution, p. 464.

A sample (No. 212) taken across this lead did not show any values.

Jumbo Mineral Claim.—This claim lies to the west of the Good Faith mineral claim. On the Portland gulch side, a large exposure, or head of white quartz occurs, which is 21 feet wide and 14 feet high. The direction of a line along the face would be N. 40° E. Its outlook is on Portland gulch, but the mass dips into the hill.

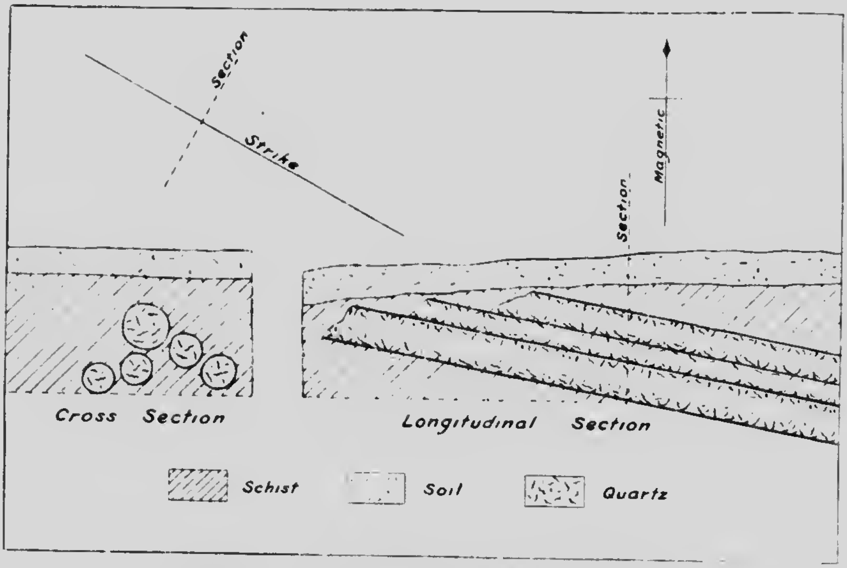

FIG. 21. Sketch of Barrel leads Good Faith M.C. Portland gulch. (After MacLachlan.)

On the southwest side of this mass, 30 feet of trenching exposes the quartz. The country is a close banded schist, and the quartz appears to bed with the schist folia. It is a lean looking, white, quartz, and, so far as noted, carries no minerals.

A trial sample (No. 198) gave no values when assayed.

Clara Mineral Claim.—About 2,000 feet south of the cabin a vein occurs on the Clara mineral claim. This vein is 20 inches wide, strikes N. 30° W. and dips 20° to the eastward, cutting the schist folia, both in strike and dip. It is exposed for about 35 feet of its length. Two samples (Nos. 240 and 241), taken across the lead at opposite ends of the cut, show values of 47 cents, and trace, respectively. The latter sample, however, showed a very few fine colours of gold in the pan.

Baker Mineral Claim.—About 2,000 feet S. E. from the trench, on the Clara mineral claim, above described, a lead is exposed on the Baker mineral claim by an 18 foot trench. This lead carries a width of 20 inches, strikes N. 60° E., and dips 58° S. E. The quartz is white, and shows practically no mineralization.

Sample No. 242 showed only a trace when assayed.

Huron Mineral Claim.—Near the southern boundary of this claim is a belt of quartz, which has been partially exposed for 37 feet of its length. A cross-cut exhibits a width of 7 feet of quartz, but has not uncovered the contact.

The quartz is here characterized by a somewhat rusty stain and was found to contain some galena and pyrite. Two samples (Nos. 243 and 244) taken across the exposed portion of the belt, showed no values, in gold, above traces, and No. 243 gave 0.16 oz. of silver.

Summary. This property contains large quantities of quartz, which occurs in the form of veins. These veins appear to vary in strike, that is, some have a northeasterly and others a northwesterly strike. These veins bulge in places to great masses, but present development does not appear to have disclosed much in the way of values.

PORTLAND GROUP SAMPLES—ASSAY SHEET No. 22.

Sample No.	Material.	Colour.	Weight. Lbs. – Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Ag.	Value per ton. $ c.	Width of sample. Ft.	In.	Check assay (b) Au.	Ag.	Remarks.
240	Quartz......	White	4 – 3	1 colour of gold .	N.W. section on vein..	0·02	0·12	0 47	1	8	trace	nil	On Clara M.C.
241	Quartz.....	White to rusty...	3 – 3	light colours of gold.....	S.E. section on vein 35' from No. 240 ..	trace		–	1	8	trace	nil	On Clara M.C.
242	Quartz.....	White	3 – 15	–	Section on vein in trench..	nil		–	1	8	trace	nil	On Baker M.C.
243	Quartz	White to rusty	3 – 10	Galena and pyrite.......	½ section of vein in cut	trace	0·16	0 09	3	6	trace	nil	On Huron M.C.
244	Quartz......	White	3 – 9	Pyrite....	½ section of vein in cut	nil		–	3	6	0·01	nil	On Huron M.C.
245	Quartz and some schist.......	Rusty to brown...	3 – 13	–	Exposure on Jumbo M.C....	nil		–	4	0	trace	nil	On Jumbo M.C.
198	Quartz......	White	7 – 10	–	Adjoining No. 245....	nil		–	6	0	trace	nil	On Jumbo M.C.
212	Quartz	White	7 – 11	Pyrites ...	Barrel lead, Good Faith M.C	nil		–	4	0	trace	nil	On Jumbo M.C.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

W. D. MACKAY'S HUNKER GROUP SAMPLES, ET AL.—ASSAY SHEET No. 23.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au	Assay in ounces (a) per ton of Ag	Value per ton. $ c	Width of Sample. Ft.	Width of Sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
226	Quartz.	White.	7	3	Galena and pyrite, colours of gold.	Excavated quartz from the shaft	0·01	0·03	0·81			0·09	nil	Jennie M. C.
227	Quartz.	White.	6	5	1 colour of gold.	N. end of open-cut at large outcrop....	nil			6	0	trace	nil	Very heavy quartz outcrop Jennie M. C.
228	Quartz.	White to rusty.	10	5	–	S. end of open-cut	nil			6	0	nil	nil	Quartz considerably crushed Jennie M. C.
229	Quartz.	White to rusty.	7	5	–	Outcrop Gold Run Fraction.	nil			4	6	trace	nil	Gold Run Fraction. This outcrop occurs about 500′ N. 70 W. from Jennie shaft.
230	Quartz.	Dull white to rusty..	7	13	–	Quartz outcrop summit of King Dome.	trace					trace	nil	Random trial sample taken in passing over the dome
233	Quartz.	Pink to rusty.	1	11	–	Capt. Miller's property 12 mile.	nil					trace	nil	Trial sample submitted by Capt. Miller. This property was not examined.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa

W. D. MACKAY PROPERTIES.

(Head of Hunker.)

Three claims, or rather, two claims and a fraction were here visited, e.g., Jennie, King Edward, and Gold Run Fraction.

These are situated on the divide, between the government road to Hunker creek and that to Sulphur creek, and a little to the south of Hunker summit.

Quartz occurs in veins or lenses, and also in great masses, throughout the schist country. In fact the quartz appears to predominate throughout a belt which strikes S. 70° E., and carries a width of more than 100 feet, for a distance of not less than 800 feet, and this may possibly reach many thousand feet, as it gives the impression of extending clear across the valley to the right fork of Hunker.

Development. Development work comprises a shaft and a pit or open-cut, on the Jennie mineral claim, and an open-cut on the Gold Run Fraction.

The shaft is 4′ × 7′ – 50 feet deep, the excavation being all in quartz. Near the shaft is a large outcrop of quartz, which is about 15 × 20 feet in area, but quite irregular in outline.

Immediately adjoining this, to the southwest, is a pit, about 6 feet in diameter and 5 feet deep, which exposes quartz in a very crushed and shattered condition, the schist being also similarly characterized.

The quartz is generally milky white, or translucent, and, though lean looking, the crushed samples generally contain galena and pyrite, while some very fine colours of gold were also noted in the pan.

A trial sample (No. 226), from the dump of the shaft, assayed only 81 cents in value, and a sample from the outcrop above mentioned (*i.e.* No. 227) gave no value when assayed. Sample (No. 228), from the pit above mentioned—6 feet across its width—gave no value.

On Gold Run Fraction, some 500 feet S. 70° E. from the shaft on the Jennie mineral claim, a ledge of quartz is exposed, in the form of a quarry face, for 18 feet of its length and 4 feet 6 inches of its height. This may, or may not, be a continuation of the same lead as exposed in the shaft. It is, however, on the same general line of strike within the quartz belt referred to above, and there is no doubt about a very large tonnage of quartz being available on this property.

The above ledge being sampled by No. 229, no values were found.

Altogether the sampling has not shown up anything of much value on the property. It may, however, be remarked that, considering the amount of quartz, the samples which it was possible to take were comparatively few in number.

PLATE XXIV.

Quartz outcrop and shaft, the latter immediately in front of the figure, on Jennie mineral claim of W. D. MacKay.

JOHN FAWCETT'S PROPERTIES.

(Right Fork, Hunker Creek.)

In company with Mr. Fawcett, a hurried trip was made, on June 29, over various properties situated along Hunker creek. Later, in August, a portion of a day was spent in sampling three open-cuts on the Alphonse mineral claim, described below.

During the drive up Hunker creek, a few trial samples were taken from exposures of quartz along the way, with the following results:—

1st exposure.—At a turn of the main road, on No. 35 below Discovery on Hunker, a vein of light grey quartz is found, crossing the road. This is a couple of feet in width, and has a comparatively regular appearance. A trial sample, No. 66, taken across the lead gave no values.

2nd exposure. In the vicinity of Six Pup, on the right limit of Hunker, below Discovery, a number of exposures occur as a result largely of placer operations.

Messrs. Fraser and Kirkpatrick own, and, during the season of 1912, were operating on placer claims on this pup, with the result that, between work accomplished by them and previous operators, a considerable area has been cleaned to bed-rock.

The formation is sericite schist, together with light banded quartz schist. Lenses and stringers of quartz occur in the schists. These vary from a fraction of an inch up to 2 feet in width. The quartz has little regularity, except that it may be said to have a prevailing strike easterly and westerly. The schists dip southeasterly, but where quartz lenses are intruded the schist folia are curved or broken to make way for the quartz. The latter is dull grey in colour, vitreous and generally lean looking, but in places this appearance is varied by oxidation of minerals causing discolouration on fracture faces.

A high bench occurs on the left limit of Six Pup, containing a hydraulieed area, where bed-rock has been cleaned off. A trench cross-cuts this area northerly and southerly and a trial sample (No. 73) of quartz and schist, taken across the trench, about midway of its length, gave a value when assayed of $4.82.

A couple of other samples (Nos. 70 and 71) were taken from a small trench-like depression, located on the extreme southern side of the hydraulieed area referred to above. This is at the head of a path-like gully which leads from the lower level of Fraser and Kirkpatrick workings, the left limit of Six Pup, near the intersection of the latter with the main road.

No values were found in the above two samples.

Other Claims.—Other claims visited were on the left limit of the right fork[1] of Hunter creek. These included the Brandon, and Hillsborough mineral claims, which adjoin each other, and are located on 24 Pup, about a mile from its mouth, and the Alphonse mineral claim, which is on the left limit of 36 Pup, a tributary on the left limit of Hunker's right fork. It is also opposite creek claim No. 35, above, on Hunker, and about 1,000 feet from the creek bed.

Mr. Fawcett's cabin, on the Brandon mineral claim, at the head of 24 Pup, is distant from Dawson, via the Hunker road, about 25 miles.

Nature of Country.—The country is here sericite, chlorite, and quartz schists, with quartzites, which grade into each other, at times being characterized by interbandings of the schists, quartzites and quartz. The latter occurs also in veins, masses or bunches, and stringers, throughout wide belts of country. If there is any regularity in its mode of occurrence it has probably a prevailing strike, west-northwesterly, or, perhaps, more nearly easterly and westerly. Generally, however, the quartz is found irregularly but widely distributed, so that it forms a large percentage of the whole rock mass.

Development.—This consists of a large number of open-cuts, trenches, and pits, scattered over the properties.

On the Brandon mineral claim an open-cut, 200 feet southwest from the cabin, and at an elevation 30 feet higher a trench, exhibited a considerable proportion of quartz of a rusty or ochreous appearance. The work had caved so badly that little could be judged as to the nature of the occurrence.

A trial sample (No. 67) was taken, and when crushed and panned showed some pyrite, and gave an assay return of ·04 oz. gold and ·56 oz. silver, equivalent to $1.14 per ton.

Hillsborough Mineral Claim.—500 yards N. 20° E. from the cabin, and 100 feet higher in elevation, a large quantity of quartz is exposed by open-cuts and outcroppings. No regular vein is found, but the aggregate tonnage of the quartz is probably very great. It is of a very white, lean looking appearance, and no values resulted from a trial sample (No. 72). Pyrite occurs in small percentages.

A more important occurrence is exposed on the Alphonse mineral claim. This is about 1½ miles, in an average direction S. 20° E. from Fawcett's cabin. A trail is blazed through a grove of small poplar, spruce, and white birch, for the greater part of the distance.

A vein of quartz is here exposed, which has the appearance of a regular fissure. It is cross-cut in three places, over a length of 175 feet of its strike which is in a direction N. 85° W. Its width is now exposed in only two cuts, the third trench having caved in and covered up the vein. It is

[1] The right fork is that fork which is on the right hand side when looking up the stream. This is reversed when the "limits" of the creek are referred to, the right limit being that on the right hand side when looking down stream.

found to be from 2 feet in one cut to an average of 4 feet 3 inches in the other. The dip is 40° to 60° northerly, the wall rock being a laminated or schistose quartzite, partially altered or decomposed.

Several inches in thickness of a rusty gouge is found between the vein and the crushed footwall. This gouge consists of finely crushed quartz. Its occurrence is, however, evidently very local, as it was noted in only one section of the vein.

Samples Nos. 234 and 235 represent a section across the face at the most northwesterly exposure of the vein. These gave no value when assayed.

No. 68 is a sample clear across the vein in the face of the intermediate cut, and Nos. 236 and 237, combined, represent a second sample of the same. None of these gave any values above traces when assayed, but No. 68 showed some good colours of gold in the pan.

From the lower trench, which, as stated, was caved, a regular sample of the vein could not be secured, but a couple of trial samples, Nos. 69 and 238, gave assays of traces only.

By referring to assay sheet No. 24, it may be noted that small values were found in some of the check assays, No. 68 showing 0·12 ounces of gold, equivalent to $2.40 per ton, while No. 237 gave $2.20, which confirm the occurrence of some gold as noted in the pannings of several samples.

JOHN FAWCETT'S HUNKER SAMPLES—ASSAY SHEET No. 24.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c	Width of Sample. Ft.	Width of Sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
66	Quartz..	Grey.	2	7	nil	Outcrop on road at 35' below.	trace		–	2	0	trace	nil	Trial sample at limit Hunker creek
73	Quartz and schist.	Dull white.	7	4	nil	Trench on hydrauliced area six pup.	·24	·04	4 82	2	0	trace	nil	See text p. 107
70	Quartz and schist.	–	3	2	nil	Six pup on Hunker	trace		–	2	0	trace	nil	Trial sample from trench-like gully.
71	Schist and little quartz.	–	4	12	nil	Beside No. 70.	trace		–	2	0	trace	nil	Same as No. 70
67	Quartz..	Rusty	7	13	Small showing of iron sulphides	Cut 200 S.W. of Fawcett's cabin	·04	·56	1·14	–		0·02	nil	Brandeta M.C.
72	Quartz.	Dull white.	10	5	Pyrite.	Outcrop 500 yds. north easterly from Fawcett's cabin	trace					trace	nil	Hillsborough M.C.
234	Quartz	Rusty	5	11	Pyrite.	Section of vein upper cut on Alphonse M.C.	trace			1	0	trace	nil	

235	Quartz.	Rusty	6 -	7	1 colour of gold.		nil	1	0	trace	nil	
236	Quartz.	Rusty	6	9	Colours of gold	Section of vein middle cut 100' below upper cut	trace	2	0	0.01	nil	Alphonse mineral claim.
237	Quartz.	Rusty	6	11	Colours of gold		nil	2	0	0.11	nil	
68	Quartz	Rusty	7	7	Small show iron sulphides.	Same as 235, 236	trace	4	3	0.12	nil	
69	Quartz.	Rusty	8	15	Several colours of gold.	Trench on vein 75' below middle cut	trace			0.01	nil	
238	Quartz.	Rusty	6	8		Same as No. 69	trace			0.01	nil	

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa

Jos. Fournier Mineral Claim.

About 200 yards northwest from the Summit roadhouse, Mr. Fournier, the proprietor, has a mineral claim, which, on being visited, was found to exhibit a trench which had caved in since the work was done.

Little could be judged of the prospect, but there was comparatively little quartz and no regular deposit. The country here resembles a porphyry.

A trial sample (No. 223) being taken of the material was found barren of any metallic minerals.

(See assay sheet No. 21.)

Summit Mineral Claim.

This claim lies immediately southwesterly from the Hunker summit, and adjoins the above-described MacKay property on the northeast. It belongs to Mr. Jas. Cameron.

The country is sericite schist, and quartz occurs in the form of stringers, kidneys and, possibly, veins. Outcroppings extend over a length of 300 feet, in a direction S. 70° E., *i.e.*, parallel to the belt noted on the MacKay properties. Practically nothing has been done to develop the deposit.

One small trench, 2′ × 6′-4′ deep, which is a few feet off the line of the supposed lead, exhibits some stringers of quartz in sericite schist. The quartz is white and contains galena and pyrite. Sample No. 224, taken across the trench, showed no value.

A piece of rose quartz, outcropping on the line of strike, near the open-cut, was sampled (No. 225), but found to contain no values.

(See assay sheet No. 21.)

DOME LODE.

This property is situated on the divide between Lombard pup and the head of Dominion creek.

It is owned by the Dome Lode Company. This company, according to Mr. T. D. MacFarlane, lately territorial mining inspector for Yukon, is composed of ten men, each of whom put up $10,000, making a cash capital of $100,000. Of this amount, $30,000 went to the promoters and $70,000 was spent in development.

The deposit consists of a vein of quartz which, at the points noted, varied from a few inches up to 5 feet in width. This is found on the summit of the divide, and is exposed at intervals by outcrops, trenches, and a couple of shafts. These extend over a length of about 1,500 feet. The strike is N. W. and S. E. and the apparent dip 65° to 70° northeasterly, with the enclosing schists. The occurrence is probably lenticular.

Development. Work was in progress during the season of 1909 and possibly during the following season.[1] Nothing was being done during the season of 1912.

One of the shafts, started near the summit, is reported to have produced some quartz, which gave assay values as high as $250 per ton. When this shaft was 60 feet deep it was decided to start a cross-cut tunnel 900 feet lower down, on the Dominion creek side of the hill. A compressor plant was there installed at a cost of $15,000 and the tunnel driven 2,600 feet, at a cost of $20 per foot, when the money became exhausted. Little was proven beyond the fact that lenticular occurrences of quartz, up to 18″ or 2′ wide, also small stringers and bunches of quartz and calcite were encountered. One vein, 5″ to 8″ wide, was cross-cut at a distance of about 1,250 feet in, and drifts started on it in both directions, with the result that it was found non-persistent after a few feet in the S.E. drift, while the N.W. drift exposed it for 25 or 30 feet. The work was then abandoned and the machinery sold for about one-tenth its cost.

The whole point of the story is, that one-quarter of the $100,000, if spent in prospecting the quartz itself, by cross-cutting the surface, sinking a couple of hundred feet, and systematically sampling the workings, should have proven whether or not an ore-body of value exists. Whereas, the whole resources of the company were spent in driving a deadhead tunnel. The latter is a good piece of work, as tunnels go, but the resultant information is all negative.

The above is a typical instance of the general condition already referred to in this report, under 'Methods of Prospecting,' and requires no further comment.

A few trial samples were taken from the surface showings and one from the tunnel. No. 365 was taken from quartz on the dump of the most northwesterly shaft. This gave a value of $1.33 per ton when assayed. No. 366, taken across 18″ of vein, distant 175 feet S.E. on strike from the above shaft, gave an assay of 44 cents per ton. No. 367, from quartz of the second shaft, distant about 1,500 feet S.E. from the first shaft, was found by Mr. Sime to assay $2.66 per ton; while the Chemical Division of the Mines Branch, Ottawa, recovered $7 from the assay. No. 368, taken from a quartz pile in the tunnel, which had come from the 5″ 8″ vein that was cross-cut, gave an assay of trace.

(See assay sheet No. 28, p. 125).

Summary and Conclusions.—A property such as this, which has already been the means of absorbing $100,000, is necessarily regarded with doubt. The few samples taken at this time were merely trial samples. The results obtained from them may be said to confirm the opinion expressed above, to the effect that a quarter of the $100,000, if expended in investigating the

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[1] Sum. Report Geol. Survey, Canada, 1909, pp. 17-18.

quartz, would have decided definitely whether the property would make a mine.

Surface indications show large proportions of quartz. The tunnel, at an elevation of 900 feet lower, exhibits a comparatively small percentage of quartz. Some values evidently occur in the main surface lead, as shown by the above few samples, and the prospect is sufficiently good to invite a mill test, if that could be arranged at reasonable cost.

HUNKER MINERAL CLAIM.

(Sam. Thurbur.)

This claim is located on the same divide as the Dome Lode property. It lies also on the right limit of the right fork of Hunker creek, about 1,000 feet east of the creek bed. The main road passes through it.

Mr. Thurbur started an open-cut into the side hill, above the road, and struck a vein, which appears to strike about S. 75° E. and to dip 40° northerly through the country which has about the same dip southerly. This vein, where exposed, showed a width of about 19 inches. The wall rock is a schist, grading into laminated quartzite, of a grey to greenish colour. Both quartz and country show mineralization, by pyrites, and the quartz contains galena. This vein, for 12 inches of its width, on the footwall, is made up of fairly solid quartz, overlain by about 7 inches of crushed quartz, and decomposed schists.

Little work had been done at the time this was visited with Mr. Thurbur, and nothing could be judged as to the continuity of the vein.

Sample No. 191, across 12″ of the hard quartz, showed some galena and pyrite, and No. 192, across 7″ of the crushed vein-matter, panned considerable iron pyrites, and one colour of gold.

In each case the assay showed no value.

See assay sheet No. 19, p. 96).

WELLS QUARTZ MINING COMPANY.[1]

(Lepine Creek.)

A large number of claims have been staked on Lepine creek, north of the Klondike river, most of them being held by the above company.

Dr. Wells, of Dawson, is head of this company, and, on August 16, accompanied the party, which thus consisted of 4 members. The trail on Moosehide mountain was a very rough one over which to get a team of horses, and after negotiating it one way it was thought best to return by driving down Lepine and Rock creeks to Klondike river, the road coming out just opposite Bear creek.

[1] McConnell, R. G., Report on Klondike Gold Fields, Part B, An. Rep. Geol. Sur. Can. 1905, Vol. XIV, p. 65B

The claims visited on Lepine creek were: the Great Eastern, May McD. mineral claim, Billy Button, and Rose. The Rose mineral claim is on the right limit of Lepine creek, 7 miles above Rock creek, where it enters the latter, which then continues down about $1\frac{1}{2}$ miles to the Klondike river.

Nature of Country. This is generally sericite schist, which in places has become silicified. Lenses of quartz occur throughout the schists, but are not so plentiful as in many other sections visited. Associated with the schists is a quartz porphyry which traverses a comparatively extensive area.

Development. This consists of a tunnel, several shafts, or near-shafts, pits, trenches, and open-cuts, which are scattered over a considerable area. No work was in progress during the past season, and many of the openings previously made had caved in.

On the Rose mineral claim, a wide dyke or ledge of bird's eye porphyry is found traversing the slope from the right limit of Ruiter creek. Two samples (Nos. 260 and 261) were taken at various trench exposures, but no values found.

A tunnel had been driven some distance into the side hill, the entry being near the right limit of the creek, but this was in a dangerous condition when visited, and could not be penetrated. There did not appear to be any vein, however. Occasional stringers of quartz were seen in the schists of the dump. A little pyrite was noticed, but no values were found in sample No. 262 taken from this material.

One shaft, said to be 30′ deep, was located beside the water ditch of the Yukon Gold Company, about 200 yards northerly from the cabin. This was sunk in silicified schist, which exhibited lenses of quartz. Two trial samples (Nos. 246 and 247) from the dump of this shaft gave no value when assayed.

On the Great Eastern Mineral Claim a second shaft, supposed to be 28 feet deep, was visited. This is in the vicinity of the head of an incline, which was formerly used to run material from an adjoining open-cut to the cyanide plant below. Quartz and schists were both found in the dump of the shaft and sampled, three trial samples being taken, Nos. 248, 249 and 250. No values above traces were found.

The open-cut mentioned above was formed by two trenches cross-cutting each other, one being 120 feet long, and from 5 to 15 feet wide, the other over 40 feet long and 8 to 10 feet wide. This was the source of the ore, referred to by Mr. McConnell[1], which was then being treated by the cyanide plant on Ruiter creek. This ore consists of quartz-porphyry dyke matter and country, all of which is completely decomposed to a depth of at least 15 feet.

A couple of samples (Nos. 251 and 252) gave only traces when assayed.

[1]McConnell, above cited, p. 102.

On the May McD. Mineral Claim, a couple of pits are opened where it would appear shafts were intended to be sunk. These are only a few feet apart, the larger being 8 feet in diameter and 4 or 5 feet deep.

The schists are here rusty, and again pale green in colour and metamorphosed in a manner similar to that noticed at the Lone Star, Victoria gulch.

One sample (No. 254A) gave an assay as high as 20 cents; three others (253, 254 and 255) only nil and traces.

On the Billy Button Mineral Claim, a shaft about 10 feet deep, and a small pit, or open-cut, are found near each other.

The condition here is similar to that already described, excavated material being chiefly silicified schists. Two samples (Nos. 256 and 257) taken from the pit gave trace and nil respectively, and Nos. 258 and 259 from the dump of the shaft, gave no values.

Nineteen samples were taken from this property, and only one gave any value above traces, i.e., 254A, which showed a value of 20 cents per ton.

WELLS QUARTZ MINING GROUP SAMPLES ASSAY SHEET NO. 25.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $	Value per ton. c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au	Check assay (b) Ag.	Remarks.
246	Quartzose and schist..	Yellowish	3	5		Dump of shaft No. 1 beside Yukon Gold ditch	nil						nil	nil	Trial sample of banded schist and quartzose material.
247	Quartz .	Dull white to rusty	3	1		Dump of shaft same as No. 246	nil						nil	nil	Trial sample of banded schist and quartzose material.
248	Quartz	White to rusty.	3	7		Dump of No. 2 shaft Great Eastern claim	trace				-		0.01	nil	Trial sample Great Eastern M. C.
249	Quartz and schist	Rusty to greenish	4	3		Dump of No. 2 shaft Great Eastern claim	trace		-				nil	nil	Average sample of quartz and schist.
249A	Quartz and schist	Rusty to greenish	3	11		Dump of No. 2 shaft Great Eastern claim	nil						trace	nil	Average sample of quartz and schist
250	Quartz	Rusty	3	7		Dump of No. 2 shaft Great Eastern claim	trace				-		trace	nil	Trial sample Great Eastern M. C.

WELLS QUARTZ MINING GROUP SAMPLES ASSAY SHEET NO. 25 *Continued.*

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $	Value per ton. c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
251	Schists metamorphosed ..	Rusty grey greenish ...	3	11	–	Trench 25′ south of No. 2 shaft	trace			–	4	0	nil	nil	Trial sample Great Eastern M. C.
	Schists metamorphosed ..	Rusty	3	15		Opposite end of trench 25′ from No. 251	nil				4	0	nil	nil	Great Eastern M.C.
253	Schists metamorphosed...	Greenish	3	5	..	8′ dump of pit No. 1 May McD. M. C.	nil						0·04	nil	Trial sample.
254	Schists metamorphosed ..	Rusty	4	3	–	8′ pit No. 1 May McD M. C.	trace				1	0	trace	nil	Sectional sample.
254A	Schists metamorphosed...	Rusty	3	7	.	8′ pit No. 1 May McD. M. C. .	0·01	trace	0·20		4	0	trace	nil	May McD. M. C.
255	Schists metamorphosed . .	Rusty.	5	5	–	Pit No. 2 adjoining the 8′ pit above .	nil				5	0	nil	nil	May McD. M. C.
256	Schistose quartzite ...	Banded white tan greenish	3	5	–	Pit No. 3 on Billy Button M. C. .	trace			–	2	0	trace	nil	Billy Button M. C.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assay conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

WELLS QUARTZ MINING GROUP SAMPLES *Cont.*. ASSAY SHEET NO. 26

Sample No.	Material.	Colour.	Weight. Lbs.	Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Ag.	Value per ton. $	c.	Width of sample. Ft.	In.	Check assay (b) Au.	Ag.	Remarks.
257	Schistose quartzite with quartz.	Banded white tan greenish	2	11		Adjoining No. 250 No 3 pit.	nil				2	0	trace	nil	Near N. W. border of Billy Button M. C.
258	Schistose quartzite with quartz..	Banded white tan greenish	3	9		Dump of shaft adjoining No. 3 pit	nil						trace	nil	Near N. W. border of Bully Button M. C.
259	Schistose quartzite with quartz..	Banded white tan greenish	3	7		Dump of shaft adjoining No. 3 pit.	nil						trace	nil	Near N. W. border of Billy Button M. C.
260	Birds Eye porphyry	Grey	3	7		Open cut on face of hill Rose M. C. ..	nil		-		2	0	trace	nil	Rose M. C.
261	Birds Eye porphyry	Grey	6	1		Porphyry ledge exposure on Montrose M. C	nil				2	0	trace	nil	Montrose M. C.
262	Quartz and schist	White to green.			Pyrites	Tunnel on Rider creek	nil		-		-		trace	nil	Trial sample of material on the dump.
263	Quartz..	White ..	3	13	Pyrites..	Challenge M. C. on McKay gulch near Victoria gulch....	0·02	0·35	0·61		-		trace	nil	Trial sample from Mr. F. E. Akin. This ground was not visited.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

PROPERTY OF MESSRS. PICKERING AND ASSOCIATES, ON YUKON RIVER.

This property is situated on the right limit of Yukon river, about 18 miles above Dawson, and a couple of miles south of Ainslie creek.

The immediate surrounding country is schist. A high and steep bank slopes up from the river. About 15 feet above the water level, a couple of tunnels were started into the hill, at a distance of 30 feet apart. The more southerly one never got beyond a start, but the northerly one was driven 70 feet N. 65° E. into the hill, on a vein of quartz which strikes in stratified schists, with a dip of 60° southeasterly. (See Fig. 22.) The quartz, which is much broken, is about 14 inches wide at the entry, but pinches to a few inches in width throughout the greater portion of the drift. The schists consist of alternating bands, from 12 inches to 18 inches thick, of more or less decomposed slatelike and graphitic material, and of greenish schist, together with dark brown, iron-stained and sheared rock.

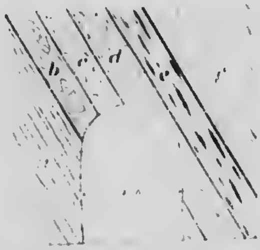


FIG. 22. Section of vein, north entry, Pickering property, Rt. limit of Yukon river. (*a*) Dark mineralized rock, (*b*) Rusty quartz lenses in dark graphitic schist, (*c*) Broken quartz, (*d*) Quartz and slaty or graphitic schist, (*e*) quartz stringers in greenish schist, (*f*) Dark graphitic schist.

The decomposed graphitic schists contain numerous bunches of rusty quartz, embedded in them. The above-mentioned drift is followed by a cross-cut, about 110 feet in length, 100 feet being to the right of the drift. As a clear exposure of the formation exists on the outside bank, at the face of the drift entry, this cross-cut is another example of misdirected effort in an attempt to open up a prospect.

The second entry started was partially in quartz also, but the work was abandoned after a few feet of drift.

Five trial samples (Nos. 342-346) were taken from various parts of the workings. One of these gave an assay of more than a trace, e.g., No. 345, taken across the face of the last mentioned opening, showing a value of ·02 oz. of gold, equivalent to 40 cents per ton. The prospect is not attractive.

EXCELSIOR CREEK: ANDERSON CLAIMS.

Property here was visited by Mr. D. MacLachlan, who describes it as follows:—

Excelsior creek flows in a northeasterly direction, and enters the left limit of Yukon river, about 53 miles above Dawson. Five miles up the creek, from its mouth, 4 claims have been staked by Messrs. J. A. Anderson and MacIntosh. These are named: Fernie, Midnight Wonder, Gigantic, and Buster.

A belt or dyke of quartz porphyry, about 300 feet wide, strikes easterly and westerly across the creek. This was traced for several thousand feet. The contact to the south is granite, while that to the north is a dark, fine grained rock, which in the field has somewhat the appearance of a dark grey limestone, and is locally known as such. On application of dilute hydrochloric acid, the effervescence was so slight as to indicate a very small percentage of lime.

The belt of porphyry constitutes the material prospected for gold values.

A tunnel was started, by Mr. Anderson, into the side hill, on the left limit of the creek, and driven 14 feet. This entry is in a bluff, which attains a height of about 40 feet. It is distant about 100 feet from the creek bed. Five samples, considered typical of the mass were taken, as follows:

No. 348, about 1,200 feet westerly from the tunnel, the elevation here being 370 feet higher than the latter.

No. 349, about 60 feet upstream from the entry in a direction parallel with the stream itself.

No. 350, taken across 4 feet width of the tunnel face.

No. 351, taken about 30 feet down stream from the entry.

No. 352, taken about 1,200 feet easterly from the tunnel, and at an elevation 590 feet above the latter.

None of the above samples, when assayed, gave any values above traces neither was any gold seen in pannings, and, so far as noted, there is practically no mineralization. (Assay sheet No. 27.)

PICKERING PROPERTY ON YUKON SAMPLES EXCELSIOR CREEK [illegible] —ASSAY SHEET No. 27

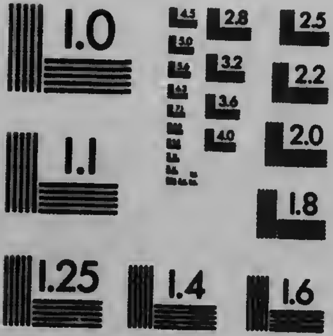
Sample No.	Material	Colour	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $	Value per ton. c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au	Check assay (b) Ag.	Remarks.
342	Schistose material	Yellowish to dark	9	14		Face of cliff adjoining S. side No. 1 drift	nil	nil			10	0	trace	nil	Pickering.
343	Quartz and schist	Rusty to black	3	14		Roof of drift at entry	nil	nil			5	6	trace	nil	Pickering
344	Quartz and schist	Dark greenish	2	6		In crosscut 70' from entry drift	trace	trace	-		4	0	trace	nil	Pickering.
345	Quartz	Grey bluish	4	6		Entry No. 2 drift	trace	trace	-		4	0	0·02	nil	Pickering
346	Quartz	Dark rusty	–			Stringers 25' S. of No. 2 drift	trace	[illegible]			0	8	trace	nil	Stringer of quartz dark graphitic schist.
348	Porphyry	Grey to brownish	1	0		1,200' westerly from tunnel	trace	nil	–				trace	nil	Excelsior creek
349	Porphyry	Grey to brownish	4	2		60' upstream from tunnel	nil	nil	–				nil	nil	Excelsior creek.
350	Porphyry	Grey to brownish	1	6		Face of tunnel	trace	nil	–		4	0	trace	nil	Excelsior creek.
351	Porphyry	Grey to brownish	6	4	–	30' down stream from tunnel	nil	nil					trace	nil	Excelsior creek.

352	Porphyry..	Grey to brownish	4 – 12		[illegible] easterly from [illegible]	nil	nil		–	trace	nil	
340	Quartz	White to rusty	2 – 10	Pyrite	Thistle creek	0·04	0·40	1·04		0·01	nil	Trial sample submitted by Mr. F. B. Kennedy.
347	Oxidized material	Brown.	1 – 3	Pyrite and free gold.	Chicken creek, Forty Mile district	13·90	2·00	279·20	–	6·81	nil	Trial sample submitted by Mr. Ole Tweedon. This property is located in U. S. territory.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y. T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa

MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



APPLIED IMAGE Inc
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Rochester, New York 14609 USA
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CALIFORNIA GIRL MINERAL CLAIM.

This claim is situated on left limit of Hattie gulch, a tributary on the right limit of Hunker, distant 11 miles from Dawson. Mr. Pickering, of Greenfield and Pickering, is interested in this property.

An open-cut, about 100 yards up the gulch from the main road, exposes a vein of quartz 2 feet wide, which strikes N. 30° E. and stands about vertical within schist walls.

The quartz is rusty and does not appear to carry any minerals.

There is not sufficient work done to enable one to judge of the extent of the lead. A couple of samples were taken. One (No. 361) from across the width of the vein, and No. 362, a trial from excavated vein matter. Neither showed values when assayed. (See assay sheet No. 28.)

UNEXPECTED MINERAL CLAIM.

This claim is located at the head of a gulch, about a mile from the main road, on the right limit of Hunker, opposite 80 Pup, or a little above Last Chance, the two latter being on the left limit of Hunker creek. The distance from Dawson is 13 miles. This property was visited in company with Mr. Pickering, who furnished transportation in his motor car.

At the head of this gulch a steep hill rises with a slope of about 30°. This whole hill consists of quartz porphyry, of a white to greyish colour. In places a purple or violet stain is found, carrying a width of about a foot, and running through the porphyry in a direction parallel with the contours of the hill.

Development.—Work consists of a small open-cut, and an entry into the side hill. The latter is about 10 feet in length. This cross-cuts a portion of the deposit in which the purple stain occurs, near the mouth of the opening, and again the stain is found at the face. The colour is the only distinguishing feature, as there is no vein formation.

A sample (No. 363), taken across about 3 feet of porphyry, including the purple stained portion near the entrance, gave no value when assayed. No. 363, taken across 3 feet of the entry face, gave an assay of 83 cents per ton.

There does not appear to be much in the deposit to offer encouragement to the prospector.

CALIFORNIA GIRL AND UNEXPECTED M.C. SAMPLES, DOME LODE AND W. O. SMITH GOLDEN AGE MINERAL CLAIM SAMPLES ASSAY SHEET No. 28.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
361	Quartz......	Rusty.....	3	12	–	Face of cut........	nil		–	2	0	trace		California Girl M.C.
362	Quartz	Rusty..	3	14	–	Dump of cut...	trace		–	–		nil		California Girl M.C.
363	Quartz porphyry	Purple stain......	3	10	–	W. Entrance tunnel..	trac					trace		Unexpected M.C.
364	Quartz porphyry	Purple stain.....	3	6	–	Face of tunnel..	0·04	0·06	0 83	3	0	trace		Unexpected M.C.
365	Qua.tz .	Rusty.	6	11	Galena and a little iron.	Trial from dump of 8 × 12 shaft No. 1	0·06	0·22	1·33			nil		Indicator
366	Quartz.....	Rusty.	3	12	A little pyrites.... ..	Trench 175' S.E. of above shaft....	0·02	0·08	0 44	1	6	trace		Indicator samples Dome Lode.
367	Quartz	Dark rusty.	2	11	–	Trial from dump 2nd shaft about 1,500' S.E. of No. 1	0·13	0·11	2 66	–		0·17		
368	Quartz......	Rusty.	2	15	–	Quartz pile 300' from tunnel mouth	nil					trace		
370	Quartz and schist.	Dull white to black .	4	4	–	Face of tunnel.	trace			3	0	trace		Golden Age M.C.

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

PROPERTY OF W. O. SMITH, KLONDIKE.

Golden Age Mineral Claim.

About half a mile below the mouth of Bear creek, on the left limit of the Klondike and adjoining the main road, is a hill of dark graphitic-looking schist[1], containing stringers and small lenses or bunches of quartz. A tunnel whose entry is at the margin of the road, has been driven southwest 27 feet into the schist. Stringers and small lenses of broken and discoloured quartz are exposed, but there does not appear to be anything of value in the deposit.

A sample (No. 370, assay sheet No. 28) was taken across the face of the tunnel, where a quartz lens occurs. This gave an assay of a trace. Mr. Smith stated that a mill test of 2 tons gave values of $9.25 per ton.

[1] A thin section of this rock was examined by Dr. Cairnes, who classified it as a sheared graphic quartzite.

CHAPTER III.

THE DUNCAN CREEK MINING DISTRICT.

For a general account of this district the reader is referred to Mr. Keele's report.[1] A very small portion in the vicinity of Dublin gulch comes in for detailed description in this report. As, however, the district is not generally familiarly known, even to the majority of residents of the Yukon, a few remarks on the general character of the country traversed are considered pertinent.

It was mentioned in the itinerary, previously outlined, that the route taken when visiting this ground was via the Yukon and Stewart rivers to Mayo, thence inland to Dublin gulch. During the season of open navigation the SS. *Vidette*, with good passenger and freight accommodation, makes almost weekly trips from Dawson to Mayo.

The Stewart river enters the Yukon about 72 miles above Dawson and Mayo is situated at a distance of 168 miles up the Stewart; it is, therefore, about 240 miles by water from Dawson to Mayo.

The valley of the Stewart is broad, with beautiful, wooded flats or stretches, usually on one, but in places on both sides. It is, in places, well wooded. The timber improves in size and quantity as the river is ascended. Poplar and spruce are found to reach 50 or 60 feet in height and 2 feet in diameter on the stump.

The town of Mayo is situated on the right limit of the Stewart, immediately above the mouth of the Mayo river, which here enters the former. The townsite is level, and a good, dark, loamy soil is found over a comparatively extensive area. Vegetables and grain flourish, and the land is evidently capable of being made highly productive.

From Mayo to Dublin gulch is between 45 and 50 miles, in a general direction north-northwesterly.

For ten miles of this distance there is a good road to Minto Bridge, a village at the junction of Minto creek and Mayo river. For a further distance of 10 miles the road is rough, though passable for a heavy wagon. This is the road terminus, however, and Look-out Cabin is here situated at the foot of the western slope of Mt. Haldane (Look-out Mountain). The balance of the distance is over a trail which is impassable for any conveyance other than pack animals. Muskegs, marshy and hummocky ground are encountered.

This trail passes along the valley of Black creek, a tributary of Minto creek and over the divide between Black and Ross creeks, following the

[1] Keele, J., Ann. Rep. Geol. Survey Can., Vol. XVI, 1904, pp. 38A–39A.

latter to McQuesten river. The trail here turns up McQuesten, to the mouth of Haggart creek, crossing a bridge on the river at a place called the 'Jam,' where a roadhouse, now vacant, is situated at a distance from Mayo of about 30 miles.

The trail from the 'Jam' follows Haggart creek for the first few miles on its left limit, then crosses to the right, and, after a few miles, back to the left.

Placer claims of Abbott Brothers, at 8 below on the Haggart, are situated about 12 miles up the creek, and several miles above this plac - claims of the Cantin Brothers are being worked just below the mouth of Dublin gulch. It will thus be seen that the prospectors at Dublin gulch are labouring under a severe handicap through lack of a good road for ingress and egress.

Location of Claims.

GENERAL STATEMENT.

The claims staked in this vicinity extend generally in a northeasterly and southwesterly direction over a length of eight or nine miles, so far as yet known. The most important are located along the limits and at the head of Dublin gulch,[1] which enters the left limit of Haggart creek, a tributary of McQuesten river. With the exception of one property, 'Independence Group,' on the divide between Haggart and Secret creeks, 5 miles distant southwesterly from the mouth of Dublin gulch, all the properties examined in this district are located in the immediate vicinity of Dublin gulch.

When visited in September, the claims were unsurveyed, but arrangements were then being made to correct that deficiency. It is very likely that this has been done in at least a few cases.

GEOLOGY.

Briefly, the formation locally consists of quartzites, quartz mica schists, or micaceous schistose quartzites and chlorite schists, probably referable to McConnell's Nasina series.[2]

The quartzites and quartz schists a so closely associated as to grade into one another. Fine banded quart es and silicified schists prevail, with interbandings of quartz. The average thickness of these bands would be about one-sixteenth of an inch. These quartzites and schists are intruded, in places, by heavy masses of grey biotite granite, and again by dykes of decomposed and altered granite and by other dark and much altered igneous ro , tentatively classified as an altered diabase.

[1] Cairnes, D. D., S . Rep. Geol. Survey Can., 1911, p. 40.
[2] McConnell, R. G art B, Ann. Rep. Geol. Survey Can., 1905, pp. 12B-15B.

PLATE XXV.

Mining engineer's party on the Haggart Creek trail en route to Dublin gulch.

The schists and quartzites vary in colour, from light grey to greenish; a reddish, banded, variety is also noticeable, and again dark iron stains are prevalent throughout.

Dynamic forces have, here, caused tremendous movements of the earth's crust, which have resulted in great fracturing. Deep gulches occur below the summits, which show evidence of erosion.

Petrography.—A few specimens of Dublin gulch rock were taken, and from them thin sections were made. These were, for the most part, illustrative of the intimate association, in places, of the schists and quartzites, which, as already noted, appear to grade into each other, so that, in the field, it is impossible to absolutely separate one from the other. One specimen, however, consisted of dark vein-matter, which appeared indeterminate in the field (described below as No. 2 d), and another, of highly altered or metamorphosed dyke material (described below under No. 2 e), both of the latter being taken from the Moose tunnel, on Stewart and Catto property.

Dr. Cairnes, of the Geological Survey, who examined these sections under the microscope, gives the following brief petrographical note on them:

'No. 2a, *Quartzite*, consists dominantly of interlocking grains of quartz, and also some disseminated particles of iron ore. There is an almost entire lack of ground mass, the quartz grains themselves, in the process of metamorphism, having grown to fill most of the interstitial space.

No. 2b, *Micaceous schistose quartzite*, consists dominantly of quartz and mica and is a mashed and sheared sedimentary rock which has been so metamorphosed as to have the general appearance of a typical mica schist. Since, however, the origin of the rock is decidedly sedimentary, and since also its general structure is that of a quartzite, it is probably better to consider it as an altered quartzite. The quartz grains are dominantly interdigited or interlocked, and the mica occurs as irregular shreds and aggregates, distributed throughout the quartz particles. The mica was originally for the greater part a brownish biotite, but has been largely altered to limonite and a colourless mica.

No. 2c, *Altered diabase?*, a much altered igneous rock that appears to have had an ophitic structure and is probably a metamorphosed diabase. A great amount of secondary biotite occurs scattered throughout the rock in the form of irregular shreds, which tend, to a great extent, to obscure its structure and original mineralogical composition.

No. 2d, *Vein material*, consists mainly of quartz, muscovite and iron ore as well possibly as other opaque minerals. The yellow powder-like mineral which is so prominent in the hand specimen is lost in the preparation of the thin section. This specimen could probably be better determined chemically and crystallographically than petrographically.'

In addition to great intrusive masses of grey biotite granite, it is evident that other varieties occur, as shown by examination of a random specimen of float, described as follows:—

No. 3. *Granite.* "Megascopically, this is a greyish, medium textured, phanerocrystalline rock of typical granitic habit, in which quartz, feldspar and biotite are distinctly visible to the unaided eye. Under the microscope this rock proves to be a medium textured, holocrystalline rock having a hypidiomorphic structure and possessing a typical granitic habit. It consists dominantly of quartz, alkali feldspar, acidic lime-alkali feldspar and biotite, with a slight amount of accessory iron ore, and also some secondary muscovite derived mainly from the alteration of the feldspars. The feldspars dominantly exhibit a wavy extinction showing the rock to have been subjected to stress or strain. The rock is thus a granite or, more strictly speaking, since the only primary ferro-magnesian mineral present is biotite, the particular specimen examined is a granitite. In all probability, other specimens from the vicinity will be found to contain muscovite or amphibole."

Some Quartz Deposits. At Dublin gulch, quartz veins occur, widely, throughout a fissured belt of these schists, which lies along a generally well defined granite contact, striking northerly and southerly, along the ridge, above the left limit of Dublin gulch, and, towards the head of the gulch, running into the Potato hills. These hills are rounded and steep, and are aptly named. They have an elevation of 5,400 feet, i.e., some 2,000 feet, or more, above the mouth of Dublin gulch.

These veins have, generally, a northeasterly and southwesterly strike, which varies between N. 10° E. and N. 60° E., and they appear to head towards the granite contact. Though, generally, not there explored, it is thought they may run into a contact vein. One drift, on the Olive claim, is said by Mr. J. E. Moskelund, who performed the work, to have exposed this condition, though, when visited, this drift was inaccessible.

These veins vary greatly in width, from a few inches up to six feet, and even more. Occasionally cross veins were noted, that is, striking northwesterly and southeasterly, but these appear to be rather the exception. One, however, apparently of some importance, was examined on the Shamrock group of Mr. Frank Carscallan.

Gold is found in these veins over the whole length prospected.

A typical feature of the auriferous quartz is its association with a green scorodite[1] (hydrous arsenate of ferric iron) constituted as follows:

Insoluble.	2·16
As_2O_5	48·06
Fe_2O_3	34·60
H_2O	14·23
P_2O_5	0·13
	99·18

The quartz and scorodite together, occur in the nature of a pay-streak, from 4 or 5 up to 20 inches wide, striking with or in the veins, the latter consisting, generally, of a vein filling composed of quartz and silicified country. Most of the veins appear to cut the schists, both in strike and dip. As a result of vein formation, the walls of the original fissure, where seen underground, were found to have been subjected to metasomatic alteration, and are more or less indeterminate. Similarly, the greenish pay-streak, though well defined, is characterized by irregular outline, as it changes from a decided green, in the centre, to a paler shade on either side, and gradually fades into the main mass of vein material. This irregular outline is doubtless due to unequal hardness of material constituting the ordinary vein filling, with resultant impregnation from the circulating waters, along lines, or zones, of least resistance.

These veins are usually and, in places, heavily mineralized, with arsenical pyrites; iron ore occurs and occasionally particles of pyrite are found. (See Fig. 23.) Leaching and oxidation of sulphide ores has taken

[1] Determined by Mr. F. G. Wait, Chief of the Chemistry Division, Mines Branch.

Scorodite is comparatively of rare occurrence in Canada. It is doubtful whether it has, so far, been found in any other locality therein.

See also Dana's Descriptive Mineralogy, pp. 821–22 (6th Ed. 1906)

'SCORODITE GROUP, ORTHORHOMBIC.'

'Scorodite,

Hydrous ferric arsenate,	As_2O_5	Fe_2O_3,	$4H_2O$
or $FeAsO_4 + 2H_2O$	49·8	34·6	15·6

Found brown colour in certain mountains in Saxony, associated with *arsenopyrite*. Found at Nerchinsk, Siberia, in fine crystals; and also as an amorphous crust or iron-sinter on beryl, topaz and quartz; leek-green in the Cornish mines, coating cavities of ferruginous quartz; found also at the Minas Geraes, Brazil; District of Lucina, Peru, in an earthy form; at the gold mines of Victoria in Australia, in quartz with arsenopyrite and gold.

Generally found with copper ore and pyrite or coating cavities of quartz and limonite associated with pyrite or with pharmacosiderite and various copper arsenates.

Scorodite occurs altered to limonite

An Iron-sinter or amorphous Scorodite.

Colours: *brown, leek green, blue, yellowish, pale greenish or white, arsenopyrite.*

place throughout the zone of oxidation, which extends to, and probably beyond, the depth so far prospected. That is about 40 or 50 feet. Most of the gold in this zone is, however, free, though very fine, and apparently well disseminated, as evidenced by the fact that nearly all the samples panned gave fine colours of gold in the form of minute dust. Some wire gold was noted. Frequently, small values in silver were found in the assays.

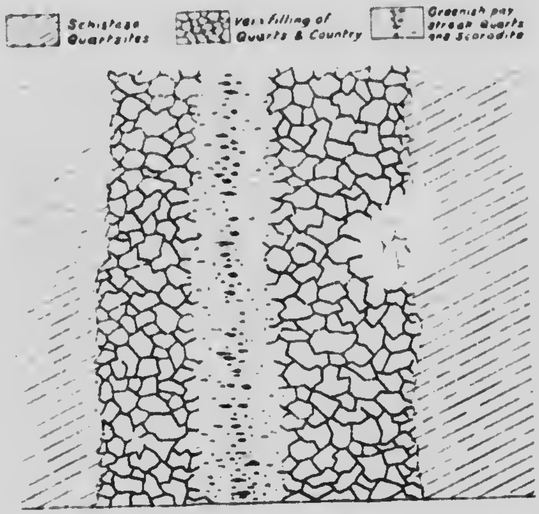


FIG. 23. Typical section of auriferous veins at Dublin gulch.

Associated with the more regular fissure veins are stringers, bunches, and, more rarely, lenses of quartz. Masses, which may be regarded as impregnated zones of country also occur, besides igneous dykes which may have a genetic relation to the auriferous depositions; these are now highly metamorphosed and require time and study on the ground for proper definition and correlation.

Stringers and smaller bunches of quartz, which as mentioned above, occur both throughout the vein filling and in zones adjoining the main vein, do not appear to have the typical associated green scorodite, neither are they, so far as noted, as highly auriferous as the pay streak above referred to.

It has been suggested that this pay streak may be the result of secondary fissuring and enrichment at a later date than the original vein formation. It is, however, more probably due to the fact that, as the available space became more confined, a proportionately greater amount of deposition or precipitation from the metalliferous waters ensued until the fissure became finally filled; the typical green scorodite (hydrous arsenate of ferric iron) being rather an end product of the more cooled and acid circulating waters in the upper zone, where original sulphides are decomposed, with various end products of metals, oxides, silicates, sulphates, or arsenates.

The greenish stain has been recognized as distinctive, by the prospectors at Dublin gulch, and just as the purple fluorite of Cripple creek, Colorado, afforded a guide to pay ore, so this has been of assistance, at least in the preliminary prospecting of certain of these properties. Unlike the Cripple creek veins, which occur in irregular ore shoots, within the fissures, of greater vertical than lateral extent, here the pay streak follows the fissures in the manner above noted; as to its persistence at depth, this can only be surmised.

Beck[2], in his work on the nature of Ore Deposits, devotes considerable space to the discussion of The Arsenical Gold-Quartz Veins, which have been worked since 1881 at Santa Cruz, in the State of Santa Barbara, Honduras[3]. Occurrences of a similar kind are scattered all over North America and include veins in the Huronian schists at Marmora, Ontario[4]. They are found also at Possegem in Brazil, Meadow lake, California, Kroundr·ai north of Krugersdorp in the Transvaal, etc. While some of these are referred to as bedded and others as true fissure veins, having considerable variation in the matter both of associated rock, and metallic minerals, yet it would appear that owing to certain points of similarity, they are supposed to admit of the same general classification.

It has been said that, in classifying a vein by its mineral contents, the main point to be remembered is, that one's judgment should not be based on one specimen, or on a few specimens in a collection. The general character of the vein should instead be determined from the examination of very many samples taken from most diverse parts of the vein, and so far as may be possible data found in connexion with separate lodes over an area should be united, and when scientific observations have been thus made and recorded, over a period of time, it becomes possible to finally arrive at an exact grouping or classification of the various vein formations. Whether it is either possible or advisable to make a particular classification sufficiently comprehensive to include deposits over widely extended, or diverse regions, is open to question. The writer is inclined to agree with McLaren[5] when he says that, since auriferous veins or deposits may be of any form, may occur in any rock, and may have received their gold from various sources, particular classifications based on similarity of form of deposit, or identity of matrix, or of associated minerals can serve no useful purpose, and though such classifications and comparisons have been current for many years, *the majority of them have helped the miner and prospector not a whit*, and have proved a source of confusion and embar-

[1] McLaren, J. M., Gold: Its Geol. Oc. and Geog. Distr., p. 552.
[2] Nature of Ore Deposits, Dr. R. Beck, pp. 308-310.
[3] Fuchs and DeLauney, Traite II, p. 942. Quot. Beck, p. 308.
[4] R. P. Bothwell, Gold-bearing Mispickel Veins of Marmora. Trans. Am. Inst. Min. Eng., 1881, Quot. Beck.
[5] Gold above cit., p. 42.

rassment to the student. Be that as it may, however, there has as yet been too little work done on the Dublin gulch veins to warrant more than tentative, and very general conclusions, as to their character. The important questions to be answered in connexion with this section of Yukon are:—

(a) How many auriferous veins occur within a given area?

(b) What is the extent, both vertical and lateral of each?

(c) What are the average values?

(d) What is the probable cost of recovery?

These questions admit of an answer in this report to such an extent only as the data secured by a brief preliminary examination may apply. One of the greatest drawbacks in this section is lack of detailed geological or mining maps, or of any surveys of the properties. As the ground is steep and comparatively rugged, it was impossible, in the time available, to properly correlate the various prospects.

Some of the individual veins were, however, traced for several hundred feet, and it is evident that veins occur over a length of several miles, which may have a somewhat continuous, or possibly a parallel strike. It should be noted further that several pups[1] tributary to Dublin gulch cross-cut the formation, and in places, expose a number of veins, which appear approximately parallel as to strike, have a nearly prependicular attitude, and cut the schists both in strike and dip. The schists, where noted, have a prevailing dip to the southwest.

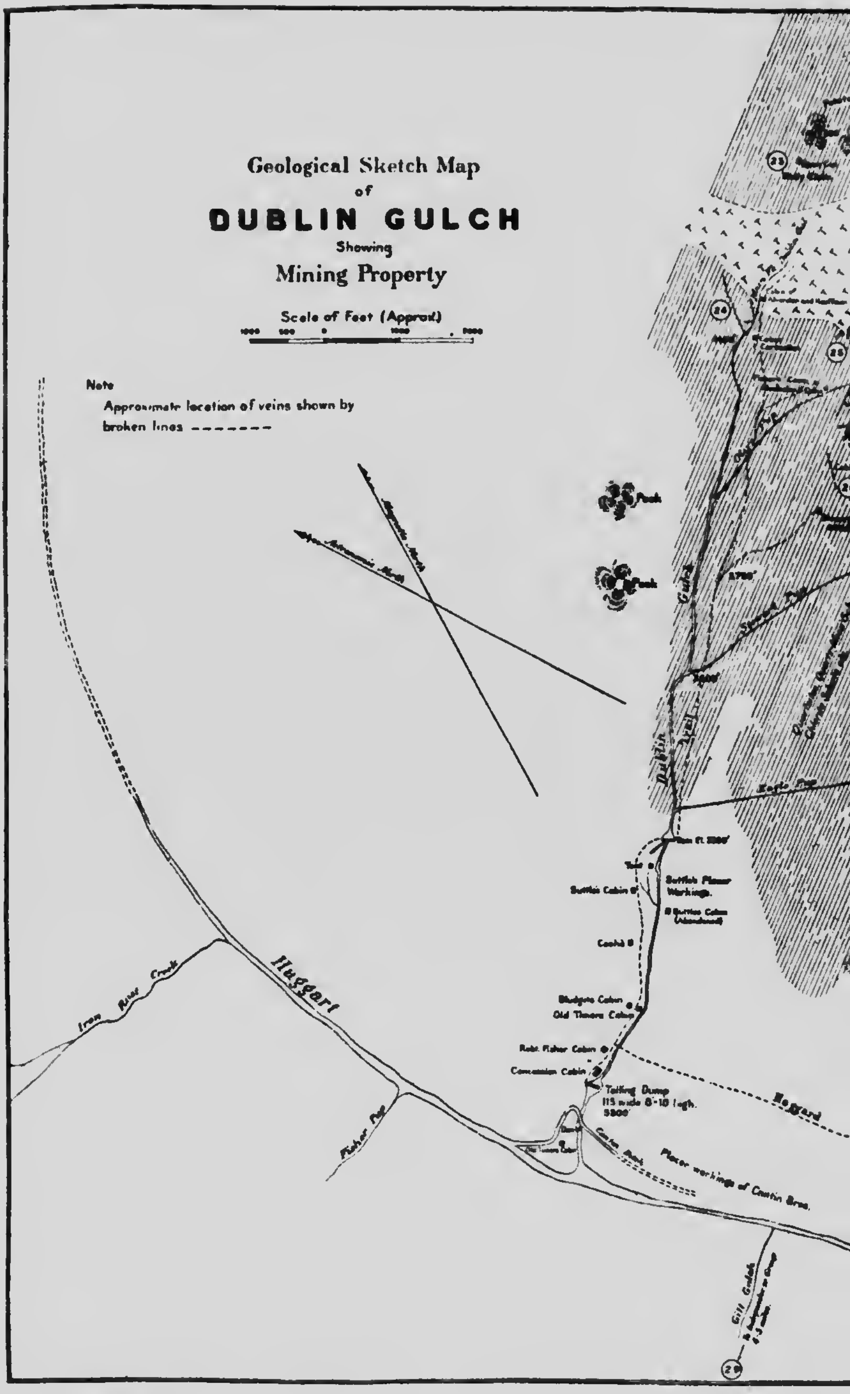
INDIVIDUAL PROSPECTS.

STEWART AND CATTO GROUP.

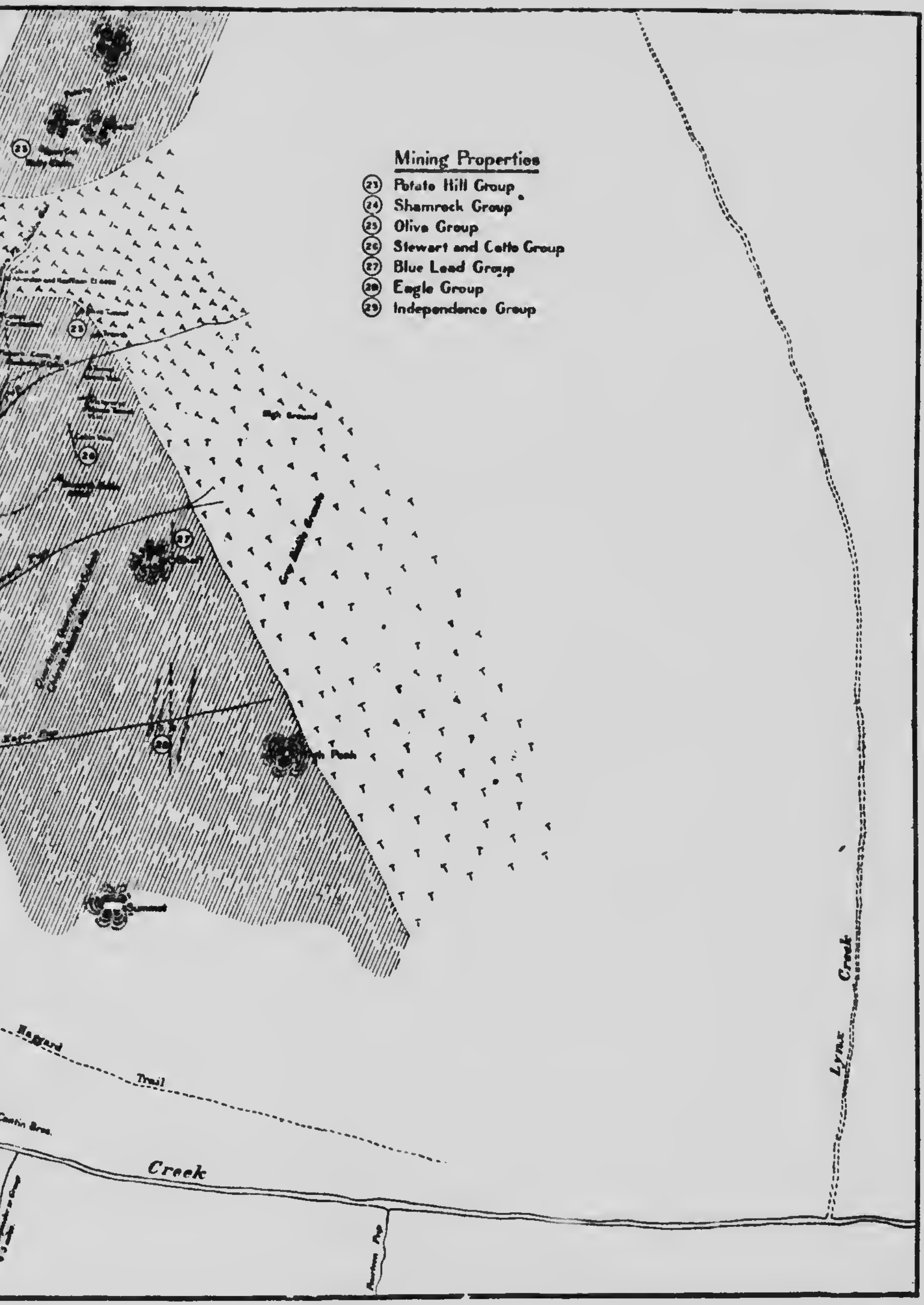
Of the Dublin gulch properties visited, that of Stewart and Catto exhibited most extensive development work. This property comprises five mineral claims located on the divide between Stewart and Olive pups, which enter the left limit of Dublin gulch, the former pup about nine and a half miles from the mouth of the gulch. Work has been confined to the Happy Jack and Victoria mineral claims, and consists of a couple of tunnels, with drifts, together with some considerable surface trenching. Several veins have been partially exposed; one known as the Green vein, on the left limit of Olive pup, has been cross trenched at intervals for over a hundred and fifty feet. It strikes N. 58° W. and carries a width of from 2 to 8 feet.

About 125 feet of tunnelling was done by Mr. Jack Stewart in the vicinity of, but not on, the vein itself. This work disclosed stringers of quartz associated with impregnated zones of country. Five sectional

[1] The word "Pup," where used in this report, signifies a small tributary of a gulch. The term has been adopted in Government reports issued from time to time, and may be found on the various maps of the Yukon territory.


Geological Sketch Map
of
DUBLIN GULCH
Showing
Mining Property
Scale of Feet (Approx)
Note
Approximate location of veins shown by
broken lines
Peak
Peak
Huggart
Iron River Creek
Fisher Pup
Dublin Gulch
Eagle Pup
Buffalo Placer
Workings.
Old Timers Cabin
Robt. Fisher Cabin
Tailing Dump
115 wide 8-10 high.
3300'
Placer workings of Cantin Bros.
Gill Gulch

39485—p. 134.


Mining Properties
23 Potato Hill Group
24 Shamrock Group
25 Olive Group
26 Stewart and Catto Group
27 Blue Lead Group
28 Eagle Group
29 Independence Group
High Ground
Summit
Haggard
Trail
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Lynx Creek

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Crosscut entry, vicinity of Green vein, Stewart and Catto property, Dublin gulch.

samples were taken at intervals along the tunnel, and these gave an average assay value of \$3.61 per ton. Two trial samples from walls of the tunnel gave \$4.65 and trace respectively. A trial sample from the dump at the tunnel mouth gave \$11.10; while five sectional samples from the surface trenches on the Green vein averaged only 90 cents over a length of 150 feet and width of 3 feet.

Another cross-cut is driven S. 75° E. 200 feet into the side hill, on the left limit of Dublin gulch and to the south of the Olive pup. At a distance of 125 feet in, this tunnel cross-cuts a fissure vein, which strikes approximately N.50°E., has a perpendicular attitude, and cuts the schists both in strike and dip. This was drifted upon for 27 feet right and 47 feet left, or 74 feet in all. It carries an average width of 4 feet, which, however bulges to 7 feet in the face of the lefthand drift.

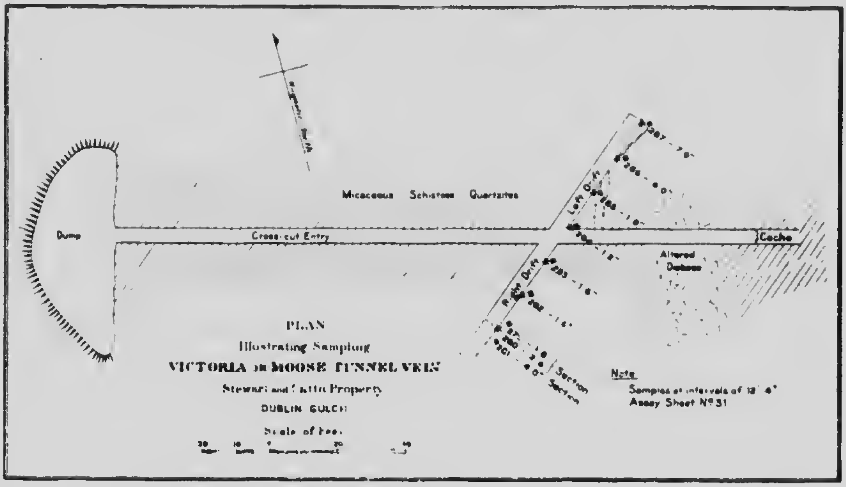

Fig. 24.

This vein consists generally of a central paystreak, from 5 to 20 inches wide, of greenish quartz and scorodite with decomposed and oxidized portions of rusty quartzose material, together with a vein filling of quartz and country.

This occurrence has been named the Victoria or Moose tunnel vein.

The arithmetic *mean of 10 samples*[1] taken at approximately equidistant intervals, is \$4.35, but allowing for variable widths (the so-called foot-ounce method) the average is \$3.48 *per ton.*

Simultaneously with the above two samples, one in the face of each drift, taken by Dr. Catto and assayed by Mr. Athelstane Day (assayer for

[1] One sample (No. 278) included in the above was taken from surface trench on this vein above the tunnel.

the Bank of B. N. A.) gave $14.44 over a width of 20 inches and $4.43 over a width of 7 feet, or an average of $6.36.

Three trial samples, taken from the dump near the entrance of the tunnel, gave the following results: –

No. 288 assayed $16.92; No. 289, $13.23; No. 290, $4.53 –the first two being material from paystreak and the third from vein filling.

Assuming that the first two represent an average of the pay streak, *i.e.*, $15.08, and that the material of this pay streak represents about one-quarter of the whole mass, as against three-quarters of the vein filling at $4.53, we then would have as an average of excavated vein matter $7.17[1].

The above figures may be taken to indicate that values somewhere between $3.48 and $7.17 are established in a tentative manner as a probable average.

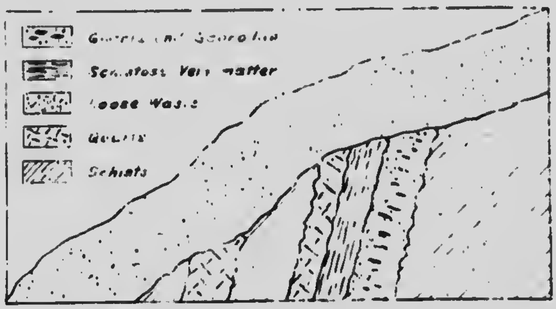

FIG. 25. Section on Cabin vein, Stewart and Catto property looking west. Taken from first trench about 500′ N. 55° E. from Stewart's cabin. Assay value, green quartz and scorodite, $10.67 per ton.

A third vein, known as the Cabin vein, has been uncovered at a distance o. 400 to 500 feet N.E. from Stewart's cabin, on the side hill on the right limit of Stewart pup.

The strike is approximately N.10°-15° E. Several trenches cross-cut this vein at intervals of 50 feet. The width varies from 2 to 8 feet, and the character of the vein is typical of the district. The average of 5 samples taken at intervals over a length of a hundred feet is between $3 and $4.

Still another prospect is shown by a trench about 150 feet in a direction S.35° W. from the entrance of Moose tunnel. A vein is there exposed 3 feet wide, striking as near as might be judged N.10°–15° E. and dipping 68° westerly. This is called vein in diabase. A sample across the vein gave $6.94.

From the foregoing results it is considered that this Stewart and Catto property well warrants more extensive development.

[1] This is based on the supposition that in this 4′ vein, 1′ might be taken as a fair average width of the pay streak. It would then constitute one-quarter of the whole mass.

As a first requirement for its systematic investigation, a complete transit survey is necessary, so that the various scattered workings may be properly correlated. Owing to the irregularity of the ground it was absolutely impossible, without a plan, to obtain an exact and comprehensive knowledge of the probable extent of these individual veins, or their relation to each other. The owners were similarly handicapped, and on advice, immediately made arrangements for this work to be done, before the season should have closed.

STEWART AND CATTO SAMPLES ASSAY SHEET NO. 29.

(Green Vein and Workings).

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Mineral in pan.	Location.	Assay in ounce (a) per ton of. Au.	Assay in ounce (a) per ton of. Ag.	Val e per ton. $ c	Width of sample Ft. In.	Check assay (b) Au.	Check assay (b) Ag	Remarks.
264	Dyke matter.		6	4	2 colours of gold, very heavy arsenical pyrite.	Across roof at face, left drift Green vein	0·22	0·90	4 91	4	0·09	nil	
265	Dyke matter and mineralized country rock.		5 –	6	Some fine gold and about 25 % arsenical iron	Left wall of drift adjoining No. 264. Arsenical pyrites	0·23	0·09	4 65	4 vert sample	0·16	nil	Trial sample.
266	Dyke matter and mineralized country rock.		3	10	Several colours of gold and some pyrites	Left wall of tunnel, Green vein.	trace			4 vert. sample	0·02	nil	Trial sample.
267	Dyke matter and mineralized country rock		4	10	Good showing of gold and a little pyrites	Tunnel Green vein	nil		nil	5	0·03	nil	
268	Dyke matter and mineralized country rock.	Ochcrous or yellow.	3	14	A little iron	Tunnel Green vein	0·01	0·07	0 24	5	0·09	nil	
269	Dyke matter and mineralized country rock.		4	6	Several colours little arsenical pyrite	Right hand breast of tunnel on Green vein	trace	0·05	0 03 silver	3	0·02	nil	

270	Qu[illegible] schist				Good show of [illegible]	[illegible] tunnel on Green vein	[illegible]	— 0·12	17 07	3	trace	nil	Average value under ground omitting Nos. 265 and 266 [illegible]
271	Quartz	Bluish	4	12	Sever[illegible] of [illegible] sul- [illegible]	Tunnel dump on Green vein	0·55	0 18	11 10		0 64	nil	
272	Quartz	Chocolate	2	14	Good show of fine gold	From first open-cut on Green vein	0 10	0 05	2 03	2½	0 03	nil	
273	Quartz	Rusty	4	14	Good show of gold, not much iron	North half of Green vein, 2nd cut from mouth of tunnel	0 09	0 03	1 82	2	0 08	nil	
274	Quartz	Cream	3	14	Considerable iron	South half of Green vein, 2nd cut	0 0[illegible]	trace	9 40	2	0 12	nil	
275	Quartz	Cream	3	12	Good show of fine gold, some iron	South half of Green vein, 3rd cut	0 02	0 08	0 45	4	0 03	nil	Average value Green vein at surface $0c.
276	Quartz	Greenish rusty	4	8	Some fine colours of gold.	North half of Green vein, 3rd cut	0 02	0 06	0 43	4	0 03	nil	

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Watt, Division of Chemistry, Mines Branch, Ottawa

STEWART AND CATTO SAMPLES (Gold)—ASSAY SHEET NO. 31.

(Cabin Vein.)

Sample No.	Material.	Colour.	Weight.		Minerals in pan.	Location.	Assay in ounces (a) per ton of		Value per ton.		Width of sample.		Check assay (b)		Remarks.
			Lbs.	Oz.			Au.	Ag.	$	c.	Ft.	In.	Au.	Ag.	
277	Quartz.	Brownish to grey	3	13		Southernmost trench 150 yds from Cabin on Cabin vein	trace				3		0.48	nil	
335	Quartz.	Ochreous	5	2	Good show of fine gold	Clear across vein Cabin cut A	0.19	0.29	3	97	3	6	0.24	nil	
336	Quartz	Green pay streak	1	8	Fine colours of gold.	Pay streak of Cabin vein cut A	0.51	0.79	10	67		18	0.69	nil	
337	Quartz	Green	4	12		Trench B. 50′ on strike from A	0.15	0.79	3	47	2		0.16	nil	
338	Quartz	Rusty	3	14	Small show of gold.	Adjoining No. 337.	nil	nil		nil	18	18	trace	nil	
339	Quartz	Pale green	3	12	Good show of fine gold	Trench 150′ south of Moose tunnel, vein in diabase	0.33	0.57	6	94	3		0.37	nil	

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

STEWART AND CATTO SAMPLES (Cont.) ASSAY SHEET No. 31.

Victoria or Moose Tunnel Vein.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of. Au.	Ag.	Value per ton. $ c.	Width of sample. Ft.	In.	Check assay (b) Au	Ag.	Remarks.
279	Quartz and scorodite	Greyish	4	2	Good show of fine colours and some iron.	Face of right drift (pay streak)	0.24	0.86	5.31	1	8	0.22	nil	
280	Quartz schist.	Greyish	2	4	1 fine colour of gold	Vein filling from face adjoining No. 279	0.06	0.0	1.22	2	4	trace	nil	
281	Vein	Cream and greenish	3	12	Good show of colours of gold.	Across roof of tunnel No. Fig. 24	0.22	0.29	4.55	4	0	0.55	nil	
282	Vein matter	Cream and greenish.	3	6	2 colours of gold high in pyrites arsenical	Roof of vein. Fig. 24	0.04	0.17	[illegible]	1	5	0.02	nil	
283	Vein matter	Cream and greenish	4	4	Several colours of gold	Fig. 24	0.08	0.28	1.76	1	6	0.11	nil	
284	Quartz	Cream	4	14	Good show of gold colours	Left drift	1.04	[illegible]	21.41	1	2	1.06	trace	The arithmetic mean of samples on this vein is $4.35, but allowing for varying widths the mean is taken on the four-dollar basis and is $3.48

STEWART AND CATTO SAMPLES (*Cont.*) ASSAY SHEET No. 31 *Continued.*
Victoria and Moose Tunnel Vein.

Sample No.	Material.	Colour.	Weight.		Minerals in pan.	Location.	Assay in ounces (a) per ton of.		Value per ton.	Width of sample.		Check assay (b)		Remarks.
			Lbs.	Oz.			Au.	Ag.	$ c.	Ft.	In.	Au.	Ag.	
285	Quartz	Rusty	4	8		Roof vein left drift	0·02	0·03	0·42	1	8	trace	nil	
286	Quartz		4	9	Fine gold.	Roof vein left drift.	0·04	0·70	1·22	4	0	0·02	nil	
287	Vein		4	2	Several fine colours	Face of left drift	0·13	0·12	2·67	7	0	0·07	nil	
278	Quartz	White green brown	3	3	Very fine colours of gold and some iron.	Open-cut over Moose tunnel vein	0·20	0·10	4·06	2	0	0·22	nil	
288	Quartz	Greenish and rusty	3	10	Fine gold with considerable pyrites	Considered high grade. Dump of Moose tunnel.	0·80	1·53	16·92	Dump		0·16	nil	
289	Quartz	Greenish and rusty	4	6	Fine gold with considerable pyrites	Dump of Moose tunnel high grade pay streak	0·51	5·05	13·23	Dump		0·33	3·09	Dump 16·92 13·23 4·53 11·56
290	Decomposed quartz and schist		4	1	Some fine colours, very little mineralization	Dump of Moose tunnel	0·21	0·55	4·53	Dump		0·17	nil	

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

Summary of Assay Sheets Nos. 29, 30 and 31.—32 samples in all were taken on this property, as follows: 13 on the Green vein and working, of which 5 were sectional samples from the tunnel[1], and, the different widths being allowed for, gave a mean assay value of $3.613 per ton over an average width of 4 feet. Two samples were indicators from walls of the tunnel and assayed $4.65 and trace respectively.

One sample was an indicator from the tunnel dump and gave $11.10. Five were sectional samples from the surface trenches on the Green vein, with an average value, based on Mr. Sime's results, of about 90 cents, over a length of 150 feet and width of 3 feet. At the time that these samples were taken, Dr. Catto also took one 20 inches wide from the centre trench on the Green vein, which was assayed by Mr. Athelstane Day (assayer for the Bank of B.N.A., Dawson). This assayed $11.13 per ton.

Five samples were taken on the Cabin vein and gave an average over 100 feet in length by 2·3 feet width, of $3.20 (at the same time Dr. Catto took 2 samples which when assayed gave $16.18 and $32.18 respectively).

One sample taken from an exposure called 'vein in diabase,' assayed $6.94 over a width of 3 feet.

Thirteen samples were taken also from the Moose Tunnel vein, 10 being sectional samples across the vein, covering about 74 feet of drifting. These gave an average of some $3.48, the mean width being 2·62 feet. Three samples from vein matter on the dump gave assays of $16.92, $13.23 and $4.53 respectively.

At the same time Dr. Catto sampled both ends of the drift, the right drift giving $14.44 over a width of 19 inches and the left drift giving $4.43 over a width of 7 feet.

OLIVE GROUP.

Adjoining the Stewart and Catto property is the Olive, on the opposite limit of Olive pup. The only work that has been done here is on the Olive mineral claim itself, which is registered in Mrs. Agnes Jane Kenzie's name. She is represented on the ground by her brother, Mr. Robt. Fisher.

Work consists of several surface trenches, a short cross-cut tunnel and drift, the work being done by J. E. Moskeland, under a lay agreement.

One trench, a hundred feet long, situated some 500 feet N.72° E. from Moskeland's cabin, on the right limit of Olive pup, exhibits a dyke-like occurrence of altered and decomposed granite and talcose material associated with, or rather intruded into, the country schists. This decomposed material contains broken and irregular stringers of quartz. The trench adjoins the main granite contact.

A couple of samples of this material from the trench show values of 40 cents each. The occurrence is somewhat indeterminate.

[1] These really represent samples of associated stringers and irregular occurrences of impregnated country.

About 800 feet from the mouth of Olive pup, on its right limit, is 'Bob' Fisher's cabin, and 750 feet in a direction N. 50° E. from this, and at an elevation of 330 feet higher, a tunnel was started into the hill, about N. 20° E., for a distance of 8 feet. Here a split was made to follow a dyke of altered and decomposed granite, containing quartz stringers, the drift being N. 72° E. Portions of this drift were allowed to cave so badly that when visited it was impossible to penetrate beyond 30 feet. Mr. Moskeland stated that, at 60 feet along this drift he cross-cut a good vein of quartz striking with the main granite contact, and that this vein contained a green pay streak 20 inches in width. He drifted on this vein for a number of feet, and the existence of the pay streak was evidenced by green vein matter on the dump.

A couple of trial samples from this (Nos. 316 and 317) gave values of $35.71 and $51.65 per ton respectively.

Two samples taken 15 feet apart in the drift on the above mentioned dyke, assayed $9.57 and $1.09 respectively.

Two samples taken from the left hand split, composed also of dyke material, assayed a trace and 83 cents per ton respectively.

Another trench, some 300 feet north from the tunnel, and at a higher altitude, which was intended to cross-cut the continuation of Stewart's Green vein, showed only stringers of quartz in decomposed and altered dyke matter associated with quartz schists.

Two trial samples here assayed $4.42 and $1.18 respectively.

This property evidently warrants further prospecting.

PLATE XXVII.

Tunnel entry, the Olive mineral claim.

OLIVE GROUP SAMPLES—ASSAY SHEET No. 32.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pun.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $	Value per ton. c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
312	Dyke material..	Rusty..........	4	8	-	From trench on right of Olive pup........	0·02	0·02	0	41	1	6	0·04	nil	
313	Dyke material..	Rusty..........	3	7	–	From trench above...	0·02	trace	0	40	2		trace	nil	
314	Quartz stringers in dyke of altered granite	Brownish and ochreous.....	3	12	A number of colours of gold.	Clear across face of left hand drift ..	trace	trace	–		4		trace	nil	
315	Quartz stringers in pegmatite		3	6	Some colours..	From winze near tunnel entrance.....	0·04	0·06	0	83	3		0·01	nil	
316	Quartz	Pale green.	4	0	Good colours, some pyrite	From dump of 60′ drift (rt.).....	1·74	1·51	35	71			2·14	0·46	
317	Quartz....	Green	4	0	Colour ...	Dump from contact vein .	2·54	1·42	51	65			4·82	0·41	
318	Vein matter decomposed .	Reddish brown ..	3	11	Good show of dust gold	From left side of right drift 15′ in..	0·47	0·29	9	57	3		0·60	nil	
319	Dyke material..	Ochreous brown..	4	1		Roof of rt. drift 30′ in	0·05	0·15	1	09	4		0·01	nil	
320	Quartz stringers in schist ...	Greenish and brown	3	14	-	Trench 300′ north of tunnel	0·02	6·79	4	42	2		0·01	6·9	
321	Quartz stringers and pegmatite	Brownish	3	8	-	Trench same as above.	0·05	0·30	1	18	2		0·08	0·91	

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

SHAMROCK GROUP.

This group comprises four mineral claims controlled by Mr. Frank Carscallen. It is situated at the head of Dublin gulch, and to the west and north of the Olive M.C.

Two veins have been prospected merely in a preliminary manner.

One strikes about N. 15° E., being exposed by a couple of outcroppings, on the ridge above the right limit, main fork of Dublin gulch, at an approximate elevation of 4,500, and by one open-cut. This open-cut is on the side hill, a couple of hundred feet lower down on the slope towards the gulch.

Even in the latter cut, which is 7 feet wide, the vein is not clearly exposed, but has the appearance of a filled fissure between quartzite and granite, the contact on the west having the appearance of a quartzite. The eastern contact is not uncovered, but a heavy mass, or bluff of grey biotite granite, occurs some 15 feet to the east of the cut. Between the two is considerable overburden. The width of the portion of vein exposed is 5 feet. It comprises 1 foot of rusty quartz and 4 feet of a pale greenish variety, due to the presence of scorodite, which as already noted is a typical occurrence throughout the district.

A sectional sample here assayed $3.68.

Two samples on the outcroppings, referred to above, assayed trace, and $3.30 per ton respectively.

Indications are that the vein extends for several hundred feet

The other vein prospected was tapped by a tunnel situate 250 feet down stream from the above described open-cut. Several surface trenches were also made, cross-cutting the line of strike, which is approximately N. 75° W. When visited, the above mentioned tunnel was inaccessible. Mr. Carscallen stated that the lead was here 2½ feet wide, that it comprised 1 foot of white quartz, carrying iron sulphides as found on the dump, and 1½ feet of greenish vein matter, the walls being porphyry.

A trial sample of typical vein matter taken from the dump assayed $9.67, while material which had come from the walls assayed $0.44.

Where seen in two surface cuts, several hundred feet apart northwesterly on the strike of this lead, the occurrence presented rather the appearance of a wide dyke of altered granite and quartzite, containing a central green pay streak associated with rusty ground up quartz.

The dyke matter is completely decomposed. The cuts show 7 to 15 feet in width of this material, and several samples which were taken assayed values from *traces to $10.06* per ton.

The depth here exposed is only three feet, and from results shown it can be recommended that further prospecting should be done. Best results would probably be obtained by driving directly on the lead, through the present tunnel, which it is understood, cuts the former diagonally. As the ground here is steep, head is rapidly gained and values at depth exposed.

PLATE XXVIII.

Portion of vein uncovered on the right limit of the main fork of Dublin gulch, Shamrock group of Frank Carscallen. Width exposed is shown by the pick and hammer handle.

SHAMROCK GROUP SAMPLES—ASSAY SHEET No. 33.

and Sundry.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton $ c.	Width of sample. Ft	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
302	Quartz		2	14	–	N. outcrop Midas claim.	trace	0·04	0·02	2	6	0·01	nil	Allowing for the sample widths and ignoring the difference in distance between samples, an average here would be $2 67.
303	Quartz and scorodite	Pale green	4	3	Several fine colours of gold.	S. outcrop Midas 40' from 302 M. C.	0·16	0·18	3·30	2	6	0·09	nil	
304	Quartz and scorodite	Pale green to rusty	3	2	Good show of wire gold	Clear across main cut Midas claim	0·18	0·14	3·68	5	0	0·25	nil	
305	Quartz	Rusty	2	8	A little or sulphide	Rusty quartz from grab from Midas cut.	trace		trace	–		trace	nil	
306	Quartz	Light to grey	3	2	Dark sulphides	Dump of tunnel cross vein	0·44	1·46	9·67	–		0·17	nil	Tunnel dump
307	Quartzite	Ochreous ..	4 –	7	Very fine colours of gold	Dump of cross tunnel vein	0·02 –	0·08	0·44	–		0·03	nil	$5 06

SHAMROCK GROUP SAMPLES—ASSAY SHEET NO. 33 *Continued.*

and Sundry.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c	Width of sample. Ft.	Width of sample. In.	Check assay b Au.	Check assay b Ag.	Remarks.
308	Decomposed dyke matter ..	Reddish	3	0	Very fine colours of gold	Open cut cross vein	0.50	0.10	10.06	8	0	1.70	nil	
309	Decomposed dyke matter	Reddish	4	10		Open cut cross vein	0.06	0.34	1.40	4	0	0.15	nil	Allowing for width, the average is $4.71
310	Vein and dyke matter ..	Greenish to rusty.	2	9	Fine colours of gold	Extreme westerly open cut about 800' from tunnel	nil	nil	nil	4	0	trace	nil	
311	Vein and dyke matter ..	Greenish to rusty	4	10		Trench top of hill 250' in strike from tunnel	0.04	0.05	0.83	3	0	0.09	nil	
341	Quartz					Outcrop at limit Stewart river 10 miles below Yukon crossing	trace			0	8	trace	nil	Prospecting sample on 8" vein Stewart river.

a Assays conducted by Mr. Wm. C. Sime of Dawson Y.T.
b Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

BLUE LEAD GROUP SAMPLES. ASSAY SHEET NO. 34

Sample No.	Material	Colour.	Weight Lbs.	Weight Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au	Assay in ounces (a) per ton of Ag.	Value per ton $	Value per ton c.	Width of sample Ft.	Width of sample In.	Check assay (b) Au	Check assay (b) Ag	Remarks
322	Vein matter	Bluish greenish brown		8	Arsenical pyrite, stibnite and pyrite	Shaft bottom N. ½ section	0.05	0.20	1	18	5	0	0.08	nil	
323	Vein matter	Brownish	3	8	Arsenical pyrite &c.	Shaft bottom S. ½ section	0.01	0.05	0	24	3	0	trace	nil	
324	Vein matter	Bluish green to brown	4	8		Dump of shaft	0.29	0.56	6	14			0.27	nil	
325	Vein matter, scorodite	Pale green	4	8		Dump of shaft	0.30	0.90	6	54			0.22	nil	
326	Vein matter	Green to grey	6	2	Fine gold, also wire gold	Open cut 250' N.W. from shaft	1.00	1.20	20	72	2	0	1.36	nil	
327	Vein matter	Brown	3	14		Open cut 75' S.E. from No. 326.	0.10	0.10	2	06	2	0	0.10	nil	

(a) Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

BLUE LEAD GROUP.

This group comprises eight claims, located in the vicinity of Stewart pup and between the group of Stewart and Catto, on the north, and the Eagle group, on the south. The property is controlled by Mr. Bowles C. Sprague of Dawson.

Some prospect work on the Blue Lead mineral claim was in progress during the season of 1912. A shaft was started, near the summit which overlooks the left limit of Stewart pup, and was sunk 25 feet on a vein, which strikes N. E. through a dyke of altered granite and decomposed quartzite, and has a perpendicular attitude. This vein comprises 2 feet of decomposed greenish quartzose material, mineralized with sulphides of antimony, arsenic, and iron, which give it a bluish cast for about 8 inches of its width.

The balance of 4 feet exposed in the width of the shaft is altered and decomposed dyke material, containing stringers and bunches of rusty quartz. An average sample taken in two sections 6 feet across the bottom of the shaft, assayed \$2.60.

Two trial samples from excavated green vein matter, taken from the dump near the shaft, assayed values \$6.14 and \$6.54 respectively, or an average of \$6.34.

Two hundred and fifty feet from this shaft, in a northwesterly direction, an open-cut exposes a greenish decomposed quartzose vein, in contact with decomposed granite on the west, and talcose material on the east. A sample (No. 326) taken over a width of 2 feet assayed \$26.72; while 75 feet southwesterly from this a second cut, characterized by somewhat similar conditions, gave a sample, which assayed \$2.06. As these trenches merely constitute surface scratching, the occurrence is indeterminate, but suggests the probability of a well defined vein being uncovered by further prospecting.

The prospect is encouraging.

EAGLE GROUP.

This group consists of 8 mineral claims situated on Eagle pup, a tributary on the left limit of Dublin gulch, about three-quarters of a mile from the latter's mouth.

Mr. Bowles C. Sprague and others, of Dawson, hold this property, and the owners are represented on the ground by Mr. 'Bob' Fisher. The latter accompanied Mr. MacLachlan, who examined the property and thus describes it:—

'Eagle pup, whose general direction is N.W. and S.E., cuts the formation in such a manner that, on the southwest side of the pup, a very steep, at times almost perpendicular wall exhibits a belt of country comprising quartz schists and quartzites, and containing four fissure veins, the first of which is exposed about three-quarters of a mile from the mouth of the pup, *i.e.*, near its head. This vein, called No. 1, is 12 inches wide, strikes N.E. with perpendicular attitude. The country strikes N. and S. and dips S.W., so the vein cuts it both in strike and dip and is characteristic of the district.'

One sample (No. 331) taken from the brow of this lead assayed only a trace, while sample No. 328, from an exposure below, assayed $27 31 over a width of 12 inches.

'Two hundred feet westerly from No. 1 vein, a second vein, known as No. 2, is partially exposed in vertical face, for a height of 30 feet. The width of this vein will average 6 inches. In one place it bifurcates, the branches enclosing several inches of country, the total width here being 14 inches. This condition, as a result of surface matter intervening, could be noted for only 2 feet in height. The vein has a very well-defined and regular appearance, strikes N 30° E., in the direction of the shaft on the Blue Lead mineral claim, which is distant about 2,500 feet, and from general indications may be the same lead. Work is, however, insufficient to determine this.'

Sample No. 329, taken across this vein, assayed $16.78 per ton.

'*No. 3 Vein* is exposed 200 feet westerly from No. 2. It strikes N.E., dipping slightly E. through the country. It consists of quartz about one foot in width. S[illegible]enings, at distances of 20 feet off the line of strike of the vein [illegible]ringers of quartz of a similar character to that found in the vei[illegible] towards the latter.'

Sample 330, [illegible] assayed $14.29.

'*No. 4 Vein* is ex[illegible] about 100 feet west of No. 3, strikes about parallel with it and has similar characteristics. Its width is about 8 inches and it is composed of dark, rusty quartz and decomposed material.'

A sample assayed $16.05.

A couple of other samples, from open-cuts, which exhibited broken quartz stringers and decomposed country, in the vicinity of the veins, gave values of $2.18 and $4.63 respectively.

'These veins have every indication of true fissures, which may extend for considerable distances. They appear to be approximately parallel with each other.'

The assays show very f[illegible]vourable results, and some systematic prospecting should be undertaken, as, for example, by drifting on the veins.

EAGLE GROUP SAMPLES—ASSAY SHEET No. 35.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces *a* per ton of Au	Assay in ounces *a* per ton of Ag	Value per ton. $	Value per ton. c.	Width of sample. Ft.	Width of sample. In.	Check assay *b* Au	Check assay *b* Ag	Remarks
328	Quartz	Greyish	4	10	Good showing of gold as minute dust	Vein No. 1 low level.	1·35	0·53	27·31		1	0	1·68	nil	
329	Quartz.	Rusty	5	8	Some wire gold	Vein No. 2	0·83	0·30	16·78		1	2	0·98	nil	
330	Quartz.	Rusty	4	10	Colours of gold	Vein No. 3	0·69	0·82	14·29		1	0	0·82	0·44	
331	Quartz.		4	8	Colours of gold	Vein No. 4	0·80	0·08	16·05		0	8	3·54	nil	
332	Vein matter (scorodite)	Greenish to rusty	3	8	Colours of gold	Trench 150' below No. 331	0·10	0·30	2·48				trace	nil	These represent trial samples from surface trenches. Little work is done.
333	Vein matter	Greenish to rusty.	4	4	Colours of gold	Trench 150' below No. 331	0·20	1·06	4·63				0·45	nil	
334	Quartz.		1	0		Vein No. 1 exposure at brow	trace	trace			1	0	trace	nil	

a Assays conducted by Mr. Wm. C. Sime of Dawson, Y.T.
b Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

INDEPENDENCE GROUP.

This group consists of eight mineral claims located on the southwestern slope of the divide, between Haggart and Secret creeks. Messrs. John Alverston and Grant Hauffmann control the property. The former resides at Dublin gulch.

The route taken, when visiting this ground, was up Gill gulch for a distance of about 1½ miles. This gulch enters the right limit of Haggart, about half a mile below the mouth of Dublin gulch, on the opposite side; thence in a general direction southwesterly, climbing the right slope of the gulch and passing along and over the ridge, a further distance of 3½ miles to the property.

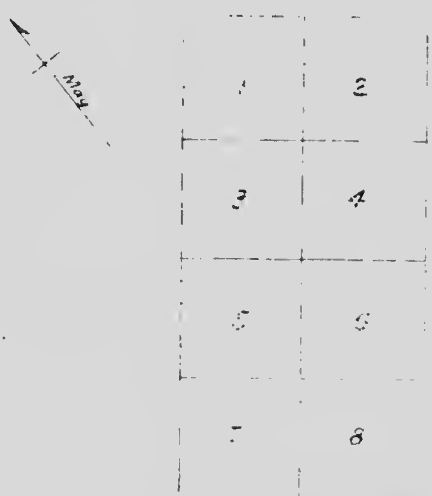

FIG. 25 A. Independence group of mineral claims.

The last mile traversed is over a belt of country which exhibits very heavy outcroppings of white quartz, striking N. E. S. W.

In places along the intermediate levels, great quantities of broken quartz, in the nature of huge slides, are found covering the hillsides.

It is only in general strike that this occurrence bears any resemblance to the deposits described as typical of Dublin gulch. In respect to the wide distribution of quartz, it is rather similar to many noted in the Dawson district.

The claims are arranged and numbered as shown in Fig. 25 A.

The only work on this group consists of a trench and a shaft on mineral claim No. 7.

These adjoin each other. The shaft is about 16 feet deep and exposes a small vein 6 inches to 8 inches wide, of greenish quartzose material and scorodite, which apparently strikes N.E. and S.W. and dips slightly to the west, through a mass of mineralized quartzites and schists. The vein is overlaid by 5 feet of broken quartz and decomposed schist. Several small sheeted quartz veins, or floors, have been encountered on the lower eight feet of the shaft. These are interbedded with a black graphitic schist, or sheared and metamorphosed graphic quartzite. Both quartz and schists are considerably sheared and crushed and are intermingled with each other, and both are mineralized, chiefly with stibnite (antimony tri-sulphide, Sb_2S_3) and iron ore.

Three specimens typical of the quartzites, from which thin sections were made, are described as follows:[1]

'No. 1A, *Quartzite*, consisting of almost entirely interlocking and intergrown quartz grains.

No. 1B, *Sheared Quartzite.*—This section represents a much sheared and highly metamorphosed sedimentary rock, and consists dominantly of quartz, biotite, muscovite and amphibole, with a slight amount of iron ore. The quartz composes the bulk of the rock and occurs as interlocking grains. The rock also contains a considerable amount of biotite and also some colourless mica, and might therefore be termed a micaceous schistose quartzite. The rock specimen, however, appears to be somewhat different from the thin section, as it is not noticeably schistose, whereas the section has a decided schistose structure.

No. 1C, *Sheared Quartzite.*—A highly metamorphosed sedimentary rock, consisting mainly of quartz and biotite, with also some muscovite, stibnite and iron ore.'

Present development is not sufficient to afford adequate data as to the exact nature or probable extent of this occurrence. The overburden obscures the country, except where it is exposed in the shaft. The trench is merely a shallow surface cut, in which a few quartz stringers are seen in the schists. The latter do not, here, appear to be mineralized. Possibly the occurrence may be regarded as a fracture zone which has become impregnated by upward circulating metalliferous solutions. The fractures finally became filled with a silicious residue, whose particles appear to be coated with, and held together by the greenish scorodite, already referred to as being a hydrous arsenate of ferric iron. ($FeAsO_4 + 2\ H_2O$), or ($Fe_2O_3 . As_2O_5 . 4\ H_2O$). This material goes to make up the greater proportion of the small vein referred to above.

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[1] Thin sections were microscopically examined by Dr. D. D. Cairnes, who kindly furnished the above brief note on them.

INDEPENDENCE GROUP AND POTATO HILL GROUP SAMPLES ASSAY SHEET No. 36.

Sample No.	Material.	Colour.	Weight.		Minerals in pan.	Location	Assay in ounces (a) per ton of		Value per ton.		Width of sample.		Check assay (b)		Remarks.
			Lb	Oz.			Au.	Ag	$	c.	Ft.	In.	Au.	Ag.	
291	Quartz and scorodite.	Greenish to grey.	2	14		Indicator sample from shaft dump.	0·02	0·29	0·57				trace	nil	Independence.
292	Quartz..	Greenish. .	3	0	One colour of gold	Indicator from dump..	trace	0·11	·06				trace	nil	
293	Vein quartz.	Greenish	3	8		Section of vein from shaft 10' depth .	0·02	1·12	1·07			8	0·02	nil	
294	Igneous diabase	Black.	3	14		From bottom of	0·01	0·25	0·35		3	0	1·07	nil	
295	Quartz and schist vein matter	Greenish to grey	3	12		Section on vein matter from trench	0·02	0·26	0·56		3	0	trace	nil	Average ·33 cents per ton.
296	Quartz..	Grey	3	8		Sample from quartz floor near shaft bottom.	trace				0	8	0·01	nil	
297	Quartz..	Rusty	2	11		On large outcrop of white and rusty quartz vein ¼ mile N.E. from shaft..	trace				1	0	0·55	nil	

INDEPENDENCE GROUP AND POTATO HILL GROUP SAMPLES ASSAY SHEET No. 36—*Continued.*

Sample No.	Material.	Colour.	Weight Lbs.	Weight Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton $ c.	Width of sample Ft.	Width of sample In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
298	Quartz..	Greyish	3	3		On strike of No. 297 ¼ mile farther	0·02	trace	0·40	1	0	trace	nil	Independence.
299	Quartz..		1	11	Sc... iron, no colours..	Vein matter face of cut	0·10	0·10	2·06	0	24	0·04	nil	Potato Hill group vein matter 2·06 × 2'.
300	Quartz..	Brownish.	3	8		Adjoining vein matter face...	trace				12	trace	nil	
301	Quartz schist	Translucent to brownish ..	3	6	Small showing of gold	Wall of cut ..	trace			3		trace	nil	Potato Hill.

(a) Assays conducted by Mr. Wm. C. Stone of Dawson, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

Six samples were taken from the above workings. These may be regarded, merely, as trial samples.

Nos. 291 and 292 were taken from excavated greenish vein matter, off the dump, and assayed 57c. and 06c. respectively.

No. 293 was a sample across an 8 inch vein, about 3 feet from the bottom of the shaft. It assayed $1.07.

No. 294, dark rock from the bottom of the shaft, 3 feet wide, gave $0.35.

No. 295, from quartz and schist, 3 feet wide, in the trench, gave $0.56, and No. 296, an 8″ section of grey quartz floor, near the bottom of the shaft, gave only trace when assayed.

The values obtained from this prospect are not nearly so good as most of those from the Dublin Gulch properties, and as will be seen, development has not so far shown up anything of economic importance.

Two other samples, Nos. 297 and 298, shown on assay sheet No. 36, represent trial samples from the belt of white quartz, which was encountered en route, at distances of about 3,000 and 5,000 feet respectively, N.E. from the above-mentioned shaft.

DUBLIN GULCH: SUMMARY AND CONCLUSIONS.

In comparing the values, variously shown throughout the Dublin Gulch properties, with those of the Lone Star mine, for example, it must be stated, that conditions, in the two localities, are very different. Whereas $3 to $4 ore might be a bonanza in case of the Lone Star, it is thought that nothing less than $8 per ton, over a stoping width of, say, 3 feet, could be of much economic importance, either under present conditions, or under any which are likely to be realized in the immediate future, at Dublin gulch.

Several factors may be mentioned which are, in part, responsible for the more onerous conditions at Dublin gulch:

(1) The difference in the nature of the deposits.

(2) The greater distance from source of supplies and difficulty of access, through lack of roads.

(3) Probability of greater expense in recovering the values.

Of these the first-mentioned is, ultimately, the important factor, as the others may, to a great extent, at any rate, be modified. The local government had started work on a trail from Minto bridge to Haggart creek, a distance of 20 miles, and if this be carried to the mouth of Dublin gulch, an additional 15 miles, conditions for the prospectors will already have been somewhat improved.

Owing to the fact that here the free gold generally occurs well disseminated, as minute dust, these deposits admit of sampling to better advantage than those of the Dawson mining district, where spotty values prevail.

Hence, more extensive sampling might be undertaken on several of these properties, with beneficial results.

Mill and laboratory tests would be of great assistance in deciding both the values and the method of treatment. As the free gold is very fine and some of the values, even in the oxidized zone, doubtless occur in refractory form, with arsenical pyrites, extraction would probably involve cyanidation, more especially as with depth it is probable that the gold occurs altogether as a primary sulphide.

'It must be recognized, however, that before commercial development is inaugurated, every mining tract embraced within the zone of a proposed plant should receive intelligent and thorough investigation.'[1]

Again, to quote Mr. J. E. Hardman, M. E.[2]

'Manifestly, in case of a prospect, no attempt at valuation would be of any worth, the engineer, at best, can only endeavour to ascertain what measure of probability the prospect has of eventually becoming a mine. His report should clearly state this limitation, and should present all the facts he is able to ascertain, but may contain the opinion which he personally deduces from these facts.'

Having regard to the above, it may here be suggested that this is considered a very promising district, and though the average values, as given, are generally below requirements, there is a strong possibility that further development, accompanied by more detailed work than was on this occasion possible, might result in establishing, beyond reasonable doubt, the existence of one or two good mines.

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[1] d'Invilliers, Ed. V., Philadelphia.
[2] Hardman on Examination and Valuation of Mines. Trans. Can. Soc. C.E., Vol. XVII, 1903, Part II, pp. 514-15.

Portion of Dublin gulch showing Suttle's placer ground. The mountain in the back ground adjoins the right limit of the gulch.

PLATE XXX.

Mining engineer's party on the Stewart river, 135 miles below Mayo, returning to Dawson from Dublin gulch. Note the timber on the lower limits.

CHAPTER IV.

WHITEHORSE MINING DISTRICT.

General Statement.

With the exception of one quartz-gold prospect to wit: the Golconda and Florence claims, located near the right limit of Fiftymile river, and nine or ten miles east of Whitehorse, all other mining properties visited in this district were copper mines or prospects. As only a few hours were spent on any one of these, a very brief reference will be made to the general conditions of the camp.

Mr. R. G. McConnell, of the Geological Survey Branch, made a careful study of this district in 1909, and has written a very comprehensive report under the caption 'The Whitehorse Copper Belt, Yukon Territory'. This contains a brief outline of the history, geology, and general features of the district, together with a description of all the mining properties of any importance at that date.

Conditions have not changed greatly since 1909, except that one property, the Pueblo, has come into greater prominence, while many others that were then being developed have since been abandoned.

History.

According to McConnell, this camp was discovered by miners on their way to Dawson in the summer of 1897. The first claim to be located was the Copper King, on July 6, 1898, followed shortly afterwards by the Anaconda, and the Big and Little Chief; while in 1899 the Pueblo, Best Chance, Arctic Chief, Grafter, Valerie, War Eagle, and others, were discovered and staked.

Development work was then started on a number of the above prospects, and continued, somewhat intermittently, until 1906, when the price of copper began to rise, and a number of the most promising claims were taken over by companies or individual operators.

Up to 1909, however, the total amount of development work carried on throughout the district did not exceed 3,500 feet, and the total shipments of ore to various coast smelters did not amount, in the aggregate, to more than 4,000 tons. At that time the ore was hauled, by wagon road, to Whitehorse, for shipment on the White Pass railway, the cost of delivery to the railway being about one-third the total transportation charge from the mine to the smelter. This condition has been much improved by the construction of a spur from the main line of the railway, through several of the properties, into the Pueblo. The total cost of transportation and smelting, combined, is now approximately \$5.14 as against \$10 to \$12 per ton under the former conditions. This is due, in part, to a reduction in freight and smelter charges, as well as to extension of railway facilities.

During the season of 1912, the Pueblo had, up to September 30, shipped 25,000 tons of ore, and the management expected that an additional 5,000 tons would be shipped before the end of the year.

This property is now controlled by the Atlas Mining Company, which has also a working option on a number of others, including the Valerie, the Best Chance, and the Grafter. With the exception, possibly, of necessary assessment work, by holders from other claims, the above mentioned company was, in 1912, alone conducting mining operations in the Whitehorse Copper Belt.

A Few Mining Properties.

THE PUEBLO.

Location.—This property is situated in the valley of Porter creek, distant from Whitehorse, by wagon road, about 6½ miles, and the elevation is between 570 and 585 feet above the town.

Ownership. In 1906 work was here carried on by the Yukon Pueblo Mining Company, of Spokane, Wash., U.S.A. This company has been succeeded by the Atlas Mining Company of Chicago, associated with Messrs. Close Brothers of London, England. Mr. W. D. Greenough is the company's representative and general manager, and Mr. C. A. Mowry is assistant manager, both are resident at the mine.

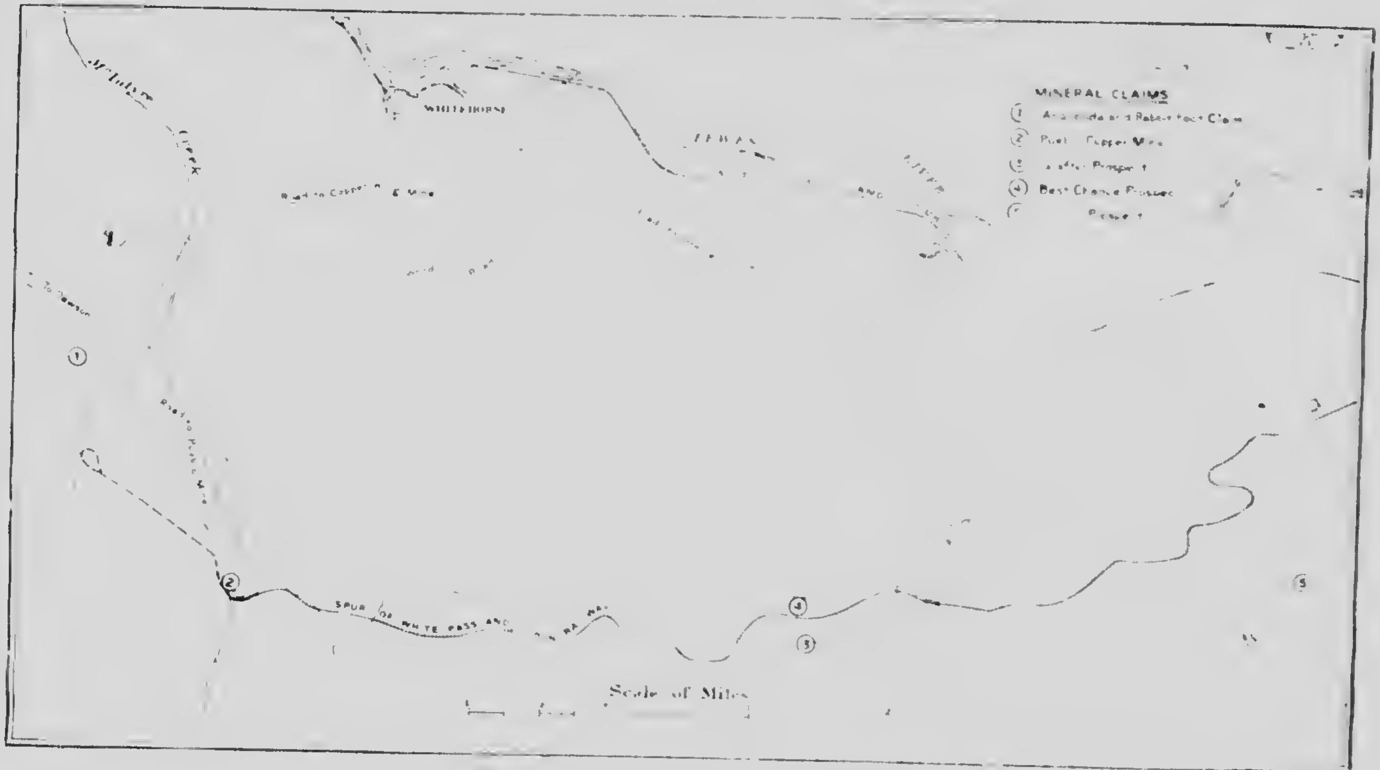
Equipment. The property is now well equipped with office and mess houses, assay office, stable, boiler house, store, shaft house, forge and repair shop, necessary tracks and inclines, with hoists for use in open-cut work, as well as main hoist for working the shaft.

Heretofore power had been supplied by one 150 h.p. return tubular boiler. Another was being installed in October, so that 300 h.p. will be available.

One 5-drill air compressor was also being duplicated, and, generally, such additions and improvements were being made as to increase the capacity, as well as the efficiency of the plant, in preparation for continued and greater development.

Nature of the Deposit. The Pueblo ore-body, together with practically all the Whitehorse copper ores, falls into the class of ordinary contact metamorphic deposits,[1] but is exceptional in that it is composed of cupriferous hematite as distinguished from other numerous deposits, in this district, which are composed of copper minerals associated with magnetite.

[1] McConnell's Whitehorse Copper Belt, p. 24.



Portion of Whitehorse Copper Belt, Y. T. (after McConnell)

PLATE XXXI.

Power-house, store, shaft-house, forge, etc., the Pueblo copper mine, Whitehorse, Y.T.

PLATE XXXII.

Open cut, Pueblo copper mine, Whitehorse, Y. T. Photo by courtesy of C. A. Mowry, asst. manager.

According to Beck[1] magnetic iron ore is the most important ore of contact metamorphic deposits, while copper sulphide ores are next in importance.

By 'contact-metamorphic ore deposit' is meant, an ore deposited within stratified rocks, under the influence of contact-metamorphism, in the vicinity of the boundary or contact between these stratified rocks and igneous masses.

At the Pueblo the ore has been deposited in limestone near the contact between the limestone and granite, and owing to metasomatic replacement of a portion of the limestone by ore, the outline of the ore body is not clearly defined, and the surface area is therefore very irregular and difficult of exact determination. It appears to be about 300 feet long by 170 to 200 feet wide. McConnell mentions the surface section as measuring about 33,000 square feet, and that the ore body was, in 1909, proven at one point to 100 feet in depth and that, at a depth of 70 feet, drifts of 120 feet northwesterly, and 35 feet southwesterly, had been made, all in ore. Recently most of the surface area has been excavated, or mined by open-face method, to a depth of possibly 20 to 30 feet, and has furnished ore, which, according to the management averaged about 3½ per cent in copper. So far as development has shown, the values recovered have all been from the carbonate ores, malachite, and azurite, or from oxides, as cuprite, which throughout the oxidized zone have replaced the original or primary sulphides.

Development.—As already mentioned, most of the ore shipped was taken from the open-cut, but prospecting, at depth, has also been carried on, though to a limited extent, as yet.

The shaft is 200 feet deep and is understood to be still in ore,[2] but nothing is known as to the area of a section below the 70 foot level. Mr. Mowry mentioned that it was the intention of his company to cross cut the lode at the 200 foot level, and to make an effort to define both its lateral, and, as far as might be possible, its vertical extent.

One of the Government diamond drills, which had been idle in the territory for a number of years, was being prepared for the purpose of assisting with this work.

It is most important that this ore body be so prospected, in order that, if values at depth are proven, the owners may continue laying the foundation for mining on a substantial basis, and may push forward their operations with confidence. If, on the other hand, it is found that the ore body is limited to a comparatively shallow zone, it would be well in the interests of all concerned that this be known.

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[1] The Nature of Ore Deposits, p. 582.

[2] The writer did not visit the shaft, as some of the hoisting or pumping machinery was temporarily undergoing repair, and it was impossible to wait over.

VALERIE.

This property is situated about 8 miles southeast of the Pueblo, and, 2½ miles southerly from Miles Canyon, and is about 700 feet higher in elevation than Whitehorse.

According to McConnell, the Valerie was staked August 22, 1899, and early development consisted in sinking shallow shafts on the principal ore outcrops. This continued up to 1904, and, after an interval of 3 years development work was resumed, in 1907, by Mr. A. B. Palmer, of Whitehorse, who made important discoveries, which consisted of rich ore shoots in the form of lenses. Three lenses were found on the surface, and one at depth of 84 feet. The latter proved to be about 50 × 17 feet in area and was encountered within the zone of contact between limestone and grano-diorite.

Development Work. This consists, in addition to the surface work referred to, of an inclined shaft, said to be 190 feet deep, together with drifts aggregating between 250 and 300 feet at the 84 foot level. Only one ore shoot has so far been developed at this level. The occurrences here, as in the Pueblo, are very irreguler in outline, but it is quite probable that other shoots or lenses will be encountered when prospect drifts are extended.

Copper carbonates and oxides, derived by oxidation from the sulphides, together with primary chalcopyrite constitute the ore values; arsenical pyrites also occurs.

In 1904, some 40 tons of selected ore, from surface workings, were shipped to the smelter. It was claimed to have averaged 18 per cent copper, and over $5 in gold per ton. No shipments have since been made so far as the writer learned.

A sample was taken at random from the 84 foot level (No. 408). This gave 18·76 per cent of copper and ·02 oz. in gold, equivalent to $66.06 per ton. Present operations are being carried on by the Atlas Mining Company, as already mentioned, under a working option. These consist mainly of exploring the 84 foot level, in the hope of locating additional shoots of ore.

Equipment.—This consists, in part, of a 60 h.p. portable boiler, one 2 cylinder hoist, an Ingersoll-Rand compressor with steam cylinder 12 × 12 and air cylinder 12¼ × 12, and one Cameron sinking pump. There is also good accommodation, as to buildings, which includes shaft and boiler house, mess house and several cabins, for use of miners. A water tank, 16 feet diameter by 8 feet height, furnishes fire protection.

GRAFTER AND BEST CHANCE.

These two properties are located about midway between the Pueblo and the Valerie, one on either side of the railway spur, which leads to the Pueblo;

the Grafter being on the west, and the Best Chance on the east side of the track. The elevation varies somewhat between 700 and 800 feet above Whitehorse.

Like the Valerie, these are now held by the Atlas Mining Company under a working option. At the Grafter, the ore body, where explored, surrounds a core of white crystalline limestone; about 28 feet in width. The ore has been followed at the 50 foot level partially around this core, for a length of 150 feet. Its width varies from a few feet to 17 feet. Considerable stoping has been done from this level, the stopes reaching near to the surface in places. Depth has been proven to about 100 feet, by means of a shaft. The intention is to follow this immediately to the 150 foot level.

The ore differs somewhat from the Pueblo and Valerie, and contains bornite, as well as chalcopyrite. Copper carbonates, malachite and azurite, and the oxide cuprite, are found. McConnell reports native copper in small quantities, also magnetite and pyrite, and shipments of 2,000 tons carrying from 6 to 8 per cent copper with about $3 per ton in gold and silver.

A random sample (No. 409) from ore contained in the bin was taken by the writer and gave the following results: Copper 8·38 per cent, gold ·03 oz., equivalent to $29.93 per ton.

Best Chance.—This property contains the largest surface showing of copper ore associated with magnetite so far discovered in the district[1]. The ore has been developed along a granite-lime contact, and the outcrop projects above the surface, giving it a mound-like appearance, the height of the mound being about 20 feet. This outcrop is a copper stained mass of magnetite. The copper occurs generally as bornite and chalcopyrite, with some carbonates and oxides, small values in gold and silver are said to occur. The width of this mound-like mass reaches a maximum of 50 or 60 feet, and it is probably several hundred feet in length.

When visited in October, a shot drill was at work over this outcrop and a number of holes had been drilled, with but indifferent results, it is believed. The writer did not have an opportunity of checking up the cores.

Summary and Conclusions.—The Atlas Mining Company has only recently taken over the above properties, and is scarcely more than started with its various prospecting schemes.

The nature of the work already inaugurated bespeaks for this field a thorough test during the coming season. When the Government diamond

[1] [illegible] Belt, p. 41.

drill was being placed, it was found to be lacking in important equipment. It is believed, however, that the Department intended replacing the shortage, so that the drill might be able to render efficient service in this very important work.

It would be of great advantage to both the owners of the properties, and to the Government, to have the work of this drill inspected and the results checked by a representative of the Mines Department.

ANACONDA.

One other copper property visited was that embracing the Anaconda and Rabbit Foot claims, both Crown granted, and owned by Messrs. Whitney and Pedler, Wm. Puckett, E. A. Dixon and Donald Ross, all of Whitehorse.

This property is located near McIntyre Creek crossing, on the road to Dawson, 3½ miles from Whitehorse.

In company with Mr. Puckett this was visited during part of an afternoon.

On the Anaconda claim a number of surface trenches expose an ore body striking north and south, of tremolite, associated with bornite, chalcopyrite, malachite and azurite, which reaches a width of ten to twelve feet in places, and strikes through a belt of limestone, which is, in places, greatly altered. The granite contact is apparently between 50 and 100 feet easterly from the above ore body.

A shaft was started, and sunk to a depth of 25 or 30 feet. This exhibited stringer-like bands of copper carbonates, and of chalcopyrite and bornite, alternating with leaner mineralized rock. The whole being an altered and silicified mineralized limestone, probably tremolite ore and garnet, referred to by McConnell [1] and illustrated in the following section from one of the trenches.

[1] Whitehorse Copper Belt, p. 51.

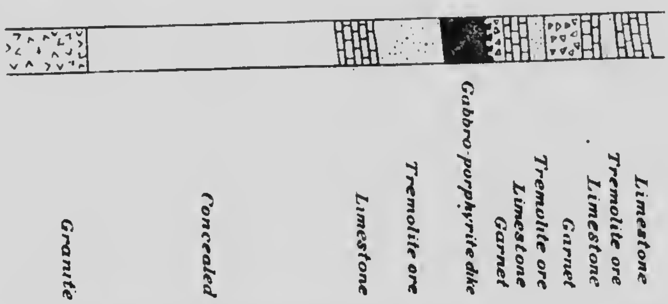


FIG. 26. Section showing alternating bands of ore, limestone and garnet (McConnell) Scale 40 feet to 1 inch.

PLATE XXXIII.

Shot drill at work on the Best Chance copper prospect, Whitehorse district, Y.T.

From the above section it will be seen that smaller tremolite ore bodies parallel the main body. The latter is supposed to be a lens which carries a width of 12 feet for about 100 feet along the strike, then narrows down.

In any event lenses appear quite persistent along the same general strike, and cross trenching has been done at intervals of several hundred feet, pretty well across the claim, and onto the Rabbit Foot, where a somewhat similar condition exists to that noted on the Anaconda.

Three samples were taken from the Anaconda, and one from the Rabbit Foot claim.

The first, No. 404, is a section across 10 feet of ore, from a trench about 70 feet northerly from the Anaconda shaft. This gave an assay of 5·1 per cent copper with traces of gold and silver.[1]

The second sample, No. 405, was taken at random from the excavated ore on the shaft dump. It gave on assay of 7·13 per cent copper with traces of gold and silver.

The third sample, No. 406, was taken over a width of 12 feet from a trench near the side of a road through the property, and distant about 700 feet southerly from the shaft. This assayed 3·87 per cent copper.

One sample, No. 407, was a trial sample from shaft dump of the Rabbit Foot. This assayed 6·42 per cent copper.

All gave traces in gold and silver. Nothing is known of the character of the deposit at depth as all the workings are shallow.

It would, however, seem that a considerable tonnage of good ore might here be readily recovered.

Operations at the Pueblo have shown that a handsome profit is possible from $3\frac{1}{2}$ per cent copper ore of the general character of those found in this district.

Prospects for this camp, therefore, look bright in the event that prices of the metal are maintained at, or near, the present level.

GOLCONDA, FLORENCE, AND CONRAD MINERAL CLAIMS.

This property is located about 3 miles northeasterly from the right limit of the Lewes or Fiftymile river, at a point 12 miles below Marsh lake, and is distant, as the crow flies, probably 9 or 10 miles from Whitehorse, in an easterly direction.

It is most readily accessible from the 'Junction' on the White Pass railway near Miles Canyon, thence by the original Tagish trail to a point

[1] See also Assay Sheet No. 37, p. 168.

on the Lewes river northeast of Dugdale where the river would be crossed by boat or raft. On the occasion visited, in October, the route taken was from Carcross by motor boat via lakes Tagish and Marsh.

The property is owned by Mr. Arthur Thompson of Porcupine, who, in company with Arch'd MacLean of Carcross, had done considerable work upon it in 1907 and 1908.

Deposit.—An immense vein of quartz is found outcropping at intervals, for several thousand feet in a west-northwesterly and east-southeasterly direction within a schist belt. The quartz carries an average width of over 6 feet and, in places, bulges to 20 or 25 feet. In the latter case the lead consists of a somewhat jumbled and broken mass of quartz and schist, which, owing to additional hardness, has offered greater resistance to the action of eroding elements than the softer country rock. This has resulted in the formation of a long mound-like mass from 25 to 50 feet wide, which incloses the lead for nearly a thousand feet along the strike, and stands up some 20 feet above the immediate surrounding area.

Towards the southern end of the vein the quartz outcrop is 6 feet in height clear above the country, and exhibits a width of 5 feet 6 inches. The dip is here about 60° southwesterly, but at different points along the vein it has been found to straighten to near the vertical.

The quartz is of a milky to cream colour with brownish or rusty stains on cleavage faces. Usually it does not show mineralization, but occasional sprinkling of pyrite was noted in places.

Development.—This consists of a shaft and several trenches on the Conrad mineral claim, some open-cuts on the Florence, and a shaft and number of open-cuts on the Golconda.

The shafts were inaccessible beyond a few feet from the surface owing to ice and snow.

On the Conrad mineral claim, a few feet south of the 6-foot outcrop of quartz, a shaft, known as the Stevens shaft, had been sunk to a depth of about 12 feet.

About 700 feet from this shaft northwesterly along the strike, an opening was started, with the intention of cross-cutting the mound at about 20 feet below its summit. This cut had only been driven 5½ feet. For the purpose of referencing samples this is known as the Hill cut. Samples 412 and 413 were taken here, while No. 414 represents a trench sample from a small trench 200 feet northerly from the Hill cut.

The most extensive development is that on the Golconda. The shaft was there sunk 65 feet in quartz, and then offset into the schist and sunk 35 feet further, the object of making the offset being more rapid progress to the 100 foot level, for the purpose of cross-cutting and drifting. So far as the vein could be followed in the shaft, it carries a width of 5 to 6 feet and has practically a vertical attitude. A small proportion of

PLATE XXXIV.

Quartz vein outcropping near Stevens shaft,
Conrad mineral claim, Whitehorse
mining district, Yukon

copper pyrites was noticed in the quartz. A couple of open-cuts, at intervals for a distance of some 300 feet beyond the shaft, were also visited.

Ten trial samples were taken from the vein and various portions of the workings. Only one showed a colour of gold in the pan and none of them gave values over 20 cer s per ton in gold.

See assay sheet No. 38, for full details of samples.

ANACONDA AND RABBIT FOOT CLAIMS SAMPLES; VALERIE COPPER PROSPECT SAMPLES; GRAFTER COPPER PROSPECT SAMPLES—ASSAY SHEET, No. 37.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Percentage of copper	Value per ton. $	Value per ton. c.	Width of Sample. Ft.	Width of Sample. In.	Check assay (b). Au.	Check assay (b). Ag.	Check assay (b). % cu.	Remarks.
404	Copper carbonates and bornite ore......	Blue, green, purple....	4	12	–	Section of lead in open cut.....			5.10	17	85	10		trace	nil	5·16	Anaconda
405	Copper carbonates and bornite ore.....				–	Dump of Anaconda shaft......	trace	·03	7·13	24	94			0·03	–	7·26	Anaconda
406	Copper carbonates and bornite ore....		2	10	–	700′ south of shaft..	trace	nil	3·87	13	54	12		nil		4·28	Anaconda
407	Bornite and chalcopyrite		3	2	–	Shaft dump on Rabbit Foot.	trace	trace	6·42	22	47			trace	–	2·40	Rabbit Foot.
408	Copper ore.....		3	6	–	Random sample 83′ level....	0·02	nil								18·76	Valerie copper prospect.
409	Copper ore.......		3	12	–	Trial sample from ore bin......	0·03	nil								8·38	Grafter copper prospect.

(a) Assays conducted by Mr. Robert Smart, Whitehorse, Y.T. Values calculated on the following basis: Gold at $20 and silver at 55c. per oz., copper at 17½c. per lb.

(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

GOLCONDA, FLORENCE, AND CONRAD MINE... CLAIMS SAMPLES, ET AL.—ASSAY SHEET No. 38.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c	Width of sample. Ft.	Width of sample. In	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
410	Quartz...	Pale rusty.			–				–	5	6	[illegible]	[illegible]	
411	Quartz...		7	8	–	Dump of Stevens shaft.			–			trace	nil	
412	Quartz.		6	14	One colour of gold	Crosscut about 600′ N.W. from Stevens shaft......			0 2[illegible]			0·01	nil	
413	Quartz.				–	Quartz pile from same cut as No. 412....			0 20			0·01	nil	
414	Quartz....		4	8	–	Open-cut 200′ N.W. of No. 412			–	4		trace	nil	
415	Quartz....		1	10		Golconda shaft 10′ from surface			0 20	3	6	0·01	nil	
416	Quartz....		7	3	One colour of gold...	Golconda dump. .			–			trace	nil	
417	Quartz....		4	10	Some pyrite.	Open-cut 15′ N.W from Golconda shaft			–	6	0	trace	nil	

GOLCONDA, FLORENCE AND CONRAD MINERAL CLAIMS SAMPLES, ET AL.—ASSAY SHEET NO. 38—*Continued.*

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $	Value per ton. c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
418	Quartz...		5	2	Small show of pyrite..	200′ N.W. from Golconda shaft...			0	20	4	0	0·01	nil	
419	Quartz and schist.	Reddish to rusty	6	7	Two colours of gold	Cross-cut 300′ N.W. from Golconda shaft			0	20	Q.3 S.2	6 6	0·01	nil	
420	Quartz		–		–	Trial sample from M. Watson's C. on Steven hill...	trace	3·00[a]	1	80			1.05	2.48	These samples were submitted by Mr Watson as indicators from his claim on Stevens mountain. The ground was not visited.
421	Quartz....		–		–	Same as No. 420..	trace	0·38[a]	0	22	–		0·01	nil	

(1) Results of Nos. 410-419 inclusive are from assays by Mines Branch, Ottawa, no local assays being made of them.
(a) Assays by Mr. Wm. C. Sime.
(a) Assays conducted by Mr. Robert Smart, Whitehorse, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

CHAPTER V.

CONRAD MINING DISTRICT.

Properties visited in this mining district are, for purposes of this report, grouped under the two subdistricts: *Wheaton* and *Windy Arm.*

Wheaton Section.

INTRODUCTION.

As an introduction to the more detailed work described in connexion with the few mining properties visited in Wheaton, it is thought advisable to incorporate herewith the following portion of a chapter on the Economic Geology of this section, from Dr. Cairnes' Wheaton Report.[1]

ECONOMIC GEOLOGY.

"Wheaton district is of interest, from the standpoint of economic geology, for its ore-deposits and its coal-measures. The former will be here first considered.

Ore Deposits.

INTRODUCTION.

"For convenience of description, the ore-deposits of this district may be classified as follows:—

(*a*) Gold-silver quartz veins.
(*b*) Antimony-silver veins.
(*c*) Silver-lead veins.
(*d*) Contact-metamorphic ore deposits.

General.

"The great majority of the ores of the district belong to the first three classes, and consist chiefly of veins, the economic importance of which depends on their gold, silver, or antimony contents. Quartz is, in these veins, nearly everywhere the most important, generally the only gangue mineral. In a few places barite and calcite also play this role. The only representatives of the last class, the metamorphic ore deposits, are found on a property near the junction of Becker creek with Wheaton river, and occur replacing bands of mica-gneiss, generally near their contact with the Jurassic granites. These ores consist chiefly of magnetite, hematite, and chalcopyrite, associated with garnet, epidote, calcite, and other secondary metamorphic minerals.

[1]Memoir No. 31, pp. 85-90, Geol. Surv. of Canada, 1912.

"Over 500 claims[1] have been located in this district since the early part of the summer of 1906, and a large portion of these are still being held. Some promising discoveries have been made, and, in several places, good or even high-grade ore has been found. Still no shipments have as yet been made, except a few test samples of 10 tons or less each, and no plant has been erected in the district for treating these ores.

Retarded Development.

"All the mining done has been of a prospecting nature, and considering the number and character of the discoveries made, the amount of development that has been performed is exceedingly small. This is due to several causes, among which the following are probably the most prominent :—

"The freight rates charged by the White Pass and Yukon railway have been such that it has been practically impossible to ship out of the territory any but the highest grade ores ; and to bring in equipment and supplies for extensive working meant excessive expenditure. Not only have the rates been high, but mining men have been unable to obtain guarantees from the railway company that even the rates, at any time fixed, would not be raised in the near future.

"When the discoveries were first made in Wheaton district there were no roads, and few trails, extending into this section of country.

"A considerable portion of the rolling upland-surface of the district is covered with superficial deposits which obscure the various vein outcrops and render prospecting difficult. This is much emphasized by the fact that this surface mantle of soil, partly decomposed bedrock, etc., is frozen the greater part, if not all the year, making stripping, trenching, etc., much more expensive than in more southerly districts. The frost does not interfere with underground mining but is a considerable detriment to prospecting.

"Still another element might be mentioned, and this is that a considerable number of the men in the district attempting development work are either entirely untrained in mining methods, or, what is more generally the case, are placer miners, and to some extent are trying to apply placer methods to quartz mining.

Present Conditions.

"The above-mentioned matters will, however, all right themselves, but some time is required, as the district is still new and comparatively unknown ; and it is hoped that the properties containing workable ore will be producing in the near future. During the summer of 1[illegible] the Railway Commission decided that the freight rates on ore from Whitehorse and

[1] The records of the Mining Recorder at Carcross, Y.T., showed on Feb. 3, 1910, that 543 claims had been recorded, to date, in Wheaton district. Of this number only 6 were recorded previous to 1906, and 167 of the 543 were still in good standing.

Caribou to Skagway shall not exceed $2 and $1.75, respectively, per ton. The Yukon Government has also constructed wagon roads to different parts of the Wheaton district, so that now all the claims are on, or may be easily connected with one of these roads, and are distant not more than 12 to 35 miles by road from Robinson on the Whitehorse Pass and Yukon railway. Finally, the men mining in the district are becoming more experienced, and more quartz miners are coming into the country, so that a lack of practical workers will also soon become a thing of the past.

Gold-Silver Veins.

Summary.

"Under this heading it is intended to give a brief summary of the more important facts, free from inference, concerning these gold-silver veins.

"These veins are of wide-spread distribution in southern Yukon, and constitute the major portion of the ore deposits, not only of Wheaton district, but also of Windy Arm district to the southeast. They occur in Wheaton district throughout a northwesterly trending belt 16 miles long and 8 to 9 miles wide. The majority of the deposits occur in a strip, 2 miles wide, which extends up the centre of this belt and includes Mt. Stevens, Wheaton mountain, Tally-Ho mountain, Gold hill, and Mineral hill. Other veins have been found on Mt. Anderson and Red ridge to the west and east, respectively, of this 2 mile belt.

"The majority of the veins strike, in a general way, parallel to the belt in which they occur, which in turn parallels the trend of the Coast range of mountains to the west. The veins are generally steeply inclined and dip, prevailingly, to the east.

"These deposits are found chiefly in the Coast Range intrusives, but also exist in the schistose members of the Mt. Stevens group—principally in the chloritic and sericitic schists and the greenstone schists. The veins in the granitic rocks occur as fissure fillings and are prevailingly regular and persistent in their various characteristics, such as strike, thickness, mineral composition, etc., for considerable distances. One vein has been traced over 3,000 feet and may extend much farther, and contains from 4 to 5 feet of vein-material throughout this distance. How far the majority of the other veins may extend is not known, but some have been traced upwards of 1,500 feet. They vary in thickness from a few inches to 7 or 8 feet, but the average vein in the granite is from 3 to 4 feet thick. When veins occur, however, in the schists the minerals have been deposited either in lens-shaped masses between the foliation-planes of the enclosing rock, or in irregular fissures which may occur connecting these lenses or may be independent of them. Thus the deposits in these schistose rocks are extremely irregular in form, but have a general trend parallel to the strike of the mineral belt in which they occur. The bulk of the ore occurs in lenses which appear to have an average width of 6 to 8 feet and are from 20 to 40 feet long. One exceptional lens on the Acme claim is about 100 feet long and 30 feet wide. Veins in this formation have been traced over 1,000 feet, consisting of a succession of lenses and connecting fissures.

"The vein-fillings consist, in nearly all cases, mainly of quartz, which, with subordinate amounts of calcite, constitute the gangue minerals. The quartz may present a massive appearance and be so finely crystalline that no distinct crystals can be seen with the naked eye; or it may consist chiefly of large, well-formed prisms which are either interlaced or pointed in a parallel manner toward the centre of the vein, thus forming distinct comb-structures. All gradations between these types of structure may be found.

"Galena is the most characteristic metalliferous mineral, and is the only one occurring in any considerable amount. It may be very finely crystalline, when it is known as 'steel-galena,' or may occur as cubes up to half an inch to the edge. Pyrite and chalcopyrite occasionally exist in scattered particles. Native gold and sylvanite, as well as hessite, petzite, and telluric ochre also occur, but have been identified in only two localities, Gold hill and Mt. Stevens. The gold is generally very fine and occurs apparently both as a primary mineral and as an oxidation product of the tellurides.

"The native gold and tellurides have so far only been found in small pockets on the Gold Reef claim on Gold hill, and in some float-quartz, which comprised chiefly a large mass of several tons, found near the summit of Mt. Stevens. Some of the samples of pockets of these ores have assayed several thousand dollars per ton in gold and silver. The source of the rich quartz on Mt. Stevens has not as yet been discovered; but it seems probable, considering the large size of the main mass found and its angular character, that the vein from which it is derived is present on the hill on which it was found. It is not known, within close limits, what average amounts of gold and silver the different veins in the district carry; but selected ore from the more promising claims on Mt. Stevens, Wheaton mountain, Mineral hill, and elsewhere, contains from $20 to $80 per ton.

"The zone of vein oxidation is very shallow, and does not appear to have had any appreciable economic effects upon these deposits. Unoxidized minerals often occur at the surface and have always been encountered above the 30 foot level; also no zone of surface enrichment due to weathering has been detected.

"Mining in Wheaton district, as mentioned above, is everywhere in the prospect stage as yet; and, although the gold-silver veins have been exploited more than the other classes of deposits in the district, on only five claims has 100 feet or more of work been performed. On the Gold Reef claim on Gold hill there are a number of drifts, cross-cuts, raises, shafts, etc., aggregating several hundred feet. On four other claims, 75 to 350 feet of work has been executed, chiefly in the form of drifts. Three of these drifts have been driven on the veins, and the fourth is intended to crosscut the ore. In all other cases where any work at all has been done it is chiefly as assessments, and in the form of small shafts, less than 20 feet deep, open-cuts, trenches, etc. For this reason, although a number of promising claims have been located and some good ore has been found, it is not definitely known that any of the properties possess ore in sufficient quantities ana containing the requisite values to allow of their being profitably mined to any considerable extent under present conditions.

Detailed Descriptions.

"*The Vein-fissures.*—The gold-silver quartz veins are of two types, each restricted in its occurrence to one type of rock. These are (1) simple gold-quartz veins in the Jurassic granitic intrusives, (2) lenticular veins in the Mt. Stevens schists. These two types contain similar minerals, belong to the same vein-system, and are contemporaneous in formation. Their differences are due, as will be explained later, to the effect of the containing rock on the formation of the fissures.

"*Distribution.*—The majority of these fissures are limited in Wheaton district to a belt 16 miles long by 2 miles wide. This belt extends in a southeasterly direction from Watson river, on the north, to the southern portion of Mt. Stevens, which are points at the north and south edges, respectively, of Wheaton district. Ten miles farther to the southeast, and in line with the general direction of this mineral belt, are a number of similar veins, in Windy Arm district. Also, ores which probably belong to this class are reported to have been found to the north of Watson river and in a line with those known to the south. Thus when this portion of southern Yukon has become more explored it will probably be found that these veins exist throughout an area greatly in excess of that existing in Wheaton district.

"The narrow belt above described includes portions of Mt. Stevens, Tally-Ho mountain, Wheaton mountain, Gold hill, Hodnett mountain, and Mineral hill. In addition, a few veins have been found some distance on either side of this area. The most distant of importance, so far discovered, is that seen on the Rip and Wolf claims on Mt. Anderson, about 4 miles to the west of the main belt. Veins were also noted on the eastern end of Red ridge and elsewhere, 2 to 3 miles to the east of this belt. So that altogether these fissures occur throughout an area of 8 or 9 miles wide, extending to the west to include Mt. Anderson, and to the east to the eastern edge of Red ridge.

"*Formations in which the fissures occur.*—These ore fissures occur in the Coast Range intrusives which are chiefly granites and granodiorites, and also in the chloritic and sericitic schists and greenstone-schists of the Mt. Stevens group.

"*Strikes and Dips*[1].—All of these fissures so far as is known strike in a general direction parallel to the trend of the belt in which they occur. They dip in all cases, except as mentioned below, to the northeast, and are generally steeply inclined, the angles of inclination to the horizontal varying from 60° to nearly 90°. Veins in the schists, however, are liable to dip to the southwest, but the only one known that does so is that on the Gold Reef claim."

It was possible for the writer to visit only three properties in the Wheaton section, e.g., Buffalo Hump, Tally-Ho and Whirlwind groups. These were reached by driving from Whitehorse to Robinson station, the distance by road being estimated at 26 miles. From here the road passes southward along a wide valley at the mouth of the Watson river. This valley is followed for several miles to the shore of Annie lake in the Corwin valley. Here, Mr George Stevens' cabin is situated on the south side of the lake.

About two miles south of Annie lake the Wheaton river enters the Corwin[2] valley and there forms what is known as the Big Bend. This is due to its change of course from a northerly to a southeasterly direction.

MINING PROPERTIES.

BUFFALO HUMP GROUP.

The first property visited was the Buffalo Hump group, owned by Mr. Geo. Stevens. This is located on the western side of Mt. Stevens, near the summit, at an elevation of about 2,500 feet above that of the valley at the Bend below. The property consists of four claims: Sunset, Sunrise, Golden Slipper, and Wheaton. Cairnes thus, appropriately, describes the deposit[3]:—

"On the Golden Slipper claim several tons of quartz were discovered, which was thought at first to form part of a vein in situ, as it had distinct granitic walls and was but little broken. Subsequent development showed this quartz and its associated rock-material to be all transported material. This overlies similar rocks which belong to the Coast Range intrusives, occurs near the summit of the hill, and does not appear to have travelled any considerable distance. A drift was commenced in the direction of the supposed origin of the quartz, and in August last (1909) had been driven 85 feet, and from it 20 feet of cross-cuts had been run, but no vein encountered.

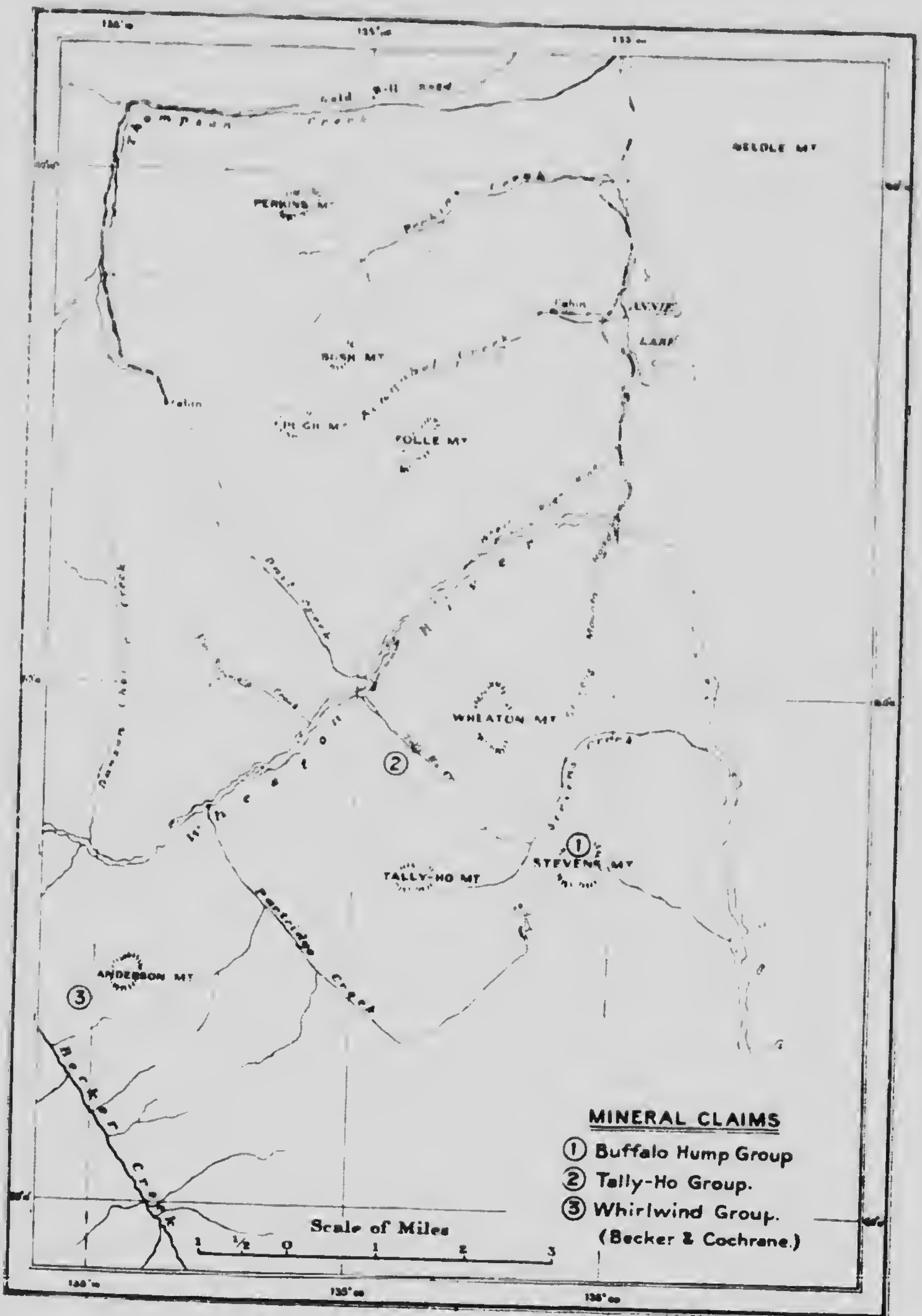
This quartz, in addition to a small amount of disseminated galena in fine grains, also contains some free-gold and sylvanite. The gold occurs either as small, spongy masses, usually surrounded by sylvanite, or in the form of minute, bright particles, often too small to be detected

[1] Bearings here quoted are astronomic; in all other cases throughout this report they are magnetic.

[2] See diagram of Wheaton map area, Yukon Geology, by D. D. Cairnes, 1909.

[3] Cairnes, D. D., Memoir No. 31, Wheaton district, Yukon territory, 1912, p. 107.

Annie lake from a point on the road to Stevens mountain, looking northerly over the Corwin valley. In the foreground the engineer's team is shown returning from Stevens mountain to the cabin at Annie lake.



Vicinity of Wheaton river (after Cairnes)

PLATE XXXVI

Seven foot quartz vein, Sunrise mineral claim, Buffalo Hump group. Mr. Stevens is seen standing in the cut, practically on the footwall.

with the naked eye. The spongy gold has been derived by oxidation from the sylvanite, but some of the gold occurs, apparently, as a primary ore. The telluride exists in small bunches, scattered throughout the quartz.

At several places on this and adjoining claims, smaller masses and pieces of high-grade quartz have been found, all of which are angular in form, do not appear to have been transported far, and are found chiefly near the summit of the mountains. For these reasons, it is thought that the rich quartz was probably originally derived from some portion of Mt. Stevens.

On the Sunrise claim is a quartz vein, in a fissure in granite, which carries some galena and native gold. Both of these latter minerals occur sparsely distributed throughout the gangue, and are here, so far as has been discovered, not associated with any of the telluride minerals found on other veins showing native gold."

The vein is fully 7 feet thick in one place, where an open-cut has been made, but will not average more than 2 or 3 feet in thickness for a distance of 50 feet, where it has been partially exposed.

The strike of this vein is southeasterly and the dip northeast. In addition to the above mentioned open-cut, and drift, development consists of three cross-cuts, at distances estimated to be 20, 120 and 1,000 feet, respectively, from the lowest one, which is that one, mentioned above, as exposing a 7-foot wide vein. The hillside is very steep and these workings are, for the most part, filled in with slide, so that only in the lowest cut is the vein clearly exposed. Samples taken may be summarized as follows: Nos. 371 and 372 represent a section across the quartz vein at this point, while No. 373 comprises one foot in width, from the centre of the vein, which shows considerable mineralization by galena. Sample No. 374 is also a section of the vein from the second cut. These show only traces on assay. No. 375 is a trial sample of excavated quartz vein from cut No. 3, and Nos. 376 and 377 of material found at the uppermost cut. The two last show good values.

BUFFALO HUMP GROUP SAMPLES MOUNT STEVENS ASSAY SHEET NO. 39

Sample No.	Material.	Colour.	Weight Lbs.	Weight Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton $ c.	Width of sample Ft.	Width of sample in.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
371	Quartz	Rusty				Main cut No. 1 Sunrise M. C.	trace	nil		3	6	0.01	nil	Western portion of section on vein.
372	Quartz	Grey				Main cut No. 1 Sunrise M. C.	tr.	nil		3	6	nil	nil	Eastern portion of section on vein.
373	Quartz				Galena	Main cut No. 1 Sunrise M. C.	trace			1	0	trace		Central portion of vein section.
374	Quartz	Dark rusty				Cut No. 2 S.E. from No. 1	trace			2	0	trace	nil	
375	Quartz					Cut No. 3 S.E. from No. 1	.01	(c)	2[illegible]			0.01	nil	Trial sample of excavated
376	Quartz	Dark grey				Cut No. 4 Golden Slipper M. C.	1.926	31.5	58.78			2.58	(c)	Stringers from excavated material.
377	Quartz	White				Cut No. 4 Golden Slipper M. C.	trace		29.80			1.49	(c)	Stringers from excavated material
378	Quartz	Grey white			Galena	Drift Golden Slipper M. C.	1.05	27.6	36.88			1.01	(c)	Trial sample

(a) Assays conducted by Mr. Robert Smart, Whitehorse, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.
(c) Not determined.
The standard value of gold and silver used by Mr. Smart in converting ounces per ton into money value was $20.67 and $0.55 respectively.

TALLY-HO GROUP SAMPLES ASSAY SHEET No. 40.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in jam.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $ c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
379	Quartz				A little galena	N. W. face of stope at 1st raise	trace		21 80(c)	1	3	1 09		
380	Quartz				A little galena	N. W. face of stope at 1st raise	trace			1	3	trace		
381	Quartz..	Grey to rusty			High in galena	Ore sacked for shipment	2 026	15 6	50 45			0 23	(c)	
382	Quartz				Galena	Main level 50' in from main entry..	trace			1	0	1 96		
383	Quartz				Galena, pyrite and colours of gold	168' in from main entry	0 713	2 7	16 21	1	0	0 62		
384	Quartz				Galena ..	360' in from main entry	0 9	1 5	19 42			1 14		
385	Vein matter ..						nil	nil		3	0	trace		

(a) Assays conducted by Mr. Robert Smart, Whitehorse, Y.T.
(b) Check assays conducted by Mr. N. L. Turner under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.
(c) Not determined.

Mr. Stevens stated that, previous to the work having caved in, he had struck the vein which at this place appeared to be about 3 feet wide.

The drift referred to above was inaccessible, due to fallen debris, etc., and sample No. 378 is representative of a small percentage of the excavated material, which, in places, occurs in the form of quartz stringers throughout the rock mass. (See assay sheet No. 39.)

As this prospect is above timber-line, it is a very difficult one to work. Owing to loose slide material, timber is required in connexion with all cross-cuts. Had the upper cut mentioned above been timbered the work might readily have been followed up with advantage, and access to the vein safeguarded. As it is, considerable prospecting must yet be done before even an approximate estimate of the extent and average value of the ore-body can be obtained.

The vein itself, where sampled in place, has shown no values. (The rich material is seemingly from stringers of quartz or from slide.) In this respect the prospect is disappointing.

TALLY-HO GROUP.

This group comprises nine mineral claims, located by Messrs. Adam Bicaie, C. J. Irwin, C.J. Burnside, Wm. Hair and F. T. McGlashen, on the left limit of Tally-Ho gulch, a tributary on the right limit of Wheaton river, some three and a half miles from the Big Bend.

When this examination was made (October 8, 1912) none of the owners were found upon the work, hence many details as to ore shipments, values, etc., which might otherwise have afforded useful information, were not noted. It was understood, however, that a considerable tonnage of pay ore had been shipped. A number of sacks of picked ore, ready for future shipment, were found on the property and it was currently reported that the owners proposed to continue development in the immediate future.

So far practically all the work has been performed in the development of one vein found on the Leader mining claim. This vein strikes in a south-easterly direction passing into the Wheeler mineral claim. It has been drifted upon for some 360 feet of its length. A short cross-cut has also been made, and some stoping carried on by means of three raises, the most extensive being about 45 feet up the pitch of the vein.

The ore occurs in a brecciated fault-zone, 4 to 12 feet thick, in a granitic formation[1]. This zone strikes in a northwesterly and southeasterly direction and dips northeasterly at angles which, where noted, appear to vary between 50° and almost vertical. A clayey gouge about half an inch thick is formed on both walls of the faulted zone, and stringers of somewhat similar material, as well as small bunches or stringers of quartz, occur

[1] Cairnes on Wheaton district, cit. above, p. 108.

throughout the breccia. A vein of quartz, which varies in width from a few inches up to three feet has been deposited along the foot-wall of the zone. So far as prospected this reaches its maximum width within the first 120 feet of the drift, after which it falls off to an average of about six inches and finally pinches out, so that the present face of the drift exhibits chiefly breccia, with, however, a considerable proportion of quartz.

In this connexion Cairnes says: "The thickness of the quartz has been apparently conditioned by the amount of original available space in which to crystallize. As fissure walls have invariably irregular surfaces, when faulting occurs cavities or spaces are produced between them that tend to become filled with the fragments that are produced by the grinding of the walls on each other; the Tally-Ho fault zone, on account of the great amount of breccia formed, would in this way become much more compact in some places than in others, and the mineral bearing solutions travelling along the foot-wall would on this account be able to deposit their dissolved quartz and associated minerals most readily in certain places. The force of crystallization of the quartz has apparently been sufficient to press back the larger pieces and more consolidated portions of the brecciated matter where not under too great pressure, thus rearranging these rock materials to some extent, and making room for the quartz to continue forming along the foot-wall in a layer of varying thickness. It would appear probable from these considerations that if this fissure is followed other places will be found where the rock materials give place to quartz, and the vein is again of workable thickness."

The quartz is generally mineralized with argentiferous galena which is fairly evenly distributed. Small quantities of pyrite and more rarely colours of gold were seen in crushed samples.

Seven samples were taken as shown on assay sheet No. 40.

In analyzing results of these, it may be noted that one sample (No. 384) was selected from a number of sacks of picked ore ready for shipment. This is generally highly mineralized, and the assay value of \$50.45 in gold and silver, here shown, probably represents a very conservative average of such ore.

Three sectional samples over a length of some 310 feet and average width of 27" of the drift give an average value of \$9 per ton. As No. 385 across the face gave no value, this figure is doubtless considerably under the true average. Cairnes[1] has noted the fact that assays of the quartz have been secured which range from \$9 to \$80 per ton.

Development here is sufficient to afford opportunity for a thoroughly comprehensive sampling of this deposit for some 300 feet of its length in the main drift, and in places for 20 to 45 feet of its extension along the raises.

Approach to this property is difficult because of the steep nature of the ground. The workings are probably 1,500 feet above the river bed

[1] Wheaton Rep. above cit. p. 110

below, but, if development is proceeded with, the ore, which readily admits of sorting, could be cheaply conveyed to a pocket on the roadside, in the valley below, by means of a gravity tram; whence it would be hauled a distance of 17 or 18 miles to Robinson station, on the White Pass and Yukon railway.

WHIRLWIND GROUP. (Becker and Cochrane.)

Associated with the Whirlwind, and under the same ownership, is the Mountain Sheep group. The former consists of five mineral claims, Whirlwind, Mavis, Rip, Idelle and Hailstorm; and the latter of six, Ptarmigan, Wheaton, Maid Marion, Mountain Sheep, Mt. View, and Lake. The owners are Messrs. Theodore Becker and Howard Cochrane.

The property is situated about two miles up Becker creek on its right limit. This creek enters the Wheaton river about four miles above Tally-Ho gulch. Recently the Yukon Council constructed a road up the creek to permit of access to the property. This road terminates at the Cabin after a climb of 650 feet in the two miles. The chief workings are, however, at an elevation fully one thousand feet higher, and the trail to them is very steep. This renders the work of prospecting and developing both difficult and laborious. Notwithstanding this fact the property exhibits considerable development in the shape of several tunnels, open-cuts, pits, trenches, etc.

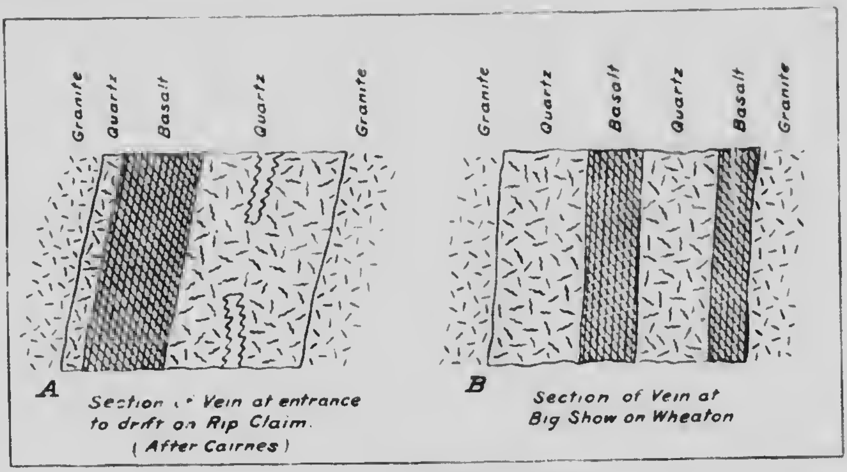


FIG. 27. Rip veins, Whirlwind group.

The country here consists of granite. Several quartz veins have been located, which have generally an east-northeasterly strike. One of these veins has been called the Idelle. This was traced by Mr. Cochrane from the Idelle mineral claim across the Rip and into the Wheaton mineral claim. Little work has been done upon it.

The most important vein occurs in a fissure in the granite, discovered on the Rip mineral claim, and prospected at intervals by drifts and cross-cuts on the Rip, and by open-cuts on the Wheaton claim, for a distance of nearly 3,000 feet.

This vein is strong and well defined and carries a width of 4 to 5 feet of quartz, which in places is well mineralized with argentiferous galena. As already mentioned the strike is east-northeasterly, the dip varying apparently between 80° northerly and the vertical.

A dyke of fine grained basalt, approximately 2 feet thick, cuts the vein longitudinally and, so far as exposures indicate, persists along its full length. By noting its position in different places it is found to pass from one wall of the vein to another, and to occupy intermediate positions; in places the dyke splits the quartz into two branches and in turn is split into branches by it.

Development. On the Rip claim this vein was approached by means of a cross-cut 172 feet in length. This is called 'No. 3 Main Level.' The vein was then drifted upon, and in October, 1912, this drift was 125 feet east-northeasterly. Mineralization of the quartz varies greatly and the ore readily admits of sorting. Mr. Cochrane mentioned that a comparatively rich shoot had been encountered in the vein near the cross-cut. This was stoped out and so far their additional work had not exposed another as good.

This drift was sampled for 108 feet from the face at intervals of 12 feet. As shown on assay sheet No. 11, samples No. 387-395, the average value for a width of 18·3 inches is $2.01 per ton.

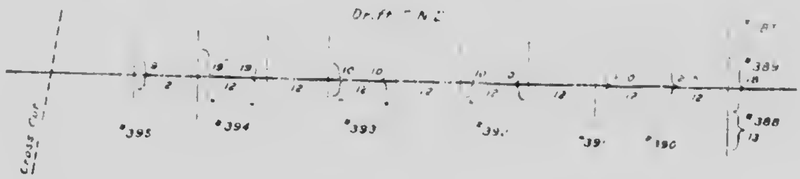


Fig. 28. Diagram showing method of sampling No. 3 main drift, Rip vein.

An average sample (No. 386), from 11 sacks of 125 lbs. each of picked ore, from this drift, ready for shipment, assayed 28·2 oz. of silver, equivalent to $15.51 per ton.[1]

Another drift, known as No. 2 drift on Rip, is made on this vein, at an elevation about 150 feet higher than No. 3. When visited in October, this was driven 110 feet, 4 samples were taken over a portion of it. Three of them (Nos. 396-398) being sectional samples, on the vein, gave values in silver of $1.76, trace, and $1.32 per ton respectively.

No. 399 represents an average of 23 sacks of picked ore from this drift, and shows an assay value of $21.89 per ton in silver.

[1] On the basis of $0.55 per oz.

Two samples, Nos. 400 and 401, from this vein, on the Wheaton mineral claim at an open-cut known as 'Big Show on the Wheaton' assayed values of $3.52 and $4.87 respectively.

An opening was made, also, on the Mountain Sheep claim, with the intention of starting a cross-cut, to tap a vein which was supposed to outcrop here. This is at a point considerably to the south of the line of strike of the Rip vein.

It was found, however, that the vein material was not in place, and that the whole work was done in slide material. A couple of samples taken of this vein material (Nos. 402 and 403), which were high in galena, gave values both in gold and silver amounting to $29.23 and $31.66 respectively (See assay sheet No. 42.)

Summary and Conclusions. -From the appearance of the ore, in the veins prospected, it may be judged that rich shoots occur, which will bring up the general average of value. Sampling should be done at close intervals, say every 5 feet, to insure a correct estimate of values.

The veins are extensive and will produce a large tonnage.

Messrs. Becker and Cochrane are both men of experience in mining, and the amount of development already accomplished bids fair to insure a thorough test for this property. It is the intention to install a small concentrating mill, on Becker creek, to be run by water power, which is said to be available a short distance up the creek. The ore will be conveyed down the hill by gravity tram (probably aerial) the estimated distance being between two and three thousand feet.

In order that ore from Wheaton properties may be brought to the White Pass and Yukon railway, for shipment to the smelter, it will be necessary to bridge the river in places and put the Wheaton road in good order. This will doubtless be attended to by the local government, which, as already mentioned, has always shown great liberality in providing good roads, throughout the territory, for the use of miners and prospectors.

PLATE XXXVII

Cabin of Becker and Cochrane on Becker creek, Whirlwind group, Conrad mining district, Y. T. The mine is situated up the slope to the left of the picture.

MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)

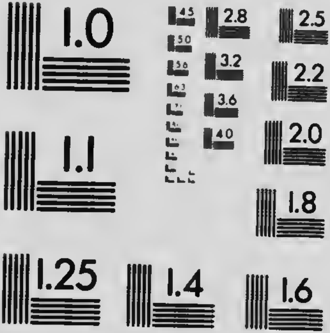


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Plate XXXVIII.

Cross-cut entry to drift, No. 3 main level,
Rip mineral claim, Whirlwind group.

WHIRLWIND GROUP SAMPLES—ASSAY SHEET No. 11.

No. 3 Cross-cut and Drift.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $	Value per ton. c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
386	Quartz and galena.	Brown....	6	11	Galena	... Average of 11 sacks, 125 lbs. each of shipping ore.. ..	trace	28·2	15	51	–		0·01	5·84	No. 3 tunnel and drift.
387	Quartz and galena	Brownish...	9	4	Galena	Working face of drift	trace	7·8	4	29	0	11	0·30	1·04	The vein of which these three samples give a section is divided at the face by a dark greenish intrusion or *horse*.
388	Quartz and galena	Brownish...	6	4	Galena.....	Working face of drift	trace	15·0	8	25	1	1	tr.	6·29	
389	*Horse*.......	Greenish.......	11	15	–	Working face of drift	trace	trace	–		1	6	trace	nil	
390	Quartz and vein matter........	–	–		Galena.....	Clear across vein roof of drift	trace	5·2	2	86	2	6	0·01	23·07	
391	Quartz and vein matter........	Brownish...	8	2	Galena..	No. 3 drift.....	trace	5·6	3	08	2	0	0	08	Note: The value of No. 390 as shown by check assay, is $13 24 as against $2 86 in the original.

WHIRLWIND GROUP SAMPLES—ASSAY SHEET No. 11—*Continued.*

No. 3 Cross-cut and Drift.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $	Value per ton. c.	Width of sample. Ft.	Width of sample. In.	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
392	Quartz and vein matter		9	8		No. 3 drift	trace	2·2	1	21		10	0·01	nil	
393	Quartz and vein matter.......		6	2	Galena	No. 3 drift	trace	2·7	1	18	0	10	0·01	nil	
394	Quartz and vein matter ..	Reddish brown.	4	0	Galena	No. 3 drift	trace	trace			0	19	0·01	0·73	
395	Vein matter					No. 3 drift	trace	trace	–		0	9	0·16	nil	

(a) Assays conducted by Mr. Robert Smart, Whitehorse, Y.T.
(b) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

WHIRLWIND GROUP SAMPLES (*Cont.*)—ASSAY SHEET No. 42.

No. 2 Drift. Rip vein. and Wheaton and Mountain Sheep Mineral Claims.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (a) per ton of Au.	Assay in ounces (a) per ton of Ag.	Value per ton. $	Value per ton. c.	Width of sample Ft.	Width of sample In	Check assay (b) Au.	Check assay (b) Ag.	Remarks.
396	Quartz..........	Rusty..........			High in galena...	28' from entry	trace	3·2	1	76	2	6	0·03	4·38	No. 2 drift. Rip vein
397	Quartz..........	Rusty..........			Some galena	16' from entry	trace	trace	–		6	4	0·28		
398	Quartz..........	Rusty..........				Face of vein above entry.	trace	2·4	1	32	5	0	tr.	1·70	
399	Quartz..........	Rusty..........			High in galena..	Average of 23-125 lb. sacks of picked ore	trace	39·8	21	89			0·03	47·[illegible]	
400	Quartz..........	Rusty..........	5	0	–	S.W. face of cut. Big show on Wheaton	trace	6·40	3	52	3	0	0·01	4·37	
401	Quartz..........	Grey to rusty.....	9	0	–	Western face of quartz S. of basalt dyke. Big shows on Wheaton	trace	3·4	1	87	2	0	0·01	nil	
402	Quartz and galena.	Grey to rusty...	4	2	–	Excavated material from Mountain Sheep	0·321	41·1	29	23			0·20	46·7	These samples represent rich galena ore taken from excavated vein matter.
403	Quartz and galena	–	6	9		Same as No. 402	·726	30·3	31	66			0·01	4·37	

(*a*) Assays conducted by Mr. Robert Smart, Whitehorse, Y.T.
(*b*) Check assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

Windy Arm Section.

This locality has been referred to in previous reports under the caption Windy Arm district.[1] It lies immediately north of the British Columbia-Yukon boundary line, and south of Nares and Tagish lakes, and is bounded by Lake Bennett on the west and Windy Arm on the east.

It consists of a rugged group of mountains, rising steeply some 4,000 to 5,000 feet above the lake levels.

The town of Carcross, formerly Caribou, a station on the White Pass and Yukon railway, situated on a narrow piece of ground between lakes Bennett and Nares, is now the distributing centre for this portion of the district.

Activity in lode mining here dates back to about 1905, when Col. J. H. Conrad began operations.

A thriving town, named Conrad, was established on the west shore of Windy Arm district about twelve miles from Carcross, and in 1906 this became the mining centre and seat of the mining recorder's office for the Conrad district; which, in addition to Windy Arm, includes most of the Watson and Wheaton rivers district.

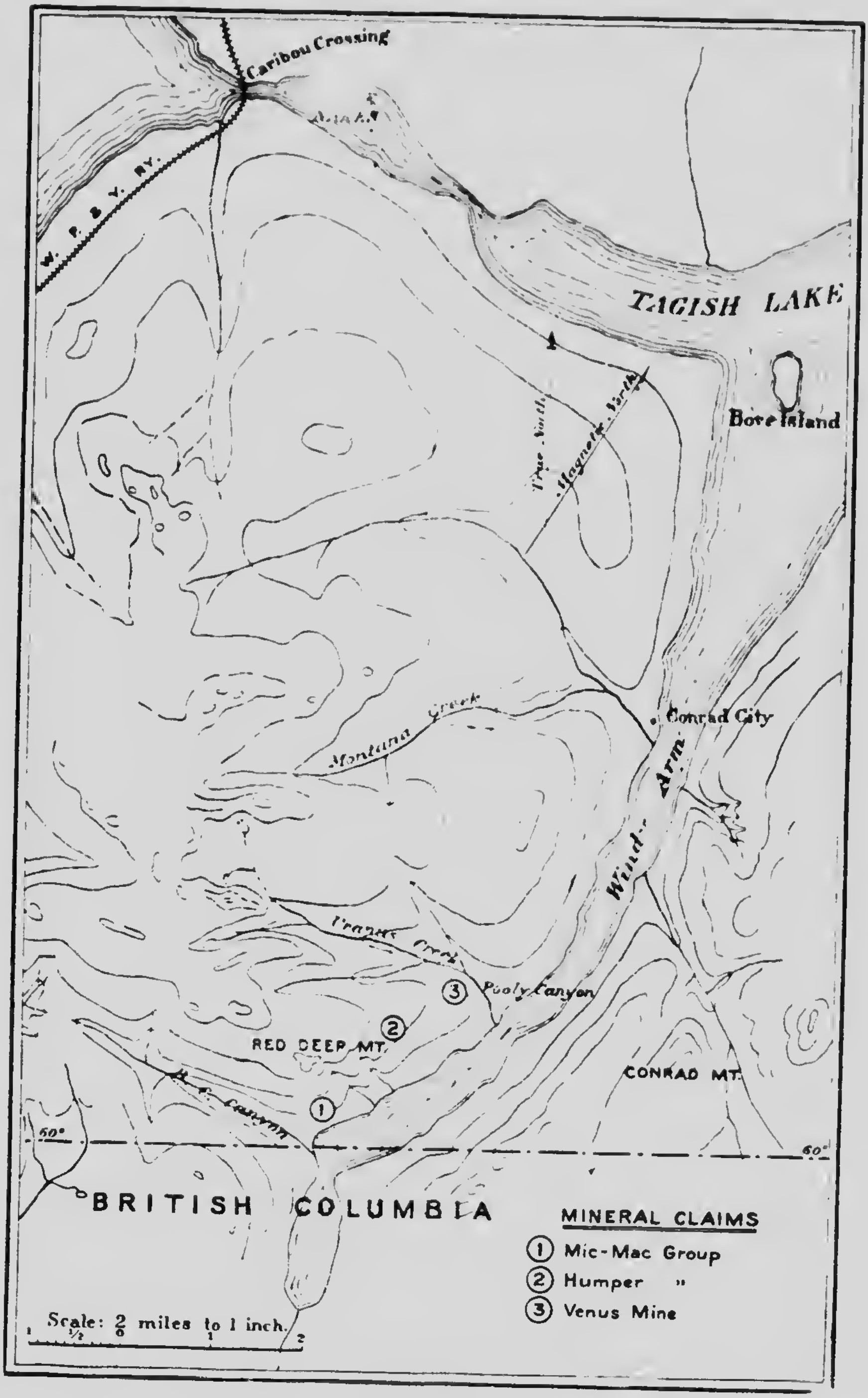
Development was inaugurated on a large scale and a number of properties, including The Big Thing, Montana and Venus, besides a number of lesser ones, were equipped with necessary plant and machinery to handle in the aggregate a large tonnage of ore.

It is estimated that Col. Conrad and associates expended about three-quarters of a million dollars in equipping and developing these properties. On the Venus alone—the only one of the Conrad group visited by the writer—nearly a hundred thousand dollars had been spent on a concentrating mill which ran only a few months before abandonment by the Conrad interests, early in the season of 1912. The once flourishing town of Conrad has now but two residents, the mining recorder's office had previously (about 1908) been removed to Carcross. Work on the chief properties of Windy Arm has been abandoned, but a few prospectors were still, in October, 1912, at work upon their claims. In the latter are included the Mic-Mac, and the Humper groups, which adjoin each other, the latter in turn lying next the Venus. Before referring to these in more detail, a very brief general statement as to the character of the country in which these deposits occur will be given.

NATURE OF COUNTRY AND DEPOSITS.

Locally the country is made up of porphyrites, andesites, basalts and tuffs which comprise a portion of the Windy Arm series. These are cut by systems of fissure veins which have, in some places, a northeasterly and in other, a northwesterly strike. These systems of veins consist generally

[1] Cairnes, D. D., Report on a Portion of Conrad and Whitehorse Mining Districts, Yukon, Geol. Survey Branch, 1908, pp. 11-18



Portion of Windy Arm Mining District, Y. T. (after McConnell.)

of main lines with secondary parallel ones, and appear to be crossed by laterals and stringers, so that the whole mountain exhibits a mass of veins, which, owing to the rugged nature of the surface, it is, in places, somewhat difficult to correlate. The veins are all mineralized quartz, or more exactly, are composed of both mineralized quartz and country. Cairnes[1] has noted the fact that fault fissures occur as shown by slickensiding of the walls, and that in these cases, which may be considered as indicative of very extensive disturbance and consequent extreme fissuring, the ores are more liable to be persistent and to continue to greater depth than in cases of ordinary minor fissuring. The veins are strong and generally carry a width of 2 to 5 feet, though veins of a few inches in thickness occur in places. The dip has two prevailing directions, e.g., northwest and southwest, at angles which vary considerably from say 20° to nearly vertical, but are generally 30° to 40°.

Minerals found variously throughout the veins of this district are: argentiferous galena, pyrite, arsenical pyrites, chalcopyrite, lead and copper carbonates, zinc blende, etc.

MINING PROPERTIES.

MIC-MAC GROUP.

This property, consisting of two mineral claims, the Mic-Mac and the Maggie, belongs to Mr. P. Kennedy, and is located on the slope of the mountain, which extends to the western shore of Windy Arm. It is distant about four miles southerly from Conrad city and, as already noted, adjoins the Beach claim, one of the Humper group. When visited in October Mr. Kennedy was found at work on the property.

A vein is here found striking northeasterly and southwesterly and dipping northwesterly into the mountain at an angle of about 70°.

The width of the vein is somewhat uncertain, but may be averaged between 3 and 4 feet, as the hanging wall is not well defined. The occurrence has the appearance of a compound fissure vein, in which the quartz is deposited chiefly along the foot-wall of the main line of fissuring, with a width that varies from a few inches up to 2′-6″, when it passes into partially altered country rock, with smaller parallel stringers of quartz, and gradually into ordinary country on the hanging wall side.

This vein has been only partially exposed in places for a distance of about 700 feet along its strike.

The quartz is found to vary from white to rusty in colour, is of a greasy lustre, and both the quartz and vein filling of country appear to be mineralized with pyrite.

Development.—Prospect trenches, stripping, cross-cuts, and some drifting, constitute the development work. The most northeasterly

[1] Conrad Report above cited, p. 17.

exposure of the vein is obtained by means of a 25 foot cross-cut which taps it, and from this a short drift uncovers a portion for a length of 8 feet.

A section was here taken by samples 422, 423 and 424, results of which are shown on assay sheet No. 43.

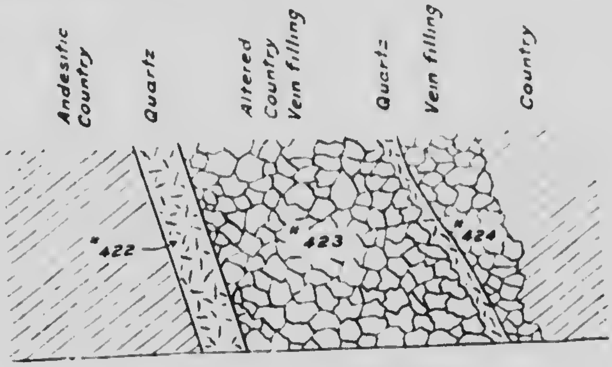


FIG. 29. Section of vein, Mic-Mac M.C.

About 400 feet southwesterly on strike, from the above opening, another cross-cut is made which exposes the vein. Sample No. 425 was here taken, and at a farther distance of 100 feet the vein is stripped for 75 feet of its length, exposing a width of 18″ of decomposed vein matter on the hanging side, and 2′-6″ of solid quartz in contact with the foot-wall. Sample No. 426 is a sectional sample across four feet of vein which here also contains pyrite. Another sample, No. 428, was taken 10 feet distant southwest from No. 426.

Beyond the southwestern end of the stripped portion of the vein, the latter strikes into a bluff and a drift follows it for 30 feet. The face of this drift exhibits the quartz of the vein split into three branches, with vein filling of country between. Sample No. 427 was taken across the face.

Mr. Kennedy had done little or no sampling, and the intention of that herein detailed was to get a preliminary line on any values which might occur. He had started another cross-cut, about 70 feet northeast from the above first-mentioned opening, at an elevation 6 or 8 feet below the latter, but had not struck the vein, the probable reason being that he had started a little too far to the west and passed, through surface material, over it.

It will be seen on examination of samples 422-428 on assay sheet No. 43, referring to this property, that so far development has shown little of value.

MIC-MAC GROUP SAMPLES — ASSAY SHEET NO. 43

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (b) per ton of Au	Assay in ounces (b) per ton of Ag.	Value per ton $	Value per ton c.	Width of sample Ft	Width of sample In	Check assay Au	Check assay Ag	Remarks.
422	Quartz	White	3	5			trace	nil				6			
423	Quartz and country vein matter(?)	[illegible] to brownish	4	0			trace	nil			2	6			
424	Quartz and vein filling	White to [illegible]	3	12			0 04	nil	0	20		7½			
425	Quartz and vein filling	Rusty to brown	9	14			trace	nil							
426	Quartz	White to grey	4	6	Pyrites		0 01	nil	0	20	4				Quartz is here 2.6 and the lead comprises in addition 1.6 of decomposed vein filling
427	Quartz and vein filling		3	12		Face of Upper [illegible] drift	[illegible]	nil			3				
428	Quartz and vein filling		3	6		Across lead 10' S. W from No. 426	0 04	nil	0	20	4				

(b) Assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa

HUMPER GROUP SAMPLES—ASSAY SHEET NO. 44.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (b) per ton of Au.	Assay in ounces (b) per ton of Ag.	Value per ton $	Value per ton c.	Width of sample Ft.	Width of sample In.	Check assay Au.	Check assay Ag.	Remarks.
429	Quartz and argentiferous galena.		4	6	Argentiferous galena	Sample of picked ore Nipper tunnel...	0·25	26·12	19	37	–				From lower vein Nipper.
429A	Quartz and argentiferous galena.				Argentiferous galena.	Sample of picked ore Nipper tunnel	0·15	18·61	10	24	–				
430	Vein matter.......		3	10	Argentiferous galena......	180′ sta. Venus entrance tunnel drift	0·15	9·45	8	20	3	0			
431	Quartz......	Rusty to brown...	5	12	Argentiferous galena......	135′ sta. Venus entrance tunnel drift..	0·38	30·22	24	22	3	6			
432	Quartz......	White grey brown	5	2	Argentiferous galena ...	105′ sta. Venus entrance tunnel drift	0·08a	1·60a	2	48	3	0			
433	Quartz......	Light to dark brown.	2	8	Argentiferous galena... ...	Drift 80′ sta. Venus entrance.	0·31	4·05	8	43	2	6			
434	Quartz......		3	6	Argentiferous galena	62′ sta. Venus entrance tunnel drift	0·43	7·11	12	51	2	0			

435	Quartz	7	10	Argentiferous-galena ...	Open-cut 200′ northerly from tunnel ..	0·33	trace	6 60	2	6
436	Quartz	4	5	Argentiferous-galena. . .	Face of south drift Venus entrance slope	0·27	nil	5 40	4	2
437	Quartz	3	10	Argentiferous-galena . .	10′ from face of south drift	0·66	2·64	14 65	4	0
438	Quartz	3	2	Argentiferous-galena... .	South drift	0·44	3·13	10 52	3	4
439	Quartz	4	2	Argentiferous-galena	North drift	1·83	4·53	39 04	3	4
440	Quartz	13	8	Argentiferous-galena . .	Face of north drift	0 66	153·15	97 43	5	0

(a) Assays conducted by Mr. Wm. C. Sime at Whitehorse, Y.T.
(b) Assays conducted by Mr. N. L. Turner, under the direction of Mr. F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

HUMPER GROUP.

This property comprises six mineral claims, Humper No. 1, Humper No. 2, Red Deer, Beach, Nipper, and Venus Extension, owned by Messrs. Dail and Fleming of Carcross. It is situated on the western shore of Windy Arm, within a distance of four miles from Conrad city and, as above noted, lies between the Mic-Mac and Venus properties.

Prospect openings are scattered all over this property and, owing to the rugged nature of the ground, it is impossible after spending only a day upon it to give a comprehensive description of these, in the absence of a survey and plan. The more important workings were, however, sampled, and are briefly described below.

A number of veins have been prospected, the most important of which, so far as known, are two on the Venus Extension and one on the Humper No. 1.

VENUS EXTENSION.

The two veins on the Venus Extension are about 30 feet apart, and strike somewhat northwesterly and southeasterly and dip southwesterly into the mountain. They have been traced clear across the claim. The upper of these veins is thought to correspond to the Venus vein; and it has been suggested that the lower one is probably an off-shoot from it that has not been discovered on the Venus ground.

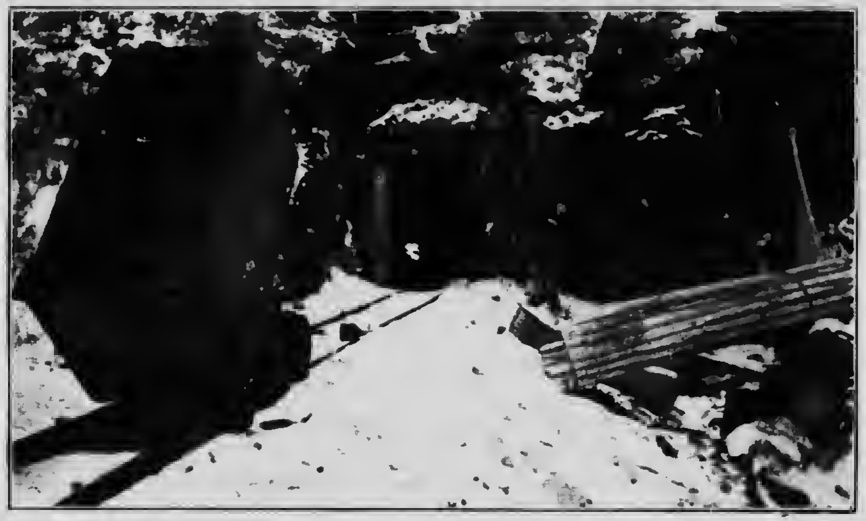
Development.—The upper vein is exposed in various places along its strike by open-cut, cross-cut and drift, and by slope, and is found to carry an average width of 3 to 4 feet, the distance between the openings referred to being several hundred feet.

In order to tap the lead at some depth a cross-cut was made at an elevation about 820 feet above that of the waters of the Arm, and a right drift made on the vein for about 200 feet. For the last 20 feet of this distance the ore is, however, lost, as the vein appears to have been folded downward or faulted. The present face is very wet, as a result possibly of local movement, with consequent fissuring, which has provided channels for streams of water to find their way into the drift. This break in the continuity of the lead is thought to be entirely local and confined to a comparatively small portion of it, for the reason that its general continuity would appear to have been pretty well established.

This drift was sampled for 118 feet of its length, at intervals shown on the accompanying diagram, the average value of the ore being obtained by substituting the values for v, w, and d, in the standard formula given on page 15 of this report, in which

v = the assay value of the sample.
w = the width of the sample.
d = the length, in feet, of the intervals between samples.

PLATE XXXIX.



Venus Extension entry, 820 feet above the level of Windy Arm waters.

It will be noted that the samples vary between $2.48 and $24.22 per ton. The average, however, of the 5 samples taken, is $13.07, for a width of 2·8′ (2′-9⅗″), over the length of 118′.

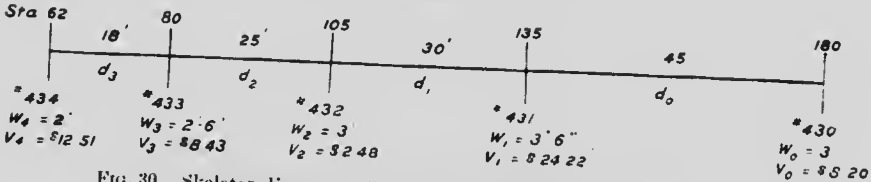


FIG. 30. Skeleton diagram to illustrate sampling of drift on Venus Extension main vein, at elevation of 820 feet, between Stas. 62 and 180 of the drift.

The ore is chiefly argentiferous galena. Arsenopyrite, and pyrite are also found. Some hundreds of feet northerly from the above working, a slope has been sunk on the vein, for a distance of 45 feet, when right and left drifts were made for 33 feet and 25 feet respectively, on the vein, which here is found to vary in width between 40 inches and 5 feet.

On being sampled, as shown on diagram herewith, the average value for the length of 58 feet sampled, over an average width of 3′-11″, is found to be $37.02 per ton.

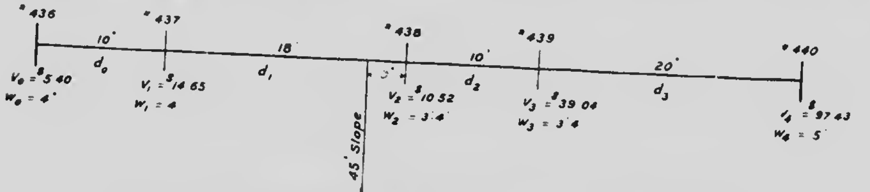


FIG. 31. Skeleton diagram to illustrate sampling of drift on Venus Extension main vein, at foot of the 45′ slope.

HUMPER No. 1.

The Humper No. 1 claim is located at an elevation of about 2,000 feet above the level of Windy Arm. The vein on this claim is supposed to pass also through the Nipper and the Beach claims. It strikes northeasterly and southwesterly and dips at an angle which varies from 45° to 55° northwesterly and carries a width of 18 inches up to more than 4 feet. Minerals found are, galena, argentite, ruby silver and pyrite; Cairnes has noted the occurrence also of stephanite and native silver.

A shaft started on this vein is 15 feet deep. The vein here exhibits about 15″ in width of a creamy quartz, containing ruby silver, and adjoining the quartz a couple of feet of iron stained reddish-brown mineralized rock.

A sample, No. 446, was taken over the 15″ width of quartz, just outside the southwest end of the shaft. This gave an assay of 0·02 oz. gold and 166 oz. of silver, equivalent to $91.70 per ton in value.

About 300 feet southwesterly from the above shaft another opening is made on the vein. This is known as the 'Humper No. 1, Big Open-cut.' Mr. Wm. Connors, who was at work on these claims when they were visited in October, stated that 5 tons of ore had been shipped from this cut, which netted $336. It is, however, not known, in this case, what proportion of the vein was discarded in sorting.

This opening consists of a short trench, 5′ in length, which taps the lead near its outcrop. The dip is here about 50°, and a drift, which is almost a surface cut, is made right and left for 20 feet each way on the

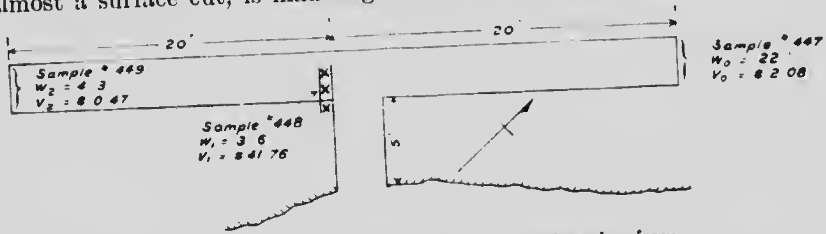


FIG. 32. Sketch showing location of samples taken from Big open-cut, Humper No. 1.

vein, a few stulls being used to support the hanging wall. Three samples were taken with the result as shown in Fig. 32 herewith.

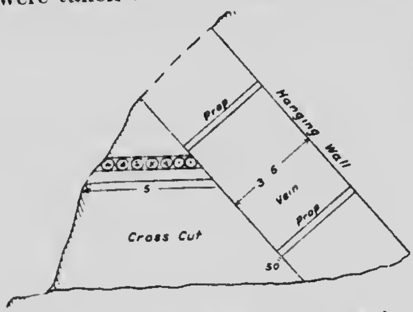


FIG. 33. Sk tch showing section of entry and vein on Humper No. 1.

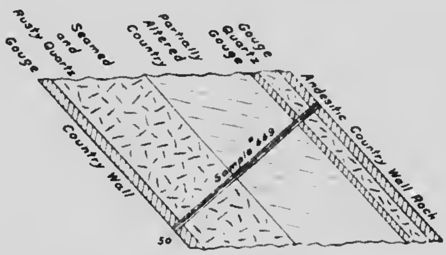


FIG. 34. Section on Humper No. 1 vein at face of drift looking S.W., showing also location of sample No. 449. Width here is 4′-3″.

RED DEER MINERAL CLAIM.

On this claim, near the head of Red Deer gulch, is an open-cut which exhibits 3 feet of vein dipping 50° northwesterly. Sample 450, on this, gave an assay value of ·07 oz. gold, and 5·47 oz. silver = $4.40.

One sample, No. 451, is an average from 20 (80 lbs.) sacks of ore, and a bin of about 8 sacks capacity, selected from this cut, ready for shipment. This is highly mineralized with galena. The value on assay was found to be 0·98 oz. gold, and 48·62 oz. of silver, equivalent to $48.77 per ton. By referring to assay sheet No. 4 it may be noted that the check assay showed 0·25 oz. gold, and 49·74 oz. of silver.

Near this cut, but on the opposite side of the gulch, some quarzt with stringers of dark decomposed material was noticed. A trial sample was taken of this (No. 452) which on assay was found to carry merely nominal value, 20c. of gold and no silver.

PLATE XL.

Buildings of Dail and Fleming, on the Humper group, shore of Windy Arm.

Nineteen samples taken from this whole property are numbered 429—440 and 446—452 all inclusive, and the net result is very favourable.[1] In view of the extensive character of the veins, the fact that appreciable values appear well distributed, and that the location is favourable and within easy reach of railway facilities, it may be concluded that the Humper group offers a very encouraging field for further development.

THE VENUS.

This is an extensive property and one of the most widely known in the district. Its location has already been described, together with the fact that it belongs to the Conrad group, and has undergone considerable development. Several hundred thousand dollars have been expended on it, a considerable portion—probably $100,000—having been spent on a concentrating mill, which, as already noted, was operated for a very few months.

In spite of the fact that the property has been abandoned for the present, an ore body of considerable extent has been developed. If this ore carries one-half the average value claimed for it, work will doubtless be resumed at some future time. It is currently claimed, in the vicinity, that the ore will average $60 per ton. Cairnes[2] reports that in certain stopes in the Venus No. 2 vein, four to eight feet of good ore is found, which will average over $20 in gold and silver.

The writer spent a few hours going over this portion of the property, and found a cross-cut between 500 and 600 feet in length, succeeded by right and left, or N.W. and S.E. drifts, the former being about 700 feet and the latter about 600 feet in length.

A number of stopes, both overhand and underhand, were made, and altogether a large tonnage must have been taken out of the mine. Near the entry cross-cut a *main raise*, 265 feet, is succeeded by an upper level, known as the first level. This is about 200 feet in length on the strike, and is probably within 75 feet of the surface. The average width of the vein, throughout these portions of the workings, appears to be between 3 and 4 feet. The dip is about 40° southwesterly into the mountain.

Another raise, known as South Raise No. 1, was started, at a point about 250 feet southeasterly from the main raise. This is 200 feet up the pitch, while a third, known as South Raise No. 2, is somewhat over 200 feet, and outlets at the surface.

Two winzes, one from each main drift, were sunk. That from the N.W. drift is said to be 250 feet deep, and a lower level was started from it, while from the S.E. drift a main winze was sunk. This is said to be 350 feet deep, with some drifting at levels between the bottom and the main drift. When visited in October, the winzes were nearly filled with water.

[1] Compare assay sheets Nos. 44 and 45.
[2] Rep. on a Portion of Conrad and Whitehorse, above cit., p. 16.

The ore is chiefly argentiferous galena, and the vein consists generally of alternating bands of quartz and mineralized country.

The chief minerals are galena, lead and copper carbonates, arsenopyrite, chalcopyrite, and pyrite.

Five trial samples, Nos. 441—445, inclusive, were taken, as shown on assay sheet No. 45. These may be summarized as follows:—

No. 441, 2′-8″ wide, from the face of South Raise, gave an assay return of ·71 oz. gold and 51·59 oz. silver, equivalent to $42.57 per ton.

No. 442, 15″ wide, from vein at face of stope, 35′ northwest of South Raise = ·15 oz. gold and 3·02 oz. silver = $4.66.

No. 443, 24″ wide, from vein at face of stope, 70′ N.W. of South Raise = ·15 oz. gold and 5·98 oz. silver = $8.27.

No. 444, 3′-6″ wide, from vein on S.E. wall of main winze, about 15 feet below main drift = 1·7 oz. gold and 113·52 oz. silver = $96.44.

No. 445, 3′-6″ wide, from face of North drift = ·03 oz. gold and no silver = $0.60.

Without attempting to average these few samples, which are, in a developed property such as this, merely indicators, it may be remarked, in passing, that the results are very hopeful.

In connexion with the work done on this property there is generally evidence of good mining, and with development showing such a considerable tonnage of ore, with a mill and other equipment on the ground to handle it, the abandonment of the property would appear strange unless it was found that the values were insufficient. $10 per ton as an average, over this whole vein should pay handsomely. That some very rich ore has been mined there is little doubt. The above sampling demonstrates some good values. The most reasonable conclusion, however, is that an average workable value has not been found in the ore-body.

A thorough sampling of this mine might disclose data sufficient to oppose the above conclusion. It is almost inconceivable that a company of business men, who had expended so much money on development and equipment, would withdraw unless under advice of an experienced mining engineer, who had thoroughly overhauled the property. Nevertheless, other factors than the average ore tenor may have had some bearing on the present situation. In the absence of personal knowledge as to any such factors, however, it would be an impertinence to discuss that phase further.

With the consent of the owners, it would certainly be in the public interest to have a thorough sampling of the Venus ore body, for the reason that its development at depth permits of securing data as to relative values, and variation from surface conditions, which would be of use in connexion with prospecting throughout the Windy Arm.

HUMPER GROUP SAMPLES (*Cont.*) AND VENUS MINE SAMPLES—ASSAY SHEET No. 45.

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (b) per ton of Au.	Assay in ounces (b) per ton of Ag.	Value per ton c.	Width of sample. Ft.	Width of sample. In.	Check assay. Au.	Check assay. Ag.	Remarks.
446	Quartz.		2 –	8		Humper shaft S. W. end.	0·02	–166·00	91 70	i	3			
447	Quartz.		3 –	6		N. E. face Big open-cut.	0·01	– 3·42	2·28					
448	Quartz.		7 –	0		Vein ir S. W. drift adjoining entry.	trace	75·93	41 76	3	6			Humper No. 1.
449	Quartz.		9 –	4		Face S. W. drift Big open-cut.	0·01	– 0·49	0·47	4	3			
450	Quartz.		5 –	6		Open-cut north of Red Deer gulch.	–		4 40	3	0	0·07	5·47	Heavily mineralized with argentiferous galena.
451	Quartz.		10 –	4		Average of 28 sacks of strippir re.	0·98	– 48·62*	48 77	–		0·25	49·74	
452	Ground up vein matter.		1 –	10		Small exposure south of Red Deer gulch	–		0 20	trial sample..		0·01	nil	

HUMPER GROUP SAMPLES (*Cont.*) AND VENUS MINE SAMPLES—ASSAY SHEET No. 45—*Continued.*

Sample No.	Material.	Colour.	Weight. Lbs.	Weight. Oz.	Minerals in pan.	Location.	Assay in ounces (b) per ton of Au.	Assay in ounces (b) per ton of Ag.	Value per ton $	Value per ton c.	Width of sample. Ft.	Width of sample. In.	Check assay. Au.	Check assay. Ag.	Remarks.
441	Quartz...........		3	14		South raise 65-75' from surface......	0·71	(b) 51·59	42·57		2	8			Venus mine.
442	Quartz...........		8	0		From stope 35' north of south raise.... ..	0·15	3·02	4·66		1	3			Venus mine.
443	Quartz.........		3	6		At face of stope 70' north of south raise.	0·15	9·58	8 27		2	0			Venus mine.
444	Quartz....		5	6		South winze....	1·70	113·52	96 44		3	6			Venus mine.
445	Quartz......		2	12		Face of main north drift....	0·03	nil	0·60		3	6			Venus mine.

(a) Assays conducted by Mr. Wm. C. Sime, at Whitehorse, Y.T.
(b) Assays conducted by Mr. N. L. Turner, under the direction of Mr F. G. Wait, Division of Chemistry, Mines Branch, Ottawa.

CHAPTER VI.

GENERAL SUMMARY AND CONCLUSIONS.

The examination herein described has verified the fact that throughout the whole district traversed quartz is found abundantly. It has also established certain preliminary values in connexion with practically all the known deposits of the Dawson and Duncan Creek mining districts, and also in connexion with at least a few of those in southern Yukon.

A number of these deposits have proven sufficiently good to warrant the opinion that further development, accompanied by more detailed sampling, might demonstrate beyond reasonable doubt that the prospects have a future as mines.

The chief among these are situated in southern Yukon, where the ore consists generally of quartz carrying argentiferous galena and gold.

The Humper group of Messrs. Dail and Fleming, and the Venus mine, both on Windy Arm, show values in gold and silver which range from $2 or $3 up to $96 per ton.

The Whirlwind group and the Tally-Ho group, both on Wheaton river, show up well. In northern Yukon the prospects at Dublin gulch are considered to be good ones. Chief of these is the Stewart and Catto group, with values which range generally between $3 and $16 per ton. The Olive and the Eagle groups, adjoining these, are also worth while. The latter shows assay values as high as $70.80 per ton, but has undergone little development.

In the vicinity of Dawson are the Lone Star mine, the Violet group, the Mitchell, the Gold Run group, and others, deserving of mention.

These properties could not, in one season, be examined in sufficient detail, nor can the report on them be sufficiently final to interest capital.

Mining methods, except in a few cases, have been crude and unscientific; and money has been expended in the vicinity of possible ore deposits rather than in the development and proving of these deposits.

Methodical sampling has generally been neglected.

The territory is in great need of more prospectors and *lode* miners, and of funds to finance them, as well as of mining engineers to direct and assist them.

The cream of the known placer deposits has already been skimmed, and the Canadian people, as a whole, have benefited greatly as a result of mining operations in Yukon.

Already, prospectors and miners now in the field have been encouraged by the interest shown by the Dominion Government in undertaking the work above described; and during the past season have frequently suggested that much good would result if the services of a mining engineer were constantly available throughout the district. Certain it is that the work of further testing the better properties, in addition to looking over others that have so far not been examined, should be pushed with vigour.

With regard to the advisability of establishing a testing mill and laboratory in Dawson, it is doubtful whether the results above shown warrant such a move at the present time.

In Dawson mining district, with its typical occurrence of free gold in spots, mill tests of quartz from such properties as the Violet, the Eldorado Dome, the Virgin mineral claim, the Mitchell, etc., should be made. This might be done by special arrangement with the owners of the Lone Star mill. It is believed that the latter company would be willing to work in harmony with the owners of these claims, to the extent of allowing such tests under the supervision of a government mining engineer, who would look after the interests of the different parties and check results.

In the case of prospects at Dublin gulch, and of those in southern Yukon, the conditions are different. The gold here generally occurs either disseminated as minute dust or in refractory form with sulphides; hence these prospects will advantageously admit of more detailed sampling and assaying in connexion with any further investigation of their individual extent and economic value.

In connexion with the placing in operation of the government diamond drills, it should be noted that there is very important work for them in proving the Whitehorse copper deposits at depth. It has been stated in this report that shipments of copper ore from Whitehorse amounted, during the season of 1912, to about 30,000 tons.

It is important to Yukon that these operations continue, as they undoubtedly must, if the ore bodies are ultimately found to be of sufficient extent and value. The work of testing with these drills should, in the interests of the public, be supervised by a government mining engineer.

It is probably unnecessary to refer to the fact that of the 200,000 square miles in this territory only the fringe has been scratched. Upon the government of the day devolves, in a measure, the responsibility for development of the Canadian frontier, and that it realizes this responsibility is amply demonstrated by such recent incidents as the Stefansson grant, for the purpose of northern exploration, and by similar aid in connexion with the coming to Canada of the International Geological Congress during the season of 1913. As a result of this Congress, it is expected that, after looking over the Canadian field, mining engineers and geologists from practically every country will carry away with them a conception of the possibilities of Canada's mineral wealth, and advertise it the world over.

It is, therefore, worth noting that this is a crucial period in the history of lode mining in Yukon, when, as yet, practically all the properties are at the prospect stage; hence, too much stress cannot be laid upon the necessity of giving the prospectors and miners further assistance. The latter, in many cases, have reached a point beyond which, through lack of means, they cannot go. If a further examination of the promising properties substantiates the opinion formed, as a result of the above mentioned preliminary examination, a report to that effect would be definite and conclusive, and capital for development would doubtless flow into the district. If even two or three properties were then placed on a paying basis, a great impetus would be given the lode mining industry throughout the whole territory. If, on the other hand, prompt aid along the lines suggested be now withheld, the district will probably experience a serious set-back, and what has already been done during the past season will be rendered largely ineffective.

APPENDIX I.

COPPER AT WHITE RIVER.

During the past season, considerable interest was awakened throughout the territory by further rich finds of copper reported from the White River district[1].

It is known that, towards the end of the season of 1912, some prospectors brought out a few tons of copper ore for the purpose of having it sampled at the Tacoma smelter.

If report as to the extent of some of these finds is at all true, this district should immediately become of great economic importance.

[1] McConnell, R. G., Sum. Rep. Geol. Sur. Can., 1905, pp. 19–26.
Brock, R. W., Sum. Rep. Geol. Sur. Can., 1909, pp. 23–26.

APPENDIX II.

COAL GULCH.

About 4 miles due south of Britannia group of claims, on MacKinnon creek, Messrs. MacKinnon Brothers own a coal prospect which is situated on the right limit of Coal gulch, a tributary on the right limit of Ruby creek, 8 miles from the mouth of the latter, where it joins the left limit of Indian river.

The writer visited this property, in company with the owners, and found a 7 foot seam of coal, partially exposed by an open-cut in the side of the hill. Several tunnels and cuts had been made to prospect the ground, but any of these that were in the vicinity of the coal, have, for the most part, caved in, and are useless as sources of information. Messrs. MacKinnon claim to have traced the coal seam, by means of these various openings, for half a mile in a northeasterly-southwesterly direction. It has a dip of about 10° in a northerly direction, and is overlain by sandstone and carbonaceous shale.

Fig. 35 illustrates Mr. Ma Kinnon's conception of the deposit.

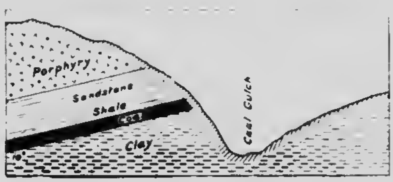


FIG. 35. Ideal section. (After Arch. MacKinnon).

In order to assist them in developing these coal areas, the Yukon Council was petitioned, by Messrs. MacKinnon, to furnish a road from the coal area to Indian river, 8 miles distant. This petition has, so far, not been granted. The possibility of transporting coal in winter, by this route, was discussed with the owners, who were of opinion that a road could then be readily broken. If this were done, and the areas developed to the extent of turning out and marketing even a few tons, there is little doubt but that the local government would assist the promoters in the matter of providing a permanent road.

The wood supply is diminishing and in the Dawson district its price is gradually mounting; the price per cord for domestic use in Dawson is $14 to $16. It would, therefore, appear as if the development of a small coal mine would be well worth while.

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CANADA

DEPARTMENT OF MINES

HON. LOUIS CODERRE, MINISTER; R. W. BROCK, DEPUTY MINISTER;

MINES BRANCH

EUGENE HAANEL, PH.D., DIRECTOR.

REPORTS AND MAPS OF ECONOMIC INTEREST

PUBLISHED BY THE

MINES BRANCH

REPORTS.

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†2. Great Landslide at Frank, Alta. Report on—by R. G. McConnell and R. W. Brock, M.A., 1903.

†3. Investigation of the different electro-thermic processes for the smelting of iron ores, and the making of steel, in operation in Europe. Report of Special Commission—by Dr. Haanel, 1904.

†4. Rapport de la Commission nommée pour étudier les divers procédés électro-thermiques pour la réduction des minerais de fer et la fabrication de l'acier employés en Europe—by Dr. Haanel. (French Edition), 1905.

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†12. Zinc Resources of British Columbia and the Conditions affecting their Exploitation. Report of the Commission appointed to investigate—by W. R. Ingalls, 1905.

†16. *Experiments made at Sault Ste. Marie, under Government auspices, in the smelting of Canadian iron ores by the electro-thermic process. Final Report on—by Dr. Haanel, 1907.

†17. Mines of the Silver-Cobalt Ores of the Cobalt district: Their Present and Prospective Output. Report on—by Dr. Haanel, 1907.

†18. Graphite: Its Properties, Occurrence, Refining, and Uses—by Fritz Cirkel, 1907.

†19. Peat and Lignite: Their Manufacture and Uses in Europe—by Erik Nystrom, M.E., 1908.

†20. Iron Ore Deposits of Nova Scotia. Report on (Part I)—by Dr. J. E. Woodman.

*A few copies of the Preliminary Report, 1906, are still available.
†Publications marked thus † are out of print.

21. Summary report of Mines Branch, 1907-8.

22. Iron Ore Deposits of Thunder Bay and Rainy River districts. Report on—by F. Hille, M.E.

†23. Iron Ore Deposits, along the Ottawa (Quebec side) and Gatineau rivers. Report on—by Fritz Cirkel.

24. General Report on the Mining and Metallurgical Industries of Canada, 1907-8.

25. The Tungsten Ores of Canada. Report on—by Dr. T. L. Walker.

26. The Mineral Production of Canada, 1906. Annual Report on—by John McLeish, B.A.

26a. French translation: The Mineral Production of Canada, 1906. Annual Report on—by John McLeish.

†27. The Mineral Production of Canada, 1907. Preliminary Report on—by John McLeish.

†27a. The Mineral Production of Canada, 1908. Preliminary Report on—by John McLeish.

†28. Summary Report of Mines Branch, 1908.

†28a. French translation: Summary Report of Mines Branch, 1908.

29. Chrome Iron Ore Deposits of the Eastern Townships. Monograph on—by Fritz Cirkel. (Supplementary Section: Experiments with Chromite at McGill University—by Dr. J. B. Porter.)

30. Investigation of the Peat Bogs and Peat Fuel Industry of Canada, 1908. Bulletin No. 1—by Erik Nystrom, and A. Anrep, Peat Expert.

32. Investigation of Electric Shaft Furnace, Sweden. Report on—by Dr. Haanel.

47. Iron Ore Deposits of Vancouver and Texada islands. Report on—by Einar Lindeman, M.E.

†55. Report on the Bituminous, or Oil-shales of New Brunswick and Nova Scotia; also on the Oil-shale Industry of Scotland—by Dr. R. W. Ells.

58. The Mineral Production of Canada, 1907 and 1908. Annual Report on—by John McLeish.

Note.—*The following preliminary Bulletins were published prior to the issuance of the Annual Report for 1907-8.*

†31. Production of Cement in Canada, 1908.

42. Production of Iron and Steel in Canada during the Calendar Years 1907 and 1908.

43. Production of Chromite in Canada during the Calendar Years 1907 and 1908.

44. Production of Asbestos in Canada, during the Calendar Years 1907 and 1908.

†45. Production of Coal, Coke, and Peat in Canada, during the Calendar Years 1907 and 1908.

46. Production of Natural Gas and Petroleum in Canada during the Calendar Years 1907 and 1908.

59. Chemical Analyses of Special Economic Importance made in the Laboratories of the Department of Mines, 1906-7-8. Report on—by F. G. Wait, M.A., F.C.S. (With Appendix on the Commercial Methods and Apparatus for the Analysis of Oil-shales—by H. A. Leverin, Ch. E.).

Schedule of Charges for Chemical Analyses and Assays.

†62. Mineral Production of Canada, 1909. Preliminary Report on—by John McLeish.

63. Summary Report of Mines Branch, 1909.

67. Iron Ore Deposits of the Bristol Mine, Pontiac county, Quebec. Bulletin No. 2—by Einar Lindeman, and Geo. C. Mackenzie, B.Sc.

†68. Recent Advances in the Construction of Electric Furnaces for the Production of Pig Iron, Steel, and Zinc. Bulletin No. 3—by Dr. Haanel.

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†Publications marked thus † are out of print.

69. Chrysotile-Asbestos: Its Occurrence, Exploitation, Milling, and Uses. Report on—by Fritz Cirkel. (Second Edition, enlarged.)

†71. Investigation of the Peat Bogs, and Peat Industry of Canada, 1909-10; to which is appended Mr. Alf. Larson's Paper on Dr. M. Ekenberg's Wet-Carbonizing Process: from Teknisk Tidskrift, No. 12, December 26, 1908—translation by Mr. A. v. Anrep, Jr.; also a translation of Lieut. Ekelund's Pamphlet entitled 'A Solution of the Peat Problem,' 1909, describing the Ekelund Process for the Manufacture of Peat Powder, by Harold A. Leverin, Ch.E. Bulletin No. 4—by A. v. Anrep (Second Edition, enlarged).

81. French Translation: Chrysotile-Asbestos, Its Occurrence, Exploitation, Milling, and Uses. Report on—by Fritz Cirkel.

82. Magnetic Concentration Experiments. Bulletin No. 5—by Geo. C. Mackenzie.

83. An investigation of the Coals of Canada with reference to their Economic Qualities: as conducted at McGill University under the authority of the Dominion Government. Report on—by J. B. Porter, E.M., D.Sc., R. J. Durley, Ma.E., and others—
    Vol. I—Coal Washing and Coking Tests.
    Vol. II—Boiler and Gas Producer Tests.
    Vol. III—
      Appendix I
        Coal Washing Tests and Diagrams.
    Vol. IV—
      Appendix II
        Boiler Tests and Diagrams.
    Vol. V—
      Appendix III
        Producer Tests and Diagrams.
    Vol. VI—
      Appendix IV
        Coking Tests.
      Appendix V
        Chemical Tests.

†84. Gypsum Deposits of the Maritime Provinces of Canada—including the Magdalen islands. Report on—by W. F. Jennison, M.E. (See No. 245.)

88. The Mineral Production of Canada, 1909. Annual Report on—by John McLeish.

Note.—*The following preliminary Bulletins were published prior to the issuance of the Annual Report for 1909.*

†79. Production of Iron and Steel in Canada during the Calendar Year 1909.

†80. Production of Coal and Coke in Canada during the Calendar Year 1909.

85. Production of Cement, Lime, Clay Products, Stone, and other Structural Materials during the Calendar Year 1909.

89. Reprint of Presidential address delivered before the American Peat Society at Ottawa, July 25, 1910. By Dr. Haanel.

90. Proceedings of Conference on Explosives.

92. Investigation of the Explosives Industry in the Dominion of Canada, 1910. Report on—by Capt. Arthur Desborough. (Second Edition.)

93. Molybdenum Ores of Canada. Report on—by Professor T. L. Walker, M.D.

100. The Building and Ornamental Stones of Canada. Report on—by Professor W. A. Parks, M.D.

100a. French translation: The Building and Ornamental Stones of Canada. Report on—by W. A. Parks.

102. Mineral Production of Canada, 1910. Preliminary Report on—by John McLeish.

†103. Summary Report of Mines Branch, 1910.

104. Catalogue of Publications of Mines Branch, from 1902 to 1911; containing Tables of Contents and List of Maps, etc.

105. Austin Brook Iron-bearing district, Report on—by E. Lindeman.

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†Publications marked thus † are out of print.

110. Western Portion of Torbrook Iron Ore Deposits, Annapolis county, N.S. Bulletin No. 7—by Howells Fréchette, M.Sc.

111. Diamond Drilling at Point Mamainse, Ont. Bulletin No. 6—by A. C. Lane, Ph.D., with Introductory by A. W. G. Wilson, Ph.D.

118. Mica: Its Occurrence, Exploitation, and Uses. Report on—by Hugh S. de Schmid, M.E.

142. Summary Report of Mines Branch, 1911.

143. The Mineral Production of Canada, 1910. Annual Report on—by John McLeish.

Note.—*The following preliminary Bulletins were published prior to the issuance of the Annual Report for 1910.*

†114. Production of Cement, Lime, Clay Products, Stone, and other Structural Materials in Canada 1910.

†115. Production of Iron and Steel in Canada during the Calendar Year 1910.

†116. Production of Coal and Coke in Canada during the Calendar Year 1910.

†117. General Summary of the Mineral Production of Canada during the Calendar Year 1910.

145. Magnetic Iron Sands of Natashkwan, Saguenay county, Que. Report on—by Geo. C. Mackenzie.

†150. The Mineral Production of Canada, 1911. Preliminary Report on—by John McLeish.

151. Investigation of the Peat Bogs and Peat Industry of Canada, 1910-11. Bulletin No. 8—by A. v. Anrep.

154. The Utilization of Peat Fuel for the Production of Power, being a record of experiments conducted at the Fuel Testing Station, Ottawa, 1910-11. Report on—by B. F. Haanel, B.Sc.

155. French translation: The Utilization of Peat Fuel for the Production of Power, being a Record of Experiments conducted at the Fuel Testing Station, Ottawa, 1910-11. Report on—by B. F. Haanel.

156. French translation: The Tungsten Ores of Canada. Report on—by Dr. T. L. Walker.

167. Pyrites in Canada: Its Occurrence, Exploitation, Dressing, and Uses. Report on—by A. W. G. Wilson.

170. The Nickel Industry: with Special Reference to the Sudbury region, Ont. Report on—by Professor A. P. Coleman, Ph.D.

184. Magnetite Occurrences along the Central Ontario Railway. Report on—by E. Lindeman.

. French translation: Investigation of the Peat Bogs and Peat Industry of Canada, 1909-10; to which is appended Mr. Alf. Larson's paper on Dr. M. Ekenburg's Wet-Carbonizing Process: from Teknisk Tidskrift, No. 12, December 26, 1908—translation by Mr. A. v. Anrep; also a translation of Lieut Ekelund's Pamphlet entitled "A Solution of the Peat Problem," 1909, describing the Ekelund Process for the Manufacture of Peat Powder, by Harold A. Leverin Ch. E. Bulletin No. 4—by A. v. Anrep. (Second Edition, enlarged.)

197. French translation: Molybdenum Ores of Canada. Report on—by Dr. T. L. Walker.

198. French translation; Peat and Lignite: Their Manufacture and Uses in Europe. Report on—by Erik Nystrom, M.E., 1908.

201 The Mineral Production of Canada during the Calendar Year 1911. Annual Report on—by John McLeish.

Note.—*The following preliminary Bulletins were published prior to the issuance of the Annual Report for 1911.*

181. Production of Cement, Lime, Clay Products, Stone, and other Structural Materials in Canada during the Calendar Year 1911. Bulletin on—by John McLeish.

†182 Production of Iron and Steel in Canada during the Calendar Year 1911. Bulletin on—by John McLeish.

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†Publications marked thus † are out of print.

183 General Summary of the Mineral Production in Canada during the Calendar Year 1911. Bulletin on—by John McLeish.

†199. Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and other Metals of Canada, during the Calendar Year 1911. Bulletin on—by John McLeish.

†200 The Production of Coal and Coke in Canada during the Calendar Year 1911. Bulletin on—by John McLeish.

202 French translation: Graphite: Its Properties, Occurrence, Refining, and Uses Report on—by Fritz Cirkel, 1907.

216. Mineral Production of Canada, 1912. Preliminary Report on—by John McLeish.

222 Lode Mining in Yukon: An Investigation of the Quartz Deposits of the Klondike Division. Report on—by T. A. MacLean.

224. Summary Report of the Mines Branch, 1912.

226. French translation: Chrome Iron Ore Deposits of the Eastern Townships. Monograph on—by Fritz Cirkel. (Supplementary Section: Experiments with Chromite at McGill University—by Dr. J. B. Porter.)

227. Sections of the Sydney Coal Fields—by J. G. S. Hudson.

†229. Summary Report of the Petroleum and Natural Gas Resources of Canada, 1912—by F. G. Clapp. (See No. 224.)

230. Economic Minerals and the Mining Industry of Canada.

231. French translation: Economic Minerals and the Mining Industry of Canada.

233. French translation: Gypsum Deposits of the Maritime Provinces of Canada—including the Magdalen Islands. Report on—by W. F. Jennison.

259. Preparation of Metallic Cobalt by Reduction of the Oxide. Report on—by H. T. Kalmus, B.Sc., Ph.D.

262. The mineral Production of Canada during the Calendar Year 1912. Annual Report on—by John McLeish.

NOTE.—*The following preliminary Bulletins were published prior to the issuance of the Annual Report for 1912.*

238. General Summary of the Mineral Production of Canada, during the Calendar Year 1912. Bulletin on—by John McLeish.

†247 Production of Iron and Steel in Canada during the Calendar Year 1912. Bulletin on—by John McLeish.

†256. Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and other Metals of Canada, during the Calendar Year 1912—by C. T. Cartwright, B.Sc.

257 Production of Cement, Lime, Clay Products, Stone, and other Structural Materials during the Calendar Year 1912. Report on—by John McLeish.

†258. Production of Coal and Coke in Canada, during the Calendar Year 1912. Bulletin on—by John McLeish.

283. Mineral Production of Canada, 1913. Preliminary Report on—by John McLeish.

NOTE.—*Lists of manufacturers of clay products, stone quarry operators, and operators of lime-kilns, coal mines, metal mines, smelters are prepared annually by the Division of Mineral Resources and Statistics, and copies may be had on application.*

IN THE PRESS.

56. French translation: Bituminous or Oil-shales of New Brunswick and Nova Scotia; also on the Oil-shale Industry of Scotland—by R. W. Ells.

149. French translation: Magnetic Iron Sands of Natashkwan, Saguenay county, Que. Report on—by Geo. C. Mackenzie.

169. French translation: Pyrites in Canada: Its Occurrence, Exploitation, Dressing, and Uses. Report on—by A. W. G. Wilson.

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†Publications marked thus † are out of print.

180. French translation: Investigation of the Peat Bogs, and Peat Industry of Canada, 1910-11. Bulletin No. 8—by A. v. Anrep.

195. French translation: Magnetite Occurrences along the Central Ontario Railway. Report on—by E. Lindeman.

203. Building Stones of Canada—Vol. II: Building and Ornamental Stones of the Maritime Provinces. Report on—by W. A. Parks.

209. The Copper Smelting Industry of Canada. Report on—by A. W. G. Wilson.

245. Gypsum in Canada: Its Occurrence, Exploitation, and Technology. Report on—by L. H. Cole.

254. Calabogie Iron-Bearing District. Report on—by E. Lindeman

263. French translation: Recent Advances in the Construction of Electric Furnaces for the Production of Pig Iron, Steel, and Zinc. Bulletin No. 3—by Dr. Haanel.

264. French translation: Mica: Its Occurrence, Exploitation, and Uses. Report on—by Hugh S. de Schmid.

265. French translation: Annual Mineral Production of Canada, 1911. Report on—by John McLeish.

266. Investigation of the Peat Bogs and Peat Industry of Canada, 1911 and 1912. Bulletin No. 9—by A. v. Anrep.

279. Building and Ornamental Stones of Canada—Vol. III. Report on—by W. A. Parks.

287. French translation: Production of Iron and Steel in Canada during the Calendar Year 1912 Bulletin on—by John McLeish.

288. French translation: Production of Coal and Coke in Canada, during the Calendar Year 1912. Bulletin on—by John McLeish.

289. French translation: Production of Cement, Lime, Clay Products, Stone, and Other Structural Materials during the Calendar Year 1912. Bulletin on—by John McLeish.

290. French translation: Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and Other Metals of Canada, during the Calendar Year 1912. Bulletin on—by C. T. Cartwright.

291. On the Petroleum and Natural Gas Resources of Canada. Report on—by F. G. Clapp, and others.

299. Peat, Lignite, and Coal: Their Value as Fuels for the Production of Gas and Power in the By-Product Recovery Producer. Report on—by B. F. Haanel.

303. Moose Mountain Iron-bearing district. Report on—by E. Lindeman.

MAPS.

†6. Magnetometric Survey, Vertical Intensity: Calabogie Mine, Bagot township, Renfrew county, Ontario—by E. Nystrom, 1904. Scale 60 feet = 1 inch. Summary report, 1905. (See Map No. 249.)

†13. Magnetometric Survey of the Belmont Iron Mines, Belmont township, Peterborough county, Ontario—by B. F. Haanel, 1905. Scale 60 feet = 1 inch. Summary report, 1905. (See Map No. 186.)

†14. Magnetometric Survey of the Wilbur mine, Lavant township, Lanark county, Ontario—by B. F. Haanel, 1905. Scale 60 feet = 1 inch. Summary report, 1905.

†33. Magnetometric Survey, Vertical Intensity: Lot 1, Concession VI, Mayo township, Hastings county, Ontario—by Howells Fréchette, 1909. Scale 60 feet = 1 inch.

†34. Magnetometric Survey, Vertical Intensity: Lots 2 and 3, Concession VI, Mayo township, Hastings county, Ontario—by Howells Fréchette, 1909. Scale 60 feet = 1 inch.

†35. Magnetometric Survey, Vertical Intensity: Lots 10, 11, and 12, Concession IX, and Lots 11 and 12, Concession VIII, Mayo township, Hastings county, Ontario—by Howells Fréchette, 1909. Scale 60 feet = 1 inch.

*36. Survey of Mer Bleue Peat Bog, Gloucester township, Carleton county, and Cumberland township, Russell county, Ontario—by Erik Nystrom, and A. v. Anrep. (Accompanying report No. 30.)

NOTE.—1. Maps marked thus * are to be found only in reports.
2.—Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

*37. Survey of Alfred Peat Bog, Alfred and Caledonia townships, Prescott county, Ontario—by Erik Nystrom and A. v. Anrep. (Accompanying report No. 30.)

*38. Survey of Welland Peat Bog, Wainfleet and Humberstone townships, Welland county, Ontario—by Erik Nystrom and A. v. Anrep. (Accompanying report No. 30.)

*39. Survey of Newington Peat Bog, Osnabruck, Roxborough, and Cornwall townships, Stormont county, Ontario—by Erik Nystrom and A. v. Anrep. (Accompanying report No. 30.)

*40. Survey of Perth Peat Bog, Drummond township, Lanark county, Ontario—by Erik Nystrom, and A. v. Anrep. (Accompanying report No. 30.)

*41. Survey of Victoria Road Peat Bog, Bexley and Carden townships, Victoria county, Ontario—by Erik Nystrom and A. v. Anrep. (Accompanying report No. 30.)

*48. Magnetometric Survey of Iron Crown claim at Klaanch river, Vancouver island, B.C.—by E. Lindeman. Scale 60 feet=1 inch. (Accompanying report No. 47.)

*49. Magnetometric Survey of Western Steel Iron claim, at Sechart, Vancouver island, B.C.—by E. Lindeman. Scale 60 feet=1 inch. (Accompanying report No. 47.)

*53. Iron Ore Occurrences, Ottawa and Pontiac counties, Quebec, 1908—by J. White and Fritz Cirkel. (Accompanying report No. 23.)

*54. Iron Ore Occurrences, Argenteuil county, Quebec, 1908—by Fritz Cirkel. (Accompanying report No. 23).

†57. The Productive Chrome Iron Ore District of Quebec—by Fritz Cirkel. (Accompanying report No. 29.)

†60. Magnetometric Survey of the Bristol Mine, Pontiac county, Quebec—by E. Lindeman. Scale 200 feet=1 inch. (Accompanying report No. 67.)

*61. Topographical Map of Bristol Mine, Pontiac county, Quebec—by E. Lindeman. Scale 200 feet=1 inch. (Accompanying report No. 67.)

†64. Index Map of Nova Scotia: Gypsum—by W. F. Jennison.
†65. Index Map of New Brunswick: Gypsum—by W. F. Jennison.
†66. Map of Magdalen islands: Gypsum—by W. F. Jennison.
(Accompanying report No. 84)

†70. Magnetometric Survey of Northeast Arm Iron Range, Lake Timagami, Nipissing district, Ontario—by E. Lindeman. Scale 200 feet=1 inch. (Accompanying report No. 63.)

†72. Brunner Peat Bog, Ontario—by A. v. Anrep.
†73. Komoka Peat Bog, Ontario—by A. v. Anrep.
†74. Brockville Peat Bog, Ontario—by A. v. Anrep.
(Accompanying report No. 71.)

†75. Rondeau Peat Bog, Ontario—by A. v. Anrep.
†76. Alfred Peat Bog, Ontario—by A. v. Anrep.
†77 Alfred Peat Bog, Ontario: Main Ditch Profile—by A. v. Anrep.
Accompanying report No. 71.

†78. Map of Asbestos Region, Province of Quebec, 1910—by Fritz Cirkel. Scale 1 mile=1 inch. (Accompanying report No. 69.)

†94. Map showing Cobalt, Gowganda, Shiningtree, and Porcupine districts—by L. H. Cole, B.Sc. (Accompanying Summary report, 1910.)

*95. General Map of Canada, showing Coal Fields. (Accompanying report No. 83—by Dr. J. B. Porter.)

*96. General Map of Coal Fields of Nova Scotia and New Brunswick. (Accompanying Report No. 83—by Dr. J. B. Porter.)

*97. General Map showing Coal Fields in Alberta, Saskatchewan, and Manitoba. (Accompanying Report No. 83—by Dr. J. B. Porter.)

*98. General Map of Coal Fields in British Columbia. (Accompanying Report No. 83—by Dr. J. B. Porter.)

NOTE.—1. Maps marked thus * are to be found only in reports.
2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

*99. General Map of Coal Field in ukon Territory. (Accompanying Report No. 83—by Dr. B. Porter.)

†106 Geological map of ustin Brook Iron Bearing district, Bathurst township, Glouces county, N.B.—by E. Lindeman. Scale 400 feet=1 inch. (Accompanying report N 105.)

†107 Magnetometric Survey, Ve cal Intensity: Austin Brook Iron Bearing District—by Lindeman. Scale 400 feet 1 inch. (Accompanying report No. 105.)

*108. Index Map showing Iron Bearing Area at Austin Brook—by E. Lindeman. (Accompanyi report No. 105.)

*112. Sketch plan showing Geology of Point Mamainse, Ont.—by Professor A. C. Lane. Sc 4,000 feet=1 inch. (Accompanying report No. 111.)

†113 Holland Peat Bog, Ontario—by A. v. Anrep. (Accompanying report No. 151.)

*119-137. Mica: Township maps, Ontario and Quebec—by Hugh S. de Schmid. (Accompanyi report No. 118.)

†138. Mica: Showing Location of Principal Mines and Occurrences in the Quebec Mica Area— Hugh S. de Schmid. Scale 3·95 miles=1 inch. (Accompanying report No. 118.)

†139. Mica: Showing Location of Principal Mines and Occurrences in the Ontario Mica Area—by Hugh S. de Schmid. Scale 3·95 miles=1 inch. (Accompanying report No. 118.)

†140. Mica: Showing Distribution of the Principal Mica Occurrences in the Dominion of Canada by Hugh S. de Schmid. Scale 3·95 miles=1 inch. (Accompanying report No. 118.)

†141. Torbrook Iron Bearing District, Annapolis county, N.S.—by Howells Frechette. Scale 4 feet=1 inch. (Accompanying report No. 110.)

†146. Distribution of Iron Ore Sands of the Iron Ore Deposits on the North Shore of the River a Gulf of St. Lawrence, Canada—by Geo. C. Mackenzie. Scale 100 miles=1 inch. (Acco panying report No. 145.)

†147. Magnetic Iron Sand Deposits in Relation to Natashkwan harbour and Great Natashkw river, Que. (Index Map)—by Geo. C. Mackenzie. Scale 40 c inch. (Acco panying report No. 145.)

†148. Natashkwan Magnetic Iron Sand Deposits, Saguenay county, Que.—by Geo. C. Mackenzi Scale 1,000 feet=1 inch. (Accompanying report No. 145.)

†152. Map Showing the Location of Peat Bogs investigated in Ontario—by A. v. Anrep.

†153. Map Showing the Location of Peat Bogs investigated in Manitoba—by A. v. Anrep.

†157. Lac du Bonnet Peat Bog, Manitoba—by A. v. Anrep.

†158. Transmission Peat Bog, Manitoba—by A. v. Anrep.

†159. Corduroy Peat Bog, Manitoba—by A. v. Anrep.

†160. Boggy Creek Peat Bog, Manitoba—by A. v. Anrep.

†161. Rice Lake Peat Bog, Manitoba—by A. v. Anrep.

†162. Mud Lake Peat Bog, Manitoba—by A. v. Anrep.

†163. Litter Peat Bog, Manitoba—by A. v. Anrep.

(Accompanying report No. 151

†164. Julius Peat Litter Bog, Manitoba—by A. v. Anrep.

†165. Fort Francis Peat Bog, Ontario—by A. v. Anrep.

(Accompanying report No. 151.)

*166. Magnetometric Map of No. 3 mine, Lot 7, Concessions V and VI, McKim township, Sudbu district, Ont.—by E. Lindeman. (Accompanying Summary report, 1911.)

†168. Map showing Pyrites Mines and Prospects in Eastern Canada, and Their Relation to t United States Market—by A. W. G. Wilson. Scale 125 miles=1 inch. (Accompanyi report No. 167.)

Note.—1. Maps marked thus * are to be found only in reports.
2. Maps marked thus † have been printed independently of reports, hence can procured separately by applicants.

†171. Geological Map of Sudbury Nickel region, Ont.—by Prof. A. P. Coleman. Scale 1 mile = 1 inch. (Accompanying report No. 170.)

†172. Geological Map of Victoria mines—by Prof. A. P. Coleman.

†173. " Crean Hill mine—by Prof. A. P. Coleman. (Accompanying report No. 170.)

†174. " Creighton mine—by Prof. A. P. Coleman.

†175. " showing Contact of Norite and Laurentian in vicinity of Creighton mine—by Prof. A. P. Coleman. (Accompanying report No. 170.)

†176. " of Copper Cliff offset—by Prof. A. P. Coleman. (Accompanying report No. 170.)

†177. " No. 3 mine—by Prof. A. P. Coleman. (Accompanying report No. 170.)

†178. " showing vicinity of Stobie and No. 3 mines—by Prof. A. P. Coleman. (Accompanying report No. 170.)

†185. Magnetometric Survey, Vertical Intensity: Blairton iron mine, Belmont township, Peterborough county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†185a. Geological Map, Blairton iron mine, Belmont township, Peterborough county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†186. Magnetometric Survey, Belmont iron mine, Belmont township, Peterborough county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†186a. Geological Map, Belmont iron mine, Belmont township, Peterborough county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†187. Magnetometric Survey, Vertical Intensity: St. Charles mine, Tudor township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†187a. Geological Map, St. Charles mine, Tudor township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†188. Magnetometric Survey, Vertical Intensity: Baker mine, Tudor township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†188a. Geological Map, Baker mine, Tudor township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†189. Magnetometric Survey, Vertical Intensity: Ridge iron ore deposits, Wollaston township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†190. Magnetometric Survey, Vertical Intensity: Coehill and Jenkins mines, Wollaston township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†190a. Geological Map, Coehill and Jenkins mines, Wollaston township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†191. Magnetometric Survey, Vertical Intensity: Bessemer iron ore deposits, Mayo township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†191a. Geological Map, Bessemer iron ore deposits, Mayo township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†192. Magnetometric Survey, Vertical Intensity: Rankin, Childs, and Stevens mines, Mayo township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†192a. Geological map, Rankin, Childs, and Stevens mines, Mayo township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

NOTE.—1. Maps marked thus * are to be found only in reports.
2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

†193. Magnetometric Survey, Vertical Intensity: Kennedy property, Carlow township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†193a. Geological Map, Kennedy property, Carlow township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†194. Magnetometric Survey, Vertical Intensity: Bow Lake iron ore occurrences, Faraday township, Hastings county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 184.)

†204. Index Map, Magnetite occurrences along the Central Ontario Railway—by E. Lindeman, 1911. (Accompanying report No. 184.)

†205. Magnetometric Map, Moose Mountain iron-bearing district, Sudbury district, Ontario: Deposits Nos. 1, 2, 3, 4, 5, 6, and 7—by E. Lindeman, 1912. (Accompanying report No. 266.)

†205a. Geological Map, Moose Mountain iron-bearing district, Sudbury district, Ontario. Deposits Nos. 1, 2, 3, 4, 5, 6, and 7—by E. Lindeman. (Accompanying report No. 266.)

†206. Magnetometric Survey of Moose Mountain iron-bearing district, Sudbury district, Ontario: Northern part of Deposit No. 2—by E. Lindeman, 1912. Scale 200 feet = 1 inch. (Accompanying report No. 266.)

†207. Magnetometric Survey of Moose Mountain iron-bearing district, Sudbury district, Ontario: Deposits Nos. 8, 9, and 9A—by E. Lindeman, 1912. Scale 200 feet = 1 inch. (Accompanying report No. 266.)

†208. Magnetometric Survey of Moose Mountain iron-bearing district, Sudbury district, Ontario: Deposit No. 10—by E. Lindeman, 1912. Scale 200 feet = 1 inch. (Accompanying report No. 266.)

†208a. Magnetometric Survey, Moose Mountain iron-bearing district, Sudbury district, Ontario: Eastern portion of Deposit No. 11—by E. Lindeman, 1912. Scale 200 feet = 1 inch. (Accompanying report No. 166.)

†208b. Magnetometric Survey, Moose Mountain iron-bearing district, Sudbury district, Ontario: Western portion of Deposit No. 11—by E. Lindeman, 1912. Scale 200 feet = 1 inch. (Accompanying report No. 266.)

†208c. General Geological Map, Moose Mountain iron-bearing district, Sudbury district, Ontario—by E. Lindeman, 1912. Scale 800 feet = 1 inch. (Accompanying report No. 266.)

†210. Location of Copper Smelters in Canada—by A. W. G. Wilson, Ph.D. Scale, 197·3 miles = 1 inch. (Accompanying report No. 209.)

[illegible] Province of Alberta: showing properties from which samples of coal were taken for gas producer tests, Fuel Testing Division, Ottawa. (Accompanying Summary Report, 1912.)

†220. Mining Districts, Yukon. Scale 35 miles = 1 inch—by T. A. MacLean. (Accompanying report No. 222.)

†221. Dawson Mining District, Yukon. Scale 2 miles = 1 inch—by T. A. MacLean, B.A.Sc. (Accompanying report No. 222.)

*228. Index Map of the Sydney coal fields, Cape Breton, N.S. (Accompanying report No. 227.)

†232. Mineral Map of Canada. Scale 100 miles = 1 inch. (Accompanying report No. 23[illegible]

†249. Magnetometric Survey, Caldwell and Campbell mines, Calabogie district, Renfrew county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 254.)

†250. Magnetometric Survey, Black Bay or Williams Mine, Calabogie district, Renfrew county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 254.)

†251. Magnetometric Survey, Bluff Point iron mine, Calabogie district, Renfrew county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 254.)

†252. Magnetometric Survey, Culhane mine, Calabogie district, Renfrew county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 254.)

NOTE.—1. Maps marked thus* are to be found only in reports.
2. Maps marked thus† have been printed independently of reports, hence can be procured separately by applicants.

†253 Magnetometric Survey, Martel or Wilson iron mine, Calabogie district, Renfrew county, Ontario—by E. Lindeman, 1911. Scale 200 feet = 1 inch. (Accompanying report No. 254.)

†261 Magnetometric Survey, Northeast Arm iron range, Lot 339 E. T.W. Lake Timagami, Nipissing district, Ontario—by E. Nystrom, 1903. Scale 200 feet = 1 inch.

IN THE PRESS.

268	Map of Peat Bogs Investigated in Quebec—by	A. v.	Anrep, 1912
269	Large Tea Field Peat Bog, Quebec	"	"
270	Small Tea Field Peat Bog, Quebec	"	"
271	Lanoraie Peat Bog, Quebec	"	"
272	St. Hyacinthe Peat Bog, Quebec	"	"
273	Rivière du Loup Peat Bog	"	"
274	Cacouna Peat Bog	"	"
275	Le Parc Peat Bog, Quebec	"	"
276	St. Denis Peat Bog, Quebec	"	"
277	Rivière Ouelle Peat Bog, Quebec	"	"
278	Moose Mountain Peat Bog, Quebec	"	"

Address all communications to—

DIRECTOR MINES BRANCH,
DEPARTMENT OF MINES,
SUSSEX STREET, OTTAWA.

NOTE. 1. Maps marked thus* are to be found only in reports.
2. Maps marked thus† have been printed independently of reports, hence can be procured separately by applicants.

144
143
142
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136
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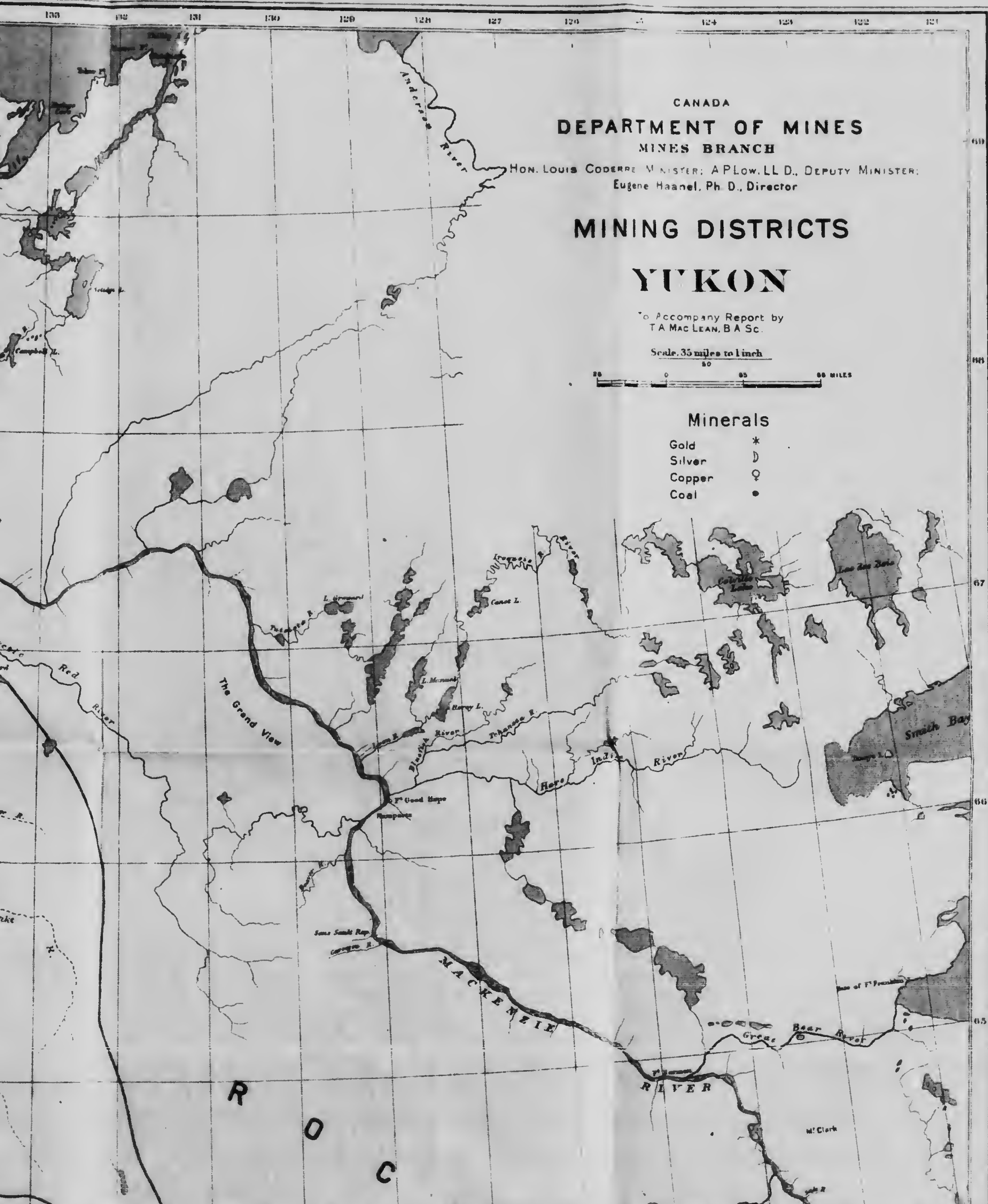
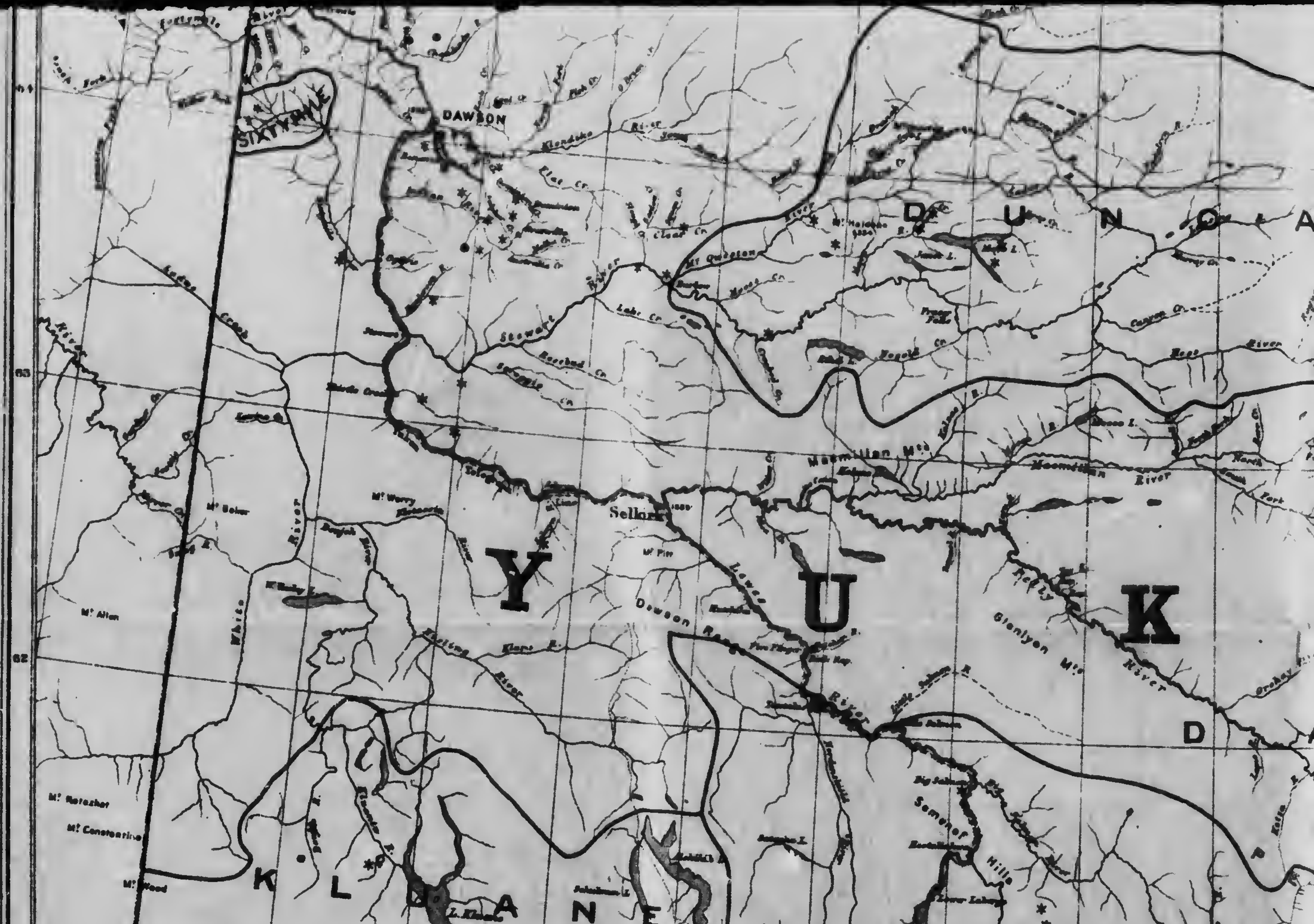
134
69
68
67
66
65
Mackenzie Bay
Richards I.
Halkett I.
Buckland Mts
Richardson Mts
Davidson Mts
Mt Gifford
Mt Goodenough
Ft Separation
Old Crow River
Old Crow Mt
Porcupine River
Upper Ramparts
Lower Ramparts
Boundary Mt
Colleen Mt
Colleen River
Rapid River
Rat River
Black River
Peel River
Ft Mc Pherson
Winter Portage
Portage
Arctic
Mt Burgess
Mt Dewdney
Nahoni Mts
Mt Klotz
Mt Deville
Mt King
Ogilvie R.
DAWSON
Wind River
ALASKA
YUKON RIVER


CANADA
DEPARTMENT OF MINES
MINES BRANCH
Hon. Louis Coderre Minister; A.P. Low, LL.D., Deputy Minister;
Eugene Haanel, Ph. D., Director
MINING DISTRICTS
YUKON
To Accompany Report by
T.A. Mac Lean, B.A.Sc.
Scale, 35 miles to 1 inch
Minerals
Gold
Silver
Copper
Coal
Anderson River
Colville Lake
Lac des Bois
Canot L.
Smith Bay
Red River
The Grand View
Hare Indian River
Fᵗ Good Hope
Ramparts
Campbell L.
MACKENZIE
RIVER
Great Bear River
Mᵗ Clark
R
O
C



H. E. Baine Chief Draughtsman
Base map Dept of Interior


C K Y
M O U N T A I N S
O N
D A W S O N
S E
C O L U M B I A
Gravel
Blackwater River
Great
Mt Camsell
North Nahanni River
South Nahanni River
Campbell Mts
Simpson Mts
Mt Logan 9000
Mt Billings 7000
L. Simpson
Upper Canon
Lower Canon
Middle Canon
Tower Peak 7000
Hyland River
Coal River
Beaver River
Teslin Lake 1400
Mt Reid
Fishing L.
Mts
Sheldon L.
Pelly L.
Frances
Canyon
Height of Land
Dease
Turnagain
Liard
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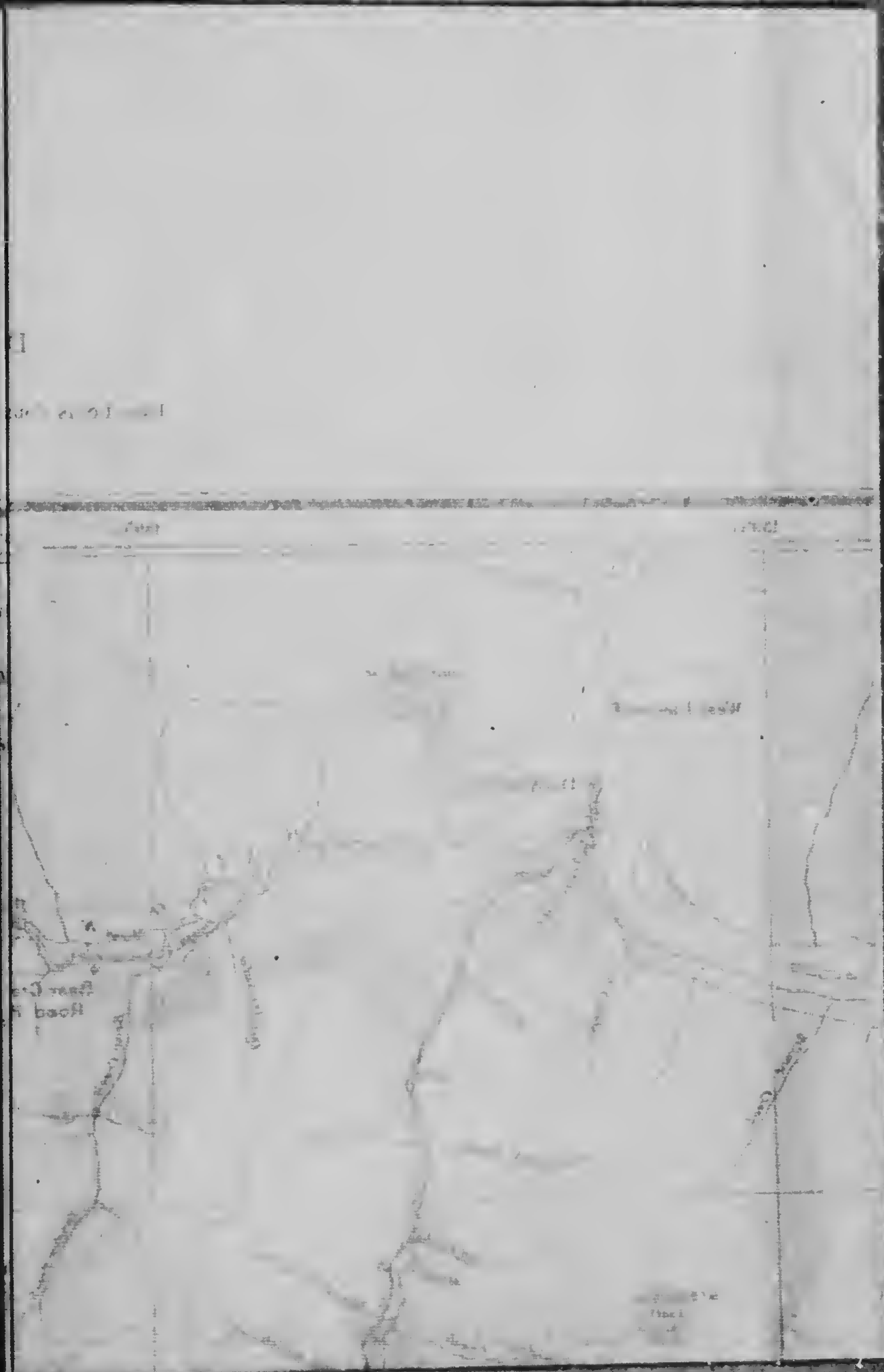
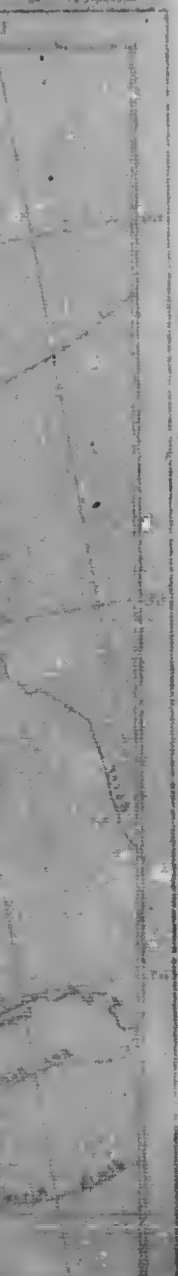




CANADA

DEPARTMENT OF MINES

MINES BRANCH

HON. LOUIS CODERRE, MINISTER; A. P. LOW, LL.D., DEPUTY MI

EUGENE HAANEL, PH.D., DIRECTOR.

1913

ES

Deputy Minister;

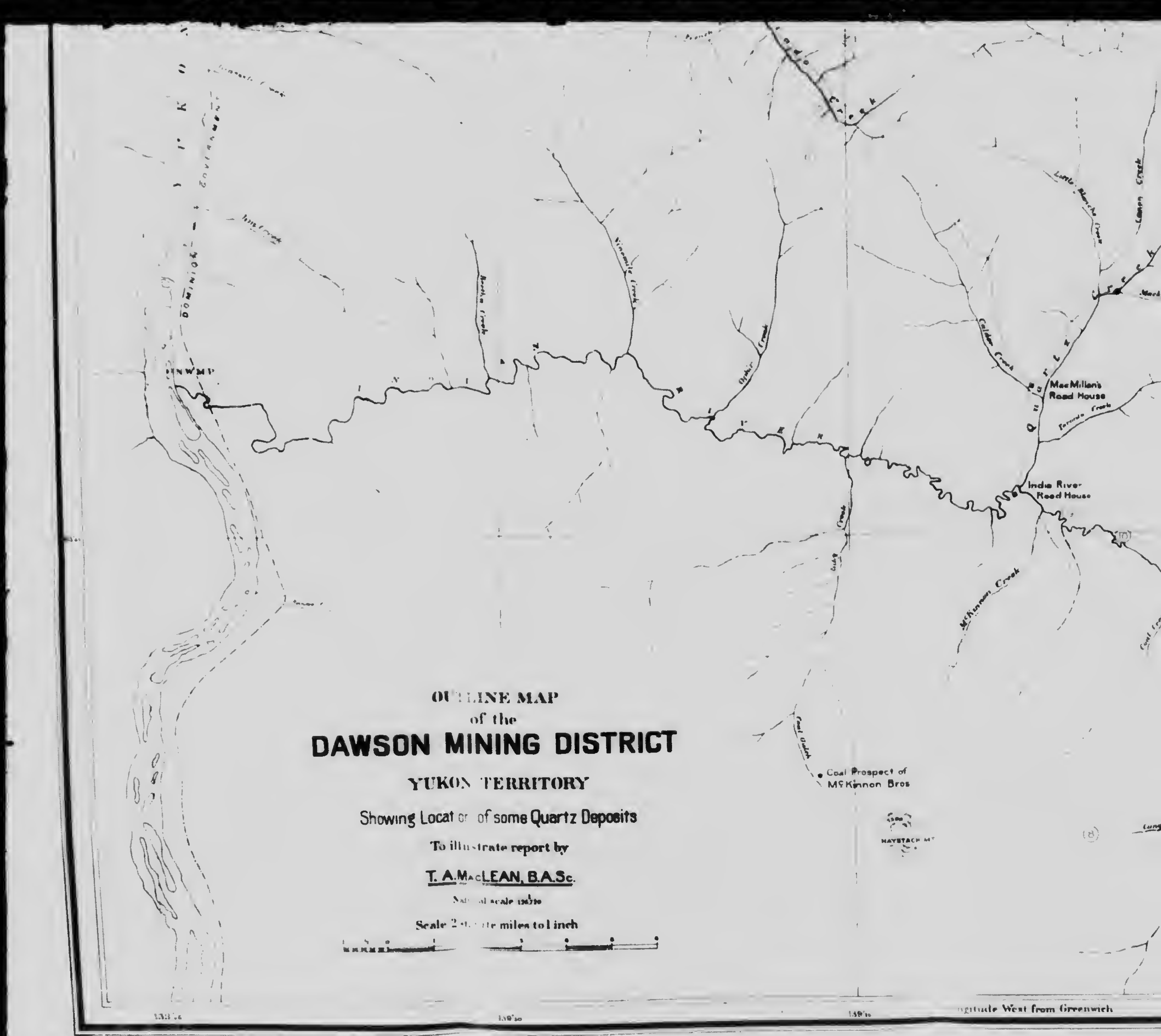
Reference

1. Lone Star Mine
2. Gordon Mineral Claim
3. Virgin " "
4. Jean I " "
5. Cullen Group
6. Violet Group
7. Britannia Group, (McKinnon Brothers)
8. Eclipse Group, (Chris. Fothergill et al)
9. Esperanzo Mineral Claim
10. Raven Mineral Claim
11. Lloyd Group
12. Green Gulch Group
13. Gold Run Group, (W. D. MacKay)
14. Patterson Group, (Flora Mineral Claim et
15. Box-Car Group
16. Mitchell Group
17. Portland Group
18. W. D. MacKay Group, Hunker
19. John Fawcett Claims, Hunker Rt. Fork
20. Summit Mineral Claim, (Jos. Fournier)
21. Dome Lode Property
22. Property of Wells Quartz Mining Company
30. Property of Pickering et al
32. California Girl Mineral Claim
33. Unexpected Mineral Claim
34. W. O. Smith Property, on Klondike
35. Eldorado Dome

Explanations

(1) Nos. 23 to 29 inclusive, apply to Claims in the Duncan Creek Mining District

(2) No. 31 refers to Claims of J. A. Anderson on Excelsior Creek, farther south on Yukon than here shown



OUTLINE MAP
of the
DAWSON MINING DISTRICT
YUKON TERRITORY
Showing Location of some Quartz Deposits
To illustrate report by
T. A. MacLEAN, B.A.Sc.
Scale 2 statute miles to 1 inch
MacMillan's Road House
Indian River Road House
Coal Prospect of McKinnon Bros
HAYSTACK MT
McKinnon Creek
Calder Creek
Ophir Creek
Vincent Creek
Little Blanche Creek
N.W.M.P.
DOMINION
Quartz Creek
ngitude West from Greenwich

THE DOME
Farmer's Road House
Government Road Camp
Caribou
Dominion Creek
MINION MT
Joe Joe Road House
Mack Fork
Meadow Gulch
Friday Gulch
Hunter Creek
Gold Run Creek
Sulphur Creek
Granville
Rob Roy Creek
Dominion Creek
Australia Creek
Wounded Moose Creek
Conglomerate Creek
No Name Creek
Coal Creek
Montana Creek
139°
138°40
138°20

Nº 221