PART B.

NORTH-WESTERN MINERAL SURVEY DISTRICT (No. 1).

BY

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The North-western Mineral Survey District (No. 1) embraces the Pacific drainage area of the Province from Seymour inlet to the Yukon boundary and all of the Arctic drainage area of the Province north of the Peace river and its tributaries.

Three main topographic features characterize the district. On the west is the comparatively low-lying coastal area with deeply indented and irregular shore-line and numerous islands. To the east the land gradually rises through rugged, mountainous country to the crest of the Coast range, from 7,500 to 9,000 feet altitude, and then descends to the comparatively rolling, though in places still rugged, Interior plateaux of from 2,000 to 3,000 feet elevation.

These three topographically distinctive sections of the district are further characterized by distinctive geological and climatic features. Decided, in places excessive, precipitation, with mild and comparatively equable temperature, marks the coastal area. Diminution in rainfall, a heavy winter snowfall, and less equable seasonal temperature characterizes the Coast Range section. The Interior Plateaux region is featured by moderate rainfall and snowfall and a marked difference in seasonal temperature.

The dominant factor in the geology of the three distinctive sections, particularly from an economic standpoint, is the Coast Range batholith and its satellites. The batholith has been intruded into and underlies the various formations exposed in the district. Most of the mineral deposits in the district are related to the batholith.

All bearings in this report refer to true north.

GENERAL SUMMARY.

There has been a decided increase in activity in all branches of the mining industry in this district during 1934. More mines have entered the production list and quantity and value output should exceed the 1933 figure. Employment has increased over 1933 and approximately 2,000 men have been on direct pay-roll employment in about forty operations of varying sizes. This is exclusive of the numbers of individual prospectors and smaller outfits scattered throughout the district.

The Stewart camp is in the soundest condition of any time in its history, with no unemployment during the season; a condition that has not prevailed for several years. Towards the close of the year negotiations between Premier Gold Mines, Limited, and B.C. Silver Mines, Limited, offers encouragement for the early resumption of operations with production from the latter property. Although the Alice Arm area has been comparatively inactive, the gold aspects of the west side of the Upper Kitsault Valley area have become more definitely apparent and have attracted attention.

In the Atlin area lode-mining has been revived and mining interests have commenced operations. Placer-gold operations in the district have also increased, and many individuals, syndicates, and companies have been active.

Interest is being taken in low-grade gold properties such as *Big Missouri* in the Upper Salmon River area.

During the year Eastern Canadian operating companies and financial interests have become actively associated with mining development in the northern section of the district. Interest in the potentialities of the district is also evident in the increased activity of examining engineers, mainly representing substantial Canadian interests.

Operations have been chiefly centred in gold. No definite revival of operating activity in purely silver and base-metal deposits has yet materialized.

The low price and discouraging market outlook for copper has had a depressing effect on present and future production concerning this metal. This adversely affects the large operation

of the Granby Consolidated Company at Anyox, and also the immediate possibility of opening up future copper-producers. Although this district contains important copper potentialities, it would seem that further development of these must await adjustment of the intricate factors of world supply and demand governing this metal.

Production.

The following is the production from No. 1 District during 1934: Ore, 2,054,332 tons; gold, lode, 47,658 oz.; silver, 968,639 oz.; copper, 37,077,718 lb.; lead, 725,164 lb.; zinc, 192,406 lb.; placer gold, 10,889 oz. Miscellaneous metals, minerals, and structural materials produced had a value of $51,761.

Development, Exploration, and Prospecting.

Development and exploration has been actively carried out on many lode properties, including *Dunwell*, *Big Missouri*, *Unicorn*, *Salmon Gold*, *United Empire*, *Surf Point*, Princess Royal Gold Mines, Atlin Pacific (formerly Norgold), and Atlin Ruffner. Exploratory work has also been carried out on many other smaller properties in the district during the year. Placer-gold operations have shown an increase as compared with 1933. Besides the larger placer operations, more individuals are engaged in prospecting and recovery work than was the case in 1933. Regarding placer activity, a feature of the year has been the introduction of substantial capital and more thorough preliminary testing of ground.

Although prospecting for both lode and placer has been very active in the district, no outstanding new discoveries in new areas have been made. Some discoveries of importance have, however, materialized, and a feature has been the constructive results achieved from detailed prospecting of many old properties in already known areas.

Transportation Facilities.

The use of aeroplanes has shown a marked increase during 1934 and has proved the suitability and feasibility of this method of transportation, particularly in connection with exploration of the more remote areas. A slight improvement in rates for aeroplane transportation has been observed, but a further reduction in this respect would make this form of transportation available for more general use, especially by prospectors, small syndicates, and companies with limited funds, and would thus be of greater material assistance in the further exploration of the extensive favourable virgin area in this district.

Acknowledgment.

The writer desires to express his thanks for their co-operation to the prospectors, operators, and all those with whom he has come in contact during the conduct of his work.

BELLA COOLA MINING DIVISION.

This Division has been described in previous Annual Reports, and in Bulletin No. 1, 1932, its geological characteristics are described and likely areas for prospecting mentioned. During 1934 the Division was comparatively inactive and was not visited.

QUEEN CHARLOTTE MINING DIVISION.

The Queen Charlotte Mining Division embraces the Queen Charlotte islands. Graham island and Moresby island, approximately 2,500 and 1,000 square miles in area respectively, are the main islands. Graham island, with the exception of its south-westerly quarter, is built entirely of Cretaceous and Tertiary sedimentary and eruptive rocks, with a generally low-lying topography. Moresby island, lying to the south of Graham island, is built almost entirely of Triassic volcanics and sediments and has a comparatively elevated and rugged topography. Although the mineral occurrence of the islands were amongst the first in the district to receive attention, and promising deposits carrying gold and copper are known to occur, the area has not yet received the exploration or prospecting attention it warrants.

No lode operations were carried out on Graham island during 1934. On the east coast several individuals have earned wages or expenses from sluicing the gold-bearing black sands in the localities of Lawn hill, Eagle river, Bull swamp, and Cape Fife.

AREAS RECOMMENDED FOR PROSPECTING.

Graham Island.—The area of granitic contacts with Triassic volcanics in the vicinity of Vancouver harbour and Rennel sound.

Moresby Island.—The area of Triassic volcanics striking north-easterly towards Mitchell inlet, about 1 mile wide and lying between a limestone-shale belt on the south and tuffaceous rocks on the north, on the west coast in the vicinity of Kootenay harbour.

The low-lying area of possibly Triassic amygdaloidal and spheroidal lavas on the south side of Mitchell inlet, Moore channel, and extending to around the head (Thetis cove).

A low-lying area of similar rocks to those described in Mitchell inlet, occupying the central section of the south side of Douglas inlet, Moore channel.

Some areas of green andesitic rocks, Peel inlet, Moore channel.

On the north side of Cumshewa inlet in the Triassic formation about a quarter of a mile from the beach and contiguous to a granitic contact exposed along Cumshewa point, Cumshewa inlet.

Haida Gold Mines, Ltd.

This company, with registered office at 612 Standard Bank Building, Vancouver, was incorporated in May, 1933, as a private company and later as a public company with an authorized capitalization of 2,000,000 shares of no par value; 400,000 vendors' shares have been issued at 10 cents and 520,000 shares sold at 10 cents. The holdings consist of ten claims located on the South arm of Kootenay harbour, Moresby island, and are reached by steamboat from Vancouver or Prince Rupert to Queen Charlotte City; thence about 30 miles by launch to Kootenay harbour. A good trail extends for about 1 mile from the beach to the showings between elevations of 300 to about 1,000 feet.

The topography of the area is characterized by comparatively steep, rugged, and timbered mountain and ridge slopes to elevations of from 3,000 to about 4,500 feet. In some places, generally marking variations in formation, the steep slopes are bordered by a low-lying, hillocked topography. The formation is composed of a belt of andesitic volcanic rocks contiguous to dark calcareous and shaly sediments. The mineralization consists of comparatively erratic quartz-replacement veins with generally tight walls, occurring in the volcanic rocks. The veins strike about east-west, dip steeply south, and are very sparsely mineralized with pyrite, chalcopyrite, and native gold in erratic distribution.

The property was staked as the *Rupert* group in 1930 by E. C. Stevens, of Skidegate, and is partly a restaking of the old *Blue Mule* group and referred to under that heading in the Annual Reports for the years 1920, 1922, and 1923. In 1922 the old *Blue Mule* owners, after carrying out some stripping and open-cutting, built a 100-foot flume, a 14½-foot water-wheel with an 8-foot drive-pulley, four ore-bins, suitable housing, and erected a Ross amalgamating-mill. Some gold was recovered with this equipment, but operations soon ceased. In the 1932 Annual Report the properties are referred to under the heading of *Kootenay* group.

Surface cuts and stripping show the veins to be brecciated and reticulated in structure and from 6 inches to about 6 feet wide, with varying degrees of silicification and a tendency to stringer into the walls. Surface exposures show characteristic sparse mineralization with pyrite, chalcopyrite, and some gold in erratic distribution. The gold is sometimes fairly coarse and visible, but is generally too fine to be detected by the naked eye. From some sections of the vein where gold is not visible it can be panned from the finely crushed quartz. The greater part of the work is being done on what is known as "C" vein. Several veins have been traced for about 100 to 500 feet on the surface.

Exploratory operations by the present company were started in 1933 and continued to the late fall of 1934, when lack of funds necessitated cessation. The work done included surface stripping, trenching, underground drifting, and crosscutting in two adits, with detailed sampling. Operations have been carried out under the management of A. H. Ingraham. At an elevation of about 445 feet "C" vein was drifted on in No. 1 adit for a distance of about 280 feet in an easterly direction. This work shows the characteristic vein-structure and mineralization with vein-widths varying from about 16 to 48 inches, and several branch stringers entering the foot-wall. Visible gold in fine distribution was encountered at intervals between the portal and the face of this working, and detailed sampling carried out by the management shows values varying from 0.02 to 1.42 oz. gold per ton, with an average assay value for the length of the working reported to be 0.214 oz. gold per ton across a width of

29 inches. Values seem to be distributed in short lengths or lenses. An analysis of the company assay-plan shows seven of these lenses or pockets in No. 1 adit. Starting from the portal, these are as follows:—

	Gold. Oz. per Ton.
Length, 15 feet; width, 18.6 inches	0.56
Length, 15 feet; width, 20 inches	0.698
Length, 20 feet; width, 35 inches	0.435
Length, 10 feet; width, 45 inches	0.259
Length, 10 feet; width, 39 inches	0.128
Length, 5 feet; width, 38 inches	0.21
Length, 40 feet; width, 17.75 inches	0.28
Length, 30 feet; width, 21.8 inches	0.257
Face: Length, 5 feet; width, 22 inches	0.145

These lenses are spaced respectively 15, 20, 10, 10, 10, 10, 35, and 20 feet apart. A summary of these lenses shows a total of 150 feet, averaging 28.57 inches wide, assaying 0.303 oz. gold per ton.

At an elevation of about 218 feet, or 220 feet below No. 1 level, a crosscut adit (No. 3) is reported to have intersected "C" vein at a distance of about 387 feet from the portal, showing at this intersection a width of 30 inches of solid quartz and about 60 inches of small quartz veins and stringers. The vein was drifted on for 50 feet to the east and about 70 feet to the west, exposing characteristic structure with some mineralization. According to the company assay-plan, the east drift shows generally low values, and one possible lens, 10 feet long and 28 inches wide, assaying 0.217 oz. gold per ton. In the face of the east drift the vein is reported to be 22 inches wide, assaying 0.4 oz. gold per ton. According to the mine assay-plan, the west drift on this level also shows generally low values, and one possible lens, 15 feet long and 30 inches wide, assaying 0.19 oz. gold per ton, with the vein in the face, 40 inches wide, assaying 0.05 oz. gold per ton.

On account of the values in this deposit being in the form of free gold in erratic distribution, it is deemed advisable that the channel-sampling should be checked by bulk samples of, say, 1 ton each, which could be shipped to a smelter or to the ore-testing laboratory at Ottawa for value determination. These samples should be taken from raises on several of the short lens-lengths in both adits. Providing this bulk-sampling offers sufficient encouragement regarding values, several other veins which occur on the property would be worth further exploration, and the continuation of the No. 1 adit to explore the section below the higher-grade lenses in the upper level would also be constructive.

Other Properties.

On the *Fairtide* claim, adjoining the *Cumshewa* group, owned by Robert Scharffe and partners, of Skidegate, a narrow vein has been stripped for 100 feet, and for this length across 10 inches assays 0.4 oz. gold per ton and 8.4 oz. silver per ton. Additional stripping and open-cutting on this vein should be carried out to determine the possibility of greater widths and further continuity. On the *Ruby* group at Copper bay, J. Peacock, of Charlotte City, has carried out open-cutting on a pyritized shear-structure, 10 feet wide, in volcanic rocks outcropping on the beach below high-tide mark. Several years ago an attempt was made to sink a shaft on this deposit by building a cement coffer around the collar. From two new open-cuts about 150 feet apart encouraging gold values were reported, but sampling of these cuts by the writer across 9 and 11 feet respectively failed to disclose any values of importance.

SKEENA MINING DIVISION.

This Division, about 22,000 square miles in area, embraces the largest area of the Coast Range batholith in No. 1 District. Mineralization occurs chiefly as cupriferous replacements and contact-metamorphic deposits of copper and magnetite in the roof-rocks, sometimes accompanied by galena and sphalerite. In the granitic rocks of the batholith, particularly those richer in hornblende, such as quartz diorite, high-grade gold-bearing pyrite in quartz veins frequently occurs. Gold-bearing copper and iron mineralization in pegmatitic dykes is

known and deposits of molybdenite also occur. Limestone, marble, possibly building and ornamental stone and superficial clay deposits, are widely distributed in this Division. There are also possibilities for the discovery of mica and refractory deposits.

In the extensive coastal area of the Skeena Mining Division the availability of immediate seaboard transportation to markets eradicates what is the main handicap for the development of mineral resources, especially those of the non-metallic category. Industrial utilization of the latter type of deposit is worthy of more intensive investigation in the Skeena Division than it has heretofore received. There are extensive areas of this Mining Division in both the pendant or included roof-rocks and also in favourable structural and contact areas of the batholith itself that are as yet very little or totally unprospected and are deserving of the attention of prospectors.

Princess Royal Gold Mines, Ltd.

This company was incorporated in 1933 with an authorized capitalization of 7,000,000 shares of no par value. The registered office of the company is 810 Rogers Building, 470 Granville Street, Vancouver, and J. B. Woodworth is managing director. The holdings embrace the *Surf Inlet* and *Pugsley* groups of the old Belmont-Surf Inlet Mines, Limited, which company ceased operations in 1926. The property is situated about 7 miles inland from the head of Surf inlet, on Princess Royal island, and is reached by launch up Cougar and Bear lakes from where about 1 mile of narrow-gauge railway extends to the camp.

The mineralization consists of pyritized quartz veins occupying shear-zones in granitic rocks of the batholith. The *Surf Inlet* workings are on the north and the *Pugsley* workings are on the south side of a deep and precipitous valley. The shear-zones strike northerly across the valley and dip from 45 to 60 degrees west. The ore in the old *Surf Inlet* mine occurred in pyritized quartz veins in places up to about 40 feet wide. The *Pugsley* veins are narrower. Production by the old Belmont-Surf Inlet Company came mainly from the *Surf Inlet* veins, although considerable mining was also carried out on the *Pugsley* veins. A total of about 836,500 tons of ore yielding nearly $8,000,000, of which $1,437,500 was paid in dividends, was produced by the old Belmont-Surf Inlet operation. This deposit, although discovered several years before, was first known as the *D.L.S.* group and was formerly owned by the Surf Inlet Mines, Limited, which sold the property to Belmont Canadian Mines, Limited. The latter company reorganized into the Belmont-Surf Inlet Mines, Limited, which began production on a large scale in 1917 and continued until 1926, when operations ceased. The property then remained dormant until the transference of the holdings to the present company in 1933.

Preparatory work by the present company was initiated in 1933 and continued into 1934 with a crew of thirty-six men under the supervision of Ed. Kinder and the direction of J. B. Woodworth, of Vancouver. This work included repairs to the wharf, buildings, railway, etc., installation of power and telephone line, laying of track, construction of ore-bunkers, transportation and installation of machinery. A small tonnage of ore selected from pockets of sulphides in several parts of the old *Pugsley* workings has been shipped. At the time of examination by the writer in June no other mining or underground preparatory work had been undertaken. The writer was informed that for the time being initial mining operations would be confined to the *Pugsley* veins.

For purposes of efficient examination the old *Surf Inlet* mine main workings were deemed inaccessible.

The *Pugsley* property was originally opened up by the Belmont-Surf Inlet Company on four levels, the main or track level being the so-called 900-foot level, with a shaft to the 1,000-foot level and raises to the 800- and 700-foot levels, and above this to and towards surface. The shaft and 1,000-foot level were flooded and inaccessible, and no criterion could be formed regarding the amount of the old mining or aspect of veins on this level. It is claimed that on this level drifting and stoping was carried out on the "Big" (or east) vein, but that no mining exploration or development was done on the "Small" (or west) vein. The mineral occurrence in the old *Pugsley* workings consists mainly of two parallel shear-structures about 90 feet apart, in gneissic quartz diorite. Mineralization consists of pyrite and chalcopyrite erratically distributed in a quart gangue in blebs, streaks, and patches, favouring generally the hanging or foot walls of the veins and sometimes being in sufficient quantity to form minable lenses and shoots. Gold values are confined entirely to the sulphides, the quartz itself being barren of values.

The east vein varies from about 5 to 15 feet in width on the 900-foot level. On this level in the drift south on the east vein to the old stope, along a distance of about 350 feet, short lengths of quartz with some sulphide mineralization can be seen and would be worth further exploration for mill-grade ore possibilities. Beyond this the level has been stoped out for a length of about 120 feet, the stope extending probably about 100 feet in the back and also below the level probably to the 1,000-foot level. The workings on the east vein in and beyond this stope were not accessible with any degree of safety. It is understood that further mining by the old company in the back of this stope towards the surface was limited by the encroaching boundary of the *Homestake* claim, which claim is reported to be now under option to the Princess Royal Gold Mines, Limited. It is also understood that surface continuity of the "Big" (or east) vein has not been definitely located. Any further possibilities in the upward extension of this stope can consequently only be ascertained by accessibility, examination and sampling of the stope-back, and further exploration in this direction. Possible continuity of this ore-shoot in the east vein below the stoped area on the 1,000-foot level can likewise only be ascertained by examination and sampling after dewatering the 1,000-foot level and the prosecution of further exploration if deemed warranted. In the drift north on the east vein good widths of quartz are exposed in places, with some scattered blebs and streaks of sulphides. In this drift the shear decreases in intensity to the face, which shows a structure of somewhat crushed diorite, 6 feet wide, containing a few small streaks and patches of quartz.

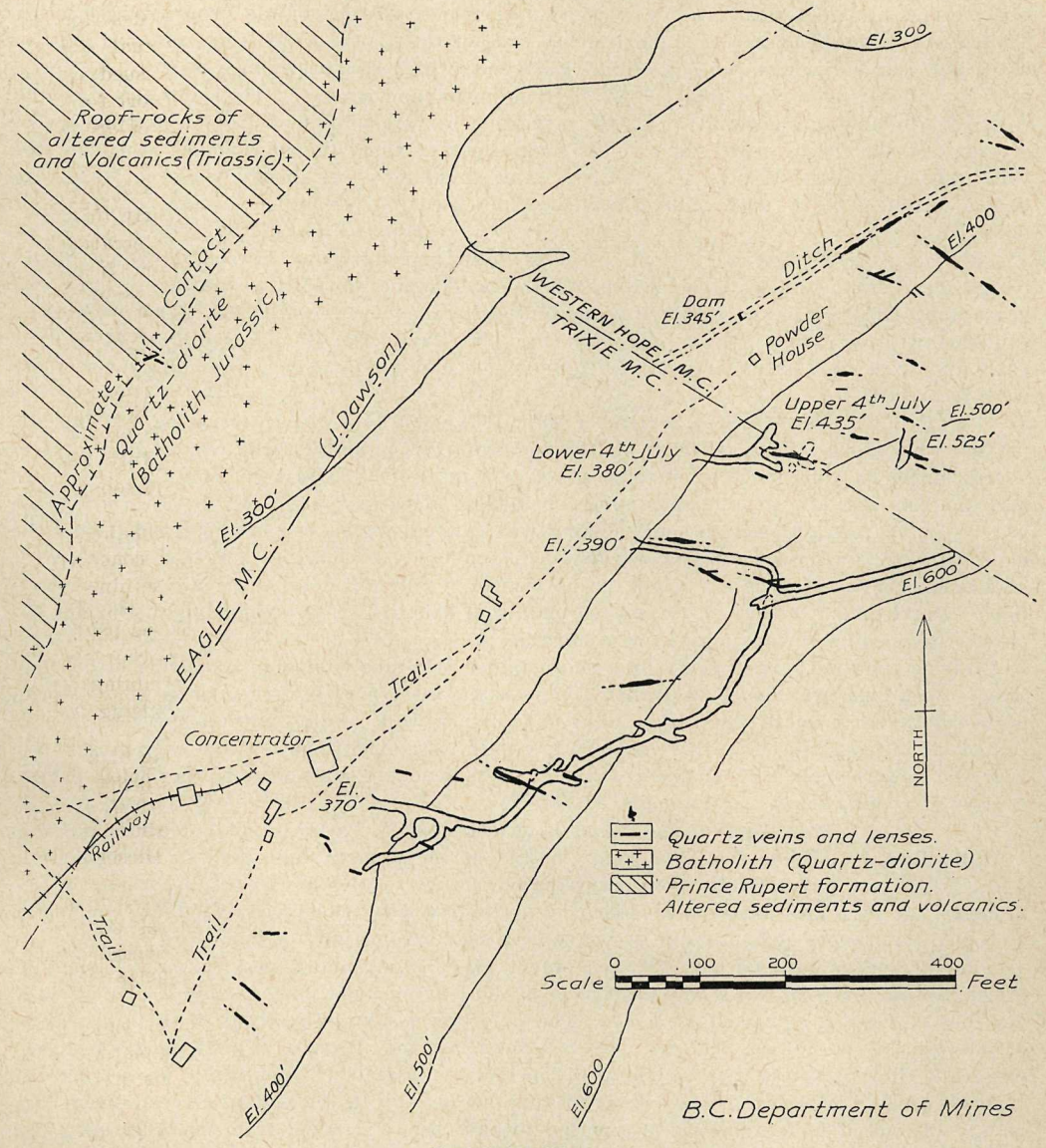
The "Small" (or west) vein varies in width from 10 to about 14 inches of quartz, with sulphide mineralization in places, contained in a sheared structure up to about 5 feet in width in some sections. Sulphide mineralization is mainly confined to the quartz gangue, which averages about 24 inches in width. Sulphides are erratically distributed in generally small lenses or shoots, which have a stope-length varying from a few feet to a maximum of about 200 feet. This characteristic necessitated careful selective mining in the old workings, with a resultant erratic stope outline. Considerable stoping was completed on this vein by the former Belmont-Surf Inlet operation between the 900-foot level and surface. Many sections of these old stopes were, however, inaccessible at the time of examination. Before any definitely accurate criterion can be gathered regarding possible remaining ore-tonnage in the worked area above the 900-foot level, these old workings should be accurately surveyed, mapped, and sampled. Along the 900-foot, 800-foot, and accessible parts of the 700-foot drift-levels short lengths of vein that may possibly grade to ore can be observed in the backs and floors. Samples taken by the writer from some of these sections on the 900-foot and 800-foot levels assayed as follows:—

Width.	Gold.	Silver.	Copper.
	0.50	Oz. per Ton.	Per Cent.
(1.) 12 inches	0.16	0.1	Trace
(2.) 24 inches	0.08	0.5	Trace
(3.) 14–39 inches	0.20	Trace	*Nil*
(4.) 14 inches	Oz. per Ton.	Trace	.....

Since the examination of this property in June the management reports raising between the 900 and 800 levels on a split section of the west vein in the *Pugsley* workings. In this work a short section of good-grade ore is reported to have been encountered. The incline shaft between the 900 and 1,000 levels is also reported to have been pumped out with a view to further exploration of the east vein on the 1,000 level and crosscutting to the west vein and drifting along it.

Surf Point. This property embodies the old *Trixie* group formerly owned by Frank Patterson, of Porcher island, and acquired some years ago by J. B. Woodworth, of Vancouver, in association with Noah H. Timmins, of Montreal. During the last two years the property has been operated by the N. A. Timmins Corporation, with R. E. Legg in charge of the work at the mine. The claims are situated off Welcome harbour, on the westerly shore of Porcher island, about 25 miles south-westerly of Prince Rupert. The property is reached by launch from Prince Rupert.

The topography of the area is featured by a comparatively flat or hillocked foreshore deeply covered with muskeg and of about 300 feet general elevation, bordering the steep slopes to mountain domes or ridges of from 4,000 to 5,000 feet elevation that form the central portion of the island. This characteristic topography is conformable to the flat and doming structure of the intrusive batholithic rocks, the low hillocked areas generally marking flat roof-horizons of the batholith with remnants of preserved roof-rocks. It is in this flat roof-horizon that



Surf Point Mine.

the mineral deposits occur. In former years small shipments of sorted ore were made to the smelter, either by the owner or by some operator working under lease and bond. In 1917 the property was bonded to the Belmont-Surf Inlet Mines, Limited, which company after doing considerable exploratory work relinquished the bond. About 1928 the property was bonded by J. B. Woodworth, of Vancouver, and later, in association with N. A. Timmins, of Montreal, was purchased. In the operation preceding the present active direction of the work by the

N. A. Timmins Corporation inaugurated in 1933, extensive underground work and open-cutting were carried out and an incline railway constructed. The older operations are described in former Annual Reports. The more recent operations are described in the Annual Reports from 1927 to date. The property is also referred to in Bulletin No. 1, 1932, issued by the B.C. Department of Mines, and in the Geological Survey of Canada Summary Report for 1922.

The mineral occurrence consists of gold-bearing pyrite in erratic and lenticular quartz veins in quartz diorite. These veins occur contiguous to the contact of quartz diorite of the Coast Range batholith with the older roof sediments and volcanics of the Prince Rupert series. The veins outcrop along a rather flat benched area of the diorite which represents a comparatively flat roof-horizon of the batholith. The veins, which strike generally easterly to north-easterly, appear to occupy joint-planes in the diorite and are very lenticular, erratic, and restricted in outcrop continuity. Sharp variations in vein-widths of from a few inches to several feet are characteristic, and unless some shearing along the joint-planes is evident the veins die out rapidly at both extremities. Over thirty of these quartz veins or lenses are known to outcrop, and underground work has indicated the possibility for the occurrence of blind lenses.

Operations have been carried out in several adits and open-cuts between elevations of 370 to 500 feet. In the work carried out by the N. A. Timmins Corporation during the last two years approximately eleven different veins and lenses have been developed. The property is equipped with a 25-ton flotation-mill built in 1933. Production commenced in July of that year, and from six months' operations 1,268 oz. gold and 345 oz. silver from 1,626 tons of ore were recovered.

For the nine months ended September 30th, 1934, 4,049 tons of ore averaging 0.81 oz. gold per ton was milled. With recovery at 94.6 per cent., this produced 364.5 tons of concentrates averaging 8.6 oz. gold and 3 oz. silver per ton, or a total of 3,136.6 oz. gold for the nine-month period. This ore all came from stoping operations above the main adit-level. During the latter part of the 1934 season some sinking was carried out on one of the lenses below the main adit-level, with encouraging results. This indicates possibilities for the occurrence of high-grade gold-bearing pyrite below the horizon of the first and present main mining operations. Development during 1934 consisted mainly of drifting, crosscutting, and raising for the purpose of opening various lenses for production.

During the first part of the year a short diamond-drilling campaign consisting of 985 feet in seventeen holes was undertaken with a view to the discovery of further lenses below known horizons. Several small lenses were located. Further work of this nature, however, is warranted, as all possibilities in this category have not been exhausted. At the beginning of the year the power-supply was augmented by the installation of a 60-horse-power Diesel engine. A crew of about twenty men is employed.

Edye Pass. This group of five claims is owned by F. T. Patterson, of Porcher island, and adjoins the *Surf Point* on the north. Quartz veins and lenses similar in character to those occurring on the *Surf Point* have been discovered on this property. Several good lenses of gold-bearing pyrite have been uncovered by extensive stripping and small shipments of high-grade ore have been made from time to time.

Recent operations have been carried out on the *Jeannie* and *Nabob* claims. During the latter part of this year work was continued on the long open-cut on the *Jeannie* claim and 13 dry tons of ore was shipped to Tacoma. The following assay and analysis of this ore may be of interest: Gold, 4.01 oz. per ton; silver, 1.25 oz. per ton; iron, 17.8 per cent.; silica, 56.7 per cent.; lime, 1 per cent.; sulphur, 19.2 per cent.; alumina, 3 per cent. Work was also commenced on a showing lying easterly of this cut and up to the end of December approximately 15 tons of high-grade ore is reported to have been extracted from lenses about 2 feet in width. On the *Nabob* claim a trench 170 feet long, continuing in an open-cut about 120 feet long, has exposed a well sheared and defined vein-structure varying from 6 to 41 inches in width. From the open-cut approximately 35 tons of ore, estimated to assay about 1 oz. gold per ton, was extracted and piled on a dump. A sample of the face of this cut across 41 inches assayed: Gold, 0.6 oz. per ton; silver, 0.5 oz. per ton. About 30 feet south of the face of this cut the vein is exposed again and shows a width of 30 inches of well-pyritized quartz. Southerly the vein is covered with muskeg, but its possible continuity is marked by a trough-depression which can be observed extending into the adjoining *Eagle* claim and aligning

itself with a deep draw about 1,000 feet south of this claim. Some further work is reported to have been carried out on the northerly extension of this vein at a point about 100 feet north of the trench. This ground is heavily covered with muskeg, but the work is reported to have exposed an encouraging width of vein carrying pyrite mineralization.

This property possesses indications for the possibility of a small-tonnage high-grade operation similar in type to that being carried out on the adjoining *Surf Point* mine and is worthy of exploration with this objective in view.

Redbird. This claim is owned by J. H. Jones, of Porcher island, and is situated adjacent to the *Edye Pass* group and *Surf Point* mine on the north. The main showing consists of a quartz vein outcropping at 120 feet elevation and striking east-west, occurring in quartz diorite of the Coast Range batholith. The vein has been traced by trenching up the 15-degree slope of the hill for about 300 feet. Continuity beyond both exposed ends is covered by muskeg. Around the central and upper parts several small quartz stringers from 6 inches to 1 foot in width radiate from the main vein. The walls are well defined and the vein dips about 80 degrees east, with about 1 inch of gouge and shearing on the foot-wall. Peculiar to this vein are brecciated inclusions of a greenish rock, probably undigested pieces of the old roof-rocks, and in these sections sulphides in the form of pyrite seem to be best developed. The structure indicates that where exposed the vein is probably very close to the roof-horizon of the batholith. In this area this is a favourable structural horizon for the occurrence of gold values.

Mineralization consists of pyrite, in erratic and sparse distribution in the form of stringers, veinlets, and small patches. An average sample of pure sulphides selected from about 1 ton of vein material on the dump along the length of the vein assayed: Gold, 2 oz. per ton; silver, 2 oz. per ton.

This vein is worth further exploration with the view to extracting ore of a sufficient grade for shipment. This work should take the form of an open-cut along the vein, starting at the lowest end. A back of about 30 feet in this open-cut would be achieved at the upper end of the exposure.

Lying southerly from the main *Redbird* showing, a well-defined shear outcrops at elevation 50 feet and has been traced for about 100 feet to the beach. This shear strikes south 20 degrees east and dips 50 degrees to the south. This structure occurs at just about the contact-horizon between the schistose roof-rocks and the granitic rocks of the batholith. The shear is well defined and in places mineralized with stringers and patches of massive pyrite. A sample of the sulphides occurring along the 100-foot stripped section assayed: Gold, *nil;* silver, *nil.* Although the absence of values may appear to be disappointing, yet in view of the characteristic low gold values contained in veins occurring in the roof-rocks in this section and the general presence of gold values in the veins in the granitic rocks, it is considered that this vein would be worth exploring for the possibility of gold values occurring in it when, and if, it penetrates the underlying granitic rock.

Work was carried out on the *Mascot* and *Eagle* claims in this area.

The *Bald Mountain* and *Wren* are described in the Annual Report for 1933.

LaPorte. This group consists of seven claims owned by P. LaPorte and W. Hause, of Prince Rupert, and is being explored by a syndicate of Prince Rupert interests. The property is located on the east side of the mouth of the Ecstall river, about a quarter of a mile west of Alexander (Balmoral) cannery, and is reached by launch from Port Essington, a distance of about 2 miles.

The formation of the area is biotite-quartz diorite of the Coast Range batholith intruded by pegmatitic and aplitic dykes and differentiation streaks, in proximity to the contact with altered sediments of the overlying Prince Rupert series. The topography is featured by a comparatively gently sloping foreshore bordered by the steep slopes of the granitic range-ridge. Structurally, the foreshore area embraces a flat roof-horizon of the batholith.

The showings are at about elevation 325 feet and 1,000 feet from the beach. They consist of some gold-bearing pyrite and chalcopyrite mineralization along a zone of stringering aplitic and pegmatitic differentiates. Mineralization occurs in small patches and streaks of pyrite and chalcopyrite in a quartzose gangue intermingled with pegmatite and aplite and is best developed in narrow streaks along some joint-planes. Eight open-cuts along a distance of about 200 feet have exposed an erratic zone of the described type without any definition of

confining walls, striking north 30 degrees west and dipping about 15 degrees north. The three central cuts along a distance of about 20 feet, each expose a small patch or lenticular pocket of pyrite and chalcopyrite mineralization in a quartzose gangue. The best of these is a wedge 5 feet long and up to 15 inches wide. Selected samples from this assayed:—

(1.) Gold, 2 oz. per ton; silver, 5 oz. per ton; copper, 7.3 per cent.

(2.) Gold, 0.64 oz. per ton; silver, 2.5 oz. per ton; copper, 8.7 per cent.

An average sample of this small pocket assayed: Gold, 0.24 oz. per ton; silver, 1.5 oz. per ton; copper, 3.6 per cent. In the three easterly cuts along a distance of about 20 feet a stringer 1 to 2 inches wide is exposed. A composite sample of this stringer exposed in these cuts assayed: Gold, 0.6 oz. per ton; silver, 1 oz. per ton; copper, 4.4 per cent. The two most westerly cuts show pegmatitic and aplitic streaks with only very sparse mineralization.

The character of these exposures indicates possibilities for the occurrence of small and erratic lenses or pockets of mineralization along pegmatitic and aplitic streaks, with no definite alignment of continuity one with the other, except where mineralization may be developed along joint-planes. The latter would show some continuity until disturbed by cross-jointing. In view, however, of the high gold content of the sulphides, the showings and the area are worthy of some limited prospecting and exploration with the objective of discovering lenses of appreciable size or some defined structure carrying mineralization. In this exploratory work some ore of a shipping-grade might be extracted.

Non-metallics.

Sericite.

This group comprises the *Sericite* and *Mother of Cloud* claims owned by C. Jedder and P. M. Ray, of Prince Rupert, with P. M. Ray acting as agent. The property is situated on the north shore of the sheltered harbour of Baker inlet, off Grenville channel, about 35 miles south of Prince Rupert. The occurrence consists of a pegmatitic zone with sericite mica lenses and pockets in gneissic rocks of the Prince Rupert series. The zone outcrops along a bluff at altitude 290 feet about 1,000 feet from the beach, strikes north-south, and dips 17 degrees west. It has been prospected by two open-cuts and some superficial stripping and can be traced for several hundred feet practically by natural exposure. Erratic widths, bulging and stringering typical of a pegmatitic structure, with, in some sections, stringers a few inches in width separated by horses of country-rock, characterize the zone.

As is typical of this type of deposit, the mica occurs in pockets and lenses. Two adjacent pockets of good-grade mica each about 10 feet in length and from 4 to 5 feet in width are exposed in the two cuts. An appreciable percentage of sericite is apparent in other exposed parts of the zone. The mica is of the type that would be adaptable to pulverizing. Samples of the raw material from one of the cuts were screened by P. M. Ray and gave the following results: Plus 10 mesh=30 per cent.; minus 10 mesh=50 per cent.; minus 80 mesh=20 per cent. All this material appears to be remarkably pure sericite. A bulk sample of the raw material from the cuts was also submitted to the Ore Testing Laboratory at Ottawa. This was submitted to dry grinding in a Raymond mill combined with a Rotex screen and Gaco air separator and screened on a double-deck Rotex screen of 100 and 200 mesh. The recovery from this test was as follows:—

Plus 100 mesh—77 per cent. of feed recovered of about 99 per cent. pure mica.

Minus 100 and plus 200 mesh—88 per cent. of feed recovered of about 99 per cent. pure mica.

Minus 200 mesh—68 per cent. of feed recovered of about 80 per cent. pure mica.

The showing is worthy of further exploration, and it is quite possible that stripping in both directions along the strike will expose a much greater continuity of the zone, with possibility for further good-grade mica pockets and lenses. The property is ideally located for economical operation and convenience to direct seaboard transportation.

Kitsumgallum Lake and Lakelse Valley Sections.

In the Kitsumgallum Lake area only assessment-work was carried out on several properties in the Maroon Mountain area, and also in the Thornhill Mountain area in the Lakelse Valley section. Properties in these areas have been fully described in former Annual Reports. The gold possibilities of the Maroon and Thornhill Mountain areas warrant more intensive exploration than they have received, with the objective of developing small-tonnage operations.

Placer Gold.

On Douglas creek, in the Kitsumgallum Lake area, several individuals have been active. Work this year has been mainly confined to the repairing of damage done by the high-water flood which occurred in the spring. A small amount of sluicing, resulting in some gold-recovery, was carried out and will be continued during the low-water period of the winter months.

NASS RIVER MINING DIVISION.

Geologically, this Division embraces a substantial portion of the central pendant-inclusion area of the Coast Range batholith and an appreciable length of the eastern contact. The mineral deposits of the Division vary in character in conformity to their relationship to these geological conditions. The outstanding general feature in this respect is a lowering temperature gradation from west to east, from predominating copper mineralization in the westerly pendant-inclusion area to a predominating zinc-lead-silver mineralization, with gold possibilities in structurally favourable sections, along the eastern-contact margin.

As with all the known mineralized areas of the district, much of the Alice Arm and other sections of the Nass River Mining Division still remain to be thoroughly prospected. With a better understanding of the geology and localization of ore-bodies in the important Alice Arm area gradually emerging, new ore sources and possibilities are being indicated. In this category, besides the known silver-lead-zinc and copper potentialities, are possibilities for gold-bearing siliceous pyritic zones contiguous to intrusive diorite or fine-grained porphyries on the west side of the upper Kitsault River valley. These possibilities are deserving of investigation.

Granby C.M.S. & P. Co., Ltd. This company was incorporated in British Columbia in 1901 with an authorized capital of 500,000 shares of $100 par value, of which 450,001 shares have been issued. Charles Bocking is the general manager and the head office is 789 Pender Street West, Vancouver. The company controls several properties in different areas of British Columbia, but in recent years operations have been confined to properties at or in the neighbourhood of Anyox, on Observatory inlet. These include *Hidden Creek*, *Golskeish*, *Bonanza*, and *Granby Point* deposits, all located in the Anyox area. The present operations are on the *Hidden Creek* and *Bonanza* deposits and during 1934 work has also been continued in the *Granby Point* mine.

The plant at Anyox consists of a crushing plant and concentrator of about 5,000 tons capacity, smelter, coke-ovens, and power plant.

The *Hidden Creek* mine was first brought into production with shipments to the smelter in 1914 and has continued producing to date on a large scale. Total production to the end of 1933 amounted to 21,133,588 tons of ore containing 693,181,686 lb. copper. At the *Hidden Creek* mine since initiation of operations production has come from Nos. 1, 2, 3, 4, 5, and 6 ore-bodies.

The mineral deposits of this area occur in a large remnant or inclusion of argillites and andesitic rocks lying within the granitic rocks of the Coast Range batholith. This remnant of sedimentary and volcanic rocks is about 7 miles wide and 17 miles long. The ore-bodies occur at or near the north-south-striking contact between argillite and a younger, possibly intrusive, andesitic rock. The formation is acutely folded and faulted and is cut with numerous post-ore dykes of both basic and acid character. The ore-bodies seem to favour the crests and troughs of the folds and are of two types—namely, replacements along the folded argillite-andesite contact or in sheared areas in the andesitic rocks contiguous to the contact. The ore along the contact generally differs from that in the sheared andesitic rocks, in that it is characteristically more siliceous and generally characterized by chalcopyrite intimately associated with pyrite, whilst that in the andesitic rocks is generally an association of chalcopyrite and pyrrhotite, with sometimes a marginal phase of more pronounced pyrite mineralization grading into pyrrhotite towards the centre or core of the ore-bodies. Nos. 2 and 3 ore-bodies are of the sheared-zone type and Nos. 1, 4, 5, and 6 are of the contact type.

Besides the ore-bodies mentioned which have been developed and from which production has been derived, two other ore-bodies, No. 7 and No. 8, which are apparently of the contact type, have been indicated by diamond-drilling with only a small amount of development done on No. 8. No intensive exploration, development, or mining has been carried out in either of these ore-bodies and their definite potentialities are consequently unknown.

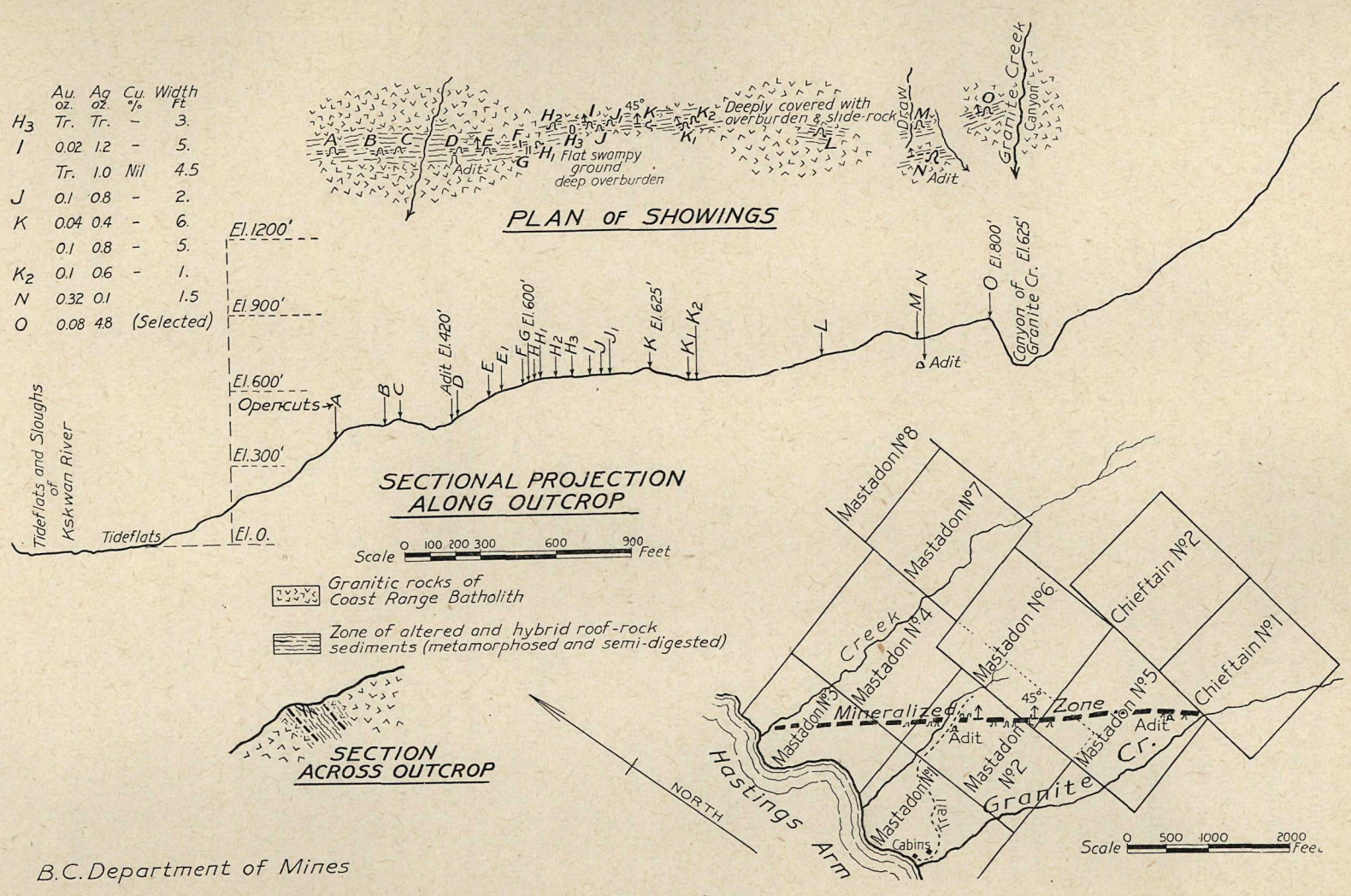
Early in 1929 the *Bonanza* ore-body, about 3 miles southerly from Anyox, which had been under development for some time, was brought into production and an aerial tramway from this deposit to the smelter constructed. Although the structure of this ore-body is not quite clear, it appears to be a shear-zone in biotite and hornblende-schist (possibly an altered andesite) near the contact of this rock with argillite. As is the case with the *Hidden Creek* deposits, numerous dykes of basic, acid, and dioritic character cut through the formation in an east-west direction and intersect the ore-body. In the shaft on the north side of Bonanza creek a pronounced fault striking north-westerly and dipping 70 degrees south-westerly intersects the northerly continuity of the zone. The ore-zone seems to occupy a portion of a flat anticlinal fold striking north-south. The segment south of the fault, on which mining is being carried out, dips from 10 to 15 degrees west and steepens to a dip of about 30 degrees west about 500 feet southerly from the outcrop, at the same time diminishing in width and increasing in grade. To the east the structural continuity is not clear. This zone has been developed on both the north and south sides of Bonanza creek and shows widths of from about 10 to 90 feet, varying in accordance with the flattening or steepening of the dip. The best development of ore seems to occupy the central portion of the zone where there are ore-widths up to 70 feet, with the best grade developed along widths of from 10 to 40 feet on the foot-wall side. In the zone, bands of solid sulphides (pyrite with chalcopyrite) several feet in width are separated by belts of chloritic schists also containing ore. These sections of the best ore are irregular in shape and sometimes occupy the locality of "rolls" in the zone, which may also possibly be inter-zonal and unconformable to the walls of the zone.

On the south side of Bonanza creek the deposit has been developed and practically mined out for a horizontal length of about 1,660 feet. Along the westerly margins of these workings the westerly dip of the structure steepens, with a corresponding restriction of the walls, but ore is seen to occur in places from 3 to 4 feet thick in the floor of the workings. Further exploration for a westerly continuity of ore-bodies similar to those which have been mined, where the dip of the structure may flatten again, would seem to be warranted. It would also appear that some possibilities may exist on the east side of the underground workings along the upward continuity of the dip. The *Bonanza* ore-body has also been developed through an incline shaft on the north side of Bonanza creek to the fault for a length of about 650 feet. Between the workings on the north and south sides of the creek there is a distance of approximately 370 feet in which no mining has been carried out.

During 1934 the continued low copper price has adversely affected the Granby operations at Anyox and the bulk of the blister-output has necessarily been stored. A generally lower tenor of ore has been met by a slight increase of tonnage to the mill, which towards the end of the year was treating about 5,200 tons of ore per day. The bulk of the mining in the latter part of the year was carried out on No. 4 ore-body between the 525 and 700 levels. No new ore developments of importance have materialized in the mine during the year. The practice of breaking a large ore-tonnage in one blast has materially assisted in achieving low costs in this operation. In the early part of December one of these blasts involving 500,000 or more tons of ore, mainly in pillars and sills of old stopes in No. 1 and No. 5 ore-bodies between the 385-foot level and surface, was carried out.

Production from *Bonanza* was continued at the rate of approximately 300 tons of ore per day. Operations were also continued in the *Granby Point* mine, from which an appreciable tonnage of gold-bearing siliceous ore was produced About 1,100 men are employed at Anyox, with a pay-roll of $135,000 per month. In view of the discouraging low copper price and outlook for this metal, at a shareholders' meeting held in December the directors were empowered to cease operations at any time in accordance with their discretion.

Mastodon. This group is owned by Carl Ecklund, J. Flynn, W. Eve, and associates, of Anyox, and is located on the east side of Hastings arm, about 12 miles northerly of the town of Anyox. It is reached by launch from Anyox to the cabin on the shore at Granite creek, from where a trail of about half a mile in length leads to the workings between 400 and 800 feet altitude. The property consists of ten claims comprising the *Mastodon Nos. 1* to *8* and the *Chieftain Nos. 1* and *2*. The mineral occurrence consists of a siliceous replacement in what appears to be a narrow belt of altered semi-digested sedimentaries contained in the granitic rocks of the batholith. The altered sedimentary belt is possibly 100 to 200 feet wide. The siliceous replacement is from about 1 to 6 feet in width.



Mastodon Group.

mineralized in places with pyrite, some sphalerite, and occasionally small amounts of galena. The quartz in which the mineralization occurs has an erratic and lenticular distribution in the form of veins and veinlets, patches and blebs, in the zone. Prospecting has been carried out by twenty-two trenches and shallow cuts along a distance of about 2,700 feet between elevations 400 and 850 feet. The best developments of quartz and mineralization occur in the central section at about elevation 600 feet along a distance of about 600 feet. The geological, structural, and topographical conditions and values are indicated on the accompanying map.

Elkhorn. This group of four claims is owned by J. Flynn and associates, of Alice Arm, and is situated at an elevation of about 3,300 feet on the eastern slope of Saddle mountain at the head of Hastings arm. The occurrence consists of an ill-defined, partially silicified structure in andesitic rock and mica-schist, in places carrying alteration products of epidote and garnet. Sparse mineralization of pyrite, pyrrhotite, with some galena and sphalerite in places, occurs along small sections of silicification in narrow and discontinuous fractures. In 1929 some spectacular finely divided gold was discovered in an isolated pocket in a small open-cut. During 1934 work was continued in several trenches and open-cuts along a distance of about 600 feet which showed some silicification and pyrite mineralization. Samples from the best mineralized of these showings only showed traces of gold and silver.

KITSAULT RIVER SECTION.

Esperanza Mines, Ltd. (N.P.L.). This company is composed of 1,000,000 shares of $1 par value, of which 510,050 are reported to have been issued. The head office is located at Victoria. The company controls the *Aldebaren*, *Black Bear*, and *I'll Chance It* Crown-granted claims and thirteen mineral claims held on location situated on Esperanza mountain, 1½ miles from the town of Alice Arm on the north side of the Dolly Varden Railway. The main showings are a series of erratic quartz veins carrying pockets and lenses of mainly silver-lead-zinc mineralization occurring in argillites of the Kitsault River formation between altitudes of about 300 and 2,000 feet.

The main showings were opened up by nine adits and in former years were worked intermittently by the locators and lessees. Since 1916 the records show 950 tons of ore have been shipped from the property, giving a net return of 121 oz. of gold, 8,200 oz. of silver, and some copper. Lead and zinc are also contained in the ore, but the base-metal content is not generally given in the smelter returns. This type of high-grade shipping-ore occurs in short and erratic lenses and was generally mined when it was located, with the result that the development of ore reserves has been handicapped. The veins occur in a series of argillites and sandstones and have a general north-easterly but varying strike and also display marked variation in dip. The best ore seems to occur where the veins are crenulated into a series of "rolls." These "rolls" seem to be best developed where the veins are transverse to the bedding of the formation, but the veins also follow the bedding in places. Mineralization consists of pyrite, arsenopyrite, galena, sphalerite, grey copper, with some ruby and native silver, mainly in a quartz gangue. In places scheelite is known to occur, but is probably not in sufficient quantity to be of commercial importance.

Mining has been carried out in a haphazard and intermittent manner and these operations are described in former Annual Reports. During 1934 the driving of the "Alice" adit at elevation 1,730 feet was continued for the purpose of intersecting the "Alice" vein outcropping at about 65 feet higher elevation. At the time of examination this adit had been driven in a winding direction for about 114 feet, with the face heading south 67 degrees west, which location should be about 50 feet to the projection of the vein at this level. The "Alice" vein has been traced by open-cuts and stripping between elevations 1,798 and 1,850 feet for a distance of about 700 feet, striking north 40 degrees west and dipping about 70 degrees to the south-west. Along this stretch the vein shows a width of from 6 to 36 inches and is composed of quartz, pyrite, galena, sphalerite, some grey copper, and possibly some ruby silver. A sample along 8 feet of the most easterly cut and across a width of 3 feet assayed: Gold, 0.10 oz. per ton; silver, 75 oz. per ton; lead, 0.2 per cent.; zinc, 2 per cent. A composite sample of the stripped vein exposed 50 feet westerly of this cut across widths of from 6 to 22 inches and along a length of 56 feet assayed: Gold, 0.04 oz. per ton; silver, 22.5 oz. per ton; lead, 0.5 per cent.; zinc, trace. It is understood that work on the crosscut adit to this vein ceased before the vein was intersected.

ERRATUM.

Page B 14, line 29, should read:—

"Since 1916 the records show 1,021 tons of ore have been shipped from the property, giving a net return of 123 oz. of gold, 84,519 oz. of silver, and some copper.

Gold Reef. This group, composed of the *Gold Reef Nos. 1, 2, 3, 4,* and *5* mineral claims and fractions, is situated on the west side of the upper Kitsault valley adjoining the *Homestake* group on the west. The claims extend from about elevation 3,000 feet on the *Homestake* line to about elevation 5,400 feet. The formation of the area consists of fragmental and massive volcanic rocks of the Dolly Varden series overlain in places by argillites, quartzites, conglomerates, and tuffs of the Kitsault River formation. These formations are intruded in this area by a series of dioritic intrusive rocks in the form of what might possibly be dykes, sills, and small bosses.

The mineral occurrence consists of three siliceous replacement-zones, in places showing some shearing. These zones strike approximately east and dip from 80 to 85 degrees north. In places silicification across appreciable widths is observed and mineralization consists of pyrite and chalcopyrite, with some sphalerite and galena. In the order of their occurrence from north to south these zones are known as the "Silver Tip" and "Tip Top" zones, the "Matilda" zone, and the "Spar" zone. In accordance with their general strike, it would appear the zones may possibly come together and form a wide mineralized area a short distance easterly from the cabin. In some of the stringers in the main zones tetrahedrite can be observed, especially in sections with a barite gangue contiguous to or in the argillite formation. Striking across the main zones are several cross-veins from about 2 to 5 feet in width, mineralized generally with pyrite, pyrrhotite, chalcopyrite, and occasionally some sphalerite and galena. A considerable amount of work in the form of open-cutting, several short adits, and some stripping has been carried out on the various showings on this property.

In order to derive some indications regarding values, the following samples were taken:—

(1.) Chip sample across a section of pyritized and quartzose andesite about 12 inches wide occurring about 200 feet above the cabin: Gold, 0.2 oz. per ton; silver, 0.2 oz. per ton.

(2.) Chip sample selected from silicified cross-fractures mineralized with pyrite, chalcopyrite, galena, and sphalerite cutting across an argillite-zone at elevation about 4,000 feet: Gold, 0.04 oz. per ton; silver, 0.8 oz. per ton.

(3.) Chip sample across a cross-vein 5½ feet wide at elevation 3,970 feet, well mineralized with pyrite and chalcopyrite, with stringers of calcite, but showing no silicification: Gold, 0.50 oz. per ton; silver, 1 oz. per ton; copper, 2 per cent.

(4.) Chip sample across 4 feet of cross-vein known as the "gold vein" from a cut above the adit at elevation 3,820 feet: Gold, *nil;* silver, *nil;* copper, *nil.*

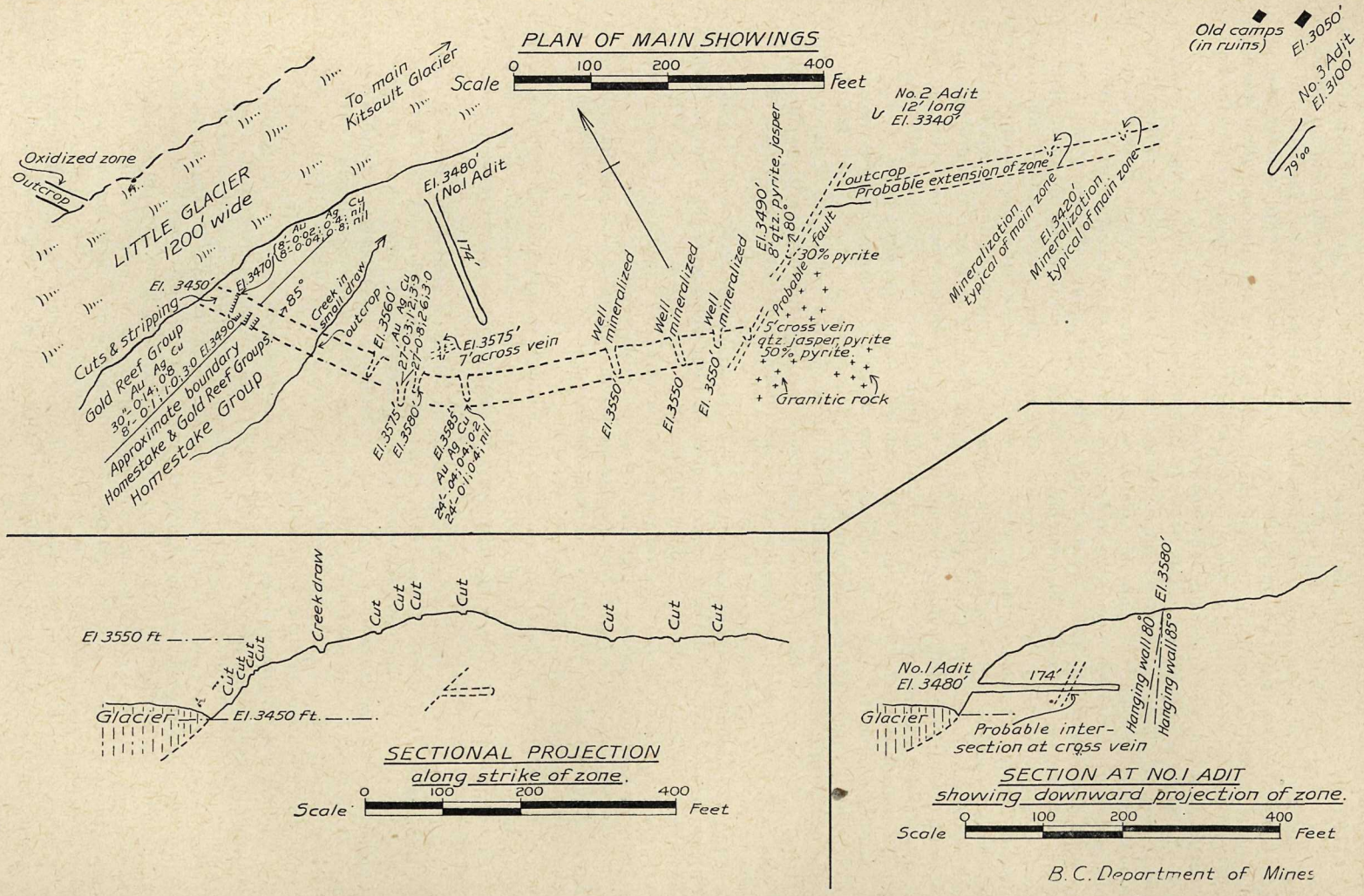
(5.) Chip sample selected from quartzose section showing the best mineralization from the dump of the old *Silver Tip* adit at altitude 3,680 feet: Gold, trace; silver, 3.6 oz. per ton; copper, 0.5 per cent.; lead, *nil;* zinc, 4.5 per cent.

In view of the widespread mineralization, the tendency to appreciable gold values in places, the geology, and good widths of mineralization in places, it would appear that this property is worthy of exploration. This could conveniently be carried out in a combined operation including the adjoining *Homestake* group.

Homestake. This group of four claims is owned by A. Davidson, Miles Donald, and partners, of Alice Arm. The claims are located about 25 miles from Alice Arm on the west side of the upper Kitsault valley bordering the "Little Glacier" and adjoining the *Gold Reef* group on the east. The property is reached by a good trail about 7 miles in length from the terminus of the Dolly Varden Railway at Camp 8. It is understood an option has recently been given by the owners to Vancouver interests. The claims lie between elevations of about 3,000 and 4,000 feet.

The mineral occurrence consists of a siliceous replacement-zone carrying chiefly pyrite, chalcopyrite, galena, and sphalerite in andesitic lavas of the Dolly Varden formation contiguous to an intrusion of dioritic rock. The zone strikes approximately east-west and dips about 85 degrees north. It has been exposed by stripping and eleven open-cuts along a length of approximately 700 feet and shows a width from about 15 to 30 feet. The zone is exposed practically at the brink of the "Little Glacier" at an elevation of about 3,450 feet and is traced easterly to elevation 3,550 feet. At this point the zone appears to be intersected by a likely-looking cross-vein and seems to be offset 150 feet down the hill, continuing from the easterly side of this cross-vein with apparently equal strength, but with no work done on it in this direction.

In some sections in the zone unmineralized horses of country-rock occur, but all the cuts examined showed fairly even mineralization. All the open-cuts were not sampled, but what



Homestake Group.

sampling was done showed low-grade values in some sections and quite encouraging gold values in others. Some exposures showed appreciable widths of heavily oxidized material which will doubtless change to sulphide mineralization below the zone of oxidation. This oxidized mineral was avoided as much as possible in the sampling. In order to ascertain possible values the following samples were taken:—

(1.) Chip sample across vein-face, 8 feet wide and 15 feet high, in the lowest cut, at elevation 3,470 feet: Gold, 0.02 oz. per ton; silver, 0.4 oz. per ton; copper, *nil;* lead, 1.5 per cent.; zinc, 1.2 per cent.

(2.) Chip sample of vein-face 8 feet wide and 12 feet high immediately above sample 1: Gold, 0.04 oz. per ton; silver, 0.8 oz. per ton; copper, *nil;* lead, 4 per cent.; zinc, 3 per cent.

(3.) Chip sample across 30 inches of unoxidized material in a cut at elevation 3,490 feet: Gold, 0.14 oz. per ton; silver, 0.8 oz. per ton.

(4.) Chip sample across 8 feet of unoxidized material in cut at elevation 3,490 feet: Gold, 0.1 oz. per ton; silver, 1 oz. per ton; copper, 3 per cent.

(5.) Chip sample of cut at elevation 3,575 feet across 27 feet: Gold, 0.30 oz. per ton; silver, 1.2 oz. per ton; copper, 3.9 per cent.; lead, *nil;* zinc, 3.5 per cent.

(6.) Channel sample along same cut as No. 5 and across 27 feet: Gold, 0.8 oz. per ton; silver, 2.6 oz. per ton; copper, 3 per cent.; lead, trace; zinc, 4.5 per cent.

(7.) Chip sample in cut at elevation 3,585 feet across 24 feet: Gold, 0.04 oz. per ton; silver, 0.4 oz. per ton; copper, 0.2 per cent.; lead, *nil;* zinc, 3 per cent.

(8.) Channel sample in same cut as No. 7 and across 24 feet: Gold, 0.1 oz. per ton; silver, 0.4 oz. per ton; copper, *nil;* lead, 0.3 per cent.; zinc, 3 per cent.

Some years ago a crosscut adit was projected at about elevation 3,500 feet for the purpose of intersecting this zone. In this work a cross-vein was intersected, but projections show that the working would have to be advanced about another 50 feet along its present bearing in order to intersect the main zone on this horizon. In this area of the zone there is a good opportunity to excavate exploratory drifts, but permanent operations, if warranted, would be from an adit-site at a lower altitude at the easterly end of the zone.

Further exploratory work should also be carried out on this zone on its easterly extension. The topography of the area indicates that permanent development-work should be carried out from the easterly side of the hill-slope, and consequently the zone should be traced and explored at this end in order to ascertain its possibilities and to supply information regarding the location of possible eventual working-sites. The topography of the locality also indicates that the zone can be readily explored by diamond-drilling, which work should be preceded by further detailed open-cutting, exploratory drifting, and sampling.

There is a good location at the easterly end of the property for a camp-site contiguous to water-supply and timber. Although no measurements were taken with regard to horse-power available, it would seem that a substantial water-power could be developed from Clearwater creek, distant from 2 to 3 miles from the property.

Assessment and further prospecting has been carried out on several other properties in the Kitsault River area, including the *Storm, Bunker Hill, Wildcat, Summit, Combination, Tyee, Highland, Maud, Vanguard Extension, Gold Reef,* and *Lucky Strike* groups and claims by their respective owners of Alice Arm.

PORTLAND CANAL MINING DIVISION.

This area is approximately 7,000 square miles in extent, and, excepting the Unuk River section, is accessible from the town of Stewart at the head of Portland canal. An important geographical feature is the fact that the west boundary of the Division, a length of about 130 miles, is formed by the Alaskan boundary.

The economic geologic feature of this Division is the mineralized eastern contact-belt of the Coast Range batholith which strikes through the Division in a north-westerly direction for about 70 miles bordering its westerly boundary. Penetrating the central portion of the Division are numerous granitic spurs and cupolas, satellitic offshoots from the underlying and easterly plunging batholith.

From a standpoint of exploration and prospecting, the Division is the most active in the district.

A growing intimacy with the area indicates that much of it, easily accessible from Stewart, in which claims have been staked and restaked for a number of years is as yet only partly prospected.

BEAR RIVER SECTION.

United Empire Gold and Silver Mines, Ltd.

This company was incorporated in 1928 with a capitalization of 4,000,000 shares of 50 cents par value for the purpose of developing the *Gold Cliff* group of claims. The company holdings at present consist of the following Crown-granted claims: *Gold Cliff Nos. 1, 2, 4, 5,* and *6; Gold Cliff Nos. 1, 2,* and *3 Fractions; Gold Fraction; Tom Fraction; No. 1 Fraction; Cliff Fraction; Lucille No. 1; Beth, Tom, Barney, Margaret,* and *Jerry Dog.* The *Lucille No. 1, Beth,* and *No. 3 Fraction* were acquired from the Bayview Mining Company, Limited. Four additional claims and two fractions were staked in 1933. A tract of 5 acres on the Bear River flats is also reported to be owned by the company and application for surface rights to an adjacent 160 acres has been made.

The property is located about 2½ miles from the town of Stewart on the easterly slope of the Bear River ridge, the claims extending from the valley-flats at about altitude 200 feet to the Alaskan boundary at about altitude 5,200 feet. A good pack-horse trail extends from the Bear River motor-road to the camp at elevation 2,920 feet. The workings are also connected by an aerial tramway with the terminal at the Bear River road. The topography of the area is steep and rugged with timber-line at about elevation 3,000 feet. The mineral occurrence consists of fracture-zones in sedimentary and volcanic rocks of mainly the Bear River series contained in an embayment of the easterly-plunging granite batholith. Mineralization is mainly pyrite, pyrrhotite, sphalerite, galena, chalcopyrite, and in some places tetrahedrite (grey copper) and ruby silver. Values are mainly in silver, lead, and zinc, with minor values in gold.

The *Gold Cliff* showings were discovered by William Dann in 1923 and the first exploratory work was undertaken in 1924. The property was then optioned to the Pacific Mines, Petroleum, and Development Company, Limited, represented by A. B. Trites, of Vancouver, which carried out some trenching, open-cutting, and driving, and later relinquished the option. With the incorporation of the present company in 1928 further exploration by trenching and driving of the "Dann" adit was carried out and continued in 1929. The property then remained practically inactive until 1933, when the present operations were initiated through the negotiation of a deal with York Investments, Limited. Reports and references to the property and the adjoining *Bayview* group are contained in the Minister of Mines' Annual Reports for the years 1924, 1925, 1926, 1928, 1929, 1930, and 1933. The property is also described in the Geological Survey of Canada Memoir 159, 1929.

The mineral deposit occurs in a formation of mainly altered sandy argillite with some tuffs and andesitic lavas contained in an embayment of granitic rock immediately adjacent to the easterly-plunging main contact of the Coast Range batholith. Mineralization occurs in fracture-zones contiguous to the granitic rock and, other than in some instances extending from the metamorphosed sedimentary and volcanic rocks into the digested or semi-digested phases of these rocks bordering the contact, does not extend into the batholithic rocks. Horizontal, lateral, and depth continuity of the mineralization is consequently limited by the bordering granitic contacts, which upon further exploration may possibly be found to dilate in relationship to the contained mineral-bearing formation, or possibly may be found to constrict and to be erratically intrusive into it. At the time of various examinations the main showings had not been tied in by accurate survey, and no correlation of the various showings into a continuous vein structure or structures can evolve until the required exploration-work and surveying is carried out. Surface showings and underground work indicate the occurrence of the best mineralization in lenticular distribution in replacements along lines of fracturing striking north-westerly contiguous to the granitic contact.

Generally, the fracture-zones are not well defined by clean-cut walls and mineralization gradually diminishes into the bordering country-rock. In places, however, better definition is evident in some subdued shearing or movement along the planes of fracturing. In places, veinlets, stringers, bands, blebs, and patches of quartz in erratic distribution, with an occasional accompaniment of garnet and epidote, occur in the structures and generally accompany the best mineralization. Silicification of the structures is, however, generally not intense.

The operations carried out in 1933 are described in the Annual Report for that year. During 1934 exploratory operations have been continuously carried out under the supervision of W. Dann with a crew of about thirty men. The property has been equipped with a 2-bucket jig-back tramway, a ground power-cable from the Dunwell plant, necessary machinery, buildings, accommodation, and a telephone-line. In the "Brindle" adit at elevation about 2,825 feet a crosscut to the north and a raise under the surface open-cut at elevation about 2,860 feet had at the time of examination not intersected the ore showing in the surface cut. In the "Trites" adit at elevation about 3,055 feet a crosscut to the south intersected a structure about 6 feet wide mineralized mainly with pyrite, galena, and sphalerite. The main crosscut at elevation 2,995 feet, at an estimated depth of about 60 feet below the "Trites" level, intersected, at a point about 1,550 feet along the working from the portal, a vein-structure 6.5 feet wide mineralized with pyrite, sphalerite, and galena. A chip sample of the north-west face (as at September 17th) across about 6 feet assayed: Gold, 0.04 oz. per ton; silver, 4.5 oz. per ton; copper, *nil;* lead, trace; zinc, 2 per cent. It is reported by the management that the south-east drift from the main crosscut has broken through to the surface and the north-west drift has been continued, with a crosscut from it to the west. In these workings better results are reported by the management. Exploratory diamond-drilling was also carried out.

At the time of examination (September 17th) it was indicated that a considerable amount of exploratory-development work in the form of drifting, raising, and sub-levelling, coupled with detailed sampling, would be required before any accurate estimate of ore-tonnage to warrant mill-installation could be made.

Dunwell Mines, Ltd. (N.P.L.). This company, with head office at 101 Pemberton Building, Victoria, was incorporated in 1922 as a specially limited reorganization of Nass River Lands, Limited, which was incorporated in 1913. The capitalization of the Dunwell Mines, Limited, was originally $350,000, but this was doubled in 1925 and further increased in 1926 to $1,000,000, divided into 1,000,000 shares of $1 par value each, of which 840,000 have been issued. Late in 1933 a debenture issue of $18,000 was authorized to provide funds for rehabilitation and resumption of operations. The property was originally owned by Stewart Bros. and W. Noble, of Stewart, and in the holdings are now included the claims of the old Stewart Mining and Development Company.

The property consists of some twenty-four claims and fractions situated on the north side of Glacier creek, about 4 miles from the town of Stewart, from where a motor-road extends to the workings.

The mineral deposit consists of a main shear-structure with lateral veins, carrying silver-lead-zinc mineralization with gold values in places. The veins occur in argillite of the Bear River series.

Early exploration was carried out by the Stewart Mining and Development Company. In 1926 an aerial tramway about 1 mile long and a concentrating-mill of 100 tons daily capacity were constructed. Milling began early in 1927 and ceased later in the same year with the depletion of the then known ore reserves.

Production from this operation amounted to 27,067 tons of ore, from which was recovered 4,805 oz. gold, 102,199 oz. silver, 1,264,787 lb. lead, and 1,602,634 lb. zinc. Some electrical prospecting by the Radiore Company of Canada, followed by diamond-drilling, was carried out during 1928 and 1929, but with negative results. The property remained inactive until attacked by lessees in 1932 and 1933, from which small-scale hand operations about 1,767 tons of ore was produced, with an output of 630 oz. gold, 28,653 oz. silver, 4,744 lb. copper, and 57,237 lb. lead. In the interval some of the mill machinery was sold to Bralorne Mines, Limited.

Reference to the property is contained in the Minister of Mines' Annual Reports for the years 1920, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1932, and 1933. The property is also described in the Geological Survey of Canada Memoir No. 159, 1929.

Surface exposures on the *Dunwell* have not been sufficiently correlated to definitely identify the vein-structures exposed. One main shear-structure with a strike about north and a dip 50 degrees west, extending throughout the length of the property, is indicated. Smaller more or less parallel lateral veins converge towards and join it at acute angles along the strike and dip. The vein-structures are frequently accompanied by pre-mineral lamprophyre dykes. These were probably injected along already-formed shear-structures, subjected to subsequent stresses, and appear to have had a controlling influence on later mineralizing solutions. Mineralization of

the ore-shoots and lenses consists mainly of a quartz-calcite gangue with sphalerite, galena, pyrite, and tetrahedrite. Argentite, ruby silver, native silver, and probably some electrum constitute very high-grade ore in places.

Commercial-grade ore in shoots or lenses seems to favour intersection areas of the lateral veins with the main north-south structure, but occurs in both structures. There is no definite evidence to indicate that commercial ore is confined solely to these areas of vein-intersection and their vicinity, and further development may show a wider ore-distribution. Underground mining in the old 1927 operation through No. 4, No. 3, and No. 2 adits was confined principally to one ore-shoot occurring apparently around one such vein-intersection area, but in the extensive underground workings and in surface exposures commercial mineralization is indicated at places appreciable distances north and south of this formerly mined area. The various surface exposures are described in detail in the 1933 Annual Report.

Although correlation is not yet definite, it would seem that the main underground workings on the *Ben Hur* claim, from No. 2, No. 3, and No. 4 adits, are on the *Sunbeam* vein-structure, with possibly closely related lateral branches. No. 4 main crosscut adit intersects the main vein-structure at 960 feet in. From the portal to about 480 feet several small quartz veins from 2 to 30 inches wide are intersected and should receive some exploration. At 480 feet from the portal a silicified shear-zone 20 feet wide, with some pyrrhotite and arsenopyrite mineralization, is worth exploration. At the end of the crosscut adit the main vein has been drifted on for 380 feet north. For the first 220 feet of this length the vein is 3 to 5 feet wide and fairly well mineralized with galena, sphalerite, and pyrite, and sections of it would probably make good milling-ore. At 40 feet along the drift a crosscut-intersection stope and chute entry has been installed. Commencing about 50 feet above the drift-level, the vein has been stoped out for a height of 150 feet to No. 3 level along a length of 120 feet. Appreciable ore probably still remains in the drift-back to the stope. Below the drift-level between station 412 and the main crosscut (a length of about 220 feet) there is an excellent chance of developing ore along what appears to be the southerly rake of this ore-shoot. North of station 412 the drift continues 160 feet to the face, with the shearing gradually diminishing along the dyke which accompanies the vein.

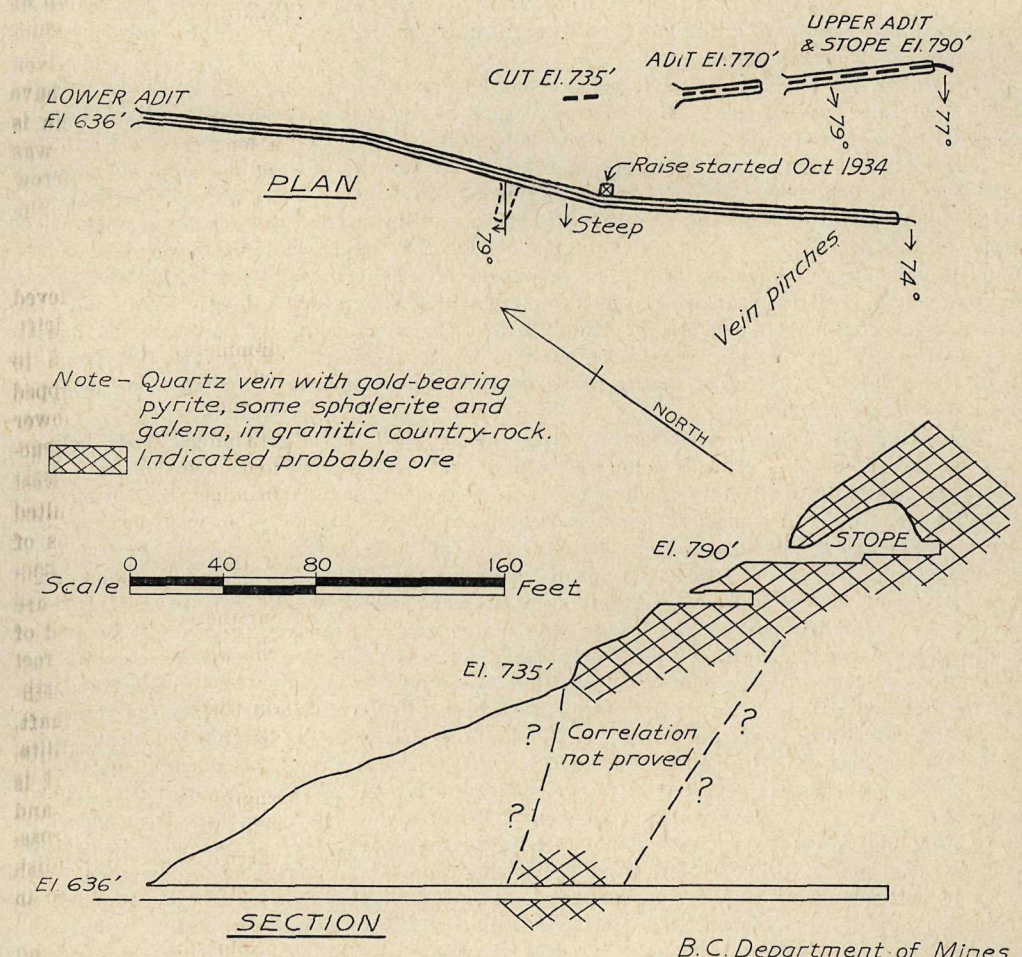
No. 3 crosscut adit, 200 feet higher in elevation than No. 4 crosscut, intersects the main vein-structure at about 450 feet from the portal. Near the point of intersection, between No. 1 and No. 2 south raises, an area 160 feet high and averaging 90 feet long was stoped out in 1927 along the upward extension of the ore-shoot from No. 4 level. The workings on No. 3 level are described in detail in the 1933 Annual Report and localities possible for further ore-development are indicated.

In the southern section of the property, on the *George E.* claim, about 200 feet lower than No. 4 level, there are two old adits on the east and west side of a deep canyon. The canyon probably coincides with the main north-south structure of the property and marked shearing with quartzose vein-matter of appreciable width can be seen along its base, especially towards its south end on the *George E.* claim and extending into the Glacier Creek property. The old adits on the east and west sides of the canyon are probably on veins converging laterally to the main shear-structure. The adit on the east side of the canyon was not examined. The one on the west side is about 500 feet long and was started on a vein 4 to 5 feet wide which follows a dyke and strikes north 15 degrees east, with a dip of 55 degrees west. The working is very crooked and appears to trend to the east off the vein at 170 feet from the portal, following a slip. The vein is fairly well mineralized from the portal to the winze, a distance of about 150 feet. At the winze, said to be 57 feet deep, the vein is 3 to 4 feet wide and well mineralized. The main working continues along a slip on a winding course and shows shearing, calcite, and a little pyrite in the face. At 100 feet from the face a small vein is intersected. A crosscut to the west from near the face intersects a vein, which is drifted on north and south for about 100 feet. The vein is 18 inches to 6 feet wide and well mineralized in places. About 35 feet from the start of this drift the vein is 4 to 6 feet wide and well mineralized. A sample across 5 feet of this section assayed: Gold, 0.5 oz. per ton; silver, 17 oz. per ton; copper, trace; lead, 28 per cent.; zinc, 5 per cent. A small shoot of ore from this showing was mined out during 1934.

On the *Ben Ali* claim a well-defined, sheared quartz vein in a granitic rock is exposed in open-cuts and adits along a horizontal length of 350 feet through a vertical distance of 250 feet.

The vein strikes north 40 degrees west, dips 80 degrees south, and varies from 20 to 48 inches in width. Mineralization consists chiefly of pyrite with some sphalerite and a little chalcopyrite. This ore assays about 0.5 oz. gold and about 1 oz. silver per ton.

Generally speaking, examinations of the *Dunwell* have indicated a probable ore-horizon along the dip in the known veins of from 300 to 400 feet deep, raking from north to south at possibly 50 degrees through practically the entire *Dunwell* property. In this, ore-shoots are lenticularly distributed. It is indicated that this ore-horizon may be structurally related to and conformable with the southerly plunge of the *Ben Ali* granitic stock, which outcrops about 1,800 feet to the westward of the main *Dunwell* workings. With this governing structural condition, mineralization and ore-carrying structures could be expected to occupy a zonal horizon in the Bitter Creek formation.



Dunwell Mine—Plan and Section of Ben Ali Workings.

During 1934, mining by the company commenced in April and the mill, with a daily capacity of 25 tons, was started in May, milling being carried on at an average of about 20 tons per day. To October 31st, 3,100 tons of ore averaging 0.186 oz. gold and 7.4 oz. silver per ton was milled, with a recovery of about 85 per cent. Besides this, 119 tons of sacked ore averaging 0.81 oz. gold and 142 oz. silver per ton and 930 tons of flux ore averaging 0.15 oz. gold and 11 oz. silver per ton has been mined and shipped. The total tonnage mined to October 31st is reported as 5,500 tons averaging 0.195 oz. gold and 12.5 oz. silver per ton. Production has come from the main workings of the old mine, where the indicated ore possibilities in stoping up along

the rake to the north are responding favourably as mining proceeds. Due to hanging-wall dilution the initial grade of mill-feed was appreciably lowered. With sufficient care to avoid this, the grade could be improved, and during the month of October mill-heads were reported to assay 0.27 oz. gold and 11.25 oz. silver per ton. Production from the *Ben Ali* of about 15 tons per day of siliceous fluxing-ore, estimated to average about 0.5 oz. gold and 11 oz. silver per ton, for shipment to Anyox was commenced in the late fall. For this purpose an aerial tram about 1,000 feet long was constructed to the road.

A crew of about forty men is employed in the operation.

Lakeview Mines, Ltd.

This company, with registered office at 101 Pemberton Building, Victoria, has a capitalization of $1,000,000, divided into 4,000,000 shares of 25 cents par value. The holdings consist of four Crown-granted claims east of the *Dunwell* at an elevation of 2,000 to 3,000 feet above sea-level. An excellent 4-foot trail on wagon-road grade has been constructed from the *Dunwell* to the *Lakeview* camp, a distance of about 2 miles.

Mineralization consists of quartz veins about 1 to over 8 feet wide with galena, sphalerite, pyrite, and some grey copper. The main structure has a general north-west strike and dips about 60 degrees south-west in a formation of argillite intruded by numerous granitic dykes.

The main ("cabin") vein outcrops in a creek-bed immediately south of the old camp at 2,250 feet elevation. Several years ago a section of this vein was stripped and a shaft sunk in the hanging-wall of the vein. In 1928 the shaft was unwatered and crosscuts were driven to the vein at depths of 25 to 45 feet from the collar. The upper crosscut is reported to have found promising ore consisting of galena, sphalerite, chalcopyrite, and pyrite, but the vein is reported not so well mineralized at the lower crosscut. About 1925 a long crosscut adit was driven to cut the vein at a depth of about 250 feet below the collar of the shaft. A narrow vein was cut at 180 feet and a vein, believed to be the "cabin" vein, at 750 feet from the portal. A total of 175 feet of drifting was done on this vein and indicated some lenses of silver-lead mineralization.

Approximately 500 feet south-easterly from the "cabin" shaft is a shallow shaft, believed to be on the same vein. This is connected with a very shallow open-cut, crosscut, and drift, known as the "McKay" cut, which exposes a well-defined and well-mineralized vein 8 to 10 feet wide, from which a small tonnage of high-grade ore is reported to have been shipped several years ago by McKay. About 300 feet south of these workings and at 100 feet lower elevation is the portal of the old "Campbell" crosscut adit driven north along a minor structure. At about 200 feet this working intersects the vein, which is drifted on to the north-west for 300 feet. Slightly east of the intersection in the crosscut the vein appears to be faulted or dragged. Along the north-westerly drift some sections of mineralization across widths of from 10 to 30 inches are encountered, starting about 50 feet west of the crosscut and continuing for about 120 feet to slightly west of the winze. Beyond this to the face the values are low and the structure is not as strong. A 25-foot raise driven in 1928 at the south-east end of the ore-shoot is reported to have encountered low-grade material, and the winze about 170 feet west of the crosscut was reported in fairly good material for 20 feet. About 400 feet north-easterly of the old "McKay" cut and at about 100 feet higher elevation there is an old shaft, short adit, and open-cut on a reticulated and brecciated quartz vein 12 feet wide in argillite. In this some quartz stringers and streaks carrying galena and pyrite are to be seen. It is reported that some very high gold assays were obtained from this showing by "old-timers" and about 21 tons of ore shipped. The strike of this vein is in alignment with a wide cross-structure at the "McKay" cut and interval trenching should be carried out to establish continuity. The property is referred to in the Annual Reports for 1925 and 1928 and also in Geological Survey of Canada Memoir 159, 1929.

During 1934 the property was leased by H. D. Rochfort and W. Noble, of Stewart, and associates, and further exploration in the effort to extract ore of a shipping-grade resulted in the sacking of about 17 tons of estimated high-grade ore for shipment. This ore came from extensions of the veins about 50 feet easterly from the old "McKay" cut, where a high-grade lens 12 to 18 inches wide in a vein up to 4 feet wide was stripped and open-cut for about 30 feet.

A sample by the writer of the cross-structure adjacent to the old McKay workings across 10 feet assayed: Gold, 0.05 oz. per ton; silver, 10.6 oz. per ton; lead, *nil;* zinc, 1.5 per cent. A sample across 10 inches of the foot-wall streak of the "cabin" vein assayed: Gold, 0.02 oz.

per ton; silver, 20.15 oz. per ton; lead, 15 per cent.; zinc, 15 per cent. A sample of the hanging-wall side adjacent to this across 4 feet assayed: Gold, 0.04 oz. per ton; silver, 10.5 oz. per ton; lead, *nil;* zinc, 3 per cent.

The development-work carried out to date has indicated the possibility of developing mill-grade ore-shoots across appreciable widths and short shoots or lenses of high-grade ore across narrow widths. The frequency, structural relation, and attitude of these shoots in the vein system has not yet been indicated by the work done. Surface exposures, especially those about the "McKay" cut and the 1934 lessees' workings, indicate a main vein-structure striking north-westerly, with cross-structures in places and smaller lateral veins joining at acute angles as is the case in the *Dunwell* structure.

King. This group of fourteen claims is owned by J. Rochfort and associates, of Stewart, and adjoins the *Dunwell* on the north-east and lies northerly of the *Lakeview* group. The claims embrace a 1934 restaking of the property of old Emperor Mines, Limited. The property is reached by a good trail branching from the *Lakeview–Dunwell* trail. Considerable underground work was carried out by the Emperor Mines, Limited, and the property equipped with necessary buildings at elevation 2,880 feet and efficient machinery for exploratory work. The property is referred to in the 1920, 1925, 1926, and 1928 Annual Reports and also in the Geological Survey of Canada Memoir 159, 1929.

The main showing consists of a well-defined quartz vein about 15 feet wide, strike about north 15 degrees east, dip 50 degrees west, apparently following a fault-plane between two dykes. The vein is generally sparsely mineralized with pyrite, some chalcopyrite, galena, jamesonite, and possibly a manganese mineral. The strike and dip of the vein are similar to the strike and dip of the siliceous argillites of the Bitter Creek series. The latter are intruded by numerous granitic and lamprophyre dykes.

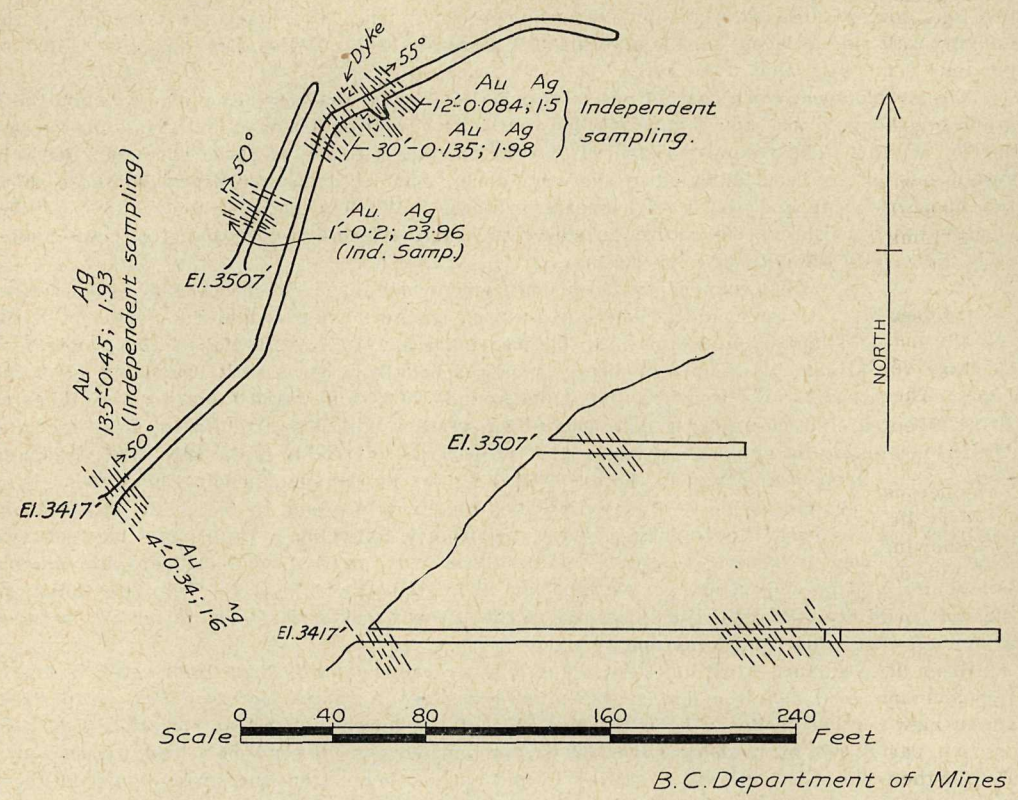
Very little surface work has been done, but two crosscut adits have intersected the main vein showing good definition but sparse mineralization. A sample across 5 feet of the best-mineralized section of the vein on the east side of the lower crosscut at elevation 2,880 feet assayed: Gold, 0.04 oz. per ton; silver, 3.9 oz. per ton; copper, 0.1 per cent.; lead, 0.5 per cent.; zinc, 14 per cent. An old adit ("McKay") and cut southerly from the surface outcrop above the upper adit shows intense oxidation evidently derived from sulphide mineralization. Other showings are reported but were not examined.

In view of the good width and definition of this vein and the fact that the small amount of work, particularly on the surface, along the strike has not adequately prospected this structure for the possible occurrence of ore-shoots, it is considered to be worthy of further exploration. This could constructively be carried out by surface-trenching and open-cutting both north and south of the known outcrop.

Playfair Gold Mines, Ltd. (N.P.L.). This company was incorporated in June, 1934, with an authorized capital of 2,000,000 ordinary shares of 50 cents par value each. The registered office is at 608 Central Building, Victoria. The holdings embrace the old *L.L. and H.* group, situated at an elevation of from about 2,000 to 4,000 feet in Harkley gulch near the head of Bitter creek, about 7 miles east of the Bear River motor-road. The property is reached by good trail extending from the Bitter Creek bridge to the lower camp at about elevation 1,907 feet and to the projected new camp-site at about elevation 2,807 feet. The property is referred to in the Annual Reports for the years 1920, 1926, 1929, and 1932.

Mineralization consists mainly of pyrite, galena, and sphalerite, with some chalcopyrite and arsenopyrite, carrying silver and, in places, appreciable gold values, in well-defined shear-zones in argillaceous sediments and andesitic lavas of the Bitter Creek series. The latter formation is intruded by dykes of granitic character. During 1934 work was carried out by two men, and consisted mainly of preparatory clearing and grading for the establishment of a new camp and projected crosscut adit-site at elevation 2.807 feet.

Detailed sampling of the underground workings was carried out by an independent engineer. A sample taken by the writer at the portal of the lower adit across 4 feet on the east side of the working assayed: Gold, 0 34 oz. per ton; silver, 1.6 oz. per ton; copper, 0.2 per cent.; lead, *nil;* zinc, 1 per cent. The workings and indicated values obtained from independent and reliable sampling are shown on the accompanying sketch. The property merits further exploration.



L.L. & H. Group (Playfair Gold Mines, Ltd.)—Plan and Vertical Projection of Workings.

Other Properties in the Bear River Section.

Prospecting and development work was carried out on a number of properties in the Bear River section, including the *L. and L.* group, *Palmey* and *Kenneth* (Argentine Syndicate), *Blackhill*, *Maud*, *Ruth and Frances*, *Mayflower*, *El Oro*, and *Lucky Date*.

In the Marmot River area work was done on the *Marmot*, *Engineer*, *Capitol Hill*, *Star*, and *Sure Thing*.

SALMON RIVER SECTION.

Premier Gold Mining Co., Ltd.

This company was incorporated in February, 1919, with a capitalization of 5,000,000 shares of $1 par value, all issued, and of which the American Smelting and Refining Company, Guggenheim Bros., and M. C. Keith and Isaac Untermeyer Estate hold 52 per cent. The head office is in the Royal Trust Building, Vancouver, and the New York office is at 120 Broadway. The company operates the *Premier* mine at Stewart and owns substantial interests in the adjoining B.C. Silver Mines, Limited, *Prosperity* and *Porter-Idaho* properties in the Marmot River area, and several other properties in British Columbia, Eastern Canada, and Australia.

The main operation is at the *Premier* mine, located in the Salmon River valley between elevations 775 and 2,000 feet, and is reached by a good motor-road from the town of Stewart, a distance of about 16 miles. The property comprises about thirty-four mineral claims. It is equipped with a complete mining plant, including a concentrator of about 500 tons daily capacity. Power is supplied by the company's own power plant, consisting of 1,620 horse-power in Diesel engines and 1,100 horse-power in water-power. An aerial tramway 12 miles long connects the mine with ore-bins and dock at tide-water, at Stewart.

The deposit consists of a quartz replacement in andesitic volcanic rocks of the Bear River series. Mineralization consists of pyrite, pyrrhotite, sphalerite, chalcopyrite, galena, tetra-

hedrite, freibergite, polybasite, ruby silver, argentite, native silver, and gold. Stephanite has also been identified. Mineralization is either massive or disseminated in isolated patches and stringers through the quartz gangue.

Silicification of the zone is generally intense and fades into the wall-rocks, with no clear line marking the walls of the ore-bodies. The general trend of the zone is crescent-shaped, striking north-easterly in its northerly section and veering to a westerly strike in its southerly section, and dips at an angle of between 70 and 80 degrees to the west. Ore-shoots of appreciable length are distributed in the zone, with a generally southerly plunge or rake. The best ore seems to occur in porphyritic sills bordering the contacts of these rocks with tuffs. The formation of the area is intruded by several large granitic dykes and also by some younger lamprophyre dykes. The rocks of the area are highly sheared, especially near the ore-bodies, and the mineralized zone is intersected in several places by faults.

The holdings embrace the *Old Bush* and *Bunting-Dillsworth* groups, staked about 1910 and originally explored by the Salmon Bear River Mining Company. The property was subsequently explored by New York interests and in 1919 was bonded to R. K. Neill, of Spokane, Wash., in association with Messrs. Trites, Wood, and Wilson, of Fernie. Under this management, work was started in the upper adit and in a comparatively short distance a shoot of high-grade gold-silver ore was intersected. In the fall of 1919 the American Smelting and Refining Company acquired an interest in the property and the present company was formed, with Dale L. Pitt in charge of operations. Production from this property since commencement of operations in November, 1919, to date totals 2,672,674 tons of ore averaging 0.52 oz. gold and 12.99 oz. silver per ton. The property is referred to in the Minister of Mines' Annual Reports from 1910 to date and in the Geological Survey of Canada Memoirs 32, 132, and Summary Report, Part B, 1919.

The property has been developed through five adits—No. 1 at elevation 2,000 feet, No. 2 at elevation 1,752 feet, No. 3 at elevation 1,582 feet, No. 4 at elevation 1,328 feet, and No. 6 at elevation 773 feet—several intermediate levels, many sub-levels, winzes, and drifts. A vertical projection of part of the mine-workings is contained in the Minister of Mines' Annual Report for 1930. The main ore-shoot is considered bottomed slightly below the fifth level, with a few shoots of commercial grade persisting down in the eastern end of the sixth level. Subsidiary lateral ore-shoots occur in the hanging-wall and particularly the foot-wall of the ground adjacent to the main zone, and more recent exploration has been devoted to discovery and development of these shoots between No. 2 level and the surface. During 1934 an ore-shoot lying in the foot-wall of the main structure between No. 1 level and the surface was discovered and developed. The increased price of gold has also permitted extraction of formerly uncommercial ore from some parts of the old workings. During the latter part of the year about seventeen drills were employed in the mine, chiefly on exploration and development. The mill treated about 500 tons per day for the first ten months of the year. An average crew of about 275 men was employed.

On November 2nd a fire destroyed No. 1 power plant and stopped milling for the last two months of the year. Immediate construction of a new plant of about the same Diesel capacity as the old one was, however, at once undertaken. Lack of power due to the fire necessitated a slight reduction in the crew to about 200 employed on development and construction. Production to October 31st, which on account of the fire will represent the year, was 153,950 tons of ore with an average content of 0.17 oz. gold and 4.38 oz. silver per ton.

It is understood that negotiations between the Premier Gold Mines, Limited, and the B.C. Silver Mines, Limited, which may culminate in the early resumption of operations and production from the latter property through the forming of a new company and its operation by the Premier Gold Mines, Limited, are progressing.

Buena Vista Mining Co. (Big Missouri).

The *Big Missouri* property is owned and operated by Buena Vista Mining Company, in which the Consolidated Mining and Smelting Company of Canada holds a 60-per-cent. interest. The remaining 40-per-cent. interest is held by Big Missouri Mines Corporation (N.P.L.). The latter company was incorporated in Quebec in August, 1933, as a holding and exploration company to acquire the assets of the Big Missouri Mining Company, Limited, shares of the old company being exchangeable into the new on the basis of two old for one new. The authorized capitaliza-

tion is 5,000,000 shares of $1 par value, of which 3,314,000 are reported as issued. The head office is at 603 Perkins Building, Tacoma, Wash., and the executive office at 221 Notre Dame Street West, Montreal.

The *Big Missouri* property consists of about twenty-four fractional Crown-granted claims situated about 18 miles from Stewart on the Missouri ridge east of the Salmon glacier and it is reached by motor-road. The original group is amongst the oldest locations in the Portland Canal area, having been staked by Dan Lindeborg in 1904. The topography of the immediate area is a rugged, hillocked, and ridged section of from 3,000 to 3,500 feet general elevation. The rock formations of Missouri ridge consist mainly of andesitic tuffs and porphyries with some argillite, of the Bear River series, intruded by granitic dykes. The andesitic rocks have been extensively altered and are generally greenish in colour. Lenticular and zonal areas of quartz stringers sometimes approaching stock-works, and sections of complete or partial silicification accompanied by general pyritization, characterize the area. The mineral deposit consists of wide silicified zones in both the tuffs and porphyries containing generally low-grade gold and silver values in irregular lenticular distribution. The zones as well as the country-rock are generally pyritized and sparsely and irregularly mineralized with galena and sphalerite. In the zones occasional quartz stringers sometimes carry native gold irregularly and finely distributed or, in rare instances, isolated pockets and patches of coarse grains, blebs, and streaks. The main silicified zone which is being explored strikes generally north-south with an indicated length of about 900 feet, and width of over 175 feet at its southerly end, about 300 feet in the central section and also at the northerly end. Beyond this northerly point the zone appears to swing north-westerly for a further distance of about 500 feet, with a width of approximately 150 feet at that end. Northerly from this point the zone appears to finger out into alternations of silicification and country-rock, which condition seems to become intensified beyond the northerly boundary of the *Province* and into the *Buena Vista* claim. In this area several bands of silicified porphyry 10 to 50 feet wide, separated by wide stretches of country-rock, occur. On the *Buena Vista* claim a change in the colour and texture of the formation seems to occur north of a hornblende-andesite dyke 20 to 40 feet wide that strikes north-west. Irregular and generally low-grade gold values are scattered through the silicified zone. In places high assays are obtained and occasionally free gold is found. The zone has been extensively explored by drifting, crosscutting, wide stope-sills breast-stoped to a height of about 16 feet, and diamond-drilling. For the purpose of ascertaining the contained distribution of values by bulk mine-run sampling, a test concentrating-mill of 100 tons daily capacity was constructed in 1930 and operated to September, 1931.

During 1933 and 1934 active exploration was continued by drifting, raising, and further diamond-drilling. In this work some values with indications of continuity were encountered in diamond-drilling below the *Province* or 300 level (elevation 2,850 feet). Together with this, the prevailing high gold price has offered additional encouragement relative to the generally low-grade content of the deposit. During 1934, for purposes of further exploration and development of the section below the "Province" tunnel, the *Day* claim on the west side of the ridge was acquired for purposes of a low-level exploratory adit. This adit (to be driven about 2,500 feet) has been started on the west side of the Missouri ridge at about 550 feet lower elevation (2,250 feet) than the "Province" level, which is on the east side. In the same area in the "Province" level the raise has broken through to the surface. From these workings further exploration and development by sub-levelling and raising is planned. In order to supply transportation to the "Day" adit on the west side of the ridge, the "Province" level was extended through the ridge to the west side. A crew of about sixty men is employed under the supervision of D. S. Campbell.

Munro. This group, owned by J. E. Munro and A. M. McDonald, of Hyder, Alaska, consists of eleven surveyed and Crown-granted claims and fractions and also nine claims and fractions held by location. The property is situated on the easterly slope of Mount Lindeborg, facing the Salmon glacier, directly opposite the "Day" adit of the *Big Missouri* property and is reached by either traversing up the glacier from its foot, a distance of about 3 miles, or crossing it from the *Missouri* workings, a distance of about 1 mile. The cabin is at elevation 2,400 feet, directly above the Salmon glacier and on the north ridge bordering the Munro glacier. There are several showings on this property which have been reported in the 1922 and 1926 Annual Reports, and which were not examined on this

occasion. The showings on the *Big Pete No. 3* claim only were examined. The formation of this section consists chiefly of folded, silicified argillite, with possibly some intercalated tuff-beds, striking north-westerly and dipping east at varying low angles. These rocks are intruded by bosses, spurs, and dykes of granitic rocks related to the adjacent Coast Range batholith. The showings on the *Big Pete* are reached by a precipitous and in places hazardous scramble up the rugged mountain-side to the workings at an elevation of about 3,750 feet.

The mineral deposit consists of a quartz vein striking north-westerly, dipping about 15 degrees east with the mountain-slope and conformable with the formation. From its southerly outcrop at the foot of a bluff this vein has been traced 230 feet north-westerly to the brink of a deep and precipitous canyon, beyond which no continuity can be seen. About 1,000 feet south-easterly of the main southerly exposure, a quartz vein 24 inches wide outcrops in a creek, but cannot definitely be correlated with the north-westerly showings. The outcrop and open-cut of the main exposure shows a width of from 1 inch to about 4 feet, mineralized with patches and streaks of galena, sphalerite, some tetrahedrite (grey copper), and chalcopyrite. In the open-cut a width of from 3 to 4 feet of quartz is exposed, with irregular mineralization but carrying a streak of possibly high-grade mineralization 2 to 3 inches wide on both the hanging- and the foot-wall sides. It is possible that some small pockets and lenses of high-grade mineralization may be located in this vein and it is considered that the area adjoining to the north is worth prospecting.

Spider. This group, owned by Theo Collart, of Prince Rupert, and associates, consists of the *Spider No. 1, No. 2,* and *No. 3* Crown-granted claims and eight adjoining claims staked in 1934 and held by location. The property is situated on the east side of the head of Long lake, about 3 miles north-easterly from the *Big Missouri* and about 22 miles from Stewart. It is reached by motor-road to the *Big Missouri* and trail for 3 miles through open country to the cabin at elevation 3,440 feet. The property was originally located in 1918, optioned to a Belgian syndicate in 1920 and in 1925 to the B.C. Bonanza Mines, Limited. Considerable underground work, some stripping, open-cutting, and diamond-drilling was done during these operations. In 1933 and 1934 the property was leased to two Stewart miners, who mined and shipped a small tonnage of high-grade ore.

The formation of the area consists of augite porphyry intrusive into slates and conglomerates, the whole being intersected by basic and acid dykes. The mineral deposit consists of quartz veins varying from 1 to about 12 feet wide, mineralized with pyrite, galena, sphalerite, and, in places, some tetrahedrite (grey copper), argentite, and native silver. The best mineralization occurs in short shoots and lenses constituting ore of a possible shipping-grade, with greater lengths of possible milling-grade ore. Values are mainly in silver with appreciable gold values in the higher-grade ore. Several veins striking generally north-easterly, but in places converging along the strike and dipping 50 to 80 degrees both east and west, have been located on the property. The largest of these is No. 1, the most northerly vein, which varies from 6 to 12 feet in width and is composed mostly of quartz carrying very little sulphide mineralization where exposed on the surface. Some surface samples of this vein are reported to have assayed about 8 oz. silver per ton and a diamond-drill intersection 15 oz. silver per ton, with a trace of gold. Very little work has been done on this vein. Other veins vary from a few inches to about 3 feet wide.

An adit about 870 feet long at elevation 3,450 feet and two raises explores part of No. 5 vein and possibly No. 3 vein underground. This working, with a raise to the surface at about 275 feet from the portal, follows No. 5 vein, showing a width of from 2 to 3 feet for about 670 feet, where it is crossed by a feldspar-porphyry dyke 18 feet wide. The vein dips into the floor of the level at the contact. In this working mineralization, especially on the hanging and foot wall across widths from 18 to 30 inches, is seen in places. The working continues south of the dyke for 165 feet in augite porphyry to the intersection with a vein (possibly No. 3) 12 to 18 inches wide, which is drifted on for 30 feet south 30 degrees east. A raise has also been driven on this vein but was not examined.

At elevation 3,630 feet, open-cutting and also drifting was done on a vein 4 to 6 inches wide. An intersection of two other veins up to 3 feet wide is indicated. Some high-grade mineralization was encountered in these workings, and during 1933 and the early part of 1934 O. McFadden and partner, of Stewart, carried out leasing operations on this showing. In

November, 1933, these lessees shipped 3½ tons of ore containing 1.01 oz. gold per ton and 294 oz. silver per ton. In August, 1934, 7.67 tons of ore assaying 0.23 oz. gold and 152.18 oz. silver per ton was shipped.

It is considered that this property is worthy of further exploration. This should be initiated by accurate sampling and surveying of the showings and workings and further exploration of the No. 5 vein in the long adit to develop possible ore-shoots along its known length and to pick up its possible continuity south of the dyke. Some diamond-drilling of No. 1 vein around the area of its intersection with No. 3 vein would also be constructive and any encouraging indications could be later explored by extending the lower level.

Troy. This property consists of twenty-three claims divided into three groups and is owned by C. H. Lake and Neil McDonald, of Stewart. The property is situated on the west side of Mount Dilsworth adjacent to the Nass River slope of the Salmon glacier. The Missouri–Tide Lake trail passes through the property, which is about 6 miles from the end of the Missouri road, and the cabin is at about 2,700 feet altitude, adjacent to the shore of Daisy lake. In 1925 the original *Troy* group of nine claims was bonded to the Northland Mining Company, but reverted to the original owners in 1926. The property is referred to in Annual Reports for the years 1925, 1930, and 1933.

The formation of the area consists of interbedded slates, argillites, sandstone, and conglomerate, possibly belonging to the Salmon River or Nass formations of Upper Jurassic age, to the west of which is a belt of tuffs, breccias, and altered andesitic lava, possibly belonging to the older Bear River series. Two types of mineralization occur. Irregular narrow and lenticular quartz veins occur in argillite, mineralized mainly with sphalerite and galena, with which is associated some chalcopyrite and tetrahedrite (grey copper). These veins have been explored in the earlier operations in several places by open-cutting, stripping, and short adits, but this work failed to disclose commercial mineralization. The second type of mineralization consists of somewhat erratic silicified and pyritized replacement-zones in the volcanics. Recent work has been confined to tracing and exploring these zones with the objective of discovering a possible commercial gold content.

During 1934 considerable stripping and open-cutting was done on a series of silicified zones and veins contained in a belt of tuffaceous and porphyritic volcanic rocks bordering the easterly rim of the Salmon glacier in a section about 400 feet wide and extending from the glacier at elevation 3,125 feet up the steep hill-slope to about altitude 3,500 feet. In places basic and acid dykes intrude the formation. The veins strike generally east-west and apparently dip both north and south. They occur in light-coloured, fine-textured tuffs southerly of and adjacent to a band of andesitic porphyry about 300 feet wide (possibly a sill), which in turn is bounded on the north by coarse-grained purple tuff and fine breccia. The "contact" vein occurs at the southerly contact of the porphyry with the light-coloured tuffs and the silicified structures occupy a belt about 400 feet wide, lying southerly of this and marked by surface oxidation. Silicification is erratic and patchy in the form of veins, veinlets, patches, and blebs. Mineralization consists of erratic, sparse, and patchy distribution of mainly pyrite, galena, and sphalerite. Lying southerly of this north belt, pronounced oxidation indicates the occurrence of two similar belts, with the most southerly adjoining the *49* group, but very little prospecting or work has as yet been done on these.

Only the most northerly belt was examined by the writer. A sample of 4.5 feet of quartz exposed in a cut adjacent on the south to the "contact" vein assayed: Gold, 0.01 oz. per ton; silver, 1.1 oz. per ton. A sample by the owners from the same cut across 4 feet assayed by John Hovland, Hyder, Alaska, assayed: Gold, 0.08 oz. per ton; silver, 2.5 oz. per ton. Another sample by the writer from a section of silicification 1 foot wide in a 12-foot cut at elevation 3,300 feet on the most southerly zone and about 400 feet south of the "contact" vein assayed: Gold, 0.02 oz. per ton; silver, 0.7 oz. per ton. A sample from the same cut taken by the owners across 8 feet and assayed by John Hovland, Hyder, assayed: Gold, 0.12 oz. per ton; silver, 3 oz. per ton. A series of twelve samples taken by the owners from different cuts on these zones across widths of from about 3 to 12 feet and assayed by John Hovland, of Hyder, Alaska, assayed from 0.02 oz. gold and 0.07 oz. silver per ton to 0.16 oz. gold and 6 oz. silver per ton. Three samples taken by the owners from cuts in the southerly belt adjoining *49* and about 4,000 feet south of the "contact" vein, across widths of from 4 to 6 feet and assayed

by John Hovland, Hyder, assayed from 0.04 oz. gold and 1.5 oz. silver per ton to 0.08 oz. gold and 2.5 oz. silver per ton.

Salmon Gold Mines, Ltd.

This company was incorporated in British Columbia in 1933 with a capitalization of 3,000,000 shares of 50 cents par value each, of which 1,000,000 shares are reported as outstanding. In February, 1934, Consolidated Mining and Smelting Company of Canada, Limited, took an option on a 60-per-cent. interest in the company and commenced exploratory operations in June.

The property consists of thirty-seven claims situated on the west side of Summit lake, at the divide between the Salmon River and Nass River drainage-basins, about 8 miles from the *Big Missouri*. The claims are reached by the Missouri–Tide Lake trail to Summit lake, which is crossed by small boat to the camp at altitude 2,720 feet.

The formation of the area consists of porphyritic, tuffaceous, and argillitic rocks of possibly the Bear River series intruded by acid and basic dykes and contiguous to a granitic spur of the Coast Range batholith. The mineral deposit consists of siliceous replacement and fracture zones in porphyritic rocks, mineralized with pyrrhotite, pyrite, chalcopyrite, sphalerite, and galena, carrying appreciable gold values. Several mineralized structures of appreciable width have been discovered and are described in the Annual Reports for 1930, 1931, 1932, and 1933.

During 1934 the Consolidated Company commenced diamond-drilling with an O'Connor drill set up at altitude 3,680 feet. The first hole drilled at a down-angle of 35 degrees intersected at depths along the hole of 340 feet, 1,094 feet, and 1,156 feet, widths of 7.5 feet, assaying respectively 0.23, 0.44, and 0.50 oz. gold per ton. The hole was stopped at the deepest intersection, which on resampling assayed 2.11 oz. gold per ton. In order to gather information for the purpose of correlating these intersections, especially the deepest, with known surface exposures, a second hole at a flatter angle was started, but remained incompleted when snow necessitated the closing of operations for the season. It is understood that the Consolidated plan the continuation of exploration during the 1935 season.

Portland.

This group consists of about sixteen claims owned by Alphonse Thomas, of Stewart. It is situated about 2 miles west of the *Pioneer* group on the west side of the foot of Tide lake and on the westerly side of the foot of a glacier-tongue coming down from the ice-sheet covering the divide to the Unuk River headwaters, and about 2 miles southerly of the Tide Lake-Unuk River glacier (Frankmakie glacier). The area is about 35 miles from Stewart and is reached by motor-road to the *Big Missouri*, a distance of 18 miles; thence by trail for 16 miles to the foot of Tide lake, from where the moraine and glacier is crossed for about 2 miles to the cabin at altitude 3,200 feet (about 1,000 feet above the level of Tide lake). The showings are located on a bluff bordering the glacier, about 300 feet south-west of the cabin. A trail could be easily constructed from the cabin following a sloping ridge to the lake-level.

The topography of the area is very rugged and is part of the slope of the ice-capped divide between the Unuk River trough and the Bowser River trough draining to the Nass river. The rock formation of the section is composed of slates, tuffs, and porphyritic lavas of andesitic type of possibly the Bear River series, intruded by granitic and dioritic dykes of sometimes appreciable dimensions. The mineral deposit consists of a siliceous replacement-zone about 20 feet wide striking north 60 degrees east and dipping 80 degrees north conformable to the formation, occurring in an andesitic lava. A band of slate about 10 feet wide constitutes the hanging-wall in contact with a diorite dyke. Several cross-fractures 2 to 4 feet wide and also showing typical mineralization characterize the foot-wall side, which is also adjacent to a dioritic rock. Mineralization consists of pyrite, galena, and some sphalerite in a quartz gangue.

The zone has been explored by four open-cuts over a vertical distance of about 50 feet. These cuts show silicification and mineralization in a well-defined structure. A sample from the main cut at elevation 3,200 feet across 9 feet of well-silicified and mineralized material on the hanging-wall side assayed: Gold, 0.04 oz. per ton; silver, 0.35 oz. per ton. A sample across 6 feet of similar material on the foot-wall side of this cut assayed: Gold, 0.10 oz. per ton; silver, 0.7 oz. per ton. In view of the presence of mineralization across appreciable widths, defined structure, and indicative gold values, it is considered that this showing and the area generally is worthy of further prospecting and exploration.

Unuk River Section.

The Unuk River section forms the extreme north-westerly area of the Portland Canal Mining Division. The trough of the drainage area is crossed by the easterly contact-belt of the Coast Range batholith, which strikes across the valley in a north-westerly direction.

Some prospecting and exploration was carried out in this area between the years 1900 and 1903, and during 1930 and 1931 some superficial prospecting was carried out on the Canadian side of the International boundary by T. McQuillan, of Ketchikan, Alaska. In 1932 a prospecting expedition into this area with the aid of aeroplane transportation was undertaken by T. S. McKay, A. H. Melville, and W. A. Prout, representing a syndicate of Premier, B.C., interests. This resulted in the discovery of a wide area of mineralization in which gold values occur. Further exploration of these discoveries was carried out by the Mackay Syndicate during 1933 and 1934. This season the country was also penetrated by an additional syndicate of Premier interests, another representing Prince Rupert interests, and several individual prospectors. During 1934 T. A. McQuillan and G. E. King, of Ketchikan, Alaska, also penetrated the area by means of river navigation from seaboard and staked three groups of claims in the central section of the valley.

A detailed citation of all the available early information concerning this area is contained in the 1929 Annual Report and it is also referred to in subsequent reports to date.

Through the courtesy of the Mackay Gold Syndicate and the facility of its chartered aeroplane based at Stewart, the section was examined by the writer during the 1934 season. To serve the upper area of the main stream, in which the recent prospecting and exploration is being carried out, aeroplane landings are made on Mackay lake at elevation 3,600 feet.

The area examined comprises Prout plateau, a comparatively sparsely timbered, indented, and ridged terrain trending north-south, about 6 miles wide and 8 miles long and from about 3,000 to 3,800 feet in elevation. This area is bordered on the east by the deep valley of the upper Unuk river, on the west by the deep-canyoned valley of Melville creek (North fork), and is centrally indented by Coulter creek. Melville creek rises in Melville glacier and is confined on the west by a rugged glacier-crowned range up to about 7,000 feet altitude. The upper Unuk river is confined on the east by the exceptionally rugged, ice-capped range-divide up to about 7,500 feet altitude between this and the Salmon-Bowser River troughs. An outstanding topographical form of this range is Twin John mountain of about 7,500 feet altitude, and a remarkable feature is the immense and practically unbroken glacier-field blanketing the range summit. This ice-field extends unbroken along the entire length of the summit of the range between the trough of Treaty creek on the north and the Chickamin river on the south, a distance of about 40 miles, and constitutes the main ice-mass to the subsidiary Frankmakie (Tide Lake), Salmon, and Chickamin glaciers.

The ice-crowned barrier between the Unuk River trough and the Salmon-Bowser troughs prohibits any efficient or convenient accessibility into the Unuk area from the latter valleys. The only possible practical route from this side would be along the Bowser River trough to Treaty creek, from the headwaters of which there is a comparatively low and glacier-free pass to the headwaters of the upper Unuk river, a total distance of about 50 miles from Tide lake, or about 85 miles from tide-water at Stewart. The natural route into the area is by way of the Unuk River valley through Alaskan territory.

The rock formation of the Prout Plateau area is composed of fine-grained, light-coloured andesitic tuffs, some fine breccias, fine-grained andesitic lavas (in places porphyritic), and dark argillaceous sediments which dip from 40 to 60 degrees west. In places the volcanic components of this series are intensely silicified and pyritized and intruded by bosses of granitic rock which are characterized in the topography by small outstanding domes rising above the general contour. Occasional large, subangular to angular boulders of conglomerate, especially to the east on the slope of the upper Unuk river, indicate the possible presence of this formation in that locality.

In places, intercalated with the tuffaceous rocks, are narrow bands of argillaceous sediments, and towards the northerly section of the plateau a gradual increase of argillite and sandstone is observed, apparently overlying the volcanic rocks. Towards the southerly end of the plateau, however, the volcanic rocks are well developed, but with occasional intercalated belts of argillite. A feature of the volcanic rocks of the area is the gradual merging of tuffs and lavas with no clear-cut line of contact or demarcation. As porphyritic structure of the

lavas is not generally pronounced and frequently only obscure shadows of phenocrysts can be observed in the ground-mass, this feature makes the accurate determination of these two phases of volcanic rocks extremely difficult in the field. As, however, the contact-zones of the tuffs and lavas appear to be structurally related to the occurrence of the best values in the recently explored mineral occurrences of the Prout Plateau area, the accurate determination of tuffs and lavas would seem to be important. Regional or local shearing and pronounced lines of fracturing are remarkably absent from the structural make-up of the area examined, but seem to be more in evidence in the southerly area around McQuillan (Sulphide) and Ketchum (South Fork) creeks and the central section of the Unuk River trough towards the International boundary.

The sedimentary and volcanic rocks composing Prout plateau are similar in character and may possibly be correlated with the Upper Bear River series of Jurassic age. In places the exposures of this series may possibly approach the younger Nass series horizon, especially in the northerly and north-westerly areas of argillaceous and sandy sediments. Structurally, the area would appear to represent a northerly-plunging anticline along the southerly axial projection of which the Upper Bear River series is exposed.

Mackay Syndicate.

This syndicate controls about thirty claims in two blocks comprised by the *Unuk* and *Barbara* groups. The claims are located from north to south along the easterly side of Prout plateau for a distance of over 3 miles covering a general altitude from 3,000 to 4,000 feet. The property has so far been reached by aeroplane from Stewart with landings on Mackay lake, a flying distance of about 90 miles.

A good cabin and assay office have been constructed at altitude 3,000 feet on *Unuk No. 4* and are reached by a 3-mile trail through open country from Mackay lake. The claims embrace a belt of volcanic rocks consisting of fine-grained tuffs with some slightly porphyritic lavas. About the central section of the ground a dioritic rock, possibly representing a cupola projection of an underlying intrusive, forms the small outstanding eminence of Prout dome (Battleship dome) of about 4,000 feet elevation. Forming outstanding knolls or domes of a central ridge striking north-south in the topography and characterized by heavy oxidation are several insular areas of comparatively intensely silicified and pyritized tuffs, possibly associated with some andesitic porphyries. In flying over the section these can be noted from a considerable distance and first attracted the attention of the Mackay Syndicate in 1932. A wide distribution of quartz in the form of a network of irregularly striking and dipping veins, stringers, and patches, with mineralization of pyrite in both the quartz and the intervening country-rock, occurs in and about the vari-coloured oxidized domes. On the east side of Coulter creek and on the *Sulphurette* group a dioritic core of a similar dome was observed. This indicates the possibility of the silicified domes which characterize the Prout Plateau ridge being cored by unexposed diorite cupola projections, of which Prout dome (Battleship) may represent a completely exposed core. It is understood that only generally low and dispersed gold values have as yet been found in the superficial prospecting of these silicified domes.

The main showings being explored consist of localities of quartz stringers and partial silicification occurring in irregular areas of slightly porphyritic lavas along the contacts of the latter rocks with the tuffs. Mineralization consists of an irregular distribution of pyrite with some galena and sphalerite. These showings occur in the more depressed area of the Prout Plateau ridge, in sections between and lateral to the oxidized knolls. Several of these occurrences carrying good gold values have been discovered in widely scattered localities on the claims. Exploratory work has so far been concentrated only on this type of showing on *Unuk No. 9* and *No. 11* claims. In 1933 these were explored by several open-cuts. No. 1 cut exposes a width of 48 feet reported to assay 0.16 oz. gold per ton, of which two sections 9 feet and 4 feet wide are reported to assay respectively 0.45 and 0.62 oz. gold per ton. No. 2 cut, about 90 feet north of No. 1, exposes about 10 feet of quartzose material reported to average 0.02 oz. gold per ton. No. 3 cut, about 50 feet south of No. 1 cut, is reported to assay 0.2 oz. gold per ton across 12 feet. No. 6 cut, about 20 feet south of No. 1 cut, is reported to assay 0.14 oz. gold per ton across 12 feet. Two specimen samples of the heavier sulphide mineralization from this cut are reported to assay 0.84 and 0.32 oz. gold per ton. Shearing does not characterize the structure in and about these cuts, but some fracturing with a general westerly dip of about 60 degrees and conformable to the regional dip of the sediments is evident.

Whether the mineralization is structurally related to this fracturing, or to the irregular contact between porphyries and tuffs which could be quite erratic and characterized by varying strike and dip, is as yet not clearly indicated.

During 1934 a Boyles Bros. "X-ray" surface diamond-drill was transported in by aeroplane and eleven holes varying from 28 to 115 feet were drilled under and around No. 1 cut. The first four holes drilled from the east side of the ridge failed to disclose values of importance. Six subsequent holes, drilled from the west side of the ridge, showed distinctly better results. In four of the holes drilled values from about 0.2 to 0.48 oz. gold per ton across widths from 3 to 9 feet respectively, with lower values across greater widths, are reported. This drilling indicates at least a local condition of northerly strike and westerly dip or plunge of the mineral-bearing structure. Whether this is the characteristic or regional attitude of the structure governing the mineralization will require further exploration to determine.

About 500 feet south of No. 1 cut, No. 4 cut on *Unuk No. 9* was excavated in 1933 on a series of quartz stringers in porphyritic lava and the following values reported: Across 6 inches, 2.56 oz. gold per ton; across 6 inches, 8.08 oz. gold per ton; across 12 inches, 1.96 oz. gold per ton; across 7 inches, 2.40 oz. gold per ton. Some further work was done on this showing and an assay of 0.20 oz. gold per ton across 5 feet is reported. Some shearing and fracturing striking north-westerly is associated with this showing.

On *Unuk No. 13* some prospecting was done in the dioritic rock of Prout dome and from a quartz stringer a selected sample is reported to assay 0.24 oz. gold per ton. About 500 feet north-easterly of this and about 2,000 feet from No. 1 cut quartz stringers were discovered in a lava-tuff area and high gold values reported in 1933. During 1934 cut No. 13 was excavated on this showing and from sectional samples reported assays average 0.384 oz. gold per ton across a total width of 10 feet. The sample-sections distributed across this width vary from 0.16 oz. to 1.64 oz. gold per ton, the highest and lowest values being across widths of 1 foot. A stringer 2 inches wide in this showing is reported to assay 6.64 oz. gold and 10.88 oz. silver per ton. The exploration of this area by diamond-drilling is planned for 1935.

On *Unuk No. 21* claim at the north end of the property and adjoining the *Verna D.* group of the Unuk Valley Gold Syndicate several quartz stringers with pyrite, sphalerite, and some galena mineralization are exposed in a porphyritic lava formation. No work has been done on these, but a selected sample of the best mineralization is reported to assay 0.14 oz. gold and 0.62 oz. silver per ton.

The results achieved in a short time indicate that the showings and area covered by the holdings warrant further exploration. In the conduct of this work detailed attention must be paid to the indicated structural relation between the mineralization and the porphyry-tuff complex. As this is indicated as being somewhat complex and irregular, varying or irregular results are not unlikely until this structural factor has been adequately solved.

Unuk Valley Gold Syndicate.

This syndicate, composed of Premier, B.C., interests, controls the *Verna D.*, *Pawn*, and *S.K.* groups, comprising sixteen claims adjoining the *Unuk* group on the north. The claims occupy a northerly segment of Prout plateau and the northerly continuation of the mineralized ridge described under the heading of "Mackay Syndicate." The tent-camp is at altitude 3,600 feet and the claims cover an area of from about 3,500 to 3,700 feet elevation. Similar rocks and knolled topography feature the area, but towards the northerly section of the claims more argillaceous and arkosic sediments occur. Tuffs and slightly porphyritic lavas, similar to those described on the *Unuk* group, but differing in that the tuffs appear to be more calcareous and in places coarsely brecciated, are, however, also well represented. Three prominent highly oxidized, pyritized, and silicified tuff knolls similar to those described on the *Unuk* group are also features of the topography. The rocks appear to represent higher horizons of the Upper Bear River series than those forming the southerly area of Prout plateau.

At elevation 3,575 feet two wide cuts in a pyritized, tuffaceous, and calcareous breccia expose dispersed stringers, blebs, and seams, mineralized with galena, sphalerite, and pyrite. About 200 feet easterly of this, three wide cuts spaced along about 300 feet between elevations 3,575 and 3,625 feet in a tuff-porphyry ridge expose a zone striking north-westerly carrying irregular patches, blebs, and joint-plane stringers 2 to 3 inches wide of galena, sphalerite, pyrite, some arsenopyrite and chalcopyrite across exposed widths of 5 to 15 feet. It is understood that generally low-grade values predominate in these showings, but as small irregular

outcrops of slightly porphyritic lavas are contiguous to the cuts, these should be extended to the tuff-porphyry contacts and any mineralization exposed there should be thoroughly sampled. Several other discoveries have been made on these claims, but as yet they have been only very superficially prospected. During the 1934 season the work was carried out under the direction of Ralph Swartzfiger, of Premier.

Sulphurettes Prospecting Syndicate.

This syndicate is composed of Prince Rupert interests. During 1934 prospecting was carried out by A. R. Nichols and Robert Wilson, of Prince Rupert. Some discoveries were made and four groups comprising sixteen claims were staked. The *Gull* group of eight claims is located adjacent to the *Unuk* group on the south. The general geology of this area is described under the heading of "Mackay Syndicate" and the group covers a section that should be carefully prospected. The *Sulphurette* group of eight claims is located south of Mackay lake and towards the northerly section of the ridge between Coulter and Melville creeks. An outstanding oxidized and silicified knoll of tuff similar to those on the *Unuk* and *Verna D.* groups, cored with dioritic rock, occurs on this group. The rocks of the area comprise tuffs, breccias, porphyritic lavas, argillite bands, and some dioritic intrusives. Some silicification and dispersed quartz stringers were seen in the porphyries, but no defined fracturing or lines of structural weakness were observed. The *Top* group of four claims is located east of and adjoining the *Verna D.* and *Pawn* groups of the Unuk Valley Gold Syndicate and the *Alone* and *Owl* groups of two claims each adjoin the *S.K.* group of this syndicate on the north. The geology and mineral possibilities of this area are indicated in the description relative to the Unuk Valley Gold Syndicate holdings. No work other than superficial prospecting was done by this syndicate during the season.

Other properties on which exploratory work was carried out are as follows: Eight claims staked by J. Storie and O. Bjorke; three groups, the *Gold Run*, *Unuk Jumbo*, and *Florence*, staked by T. J. McQuillan and Geo. E. King.

STIKINE MINING DIVISION.

This Division covers an area of about 19,850 square miles and embraces an appreciable area of the eastern contact-margin of the Coast Range batholith which cuts across the Stikine River trough at about the confluence of the Iskut river and then follows the main Stikine valley in a northerly direction to the confluence of the Chutine (Clearwater) river, which it parallels on the westerly side, striking in a north-westerly direction across the Whiting and Taku River troughs.

From a lode-mining aspect, interest in the Stikine Division is comparatively new and from year to year is receiving more attention from prospectors. Although nothing of definite economic importance has as yet materialized in lode-mining, many discoveries, particularly of the base metals, have been made. A favourable area for prospecting occurs along the eastern contact-belt of the batholith, accessible from the Stikine River drainage-basin. Reference to various mineral deposits occurring in the district will be found in former Annual Reports, and are thoroughly covered in the reports from 1927 to 1933. This Division was not visited during the 1934 season.

LIARD MINING DIVISION.

This Division, about 52,930 square miles in extent, is the largest Division in the district and is embraced by the Interior Plateaux country which lies east of the Coast range. The area is about 3,200 feet average elevation, with peaks and ranges rising to about 4,000 feet above the rolling upland plateaux. In conformity to the orogenic structure and in contrast to the westerly bordering Coast Range area, the drainage of the section is northerly to the Arctic.

This Division is as yet very imperfectly mapped both geologically and topographically. It is indicated, however, that the area is underlain by sedimentary and volcanic rocks of varying ages from early Palæozoic (in some sections possibly Precambrian) to Recent. Intrusive into this complex are granitic rocks of the Cassiar batholith and many stocks and bosses of about Upper Jurassic age.

On account of its remoteness, very little attention has been paid to lode possibilities of this Division. Several important discoveries of the silver and base-metal type have been made, but to be of immediate commercial utility gold deposits, especially of the free-milling type, would be required. The Division is largely unprospected. A favourable and comparatively

easily accessible area deserving of prospecting is that embraced by the Cassiar batholith. The area is described in Bulletin No. 1, 1932, "Lode-gold Deposits of British Columbia."

Placer-gold prospecting has been carried out in the Division for a number of years and dates from the early discoveries in 1872. During the early period a substantial production resulted, but the output declined steadily in subsequent years. This phase of mining is described in former Annual Reports; latterly in the reports for the years 1927 to 1933 and in Bulletins No. 2, 1930; No. 1, 1932; and No. 2, 1933. Despite these long-standing placer activities, there still remains an extensive favourable area totally unprospected for placer gold and several known favourable sections only partially prospected.

ATLIN MINING DIVISION.

The Atlin Mining Division embraces about 18,800 square miles, bounded on the north by Yukon territory. The central (or Atlin) section proper occupies an upland plateaux area draining through a complicated system of lakes and rivers into the Yukon river and Bering sea. The southerly and north-westerly segments, embracing the Whiting River, Taku River, and Rainy Hollow sections, drain into the Pacific ocean. The north-westerly and southerly sections are generally underlain by a rock-complex of about Carboniferous to Recent age, and the central plateaux section of Precambrian to Recent rocks. The geologic factor governing lode-mineral deposits in the southerly and north-western sections is the Coast Range batholith, the eastern contact of which cuts across the Whiting and Taku River troughs in the south and through the Rainy Hollow section in the north-west. In the central plateaux section Jurassic granitic rocks in the form of stocks and bosses, with later dykes, are intrusive into the older rock-complex.

Due to comparative remoteness, high transportation and freight rates, lode-mining has been comparatively inactive, and for this reason, although several silver and base-metal deposits are known, the limited lode-mining activity has been mainly devoted to gold deposits.

Placer-gold mining dates from the discovery of rich gravel deposits in the Atlin Lake area in 1898. Substantial placer-gold production came from the Atlin deposits up to the period of the World War, but then declined steadily up to 1929, when interest revived. Since that year there has been a steady increase in placer-mining and exploratory activity, with a gradual increase in production, which promises to continue. There is in this section an appreciable known area of favourable ground as yet only partially prospected and explored. There is also a large area of possibly favourable virgin territory worthy of prospecting for both lode and placer deposits.

This Division is described in detail in former Annual Reports and especially those for the years 1929 to 1933. Detailed references will also be found in Bulletin No. 1, 1931; Bulletin No. 1, 1932; and Bulletin No. 2, 1933, issued by the British Columbia Department of Mines, and also in numerous publications of the Geological Survey of Canada.

LODE-MINING.

Atlin Pacific Mining Co., Ltd. (N.P.L.) (formerly Norgold).

Under the name of Norgold Mines, Limited, this company was incorporated in British Columbia in December, 1933, with a capitalization of 5,000,000 shares of no par value. In order to avoid confusion with an Eastern company of the same title, the name was later changed to the present one. The registered office of the company is at 1002 Stock Exchange Building, Vancouver. Late in 1934, Bobjo Mines, Limited, an Ontario company, acquired an interest in the company and assumed active management, with Frank Smith, a member of its engineering staff, in charge of operations at the property.*

The holdings consist of thirty-nine claims and fractions held by location and include the *Spokane* group, formerly owned by Fred Lawsan, of Lawsan's Landing, Taku arm (Tagish lake), and associates, of Atlin. The property is located on the westerly side of Bighorn river and is reached by wagon-road about 8 miles long from the lake at Lawsan's Landing (elevation 2,161 feet). The camp is at elevation 2,640 feet on the west side of Bighorn river. Several claims are located on the east side of the river, but the majority cover the steep slopes of the mountain on the west side from the river at about elevation 2,620 feet to the summit at about

* Bobjo Mines, Limited, relinquished its interest in February, 1935.

elevation 5,000 feet. The mineral deposit was first discovered in 1898 and was formerly staked as the *Birdie* and *Gold Cup* claims. Since that time claims covering it have been abandoned, restaked, and owned by several different parties. On the adjoining *Bighorn* group Mr. and Mrs. Fred Lawsan, in the early days, carried out some small-scale mining of rich gold pockets in lenticular quartz veins. The property is mentioned in Bulletin No. 1, 1932, and described in the Annual Report for 1933, and in Bulletin No. 1, 1934, issued by the British Columbia Department of Mines, and referred to in Memoir 37, 1913, Geological Survey of Canada.

The rocks of the area consist of a gneissoid complex of the Mount Stevens series tentatively referred to the Precambrian. Intrusive into this series are post-Palæozoic dykes of andesite, rhyolite, and feldspar porphyry. In general the formations strike slightly east of north and dip at varying angles to the east. In places the formation is cut by fault-zones characterized by crumpling, mashing, and distortion of the rocks.

The mineral deposit consists of a quartzose fissure, striking generally east-west across the formation, and standing vertical or dipping steeply to the north. The vein (or veins) is adjacent or contiguous to a dyke of possible andesitic type. Surface tracing of the vein or veins was indefinite at the time of the writer's examination. A major fault marked by a deep gully, striking north-south and apparently dipping east, cuts the fracture-structure at about elevation 4,000 feet, between the "Incline" and "Blacksmith" adits, causing a horizontal displacement of about 250 feet. On account of the pronounced shearing, crushing, and distortion of the rocks in the gully, it is probable that extensive vertical movement has also accompanied this dislocation. The structural aspects of the vein or veins, however, indicate quite persistent fissuring. At the time of examination (June 28th and 29th) intermittent tracing of the vein had been carried out from elevations of about 2,650 to 4,225 feet, along a horizontal distance of about 3,000 feet, with surface and underground exposures showing a vein-width varying from about 2 to 6 feet and averaging about 3.5 feet. The gangue consists of quartz with generally sparse mineralization of pyrite, with some galena and sphalerite, in places carrying appreciable gold values with low silver values. In this mineralization it is interesting to note that free gold is not visible.

At the time of examination exploration was being carried out in three short adits. The "Incline" adit at elevation 4,125 feet had advanced about 67 feet on the vein. A sample across 27 inches about 42 feet from the portal assayed: Gold, 0.6 oz. per ton; silver, 0.8 oz. per ton; lead, *nil;* zinc, 2.4 per cent. A sample across 51 inches at the face assayed: Gold, 0.06 oz. per ton; silver, trace; lead, *nil;* zinc, 1.5 per cent. The "Blacksmith" adit at elevation 3,540 feet had advanced 81 feet on the vein. A sample from this working across 30 inches, 42 feet from the portal, assayed: Gold, 0.64 oz. per ton; silver, 0.8 oz. per ton; lead, trace; zinc, 3 per cent. A selected specimen sample of a streak of fairly massive mineralization at about this point assayed: Gold, 1.40 oz. per ton; silver, 0.8 oz. per ton; lead, 1.7 per cent.; zinc, 5 per cent. A sample from the face across 22.5 inches on the foot-wall side assayed: Gold, 0.04 oz. per ton; silver, trace. A sample across 31 inches on the hanging-wall side assayed: Gold, 0.34 oz. per ton; silver, 0.6 oz. per ton; lead, *nil;* zinc, 2.2 per cent. The "Peters" adit at elevation 3,370 feet parallels the vein for about 87 feet, where a crosscut to the south for 23 feet intersects the vein at 12 feet, showing a width of about 44 inches. A sample of the east face across 44 inches assayed: Gold, 0.04 oz. per ton; silver, 0.2 oz. per ton. A sample of 3 feet of wall-rock on either side of the vein at this face assayed: Gold, 0.03 oz. per ton; silver, trace. Systematic sampling of the workings at about the beginning of September by a reliable independent engineer is reported to indicate ore-shoots of about 0.31 oz. gold per ton grade across an average width of 3 feet. Length, attitude, and frequency of these will be determined by further exploration. Other veins are known on the property, but no work has been done on them. It would also seem that the fault-zone is worth some exploration.

It is understood that equipment for machine-mining has been installed and development is proceeding in the "Blacksmith" and "Peter" adits and in a new low-level adit.

Engineer Gold Mines, Ltd., Inc. (Refer to Annual Report for 1933 and former Annual Reports.) During 1934 the assets of this company were sold at Sheriff's sale to representatives of the Mining Corporation of Canada, Limited, for $25,000 cash in satisfaction of a judgment for $207,431.18 in favour of John G. Harris, Oakville,

Ontario. Although definite plans have not as yet been made public, it is understood that exploratory operations will be resumed on this property in 1935 by the Mining Corporation of Canada.

Atlin Ruffner Lead-Silver Mines, Ltd.

(Refer to former Annual Reports.) During 1934 Bobjo Mines, Limited, of Ontario, through purchase of shares, acquired an interest in this property and early in the season carried out some further exploration under the supervision of Frank Smith. This work was mainly confined to the exploration of known higher-grade sections of the veins at the upper elevations with the objective of exploring the vertical continuity of this ore-grade. Towards the late summer the operation was discontinued.

Placer-gold Mining.

In the Tatshenshini River and Squaw Creek areas placer operations have been very active during the year. Although more individuals penetrated this area, many were inexperienced and poorly equipped, and after the exhaustion of their own resources were forced to look for jobs on profitable ground held by others. Prospecting of this area suffered accordingly. On Blizzard creek the promising superficial indications discovered in 1933 were followed up by several parties, but after the excavation of long and deep drainage-cuts the heavy boulders and deep gravel forced abandonment before bed-rock could be reached.

On Squaw creek about forty Indians and whites were active and some fair recoveries were made. On *Discovery* claim a recovery of about 190 oz. gold is reported. On No. 1 above *Discovery*, Gold Run Exploration Company, under the supervision of G. Stillwell, reports a recovery of 270 oz. gold. This organization with a crew of ten men also carried out prospecting of several other localities and creeks in this section. The feature of the year on Squaw creek has been the extension of pay-channels under the benches on both sides of the creek. This indicates an appreciable area still to be prospected along the banks of this creek both on the low and high benches. In the canyon and mouth area of Squaw creek, on the Yukon side of the boundary, Victoria Ventures, Limited, carried out extensive exploration under the supervision of John Shaller, with the objective of determining values and character and extent of possible "pay" ground for an hydraulicking operation. Values are reported in places and a subdued boulder condition in comparison to that pertaining in the Upper Squaw Creek area is indicated. Some exploratory work was also carried out by this company on a lease held in the Upper Squaw Creek area in British Columbia territory. In the old-channel outwash area behind Muncaster's camp two test-pits showed some fine gold. Some prospecting of creeks westerly of Squaw creek was also done.

In the Atlin area proper much activity by individuals, syndicates, and companies has prevailed on O'Donnel river, Bull, Wilson, McKee, Spruce, Pine, Birch, Boulder, Ruby, Cracker, Otter, and Wright creeks. Exploration has also extended to several creeks in the outlying areas. Under the supervision of R. D. Adams, the Yukon Border Placer Golds, Limited, incorporated in 1934 and controlled by the J. E. Hammell interests of Toronto, carried out extensive Keystone-drilling on Lincoln and Consolation creeks in the Gladys Lake area, but reports discouraging results. On McKee creek, Atlin Gold Mines, Limited, with George Adams in charge of operations, continued hydraulicking with a crew of seventeen. Stripping of overburden was done and piping into the bed-rock gravels commenced in two pits. Towards the close of the season a third pit at the upper end of the workings was started. At the close of the season the management reports from the lower pit the disposal of 50,390 cubic yards of tailings and 3,750 cubic yards of pay-gravel sluiced, averaging 36 cents per cubic yard, or $1.44 per square yard of bed-rock, with a total recovery from this pit of $1,350. Operation in the upper pit No. 1 is reported as 50,000 cubic yards of overburden stripped, 44,940 cubic yards of tailings disposed, and 2,520 cubic yards of pay-gravel sluiced, averaging $2.53 per cubic yard, or $10.12 per square yard of bed-rock, a total recovery from this pit of $6,374.45. The upper pit No. 2 operation is reported as 6,192 cubic yards of tailings disposed and 3,096 cubic yards of pay-gravel sluiced, averaging $1.1927 per cubic yard, or $4.77 per square yard of bed-rock, a total recovery from this pit of $3,692.72. For the season a total recovery of $11,417 is reported from this operation.

On Boulder creek, Consolidated Mining and Smelting Company, with a crew of fifteen, discontinued hydraulicking and started exploratory drifting, and report a recovery of 135 oz. gold

for the season. Drift-mining in the deep bed-rock gravels on Otter creek has also been inaugurated by Compagnie Francaise des Mines d'Or du Canada. On Pine creek extensive hydraulicking by the Northern Goldfields Exploration Company, Limited, with a crew of nine, had proved disappointing up to the time of examination in July.

On Spruce creek drifting and shovel operations have returned some very good recoveries. On this creek the settlement of litigation concerning the *Beaton* drift-mine has permitted this, Atlin's most substantial producer, to again proceed with production. A feature in the Atlin area this year has been the installation on Spruce creek by the Columbia Development Company, controlled by A. R. Kaufman, of Kitchener, Ontario, of a Bucyrus-Erie caterpillar steam-shovel of ⅝ cubic yard capacity. The work of installation and operation was carried out under the supervision of J. Walsh. The management reports a recovery of $1.13 to the cubic yard of gravel sluiced and a total recovery of about 1,400 oz. gold for the season. The extension of this work during the 1935 season is planned.

McLaren (McLair) Creek Valley. Belle Creek enters McLaren Creek at Right. Near Headwaters of Finlay River.

McLaren (McLair) Creek—looking Down-stream above Canyon.

Transporting Supplies on Crooked River, Tributary of Parsnip River.

Quesnel Forks—Old Buildings of the Cariboo Gold-rush Days.