

Stewart Co.

The Preliminary Investigation of
of the Ore Minerals of the
Big Four Silver Mines Ltd.

Geology 409
1947

Portland Canal Mining Division 59

A. McLean

600348

5408 Cecil Street,
Vancouver, B. C.

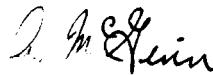
April 19, 1947.

Faculty of Applied Science,
University of British Columbia,
Vancouver, B. C.

Gentlemen:

I am submitting herewith a report on "The Preliminary Investigation of the Ore Minerals of the Big Four Mines Ltd." required by you in partial fulfillment of the course in Geology 409.

Yours respectfully,

A handwritten signature in cursive script, appearing to read "A. McGinn".

A. McGinn

Acknowledgements

In submitting this report I wish to acknowledge with thanks the aid and advice given by Dr. H. V. Warren and Mr. J. Fyles.

I wish also to thank the officers of "The Big Four Mining Co. Ltd." and especially Dr. J. Mandy for supplying the suite of ores studied.

All flotation work was done by the author under the direction of Professor H. M. Howard of the Department of Metallurgy. The photographs included in this report were taken in the metallurgical laboratory with the permission of Professor W. Armstrong.

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Object

To determine the ore minerals in the suite of ores supplied by the management of the "Big Four Silver Mines Ltd." and to investigate the possibility of producing concentrates by flotation.

Sample

All specimens examined during the investigation were taken from an ore sample taken from the Silverado section of the "Big Four Silver Mines Ltd." property at Stewart, B.C.

Summary

Selected specimens, from the ore sample supplied, were cut, mounted, and polished. The sections were then examined under the microscope and the ore minerals

present were determined as outlined in Short's
"Microscopic Determination of the Ore Minerals".

Part of the sample was prepared in the university
sampling laboratory and two selective flotation tests were
run.

Results

In the study of the polished sections the
following minerals were identified:

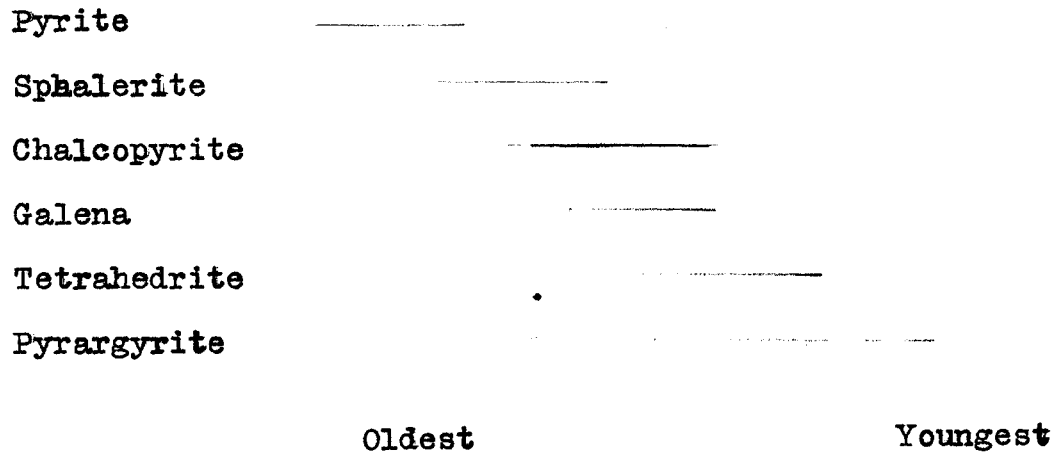
Galena	Pyrite
Sphalerite	Quartz
Chalcopyrite	Calcite
Native Silver	

The following minerals have been tentatively
identified:

Tetrahedrite
Pyrargyrite (Ruby Silver)

The age relation of the ore minerals are outlined
in the following chart.

Age Relations



Flotation Tests

Two flotation tests were run in an attempt to make a clean lead-silver-zinc concentrate and a clean zinc concentrate with a tailing free of all valuable minerals. The tests were fairly successful in recovering most of the valuable minerals except silver but the lead concentrate produced contained a large part of the zinc present. Tables on the following pages give the detailed results of the tests. The following important features should be noted:

1. There was a high loss of silver amounting to 17.9% of the contained silver in the first test and 13.4% of the contained silver in the second test.
2. There was a good overall recovery of the lead, zinc, and gold

Heads Assay of the sample

Gold	.10 oz/ton
Silver	35.56 oz/ton
Lead	14.72%
Zinc	9.43%
Iron	8.68%
Copper	.23%

	Weight		Gold			Silver			Lead			Zinc			Iron	Copper
	Gms.	%	oz/ton	units	%dist	oz/ton	units	%dist	%	units	%dist	%	units	%dist.	%	%
Pb Conc.	328	32.5	40	131.2	82.5	80.96	26500	72.4	41.4	13580	90.1	18	5900	69.8	7.40	.41
Zn Conc.	78	7.7	.20	15.6	9.8	46.12	3595	9.7	2.14	224	1.5	36.8	2870	24.3	7.81	.60
Tails	604	59.8	.02	12.1	7.7	10.84	6550	17.9	2.05	1240	8.4	1.15	695	5.9	9.87	.115
Totals	1010	100		158.9	100		36645	100		15044	100		8465	100		
Calculated Heads			.157 oz/ton			36.28 oz/ton			14.89			9.37			8.90	.25

Flotation Results
Test No. 2

	Weight		Silver			Gold								
	Gms	%	oz/ton	units	%dist.	oz/ton	units	%dist.						
Pb Conc.	359	35.5	72.64	26050	70.6	.36	129.2	65.3						
Zn. Conc.	122	12.1	48.20	5880	16.0	.12	57.9	29.3						
Tails	530	52.4	9.52	4955	13.4	.02	10.6	5.4						
Totals	1011	100		36885	100		197.7	100						
Calculated Heads			36.45 oz/ton			0.195 oz/ton								

Introduction:

The "Big Four Silver Mines Ltd." holds title to a group of thirty claims in the Portland Canal Mining District. The claims belong to the Silverado, Silver Range, Porter Idaho and Prosperity groups and form a solid block on the summit and upper slopes of Mt. Rainey. The mine portal on the Silverado groups, on the western slope of Mt. Rainey, is at an elevation of 2,900 ft. and is about two miles south east of Stewart, B. C. The Porter Idaho and Prosperity groups of claims are on the eastern slope of Mount Rainey and occupy the upper valley of the north fork of the Marmot River. The property of the Big Four Silver Mines Limited is connected with Stewart on the Silverado side by about three miles of road and an arial tramway.

History:

The operation now being carried out by the "Big Four Silver Mines Ltd." is the first attempt to consolidate the workings on the four groups of claims making up the property. The claims have in the past been worked by one company, The Premier Mining Company, but never as one unit.

In 1920 the Silverado group of claims was first staked by J. Haashti and the late R. Stewart of Stewart, B.C. These claims have been worked intermittently since they were staked but have produced no large tonnages of ore.

The Porter Idaho group of claims was staked in 1925 and was worked until 1927 by Porter Idaho Mining Company.

The Prosperity group, adjoining the Porter Idaho group, was staked in 1925. In 1928 the Premier Mining Company took over the management of the Porter Idaho and Prosperity claims. The claims were rapidly developed and in 1930 the Prosperity group became the third largest producer of silver in B. C.

The falling price of silver forced the closing of both the Prosperity and Porter Idaho properties in 1931 and the properties remained inactive until becoming part of the "Big Four Group" in May 1946.

Geology:

The geology of the "Big Four Silver Mines" property is outlined in a report by Dr. J. T. Mandy as follows:

"The Silverado-Prosperity-Porter Idaho claims are underlain by a complex of Triassic andesitic volcanic rocks (Hazelton or Bear River Series) composed of tuffs, breccias, rhyolite, intruded by lamprophyre dykes. In the area these rocks strike northeasterly and dip at moderate angles north-westward. These rocks occupy a prominent embayment with north-south axis and closed on the west, in a spur of granodiorite of the Coast Range intrusives. The west side or base of this embayment is occupied by the Bear River fault along which there has been a displacement of $1\frac{1}{2}$ miles south of its east side. (Hanson Map "A") Beneath the embayment the granitic intrusives plunge steeply to the east.

"The Silverado-Prosperity-Porter Idaho area forms a an angular segment between the Bear River fault (striking about north-south) and the Big Rig fault (striking about

north 70 degrees east.) (Map "A").

"The ore deposits consists of a zone of fracturing and shearing from 1,000 to 2,000 feet wide containing veins varying in width from a few inches to 20ft., but generally less than 5 ft. wide. On the Prosperity- Porter Idaho, the veins are characteristically oxidized to a depth of over 400 ft. This feature locally requires close timbering and also withdrawal of broken ore from some slopes to avoid loss and dilution from caving of stope. On the Silverado this characteristic is not prominent. It will probably ease as the Prosperity workings proceed north-westerly under the ice sheet towards the Silverado.

"The veins are mineralized with pyrite, sphalerite, galena, tetrahedrite, ruby silver and other silver minerals as well as native silver locally. In view of the deep oxidation and presence of native silver, it is probable that that some secondary enrichment of the silver has occurred. In the vein system bunchy ore-shoots of shipping-grade ore were irregularly interspersed with in a general low-grade silver mineralization, some of which may be disclosed by sampling , to be of milling grade. No regular attitude or rake of the high-grade oreshoots has been established. Some control in this regard may be found in some tuff beds, through which the veins strike, being more favourable then others.

"Observed characteristics of the ore deposits indicate the mineralization may be subdivided into the

following vertical column:

- (1) Zone of primary sulphides and secondary enrichment ores.
- (2) Zone of decreased primary sulphides with some secondary enrichment.
- (3) Continuation of vein structure, no primary sulphide and some secondary silver ores.

"The characteristics of the deposit suggest the establishment of a commercial ore-horizon conforming approximately to the slopes of the mountain and with a back of possibly between 300 and 750 feet, dependent on the depth of erosion or truncation of the east and west sides of the mountain by their respective valley-glaciers."

Development:

Development work has been carried out on the Silverado section of the property since the company assumed control in 1946. The development program consists of:

- (1) A complete resampling of the old workings
- (2) Extension of the Silverado transport adit to reach the former Prosperity-Porter Idaho workings. This project will explore upwards of 6,000 feet of virgin ground and provide a centralized operation from the Silverado entry, adjacent to tidewater.
- (3) Erection of a mill of 150 to 200 tons per day capacity if the estimates of mill grade ores are confirmed during the development program.

Ore Reserves:

The ore reserves of the property may be divided into two classes:

- (1) Those that can be estimated with reasonable accuracy from the available reports, maps and other reliable information compiled during the period the

property was previously worked.

- (2) The potential ore that may be encountered in driving the main haulageway through the mountain.

The first class of ore reserves has been estimated to amount to 250,000 tons assaying 0.03 oz. gold/ton, 12 oz. silver/ton, 3 per cent lead and 3 per cent zinc.

The amount and grade of ore that may be developed in driving the main haulageway can only be inferred from knowledge of the existing workings.

Macroscopic Examination:

Approximately 15 lbs. of ore was received for study from the management of the "Big Four Silver Mines Limited". The sample came from the Silverado section of the Big Four property and was highly oxidized. It is assumed from the description in Dr. Mandy's report on the geology of the property that the samples came from the upper zone of the primary sulphides and secondary enrichment ores.

The hand specimens were heavily mineralized and the following minerals were identified:

Galena	Calcite
Pyrite	Chaleopyrite
Sphalerite	Malachite
Quartz	

In the specimens examined, galena and pyrite were the most prominent metallic minerals present. In other samples examined by the author at the property, native silver was found in the ore.

Microscopic Examination:

The specimens of the ore sample to be examined microscopically were prepared in the Geology Laboratories at the University of British Columbia. The United States Geological Survey Bulletin 914, "Microscopic Determination of the Ore Minerals" by M. N. Short was used as a text and the procedures outlined in this bulletin were followed throughout the examination.

The following minerals were found during the examination;

Pyrite	Tetrahedrite
Galena	Ruby-Silver
Chalcopyrite	Quartz
Sphalerite	Calcite

Pyrite

Pyrite was observed in all the sections examined. The pyrite was present in well formed grains and was closely associated with the other sulphides present in the sections.

The pyrite was determined by its hardness and colour and was easily recognized whenever present.

Galena

Galena was present in all of the sections examined. The galena was determined by its characteristic colour, hardness of triangular polishing pits and by the reaction/galena with HNO_3 and HCL .

The galena present was closely related to the other

sulphides present. Veins of galena were observed cutting grains of pyrite. The relation between the galena and sphalerite is quite complex, but it would appear that the galena is both contemporaneous and younger than the sphalerite. The evidence for the replacement of sphalerite by galena is as follows:

1. Veins of galena were observed cutting the sphalerite.
2. Under low magnification, some of the sphalerite appears as rounded inclusions in the galena.

There were, in some of the sections examined, small inclusions of galena in sphalerite which ranged in size from about 180 microns diameter to about 18 microns in diameter. Small, 36 micron to 18 micron diameter, disseminated galena particles were observed in quartz.

Sphalerite

Sphalerite occurs throughout the sections examined and is closely associated with galena and chalcopyrite. The sphalerite was identified by its hardness, colour, internal reflection and the reaction between the sphalerite and HNO_3 , HCl and aqua regia. The relation between the sphalerite and galena is outlined in the description of the galena.

Chalcopyrite

The chalcopyrite observed in the specimens was generally very fine grained and closely associated with the sphalerite. The chalcopyrite was determined by its colour,

hardness and the reaction between the chalcopyrite and HNO_3 , and aqua regia.

Chalcopyrite occurs chiefly as small grains of about 10 microns diameter in sphalerite. The grains of chalcopyrite seem to have a definite line orientation and they may be following the dodecahedral cleavage planes of the sphalerite. These grains of chalcopyrite would indicate that the chalcopyrite is younger than the sphalerite.

Some of the chalcopyrite is associated with the galena. There are small grains, about 36 microns in diameter, of chalcopyrite included in some sections of the galena. The chalcopyrite associated with the galena occurs chiefly as larger grains in contact with the galena and sphalerite.

Tetrahedrite

The tetrahedrite observed in the specimens was found as small, approximately 54 to 90 microns in diameter, inclusions in the galena. While some of the tetrahedrite disseminated throughout the galena, it occurs usually on the contacts between the sphalerite and galena.

The tetrahedrite was determined by its colour, hardness and the etch reactions. The tetrahedrite appeared to be entirely unaffected when covered with a drop of HN_3 but the tetrahedrite seemed to be tarnished when exposed to HNO_3 fumes. Both of these reactions were hard to analyze because of the size of the tetrahedrite particles and their relation to the galena. The strong reaction between the

surrounding galena and the HNO_3 masked the reaction between the tetrahedrite and the HNO_3 . A positive reaction was observed when KCN was applied, the tetrahedrite turning a light brown. When tested with HCl , FeCl_2 , KOH , HgCl_2 , and aqua regia, the tetrahedrite showed no alteration. The results of the tests would seem to eliminate the possibility of this mineral being Freibergite which has no reaction with KCN and a positive reaction with FeCl_3 . The smallness of the particles being tested must be considered in weighing this evidence and absolute identification of this mineral should be withheld until a sufficiently large piece can be picked for spectroscopic analysis.

Pyrargyrite

A light bluish mineral found in the galena has been identified as pyrargyrite. Identification was based on the physical properties and etch reactions. The mineral was identified by its light blue colour, hardness and its red internal reflection. When etch reagents were applied to the mineral, the following reactions were observed. The mineral was tarnished by HNO_3 , with KCN the mineral was stained brown, and with KOH the mineral was stained black. Neither HCl nor HCl fumes had any effect on the mineral and the reaction between FeCl_3 and the mineral was also negative.

The mineral here identified as pyrargyrite was found in the galena and on the contacts between the sphalerite and the galena. The mineral was also observed in quartz surrounded by a matrix of sphalerite.

Silver

Native silver was identified in the galena. Identification was based on the colour, hardness, sectility and etch reactions.

Quartz

Quartz was found to be the chief gangue material. The quartz was identified by its hardness and lack of reaction with etch reagents.

Flotation Tests

Two flotation tests were run on the ore sample in order to determine the possibility of treating this ore by selective flotation. These tests can only be taken as preliminary tests since the test sample does not represent accurately the grade of ore that is to be treated at the property since;

1. The sample was small and could not be truly representative.
2. The grade of the sample tested was much higher than the expected grade of ore to be milled.

	<u>Sample</u>	<u>Milling Grade Ore</u>
Au	0.157 oz/ton	0.03 oz./ton
Ag	36.28 oz/ton	12 oz/ton
Pb	14.89 %	3%
Zn	9.37%	3%

3. The sample was highly oxidized and the conditions for floating this material would be different from the conditions required for floating freshly broken ore.

The tests showed that good recovery of the lead, zinc and gold may be expected. The recovery of silver was poor and although the recovery was ^{im}proved in the second test, there was still a tailing loss of 13.7% of the contained silver. The lead concentrate has still to be treated to clean the zinc from it.

Details of Tests:

Approximately 3,000 gms of the sample were taken and crushed to -1/2 inch with the small Dodge type crusher in the University Sampling plant. The -1/2 inch material was then reduced to -10 mesh by crushing with rolls. Two samples of approximately 1,000 gms each were riffled out for testing, the remainder of the sample being prepared as a heads sample.

Test No. 1

Charge to batch type rod mill

Ore	1,000 gms
Water	1,000 gms
Soda Ash	3.5 gms { 3 lbs./ton)
Sodium Cyanide	0.2 gms { 0.9 lbs./ton)
Zinc Sulphate	0.5 gms (1b/ton)
Aerofloat	2 drops

The charge was ground for 15 minutes and then charged to a Denver Type Sub-Aeration flotation machine and the following reagents were added:-

10 c.c. of 0.5% Z3
 1 drop pine oil
 1 drop cysilic acid

The charge was conditioned for less than a minute since the galena floated very easily. After the lead concentrate was floated, the following reagents were added to the cell;-

10 c.c. of 10% Copper Sulphate solution
 10 c.c. of 0.5% Z-3
 1 drop crysilic acid
 2 gms. lime

The charge was conditioned for four minutes and zinc concentrate floated off. After the flotation was completed, the tails were removed from the cell. All of the products were then dried, weighed and assayed.

Test No. 2

Charge to batch type rod mill

Ore	1,000 gms
Water	1,000 gms
Soda Ash	1.5 gms (3 lb/ton)
Sodium Cyanide	0.4 gms (0.8 lb/ton)
Zinc Sulphate	0.5 gms (1 lb/ton)
Aerofloat	2 drops

The charge was ground for 12 minutes and then charged to a Denver Type Sub Aeration Flotation Machine where the following reagents were added:-

5 c.c. of 1% Z-3
 10 c.c. of 1% Reagent 208
 1 drop pine oil
 1 drop crysilic acid

The charge was conditioned for less than a minute, the galena floating very rapidly. After the bad concentrate was floated, the following reagents were added to the cell:

15 c.c. of 10% Copper Sulphate Solution
 5 c.c. of 1% Z-3
 10 c.c. of 1% Reagent 208
 1 drop pine oil
 Lime 2 gms (4lb/ton)

The charge was then conditioned for 10 minutes and another 10 c.c. of 10% Copper Sulphate Solution was added and conditioning continued. After conditioning for a total of 25 minutes, another 10 c.c. of 10% Copper Sulphate solution was added and 5 c.c. of 1% Z-3. The conditioning was continued for 5 minutes.

Totals

10% Copper Sulphate Solution	35 c.c.
1% Z-3	10 c.c.
Time of Conditioning	30 minutes

After the flotation was completed, the tails were removed from the cell. All of the products were dried, weighed and assayed for gold and silver.

MICROPHOTOGRAPHS

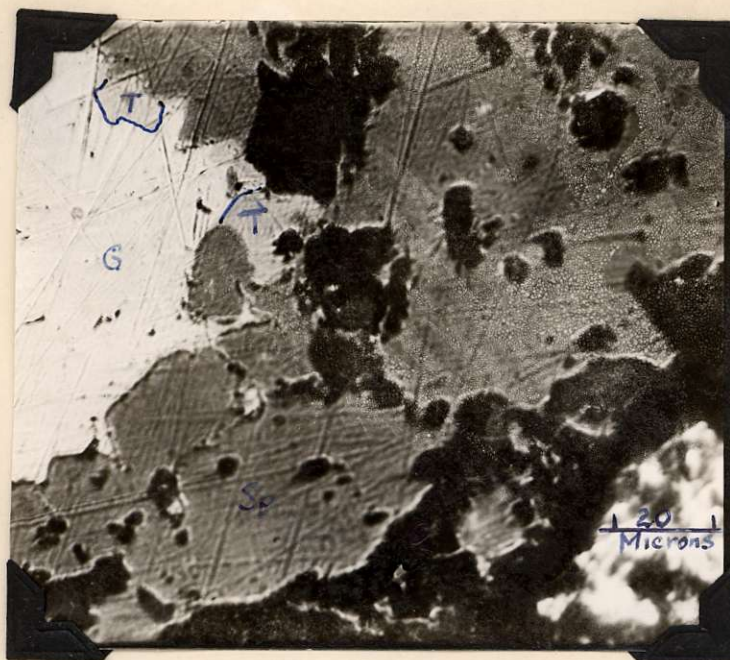
The following micro^ophotographs were taken in the metallurgical laboratory of the University of British Columbia.

Leitz Microscope No. 277417 was used in taking all of these pictures and the following conditions were used throughout.

Illumination Carbon arc lamp with green filter.

Kodak Super-Panchromatic Plates

Exposure time 20sec. (except where noted)



Tetrahedrite in Galena

associated with

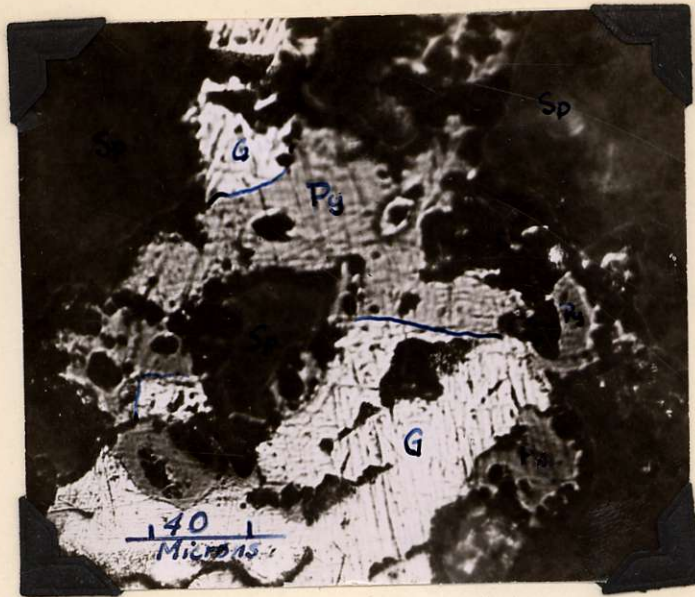
Sphalerite and Quartz

Magnification 650X

Objective No. 6a (Deckglas Tubus 1.215 m.m.)

Ocular 10X

Tetrahedrite	T
Galena	G
Sphalerite	Sp
Quartz	Q



Pyrargyrite in Galena associated with Sphalerite.

Objective No. 6a (Deckglas Tubus 1.215 m.m.)

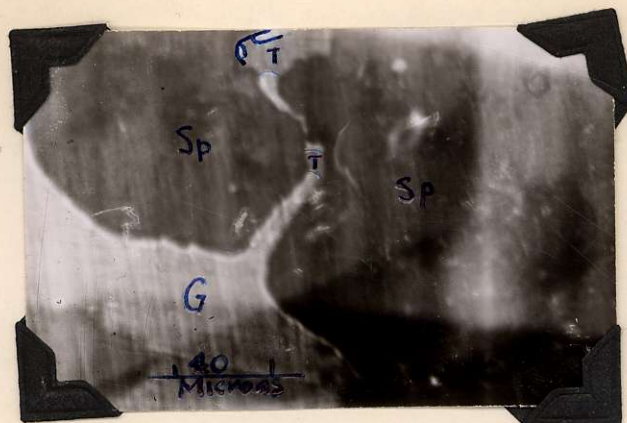
Ocular 5X

Pyrargyrite Py

Galena G

Sphalerite S

Magnification 325 X



Tetrahedrite in Galena Vein cutting Sphalerite
Magnification 325X

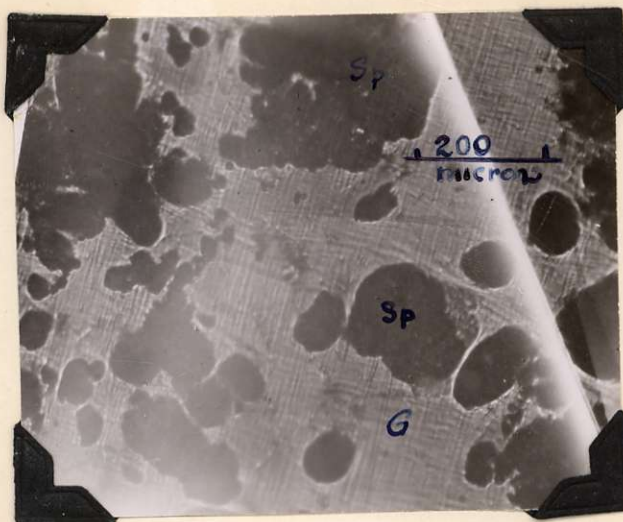
Objective No. 6a (Deckglas Tubus 1.215 m.m.)

Ocular 5X

Tetrahedrite T

~~Sphalerite~~ Sphalerite Sp

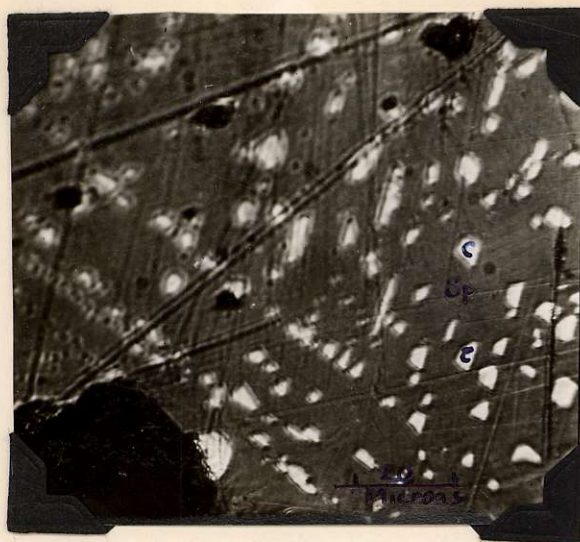
Galena G



Sphalerite in Galena

Magnification 85.5X

Objective No. 3b	10X
Ocular	5X
Galena	G
Sphalerite	Sp



Chalcopyrite in Sphalerite

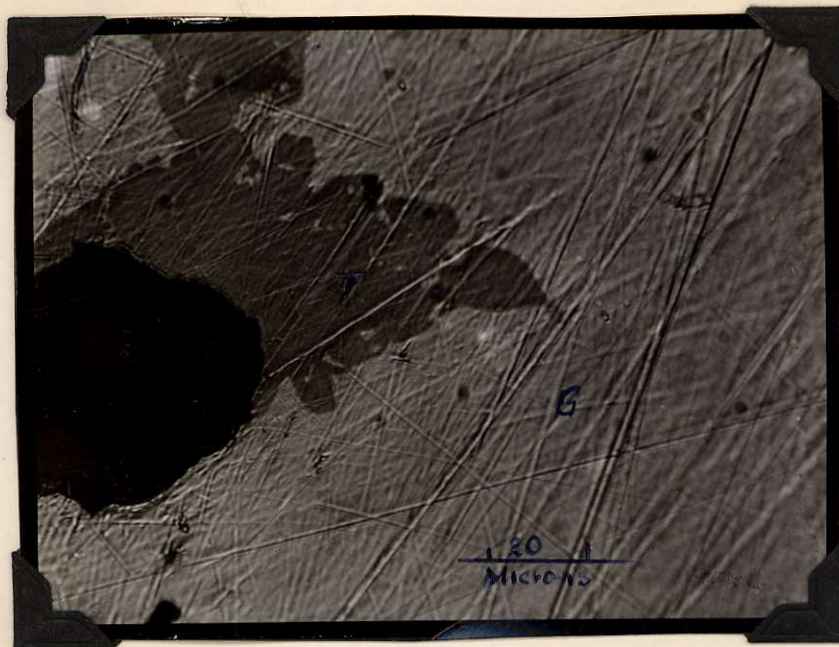
Magnification 650X

Objective No. 6a (Deckglas Tubus 1.215 m.m.)

Ocular 10X

Chalcopyrite C

Sphalerite Sp



Tetrahedrite in Galena

Magnification 650X

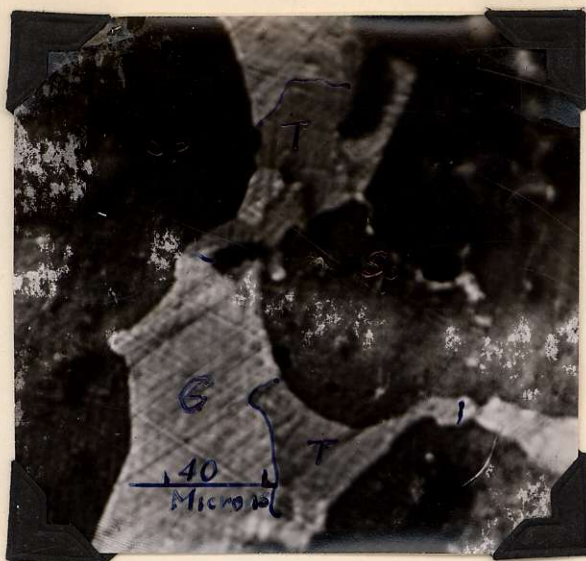
Objective No. 6a (Deckglas Tubus 1.215 m.m.)

Ocular 10X

Tetrahedrite T

Galena G

Exposure 15 sec.



Tetrahedrite in Galena Vein cutting Sphalerite.

Objective No. 6a (Deckglas Tubus 1.215 m.m.)

Ocular 5X

Tetrahedrite T

Galena G

Sphalerite Sp

Magnification 325X

Canada Department of Mines

HON. W. A. GORDON, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER.

BUREAU OF ECONOMIC GEOLOGY
GEOLOGICAL SURVEY

Issued 1935

LEGEND

- MODERN**
PLEISTOCENE AND RECENT
- 6 Recent alluvium and glacial drift
- TERTIARY**
- 5 Basaltic lava
- JURASSIC AND/OR CRETACEOUS**
UPPER JURASSIC AND/OR LOWER CRETACEOUS
- 4 Belt of quartz porphyry and quartz diorite dykes
- 3 Coast Range intrusives; granite, granodiorite, quartz diorite
- JURASSIC**
- 1 2 Hazelton Group, possibly in part Triassic, in part Lower Cretaceous; 1 - sediments; 2 - igneous rocks; argillite, greywacke, quartzite, limestone, tuff; 2a - mainly massive and fragmental rhyolite-dacite and related types; 2b - massive and fragmental rhyolite-dacite and augite porphyry; 2c - augite porphyry and allied fragmental rocks; augite, syenite, gabbro; 2d - amphibolite, minor amounts of fragmental amphibolite, sediments (mainly as inclusions)

Symbols

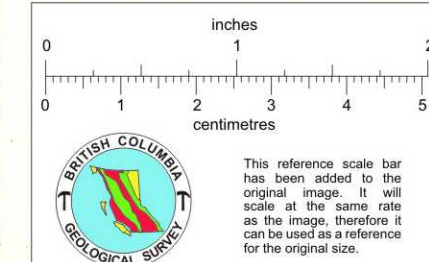
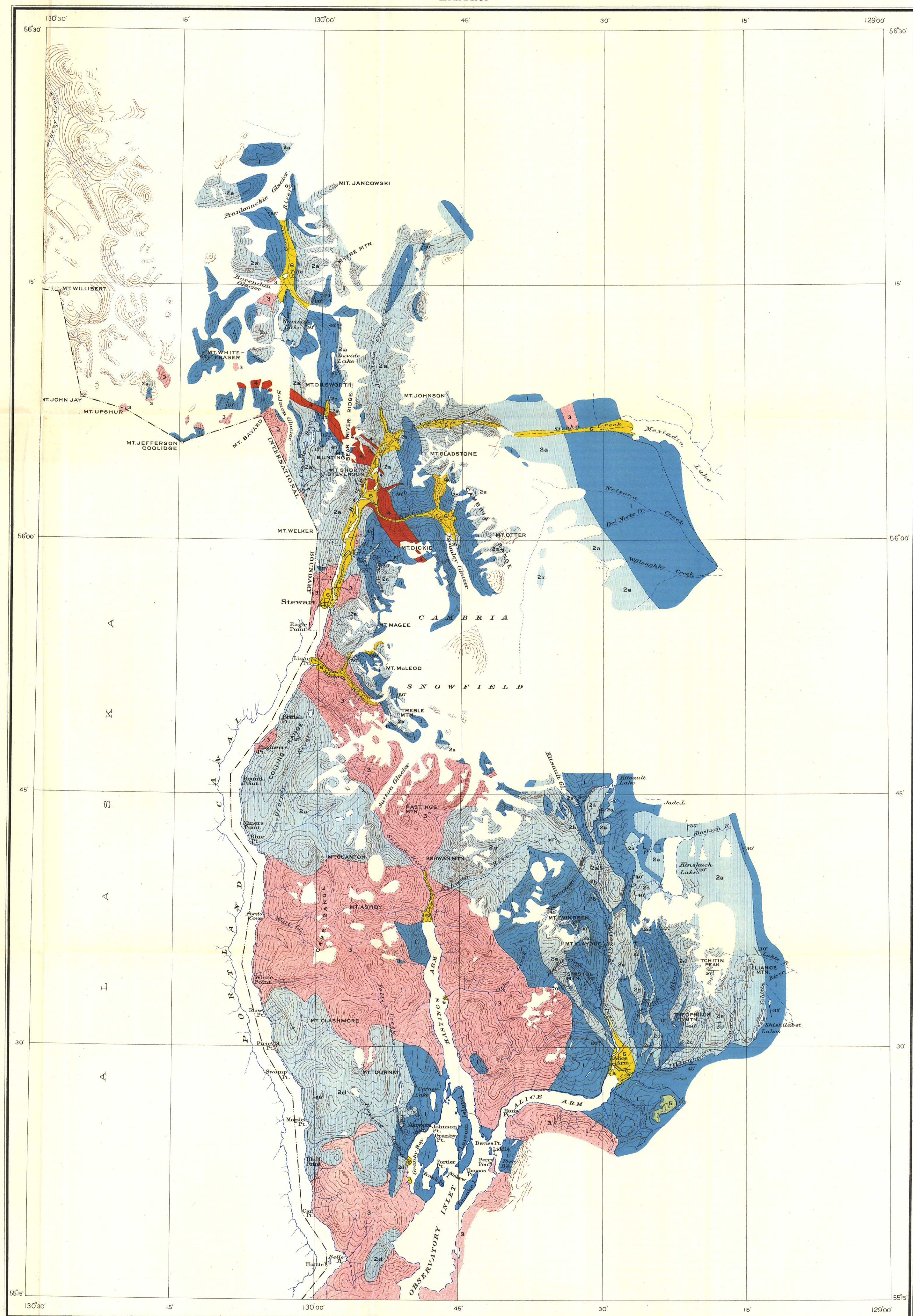
- Geological boundary (defined) ————
- Geological boundary (approximate) - - - - -
- Fault (defined, approximate) - - - - -
- Bedding (inclined, vertical, horizontal) / X +

SOURCES OF INFORMATION

Geology by R. G. McConnell, 1910, 1911; J. J. O'Neill, 1919; S. J. Schofield, 1920; and by G. Hanson, 1920, 1921, and 1926 to 1932.

RELATED PUBLICATIONS

Memorandum 175 "Portland Canal Area, British Columbia," 1934, by G. Hanson; and Map 355A "Mining Properties in the Portland Canal Area, Cassiar District, British Columbia," scale, 1 inch to 4 miles.



MAP 307 A PORTLAND CANAL AREA CASSIAR DISTRICT BRITISH COLUMBIA

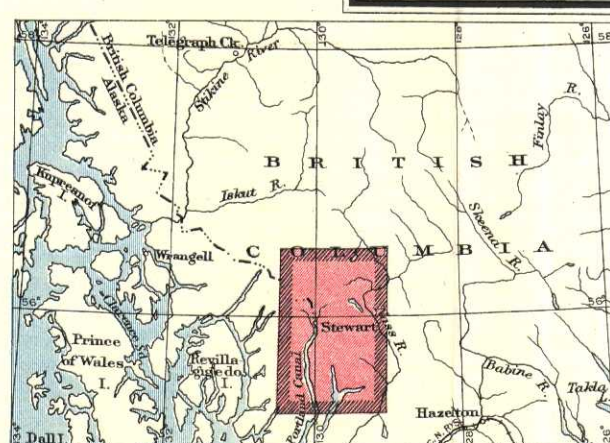
Scale, 253,340 or 1 inch to 4 miles

Kilometres 0 5 10 15 20
Miles 0 5 10 15 20
Contour interval 500 Feet

Legend

- Road ————
- Trail - - - - -
- Mine railway ————
- Aerial tramway ————
- Pipe line ————
- Telegraph line ————
- International boundary ————
- Lake and stream (position approximate) - - - - -
- Boundary of glacier or snowfield ————
- Contours ————
- Contours (position approximate) - - - - -

Survey and topography by Topographical Division, Bureau of Economic Geology, Department of Mines; International Boundary Commission, Department of the Interior; and by Canadian Hydrographic Service, Department of Marine.



Scale 1 inch to 100 miles

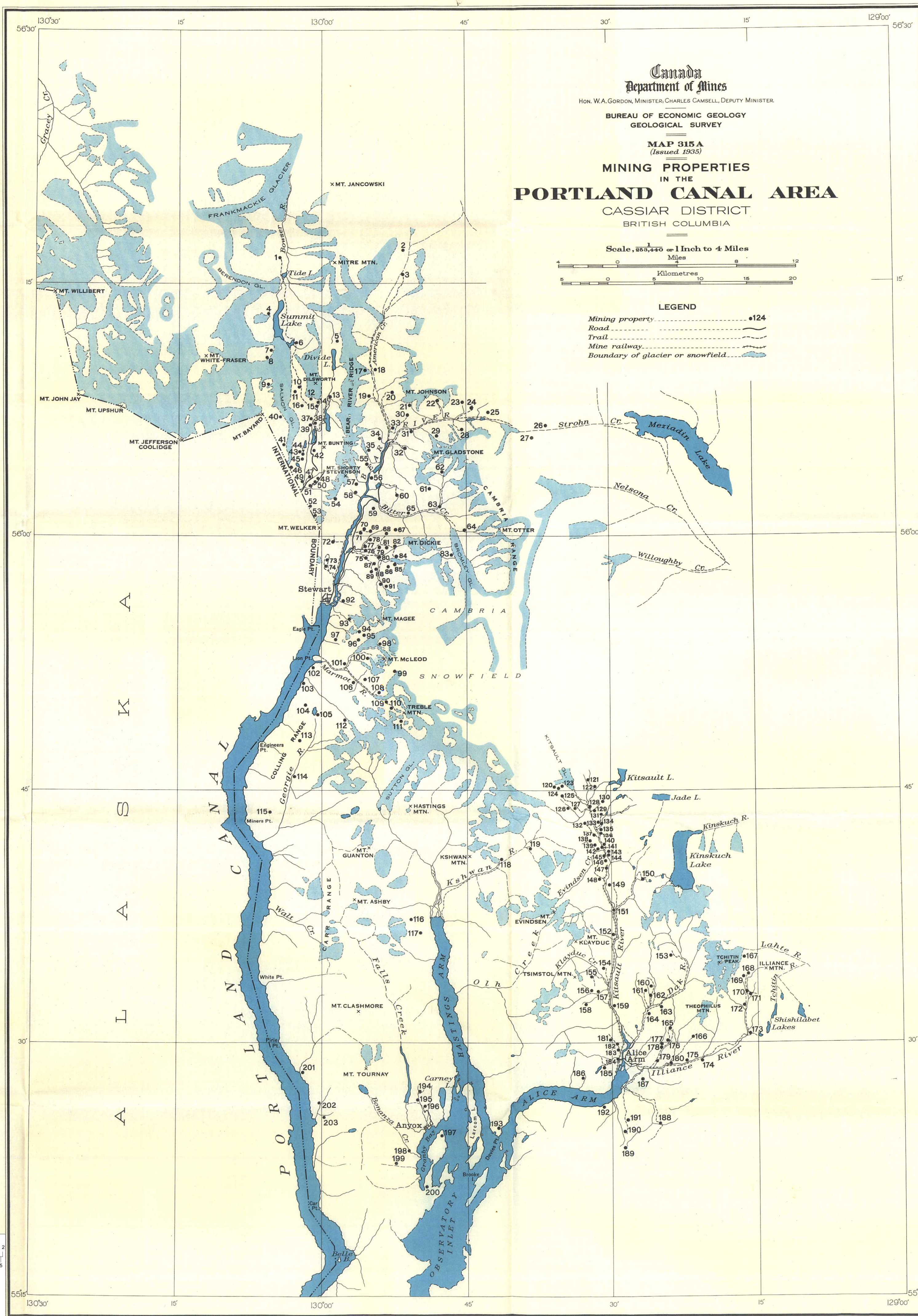
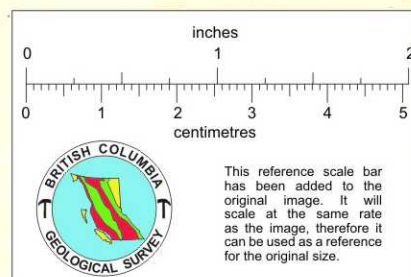
INDEX TO MINING PROPERTIES

- Pioneer Group; Silver Group; Silverton Group
- North-western Aerial Prospectors, Ltd.
- Excelsior Prospecting Syndicate
- Salmon Gold Group
- American Mining and Milling Company, Ltd.
- Salmon River High Grades, Ltd.; Troy Group
- St. Eugene Group
- Hollywood Mines, Ltd.
- Eldorado Gold Mines Consolidated, Ltd.; Outland Silver Bar Mines, Ltd.
- Forty Nine Mining Company, Ltd.
- Yellowstone Group
- Lion Group
- B.C. Bonanza Mines, Ltd.
- Silver Crest Mines, Ltd.
- Silver Tip Mining and Development Company
- Hercules Mines, Ltd.; Montana Fraction; Silver Basin Group
- American Creek Mining Company, Ltd.
- Anaconda Group
- American Girl Group; Lucky Jim Group; Mountain Boy Group
- Kansas Group; Terminus Mines, Ltd.; Vancouver Mines, Ltd.
- Morning Star Group
- Rufus Argenta Mines, Ltd.
- Barite Gold Mines, Ltd.
- Bornite Group; Doolia Property; Red Top Group
- George Enterprise Mining Company, Ltd.
- Montreal Group; Southern Cross Group
- Bear Pass Mining Syndicate
- George Copper Group
- Atlas Gold Copper Mining Company, Ltd.; Grey Copper Group
- Mount Gladstone Mining Company; Portland-lax Group
- Bear River Canyon Mining Company, Ltd.
- Ruby Silver Mines, Ltd.
- Galena Farm Group; Morning Group
- Big Casino Mining Company, Ltd.; Initial Group; Red Cliff Extension Mining Company, Ltd.; Red Cliff Mining Company, Ltd.
- Independence Gold Mining Company
- Unicorn Mining Company, Ltd.
- Mineral Hill Mines, Ltd.
- Buena Vista Mining Company, Ltd.
- Munro Mining Company, Ltd.
- Last Chance Group
- Bush Consolidated Gold Mines, Ltd.
- Boundary Group
- Payroll Group
- Indian Mines Corporation, Ltd.
- Glacier Group
- Premier Border Mining Company, Ltd.
- Sebakwe and District Mines, Ltd.
- Blue Jay Group; Premier Extension Gold Mining Company, Ltd.; Woodbine Gold Mining Company, Ltd.
- B.C. Silver Mines, Ltd.
- Premier Gold Mining Company, Ltd.
- International Group
- High Ore Gold Mining Company, Ltd.
- M.C. Group
- A. and T. Group
- Royal Irish Group
- Dalhousie and Rock of Ages Group; Palmey Group
- Artec Group; International Portland Mining Company
- America's Girl Group; Gold Bar No. 1 Claim
- Little Wonder Group; Ore Mountain Mining Company, Ltd.
- Mayou Gold Copper Company, Ltd.
- Jutland Group; Lucky Date Group; St. Elmo Group
- Roosevelt Group
- L.L. and H. Group; Old Chum Group
- Hill 60 Group; Radio Stewart Mines, Ltd.
- Goldie Group; Superior Mines, Ltd.
- Emperor Mines, Ltd.
- Silver Ledge Mining Company, Ltd.; Victoria Mines, Ltd.
- Mayflower Group
- Tyee Group
- Prince John Group
- United Empire Gold and Silver Mining Company, Ltd.
- Bayview Mining Company, Ltd.
- Phoenix Silver Mines, Ltd.
- Glacier Creek Mining Company, Ltd.; Little Wonder Claim; O.K. Fraction Claim
- George E. Claim
- Dunwell Mines, Ltd.; Sunbeam Mineral Claim
- Lakeview Mines, Ltd.
- Mimico Group
- Nabob Group
- Copper King Group; Ruth and Francis Group; Silver Bow Group
- Black Bear Group; Windsor Group
- Morning Star Group (Glacier Creek); Sunshine Group
- L. and L. Group; Silver King Claim
- Columbia Group; Rush-Portland Mining Company, Ltd.; Union Silver Mines, Ltd.
- Black Bear Claim; Portland Canal Mining Company
- Ajax Claim; Albion Mining Company, Ltd.; Hallie Claim
- Mobile Group
- Ben Bolt Group; Chicago Group; Cook and Dobson's Claim
- Black Hill Mining Company; Excelsior and Eagle Claims
- Copper Cliff Mines, Ltd.; Gold Ore Mining Company, Ltd.
- Silverado Group
- Prosperity and Porter Idaho Mines
- Merlin Group; Prosperity and Porter Idaho Mines
- Aberdeen Group
- Coast Silver Mines, Ltd.; Molly B. Claim; Red Reef Group; Silver Bell Mining Company, Ltd.
- Dominion Group
- Glacier Girl Group
- Fraser Group; North Fork Basin Group
- Wire Gold Group
- Emma Gordon Group
- Big Mike Group
- B.C. Verde Group
- Georgia Bay Group; Glory Extension Group; North Country Mining Company, Ltd.
- Bi-Metallic Syndicate
- Patricia Group
- Marmot Metals Mining Company, Ltd.
- Marmot Engineer Syndicate
- Washington Group
- Harner Group; High Grade Group; Prince George Group
- Monday Group
- Georgia River Gold Mines, Ltd.
- Pedro Group
- M.J. Group
- Saddle Claim
- Elkhorn Group
- Vimy Ridge Group
- Carpenter's Claims
- Blue Ribbon Group
- Black Diamond Group
- Columbia Group
- Homestake Group
- Mathilda Claim; Tip Top Claim
- Fox Claim
- Lucky Strike Group
- Vanguard Group; Vanguard Extension Group
- Second Thought Group
- Highland Group; Kitsault River; Tyee Group
- No Name Claims; Summit Group; Yukon and Nome Claims
- Chance Group; Queen and Queen Fraction
- Copper Cliff Group
- Camalachie Claim; Moose Group
- Climax Group
- Silver Horde Group
- Wolf Group
- Ouray Group
- Racehorse Group; Starlight Group
- Combination Claim
- Musketeer Group
- Bonanza Fraction
- Combine Fraction; Red Point Group
- Tiger Group
- Ruby Group; Toric Mine
- North Star Claim
- Dolly Varden Mine; Silver Tip Group
- David Copperfield Group; Surprise Claim
- Medallion Claim; Wild Cat Group
- Canyon Claim; Homeguard Group; Rex Claim; Silver King and Eagle Claims
- Basin Group
- Zorka Group
- Henderson's Claims
- Butte Claim; Ida Claim; Le Roy Group
- Eagle Group
- La Rosa Mine; Speculator No. 2 Claim
- Bunker Hill Group
- B. and C. Group
- Silver Wing and Copper Crest Claims
- Riverside Group
- Observer Group
- Red Bluff Group
- Fox Group
- L.L. Group; Silver Bar Group; Silver Chord Group; War Dance Group
- San Diego Group
- Sunrise Group
- Horseshoe Group
- Glacier Claim; Left Over Group
- Monarch Group; Titrite Group
- Falcon Group; Homebush Group
- Silver Bell Group; United Metals Mining Company, Ltd.
- Silver Cliff Group; Silver Star Group
- Bellevue Group; Grey Goose Claim
- Beaver Extension Group; Golden Crest Group; Iron Group
- Silver Leaf Group
- Copper Creek Group; Ingham's Claim
- Standard Group
- Highland Group
- Billy Mac Group; Kent and Maple Leaf Claims
- Alamoza Group; Casey Group; Lone Star Group; Silver Bell Claim
- Three Mile
- Lone Maid Group
- Alice Group; Anna Mack Claim
- Acadia Group; Esperanza Mines
- Caribou Fraction Group; Independent Claim; Wolf Claim
- Billy Barton Group; Utopia Group
- Mayflower Group
- Beverly Group
- Last Chance Group; Lynx Group; Silver Bow Claim; Verona Group
- Theda Bara and Bebe Daniels Claims
- Sunset Group
- Mohawk Group
- Macy Mine
- Anyox Extension Claim
- Deadwood and Quartz Groups
- Homestake Group
- Hidden Creek Mine
- Granby Point
- Black Bear Group; Bonanza Mine
- Redwing Group
- Golskeish Mine, Ltd.; Ground Hog Claim
- Swamp Point
- Outsider Group
- Maple Bay Groups

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