

PART E

ANNUAL REPORT

OF THE

MINISTER OF MINES

OF THE PROVINCE OF

BRITISH COLUMBIA

FOR THE

YEAR ENDED 31ST DECEMBER

1938



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1939.

BRITISH COLUMBIA DEPARTMENT OF MINES.  
VICTORIA, B.C.

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Hon. W. J. ASSELSTINE, *Minister.*

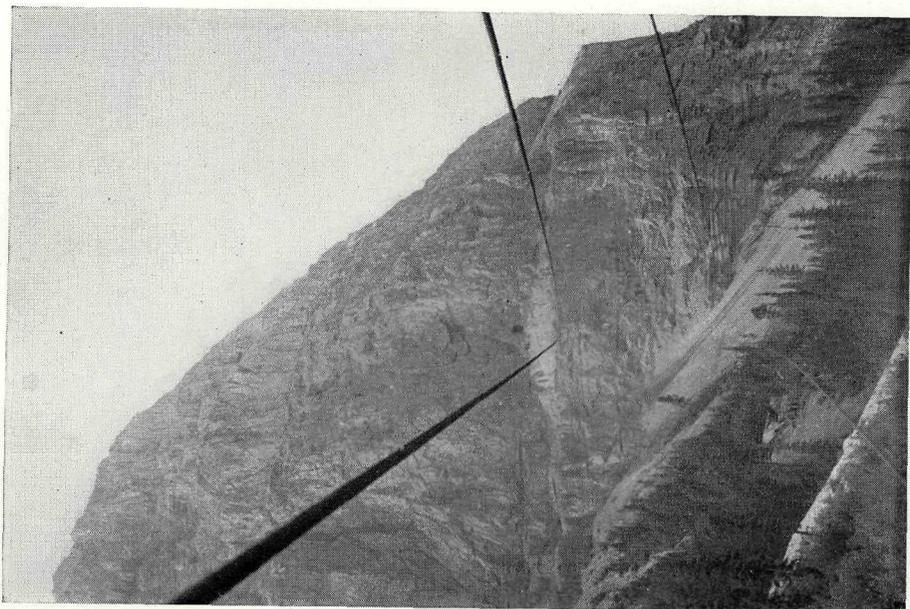
JOHN F. WALKER, *Deputy Minister.*

JAMES DICKSON, *Chief Inspector of Mines.*

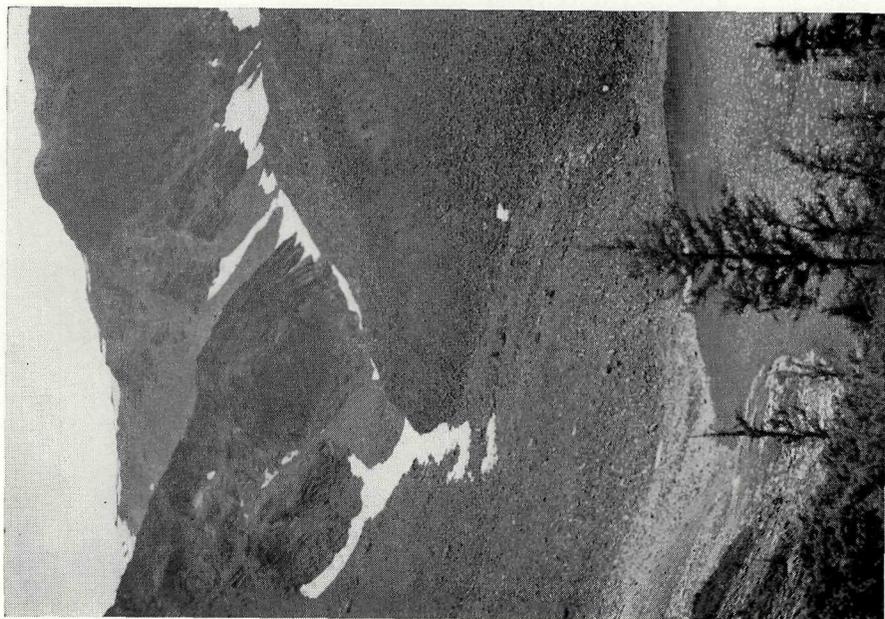
D. E. WHITTAKER, *Provincial Analyst and Assayer.*

P. B. FREELAND, *Chief Mining Engineer.*

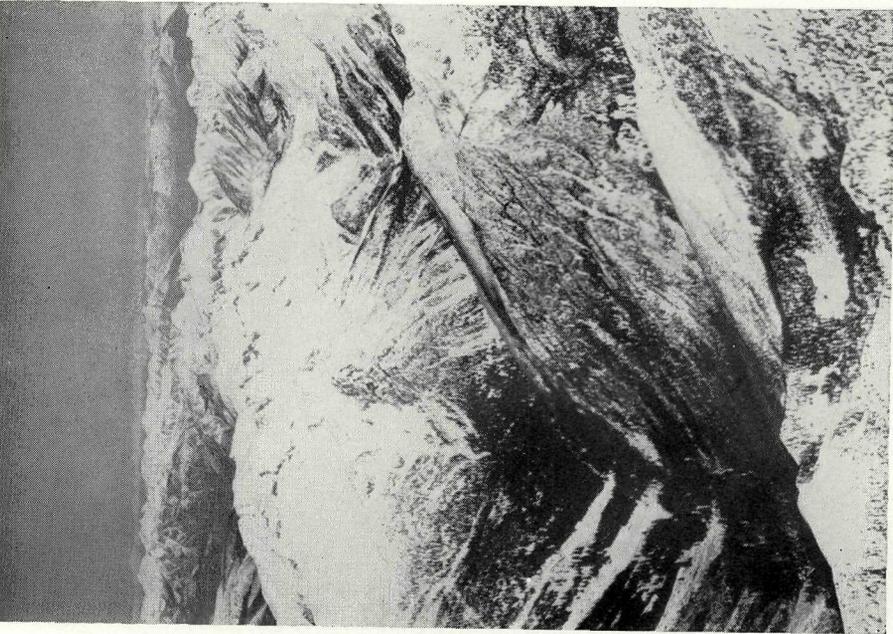
R. J. STEENSON, *Chief Gold Commissioner.*



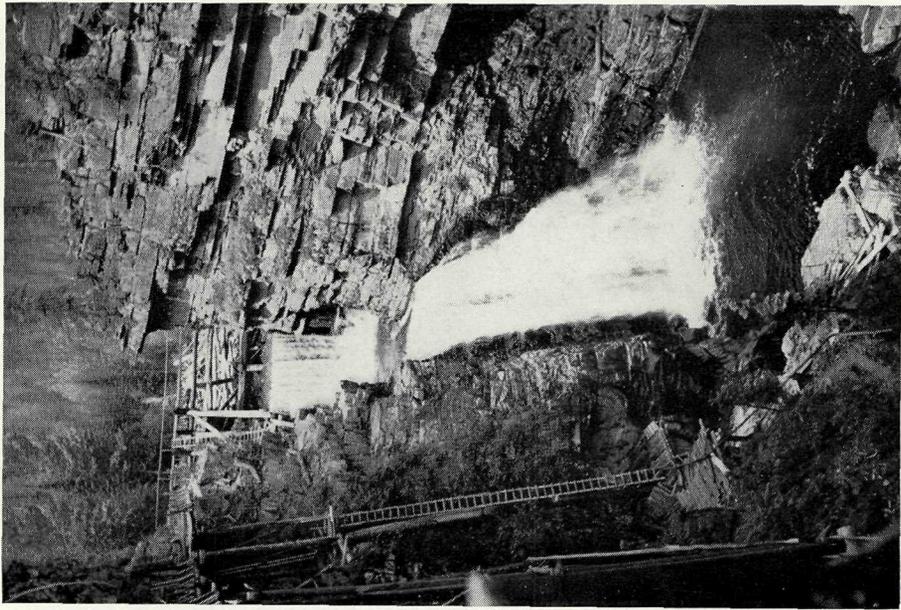
Monarch Mine, Field.  
Looking southward to Monarch portal from mill terminal.



Lake at head of Granite Creek.  
Silver Key group.



Headwaters of Lemon Creek.



Falls on Moyie River at Nero Placers.  
Portal of workings at foot of ladder.

PART E.  
SOUTH-EASTERN DISTRICT.

BY

R. J. MACONACHIE.

SUMMARY.

Like last year, the properties of the Sheep Creek camp were outstanding among the gold producers, with *Reno*, *Sheep Creek*, and *Kootenay Belle* continuing operations on established scales. Particular encouragement was found at the property of Sheep Creek Gold Mines, Limited, with the discoveries of additional veins of proved and possible commercial importance. Also of special consequence was the coming into production of the *Gold Belt* property in October where, geologically, conditions apparently compare favourably with those existing in the successful operations adjacent.

At the *Second Relief* gold production was maintained from the main workings, and continued development of the two veins on the west side of Erie Creek was sufficiently encouraging to indicate that further work is warranted.

Production from the Ymir camp was severely curtailed by the closing of the *Ymir Centre Star*, operated by Wesko Mines, Limited, and of the *Howard*, operated by Durango Mines, Limited. Both of these properties were milling gold-silver-lead-zinc ore.

The closing of the *Bayonne* property at the end of the year was particularly unfortunate in that it was the largest and most important operation in that area, and it is to be hoped that interest and prospecting activity will not be entirely diverted from the other smaller properties in the surrounding district.

Several gold properties with previous records have been reopened during the year, partly due to the low rates granted by the Trail smelter on siliceous ore. Examples are the *Daylight*, under option to the Hedley Amalgamated Gold Mines, Limited, and the *Athabasca*, being developed by Noble Five Mines, Ltd., both on Toad Mountain near Nelson; the *Inland Empire* at Paulson; the *Highland Surprise* at Retallack; the *Kilo*, on Chapleau Creek, near Slocan City; and the *Gilman* in the Lardeau. The two last-named operations are described in detail in this Report.

Of new gold discoveries, the most interesting was at Rosebud Lake, south of Sheep Creek. The gold-bearing vein on the *Andersen* property, on Perry Creek, in Fort Steele district, is worthy of mention, for although not discovered this year it was only toward the end of the season that comprehensive development has been undertaken. Both this property and the Rosebud Lake area are herein described. The Nero Placers, on the Moyie River, near Lumberton, are in a similar position in that development carried on over a period of several seasons culminated this year in assuring a working profit and indicating further attractive possibilities.

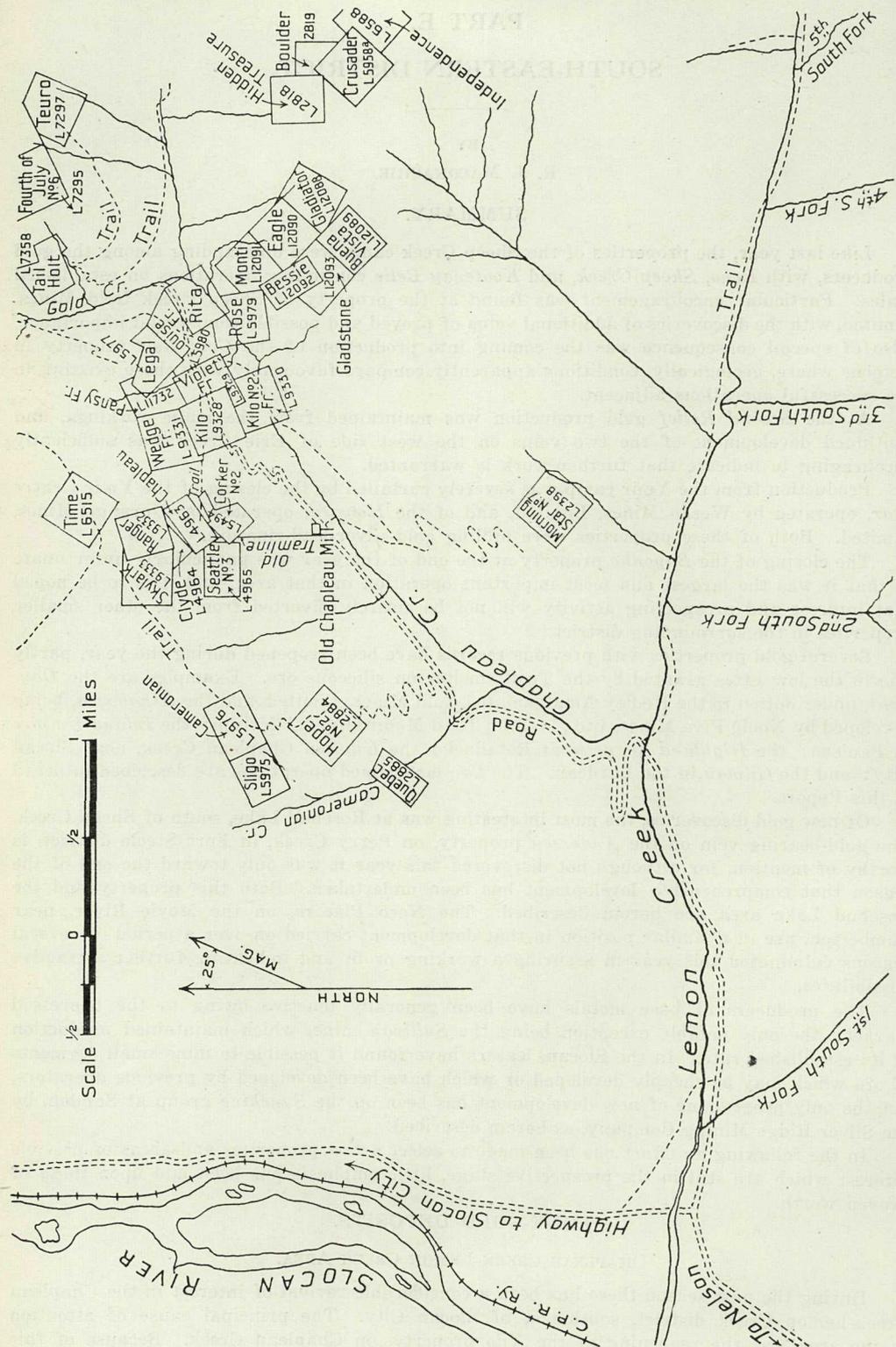
The producers of base metals have been generally inactive owing to the depressed market; the only notable exception being the *Sullivan* mine, which maintained production at its established rate. In the Slocan, leasers have found it possible to mine small segments of ore which may be cheaply developed or which have been developed by previous operators, but the only programme of new development has been on the *Sunshine* group at Sandon, by the Silver Ridge Mining Company, as herein described.

In the following an effort has been made to select a few properties and areas of possible interest which are still in the prospective stage, little emphasis has been laid upon those of proven worth.

LODE-GOLD DEPOSITS.

CHAPLEAU CREEK-LEMON CREEK AREA.

During the past season there has been a considerable revival of interest in the Chapleau Creek-Lemon Creek district, south-east of Slocan City. The principal cause of attention to the area was the reopening of the *Kilo* property, on Chapleau Creek. Because of this



Chapleau Creek-Lemon Creek Area. Map showing locations of surveyed claims.

operation and of the possibility that improved means of access would lead to the discovery and development of other similar deposits by stimulation of prospecting in the area, the road was reconditioned and extended for truck-hauling as far as the *Goldstream* property, half a mile above the *Kilo* property and 9 miles from the highway. The point of junction with the highway is 6 miles south of Slocan City. The road follows up Lemon Creek to the mouth of Chapleau Creek. It is on easy grade for the first 3 miles, but for the remainder of the distance, as it rises above Chapleau Creek on its north-west side, the road is on a steeper gradient. Although satisfactory during summer months, parts of this latter stretch, particularly the last 2 miles to the *Kilo*, would require some relocation to permit continuous winter-hauling by trucks.

In the district, the creeks, Chapleau, Lemon, and other small tributaries, are deeply incised between peaks rising to altitudes of nearly 8,000 feet. The larger streams run swiftly on steep gradients and assure year-round source of power and water-supply for any milling operation which might be warranted by the deposits in the area. Snowfall, although heavy enough to necessitate sturdy construction of buildings, is not sufficient to affect any well-organized mining operation. Timber is plentiful and suitable for all domestic, mining, or construction needs.

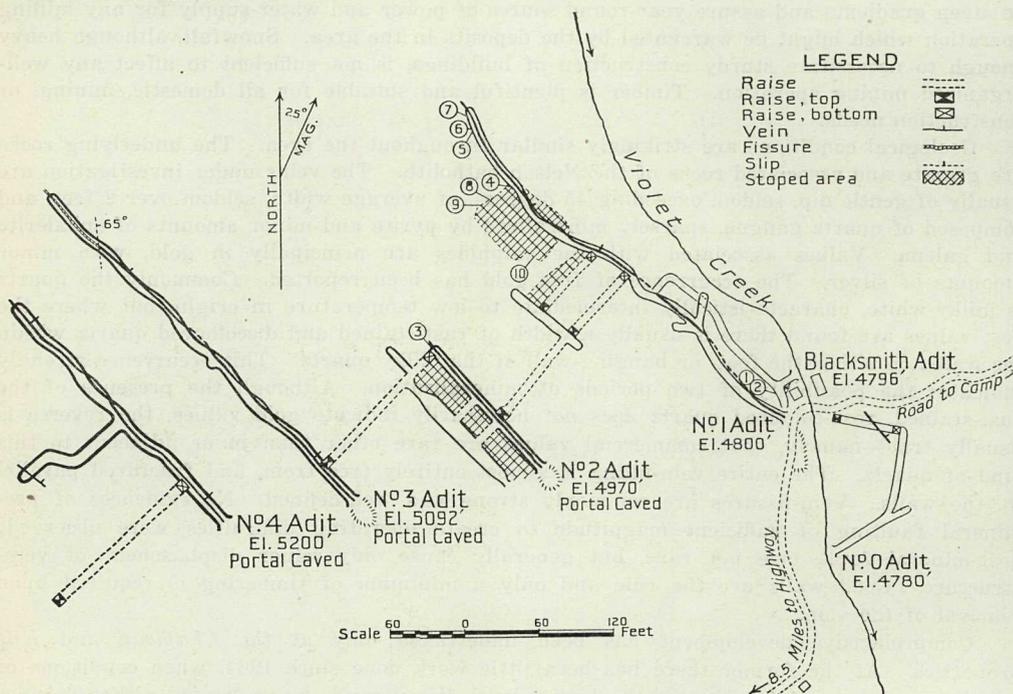
Geological conditions are strikingly similar throughout the area. The underlying rocks are granite and associated rocks of the Nelson batholith. The veins under investigation are usually of gentle dip, seldom exceeding 45 degrees, of average width, seldom over 2 feet, and composed of quartz gangue, sparsely mineralized by pyrite and minor amounts of sphalerite and galena. Values associated with the sulphides are principally in gold, with minor amounts of silver. The occurrence of free gold has been reported. Commonly the quartz is milky-white, characteristically intermediate to low temperature in origin, but where the best values are found there is usually a width of rust-stained and discoloured quartz within the walls, on either the foot- or hanging-wall of the milky quartz. This occurrence strongly indicates the possibility of two periods of mineralization. Although the presence of the rust-stained, rose-coloured quartz does not necessarily indicate gold values, the reverse is usually true—namely, that commercial values are rare other than in or adjacent to this kind of quartz. The entire vein-filling is almost entirely free from, and fractured parallel to, the walls. Vein-fissures are commonly strong and well-defined. No evidences of pre-mineral faulting of sufficient magnitude to create operating difficulties were observed; post-mineral faults are not rare, but generally cause only minor displacement of vein-structure. Good walls are the rule and only a minimum of timbering is required upon removal of the vein.

Comprehensive development has been undertaken only at the *Chapleau* and *Kilo* properties. At the former there has been little work done since 1904, when conditions of faulting and decreased values on the lowest level discouraged the operators, although since that time various leasers have made small shipments. In consideration of typical conditions in this district it must be mentioned that the *Chapleau* property probably presents problems not generally encountered by reason of its proximity to an area on the north-west and north, in which geological conditions are irregular by reason of the inclusion of older rocks within the granite mass. These occurrences may be studied on the *Skylark* and *Ranger* claims immediately adjoining the *Chapleau*.

In the district, the *Kilo* property thus offers the only opportunity for detailed study of what at this time appears to be the most favourable conditions for the development of commercial ore.

Reference should be made to the Annual Report of the Minister of Mines for 1933. Owned by Mrs. N. F. McNaught, of Silverton, operated intermittently since 1897, the group consists of the *Violet* and *Kilo* Crown-granted mineral claims, and the *Wedge*, *Pansy*, and *Kilo No. 2* Crown-granted fractional mineral claims. During 1938 the property has been held under lease and bond by H. V. Dewis, of Silverton, who built new camp buildings and employed up to eleven men. Assay equipment, compressor, and machine-drills were placed on the ground and active development was carried on for four months. A total of 501 tons was shipped with content of 197 oz. of gold and 282 oz. of silver.

Geological conditions are similar to those previously described as characteristic of the district. The vein averages about 2 feet wide and where values have been found sufficiently high to constitute shipping-ore they are invariably confined to a width of discoloured vein-quartz that accompanies the ordinary white quartz gangue. The granite host-rock is commonly dark-coloured and even-grained, with occasional conspicuous feldspar phenocrysts. The walls are good and stand with little timber, except in the portions of the mine originally opened. There, the granite has decomposed, but such deterioration naturally would not be effective in the life of a continuous operation. Generally, the vein strikes north-west and dips up to 45 degrees north-east. Mineralization by pyrite, galena, and sphalerite is commonly sparse. Near the face of the No. 1 level a 1- to 2-inch width of siliceous gouge lies on both foot- and hanging-wall of the quartz, separating it from the granite. Such occurrence is unusual.



Kilo Group. Plan of underground workings from owner's map. No. 0 adit approximate location only; Blacksmith's adit from survey by the writer.

As detailed in the 1933 Report, development completed prior to this year consisted of the driving of four principal drift-adits; the elevation of the lowest of these, No. 1, the main haulage-level, is 4,800 feet. At 4,780 feet elevation a short prospect adit, No. 0, was started at the level of Violet Creek in an effort to develop the vein below the No. 1 level. At 5,350 feet, ahead of the face of No. 1 level, there is reported to be an inclined shaft, sunk on ore presumed to be an extension of the vein, from which early operators are said to have shipped ore of good grade. At this time, the shaft is difficult to find. Near the portal of No. 1 level earlier operators exposed and exploited a shoot of ore which was worked partly by underhand stopping and partly from a shallow adit driven between the elevations of No. 1 and No. 0; in addition, a second shoot of ore was developed but not completely mined near the face of the level.

Unless the reported ore in the inclined shaft at 5,350 feet elevation proves the exception, development has been productive of little ore other than slightly above and slightly below the No. 1 level. A raise from this level to No. 2 and a further raise to No. 3 level, at elevations 4,970 feet and 5,092 feet respectively, and several hundred feet of drifting at these levels, has displayed vein continuity but shows a general lack of commercial values. No. 4 level, a drift-adit 250 feet long, at 5,200 feet elevation, is not connected with the other

levels and is, at the present time, accessible only through a long inclined shaft. This working has not been examined for several years. From the given elevation and the position shown for this level on the owner's plan, conjecture arises as to whether or not the drifting has been on the principal vein or on another in the hanging-wall. This consideration is emphasized by the presence of a second vein, of similar strike and dip, indicated in a foot-wall crosscut from the drift, 85 feet south-west of the vein, exposed by the drift. On the No. 2 and No. 3 levels, vein-widths probably average less than 2 feet and the quartz is milky-white with little mineralization.

On the No. 3 level, after drifting some 290 feet on the vein, the adit intersected a strong slip striking north 5 degrees west, dipping 65 degrees east. Up to this point in the drift, the vein is narrow, attaining widths greater than 1 foot only in short sections, the best of which shows 15 inches for a length of 36 feet. In many places up to the 290-foot mark, the quartz is heavily fractured and on its foot-wall carries a 2- to 4-inch band of siliceous gouge. At the intersection with the slip the vein-quartz, here having a width of 15 inches, is cut off and does not appear again in the remaining 60 feet to the face of the drift. The gouge seam does continue, however, thus indicating the probability of two periods of fissuring. Correlation may be possible between two such assumed fissurings here in the plane of the vein and two periods of mineralization embodying the discoloured quartz and the white quartz in the productive parts of the vein. On the No. 2 level, where a drift developed the vein for a length of 130 feet, values were apparently high enough to permit shipping of ore, as stopes have been carried to a distance of some 45 feet up the dip of the vein over the full length exposed. In the working-adit, between No. 0 and No. 1, known locally as the Blacksmith tunnel, the earlier operators drifted on the vein for about 150 feet, some 85 feet of which is now accessible. As the difference in elevation between this and the No. 1 level is only about 6 feet, the work constituted little more than underhand stoping. However, of possible interest in the light of future operation, this working provides exposures of several small post-mineral faults striking at right angles to the vein and throwing downward some 3 feet on the south side.

In 1938 Dewis stoped the shoot of ore already developed near the face of the No. 1 level. A length of 50 feet in the drift showed commercial assays when operations commenced, and stoping was carried upward from this length for a slope distance of 50 to 70 feet before losing shipping values. Some ingenuity was displayed in this working by carrying water by pipe-line from a point farther up the hill and sluicing the muck down the 40-degree dip into wing shoots. At this location the iron-stained, rust-coloured quartz band was found to be persistent but variable in width from a mere stringer to 35 inches. No definite information was obtainable, but indications were that the ore raked upward to the north-west.

When values in this section of the vein on No. 1 level decreased to a point at which shipping was no longer profitable, the operation was transferred to the No. 0 level, and an effort made to tap the downward extension of the small shoot originally developed near the portal of No. 1 level and by means of the Blacksmith tunnel. This work was done since the property was examined, but it is understood that extension of the raise, already started from the No. 0 level, found ore and permitted one shipment.

Although development on the upper levels has been disappointing, results from the No. 1 level are sufficiently attractive to make further extension of this level worthy of consideration, especially if proof of continuity between the present face and the inclined shaft is forthcoming by means of surface development. Any operation would of necessity have to be conducted with the utmost economy, because at the present time attractive assays are offset by the generally narrow widths of the high-grade streak and the lack of information as to frequency of ore-shoots.

The following are assays of samples taken from this property:—

No. 1.—Over 10 inches discoloured vein-quartz, containing slight pyrite, no visible sphalerite or galena, on the hanging-wall of the vein, in the Blacksmith tunnel at 12 feet from the south end: Gold, 0.36 oz. per ton; silver, 0.4 oz. per ton.

No. 2.—Over 13 inches of typical milky-white vein-quartz, containing only slight pyrite, below the previous sample: Gold, *nil*; silver, *nil*.

No. 3.—Over 31 inches of white vein-quartz at the face of No. 2 level: Gold, 0.08 oz. per ton; silver, 0.3 oz. per ton.

No. 4.—Over 9 inches discoloured vein-quartz, heavily fractured parallel to the walls, containing no visible mineral, on the No. 1 drift wall, at the north end of the stope under development: Gold, 0.46 oz. per ton; silver, 0.3 oz. per ton.

No. 5.—Over 12 inches white quartz, considerably mineralized by pyrite, on the west wall of the No. 1 drift, 12 feet short of the face: Gold, *nil*; silver, *nil*.

No. 6.—Over 2 inches of siliceous gouge on the foot-wall of the previous sample, containing no visible mineral: Gold, trace; silver, trace.

No. 7.—Over 19 inches white vein-quartz, slightly mineralized by pyrite, at the face of the No. 1 level: Gold, *nil*; silver, *nil*.

The following five samples were taken from the working-face and ends on the No. 1 level stope at the time of examination:—

No. 8.—Over 24 inches of strong brown vein-quartz, mineralized by galena, sphalerite, and pyrite, concentrated in fractures: Gold, 0.74 oz. per ton; silver, 0.5 oz. per ton.

No. 9.—Over 17 inches of similar material: Gold, 0.28 oz. per ton; silver, 0.7 oz. per ton.

No. 10.—Over 35 inches of similar material: Gold, 0.28 oz. per ton; silver, 0.3 oz. per ton.

Select fine-grained sphalerite and pyrite: Gold, 49.20 oz. per ton; silver, 35.4 oz. per ton.

Select brown quartz carrying disseminated medium to coarse-grained galena and pyrite, no visible sphalerite: Gold, 1.20 oz. per ton; silver, 2.4 oz. per ton.

This group, consisting of the *Rose* and *Louise Fraction* Crown-granted mineral claims, is owned by A. S. Johnson, of Montreal, Quebec. These claims, on both sides of Chapleau Creek, adjoin the *Kilo* ground on the east and south-east. Present access is by some 1,500 feet of badly overgrown foot-trail leading from the *Kilo* camp. If necessary, a road could be constructed from the *Kilo* road slightly below the *Kilo* camp or, as an alternative, on excellent grade for a distance of 1 mile from the *Kilo* road at the *Chapleau* mill. No development on this ground is reported since 1899, and although there are evidences of that development none is in condition for purposes of examination or is worthy of rehabilitation. On Chapleau Creek, at an elevation of 4,500 feet, there is a small pile of apparently selected vein material from irregular exposures of vein in granite host-rock, showing in place in the creek bottom. The vein-quartz is milky and massive, heavily fractured with healing of the fractures by later quartz. Sulphide mineralization is chiefly by medium to coarse-grained pyrite and galena with, although not identified, probably some sphalerite. Two grab samples were taken from this ore pile and assayed as follows:—

Selected medium to coarse-grained pyrite and galena: Gold, 0.42 oz. per ton; silver, 0.2 oz. per ton.

Patchy coarse pyrite and galena in quartz: Gold, 20.40 oz. per ton; silver, 10.6 oz. per ton.

The exposure suggests that limited expenditure for surface-stripping is justified.

Of particular interest in connection with this showing is the speculation as to whether it can be correlated as the extension of the *Kilo* vein on its strike and dip.

The workings on this claim are at the end of the road, half a mile beyond the *Kilo* camp. The *Goldstream*, *Bearpaw*, and *Gold Knob* are held on **Mineral Claim.** location by G. Soucey, of Vallican, who also owns the adjoining *Legal* Crown-granted mineral claim. At this time all four claims are under lease and bond to C. Ritchie, of Rossland, who, with one or two partners, worked on the ground up to the end of the year. The *Legal*, *Goldstream*, and *Gold Knob* adjoin each other and lie in an easterly line from the *Kilo* ground; the *Bearpaw* adjoins the *Legal* and *Goldstream* claims on the north. A cabin beside the road, only a few hundred feet from the showing, is well constructed and provides accommodation for four men. Water for domestic use is obtained from Gold Creek. This summer there was installed a small air-compressor capable of supplying one drill.

Development during the past season was concentrated on the showing on the *Goldstream* claim on Gold Creek. At an elevation of 5,000 feet, at the end of the road, the creek crosses a typical quartz vein in granite, striking south 85 degrees west, dipping 25 degrees north. At the time of examination the vein had been exposed for 20 feet on the east side of the creek and 35 feet on the west side, and showed widths from 15 to 23 inches. Within the vein

are inclusions of light-green acidic rocks, altered phases of the host-rock. The vein is made up of milky-white quartz and rust-stained, brown or pink quartz on either wall, the latter carries the principal mineralization of pyrite, galena, and sphalerite. In this part of the vein-filling the writer saw some specks of free gold. In one section a total width of 48 inches was made up by 10 inches of discoloured quartz on the foot-wall, 24 inches of white quartz on the hanging-wall, and a centre section of included rock. The width of the stained high-grade quartz commonly ranges in the limited development from 3 to 6 inches. As at the *Kilo*, mineralization, typically medium to coarse grained, is concentrated along fracture-planes paralleling the walls rather than disseminated through the quartz mass.

At the time of examination development had been centred on the exposure on the west side of the creek and consisted of stripping out the vein from the surface. It is understood that, since then, a drift has been driven 32 feet westward from the face of the open-cut. At the face of the drift the operators report the vein to have pinched to 3 inches. It is also understood that 40 feet of prospect-tunnel was driven south of the drift and at a higher elevation. This work was an attempt to develop the vein up its dip, but unfortunately the overburden was so heavy at the location selected that bed-rock was never exposed.

Eighty feet south of the original exposure there is another vein-outcrop, poorly exposed for a few feet on the bank of the creek. As nearly as could be determined, the strike at this outcrop is north 40 degrees west, the dip 35 degrees north-eastward.

Samples taken from the exposure on the west side of the creek assayed as follows:—

Select sample of oxidized gouge occurring irregularly within the vein, no visible mineral: Gold, trace; silver, 0.4 oz. per ton.

Across 12 inches of white vein-quartz, little mineralized: Gold, *nil*; silver, 0.2 oz. per ton.

Across 30 inches, mixed quartz and included rock on hanging-wall of previous sample, slightly mineralized by fine-grained pyrite: Gold, *nil*; silver, *nil*.

Select brown and rose quartz from shipment pile, slightly mineralized by galena, sphalerite, pyrite: Gold, 11.50 oz. per ton; silver, 8.7 oz. per ton.

As given in the foregoing report on the *Goldstream* mineral claim, the **Legal Mineral Claim.** *Legal* Crown-granted mineral claim is, at the present time, under lease and bond to C. Ritchie, of Rossland, B.C. It adjoins the *Goldstream* claim to the east and the *Kilo* ground to the west; considerable work has been

done on this claim in the past, principally in an effort to prove extension of the *Goldstream* vein westward. The generally light overburden facilitates economical surface-stripping.

Near the south-east corner of the claim, at elevation 5,385 feet, two small cuts expose a quartz vein striking north 55 degrees east, dipping 50 degrees north-west. The exposure is typical of the district, the vein has a width ranging from 13 to 16 inches of white unmineralized quartz with, at one exposure, 6 inches of brownish quartz on the hanging-wall. A sample taken over 22 inches at this location, including both white and discoloured quartz, assayed: Gold, trace; silver, 0.4 oz. per ton. Sixty-five feet away, on a south 60 degree west line, at elevation 5,390 feet, another small cut exposes 13 inches of slightly discoloured quartz containing no visible mineral, which assayed: Gold, trace; silver, trace. Twenty feet still farther south-west another caved cut indicates continuity of the vein. In these exposures there is characteristically 2 to 3 inches of hydrothermal leaching of the ferromagnesian minerals on both foot- and hanging-wall of the vein.

At 5,355 feet elevation, some 400 feet from the south boundary and near the centre of the claim, an adit has been driven on an east-west quartz vein in granite. The vein exposed by this work differs from the usual type in the area in that it is narrower, tighter, and faulted.

For 57 feet on a north 15 degrees east bearing, a drift exposes widths ranging between 2 and 5 inches of white quartz mineralized by pyrite. The dip of the vein is here 35 degrees west. A sample taken at the centre of this exposure, over 4½ inches, assayed: Gold, 0.02 oz. per ton; silver, 0.4 oz. per ton. In the length of 57 feet, one section of about 10 feet contains no quartz, and fissure continuity is maintained only by a tight fracture. At 57 feet the strike of the vein is changed abruptly to north-east by a complicated system of fractures, the two most prominent of which strike due north and north 70 degrees west, and dip 85 degrees east and 65 degrees south respectively. A drift for 40 feet in this new

direction developed widths of vein up to 10 inches, shows it to dip 20 degrees north. Near the centre of this 40-foot length a raise was driven 30 feet south on the vein. In the raise the vein ranges in width from 4 to 10 inches and is composed of white quartz, little mineralized. A sample taken in the drift at the foot of the raise, over 10 inches of white quartz mineralized by pyrite, assayed: Gold, 0.94 oz. per ton; silver, 0.9 oz. per ton. Just beyond the 40-foot length of north-easterly development the vein is faulted out of the working between two tight fractures 9 feet apart, one strikes north 80 degrees east and dips 60 degrees south, the other strikes due east and dips 60 degrees south. The working was driven on a north-west bearing through this section of granite. At the second fracture, the working is still on a north-west bearing, the vein was again intersected and followed for 5 feet. It strikes north-west and dips flatly south-west. Five feet beyond the second fracture the vein and drift change direction to north 20 degrees east, the vein dipping 30 degrees north-west. The face of the adit is 9 feet from the last change of direction and the vein has a width of 4 inches of white quartz, slightly oxidized and mineralized only by a slight amount of pyrite occurring in irregular bunches.

In a direction south 65 degrees west from the portal another adit was at one time driven at an elevation some 95 feet lower, apparently in an attempt to develop the vein on its dip. The working is now badly caved.

The *Bearpaw* claim, under lease and bond to C. Ritchie, of Rossland, **Bearpaw Mineral** adjoins and lies to the north of the *Goldstream* claim and the *Legal* claim, **Claim.** and is staked to cover the top of the southern slope of the hill between Violet Creek and Gold Creek. Timber is scarcer than on the *Goldstream* and *Legal* claims and little water is available. Overburden is light enough to permit economical surface work. At 5,850 feet elevation, at a point about half a mile above the *Kilo* camp, a small open-cut exposes a vein of pyrolusite in decomposed granitic rock. The strike of this vein appears to be about north 60 degrees east and the dip almost vertical. On both margins of the central 42-inch width of pyrolusite mineralization, the granitic wall-rock has been absorbed irregularly for widths up to 8 inches and contains additional amounts of that mineral. A sample over the central 42-inch width assayed: Gold, *nil*; silver, *nil*; manganese, 7.3 per cent.

There is a further exposure of the vein 50 feet south-west and 20 feet lower, at the portal of a caved adit. There a 36-inch width of vein carries considerable pyrolusite.

This group, consisting of the *Hollinger*, *Hollinger No. 1*, *Hollinger No. 2* **Hollinger Group.** mineral claims, and *Hollinger Fractional* mineral claim, is held on location by E. A. Panquist and C. W. Tipping, of Slocan City. This ground lies approximately 1 mile by trail from the *Kilo* camp, on the opposite or south-east side of Chapleau Creek, and adjoins the *Rose* Crown-granted mineral claim. The slope is more precipitous than on the north-west side and is covered by heavy timber at all but the highest altitudes. The trail from the *Kilo* camp at the present time is only a foot-trail and, as in the case of the *Rose* claim, if future development so warranted access would be by a new road on creek grade from the *Chapleau* mill. This year the owners have built a new cabin on the ground to provide accommodation for two men. It is near a small spring which provides domestic water.

The principal exposure consists of a quartz vein striking north 40 degrees west, dipping 10 degrees to the north-east, with a width ranging from 1 to 4 feet. The quartz-filling is typically strong and white, mineralized only slightly by pyrite, and heavily fractured. In places the granite walls of the vein are badly decomposed as a result of the length of time since the work has been done. Development on this showing has been by intermittent surface-stripping over a length of about 550 feet. The vein, as thus exposed down its dip, drops away gently from the contour of the hillside toward the north-east. At the south-west end of this series of open-cuts, at an elevation of 5,325 feet, an adit has been driven on the strike for 29 feet from the face of a 13-foot open-cut in overburden. This adit presents the only opportunity for comprehensive sampling and samples were taken at 5-foot intervals. The vein is strong and shows no displacement. Samples taken in this working are as follows:—

Across 8 inches of hanging-wall granite, silicified, showing some effects of hydrothermal leaching, containing no visible mineral, at portal: Gold, *nil*; silver, *nil*.

Across 22 inches vein-quartz, no visible mineral, below previous sample: Gold, 0.06 oz. per ton; silver, trace.

Across 8 inches foot-wall granite below preceding sample: Gold, *nil*; silver, *nil*.

Across 24 inches vein-quartz, no visible mineral, at portal plus 5 feet: Gold, trace; silver, 1.6 oz. per ton.

Across 23 inches vein-quartz, no visible mineral, portal plus 10 feet: Gold, *nil*; silver, *nil*.

Three samples at portal plus 15 feet over 20 inches of hanging-wall granite, 25 inches of vein and 7 inches of foot-wall granite respectively, each assayed: Gold, *nil*; silver, *nil*.

Across 18 inches vein-quartz, no visible mineral, at portal plus 20 feet: Gold, trace; silver, trace.

Across 21 inches vein-quartz, slight pyrite, at portal plus 25 feet: Gold, 0.16 oz. per ton; silver, 0.2 oz. per ton.

Across 20 inches foot-wall granite decomposed to gougy constituency, below previous sample: Gold, *nil*; silver, *nil*.

Across 14 inches vein-quartz, no visible mineral, at the face: Gold, trace; silver, 0.2 oz. per ton.

These assays are low and it is probable that higher ones could be obtained from the surface showings if the cuts were cleaned and the vein exposures freshened.

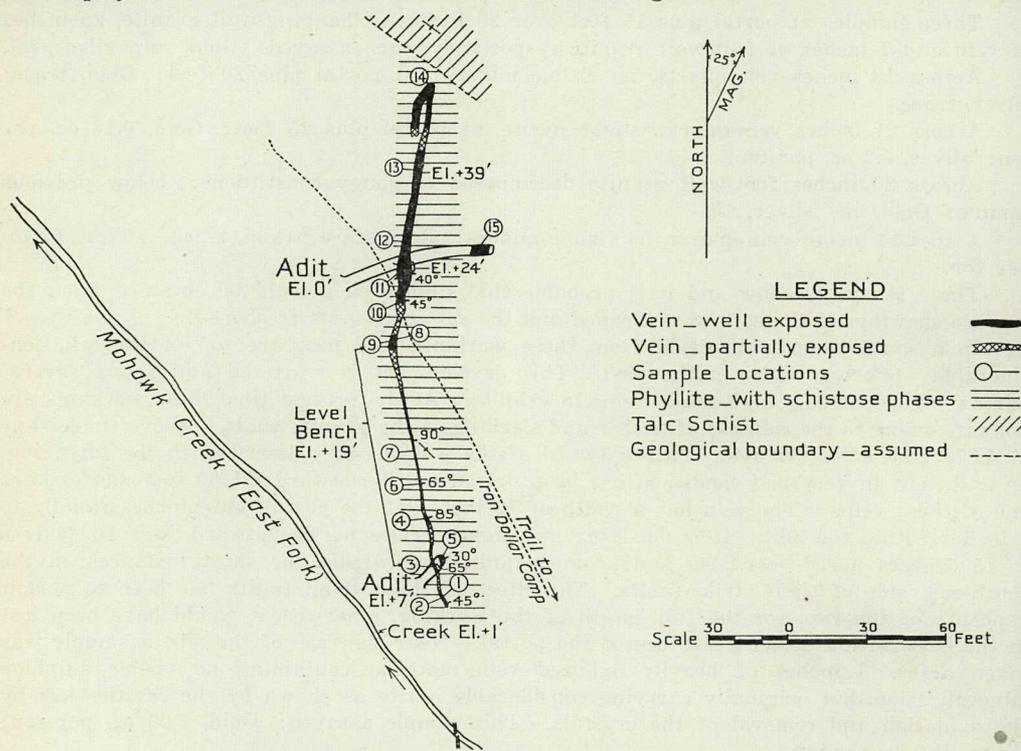
In a south-easterly direction from these workings and near the top of the hill, considerable work was done in the past. This development is scattered and shows several narrow but reportedly high-grade veins in granite. At the present time these workings are not safe owing to the collapse of timber and slacking of the granite walls. Above timber-line at 5,870 feet, some 600 feet south-eastward of the working-adit described in the foregoing, an adit, now in very bad condition, has been driven south-eastward for 30 feet and exposes one of these veins. The vein has a width of 12 inches at the portal, but pinches rapidly to 3 inches within the adit. It is flat-lying and tight, strikes north-eastward, dips 10 degrees to 15 degrees north-westward, and is down-faulted repeatedly for short distances on the south-east side of tight strike-faults. The effect of these small faults has been to permit exposure of the vein for the full length of the working, otherwise it would have been lost in the back within a short distance of the portal. Near the face of the adit a sample was taken across 3 inches of heavily oxidized vein material containing no visible sulphide mineralization, but originally carrying considerable pyrite as shown by the cavities left by the oxidation and removal of the crystals. This sample assayed: Gold, 1.06 oz. per ton; silver, 21.3 oz. per ton.

Two hundred and twenty-five feet east of this adit, at elevation 6,060 feet, another caved working shows a 3- to 4-inch quartz vein in granite. It strikes due north, and dips 10 to 15 degrees east into the hill. Although it was not possible to examine the vein within the working, its width there appears to increase to about 6 inches. A sample taken at the portal over 3 inches of honeycombed quartz from which much of the sulphide mineralization had been leached, assayed: Gold, 0.92 oz. per ton; silver, 11.3 oz. per ton.

#### LARDEAU AREA.

This property, under option to J. S. Rear, of Vancouver, B.C., consisting of the *Gilman*, *Black Hock*, and *Frisco* Crown-granted mineral claims, has been previously described in the Annual Reports of the Minister of Mines for 1914 and 1933. The ground under development lies on the north-east side of the East Fork of Mohawk Creek, about 1 mile from the head of this branch of the creek. The slope rising to the north-east above the showings is regular and covered by only sparse growth and is subject to snowslides, particularly affecting a short section of the trail to the property lying about one-third of a mile north-west of the developed ground. The local topography is gentle and rounded rather than rugged and precipitous. Access to the holdings is by means of trail from Camborne, by way of the property of the Spider Gold and Silver Mines, Limited. For  $2\frac{1}{3}$  miles, from Camborne to the *Spider* property, the trail, though steep in parts, permits transportation by caterpillar tractor; of the four succeeding miles of foot-trail from the *Spider* to the *Gilman*, the first  $2\frac{1}{2}$  miles, to Mohawk Creek, are on excellent grade, the remainder being slightly steeper though still lending to economical

construction of improved trail or road. At present, the bridge crossing of Mohawk Creek is adequate only for horse-traffic. Close to timber-line, growth is small and sparse, mainly young alder and brush, but timber suitable for all domestic and mining purposes is available readily within a short distance down-stream. The creek is of sufficient flow to permit a small year-round milling operation. At the present time camp buildings on the adjacent *Iron Dollar* property, also under option to J. S. Rear, are being utilized by the crew of four men employed. These accommodations are sufficient for eight men.



Gilman Group, Lardeau Mining Division.

The showing consists of a strong quartz vein, striking north generally, dipping from 30 degrees east to vertical, lying in phyllite and schist of the Lardeau series. Mineralization is chiefly by pyrite, with lesser amounts of galena and sphalerite. By assay results on samples taken, gold values appear to be associated chiefly with pyrite. The vein is well exposed by surface-stripping for a length of 200 feet, and exhibits characteristic minor variations in strike and a major deflection from slightly west of north to slightly east of north near the centre of the exposure. Typically lenticular in habit, the vein reaches a maximum width of 6 feet near the point of deflection. In this length upon which development has been concentrated, the wall-rock is of firm and comparatively competent phyllite, striking north-westward; bands of phyllite are contained within the vein-quartz. Beyond the southern limit of the stripping quartz is exposed irregularly in the bed of the creek for a short distance, but little work has been done to test continuity under the overburden and growth on the south-west bank. Toward the northern limit of the stripping the vein becomes irregular, occurring as two strands, of 3-foot and 1-foot widths respectively, in the distance between samples No. 13 and No. 14. For 175 feet north of sample No. 14 small crosscutting trenches have been dug in an effort to prove additional length in this direction but, although narrow and irregular widths of quartz had been found in three of the four cuts completed at the time of examination, none exposed vein-structure similar to that exposed farther to the south. This prospecting on the north of the showing has been in talc-schist, characteristically light-brown in colour and flecked with darker brown specks, probably limonite resulting from the decomposition of contained iron sulphides. As far as could be

determined by the limited exposures, this formation strikes north 50 degrees west, dips vertically or steeply north-east, and is in contact with the phyllite immediately north of sample No. 14, which probably explains the lack of vein strength beyond that point.

Up to 1938, little work has been done on the property since the original development recorded in the 1914 Annual Report, Minister of Mines, with the exception of certain sampling in 1933.

At the present time surface-stripping is almost continuous for the 200-foot length shown on the accompanying map; at the time of examination certain sections, although stripped, were not freshly broken and the weathered surfaces offered no opportunity for accurate sampling.

Two short crosscuts have been driven to intersections with the vein. One of these, 14 feet long, near the southern limit of the stripping, is only about 12 feet below the surface exposure; the other, 59 feet long, near the centre of the stripping, is 24 feet below. In the southerly crosscut the vein ranges in width from 12 to 23 inches, is composed of almost solid quartz seamed by phyllite and is only very slightly mineralized by pyrite and galena. In the longer crosscut, the vein-width is 72 inches, mineralized by bunches of pyrite. Here the foot-wall is well defined, the hanging-wall less so by reason of inclusions of wall-rock.

Most effective further development would be additional stripping south of the present work and driving of a crosscut from a point on the creek which would permit of a right-angled intersection with the vein, approximately 100 feet below the surface exposure near its present northern limit.

Samples taken, and assays thereon, are as follows:—

Sample No.	Gold.	Silver.	Description.
	Oz. per Ton.	Oz. per Ton.	
1	1.10	1.0	Across 16 inches freshly broken, friable quartz, carrying bunchy pyrite, very slight galena and sphalerite.
2	Nil	Nil	Across 11 inches on the foot-wall of the previous sample. Rusty gouge, sheared phyllite seamed by quartz stringers.
3	0.44	0.8	Across 24 inches fresh quartz with inclusions of phyllite. Slight mineralization by pyrite.
4	0.06	Trace	Across 11 inches fresh quartz seamed by phyllite. Slightly mineralized by pyrite.
5	Trace	Trace	Grab sample of quartz, containing only very slight pyrite and galena.
6	0.06	5.0	Across 9 inches practically barren quartz.
7	1.34	0.4	Across 5 inches of fresh quartz slightly mineralized by pyrite.
8	0.25	0.9	Across 21 inches fresh quartz, containing bunches of pyrite.
9	0.02	0.4	Across 13 inches of fresh quartz on the foot-wall of Sample No. 8, well mineralized by galena and slight sphalerite.
10	0.36	1.2	Across 34 inches of rusty quartz, containing bunches of pyrite.
11	0.88	1.2	Across 69 inches of fresh quartz carrying considerable pyrite, slight sphalerite and galena.
12	0.14	0.4	Across 40 inches rusty quartz, very slightly mineralized by pyrite.
13	1.20	0.8	Across 36 inches of quartz, well mineralized by fine-grained pyrite and slight coarse galena.
14	1.02	0.4	Grab sample of fresh quartz with inclusions of phyllite, slightly mineralized by pyrite.
15	0.30	0.3	Across 72 inches of fresh quartz mineralized by bunches of pyrite.
	0.84	0.4	Select sample of pyrite.
	0.86	5.6	Select sample of mixed pyrite, galena, and sphalerite.

Reference should be made to the Annual Report of the Minister of Mines, **Alpine Gold Co.**, British Columbia, for 1927, containing a report on this property by B. T. O'Grady. The holdings of the Alpine Gold Company, Limited, consist of the Crown-granted claims *Crown Point No. 6* and *Nelson No. 5*, and the following located claims: *Alpine Fraction*, *Swiss Fraction*, *Washington*, *Oregon*, *Idaho*, *Meadow Basin*, and *Sitkum*. All the foregoing are held in the name of John B. White, of Spokane, who, in addition, has lease and option from E. Harrop and associates, on the following Crown-granted claims: *Kootenay Pass*, *Rocky Fraction*, *Berne*, *Highland Chief*, and *Swiss*.

The workings are well above the timber-line at the head of Sitkum Creek, on the south-eastern slope of the Lemon Creek divide, at an elevation of 7,000 feet. The area has been subjected to intense erosion, relief is marked but not precipitous. The camp has been built to the east and south-east of the principal workings, in the draw followed by one branch of Sitkum Creek from the Lemon Creek divide. The elevation of the camp is 6,750 feet; of the 189-foot adit reported upon in 1927, 7,150 feet; of a new adit driven this year, 6,925 feet. The trail from the camp to the new adit, north-west of the camp, follows up the draw, whereas that to the old adit traverses directly up the bare slope to the west of the camp. The most noticeable feature of this western slope is the abundance of massive blocks of float rock, amongst which there is a considerable amount of vein-quartz.

The property can now be reached by 8 miles of truck-road, following up Sitkum Creek on a 12-per-cent. grade, leading from the main highway along the West Arm of Kootenay Lake at a point some 8 miles north-east of the city of Nelson. This road leads to the lower part of the claims and an additional half mile of steeper tractor-road has been built to the camp-site. Sufficient ground is held at lower elevations beside the road to supply all timber necessary during the life of any operation at the property. Water sufficient for any future milling operations is available from Sitkum Creek. A new bunk-house, cook-house, and combination compressor-house and blacksmith-shop have been built at the property during the past two seasons. Accommodation is adequate for fifteen men.

The state of development of the deposit is essentially as described in 1927, with the addition of the new low level, or No. 10 adit. As exposed, the area is underlain by granite of the Nelson batholith, host to the quartz vein under investigation. The vein strikes approximately south 75 degrees west and dips 20 to 30 degrees to the north. The small amount of development and the flatness of the vein make these figures of strike and dip open to possible later adjustment in the light of further exposure. Apparently lenticular in habit, the vein may be traced for several thousand feet on the surface by means of irregular natural exposures on the barren hillside. Widths of 5 feet were noted in such surface exposures, and one sample underground was over 82 inches without reaching the foot-wall, but such figures must be considered as above the probable average width of vein over its length. The quartz lies commonly between well-defined walls, is rust-stained in many of the exposures and fractured parallel to the walls, and is mineralized by irregular concentrations of pyrite and a slight amount of galena and sphalerite. A narrow width of hydrothermal leaching of the ferro-magnesian minerals from the granite is more pronounced on the foot-wall than on the hanging-wall. Underground development exposes mica-lamprophyre dykes up to 16 feet in width, younger than the vein, which strike across it at from north 10 degrees east to north 50 degrees west and dip steeply east or west.

Surface-stripping has been limited principally to slight additional work at locations where the vein was previously exposed by natural causes.

Principal underground development consists of the drift-adit described in the 1927 Report, upon which no work has been done since, and the drift-adit driven this year at a point 770 feet north-eastward from and 225 feet below the old tunnel.

For 60 feet from the portal of the old tunnel, driven at south 75 degrees west, the vein is strong, extending from back to floor. Three samples, taken at 20-foot intervals along this section, assayed: 0.49 oz. gold per ton over 44 inches, 1.29 oz. gold per ton over 45 inches, and 0.05 oz. gold per ton over 56 inches. Between 60 and 116 feet from the portal, the adit crosscuts three mica lamprophyre dykes all striking between north 10 degrees east and north 50 degrees west, dipping steeply east or west; the width of the first is 13 feet, of the second 2 feet, and of the third, 17 feet. Between the first and second of these dykes the vein is displaced by downward block-faulting for a distance of 3 feet; in this 7-foot section it has been considerably disturbed and calcite is prominent as gangue. Between the second and third dykes the vein regains its normal strike and dip, is but sparsely mineralized, and has an average width of at least 72 inches. A sample taken at the centre of this 17-foot section assayed: Gold, trace; silver, trace. For 35 feet beyond the third dyke to the face of the drift-adit, the working is all in granite. Just short of the face a crosscut was driven due south for 20 feet; the vein was intersected in the floor at 4 feet from the south wall of the drift. It dips 30 degrees to the north, reaches the back at the face of the crosscut, and exposed across a full width of 56 inches. The indicated faulted down-throw on the

west side of the third dyke is some 8 to 10 feet. From the face of the crosscut a drift extends 19 feet south-westward. From the 56-inch width at the face of the crosscut the vein narrows rapidly along the strike to the south-west, and at the face of the drift is evidenced by two bands of quartz separated by granite; the stronger of the two quartz bands has a width of 11 inches. A sample taken 10 feet back from the face, over 26 inches of vein-quartz containing considerable mica and included granite, but practically no sulphide, assayed: Gold, trace; silver, 0.2 oz. per ton.

The lower, new adit was begun at the outcrop farthest north-east, a few feet below the vein exposure. Between the two workings the vein is exposed irregularly. The new adit was driven westward for a distance of 260 feet in granite, generally following a series of strong fractures filled by gouge and crushed granite, on several of which there has been considerable movement. Originally this working nowhere intersected the vein. At 155 feet from the portal the fractures diverge, and two of the strongest swing to the left wall of the adit. They strike south 75 degrees west, and dip 65 and 80 degrees southward respectively. A third, the main fracture, continues due west, dipping at 80 degrees to the south. The main working has followed the west striking fracture to the present face. The two branching fractures have been followed for 15 feet into the left wall. After the completion of the adit to 260 feet, at 150 feet from the portal the back was broken upward to a height of 17 feet above the rail. Vein material exposed there consists of 23 inches of white quartz containing slight coarse pyrite at the top of the backswipe, succeeded below by 15 inches of similar quartz, included in which are fragments of rock darker than the usual granite; below again is exposed 18 inches of strong quartz, well-mineralized by coarse-grained pyrite. A sample over the upper 23 inches and a second from the centre 15 inches assayed: Gold, *nil*; silver, *nil*. From across the lowest 18 inches a sample assayed: Gold, 1.34 oz. per ton; silver, 0.5 oz. per ton. The vein exposure was not very satisfactory at the time of examination, it permitted only an approximation of strike and dip and limited information regarding possible faulting on the fractures. As read, the strike is south 70 degrees west, dip 30 degrees northward. Where the back is taken down, the principal fracturing is confined to one strong width on the right-hand side of the working and the vein appears to be faulted on it; only a few feet farther west the divergence of the fracturing takes place. In an effort to determine which of the branches of the fracturing controls the faulting of the vein, the back of the short tunnel to the left has been broken upward to a height varying from 10 to 15 feet, but no evidence of the vein in place was found as at the first location in the main tunnel. The only possible indication of vein material in this branch working, at the time of examination, were stringers of quartz within the fracture farthest south on its foot- and hanging-walls. As evidenced at this location, this branch fracture is sufficiently strong and wide, with marked signs of movement, to be better termed a fissure; within it, between the quartz stringers, is a 10-inch width of the darker rock noted as included in the quartz in the vein. Examination shows this to be definitely acidic and high in plagioclase, probably one phase of the main granitic intrusion. By evidence of quartz stringers within its mass, embayments of quartz from the two wall concentrations and general silicification, this rock is placed as older than the mineralization. At the face of the branch tunnel the fracture has regained its normal narrower width and contains no such included rock or quartz. Further development at this level must be directed not only to the determination of the vein to the north of the faulting but toward its location to the south of the fracture system and west of the present exposure in the back of the main adit.

#### CRANBROOK AREA.

These holdings, known also as the *Golden Egg* group, consist of the *Golden Anderson Group*. *Egg*, *Lucky Strike*, *Gold Brick*, *Twilight*, *Sunset*, and *Black Bear* claims, all held on location by J. J. Rollheiser, of Kimberley. At the present time the group is under lease for five years, from 1938, to the Hall Brothers, of Marysville. The property is on the north-west side of Perry Creek, and on the east side of Sawmill Creek, between elevations of 5,000 and 6,000 feet. Access from the main Perry Creek road is by some 2 miles of good road leading directly to the present workings. No camp buildings have been constructed on the property.

The area is underlain by rocks of the Creston formation; green, purple, and white argillaceous quartzites, commonly heavily weathered on exposure. Outcrops are not numerous, for, despite the comparatively high elevations, the topography is regular and overburden generally covers the bed-rock. For this reason the discovery of the showing is a credit to the patience and persistence of the prospectors. They found attractive float, and reasoning that it could not have come far by reason of the gradual slope of the hillside, sunk pits and trenches to bed-rock, more or less blindly, over a considerable area. When a quartz vein was finally discovered it was necessary to drive 135 feet of crosscut trenching to provide a fresh exposure. From the end of this trench 35 feet of additional stripping along the vein exposed it striking north 10 degrees west, dipping 25 to 35 degrees westward. For the first 15 feet of this additional work the quartz filling is heavily shattered and weathered; for the remaining 20 feet to the face of the cut, where the floor is 15 feet below the surface, the effects of surface action are much less marked. In the latter length, vein widths range between 15 and 28 inches. The vein-quartz is characteristically glassy and fractured, and the fractures are healed by hematite. Dendritic structure on fractured faces indicates the presence of manganese. Mineralization by pyrite is sparse and values occur as visible free gold.

The property was under option to the Consolidated Mining and Smelting Company of Canada, Limited, for a short time. During that period, a 16-foot shaft was sunk at the face of the cut and three diamond-drill holes were put down. According to information supplied by that company the holes were located and drilled as follows:—

Number.	Location.	Dip.	Length.
One.....	100 feet north of shaft.....	40 degrees, bearing southward	Feet. 243
Two.....	At hanging-wall of outcrop.....	90 degrees.....	25
Three.....	At hanging-wall of outcrop in trench 75 feet west of hole No. 2.....	90 degrees.....	95

During the past year Rollheiser and associates made shipments totalling 43 tons, with contents of 10 oz. of gold and 21 oz. of silver.

Samples taken by the writer were as follows:—

At 5 feet from face of the cut, over 24 inches firm discoloured quartz containing a very slight amount of pyrite: Gold, 0.34 oz. per ton; silver, trace.

Eleven feet from face of the cut across 28 inches of vein as described above: Gold, 1.33 oz. per ton; silver, 0.9 oz. per ton.

At 11 feet from face of the cut, across 23 inches to the hanging-wall of the vein, soft gouge, decomposed Creston quartzites, no visible sulphide mineralization: Gold, 0.14 oz. per ton; silver, 0.3 oz. per ton.

At 11 feet from face of the cut, across 12 inches to foot-wall of vein, description as previous samples: Gold, 0.28 oz. per ton; silver, trace.

At 17 feet from the face of the cut, across 15 inches, firm discoloured vein quartz, little mineralized: Gold, 1.88 oz. per ton; silver, 0.5 oz. per ton.

#### LOWER ARROW LAKE AREA.

**Big Cayuse Group.** This group, consisting of the *Box Canyon*, *Box Canyon Nos. 1 to 4*, *Big Cayuse*, *Summit*, *Joe*, *Rainy Day*, and *Alley Oop* mineral claims, is held by right of location by Joe Gallo, of Nelson, B.C., and two associates. The property is on the north-west side of Cayuse Creek, which drains into the east side of Lower Arrow Lake near its southern end. Access from the small settlement of Deer Park to the property is by 1½ miles of Government road, 3½ miles of logging-road, and finally 3 miles of poor trail following up the creek. A new trail is at present being built which will be shorter than the old one and better located. The camp, beside the creek, at an altitude of 4,000 feet, consisted at the time of examination of one tent; a new log cabin, providing accommodation for two men, has since been built. The principal showing, a quarter of a mile west of the camp, is on the steep bluffs on the north-west side of the

creek, at an elevation of 4,445 feet. Big Cayuse Creek is of sufficient flow for any milling needs, and falls within 2 miles up-stream from the camp provide excellent sites for the development of power. Timber is plentiful, mainly yellow pine, fir, cedar, and spruce.

The rocks close to the showings consist principally of metamorphosed sediments intruded by granitic members of the Nelson batholith. The showing upon which development is being concentrated at the present time consists of mineralization by pyrite, pyrrhotite, chalcopyrite, and molybdenite carrying gold and silver values. It lies within the altered sediments either along or within a few feet of the contact between those rocks and the igneous members. Fissuring is poorly defined except at the upper limits of the outcrop. At the contact with the igneous rocks the alteration in the sediments has been intense and the product is commonly a quartz-feldspar-hornblende-biotite-gneiss or quartz-feldspar-biotite-gneiss. Within a few feet of the contact the bedding in the sediments is still evident; there, the most typical formation is micaceous quartzite.

Development up to the time of examination on October 18th consisted of a 13-foot drift-adit on the best mineralized exposure at the base of a 20-foot cliff. There, at 4,445 feet, the zone of mineralization strikes north 70 degrees west, dips 65 degrees southward. The igneous rock is in contact with the zone on its south-west side and the alteration in the sediments decreases gradually toward the north-east. On the cliff face above the portal mineralization is irregular and disseminated over a width of 3 to 4 feet. After driving 3 feet in the drift there was little or no mineralization, but such irregularity was expected in view of the surface exposure; an additional few feet of work re-established its presence. At 2 feet from the face a tight slip, striking north 20 degrees east, dipping 60 degrees to the south-east, displaces the zone 18 inches to the south-west, and at the face a 4-inch post-mineral lamprophyre dyke strikes across the drift at north 20 degrees east, dipping vertically. A sample taken across 49 inches in the back at the portal assayed: Gold, 0.16 oz. per ton; silver, 0.05 oz. per ton. At this location the zone is slightly silicified, mineralized by pyrite and pyrrhotite concentrated principally within 18 inches on the hanging-wall side. A sample taken across 17 inches on the left side of the face, mineralized by pyrite and pyrrhotite, assayed: Gold, *nil*; silver, *nil*. A select sample taken from the small dump at the portal, well-mineralized by pyrrhotite, pyrite, and slight chalcopyrite, considerably silicified, assayed: Gold, 0.72 oz. per ton; silver, 0.2 oz. per ton.

Some 700 feet up the 40-degree side-hill above the adit, approximately on the strike of the showing at the adit, a small amount of stripping over a length of 300 feet has exposed what is believed to be the extension of the same mineralization. The exposure is within the gneiss, usually 6 to 10 feet north-east of the igneous contact. It averages about 10 inches in width. The margins are defined by tight fractures, in contrast to the exposure at the adit. Mineralization and silicification are slight. Owing to the greater distance from the igneous contact, the wall-rocks and the gangue rock within the zone are not as highly metamorphosed as at the lower showing. Within as little as 10 feet to the north-east of the zone the bedding of the sediments is pronounced. At a point near the centre of the exposure the strike of the mineralization is north 35 degrees west and the dip appears to be vertical, although the small extent of the stripping does not permit accuracy.

The feature of principal interest in connection with this property is its location in a little-developed district. Favourable results from the present operation would indicate a considerable area worth prospecting.

## GOLD-SILVER DEPOSITS.

### ROSEBUD LAKE AREA.

During the past season Godfrey Birtsch, of Nelson, reported the discovery of gold on the *Lucky Strike* and *Davne* claims in the Rosebud Lake area. This area lies east of the main highway from Salmo to Nelway, south-east of the junction of the Salmo River with its South Fork. Access is by truck-road from the main highway close to South Fork, at a point 10 miles south of Salmo. As far as Rosebud Lake, where there is a short turn-off to the *Lone Silver* property, the road is the old highway; this year, extension has been made so that it is now possible to drive an additional mile east of the lake to within a few hundred feet of the development work on the *Davne* claim. The occurrence of commercial mineralization in this district has been recognized for many years by reason of the operation at the

*Lone Silver* property, but until 1936 production from this property was principally silver; in 1936 leasers discovered gold mineralization in one section of the workings and made three small high-grade shipments. However, until Birtsch's discovery this year on nearby ground the district generally was not considered as a potential producer of gold.

In this area recent fires have burned off most of the timber, displaying the gentle topography and the higher elevations rising by rounded slopes from small areas of swampy land which occupy the shallow valleys. From Rosebud Lake, at an elevation of 2,650 feet, the road passes eastward through a section of low-lying land at the foot of a gently-rounded slope which rises to the south. On this slope, above Rosebud Lake and slightly east of it, is the *Lone Silver* property. On the same slope, half a mile east of the *Lone Silver* and slightly higher, is the principal working on the *Davne* claim. Below this the road ends and further access to the *Lucky Strike* property is by foot-trail which continues south-eastward up the slope to an altitude of 3,000 feet, down into a second swampy valley and up a second slope to an elevation of 2,900 feet, all within a distance of three-quarters of a mile.

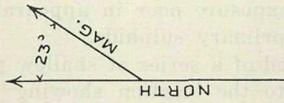
On and near these claims fires have left sufficient timber for domestic purposes and limited mining needs, but there is no large supply. However, either timber or lumber may be purchased locally. Water for domestic purposes is at present taken from wells or springs, and beyond this the South Fork of the Salmo River and Rosebud Lake are the only available sources of supply closer than the Salmo River itself. Records show that the South Fork is of adequate year-round flow for any milling operation which might be required.

The area is underlain by rocks of the Pend d'Oreille series of phyllite, argillaceous quartzite, and limestone intruded by various members of the Nelson batholith. Only one major exposure of the igneous rock occurs anywhere near the showings and this is a small mass of syenite and monzonite exposed a mile to the south-west. As reported in the Minister of Mines Report for 1936 the rocks at the *Lone Silver* property consist of dolomitic limestone and platy argillite, both dark in colour, striking east and dipping steeply south. On the *Davne* and *Lucky Strike* claims the formation is represented by phyllite and dolomitic limestone. The phyllite is typically light to dark brown in colour, folded and contorted and, where carbonaceous, transitional to graphitic schist. Schistosity has been developed parallel to the bedding-planes which strike generally east, and dip from 35 to 60 degrees to the south. In the exposures examined the dolomitic lime rocks are predominantly light grey to medium grey in colour, are compact, have a conchoidal fracture, and display only traces of bedding. Locally these limy members give rise to light-green talc-schist.

Four claims, the *Lucky Strike*, *Davne*, *Iron Mask*, and *Frog Pond*, were staked in the spring of 1938 by Godfrey Birtsch, of Nelson. Of these the *Davne* and *Iron Mask* were sold by Birtsch. Since then the *Lucky Strike*, *Davne*, and *Frog Pond* claims, and several others adjoining, have been optioned to R. C. McCorkell, 703 Royal Trust Building, Vancouver, and his entire holdings will here be treated as a unit under the name of *Lucky Strike* group. Mr. McCorkell's optioned ground includes the *Butcher Boy* group of five claims and one fraction, adjoining the *Lucky Strike* and on the strike of the fissure to the south-east, the *Jackie Fractional* claim, adjoining the *Lucky Strike* and on strike of the fissure to the north-west, and the *Davne* claim and the *Hawes-Currie* group of five claims staked on strike still farther to the north-west.

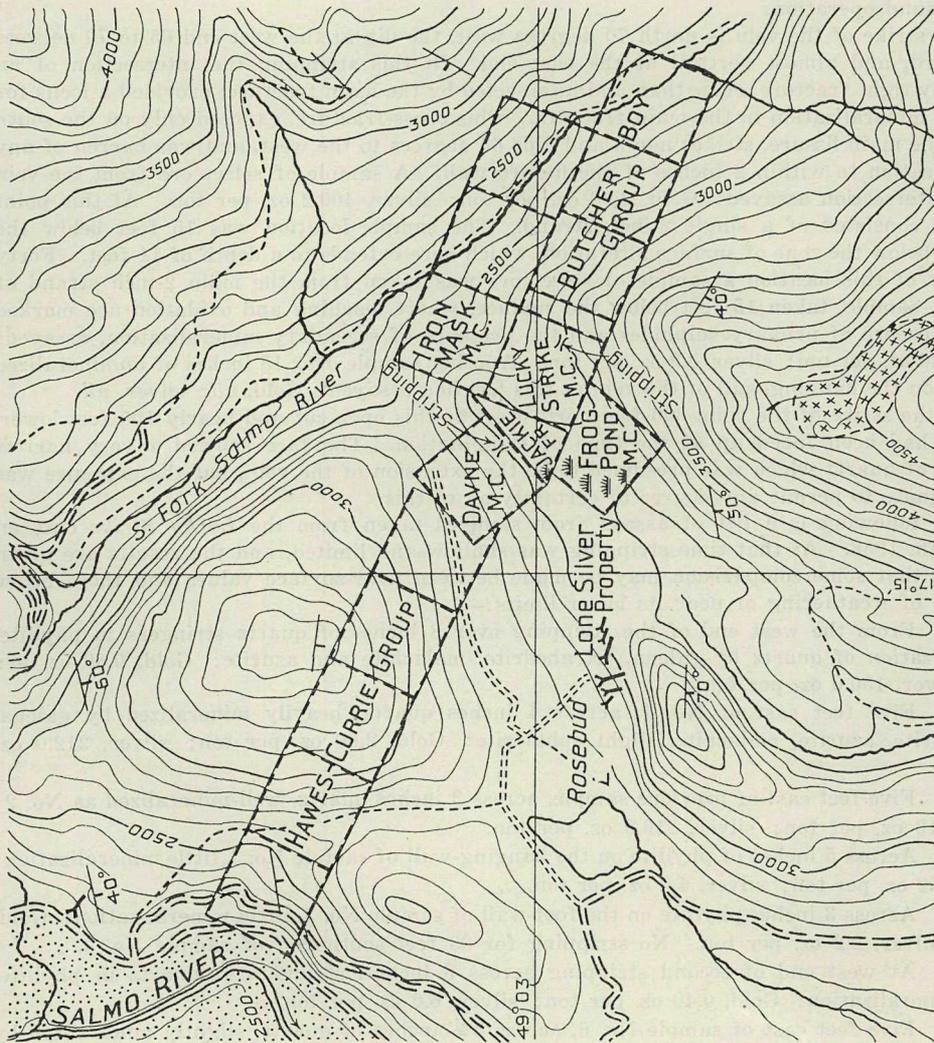
Two log cabins have been built on the *Davne* claim, providing adequate accommodation for a crew of six men. Water for domestic use is obtained from a shallow well.

The original work on the *Lucky Strike* claim disclosed a fissure striking in a north-westerly direction within phyllite. Characteristically the fissure is tight and narrow, and is represented by several parallel openings now filled by sulphide-bearing quartz gangue. Between the individual strands of vein material the phyllite is fissured across the planes of bedding and schistosity, and lies as short incompetent blocks. The maximum fissured width observed, including enclosed phyllite, is 20 inches; in certain locations vein structure is evidenced by only a single strand of mineralization ranging in width from 1 to 6 inches. Average total width of fissuring is close to 6 inches as exposed by all the present development-work. Sulphide mineralization, with which are associated gold and silver values, consists of galena, tetrahedrite, pyrite, sphalerite, and chalcopyrite; very marked near the surface is the production of secondary mineralization, notably cerussite, chalcocite, covellite,



**LEGEND**

- RECENT & PLEISTOCENE  
Recent alluvium and  
glacial deposits
- POST-TRIASSIC  
NELSON BATHOLITH  
Syenite, monzonite
- WINDERMERE  
PEND D'OREILLE SERIES  
Phyllites; argillaceous  
quartzites; limestone
- Road — well travelled
- Branch road
- Mine adit
- Surface stripping
- Contours
- Approximate boundaries  
of staked claims
- Swamp



Scale 0 1/8 1/4 1/2 3/4 Miles

Rosebud Lake Area. Showing approximate locations of some staked claims. After G.S.C. Map No. 299A.

Map based on Geological Survey of Canada  
Map No 299a Salmo Sheet

malachite, and azurite. Microscopic examination shows that in places the galena and tetrahedrite are intimately associated, in addition to which a small but important proportion of these minerals occurs finely and irregularly disseminated in gangue minus 200 mesh in size. Detailed microscopic examination failed to reveal native gold or any silver minerals. This leads to the conclusion that gold occurs either in grains too fine to see or in erratic distribution, and that silver values are associated with the tetrahedrite. Where fresh, mineralization is commonly strong, the gangue compact and white in colour. On weathered surfaces sulphide mineralization has been leached, leaving an exposure poor in appearance and composed of vuggy, copper-stained quartz, carrying little primary sulphide.

The original development on the *Lucky Strike* claim consisted of a series of shallow pits on the strike of the vein. Further work was then confined to the location showing the highest values, and there, at the time of examination, at an elevation of just under 3,000 feet, a length of 150 feet on the vein had been opened to a depth of 20 feet below the surface. Overburden at this location is not over 3 feet, but the phyllite is shattered and weathered to a depth of 13 feet. This, with the fact that where the vein is narrow the foot-wall is commonly frozen, creates some slight difficulty in the holding of the walls and presents a problem of sorting or dilution. Working from the surface in this manner, using only a gad or short steel, has made it possible to mine a narrower width than would be feasible in an underground operation.

The strike of the vein is north 70 degrees west, the dip at the west end 65 to 70 degrees northward, and almost vertical at the east end. In this stripping the intersection of an extremely tight fracture, older than and intersected by the main fracture, provided a locus for sulphide mineralization in the main fracture. This cross-fracture, exposed only on the south side of the main fissure, strikes north and dips 65 degrees to the west, and was barren of any mineralization to within 2 inches of the fissure wall. A sample of select ore from the vein at the intersection assayed: Gold, 2.96 oz. per ton; silver, 400.2 oz. per ton. At this point the vein consisted of a single 2-inch strand. The sample location was 15 feet below the surface, below the zone of surface alteration, which here extends to a depth of 11 feet. Forty feet east of this location a sample of select ore was taken from the main 2-inch strand of vein. A sample, taken 15 feet below the surface, where leaching and oxidation are marked by the absence of primary sulphides and the presence of secondary mineralization, assayed: Gold, 2.46 oz. per ton; silver, 3.9 oz. per ton. Another sample over 15 inches of unmineralized phyllite on the hanging-wall of the vein at this location assayed: Gold, *nil*; silver, *nil*.

On the strike of the vein, 300 feet north-west of this open-cut and nearly 100 feet lower, an adit had been faced up at the time of examination. The face showed a very narrow stringer of quartz which was presumed to be the extension of the vein, but the exposure was not adequate to permit any degree of certainty as to this.

The following is a list of assays from samples taken from the *Lucky Strike* cuts on June 20th, 1938. At that time stripping was shallow and limited, and the results are given in order that some comparison may be made between near-surface values and those below the zone of weathering or near its lower limits:—

(1.) From the west end of the stripping over 8 inches of quartz stringers in phyllite, mineralization of quartz by galena, tetrahedrite, malachite and azurite: Gold, 0.60 oz. per ton; silver, 150.0 oz. per ton.

(2.) Five feet east of No. 1, across 4 inches quartz, heavily mineralized by galena, tetrahedrite, azurite, malachite, slight sphalerite: Gold, 2.60 oz. per ton; silver, 212.0 oz. per ton.

(3.) Five feet east of previous sample, across 3 inches quartz, well-mineralized as No. 2: Gold, 2.10 oz. per ton; silver, 316.0 oz. per ton.

(4.) Across 5 inches of phyllite on the hanging-wall of sample No. 3, little mineralization: Gold, 0.02 oz. per ton; silver, 4.0 oz. per ton.

(5.) Across 3 inches phyllite on the foot-wall of sample No. 3, little mineralization: Gold, trace; silver, 2.2 oz. per ton. No stripping for 33 feet south-east of sample No. 3.

(6.) At west end of second stripping across 8 inches, stringers of quartz in phyllite, little mineralization: Gold, 0.40 oz. per ton; silver, 6.0 oz. per ton.

(7.) Five feet east of sample No. 6, across 3½ inches of quartz, slightly mineralized by galena and tetrahedrite: Gold, 1.2 oz. per ton; silver, 4.0 oz. per ton.

(8.) Five feet east of sample No. 7, across 4 inches of quartz, little apparent mineralization: Gold, 2.70 oz. per ton; silver, 0.4 oz. per ton.

(9.) Five feet east of sample No. 8, across 1 inch of discoloured quartz, little apparent mineral: Gold, 1.84 oz. per ton; silver, 1.2 oz. per ton.

(10.) Five feet east of sample No. 9, at east limit of stripping, across 3 inches of quartz, very slight galena, tetrahedrite: Gold, 1.40 oz. per ton; silver, 0.4 oz. per ton.

Total shipments for 1938 from the *Lucky Strike* claim amounted to 37 tons, containing 53 oz. gold and 1,727 oz. silver.

On the *Davne* claim the original stripping, some 1,700 feet north-west of the *Lucky Strike* working and on the strike of the fissuring on that claim, exposed similar vein-structure in fairly compact, dolomitic lime rocks which are sheared and show gradational phases to talc-schists. Mineralization is similar to that on the *Lucky Strike* claim, with the same general intimate association of galena and tetrahedrite. Primary mineralization, with minerals identified in order of relative abundance, is by galena, tetrahedrite, sphalerite, and pyrite. Secondary mineralization is pronounced, the galena is commonly traversed by tiny fractures containing cerussite showing ragged replacement outlines. Many areas of tetrahedrite have been almost entirely replaced by chalcocite and covellite or by malachite and azurite. Covellite and chalcocite have also invaded and replaced galena in certain areas adjacent to original tetrahedrite inclusions. As in the *Lucky Strike* mineralization, no free gold or silver minerals were observed on microscopic examination.

On this claim, at elevation 2,965 feet, one of the original shallow cuts made on the line of strike of the *Lucky Strike* fissure exposed a vein having a width of 2 inches. At the time of examination this cut had been extended 33 feet south-east, partly as an open-cut and partly as an inclined shaft. In this work the vein was found to continue south-eastward for a length of 16 feet with a width seldom over 2 inches. At 16 feet it split into two stringers which, 17 feet farther south-east, at the foot of the shaft, were separated by 4½ feet of dolomitic lime rock. At this point one of these two branches had a width of 2½ inches, the other 2 inches. The strike of the main undivided section is south 45 degrees east, and the dip vertical or nearly so; one of the two branches continues on this strike, the other diverges on a south 65 degrees east strike; both branches have a nearly vertical dip.

A sample taken over the 2½-inch width of the south-west stringer at the face of the shaft assayed: Gold, 5.92 oz. per ton; silver, 193.1 oz. per ton. Another sample over the 2-inch width of the north-east branch at the face of the shaft assayed: Gold, 4.08 oz. per ton; silver, 102.7 oz. per ton. In each of these two stringers the mineralization is principally by galena and tetrahedrite, with that mineralization concentrated in a 1-inch width; the remaining width, on the margins, consists of rusted unoxidized quartz.

Some 75 feet south-east of the face of the shaft a small cut exposes typical phyllite as found in the *Lucky Strike* workings, but does not expose any extension of the vein. Still farther south-east by 60 feet a shallow cut in dolomitic lime shows a 1-foot width of disseminated quartz and quartz stringers. Values lower than those found in the main cut at the shaft are reported there.

On the northern margin of the shallow draw, between the original exposures on the *Lucky Strike* and *Davne* claims, on the strike of the vein, there are exposures of light to medium grey dolomitic lime rocks, generally more compact and fresher than at the *Davne* working. Crossing the strike of the vein, a width of at least 200 feet is indicated for this member of the series. To date there has been no development within this width and it is not possible to say what effect it may have on fissuring or mineralization.

Movement in the plane of the fissure-shearing is well demonstrated by exposures of faulted segments of pre-mineral dyke rock, originally crosscutting the fissure. Only one of these dykes, occurring in the main cut on the *Davne* claim, is sufficiently fresh to permit an approximation of its original composition, which was probably that of a diorite. In this instance the dyke is well exposed on the north-east side of the cut where it strikes south 60 degrees east, dips 35 degrees south-westward, and a small faulted segment on the south-west wall of the cut indicates a throw of only a few feet. The vein fissuring in traversing the dyke appears to be unaffected by it. Two other dykes crosscut by the fissure were noted on the property, but in neither case was any faulted extension observed; these two dykes, severely affected by regional metamorphism, are altered from their original composition and display incipient gneissic structure.

Total shipments for 1938 from the *Davne* claim amounted to 4 tons, containing 11 oz. gold and 170 oz. silver.

The development described above was completed before the ground was optioned to R. C. McCorkell. Further work under his direction consisted principally of surface-stripping by bulldozer on the *Davne* claim and a small amount of supplementary hand-stripping. The bulldozer work was not eminently satisfactory owing to the depth of the overburden and to the decomposed state of certain of the underlying rocks, notably the phyllite. It was of certain help, however, in tracing the fissure extension to the south-east of the inclined shaft and has cleared a road location which may later be utilized from the end of the present road to the *Davne* workings.

#### SILVER-LEAD-ZINC DEPOSITS.

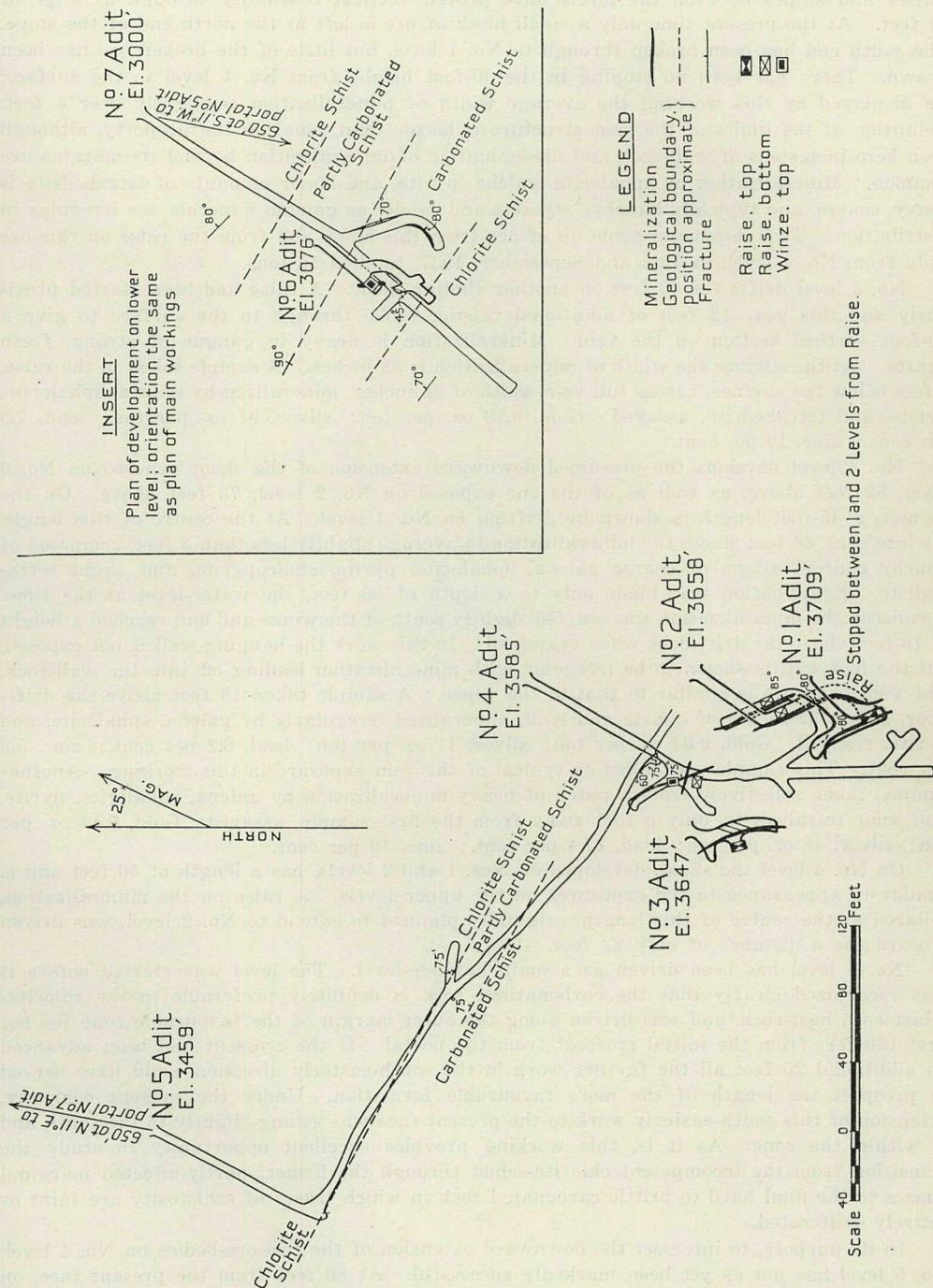
##### LARDEAU AREA.

This property was formerly owned and operated by the Multiplex Mining, **Spider Gold and Milling and Power Company, Limited**. In December, 1936, a syndicate, **Silver Mines, Ltd.** headed by I. G. Nelson, of Nelson, reopened the mine and commenced operation. In 1937 control was transferred to the Spider Gold and Silver Mines, Limited; I. G. Nelson, president, and W. S. "Duke" Harris in charge of operations at the mine. The holdings of the company consist of five located claims and one fraction, the *Spider, Multiplex No. 1, Winton, Ready Money* claims, and the *Mabel Fraction*. The camp is at an elevation of 3,500 feet on the south side of Poole Creek. The trail to Camborne, 1½ miles distant, has been improved during the past two years and, although steep, serves excellently for hauling by tractor. An agreement was made with the Meridian Mining Company for the use of their mill-building at Camborne and two ore-bins were constructed, connected by a short jig-back tram, in order to obviate tractor haulage down the last steep third of a mile of trail. Plans to install mill equipment have not yet matured. Two excellent camps, one at the upper workings and one at the lower workings, provide accommodation for twenty men. Up to nineteen men were employed prior to suspension of the operation last June.

The property has been reported upon in the Annual Reports of the Minister of Mines, British Columbia, for 1924, 1926, and 1929, and in Memoir 161 of the Geological Survey, Canada. As described in these reports the rocks exposed by the development consist of massive, dark green chloritic schists which have been partly converted to grey carbonate rock. This alteration was effected by rising mineralizing solutions whose ascension was principally through a set of joints striking slightly west of north and dipping steeply east, and by ensuing lateral passage of the solutions from these joints along the schistosity of the rock and other fractures. Later these same north-westerly joints provided the principal means of entry for solutions bearing the ore minerals, pyrite, sphalerite, galena, some chalcopyrite, arsenopyrite, and tetrahedrite in a quartz-calcite gangue. At the later phase of mineralization intersections between the joints and other minor openings provided suitable loci for the concentration of ore-deposition. Replacement is distinct, both by the early carbonatizing solutions and by the ore-bearing mineralization, with the effects marked most clearly along planes of schistosity and secondary cross-jointing intersecting the north-westerly joints. The production of chlorite is marked and was greatest near the close of each of the two periods of mineralization.

The zone of carbonatization best defined by the underground work has an average width of about 50 feet, with its length in a south-easterly direction along the strike of the schists. The margins of the zone are variable by reason of a transitional band between the two rock-types. This transition-zone ranges between 20 and 50 feet in width. Commercial mineralization, as so far exposed, is confined within the carbonated rocks. Ore-shoots strike north-westward across the zone, and range in length from 40 to 70 feet, with a maximum width of 4½ feet. Close to the unaltered rock, structure and mineralization weaken and there is an indicated tendency for the strike to swing toward that of the schists. The dip of these shoots is steeply east, the pitch north, as exposed by present development.

Development has been upon seven levels as shown on the accompanying map. Levels Nos. 1 to 5 comprise the principal work and expose the best showings on the property. Levels Nos. 6 and 7, considerably lower, represent effort which would have been better directed toward more thorough exploration of the nature and possibilities of the deposit on the upper levels.



Spider Gold and Silver Mines, Ltd. Plan of underground workings after company map.

Within the zone of carbonatization on levels Nos. 1 and 2 the principal ore-shoot so far developed on the property has been exposed for a length ranging between 50 and 70 feet. Raises and stopes between the levels have proved vertical continuity through a range of 50 feet. At the present time only a small block of ore is left at the north end of the stope. The south end has been broken through to No. 1 level, but little of the broken ore has been drawn. There has been no stoping in the 30-foot height from No. 1 level to the surface. As displayed by this working the average width of mineralization is slightly over 3 feet. Definition of the limits of the vein structure is better than usual on the property, although even here inclusions of wall-rock and dissemination of mineralization beyond its margins are common. Mineralization by sphalerite, galena, pyrite, and lesser amounts of tetrahedrite is heavy, coarse, and typically bunchy. Quartz and calcite as gangue minerals are irregular in distribution. Two shipments made up of ore from this stope and from the raise on this ore body from No. 4 level, in July and September, 1937, totalled 50 tons.

No. 3 level drifts for 40 feet on another similar shoot. A raise had been started previously and this year 12 feet of additional raising broke through to the surface to give a 20-foot vertical section on the vein. Mineralization is heavy in gangue of strong, fresh quartz. At the surface the width of mineralization is 38 inches. A sample taken in the raise, 8 feet below the surface, across full vein-width of 22 inches, mineralized by galena, sphalerite, pyrite, and tetrahedrite, assayed: Gold, 0.10 oz. per ton; silver, 91 oz. per ton; lead, 7.8 per cent.; zinc, 19 per cent.

No. 4 level develops the presumed downward extension of the shoot exposed on No. 3 level, 62 feet above, as well as of the one exposed on No. 2 level, 73 feet above. On the former, a 45-foot length is shown by drifting on No. 4 level. At the centre of this length a winze sunk 46 feet shows the mineralization to average slightly less than 3 feet, composed of bunchy concentrations of coarse galena, sphalerite, pyrite, chalcopyrite, and slight tetrahedrite. Examination was made only to a depth of 36 feet, the water-level at the time. A raise on the mineralization was started slightly south of the winze and had reached a height of 18 feet above the drift-floor when examined. In this work the hanging-wall is not exposed, but the foot-wall is shown to be irregular with mineralization leading off into the wall-rock. The vein exposure is similar to that in the winze. A sample taken 13 feet above the drift-floor, across 32 inches of quartz and rock, mineralized irregularly by galena, sphalerite, and pyrite, assayed: Gold, 0.04 oz. per ton; silver, 11 oz. per ton; lead, 6.2 per cent.; zinc, 5.8 per cent. This sample was taken as typical of the vein exposure in this working. Another sample, taken selectively from a patch of heavy mineralization by galena, sphalerite, pyrite, and some tetrahedrite, only a foot away from the first sample, assayed: Gold, 0.14 oz. per ton; silver, 48 oz. per ton; lead, 27.4 per cent.; zinc, 10 per cent.

On No. 4 level the shoot, developed on Nos. 1 and 2 levels, has a length of 50 feet and is similar in appearance to the exposures on the upper levels. A raise on the mineralization, collared at the centre of this length, originally planned to extend to No. 2 level, was driven upward for a distance of only 23 feet.

No. 5 level has been driven as a main haulage-level. The level was started before it was recognized clearly that the carbonatized rock is definitely preferable to the chlorite-schist as a host-rock, and was driven along the outer margin of the favourable zone for the first 160 feet from the initial crosscut from the portal. If the crosscut had been advanced an additional 25 feet all the further work in the south-easterly direction could have served to prospect the length of the more favourable formation. Under the present company, extension of this south-easterly work to the present face was swung slightly to the south and is within the zone. As it is, this working provides excellent opportunity to study the transition from the incompetent chlorite-schist through the firmer, partly-affected marginal phases to the final hard to brittle carbonated rock in which traces of schistosity are faint or entirely obliterated.

In its purpose, to intersect the downward extension of the two ore-bodies on No. 4 level, No. 5 level has not as yet been markedly successful. At 80 feet from the present face, on the left wall, there is a sparse scattering of pyrite, galena, sphalerite, and chalcopyrite mineralization disseminated in quartz gangue. A sample taken across 24 inches assayed: Gold, trace; silver, trace; lead, *nil*; zinc, 10.1 per cent. A select sample, taken 2 feet below the channel sample, from a small patch of mineralization, mainly galena, assayed:

Gold, 0.12 oz. per ton; silver, 130 oz. per ton; lead, 42.5 per cent.; zinc, 14.9 per cent. Thirty feet beyond this location a slip striking south 60 degrees east, dipping 60 degrees south-westward, is intersected close to the right wall. Eighteen feet farther south-east, at which point the fissure again enters the wall, the strike swings to a bearing of south 25 degrees east and the dip steepens to 75 degrees. Just short of this an 8-foot crosscut driven into the right wall provides a good exposure of the fissure, which has a width of 2 feet and is slightly mineralized by galena, sphalerite, and chalcopyrite in quartz gangue. The face of the crosscut and the face of the main adit 30 feet ahead of the crosscut are both barren of mineralization. At the time of examination, the fissure was making considerable water and the filling was heavily rust-stained.

The principal point of interest in this exposure is, of course, any possible correlation with the exposures in the winze above and on No. 4 level. In favour of such correlation is the location of the exposure on No. 5 level, which is approximately where it might be expected, and the fact that the winze was the most likely source of the water in the fissure. Also, it is interesting that at the north end of the exposure on No. 4 level the strike of the shoot swings to the west, a change comparable to that in the fissure on No. 5 level. Against correlation of the two exposures is the reverse dip of the fissure on No. 5 level, and the necessity of assuming a pitch to the south-east, opposite to that indicated for the shoot assumed between the exposures on Nos 3 and 4 levels. The consideration of the reverse dip on No. 5 level is offset in certain degree by the fact that the fissure there is steepening progressively toward the south-east and may, quite conceivably, show a reverse dip to the north-east within a short additional distance south-east. In the final analysis, further drifting south-east on this fissure is indicated as the next logical step in the course of exploratory development.

Levels No. 6 and No. 7 have been driven some 500 feet below the upper workings in order to explore the presumed downward extension of the zone of carbonated rock.

No. 6 level, at an elevation of 3,076 feet, was started close to the margin of the altered formation and, 35 feet from the portal, intersected mineralization exposed by surface-trenching. At this intersection a winze was sunk for 16 feet on the mineralization, exposing its strike as north 5 degrees west, the dip steeply east. Mineralization is heavy and composed of coarse galena, sphalerite, and pyrite. Little tetrahedrite is seen at this level. Gangue minerals are quartz and calcite. A sample taken over 52 inches, at 6 feet from the bottom of the winze, assayed: Gold, 0.14 oz. per ton; silver, 12 oz. per ton; lead, 12.1 per cent.; zinc, 20 per cent. Additional width on the hanging-wall is indicated beyond the wall of the winze. Later work to locate the southerly extension of this body on this level disclosed fracturing but little mineralization. A shipment of 36 tons was made from the dump of this working in November, 1937, reportedly representing unsorted vein material from the winze.

No. 7 level, at an elevation of 3,000 feet, was driven to intersect any downward extension of the showing on No. 6 level. It was started in chlorite-schist, and not only crosscuts the carbonated zone but extends beyond for 70 feet into the unaltered schist. A branch working, following a fracture off the main crosscut to the south, has exposed an irregular zone of silicification, sparsely mineralized, which strikes north 10 degrees east, and dips 65 to 80 degrees east. Within the development-work on this level this exposure apparently represents the only likelihood of extension downward from the showing on No. 6 level.

#### SLOCAN AREA.

##### Sunshine Group.

The *Sunshine* group, controlled by the Silver Ridge Mining Company, of Vancouver, consists of the *Corinth* and *Dozer* mineral claims and the *Katie* and *Peggy* fractional mineral claims. The *Corinth*, *Katie* and *Peggy* are Crown-granted, the *Dozer* is held by right of location. In addition to these claims the company has certain rights to several others adjoining. This ground is 2 miles due west of the town of Sandon, at elevations varying between 5,000 and 6,500 feet, and has been developed during the past three years under the direction of R. A. Grimes. The property is reached from Sandon by 4½ miles of good road on easy grade. Excellent camp buildings, providing accommodation for eleven men, have been constructed at an elevation of 5,700 feet. Late this season a new camp has been built closer to the location of present operations. Timber is plentiful on the property, mainly spruce and balsam, suitable for any immediate

domestic construction or mining needs. Water sufficient for milling purposes is available only from Carpenter Creek, slightly more than a mile east of the property at an elevation of 3,200 feet.

The rocks underlying the holdings are members of the Slocan series. Where exposed these are principally fine-grained, slaty and argillaceous members with limy and quartzitic phases. Colour varies between dark grey, dark green, and black, with slight variations marking bedding. Several veins, striking generally east to north-east, were indicated before operations were started by the present company, but no comprehensive development had been undertaken. The present programme is based simply on the belief that the ground is worthy of prospecting by reason of its favourable location close to several other properties having profitable records of production in silver-lead and zinc. Further encouragement is lent by the acknowledged fact that vein-outcrops are frequently poor in this district.

The first stage of prospecting by the Silver Ridge Company consisted of widespread surface-stripping by bulldozer, principally in a north-south direction across the prevailing strike of the veins. Next, shallow underground work was done with a view of obtaining more precise information as to structure and vein characteristics. Finally, a low-level cross-cut is being driven to explore any downward extension of the surface and near-surface exposures. In the first year of operation, before this programme of development was adopted, a 400-foot adit was driven on the *Sunshine* claim. In the light of later knowledge this work proved to have been misdirected.

Some very valuable information was gained relative to the use of bulldozer for surface prospecting. Ideal conditions of steep side-hill, reasonably light overburden and decomposed near-surface rock-formation facilitated the operations and permitted speed and economy. It is claimed that, hiring bulldozer and labour, material was moved at 10 cents a cubic yard. More exact information from the surface exposures necessitated subsequent hand-work, but the bulldozer was found eminently satisfactory in narrowing down the likely field for such more intensive development.

Two adits on the *Cuba* claim give interesting exposures of vein-conditions near the surface. These adits, the *Jan*, at elevation 5,700 feet, and the *Belle*, at 5,603 feet, were driven on vein exposures made by bulldozer stripping. The original exposure of the *Jan* vein was heavily weathered, but contained small pieces of clean galena. The outcrop strikes south 65 degrees east and dips 15 degrees south-westward, and cuts a salic, pre-mineral sill, 2½ feet in width, bedded with the sediments which lie horizontally or have only a slight dip to the north-east. From the outcrop, a shaft was sunk 50 feet on the vein. In this work it is not possible to estimate the original width of the vein as later movements in the plane of the fissuring and marked weathering have created a shattered zone ranging in width from 2 to 3 feet, with the mineralization, principally clean galena, disseminated throughout. Fifty feet down the shaft the vein is cut off on the hanging-wall of a flat fault striking south 65 to 70 degrees east dipping 10 to 20 degrees north-eastward. The adit was then started and driven 95 feet north-westward to a point 10 feet below the foot of the shaft. From this point a crosscut for 45 feet to the south-west found the faulted section of the vein and indicated the heave to be about 40 feet to the south-west. From this intersection a drift was carried on the vein, below the fault, for 110 feet north-westward and 30 feet south-eastward. In this drift the dip of the vein was found to have steepened to 65 to 70 degrees south-westward. The vein is characteristically narrow, 2 to 6 inches, mineralized by silver-bearing galena, and below the fault is oxidized and sufficiently irregular to render tracing difficult. On the north-westerly extension a 25-foot length was underhand-stopped to a depth of 8 feet and showed clean silver-lead ore across a width of 20 inches. The hanging-wall in this stope is well-defined despite characteristic pinching and swelling. At the north-west face of the drift the vein is cut off by a fault. At the end of the 30-foot drift south-eastward from the crosscut a small stope was carried up on the vein to the fault intersection.

The *Belle* adit lies 200 feet north-eastward of the *Jan* portal. This working was driven as a drift for 400 feet on a narrow vein striking west to north-west, dipping 60 to 70 degrees to the south-west. The sediments strike north to north-west, dip gently west to south-west. The vein is seldom over 2 inches in width and is heavily oxidized and mineralized by stringers of clean galena. Continuity is disrupted by a series of small faults parallel to the bedding of the sediments, which made it difficult to follow the vein under-

ground and are thus responsible for the irregular outline of the working. Eighty feet short of the face of the drift a crosscut was driven 45 feet on a bearing slightly east of north. At the face of this crosscut a poorly-defined fault strikes slightly west of north, dips 65 degrees east. This movement is earlier than those that parallel the bedding.

As mentioned previously, the value of this shallow development is primarily as a source of information for the guidance of further work. One shipment was made from the *Jan* tunnel.

Recently a caterpillar Diesel and a 400-foot Gardner-Denver compressor have been purchased and installed near the new camp on the *Oregon* claim where, at 5,303 feet elevation, a crosscut is being driven on a bearing south 24 degrees west. This working within 1,700 feet should intersect any extension of the *Jan* and *Belle* veins on this level as well as crosscut at least one other vein indicated on the surface. A recent report by Mr. Grimes states that the face of this crosscut was in 150 feet at the end of the year.

#### GOLDEN AREA.

**Monarch.** This property, on Mount Stephen, 3 miles east of Field, is controlled by the Base Metals Mining Corporation, of Toronto. Considerable detail on this operation is given in the Annual Report of the Minister of Mines for 1935 and previous years. The mill has not operated since 1935, and during the past season only a small crew was maintained on development-work in the East Monarch section of the workings.

Since the beginning of 1936, development-work has traced two ore-bodies, delineating one fairly completely and partly exploring the limits of the other. Both are south to south-eastward of the original stopes in the East Monarch. Mineralization by galena and sphalerite is similar to the sections previously mined.

The body, upon which development is considered fairly complete, is small. It is probably 125 feet long, averages 30 feet wide, and 2 to 13 feet thick. The ore-body is developed by east and west crosscuts from what is known as the 200 level, properly an incline, the length of this lens lies in a north-south direction, and dips about 15 degrees to the north. The eastern limits of the ore are marked by the presence of fine to medium grained pyrite, mixed usually with sphalerite but little galena. There is only slight pyritization at the western limits of the ore. On this level mineralization is all within unstratified, light blue-grey limestone, which commonly contains irregular stringers and bunches of calcite.

The northerly end of the larger of the two ore-bodies lies 200 feet east of the south end of the 200 level ore-body. From this point development has been carried some 400 feet south-eastward in the ore-bearing zone which rises gently in that direction. The dip of the ore-body is about 15 degrees to the north-east, which results from its location on the east limb of a broad anticline whose axis strikes north 25 degrees west and pitches gently north, as reported in the Annual Report of the Minister of Mines for 1929. South-eastward the width of mineralization tapers from 80 feet to approximately 40 feet. The thickness ranges from 50 to 10 feet, it being thinner toward the southern end. At the time of examination development was still proceeding south-eastward. Pyritization marks the western limits of galena-sphalerite mineralization along this length.

At the north end of this ore-body, mineralization is partly in unbedded light grey limestone and partly in the underlying dolomitic limestone. The contact between these two formations rises toward the south-east at almost the same inclination as the ore-body, and the decreased thickness at that end of the body is all within the dolomite, just below the grey lime contact. Previously, mineralization has been found only within the grey lime formation.

An interesting feature is the presence of marked fissuring, assumed to be pre-mineral, which strikes eastward across the larger ore-body. Some of these fissures make a considerable amount of water and adjacent mineralization is markedly lower in grade than average. Although it is a considerable distance underground it is reasonable to assume that the loss in values is directly attributable to the leaching action of the water. This assumption is at least partly substantiated by the fact that at these locations zinc values are depleted further below the average than are the lead values.

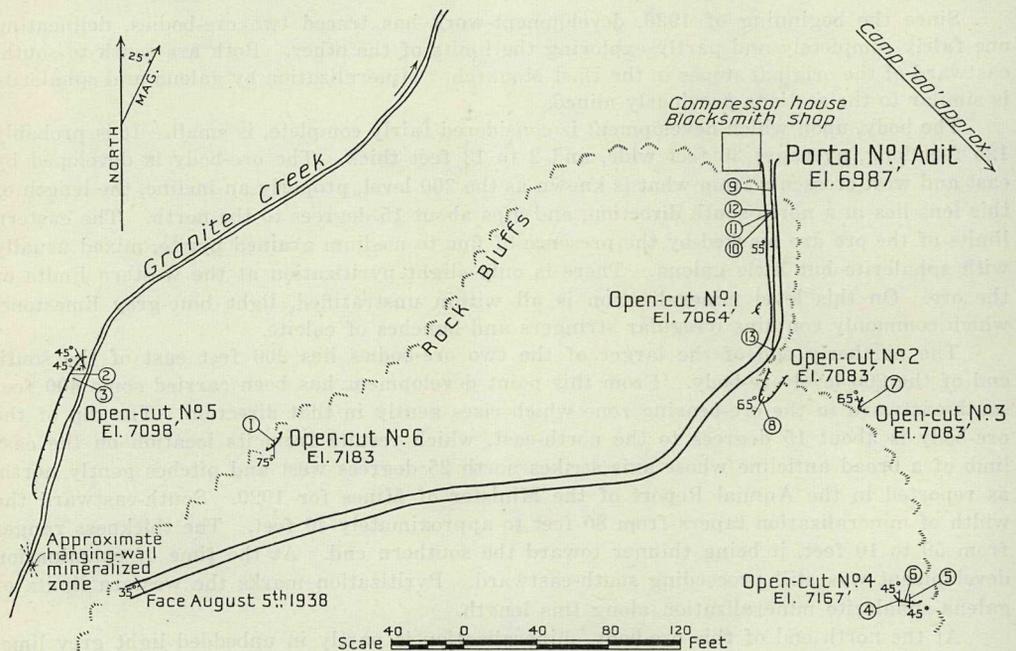
The company reports, tentatively, that 70,000 tons are available from the larger block, which probably averages: Silver, 1.4 oz. to the ton; lead, 10.5 per cent.; zinc, 13.6 per cent. The probable average of the small tonnage indicated on the 200 level is given as: Silver, 1.3 oz. to the ton; lead, 7 per cent.; zinc, 19.5 per cent.

#### WINDERMERE AREA.

**Key Group.** This group of claims, known either as the *Key* group or *Silver Key* group, was reported upon by the Resident Mining Engineer in 1935: "Leaving the highway 3 miles northerly from Canal Flats, an old logging-road is followed for 12 miles, thence 13 miles of pack-trail leads to the property, at elevation between 8,000 and 9,000 feet above sea-level, which is situated at the head of the East fork of Doctor creek, a tributary of Findlay creek.

"Near the property two tributaries of the East fork of Doctor creek rise separately in a large basin. The west tributary rises in a small lake, flows through a short canyon and is divided from the East branch, which rises in a meadow, by a flat-topped rock ridge. To the east and south the rim of the basin is about 3,000 feet above the meadow and is formed of porphyritic granodiorite with large feldspar phenocrysts, while to the west the rim is quartzite, apparently overlain by greenstone for some distance.

"The canyon marks a fault and along it the beds vary greatly in dip and strike and at places are quite contorted."



Key Group. Plan of surface and underground workings from compass survey.

Since 1935, W. S. Bryant, of Fort Wayne, Indiana, has leased the property from the Blake Brothers, of Skookumchuck. The group consists of the *Silver Key* and *Key Nos. 2 to 8* mineral claims, and the *Mascot* and *Mascot No. 2* and *No. 3* fractional claims, all held on location. Since 1936, the road has been improved at its upper end so that it is now possible to drive for 15 miles from the highway; the succeeding 11 miles of trail from the end of the road to the camp needs considerable further work, including some relocation, before permitting of economical horse-packing in either summer or winter. The trail was kept open at considerable expense and effort during the winter of 1937-38 when a crew of four men was maintained at the property. On the trail and at the camp, the high elevations and rugged topography lend to heavy snowfall with resulting danger and difficulties from slides.

A new bunk-house providing accommodation for eight men has been built at the location of the original cabin. A small gasoline compressor, capable of supplying one light drill, has been installed together with the necessary blacksmith equipment.

As described in the 1935 Report, the two streams tributary to the East Fork of Doctor Creek are separated by a flat-topped rock ridge consisting, on the east, of greenstone, and on the west of a succession of quartzite-beds varying from cherty to argillaceous. Impurities originally contained within the quartzites have produced considerable muscovite and graphite as products of regional metamorphism. Jointing is commonly platy, owing to the presence of the muscovite. The original colour of the rock has been modified to varying degrees, the most noticeable result is the production of an iridescent sheen which coats many of the exposed surfaces. This effect is due probably to the leaching action of descending waters upon iron contained within the rocks as pyrite and as an original constituent, followed by its redeposition as a pigment.

The showings of principal interest occur within the quartzite, on the west flank of the ridge and near its northern end. On the west flank a zone of slight mineralization by galena and pyrite, 60 feet in width, is exposed on both sides of the west tributary creek, known locally as Granite Creek. At Cut No. 5 on the west side of this creek, the zone strikes nearly due north and dips 45 degrees west, with the bedding of the quartzite. The foot-wall is naturally well exposed but the hanging-wall is obscured by overburden. A sample (No. 2) taken over 69 inches of heavily-oxidized quartzite, slightly mineralized by galena and pyrite, on the foot-wall of the zone, assayed: Gold, trace; silver, 2.0 oz. per ton; lead, 3.2 per cent. A grab sample (No. 3) taken from a small pile of select mineralization from this location assayed: Gold, trace; silver, 4 oz. per ton; lead, 7.2 per cent. The extension of this zone on the east side of the creek is displaced 500 feet south by a fault traced by the line of the creek. Near the faulted extension the quartzite is folded and contorted but the prevailing strike of the zone is north 20 to 30 degrees west, with the dip irregular but predominantly south-westward. The width of the zone is close to 50 feet. A sample taken across 48 inches of stained quartzite, at the best exposure of mineralization by pyrite and galena, assayed: Gold, trace; silver, 0.4 oz. per ton; lead, 0.6 per cent. This mineralization is concentrated principally along the bedding-planes.

Above Cut 5, on the west side of the ridge, 3 to 4 inches of heavy mineralization, mainly galena, lies bedded with the quartzite, which strikes north 3 degrees west and dip at 75 degrees to the west. A small Cut, No. 6, has been made and the exposure suggests that the dip is probably greater than usual owing to local pressure from the steeply overhanging ground immediately above. A sample (No. 1) taken across this mineralization assayed: Gold, 0.02 oz. per ton; silver, 27.5 oz. per ton; lead, 38.5 per cent. The wall-rock, of grey quartzite, is barren or only slightly mineralized.

On the top of the ridge, near its northern end, there are several narrow stringers of heavy mineralization, principally galena with some tetrahedrite, carrying attractive values in silver. At Cut No. 2, a 3- to 4-inch vein, bedded, strikes north 30 degrees east, dips at 65 degrees westward. Additional width of shearing up to 8 inches is due to the intersection of the mineralized fissure by a barren post-mineral fracture striking due north, dipping 50 degrees west. A sample (No. 8) taken across 2½ inches of heavy mineralization of galena and some tetrahedrite, assayed: Gold, 0.04 oz. per ton; silver, 278 oz. per ton; lead, 13.9 per cent. At Cut No. 3, 50 feet to the east of Cut No. 2 and at the same elevation, another vein of similar width strikes north 10 degrees west, dips 65 degrees west. There, too, the vein is bedded and consists of strong mineralization by galena and some tetrahedrite with the production of some secondary copper minerals, notably malachite. A sample (No. 7) across 4 inches assayed: Gold, 0.02 oz. per ton; silver, 235 oz. per ton; lead, 6.6 per cent. The wall-rock is, as usual, unmineralized or mineralized only to slight degree. One hundred and ten feet south of Cut No. 3 and on strike sufficiently close to be considered as a probable extension of the vein similar vein-structure has been exposed at Cut No. 4. There, 4 to 6 inches of fair mineralization by galena and tetrahedrite in a quartz gangue is separated from a parallel vein by 6 to 8 feet of barren quartzite. The parallel vein has a width of 3 to 6 inches. Both veins are bedded, strike due north, and dip 45 degrees west. A sample (No. 4) from the west vein, taken across 6 inches, well mineralized by galena and a small amount of tetrahedrite, assayed: Gold, 0.01 oz. per ton; silver, 110 oz. per ton; lead, 1.2 per cent.

A sample (No. 5) from the east stringer, across 6 inches slightly mineralized by galena assayed: Gold, trace; silver, 2 oz. per ton; lead, 0.6 per cent. A chip sample (No. 6) taken across 96 inches of quartzite between the two leads assayed: Gold, *nil*; silver, *nil*; lead, 0.5 per cent.

Underground development has been directed principally toward exploration of the wide zone exposed on Granite Creek as described above. Owing to danger and inconvenience from snowslides from the precipitous walls of the creek, an adit was collared at the northern end of the ridge. The location selected was at the outcrop of one of the narrow, well-mineralized veins, and the adit served the dual purpose of developing this vein while progressing toward the principal intersection. The drift on the vein was carried for slightly over 100 feet from the portal and in this length displayed the vein bedded with the quartzite, striking almost due north, dipping 55 degrees west. Vein-widths range generally between 2 and 4 inches, although in places weakness in the bedding has permitted dissemination of the mineralization, creating increased widths accompanied by a corresponding decrease in concentration and partial loss of true vein characteristics. Mineralization by galena and pyrite is erratic and generally weak; the gangue is composed of silicified quartzite and some free quartz. The wall-rock in this section is typically of grey, unmineralized quartzite. Samples taken from this vein were as follows:—

Sample No.	Gold.	Silver.	Lead.	Description.
	Oz. per Ton.	Oz. per Ton.	Per Cent.	
9	0.02	3.6	0.8	Over 20 inches disseminated mineralization by galena and pyrite in silicified quartzite at portal plus 15 feet south.
10	Trace	1.0	0.4	Over 24 inches on the foot-wall of the lead, silicified quartzite containing very slight pyrite and galena. Portal plus 26 feet south.
11	Trace	8.0	0.4	Over 4 inches vein mineralized by galena. Portal plus 26 feet south.
12	Trace	0.2	0.3	Over 17 inches hanging-wall slightly silicified quartzite, very slightly mineralized by galena and pyrite. Portal plus 26 feet south.
13	Trace	6.4	0.7	Over 14 inches vein mineral, here evidenced by silicification of quartzite bedding and fine seaming by galena. Portal plus 103 feet south.

At 105 feet from the portal the adit was swung to a bearing slightly south of west. For 320 feet from the change in direction the working is in quartzite, unmineralized and exhibiting little irregularity of possible importance. At 320 feet the ground becomes heavily sheared and continues so for the next 50 feet. At 370 feet a well-defined hanging-wall, striking north 25 degrees west, dipping 35 degrees south-westward, marks the limit of the movement. Examination disclosed no distinct foot-wall. After the date at which examination was made the operators extended the adit and reported the intersection of both the narrow vein exposed at Cut No. 6 and the main wide zone of mineralization for which the working had been driven.

South of these principal showings the basin is rimmed by high ground rising to elevations of 9,000 feet. On the north slope of this rim, at an elevation of 7,630 feet, some 1,500 feet south of the camp and above the source of the east branch creek, a shear-zone in porphyritic granite has attracted attention.

The shearing is only about 100 feet east of a contact with typical quartzite. This contact strikes due north. Within the granite, over a width of 50 feet, there occur individual shears ranging in width from 1 foot to 6 feet. These shears, also striking approximately north, dipping to the west, are generally unmineralized except for the presence of muscovite and sericite. A sample taken across the full 6-foot width of the largest shear-zone assayed: Gold, trace; silver, 0.2 oz. per ton; lead, 0.8 per cent. A shear, striking north 15 degrees west, dipping at 75 to 80 degrees westward, is cut off on the cliff face some 25 feet above the floor of the cut by another later shear which strikes north 20 degrees west and dips 55 degrees

westward. These movements are later than the mineralization of the quartzite, and, lacking evidence of any later period of mineralization, it is doubtful if this area within the granite is of commercial interest.

#### DRY SILVER ORES.

##### SLOCAN LAKE AREA.

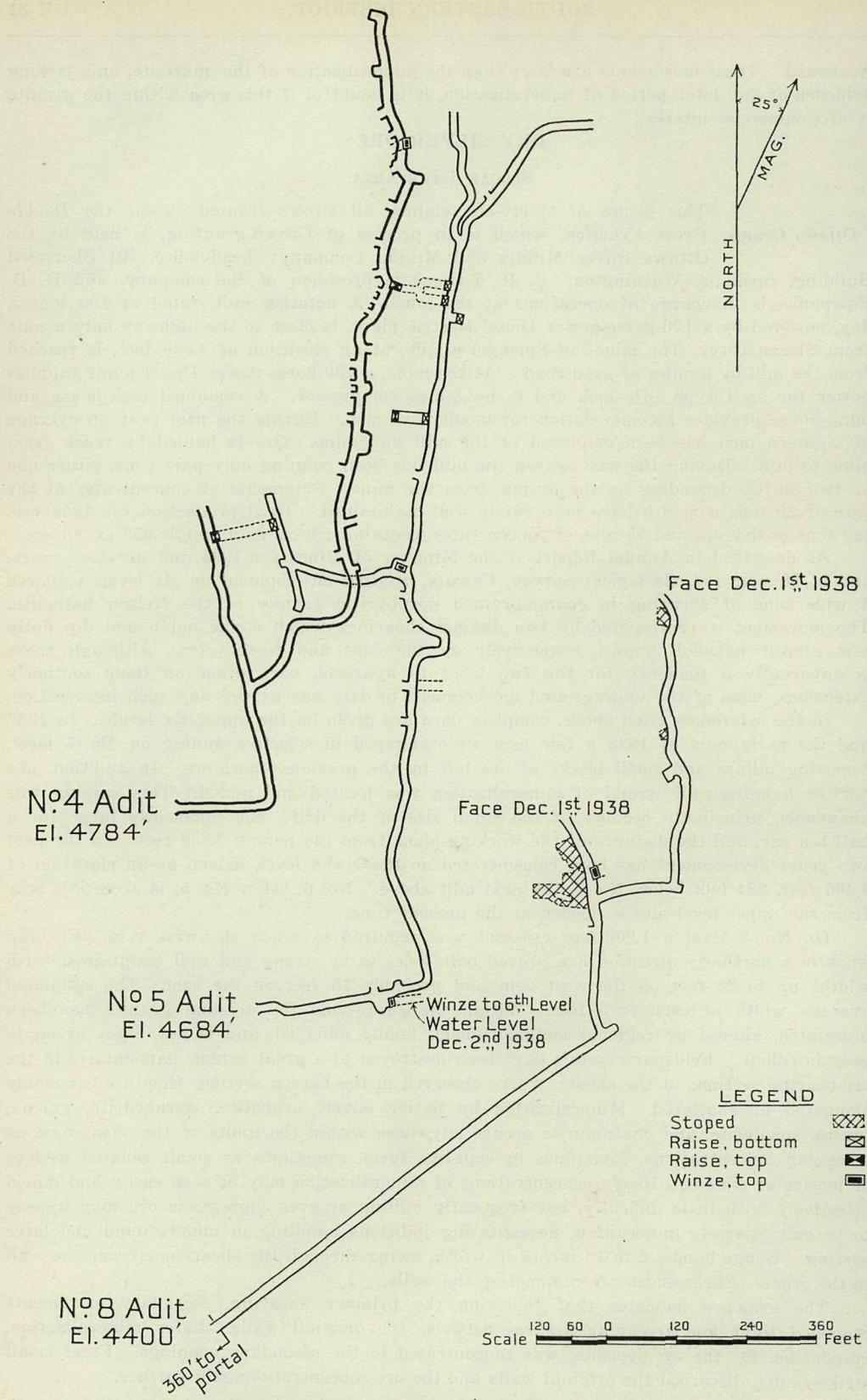
This group of thirty-one claims, all Crown-granted except the *Double Ottawa Group*. *Cross Fraction*, which is in process of Crown-granting, is held by the Ottawa Silver Mining and Milling Company; head office, 401 Sherwood Building, Spokane, Washington. C. R. Thomas is president of the company, and D. D. Fairbanks is in charge of operations at the mine. A flotation mill, rated at 100 tons a day, powered by a 170-horse-power Diesel electric plant, is close to the highway only a mile from Slocan City. The mine, on Springer Creek, at an elevation of 4,500 feet, is reached from the mill by 5 miles of good road. At the mine, a 150-horse-power Diesel plant supplies power for an L-type 13½-inch and 8- by 8-inch compressor. A combined cook-house and bunk-house provides accommodation for twenty-five men. During the past year an average of eighteen men has been employed at the mill and mine. Ore is hauled by truck from mine to mill. During the past season the mill has been running only part time, either one or two shifts, depending on the output from the mine. Shipments of concentrates at the rate of 20 tons a month have been fairly well maintained. Total production for 1938 was 112 tons of dry ore and 75 tons of concentrates, containing 3 oz. gold and 59,959 oz. silver.

As described in Annual Report of the Minister of Mines for 1935 and previous years, and in Memoir 184, Geological Survey, Canada, original development on six levels explored a wide zone of shearing in coarse-grained porphyritic granite of the Nelson batholith. The movement is represented by two distinct shearings which strike north and dip flatly east almost parallel, known respectively as the east and west veins. Although there is apparently a tendency for the two lodes to approach each other on their southerly extensions, none of the underground development to date has proved any such intersection.

In the references cited above, complete data are given on the upper six levels. In 1937 and the early part of 1938 a few men were engaged in selective mining on No. 5 level, removing pillars and small blocks of ore left by the previous operators. In addition, one narrow hanging-wall strand of mineralization was located and mined. This sniping was abandoned principally because of the small size of the drift, not sufficiently large for a half-ton car, and the distance of the working-place from the portal, 2,600 feet. In the past two years development has been concentrated on the No. 8 level, driven at an elevation of 4,400 feet, 284 feet below No. 5, the next adit above. No. 6, below No. 5, is accessible only from the upper level and is flooded at the present time.

On No. 8 level a 1,200-foot crosscut was required to reach the west vein. Ensuing work in a northerly direction has proved both lodes to be strong and well maintained, with widths up to 20 feet on the west vein and probably 15 feet on the east. The estimated average width of each is 5 feet. Within the shear-zone the original granite has been brecciated, altered by regional metamorphism, finally silicified, and is now light green to grey in colour. Feldspar crystals have been destroyed to a great extent, particularly in the ore-bearing sections of the shear; where observed in the barren sections they are commonly elongated or shattered. Mineralization by native silver, argentite, tetrahedrite, galena, pyrite, sphalerite, and chalcopyrite occurs anywhere within the limits of the shear-zone as irregular concentrations, sometimes in vein-like form, sometimes as small isolated wedges or lenticular masses. Heavy concentrations of mineralization may be seen easily and mined selectively with little difficulty, but frequently milling or even high-grade ore may appear to be only sparsely mineralized, necessitating judicious handling in underground and later sorting. Gouge bands, 2 to 12 inches in width, swing through the shear-zone from one wall to the other. Slickensides are common on the walls.

The evidence indicates that following the primary shearing, secondary movements reopened tight and irregular fissures between the original walls. Later mineralization, responsible for the ore-deposits, was concentrated in the secondary openings. Final small strike-faults, disturbed the original walls and the ore-concentrations still further.



Ottawa Silver Mining and Milling Co. Plan of 4th, 5th, and 8th level workings after company's map.

From the initial crosscut on No. 8 level, on December 1st, 1938, the drift on the west lode had been advanced 375 feet north. The strike of the shear is north 10 to 30 degrees west, the dip 30 to 35 degrees eastward. At 220 feet from the initial crosscut, another crosscut was driven 145 feet from the west lode to the east. A drift northward on the east lode had reached a point 500 feet north of the crosscut on December 1st. The strike of this shear is predominantly north 10 to 20 degrees west, and the dip 30 to 35 degrees eastward, but one short section strikes north 20 degrees east, dips 30 to 40 degrees eastward.

To date the west lode has produced most of the ore from No. 8 level. From the initial crosscut to the crosscut to the east drift the exposure, according to the operators, returns only low assays. From the crosscut to the east lode, for a distance of slightly over 100 feet northward, a stope had been carried to a maximum distance of 90 feet up the dip of the west vein. This stope provides the best exposures of the shear on this level. The southern part, stope No. 1, has been worked most extensively and, at the time of examination, a high-grade concentration was being mined at the south end. A sample across 16 inches assayed: Gold, trace; silver, 301 oz. per ton. Mineralization by argentite, native silver, and tetrahedrite was strong over this width, but a 4-inch width included at the centre of the sample showed particularly heavy concentration. A sample taken selectively from this 4-inch width assayed: Gold, trace; silver, 1,107.2 oz. per ton. A third sample taken across 48 inches, to the hanging-wall of the first sample, composed of silicified shear filling, little mineralized, assayed: Gold, *nil*; silver, 7.8 oz. per ton. Extension of the high-grade mineralization toward the north end of the stope was not well-defined but appeared to be rising toward the hanging-wall of the shear.

No. 2 stope is properly an extension of No. 1 stope northward, but has been developed separately by reason of an abrupt break in the hanging-wall which makes that wall some 4 feet lower in No. 1 than in No. 2. A dragging movement later than the shearing is clearly marked at this point by pronounced slickensides. At the south end of No. 2 stope, 40 feet up the dip of the vein from the drift, a sample across a 5-inch streak of heavy mineralization carrying argentite and tetrahedrite assayed: Gold, trace; silver, 166.8 oz. per ton. Another sample across 45 inches, little mineralized, on the foot-wall of the preceding sample assayed: Gold, *nil*; silver, 1 oz. per ton. Shallow underhand-stoping has been carried for a length of 50 feet on the east side of the drift, opposite No. 1 and No. 2 stopes. At the face of the west drift, beyond any stopes, the shear is practically barren of mineralization. A sample taken here across 60 inches assayed: Gold, *nil*; silver, 0.6 oz. per ton.

The crosscut from the west drift to the east drift followed a fracture striking north 60 to 75 degrees east, dipping 40 degrees southward. Twenty-five feet short of the east drift the strike changes to north 25 degrees east, the dip becomes almost vertical. The crosscut was continued eastward to the east lode. A drift run north on the lode intersected the cross-fracturing on the west wall of the drift.

The east lode, as so far exposed on No. 8 level, is more irregular in strike and dip than the west lode. A sample taken at the intersection of the crosscut and the east lode, across 30 inches of gouge and heavily-sheared rock, little mineralized, representative of the shear filling at this location, assayed: Gold, *nil*; silver, *nil*. For the first 250 feet of drift on the east lode, ore-lenses are irregular and not large. Beyond that point, to the face at 303 feet from the crosscut at the time of examination, the concentrations of mineralization are stronger and give promise of better continuity. At 220 feet a short crosscut was driven west to reach the foot-wall of the shear. There a sample taken across 25 inches of shear filling, little mineralized, assayed: Gold, 0.04 oz. per ton; silver, 5.4 oz. per ton. At 50 feet from the face a sample across a 5-inch width of strong mineralization assayed: Gold, trace; silver, 429.8 oz. per ton. This stringer could be traced along the wall for several feet. It is marked by a well-defined gouge band on its hanging-wall. Both the gouge band and the mineralization lie toward the centre of the shearing, and display no tendency toward concentration on either wall.

The drive northward on these two drifts has not yet reached the projected downward extension of the best mineralization within the shear-zone on the upper levels. One difficulty that the operators have encountered in their calculations is inadequate knowledge of the pitch of the ore-shoots. Estimation of outcome of the property is rendered extremely difficult without comprehensive bulk-sampling and close estimation of mining costs. Bulk-

sampling, or careful compilation of assays of channel samples from both the high-grade concentrations and the remainder of the shear filling, would give an assay for mill-heads which might be mined at a reasonable cost. In the event that this assay proved too low to permit operation, the returns from the sampling of the high-grade concentrations might indicate the feasibility of selective mining, possibly by hand-steel, and a system of back-filling the waste. However, whether the property is considered on a milling or on a shipping basis, any contemplated system of underground work must allow for handling of the entire shear filling, as nowhere may any part of it be considered competent to remain in-place during the course of selective mining.

#### PLACER-GOLD DEPOSITS.

**River Placers Syndicate.** The operation by this syndicate during the past season on the Pend d'Oreille River, 6 miles by road west of Nelway, merits brief description. Under the direction of A. H. W. Crossley, of Nelson, experimental equipment has been used to apply the principle of the air-lift to the problem of raising placer gravel from the bottom of the river. The lift, a small gas-engine, a compressor, receiver, and a short sluice-box are mounted on a raft. The raft is attached by movable blocks to an overhead cable slung across the river, and permits the working of a narrow strip of gravel from bank to bank. A hand-winch on the raft, with one end of the cable attached on shore, provides the motive power.

The lift-pipe is supported over one end of the raft, raised and lowered by block and tackle. The most efficient pipe size has not yet been definitely ascertained; at the time of examination the upper 8 feet were of 9-inch pipe, the lower 6 feet and a 2-foot nozzle on the bottom of 8-inch, but since then the advisability of using one diameter throughout has been given serious consideration. The advantage of having slightly greater diameter on the top section is that it may be slid over the lower section, to provide an easy adjustment for different depths of water. When the nozzle is on the river-floor a lip at the top of the 9-inch section must be above the upper end of the sluice-box. Air at about 20 lb. pressure is let into the pipe from two jets, one at the bottom, the other a few feet higher up, the air from the upper one acting as a booster. The rising column of air and water within the pipe carries sand, gravel, and boulders with it from the river-bottom. Any gold brought up with this material is saved in the sluice-box.

There is no doubt that the lift will function as planned; when examined it was bringing up boulders weighing up to 15 lb. A little fine gold showed on cleaning up the sluice-box, but the weakness of the operation appeared to be the lack of gold in the gravel rather than imperfection of the equipment.

**Nelson Placers, Ltd.** Two placer operations have been conducted on Forty-nine Creek during the past season. Nelson Placers, Limited, represented by H. W. Robertson, of Nelson, holds two adjoining leases, the *Pot Hole* and the *Old Channel*, accessible from the Blewett road by a quarter of a mile of side road. The end of this branch road is 8½ miles from Nelson. H. A. McKen represents the owners of, and applicants for, ten claims and four leases staked above and two leases staked below the *Pot Hole* and *Old Channel* leases.

The ground of the Nelson Placers, Limited, includes much of the area that was hand-worked and hydraulicked between the years 1890 to 1900. During the past season, the operation has been directed principally toward hydraulicking marginal gravel considered too low-grade to be worked by the earlier operators. To this end a high flume was built along the north-east bank of the creek, with intake at a considerable distance up-stream; 8-inch pipe-lines carry the water from penstocks to 4-inch and 2-inch monitors.

At the time of examination low water prevented operation of the larger monitor, which had already stripped a section from the north-east bank, 25 feet wide and 175 feet long. The face of the bank exposed over this length was made up of 20 feet of reworked boulder-clay at the top, underlain by 1 foot to 2 feet of brownish, angular fragments of granite in a medium fine matrix. Below this a 3- to 4-inch layer of gravel, loosely cemented by bluish clay, lying on bed-rock of Nelson granite, appeared to be the most favourable bed for gold occurrence. The 2-inch monitor was being used to prospect the same bank farther down-stream.

During the season an average of four men was employed for seventy-three days, the greater part of this time being spent on construction-work. A total of 11 oz. of gold was produced.

McKen's operation is concentrated on the seventh claim up-stream from Robertson's ground, the *Ebby* claim. Two gas-engines, are used, one for the drag-line and one for a small centrifugal pump. The operation consists of sinking a shaft on the north-east side of the creek. At the time of examination a depth of 28 feet had been attained. No details were forthcoming from the operators concerning the success of this work.

The operations of this company were conducted on Hall Creek, just below **J. D. Mining and Prospecting Co., Ltd.** Keno Creek, 1 mile from the Nelson-Nelway highway at Hall Siding, a station of the Great Northern Railroad. The company, directed by J. D. King, financed by Spokane interests, was organized on the assumption that commercial gold and platinum values are associated with the black sands found on the creek. In addition, a small concentrating plant, consisting of a jig and a 1-ton combination amalgam-barrel ball-mill, was installed in Nelson with the idea of handling not only the black sand product from Hall Creek but any that might be supplied from other placer operations in the district. Several camp buildings were constructed on Hall Creek and up to eighteen men were employed during the season. After many minor difficulties, culminating in the disappearance of King, operations ceased early in September. At the present time, Sidney Sloane, of Spokane, the largest individual shareholder in the company, is attempting to make arrangements with various creditors and other shareholders in order that the programme of development at the property and custom concentration of sands in Nelson may be continued next season.

It is unfortunate that no comprehensive data were obtained either from the workings or from the concentrating plant. The former was not in operation sufficiently long to permit any conclusive estimate of the amount of black sand carried by the ground and the concentrating plant was never used. The only apparent worth of the efforts to date lies in a slight amount of additional geological information obtainable from the pit excavated in the course of testing the equipment, and in data relative to the system used to save the black sand.

The excavation exposed a section comprised of 10 to 15 feet of reworked boulder-clay overlying some 8 feet of bluish boulder-clay and gravel which is succeeded below by 3 feet of hard-pan. Bed-rock, exposed irregularly below the hard-pan, is of the Hall series of conglomerate, sandstone, and carbonaceous shales intruded by later dykes. In the course of the operation it was found that the top section of drift carried only small amounts of fine gold, that the blue clay and the hard-pan below were productive of the black sand. Some coarse gold was reported in the hard-pan on and near bed-rock. No information is available concerning the presence of minerals of the platinum group. The operation was hampered considerably by the large boulders in the two upper strata.

At first, the operators believed that Keno Creek was the source of the black sand and the gold. Toward the end of the season further prospecting suggested that a dry wash on the north side of Hall Creek, nearly opposite Keno Creek, is a more likely possibility.

The equipment used for the recovery of the black sand and the gold is of interest. Water for a 4-inch and a 6-inch monitor is taken from Keno Creek by pipe-line and from Hall Creek by flume. In the sluice-box, 3½ feet wide, the gravel passes first over 75 feet of ordinary pole and rail riffles; next, over an 8-foot length of plank which is succeeded by 6 feet of screen of ¼-inch opening. Tailings are carried on past the screen and return to the creek. The screened product passes to a sluice-box 2 feet wide in which four successive undercurrents are set; the first two are spaced 15 feet apart; the second and third, and third and fourth, 10 feet apart. Beyond the fourth undercurrent the tailings pass over 50 feet of wooden riffles before being rejected as waste. The four undercurrents are worthy of particular attention, in that they provide the principal means of separating grey sand from the black sand. A 2-foot length of 25-mesh screen is set in over the full width of the bottom of the sluice-box above each of four undercurrents, with wooden cross riffles in the intervals between the screens. The box below the screen is 14 inches deep, tapered from 2 feet square at the top to 1 foot square at the bottom. On two opposite sides of the box are cut two horizontal lines of three holes, 1 inch in diameter, 2-inch centres. On each side,

there is one line of holes near the top of the box, and one near the bottom. Four small slides fitting on the outside of the box are each bored with three corresponding holes, so that by moving the slides it is possible to regulate the flow from the capacity of the holes to zero. The closing of the lower three holes and the opening of the upper permits a concentration of black sand in the bottom of the box and the removal of the lighter mixture of grey and black sand from the top. When the feed is heavy in black sand, the openings are reversed and the concentrate is carried through the lower pair of holes. At the bottom of the box there is a drain-hole and plug.

The sand passes from the four undercurrent boxes and is carried by a flume for a few feet and then passes over a 6-foot length of 225-mesh screen. Grey sand is carried over the screen as waste and the finer black sand is collected in bin No. 1 below. When the bin is full a baffle is placed in the flume, ahead of the screen, and the flow of water is diverted from the tailing flume to another, in the floor of which is placed a second 6-foot length of 225-mesh screen over bin No. 2. The product in bin No. 1 is then shovelled into the flume, ahead of the baffle, and the final concentrate is caught in bin No. 2. When handling clean black sand bin No. 1 is not used, a single screening at bin No. 2 provides sufficient concentration.

At the time of examination No. 2 bin contained several tons of sand that was predominantly grey although supposedly ready for shipment to smelter or concentrating plant.

#### SPECIAL REPORTS.

Typewritten copies at 25 cents each are available to those who specially request reports on the following properties:—

Cranbrook Area: Campsall Group, Golden Dream Group.

Sheep Creek Area: Mountaineer Group.

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#### PROGRESS NOTES.

BY

H. C. HUGHES.

#### LODE-GOLD DEPOSITS.

##### VICINITY OF NELSON.

*Athabasca*.—Situated on Morning Mountain. Owned and operated by the Noble Five Mines, Limited; Paul Lincoln, manager; P. Hansen, mine foreman. The property was reopened in September and an 100-horse-power electric motor was installed in October to run the compressor. A crew of six men with four working underground was employed. Development-work consisted of approximately 60 feet of sinking and 60 feet of drifting, 100 feet of raising and 30 feet of crosscutting. The total production amounted to 91 tons which was shipped to Trail. This yielded 97 oz. of gold, 323 oz. of silver, 3,087 lb. of lead, and 5,867 lb. of zinc.

*Alma N.*—Situated on Morning Mountain above the *Granite Poorman*. Owned and operated by the Alman Star Syndicate; W. R. C. Beadon, manager, who purchased the property outright from the owners. During the summer and fall the old workings were resampled and 5,000 feet of diamond-drilling done.

*California*.—Situated on Toad Mountain, near Nelson. Owned by Mrs. Mary Wilson, of Nelson, B.C. This property was operated desultorily by several sets of leasers during the early part of the year. It was then taken over by R. H. Kline and Alex Poelzer, of Nelson, B.C., who installed a small gasoline-driven compressor. A total of 128 tons of ore was shipped to Trail, which yielded 180 oz. gold, 269 oz. silver, 2,585 lb. lead, and 4,560 lb. zinc. The level being worked required considerable repair-work and retimbering near the portal.

*Daylight and Victoria-Jessie*.—Situated on Toad Mountain, adjoining the *Silver King* mine. Operated by the Daylight Gold Mines, Limited, a public company capitalized for

3,000,000 shares, with Mr. W. G. Norrie-Loewenthal as managing director. The mine foreman is Andy McIntyre. An extensive programme was undertaken at this property this year. A new camp, consisting of cook-house, bunk-house, and dry-room of sufficient capacity to accommodate sixteen men, was built near the site of the old Victoria tunnel. The *Silver King* power-line was put in repair by the West Kootenay Power and Light Company. A new compressor-house was built and a 75-horse-power electric motor belt-connected to a 450-cubic-foot Gardner-Denver compressor was installed. Development-work done during the year consisted of 370 feet of surface-trenching on the *Daylight* and *Victoria-Jessie*, 33 feet of drifting and 34 feet of crosscutting by hand-steel on the *Daylight* claim, and 355 feet of drifting and 77 feet of crosscutting on the *Victoria-Jessie* group. In the early part of the year 12 tons of ore was shipped by the Rolick Brothers, which yielded 13 oz. gold and 8 oz. silver.

*Euphrates*.—Situating 8 miles south of Nelson, on the Nelson-Salmo highway. Owned by the General Lee Mining and Milling Company, with Sarkis Terzian as manager. Development-work done during the year consisted of 2,000 feet of underground diamond-drilling. Eight men were employed for this work with four underground.

*Granite-Poorman*.—Situating on Eagle Creek, near Blewett, B.C., about 5 miles west of Nelson. The property is owned by the Livingstone Mining Company, Incorporated; H. R. Smith, manager; and was operated by them until the end of July. A crew of nineteen men with thirteen working underground was employed during that time. An option was then taken by W. R. Green, but little or nothing was done under this agreement. Toward the end of the year a lease was taken on the property by Mr. H. D. Forman, of Nelson, B.C. The tonnage treated yielded 184 oz. of gold and 196 oz. of silver.

*Venango*.—This property adjoins the *Granite-Poorman* on the west. It is owned and operated by D. H. Norcross and associates. During the year 1,500 feet of truck-road was built from the *Granite-Poorman* road, a geophysical survey made, 400 lineal feet of ground-slucing was done, and 60 feet of sinking. A camp was built and a complete small mining plant was installed.

*Gold Crown*.—Situating at the head of Sitkum Creek, adjoining the *Alpine* group. Owned by Mrs. Anna Belle Radcliffe, of Nelson, and operated for a short time during the summer under lease by S. Reese, A. Mona, Rudolph Nelson, and Russell Decaire. Hand-steel only was used and the ore mined was taken from surface cuts and trenches. A total of 39 tons was mined and shipped to Trail. This yielded 36 oz. gold and 28 oz. silver.

*Venus-Juno*.—Situating on Morning Mountain, near Nelson, B.C., owned by R. Heddle, of Nelson. It was operated by leasers during the year, and 392 tons shipped to Trail yielded 407 oz. of gold and 760 oz. of silver.

*Golden Eagle Group*.—Situating on Hall Creek, about 4 miles above the Nelson-Salmo Highway. Owned and operated by the Nelson Gold Mining Syndicate; W. Rozan, manager. Three men were employed during the year and did surface trenching and tunnelling.

#### YMIR CAMP.

*Goodenough*.—Situating on Elise Mountain. Operated by the Ymir Consolidated Gold Mines, Limited; G. G. Sullivan, manager. The mine and mill were operated continuously during the year, an average of thirty-six men being employed with twenty-four underground. The mill was run only one shift per day. Development-work consisted of 667 feet of drifting, 135 feet of crosscutting, 564 feet of raising, and 3,000 feet of diamond-drilling.

*Ymir*.—Situating on the north fork of Wildhorse Creek. This property is owned and operated by the Ymir Consolidated Gold Mines, Limited; G. G. Sullivan, manager. The mine was operated continuously during the first five months of the year, all ore mined being treated in the mill. An average of ten men was employed with seven working underground. During the latter part of the season leasers removed some ore from the surface at the old glory-hole. Development-work consisted of 350 feet of drifting, 48 feet of crosscutting, and 100 feet of raising. From the combined Ymir Consolidated operation a total of 13,978 tons was milled, yielding 5,481 oz. gold, 34,938 oz. silver, 410,274 lb. lead, and 225,710 lb. of zinc.

*Colorado*.—Situating on the North Fork of Wildhorse Creek. Owned and operated by a local syndicate, composed of J. Ferguson, S. Curwin, R. Griffiths, and A. Holstrom, with J. Ferguson as manager. Three men were employed underground. Work was confined to

development, which totalled 125 feet of drifting and 50 feet of raising. A portable gasoline-driven compressor was used.

*Ymir-Wilcox*.—Located on Wildhorse Creek. Owned by the Wilcox Mines, Limited, and operated under lease by the Ymir-Wilcox Development Company; D. H. Norcross, manager. The lease expired this year and was not renewed. This mine was operated only during the open season. Eleven men were employed with six working underground. The ore was treated in a 10-stamp mill on the property and the concentrates shipped to Trail. Development-work consisted of 20 feet of raising and 160 feet of diamond-drilling. A total of 1,395 tons of ore was mined, yielding 112 oz. of gold, 443 oz. of silver, 7,580 lb. of lead, and 4,984 lb. of zinc. In addition amalgam yielded 237 oz. of gold and 256 oz. of silver.

*Ymir-Yankee Girl*.—Situating on Bear Creek, 3 miles from Ymir, B.C. Operated by the Ymir-Yankee Girl Gold Mines, Limited; L. G. Morrell, manager, and E. McQuaid, mine foreman. The mine and mill operated continuously throughout the year. The average number of men employed was 110 with an underground crew of eighty. The problem of recovering ore left in pillars and in stopes in the less accessible parts of the mine has been met by giving this to leasers; an average of sixteen men being engaged in this work for the last seven months of the year. This work was all done by hand-steel. The development-work done included 1,740 feet of drifting, 377 feet of crosscutting, 1,194 feet of raising, 148 feet of sinking, and 1,939 feet of diamond-drilling; 50,930 tons of ore were broken and, of this, 42,717 tons were milled. This last yielded 10,818 oz. of gold, 43,342 oz. of silver, 794,498 lb. of lead, and 556,856 lb. of zinc. The contract miners produced 4,132 tons of ore, which was purchased by the company.

*Ymir Centre Star*.—Situating on Jubilee Mountain, near Ymir. Operated by the Wesko Mines, Ltd.; Harold Lakes, manager; Harry Stevens, mine superintendent; John Sandberg, mill superintendent. The mine and mill were operated continuously until August 21st. During this time an average of forty-three men was employed with twenty-two underground. From this date until October 1st an underground development crew of six men was employed. Then the mine closed down and a watchman was left in charge. Development-work included 223 feet of drifting, 325 feet of crosscutting, 53 feet of raising, and 2,432 feet of diamond-drilling. A total of 15,096 tons of ore was mined, yielding 2,930 oz. of gold, 19,555 oz. of silver, 389,465 lb. of lead, and 186,069 lb. of zinc.

*Tamarac*.—Situating on Elise mountain. Operated by the Balsam Gold Mines, Limited; F. O. Orr, manager, Vancouver, B.C. An average of eight men with six underground was employed for a short time in the early summer. Work was confined to development, which included 40 feet of crosscutting, 107 feet of raising, and 200 feet of diamond-drilling.

*Ymir Commodore*.—Situating on Wildhorse Creek. Operated by the Ymir Commodore Mines Company; J. D. Ferguson, manager. Work was commenced on this property in April and confined to development. Five men were employed with three working underground. A complete mining plant, consisting of 75-horse-power electric motor belt-connected to a 12- by 12-inch single-stage compressor, steel sharpener, and oil furnace, were installed in a new power-house near the portal of the low-level tunnel. Development-work included 200 feet of surface-trenching, 400 feet of drifting, and 300 feet of diamond-drilling.

#### VICINITY OF SALMO.

*Queen*.—Situating on Wulf Creek. Operated by the Sheep Creek Gold Mines, Limited. H. E. Doelle, manager; F. R. Thompson, mine superintendent; Louis Vogel, mill superintendent. The mine and mill operated continuously throughout the year. The average number of men employed was 105, with sixty-three of these underground. An extensive development programme, with the ultimate object of exploring all the favourable belt of quartzites on the Sheep Creek ground, has been successful in showing up three promising veins, in addition to the *Queen*, *Hideaway*, and *Bruhn*. These in order of their occurrence from the shaft are called the "76," "81," and "85" veins. Of these, the "81" to date has been the most promising. The 5 and 7 levels from the *Queen* shaft have been connected by raises to the 2-level adit on the *Hideaway* vein. Some development was also done on the *Midnight* vein across Wulf Creek. All development waste is being back-filled into old stopes. Development-work included 9,612 feet of drifting and crosscutting, 779 feet of raising, and 608 feet of diamond-drilling. The tonnage mined and milled was 53,728 tons, from which bullion yielding 25,862 oz. of gold and 9,822 oz. of silver was obtained.

*Kootenay Belle*.—Situating on Sheep Creek. Operated by the Kootenay Belle Gold Mines, Limited; Vere McDowall, manager; J. Tonkin, mine foreman; and Neil Munro, mill superintendent. The mine and mill operated continuously throughout the year, with an average crew of 120 men, eighty of which were employed underground. Development on the No. 4 level adit-crosscut was pushed during the year. A raise on the "A" vein to the 3 level has greatly improved ventilation in the lower parts of the mine. Preparations are being made to sink from the 4 level not far from the intersection of the crosscut and the "A" vein. Surface-trenching on the *Dixie* claim, across Sheep Creek, disclosed the presence of commercial widths and values in a vein thought to be the extension of one of those found on the *Gold Belt*. A certain amount of preliminary sinking and drifting with hand-steel on the surface showing gave sufficiently encouraging results to warrant the commencing of a crosscut to intersect this vein at depth. This was commenced at the same elevation as the No. 4 adit-level. Development-work on the *Dixie* claim included 200 feet of surface-trenching, 51 feet of sinking, and 26 feet of drifting. Development-work in the main part of the mine included 2,375 feet of drifting, 381 feet of crosscutting, 519 feet of raising, and 1,405 feet of diamond-drilling. The tonnage mined and milled was 48,238 tons, from which bullion yielding 19,421 oz. of gold and 6,307 oz. of silver was obtained.

*Gold Belt*.—Situating on Sheep Creek and operated by the Gold Belt Mining Company, Limited, with H. E. Doelle as manager, Mike O'Donnell as mine superintendent, and O. Bellavance as mill superintendent. Development-work with a crew of forty men, twenty-one of which were employed underground, was in progress until June, when the construction of an 150-ton mill was commenced. This necessitated increasing the surface crew to about sixty men. The mill was put in operation near the end of October, after which a total of ninety men was employed with about forty-five working underground. Development-work included a raise from the 2,100 to the 1,580 level, the completion of which established good natural ventilation in the mine. The total development footage was as follows: Drifting, 4,200 feet; crosscutting, 782 feet; and raising, 475 feet. A total of 9,844 tons of ore was mined and milled and the precipitate treated at the *Queen* mine. The bullion yielded 4,437 oz. of gold and 1,724 oz. of silver.

*Reno*.—Situating on Fawn Creek, and operated by the Reno Gold Mines, Limited. W. S. Ellis, manager; A. K. Olsen, mine foreman; and Albert Norcross, mill superintendent. The mine and mill were operated continuously throughout the year. An average crew of 120 men was employed with eighty working underground. Owing to the fact that development at depth on the *Reno* vein and on parallel veins to the north has not produced commercial ore the mill will be closed down when the available reserves are exhausted, possibly about the middle of February. An aggressive development campaign, commenced last summer, will be carried on after the conclusion of milling operations. A geological and geophysical survey, surface-trenching, and diamond-drilling programme was carried out last summer. Present development consists of underground work on the *Bluestone* vein in the Fawn Basin and the driving of the 4,900 crosscut. The portal of the 4,900 crosscut is just above the mill. It has as its objective the downward extension of the *Motherlode* and *Nugget* veins about 600 feet below the No. 5 level on the *Motherlode*. The possibility of exploring the entire favourable belt of quartzites on the *Reno* ground for parallel veins, from this tunnel, is being kept in mind. Development-work for the year included 574 feet of drifting on the *Bluestone* vein; 1,014 feet of crosscutting in the 4,900 crosscut; 13,390 feet of diamond-drilling as well as 2,385 feet of drifting; 300 feet of crosscutting, 505 feet of raising, and 38 feet of stations cut, and 218 feet of sinking, in the *Reno* mine proper. In addition, 1,700 feet of surface-trenching was completed. A total of 49,158 tons of ore was mined and milled, and bullion produced which yielded 19,897 oz. of gold and 6,987 oz. of silver.

*Clubine-Comstock*.—Situating on Boulder Creek, about 4 miles north of Salmo. Operated by the Clubine-Comstock Gold Mines, Limited. L. R. Clubine, manager. The mine was operated continuously throughout the year, twelve to fifteen men being employed with ten underground. Both compressed air and hand-steel were used. A total of 851 tons of ore was mined and shipped to the Trail smelter, yielding 649 oz. of gold and 80 oz. of silver.

*Kootenay Ore Hill*.—Located on Mount Vernon, about 3 miles from the *Queen* mine. This property is owned by the Kootenay Ore Hill Gold Mines, Limited. It was operated under lease by H. D. Forman, in conjunction with the adjoining *Summit* group, from

February until May. The ore mined was treated in the small 10-ton mill on the property and concentrates shipped to Trail. No development-work was done. An average of twelve men was employed with five underground. The tonnage mined yielded 1,019 oz. of gold, 1,026 oz. of silver, 45,848 lb. of lead, and 45,168 lb. of zinc.

*Nugget.*—This property, which adjoins the *Motherlode*, is controlled by the Reno Gold Mines, Limited. It was operated for several months of the year by two leasers, who mined 350 tons of ore which yielded 232 oz. of gold and 126 oz. of silver. The ore was shipped crude to Trail.

#### ERIE CREEK AREA.

*Arlington.*—Situated on Keystone Mountain. Owned by the Relief-Arlington Mines, Limited, and operated under lease by Roger Oscarson, of Spokane, Wash. Nine men were employed continuously throughout the year, six working underground. All work was done by hand-steel and the ore shipped crude to Trail. Development-work included 693 feet of drifting and crosscutting, and reopening of an old working for a distance of 90 feet. In addition, there was a total of 10,375 feet of new road built. A total of 972 tons of ore was mined, which yielded 1,345 oz. of gold, 2,940 oz. of silver, 51,394 lb. of lead, and 49,471 lb. of zinc.

*Harriet.*—Situated on the East Fork of Erie Creek, about 3 miles from the road to the *Second Relief* mine. Owned by E. Ballanger, of Salmo. Four men were employed underground for the greater part of the year. All work was done by hand and the ore shipped to Trail. A total of 40 tons yielded 145 oz. of gold and 18 oz. silver.

*Second Relief.*—Situated on Erie Creek, about 13 miles by road from Erie, B.C. Operated by the Relief-Arlington Mines, Limited. S. M. Manning, manager; Walter Tattrie, mine foreman; and Gus Kvist, mill superintendent. The mine and mill operated continuously throughout the year, an average of 100 men being employed with fifty underground. During the year the main shaft was sunk another level and considerable work done on the showings on the west side of Erie Creek. Development-work on the main vein included 245 feet of surface-trenching, 1,743 feet of drifting, 655 feet of crosscutting, 477 feet of raising, 189 feet of sinking, and 353 feet of diamond-drilling. On the showings to the west of the creek 1,406 feet of trenching was done by hand and 4,290 feet of stripping was done by bulldozer, as well as 1,689 feet of drifting, 176 feet of crosscutting, and 766 feet of diamond-drilling. A private townsite, on which about twenty dwellings were built last year, is located about a mile below the mine. The total ore mined and milled amounted to 45,918 tons, which yielded bullion carrying 12,229 oz. of gold and 2,651 oz. of silver. In addition refinery slag and amalgam yielded 115 oz. of gold and 1,082 oz. of silver.

#### NELWAY AREA.

*Bunker Hill.*—Situated on 16-Mile Creek, about 7 miles east of Nelway. Operated under lease by the Westmont Mines, Incorporated; H. R. Stayton, of Trail, B.C., manager. Operations employing nine men with six underground were commenced in October. A total of 74 tons of ore was mined and shipped to Trail, which yielded 5 oz. of gold and 76 oz. of silver.

#### ROSEBUD LAKE AREA.\*

*Lone Silver.*—Operated during the past season by the Lone Silver Gold Mines, Limited, of Vancouver, haphazard development added little information of apparent value to that already published in the Minister of Mines Report for 1936.

#### ARROW LAKES AREA.

*Paladora (Meadowview).*—Situated 30 miles east of Edgewood, on the Vernon-Edgewood Road. Operated under lease by S. P. Pond, of Nelson, B.C. Four men were employed underground from July to October. Development-work consisted of 20 feet of crosscutting. A total of 50 tons of ore was mined and shipped to Trail, which yielded 19 oz. of gold and 93 oz. of silver.

*Big Cayuse.*—Situated on Cayuse Creek, about 9 miles from Deer Park. Owned and operated by Joe Gallo and partners. Two men were employed on surface and underground work. This included the building of  $2\frac{3}{4}$  miles of foot-trail, a cabin, and 30 feet of drifting underground.

\* By R. J. Maconachie.

## VICINITY OF RETALLACK.

*Highland Surprise*.—Situated on Lyle Creek, about 3 miles from Retallack. Operated by Joe Gallo, of Nelson, who undertook an active development campaign. A good raw-hide trail was built from the end of the road to the camp, a distance of about three-quarters of a mile, the bunk-house was reconstructed to accommodate twelve to fifteen men, and a cook-house and dry-house built. A crew ranging from seven men with three underground in August to fifteen men with six underground in November was employed; supplies were hauled in the late fall and preparations made for continuing the operation all winter. Development-work included 200 feet of surface-trenching, 220 feet of drifting, and 80 feet of crosscutting. A total of 295 tons of ore was mined and shipped to Trail, which yielded 278 oz. of gold and 191 oz. of silver.

*Eureka*.—Situated about 3 miles east of the *Highland Surprise* and operated for a short time by Roy Wallace, of Walla Walla, Wash. About 3 miles of a truck-road, connecting this property with the *Highland Surprise* road, was built last summer. A total of 15 tons of ore was mined, yielding 10 oz. of gold and 4 oz. of silver.

## ROSSLAND-TRAIL AREA.

*Properties of the Consolidated Mining and Smelting Co. of Canada, Ltd.*—The *War Eagle*, *Le Roi*, *Josie*, *Centre Star*, and *Columbia* and *Kootenay* were operated by lessees under arrangements made by the Company in 1933. In all there were twenty-four separate leases in which a total of sixty-four men were engaged in mining ore in surface and underground operations. The work was carried on under the supervision of J. K. Cram. The total tonnage shipped to the Trail smelter was 9,633 tons; this yielded 6,807 oz. of gold and 7,994 oz. of silver.

*Velvet*.—Situated on Sophie Mountain, on the Cascade Highway, 13 miles east of Rossland. Operated by the Velgo Mining, Incorporated, of Spokane; H. W. Seamon, manager. A development programme which entailed raising from the No. 8 level adit-crosscut to the old No. 6 level and thereby dewatering the workings from the shaft for examination and sampling was completed. Late in the year a lease was taken on the property by R. Bielli and associates of Rossland, who shipped a small tonnage to Trail.

*I.X.L.*—Situated on Mount Roberts. Operated by the I.X.L. lessors, of Rossland, B.C., K. Jorgensen, manager. Six men with two working underground were employed throughout the year. A total of 150 tons shipped to the Trail smelter yielded 393 oz. of gold and 92 oz. of silver.

*Midnight*.—Situated on Mount Roberts. Owned by Mrs. Laura Gilmour, of Rossland, B.C., and operated under lease by D. A. Lins. From three to five men, with two to four underground, were engaged in this work throughout the year. A total of 265 tons of ore was mined and shipped to the Trail smelter, which yielded 991 oz. of gold and 254 oz. of silver.

*O.K.*—Located on Mount Roberts. Operated under lease by L. and C. Penny for a short time early in the year. A total of 39 tons of ore was mined and shipped to the Trail smelter, which yielded 18 oz. of gold and 22 oz. of silver.

*Gold Drip*.—Located on Mount Roberts. Owned by Mrs. M. D. McKinnon, of Beverley Hills, California, and operated under lease by C. A. Ritchie and partner for the first half of the year. A total of 19 tons was mined and shipped to the Trail smelter, which yielded 3 oz. of gold and 6 oz. of silver.

*Georgia Group and Mascot*.—Situated on Monte Cristo, near Rossland. Operated by the Gold Cup Mining Company, under the direction of R. W. Haggen, of Rossland. Nine men, three underground, were employed throughout the year in a development programme which included 800 feet of surface-trenching, 180 feet of drifting, 180 feet of crosscutting, and 1,700 feet of diamond-drilling. In addition a geophysical survey was made of the property.

## BAYONNE AREA.

*Bayonne*.—Situated on Summit Creek, 23 miles by road from Tye Siding. Operated by the Bayonne Consolidated Mines, Limited; head office, Vancouver, B.C.; P. N. Pitcher, mine

manager; Jack Ratledge, mine foreman; and O. Bellavance, mill superintendent. The mine and mill operated continuously throughout the year with an average crew of eighty-one men, forty-three of whom were employed underground. According to the company officials, development-work has failed to disclose commercial ore and in their opinion, no further work is justified. Present ore reserves will be exhausted about the end of the year when the mine and mill will be closed. Development-work included 1,719 feet of drifting and crosscutting, 642 feet of raising, and 2,847 feet of diamond-drilling. A total of 19,298 tons of ore was mined and milled, from which bullion yielding 10,289 oz. of gold and 35,638 oz. of silver was recovered.

*Spokane Group.*—Situating on Wall Mountain, about 18 miles from Tye. Owned and operated by R. M. and K. K. Laib, of Bayonne, B.C. A small amount of work was done this year by the owners. A total of 79 tons of ore shipped to the Trail smelter yielded 61 oz. of gold, 1,051 oz. of silver, and 28,299 lb. of lead.

*Virginia.*—Situating on the Bayonne Road, near Arkansas Lake. Owned by J. Mulholland and operated under lease by D. Masciangelo and three partners. Development-work included 200 feet of drifting. A total of 20 tons of ore was mined by hand-steel and shipped to Trail. This yielded 10 oz. of gold and 16 oz. of silver.

#### SPRINGER CREEK (NEAR SLOCAN CITY).

*Lakeview.*—Situating on the Springer Creek road, about 2 miles from Slocan City. Owned by P. Johnson and operated under lease by Mike Negovan and R. Bassic. Ninety-six and a quarter tons of ore was mined by hand-steel and shipped to the Trail smelter. This yielded 26 oz. of gold and 517 oz. of silver.

### SILVER-GOLD DEPOSITS.

#### SLOCAN LAKE AREA.

*Molly Hughes.*—Situating on the shore of Slocan Lake, about 1 mile above New Denver. Operated by the Slocan Idaho Mines Corporation, Spokane, Washington, under the direction of O. C. Born. A total of eleven men with six underground was employed for the greater part of the year. Development included 142 feet of drifting and 40 feet of crosscutting, all on the No. 4 level. A total of 137 tons of ore was mined and shipped to Trail, which yielded 57 oz. of gold, 14,165 oz. of silver, 5,236 lb. of lead, and 5,753 lb. of zinc.

*McAllister.*—Situating on London Mountain, about 3 miles from Three Forks. Owned by the Slocan Silver Mines, Limited, and operated under lease by George Allen. Ten men, with six underground, were employed during the greater part of the year. Compressed air developed from water-power was used to mine ore. A total of 1,534 tons was shipped to Trail, which yielded 13 oz. of gold and 38,743 oz. of silver.

### GOLD-SILVER-LEAD-ZINC DEPOSITS.

#### YMIR CAMP.

*Howard.*—Situating on the South Fork of Porcupine Creek. Operated by the Durango Mines, Limited, Vancouver. Major A. W. Davis, who resigned as manager, was succeeded by A. M. Richmond; A. McIntyre was mine foreman, and Wm. B. Donohue mill superintendent. An average of sixty-five men, with thirty-two underground and seven in the mill, was employed from the beginning of the year until November 5th, when the property was closed down. According to the management the development-work undertaken was not successful in finding commercial ore and the mine reverted to the original vendor, Mr. J. F. Duthie, of Seattle. The mill and greater part of the 5-mile tram remain the property of the Durango Mines, Limited. Development-work included 115 feet of drifting, 266 feet of crosscutting, 599 feet of raising, and 2,621 feet of diamond-drilling. In addition a geophysical survey was made on the property.

*Porcupine Group.*—Situating on Porcupine Creek, about 3 miles from Ymir. Owned by E. Haukedahl and associates, of Ymir, B.C., and optioned to Ernest H. Carlson, Spokane, Washington. A small blacksmith-shop and 275 feet of drifting was done during the year.

## VICINITY OF SALMO.

*Emerald.*—Situated on Iron Mountain, about 4 miles from Sheep Creek. Operated by the Iron Mountain, Limited; head office, San Francisco, California; Harold Lakes, of Nelson, manager. A programme of surface-stripping by bulldozer in which 6,234 lineal feet of work was done was followed by underground work with hand-steel. About 35 feet of tunnel was driven; three men were employed.

## SILVER-LEAD DEPOSITS.

## AINSWORTH CAMP.

*Revenue.*—Situated near the head of Sturgis Creek, a tributary of Keen Creek. Owned by the Sturgis Creek Mines, Limited, of Calgary, Alta., and operated under lease by H. E. Singel and one man. The old workings are badly caved and require considerable repair-work and retimbering before underground work can be done. A total of 38 tons of ore was shipped, chiefly from an old dump, which yielded 1,796 oz. of silver, 10,092 lb. of lead, and 3,956 lb. of zinc.

*Utica.*—Located on Paddy's Peak. Owned by the Utica Mines, Limited, and operated for about six weeks on a contract basis by R. Rowe, of Nelson, B.C. Five men, three underground, were employed during that time. The stoping-ground is some 2,400 feet from the portal of the low-level adit and a fairly efficient mechanical ventilation system has been installed. Hydro and Diesel power are used.

*Caledonia.*—George McCready operated this property for thirteen days during the year.

## SANDON-THREE FORKS AREA.

*Monitor.*—Situated on Carpenter Creek, about 3 miles from Three Forks. Operated by the Slocan Monitor Silver Mines, Limited; Harold Lakes, manager; W. Postelwaite, mine foreman. A bunk-house and cook-house, to accommodate ten men, and an office were built, and a portable gasoline-driven compressor installed. During the first half of the year fifteen men were employed, ten of these working underground. The ground is very soft and requires close timbering. Development-work included 816 feet of drifting and crosscutting, 133 feet of raising, and 336 feet of diamond-drilling. A total of 46 tons of ore was mined and shipped to Trail, which yielded 4,646 oz. of silver and 29,041 lb. of lead.

*Silver Ridge.*—Situated on the Silver Ridge road, near Sandon. Operated under lease by Clarence Cunningham, who employed two men underground. A total of 21 tons of ore was mined by hand-steel, which yielded 1,850 oz. of silver and 21,373 lb. of lead.

*Victor.*—Situated about 3 miles from Sandon. Owned by Mrs. D. Petty, of Nelson, and operated by E. Doney and son. A total of 78 tons of ore, mined and shipped to Trail, yielded 17,472 oz. of silver, 57,261 lb. of lead, and 27,207 lb. of zinc.

## SLOCAN LAKE AREA.

*Bosun.*—Situated on Slocan Lake, near New Denver. Owned by C. J. Campbell and operated under lease by Louis Vigna and Mike Zatoni, with Thomas Avison, of New Denver, in charge. A total of 92 tons of ore was mined and shipped to Trail from the Lake level tunnel.

*Standard.*—Situated on Emily Creek, about 2 miles from Silverton. Controlled and operated by the Western Exploration Company, Limited; A. M. Ham, manager; and Charles Hanna, mine foreman. An active development campaign was carried on until August, when the mine was closed down, awaiting a period of better metal prices. According to the management a substantial tonnage of new ore was blocked out between the No. 7-C and No. 7-B levels. The number of men employed varied between thirty-two, with fifteen underground in the early part of the year, to fifteen, with eight underground, during the latter part of the development programme. This programme included the cleaning-out and retimbering, where necessary to make safe and accessible, some 4,520 feet of old workings, as well as new work consisting of 687 feet of drifting, 96 feet of crosscutting, 202 feet of raising, and 2,200 feet of diamond-drilling. Included in the repair-work was the retimbering of the main raise from the No. 6 to the No. 5 level and reconditioning 2,600 feet of the No. 5 level to provide ventilation and a second exit from the mine. The remainder of the work, old and new,

was done on Nos. 6, 7-C, and 7-B levels. Mechanical ventilation was found to be necessary and was installed on No. 6 level. In addition a new truck-road was built to connect the bins at the No. 7-C portal to the main *Standard* road.

*Hewitt*.—Situated on Red Mountain, near Silverton, B.C. Owned by the Galena Farm Consolidated Mines, Limited, and operated under lease by George Mathews, Jack Harding, and George Hegberg, all of Silverton, B.C. A total of 147 tons of ore was mined and shipped to Trail, which yielded 13,587 oz. of silver, 50,636 lb. of lead, and 34,446 lb. of zinc.

*Capella*.—Situated on Goat Mountain, near New Denver. Owned by the Wells estate and operated under lease by Emile Bettle and Charles Stedile. A raw-hide trail was built from the mine to the road near New Denver, a distance of about 1 mile. A total of 9 tons of ore was mined and shipped to Trail, which yielded 2,401 oz. of silver, 305 lb. of lead, and 100 lb. of zinc.

#### LARDEAU AREA.

*True Fissure*.—Situated on Great Northern Mountain, about 3½ miles by road from Ferguson. Operated by the New True Fissure Mining and Milling Company, Limited; head office, Canada Trust Building, Windsor, Ontario. K. G. Gillie, manager. Operations were suspended until November, when a contract to do 1,500 feet of drifting with additional crosscutting on the No. 3 level was let to the Interior Construction Company, of Penticton, B.C.

#### VICINITY OF ALBERT CANYON.

*Regal Silver*.—Situated on Clabon Creek, about 11 miles from Albert Canyon. Operated by A. S. McCullough, Vancouver, B.C., and associates. E. C. Lansing, manager. The mine operated during June, July, and August, during which time twenty men were employed with eleven underground. Some experimental work toward making a marketable tungsten concentrate was done in the small underground mill of about 25 tons daily capacity.

#### NELWAY AREA.

*Reeves-McDonald*.—Situated on the Pend d'Oreille River, about 5 miles from Nelway. Operated by the Reeves-McDonald Mines, Limited. B. N. Murphy, mine manager. During the first four months of the year development-work employing fourteen men, six of whom worked underground, was carried on in the River tunnel, and 270 feet of drifting and 62 feet of crosscutting accomplished. During the next three months, 1,297 feet of diamond-drilling was done from various points near the face of this tunnel. The River tunnel is now over 1 mile long without a second opening to the surface and the present ventilation equipment is taxed to capacity.

### SILVER-LEAD-ZINC DEPOSITS.

BY

H. E. MIARD.

#### CRANBROOK AREA.

*Sullivan Mine*.—Owned and operated by the Consolidated Mining and Smelting Company of Canada, Limited. General superintendent, William Lindsay; assistant mine superintendents, Jos. R. Giegerich and L. D. Thompson; mill superintendent, H. R. Banks. The enviable record established by this gigantic operation, in several respects, was maintained during the year. The output averaged 7,600 tons per working day and the development-work done comprised 3,718 feet of drifting, 721 feet of crosscutting, 5,047 feet of raising, and 58 feet of sinking. Filling operations were resumed in the spring and were carried on as long as the weather remained favourable, 436,420 cubic yards of gravel being placed in stopes in that time. It is intended to start this work again early in the current year, possibly with some improvements on the present method based on the experience gained.

Exploration of the ground surrounding the present workings continued and an aggregate length of 10,615 feet of diamond-drilling was done in the course of the year.

The number of men on the pay-roll varied within limits in the course of the year, the average being 552 underground and 555 on the surface (264 of the latter representing those employed at the concentrator), or a total of 1,107.

Ventilation and dust-control have very rightly been considered of sufficient importance to be placed under the administration of a special department, in charge of an engineer who devotes all his time to the study of these vital matters. Generally, the ventilation is ample and well managed. In the 3,901 shaft the circulation still depends upon auxiliary fans and sheet-metal pipes, an installation which it has been found advisable to reinforce lately, but the intended immediate driving of a raise, from the 3,350 at the 3,900 level will place this section, at least in part, into the main ventilating circuit.

*St. Eugene Extension.*—Owned by the St. Eugene Extension Mines, Limited. Little was done on this property, situated on Moyie Lake, beyond a thorough mineralogical and geological examination after the dewatering of the workings was completed early in the year. All activities were suspended at the beginning of March, but it is understood that exploratory and development work is to be resumed there again shortly.

#### PLACER-GOLD DEPOSITS.

##### PEND D'OREILLE RIVER.

Several small operations conducted by one or two men were active along the river throughout the season.

##### BIG BEND AREA, NORTH OF REVELSTOKE.

*Hail Columbia Placer.*—Situated on the Big Bend highway, 62 miles north of Revelstoke. Owned and operated by Alex McCrae and sons, of Revelstoke. Ground-sluicing by booming methods is practised, as the supply of water is limited. An ingenious winch, operated by a water-wheel, is used for removing large boulders.

*Camp Creek Placers.*—Situated on the Big Bend highway, 59 miles north of Revelstoke. Operated by the Camp Creek Placers, Limited. K. G. McKenzie, manager. A crew of six men was employed during the placer season. Gravel was moved through the sluices by two 3½-inch monitors for which there was ample water available. A new type of rubber riffle was used in the sluices and claimed by the management to be very satisfactory.

##### LEMON CREEK AREA.

*Lemon Creek Lease.*—Situated on Lemon Creek, about half a mile above the Slocan highway. Five partners—Clarence Bond, C. Strike, J. Ingram, George Boder, and Ole Gullickson—operated this lease for a short time during the summer. The many large boulders encountered made the work very difficult and unprofitable. A total of 10 oz. of gold was produced.

##### CRANBROOK AREA.

*Inca Placers.*—On the Moyie River. Operated by the Consolidated Mining and Smelting Company of Canada, Limited. An average crew of eleven men was employed from April 15th to November 9th under the direction of W. F. Marleau. A total of 60,000 cubic yards of gravel was handled in sluices with the help of a power-shovel, and 474 oz. of gold was recovered.

#### NON-METALLIC DEPOSITS.

##### VICINITY OF NELSON.

*Kootenay Lake Limestone Quarry.*—This property, owned and operated by the Consolidated Mining and Smelting Company of Canada, Limited, was closed down in April following a fire which destroyed the blacksmith-shop and compressor-house.

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