

521049

Note

MAR - 6 1985

The colors for the Iva Fern map are not available now as Dad has the original with him & he is away.

A dyke of similar composition to the main one at the Clubine Comstock was found almost 2 miles away heading towards the Clubine. All this is within the property Jack

IVA FERN

TRACED FROM M.R. MAP - 8T300

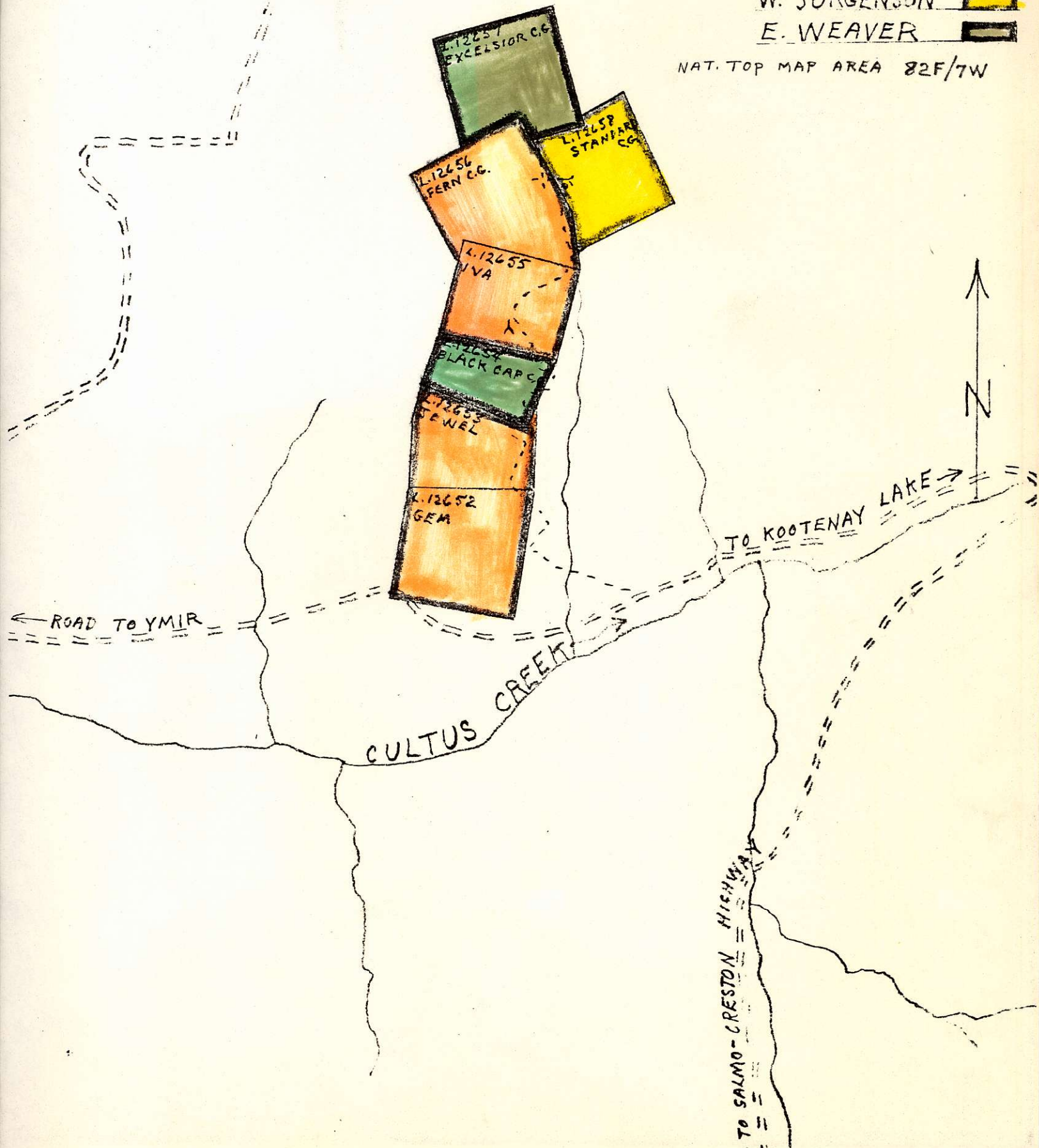
SCALE - 1 INCH = 1500 FEET

E. + J. DENNY

W. JORGENSEN

E. WEAVER

NAT. TOP MAP AREA 82F/7W



The Iva Fern is presently held by the following: - Mrs. E. Weaver, 1315 Robertson Ave., Nelson owns the Excelsior L.12657 C.G. and the Black Cap L.12654 C.G. W.B. Jorgenson owns the Standard L.12658 C.G. and Eric Denny and Jack Denny own the Fern L.12656 C.G. and the three reverted Crown grants Iva L.12655, Gem L.12652, Jewel L.12653 or a total of 7 claims altogether.

No work of any importance has been done on these claims since 1930 at which time they were accessible from Tye on Kootenay Lake by 8 miles of trail only. Until 1931 when the railway between Procter and Kootenay Landing was completed the only connection that Tye had with the rest of the world was by paddle wheel steamer or smaller boats on the lake. Today a road from Ymir goes up Porcupine Creek and down Cultus Creek to Tye and passes beside the south boundary of the Gem (the most southerly and lowest claim of the group. A branch road goes within a mile of the three upper claims where most of the development has taken place. Surface rights to the ground are held by Darkwoods Forestry Ltd. Distance from the highway just south of Ymir is approximately 18 miles by good logging road. The claims are shown on Nat. Top. Map 82F/7W. They extend from 4100 ft. up to 6400 ft. on the north side of Cultus Creek so they face south and should be bare of snow to the top of the hill by June 15. Parts of the old trail are still in fair shape but the old claims at the mine are beyond repair. Both portals are caved and many of the open cuts are partially sloughed in. No shipments were ever made as transportation was a severe problem at the time the claims were worked. The Great Depression was in full swing when work ceased.

1930's
or 1940's

The only government geological mapping of this area was by H.M.A. Rice from 1936 to 1938 and published in 1940 (reprinted in 1956) and accompanying Memoir 228 Nelson Map-Area-East Half - at a scale of 1 inch equals 4 miles. Rice places the Iva Fern in the Horse Thief Creek Series which consists of "green, argillaceous quartzite; blue-grey limestone, arkose, pebble conglomerate." Granitic rocks outcrop to the east and lamprophyre dykes accompany the mineralization in places. Some of the ore is brecciated. The old reports in the Annual Reports of the Minister of Mines appear accurate as far as the writer has been able to determine. These reports together with the copy of the Miners Western underground plans (compiled from C.M. & S. plans of 1920, 1929 & 1930) give a good idea of the values, widths and types of mineralization encountered in the surface workings and underground. Apparently there has been no stopping done. This plan shows the main drift as having continuous mineralization of tunnel width for 600 ft. and is open at both ends with several open cuts on surface proving the upward continuation of the ore.

The 500 ton pile of sorted ore is still there together with small piles at many of the open cuts and some lower grade ore scattered through the various dumps.

Similar mineralization shows on the southside of Cultus Creek and near Low Pass. The writer staked approximately 130 claims along the trend of this mineralization for a Vancouver company about 1969 but they ran out of funds before accomplishing anything. There is practically no outcrop in the entire area so there is a possibility of a considerable tonnage of ore. Detailed mapping together with soil sampling and followed by the most suitable geophysical methods over a grid could very likely provide some very worthwhile targets for diamond drilling and to confirm obvious drilling targets already in existence.

For further information, a look at some samples, and arrangements for a tour of the property please contact Eric Denny, R.R. #1, Nelson, pn. 325-4480 or Jack Denny, ph. 352-2378 who each have a 4 wheel drive truck. The fastest way to see it is by helicopter. It is just over 20 miles by air from Nelson. The main dump was a good heliport a few years ago, and one can also land in a logged area 3/4 of a mile to the north.

Resident Engineer → 1917-page 167 - This group, consisting of seven claims, is situated on the north side of Cultus Creek, at a distance of about seven miles from Kootenay lake. The property is owned by J. Mullholland, of Sirdar, B. C. In the vicinity of the

workings the hillside has a fairly uniform slope which is covered with overburden, and on which there is ample timber for all requirements. The workings are situated near the top of the hill at an elevation of 5,735 feet, or 1,870 feet above Cultus creek, where there is abundant water-power available.

The formation is of sedimentary origin, composed of shales and schists, and is cut by intrusive dykes which are said to run parallel to the formation, but the short time that the writer had on the property did not allow a surface reconnaissance to be made in order to trace the geology or to identify the various surface showings of ore with the vein system.

The work done consisted of a number of open-cuts, which in every case showed a width of ore from 1 to 6 feet, but on account of the heavy covering of overburden it was difficult to definitely determine the nature of the walls and the dip and strike of the strata, which latter, as far as could be ascertained, was approximately north and south. However, with only the cursory examination that was made, it was quite evident that the surface showings and general conditions were encouraging and fully warranted the further exploitation of the property.

At the lowest exposure the ore consisted of a mixture of galena, a little chalcopryite, and iron pyrites occurring in oxidized ledge-matter; at the upper workings the ore was principally galena. A sample taken at the lowest showing, across a width of 6 feet, gave the following returns: Gold, trace; silver, 3.50 oz.; lead, 5 per cent. Farther up the hill a sample across a width of 2.5 feet gave: Gold, 0.02 oz.; silver, 3.40 oz.; lead, 22 per cent.; while at a short distance from this, on the summit of the hill, a sample across a width of 2 feet gave: Gold, trace; silver, 1.80 oz.; lead, 10 per cent.

During the summer development-work was carried on, and according to recent reports the property has now been bonded by the Consolidated Mining and Smelting Company.

In connection with the occurrence of sedimentary rocks in this section, it may be of interest to note that this belt of schists and slates, bounded by the granite formation on the east and west, extends southward across Cultus creek and apparently forms the saddle of the Low Pass divide; and, further, it has been reported that the same character of ore has been found in the vicinity of the Low pass on a group of claims owned by C. O. Woodward, R. J. Elliot, and others, of Nelson.

1918-page 198 - This group situated on Cultus Creek, seven miles from Kootenay Lake, was staked by J. W. Mulholland. It consists of fifteen claims. Considerable stripping was done by the locators, discovering large bodies of silver-lead ore, and a bond was taken on November 10th, 1917, by the Consolidated Mining and Smelting Co. of Trail, for a considerable sum. This company has done several thousand feet of stripping with good results and is at present driving a long crosscut tunnel to tap the veins at depth. It gives promise of being one of our large shippers. Mr. Mulholland has other claims in the vicinity that show good values.

By A.G. Langley.

1919 -page 135 - This property, consisting of seven Crown-granted claims, is situated on Cultus Creek at an approximate distance of seven miles from Kootenay Lake. There is a good trail from the lake-shore to the mine, and the camp can be reached

comfortably either on foot or horseback in about three hours. The claims are staked in a northerly direction along the strike of the veins from the valley of Cultus creek to the summit of the rounded ridge lying between the North and South forks of the creek. J. Mulholland, the original owner, bonded the property to the Consolidated Mining and Smelting Company in 1918, under which bond he accepted a contract to drive a crosscut tunnel and altogether do some 700 or 800 feet of underground work. The mine cabins consist of a bunk-house and cook-house with accommodation for about eight men; there is also a small blacksmith-shop at the tunnel and another cabin on the creek at the foot of the mountain trail which is used as a storehouse.

The surface of the mountain in the vicinity of the workings is covered with a depth of from 3 to 6 feet of overburden and few rock-exposures are visible. The formation in which the ore has been found, consisting of steeply tilted and highly metamorphosed rocks of sedimentary origin, has been intruded in the vicinity of the veins by a basic lamprophyre dyke, which may be genetically connected with the ore-deposits.

The surface work has so far been confined to an area near the summit of the ridge, and although the vein is said to have been traced down the hill, little work has been done at lower altitudes. Long shallow trenches dug across the strike of the formation disclose the rock in place, which near the surface has been subjected to highly oxidizing agencies; the dyke-rock is decomposed and there are wide zones of broken material stained with oxide of iron. Besides oxidized and decomposed ledge material, small quartz stringers carrying ore are the only indications of the vein or veins in these trenches.

Near the summit of the ridge, at an elevation of about 6,300 feet, a 10-foot shaft has been sunk on the No. 2 vein. At this point there is a wide exposure of oxidized and decomposed material in which ore occurs in streaks and bunches. On the foot-wall side at the bottom of the shaft the ore shows a width of 2 feet, but the shattered condition of the enclosing rocks is not convincing as to its continuity. The vein conforms to the stratification of the formation, the dip being almost vertical and strike north and south. From this shaft 3 or 4 tons of ore has been extracted, a grab sample of which ran: Gold, 0.04 oz.; silver, 4.2 oz.; copper, 3.5 per cent.; lead, 26 per cent.; zinc, 9 per cent.

Farther down the hill and in an easterly direction from the No. 2 vein a 20-foot shaft has been sunk on what is known as the No. 1 vein. At the top of this shaft the vein shows a width of about 6 feet, but the fact that the shaft was caved and partly filled prevented an examination of the bottom. A grab-sample of a few tons of ore extracted from this shaft ran: Gold, 0.02 oz.; silver, 5.2 oz.; lead, 35 per cent.; zinc, 4 per cent.

It is interesting to note the difference between the ore from these two veins. That from the No. 2 vein consists of a fairly coarse-grained galena, with which is associated chalcopryite and zinc-blende. The ore from the No. 1 vein is a steel-grain galena and carries no copper. The gangue material in both cases is composed of lime and silica.

The crosscut tunnel which is being driven by the Consolidated Mining and Smelting Company to intersect these veins is now in 252 feet, and will gain a depth of about 200 feet on the No. 2 and 125 feet on the No. 1 vein. At a distance of 200 feet from the portal two quartz stringers carrying galena were cut. The wall-rocks at this point are hard, massive slate. The last 50 feet of the tunnel is in the same material, but, judging by surface indications, softer ground will be encountered as the No. 2 vein is approached.

The No. 2 vein is the strongest and is of particular interest on account of its copper content, which possibly owes its origin to pneumatolytic processes created during the intrusions of the hornblende dyke-rock. More surface prospecting might be done to advantage on this vein, while the continuation of the crosscut tunnel will demonstrate the possibilities at depth.

The property is still a prospect and its future depends upon the development of sufficient ore to warrant the erection of a concentrator. The indications for finding ore are favourable, but at present the probabilities of its becoming an important producer are still problematical.

1919-page 159-This group, situated on Cultus Creek, is under development bond to the Consolidated Mining & Smelting Co. Ltd., and consists of 15 claims, seven of which have been Crown granted. A comprehensive plan of development has been initiated, but owing to the scarcity of miners the contemplated long crosscut tunnel, started to cut all veins, was only driven 225 feet, and work was closed down during the winter, the intention being to install machinery as soon as weather conditions permit in the spring. Several hundred feet of surface-trenching was done, disclosing a series of parallel veins of economic width and value, and from all indications the property promises to be a large producer. The values are in lead-silver-copper-gold. J.W. Mulholland, the locator and owner, has been retained as manager.

1919-page 370-

Iva, etc. Nelson Div. J.W. Mulholland Lot 12655G.1 39.07 acres Dec. 9
7 crown grants

1922- page 209- At the Iva Fern on Cultus Creek, driving the crosscut was continued by the Standard Silver Lead Mining Co. of Silverton, with Jack Mulholland in charge of the work.

1923- page 219- At the Iva Fern, on Cultus Creek, work was proceeded with during the greater part of the year by the Standard Silver Lead Co. under option from the owner, J. Mulholland. According to recent advice the company has stopped work at this property.

1925-page 251- By B.T.O'Grady Assistant Engineer.

Iva Fern.* As numerous references have been made to this property in previous Annual Reports, it is only intended to give a short summary here of the work done since the property was last described in the Annual Report for 1919. The Iva Fern, owned by Jack Mulholland, who staked it originally, and A. B. C. Dando, who has recently acquired an interest, is situated on Cultus creek, about 7 miles from Kootenay lake. The ore contains values in silver, lead, zinc, and copper. The property was bonded by the Consolidated Mining and Smelting Company in November, 1917, and developed by them in 1918 and 1919. Work done by this company included a considerable amount of surface-trenching and the driving of some 250 feet of tunnel to crosscut at depth the veins, of which there are three. Work was discontinued before the objective was reached, however, and the property was shut down during the following two years. In 1922 the Standard Silver Lead Mining Company continued the crosscut tunnel for a further 250 feet to its intersection with the principal vein, which was then drifted on northerly for 120 feet. A short tunnel was also driven lower down the hill on the Iva claim. In 1923 work was discontinued by this company and nothing of importance has been done since.

All the development-work done on the Iva Fern property is localized towards the summit of the ridge. The claims cover a large area, and although the mineralized zone has been traced for a long distance little work has been done at lower altitudes and much ground remains to be prospected. The drift on the main vein off the crosscut tunnel was stopped before reaching a point vertically below the strong surface showing exposed in the shaft and the trench just south of it.

1926- page 275- On Cultus Cr. the Iva Fern chiefly owned by J. W. Mulholland, who discovered the property, was bonded by him late in the fall to A. E. Place, of Los ANGELES. An initial payment was made and development work is due to start in the spring of 1927.

By → 1928-page 351 - This group consists of the seven Crown-granted claims; Excelsior, Lot 12657; Fern, Lot 12656; Standard, Lot 12658; Iva, Lot 12655; Black Cap, Lot 12654; Jewel, Lot 12653; and Gem, Lot 12652. The property is situated on the northern side of Cultus creek, about 7 or 8 miles by trail from Kootenay Lake, on which transportation is afforded by steamers of the Canadian Pacific Railway Company. Cultus Creek flows into the western side of the lake at a point 9 miles north-westerly from Kootenay Landing. There is a good wide trail on an easy grade from the lake-shore to the foot of the hill a distance of about 5½ miles, from the end of which a switchback trail leads to the mine. The claims are staked in a northerly direction along the strike of the veins from the valley of Cultus creek to the summit of the rounded ridge separating the North fork from the main creek. The mine buildings include a bunk-house to accommodate about 10 men, a combined dining-room and

kitchen to accommodate about twenty men, blacksmith-shop, etc. At the lake-shore there is a convenient cabin to accommodate men and supplies in transit.

There is little information available on the geology of the area, which has not yet been mapped with any accuracy. On the provisional West Kootenay sheet of the Geological Survey the area in which the property is situated is shown as entirely consisting of granite. This is not correct, however, and the formation in which the deposits are found consists of steeply tilted metamorphosed rocks, chiefly of sedimentary origin. Some distance east of this formation, however, there is a belt of granite several miles wide. These sedimentaries, which consist of banded argillites, schists, silicified dolomites, and quartzites, resemble the rocks of the Summit series, shown along the eastern margin of the Geological Survey map of the Ymir camp (Map 175A) and tentatively referred to the Cambrian or Pre-Cambrian period.

On the South fork of Porcupine creek the *Howard*, where new discoveries of importance have been made recently, is probably situated in a roof-pendant of the Summit series and farther south these rocks contain the deposits of the Sheep Creek gold camp. The mineral-belt in which the *Iva-Fern* is situated has been traced at intervals for several miles in a southerly direction, and during recent years a number of claims have been staked southerly from Cultus creek. The mineralization in the southern extension of the *Iva-Fern* mineral-belt consists of copper sulphides containing low values in gold and silver.

On the *Iva-Fern* two different types of mineralization were noted, one consisting of a fairly coarse galena, with which is associated chalcopyrite and zinc-blende, the other consisting of disseminated sulphides of lead and zinc without any copper. The gangue contains lime and silica and in places a considerable development of siderite was noted. In general the mineralization is of a character requiring concentration.

There are two veins exposed in the surface workings examined, which consist of numerous long shallow trenches dug across the strike of the formation and two shafts, 10 and 30 feet down respectively. These veins apparently coincide with the trend of the enclosing argillaceous rocks (slates), the strike of which is about N. 10° E. The dip of the veins is steeply to the west, apparently cutting the dip of the country-rocks, which is about 40° to the west. Basic lamprophyre dykes accompany the veins in places, but their possible connection with the ore-deposits has not yet been determined.

Most of the work has been done on the No. 2 vein, which is the most westerly or farthest up the hill. This vein is traced at short intervals on the surface by long shallow trenches and a shaft for a total length of about 600 feet of outcrop. The No. 2 tunnel, hereinafter described, develops the same vein a considerable distance farther south, so that altogether the No. 2 vein outcrop is traced over 2,000 feet in length. The elevation of the northern end of these workings at the summit is about 6,340 feet. At this point a trench shows iron-stained siliceous ledge-matter impregnated with galena over a width of several feet.

Farther south, at an elevation of 6,300 feet, there is a shaft, caved and inaccessible, at the southerly end of a trench about 36 feet long. On the dump of this shaft there are several tons of partially oxidized ore, heavily impregnated with galena and some chalcopyrite. Going south from the shaft for about 40 feet there is a trench at the easterly end, of which there is exposed a width of 10 feet of ore which is well mineralized with disseminated galena throughout. Some 70 feet farther south a trench 15 feet long exposes some ledge-matter containing disseminated galena. In this trench the full width of the mineralization is not exposed. The next trench to the south is off to one side of the strike of the vein. Continuing in the same direction, two more trenches expose oxidized ledge-matter only. The next two trenches, which are about 120 feet apart, were not accessible for debris, but the dumps show siliceous material well mineralized with galena. Therefore the strongest mineralization seen on the surface was in the trenches at the southern end of the outcrop workings and, farther north, at the shaft and trench just south of it.

The No. 1 vein lies a few hundred feet to the east of the main No. 2 vein, which it parallels at a slightly lower elevation. Surface workings seen on this vein consist of some eight or nine trenches and a shaft. Going south from the crest of the ridge, five trenches, distributed over a total length of around 180 feet, expose oxidized ledge-matter with some disseminated galena in places. Some 30 feet south of the last of these trenches there is a shaft, which was inaccessible for caving, on the dump of which are a few tons of good lead ore. A grab sample of this

ore assayed: Silver, 15 oz. to the ton; lead, 65 per cent. Some trenches south of the shaft show oxidized ledge-matter, no galena being noted.

The elevation of the upper tunnel and camp is about 5,950 feet. (All elevations herein are relative only, being based on aneroid readings.) This tunnel, which gains a depth of about 200 feet on the outcrop of the No. 2 vein, is driven westerly as a crosscut for about 500 feet. A drift to the north then extends along the No. 2 vein for about 120 feet. A basic lamprophyre dyke follows the hanging-wall side of the vein, but crosses to the foot-wall side of the vein at its intersection in the crosscut.

In the main crosscut, 22 feet east of the No. 2 vein, a 6-foot vein was cut, a sample across 4 feet of which assayed: Silver, 4.1 oz. to the ton; lead, 12.1 per cent.; zinc, 11.9 per cent. Continuing along the crosscut and a short distance beyond the main vein, there is, according to reliable report, a short drift developing a copper-silver showing which the writer missed seeing.

A cursory inspection of the 120-foot drift showed milling-ore in places through the first 100 feet of the tunnel, with continuous mineralization throughout the last 20 feet. A sample across 4 feet, 20 feet back from the face, assayed: Silver, 2.9 oz. to the ton; lead, 11.5 per cent.; zinc, 8.2 per cent.; and a sample across 4 feet in the face of the drift assayed: Silver, 2.5 oz. to the ton; lead, 5.9 per cent.; zinc, 15 per cent. A short distance back from the face a narrow stringer of massive galena and chalcopryite is visible in the west wall of the drift.

According to the plans seen by the writer, the face of the drift is about 80 feet short of reaching a point vertically below the shaft and about 40 feet short of a point vertically below the trench just south of it, in which surface workings strong showings are developed. The drift, therefore, would only have to be extended a short distance to prove the downward continuation of the ore-body indicated on the surface. The No. 1 vein is cut in the main crosscut where it shows well-defined lines of fracturing but no appreciable mineralization.

The No. 2 tunnel, developing the No. 2 vein at an elevation of about 5,650 feet, has only been driven a short distance. Just inside the portal mineralization was encountered consisting of a width of 6 feet of disseminated galena, zinc-blende, and chalcopryite, in a gangue of siderite and altered silicified country-rock. The dip of the vein in this working is apparently about 60° to the west. The hanging-wall of the vein is well defined, but the foot-wall is somewhat indefinite.

A short length of this ore is exposed near the portal of the tunnel, which continues for a short distance in a semicircular direction towards the west, but does not show any further appreciable mineralization. The ore at the portal has the appearance of being the apex of an ore shoot to explore which it will be necessary to gain further depth. On the dump of this tunnel there are a few tons of ore which is heavily impregnated with galena and chalcopryite. The above workings comprise the area examined by the writer, but there are, it is understood, other showings, and also areas where considerable amounts of float-ore have been found.

Some preliminary work was done on the *Iva-Fern* by the Consolidated Mining and Smelting Company in 1918 and 1919. Work done by this company included most of the surface-trenching and the driving of the first 237 feet, approximately, of the crosscut tunnel. In 1922 the Standard Silver Lead Mining Company bonded the property and continued the crosscut to the intersection with the main vein, which was drifted on 120 feet to the north. In 1923 work was discontinued by this company and no work has been done since.

The position is that, for various reasons not detrimental to the property, work done on the *Iva-Fern* has not been brought to full conclusions. By extending the drift a few hundred feet the downward continuation of the shaft ore-body will be tested and information gained which will be of value in developing the numerous other showings on the property.

The mineral-belt in which the *Iva-Fern* is situated presents very interesting exploratory possibilities, chiefly on account of the numerous indications of copper-deposits. The veins can be developed to a considerable depth by tunnelling, while conditions for timber-supply, water-power development, and aerial-tram location are favourable. All the development-work done on this property is localized towards the summit and much ground remains to be prospected. The interesting possibilities of exploration along the vein extensions at lower altitudes is indicated by the recent discoveries of gold-silver-copper ore in the continuation of the same belt south of Cultus creek.

Since the above report was written the *Iva Fern* Mines, Limited, was formed, but up to the end of the year no work resulted owing, it is reported, to disagreement among the principals.

IVA FERN ASSAYS. - A- BY B.T.O'GRADY-1928.
B- BY C.M.T.S. (MINERS WESTERN PLAN)

	WIDTH	SAMPLE NO.	SILVER	LEAD	ZINC	COPPER	REMARKS
GRAB	A		15 oz.	65%			FROM SHAFT DUMP
4 FT.	A		4.1 oz.	12.1%	11.9%		6 FT. VEIN IN MAIN X & Y
4 FT.	A		2.9 oz.	11.5%	8.2%		20 FT. BACK FROM FACE
4 FT.	A		2.5 oz.	5.9%	15%		AT FACE OF DRIFT
3 FT.	1501 B		4.4 oz.	4.4%	.03%		FROM 3 PLACES IN 105 FT. LONG TRENCH FOLLOWING VEIN.
2' 2"	1502 B		6.6 oz.	15.7%		2.4%	
2' 1"	1503 B			3.1%	1.1%		
FLOAT	1504 B		6.8 oz.	5.5%	4.6%		IN OPEN CUT
DUMP	1505 B		5.9 oz.	3.2%			DUMP OF OPEN CUT
7.2 FT	1506 B		1.5 oz.	1.4%	1.6%		MAIN DRIFT ON FERN
3 FT.	1507 B		4.5 oz.	3.4%	1.6%		" " " "
SAMPLE	1515 B		3.4 oz.	9.6%	4.4%		SELECT SAMPLE (500 TON) FROM ORE PILE
AVERAGE WIDTH OF 8 SAMPLES 3.6 FT		AVERAGE OF 11 SAMPLES		AVERAGE OF 12 SAMPLES	AVERAGE OF 9 SAMPLES		
		3.69 OZS.		13.8%	5.3%		

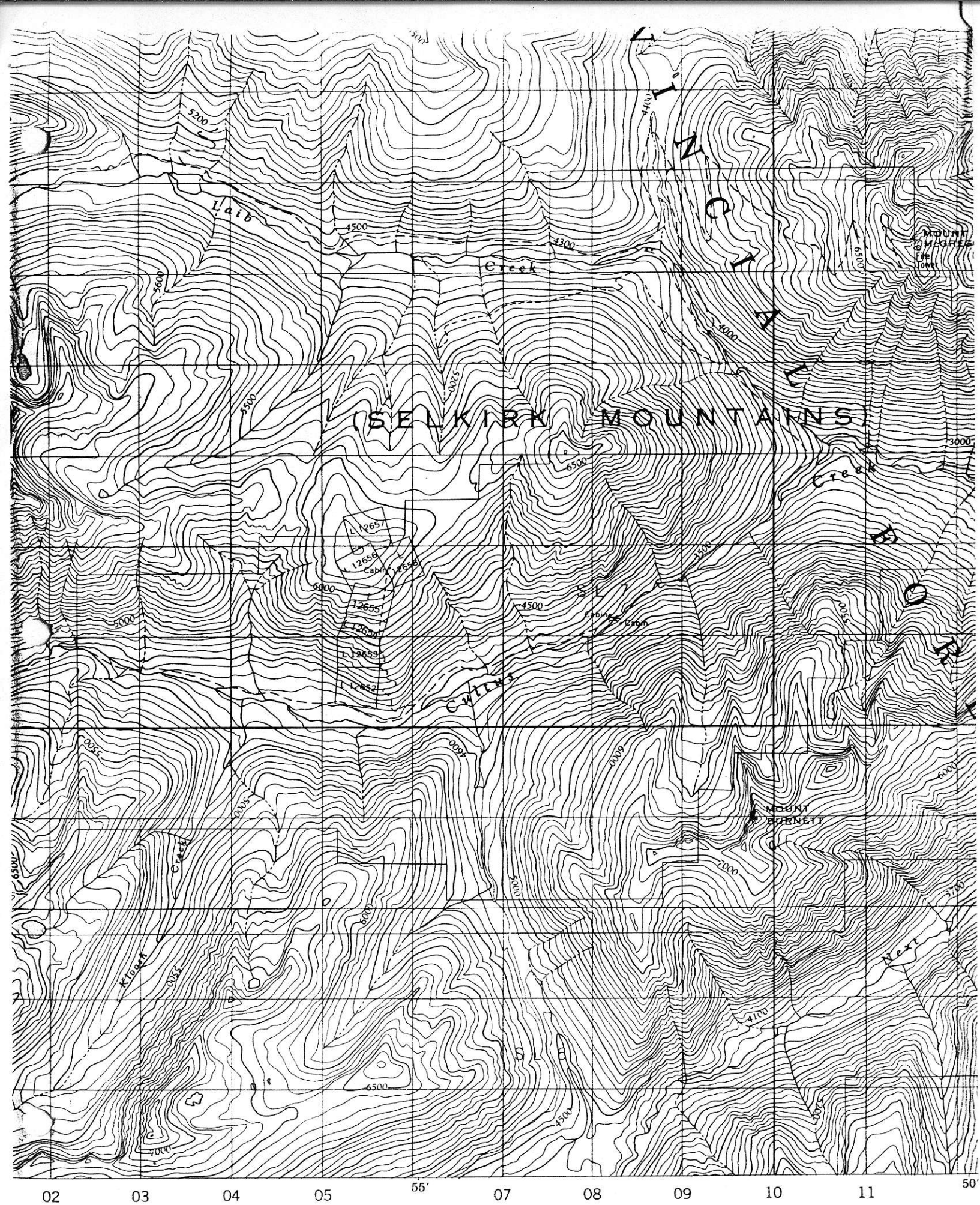
1928-page 354

News has just come to hand to the effect that the property has been taken under a development bond by the Consolidated Mining and Smelting Company.

1929-page 359 - This group owned by the Iva Fern Mines, Ltd. is situated on the northern side of Cultus Creek, about 7 or 8 miles by road and trail from Kootenay Lake. The property was taken under a development bond by Consolidated Mining and Smelting Co. early in 1929, since when exploratory work has been carried on continuously. The Iva Fern deposits are described in detail in the Annual Report for 1928. Since the new operations were initiated a large amount of trenching and 834 feet of underground work have been done. The surface work indicated an ore-body to the south of the main tunnel, but subsequent drifting and crosscutting in this direction failed to prove the continuity of the ore to that depth. The northerly drift was also advanced without any appreciable results. Sinking has recently been started on the north side of the main crosscut. As the vein apparently dips steeper than the argillite country-rock, with which it coincides in strike, it is possible that at further depth conditions will be found more favourable for deposition in the underlying strata, which includes a band of dolomitic limestone.

By B.T. O'Grady

1930- page 278- This group, owned by Iva Fern Mines, Ltd., is situated on the northern side of Cultus Creek, about 7 miles by road and trail from the western shore of Kootenay Lake. Exploration, started by the Consolidated Mining and Smelting Co. of Canada in 1929, was continued until May 1930, when work was suspended. Since the company's operations were initiated a large amount of trenching and 1,416 feet of underground work have been done. On this, 457 feet of tunnel was driven and a winze 125 feet deep was sunk during 1930. The Consolidated Mining and Smelting Company of Canada has acquired control of the holdings by purchase of most of the issued stock of the Iva Fern Mines, Ltd.,. Descriptions of the deposits are contained in past Annual Reports.



02

03

04

05

55'

07

08

09

10

11

50'

[illegible]

PROTEOZOIC

LOWER CAMBRIAN AND HADRYNIAN

Ch	HAMILL GROUP: undivided
Ch ₄	Dark quartzite; quartz-rich schist
Ch ₃	White quartzite; q-white quartzite, but may not be Ch ₃
Ch ₂	Muscovite-biotite-chlorite schist, quartzite, siltstone Ch _{2a} - VVVV epidote-chlorite-amphibolite gneiss (greenstone?) Ch _{2b} - marble
Ch _{1b} Ch _{1c}	Massive white quartzite; micaceous quartzite Pebbly and feldspathic quartzite Ch _{1c} - pebble and cobble conglomerate Ch _{1d} - calcitic and dolomitic marble.

HADRYNIAN

WINDERMERE SUPERGROUP (Hh, Ht)

Hh	HORSETHIEF CREEK GROUP:	Hhc - Grey marble Hhb - Pebble conglomerate Hha - Cobble conglomerate
Hh ₇	Quartzite; Hh _{7a} - cobble conglomerate	
Hh ₆	Phyllite; Hh _{6a} - cobble conglomerate	
Hh ₅	Grey limestone and marble	
Hh ₄	Phyllite; Hh _{4a} - cobble conglomerate	
Hh ₃	Phyllite, grit and quartzite; Hh _{3a} - pebble conglomerate	
Hh ₂	White quartzite	
Hh ₁	Phyllite	

Ht	TOBY FORMATION: polymict conglomerate, conglomeratic dolomite, conglomeratic pelite
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HELIKIAN

Hgr	Granite, pegmatite
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PURCELL SUPERGROUP (Hmn to Hd)

Hmn	MOUNT NELSON FORMATION: undivided
Hmn ₄	Dolomite, white or dark grey, buff or brown weathering
Hmn ₃	Black argillite and argillaceous grey siltstone, thin-bedded
Hmn ₂	Dolomite, dolomitic siltstone, argillite
Hmn ₁	white or green, thick-bedded quartzite

Hda	DUTCH CREEK FORMATION: undivided
Hda ₃	UPPER: siltstone, argillite, quartzite 2a-carbonate bearing beds and dolomite
Hda ₂	LOWER: black argillite and argillaceous grey siltstone, thinly interbedded; 1a-thin successions of dolomite and/or white quartzite

Hm	MOYIE INTRUSIONS: meta-diorite, meta-quartz diorite
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Hk	KITCHENER FORMATION: undivided
Hk ₃	Red weathering dolomite, black argillite, quartzite
Hk ₂	Black argillite, grey siltstone, tan siltstone all thinly interbedded; rare carbonate bearing horizons
Hk ₁	Dolomitic siltstone, dolomite, green argillite, black argillite. b-black argillite; buff dolomite and dolomitic siltstone, white siltstone a-green argillite, buff dolomitic siltstone, dolomite

Hc	CRESTON FORMATION: undivided
Hc ₃	UPPER CRESTON: deep green siltstone, light and dark, thinly laminated argillite and siltstone; purple argillite.
Hc ₂	MIDDLE CRESTON: grey, blocky siltstone and very fine quartzite in beds to 30 cm or more, commonly ripple marked, and commonly purple lined or mottled; black to deep purple argillite and thin-bedded siltstone; white, medium-grained quartzite commonly associated with purple mud-chip breccias.
Hc ₁	LOWER CRESTON: thin-bedded dark argillite and grey siltstone characterized by irregular pinching and swelling beds, ripple cross-lamination, mud-cracks, minor cut and fill features; green siltstone with thin interbeds of argillite.

Hd	ALDRIDGE FORMATION: undivided
Hd ₃	UPPER ALDRIDGE: rusty weathering, black argillite and silty argillite, fine, regular, white laminae of siltstone.
Hd ₂	MIDDLE ALDRIDGE: light grey weathering, grey quartzite and siltstone in beds 10 to 70 cm; interbeds of dark argillite and thin bedded alternating black argillite and grey siltstone.
Hd ₁	LOWER ALDRIDGE: rusty weathering, laminated or cross-bedded quartzite, argillite and silty argillite.

LOWER CAMBRIAN AND HADRYNIAN

HAMILL GROUP

Qqr	QUARTZITE RANGE FORM
Qqr ₄	White and bluish-green quartzite
Qqr ₃	Conglomerate
Qqr ₂	Brown micaceous quartzite
Qqr ₁	White, green and pink orthoquartzite

HADRYNIAN

WINDERMERE SUPERGROUP (Hts to Ht)

HORSETHIEF CREEK GROUP (Hts)

Hts	THREE SISTERS FORMATION
Hts ₃	Quartzite; grit
Hts ₂	Polymict conglomerate
Hts ₁	Interbedded grit and quartzite

Hm	MUNK FORMATION: undivided
Hm ₃	Grey phyllite; black graphitic phyllite
Hm ₂	Laminated limestone
Hm ₁	Grey phyllite; quartzite

Hv	IRENE VOLCANIC FORMATION: mafic tuff; phyllite. xxx
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Ht	TOBY FORMATION: Polymict conglomerate and pelite; quartzite
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Massive to schistose greenstone
mafic tuff; phyllite.
xxx Dolomite horizon

Polymict conglomerate;
conglomerate quartzite and pelite;
quartzite.

Geological boundary (defined, approximate)

Bedding, tops known (horizontal, inclined, ...)

Bedding, tops unknown (inclined)

Cleavage (inclined, vertical)

Schistosity (inclined, vertical)

Mineral lineation

Fault (defined, approximate, assumed)

Thrust fault (defined, approximate, assumed)

Small folds (axial plane, inclined, vertical, ...)

Anticline, Syncline (Trace of axial surface)

Antiform, Synform (Trace of axial surface)

Overturned Anticline; Syncline (Trace of axial surface)

Overturned Antiform, Synform (Trace of axial surface)

LEGEND - Nelson Map-Area East

PURCELL MOUNTAINS

CENOZOIC

QUATERNARY

PLEISTOCENE AND RECENT

Qd Drift covered; till, alluvium, colluvium

EOCENE(?)

Es Syenite, shonkinite

CRETACEOUS(?)

Knd Hornblende and diorite

CRETACEOUS

Kgr Discrete shear zones and strong foliation
Granite with accessory garnet
Granite with many inclusions of metasediments
Extensive pegmatite (and aplite)
Kgd Biotite granodiorite
Kgr Biotite granite
Kgr Biotite leucogranite
Kgr Leucocratic granite with biotite and muscovite
Kgr₂₀ - foliated
Kgr Biotite granite with megacrysts of Potash Feldspar

JURASSIC(?)

Jgr Leucogranite sills and lenses (foliated and/or lineated)

Jgd Biotite-hornblende granodiorite with megacrysts of potash feldspar

JURASSIC

Jgd Biotite-hornblende (± epidote) granodiorite

Jgd Epidote-biotite granodiorite

JURASSIC(?)

ub Ultrabasic, serpentinized peridotite

CAMBRIAN TO MISSISSIPPIAN

LARDEAU GROUP (P₁)

P₁ INDEX FORMATION: undivided
P₁₃ Biotite-quartz-feldspar (± garnet) gneiss; amphibolite
P₁₂ Marble with calc-silicate gneiss; amphibolite and schist layers; micaceous quartzite; **P_{12a}** - calcite marble
P₁₁ Hornblende gneiss, amphibolite; cc-calcite marble
P₁₀ - biotite-muscovite schist and gneiss

CAMBRIAN

LOWER CAMBRIAN

€bm BADSHOT-MOHICAN FORMATION: calcite marble, dolomite; calcareous schist, quartzite

LOWER CAMBRIAN AND HADRYNIAN(?)

€h HAMILL GROUP: undivided
€h₄ Dark quartzite; quartz-rich schist
€h₃ White quartzite; q-white quartzite, but may not be **€h₃**
€h₂ Muscovite-biotite-chlorite schist, quartzite, siltstone
€h_{2a} - V.V.V. epidote-chlorite-amphibolite gneiss (greenstone?)
€h_{2b} - marble
€h_{1b} Massive white quartzite; micaceous quartzite
€h_{1a} Pebbly and feldspathic quartzite
€h_{1c} - pebble and cobble conglomerate
€h_{1d} - calcitic and dolomitic marble

HADRYNIAN

MESOZOIC

SELKIRK MOUNTAINS

MESOZOIC

TRIASSIC AND (?)JURASSIC

SLOCAN GROUP

ts Limestone, dolomite, argill

PERMIAN AND/OR TRIASSIC

KASLO GROUP

Ptk Greenstone, chlorite and h

MISSISSIPPIAN AND (?)LATER

UPPER MISSISSIPPIAN AND (?)LATER

MILFORD GROUP

Mm Fine-grained grey schist, g limestone and quartzite

CAMBRIAN TO MISSISSIPPIAN

LARDEAU GROUP

P₁ INDEX FORMATION: undi
P₁₃ Micaceous quartzite and g
P₁₂ Grey phyllite
P₁₁ Mica schist and silicate ma

CAMBRIAN

LOWER CAMBRIAN

€bm BADSHOT-MOHICAN FORMATION: calcareous schist, quartzite

LOWER CAMBRIAN AND HADRYNIAN

HAMILL GROUP

€qr QUARTZITE RANGE FOR
€qr₄ White and bluish-green qua
€qr₃ Conglomerate
€qr₂ Brown micaceous quartzite
€qr₁ White, green and pink orth

HADRYNIAN

PALEOZOIC



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TO Mr. Eric Denny

R.R. #1

Nelson, B.C. V1L 5P4

Certificate No. K-4521

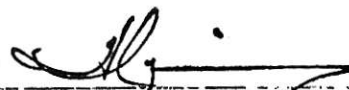
Date October, 16, 1981

I hereby certify that the following are the results of assays made by us upon the herein described Rock samples

Kral No.	Marked	GOLD	SILVER	Pb	Zn	Cu				
		Ounces Per Ton	Ounces Per Ton	Percent	Percent	Percent	Percent	Percent	Percent	Percent
K-4521-1	<u>IVA FERN</u>									
	I.F. - 5-SHAFT NEAR -		3.28	24.4	.88	1.38				
	FERN-STAMP-EXC. CORNER									
	6-4TH. CUT S. -		7.13	38.9	.35	.06				
	OF EXCELSIOR ONE VEIN		$2\overline{)10.41}$	$2\overline{)63.3}$	$2\overline{)1.23}$	$2\overline{)1.44}$				
	AVERAGE		5.20 oz.	31.6%	.61%	.72%				

NOTE:

Assays are valid for three weeks.
Re-assays retained three months
and re-assays are arranged.


Registered Assayer, Province of British Columbia

References to, in Minister of Mines Reports, Bulletin 1, 1932 and Memoirs 72 and 308.

1925 - page 248 - The Consolidated Mining and Smelting Co. has a crew of men at work on the development of the Boulder City group between Ymir and Salmo.

1926 - page 287 - 7 tons of gold ore shipped.

1932 - page 188 - Clubine Comstock Gold Mines. - On Boulder Creek, north of Salmo, work was continued throughout the year under the direction of L. R. Clubine, of Salmo. General conditions at this gold prospect are described in Bulletin No. 1, 1932, "Lode-gold deposits of British Columbia." Shipments of sorted ore made during 1932 total about 169 tons derived from the three closely spaced drift-tunnels comprising the upper workings. Net smelter returns (freight and treatment charges deducted) for the six cars shipped totalled \$4,816.55, or \$28.50 per ton. The new workings aggregate over 500 lineal feet of development, of which the upper (or No. 1) tunnel is in 50 feet. The Nos. 2 and 3 tunnels, connected by a 78 foot raise, have been driven 190 and 180 feet respectively. Improvements made during the period under review include completion of the road connecting the new ore-bin with the main road and construction of blacksmith-shop and compressor-house.

1932 - Bulletin No. 1 - 1932.-page 99 - Clubine Comstock Gold Mines.- On Boulder creek, north of Salmo, exploration on a small scale has been undertaken by this recently incorporated company under the direction of L. R. Clubine, of Salmo. The deposits are in an area of schistose rocks of the Rossland volcanic group, about half a mile north-westerly from the contact of the granite area extending along the Salmon river from Hidden creek to Salmo. The country-rock in the vicinity of the workings is apparently chiefly greenstone.

The lower (or No. 2) tunnel is about 370 feet in length. It follows a line of shearing and silicification along the lower contact of a dyke which, according to J. F. Walker, proved under the microscope to be an augite-biotite-syenite. The shear-zone strikes about N. 20° W. and its average dip is 35° to the north-east. At 300 feet in from the portal there is an easterly bend in the working and then the tunnel continues along its original bearing for another 70 feet. The bend marks the location of a fault which causes a small displacement. Mineralization consists of iron sulphides disseminated through siliceous bands and streaks occurring in small elongated lenses in the vein. At 90 feet in from the portal there is a small stope up some 30 feet above the level. A sample taken across 18 inches on the foot-wall side of the vein in the stope assayed: Gold, 0.41 oz. to the ton; silver, 1.1 oz. to the ton. Across the creek a short distance from the No. 2 tunnel portal a sample taken across an exposure of quartz containing pyrite and visible free gold, 6 feet wide, assayed: Gold, 2.44 oz. to the ton; silver, 1.2 oz. to the ton. At the time of examination early in the summer this showing had not been opened up to any appreciable extent.

The dyke can be traced several hundred feet northerly up the hill by outcrops and a shallow cut. An upper tunnel, 488 feet horizontally and 176 feet vertically above the No. 2, and in a westerly direction from it, exposes a small fracture containing a narrow seam of galena. This is not considered to have any relation to the lower tunnel vein. Showings in several open cuts farther up the hill were not seen, but good values are claimed over widths approximating 1 foot. Work has recently been done here and a car-load of sorted ore shipped to Trail towards the end of 1931. A start was previously made to drive a crosscut under the 6-foot showing sampled across the creek from the No. 2 tunnel, but this was discontinued for further surface work. The property is connected by half a mile of trail to a branch road, 1½ miles in length, with the Nelson-Salmo highway.



Clubine Comstock Mine, Nelson M.D. 1933

1933-228

BOULDER CREEK.

**Clubine-
Comstock
Gold Mines.**

At this company's *Boulder City* group, on Boulder creek, 3 miles north of Salmo, work was continued throughout 1933 with L. R. Clubine in charge. The geology and character of the mineral occurrences are described in Bulletin No. 1, 1932, and subsequent progress is recorded in the Annual Report for 1932. Two shipments of ore, aggregating 57 tons, were made early in 1933. This ore was extracted from an ore-shoot 90 feet long in No. 2 tunnel, which working was advanced to a point 300 feet in from the portal. One car-load averaged: Gold, 1.22 oz. per ton; silver, 1.9 oz. per ton; and the second averaged: Gold, 1.17 oz. per ton; silver, 1.17 oz. per ton. The No. 2 tunnel is the uppermost of the group of three tunnels where work has been proceeding during 1932 and 1933, the No. 1 being over 1,000 feet higher along the outcrop. In the No. 3 tunnel, 100 feet below the No. 2, new work has exposed a short ore-shoot, 6 to 8 inches wide, assaying 1.5 oz. gold per ton. The vein here is up to 12 feet wide, well mineralized with iron sulphides, values outside of the pay-streak being very low. No. 4 tunnel, at 50 feet lower elevation, has been extended 125 feet in ore and is now about 250 feet long. According to the management, the best values are on this level and samples across widths of 18 inches assayed from 0.86 to 2.27 oz. gold per ton. About 14 tons taken off the outcrop at the portal assayed nearly 3 oz. gold per ton. A shipment of about 37.5 tons made from the No. 2 tunnel at the end of the year (credited to 1934 production) assayed: Gold, 1.225 oz. per ton; silver, 1.9 oz. per ton. Ore is shipped as extracted without any appreciable sorting. A fair road, $1\frac{1}{2}$ miles in length, now connects the workings with the Nelson-Salmo highway. New machinery consisting of a Sullivan compressor and an 80-horse-power Junkers-Diesel engine, has been provided, with which development-work will be expedited. New bunk and cook houses, office, compressor-house, and accessory buildings have been erected, accommodation being provided for twenty men.

1934 - Memoir 172 - page 77 - Boulder City Group.

The Boulder City Group of twelve claims held on location is owned by Clubine Comstock Gold Mines, Limited, and Consolidated Mining and Smelting Company, the latter company's claims being held by option.

The Boulder City group is on a small tributary of Boulder Mill Creek from the southwest. Bedrock outcrops are not particularly good. The workings, at 3,500 feet and more in elevation, are $1\frac{1}{2}$ miles by road and trail from a point on the highway $3\frac{1}{2}$ miles north of Salmo.

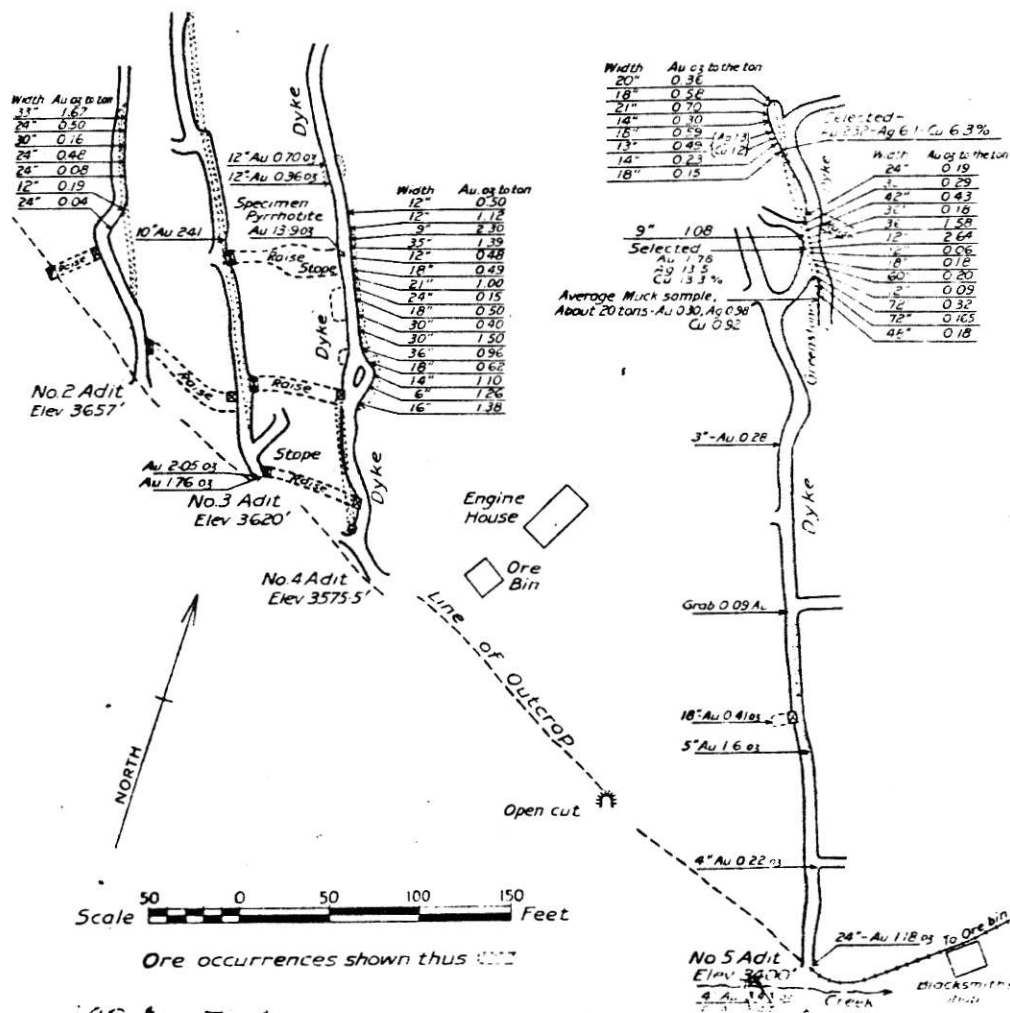
The Boulder City group is an old prospect upon which some new work has been done during the past three seasons. Gold values are reported to occur in mineralized fissures in greenstone of the Beaver Mountain-Rossland group about one-half mile northwest of the contact of the large area of Nelson granite extending northeasterly from Salmo.

The workings consist of two adits and a number of pits in surface material. The lower adit follows a fissure in greenstone along the under side of a lamprophyre dyke that strikes 340 degrees and dips 35 degrees to the northeast. At 300 feet from the portal a small fault, striking 320 degrees, dipping 72 degrees northeasterly, and with downthrow on the northeast side, displaces the dyke which is, however, entered again around a short easterly bend in the adit and has been followed for 70 feet to the face of the adit. The fissure is not as well defined near the face as in the rest of the working. At 90 feet from the portal a small stope, 20 feet long, goes up 30 feet on a 42-degree slope. Gold values are reported to have been recovered from the fissure which may better be described as shearing of the greenstone along the side of the dyke. The fissure or shear is not bounded by definite walls.

From the portal of the lower adit, the dyke can be traced up the steep hill-side for about 100 feet. It is again exposed 118 feet vertically above the portal and 185 feet distant horizontally. Seventy-seven feet higher and 150 feet farther northwest a small pit exposes a decomposed lamprophyre dyke that may be the continuation of the one along which the lower adit is driven. Seventy-five feet higher, and 190 feet horizontally from the last point, a cut exposes decomposed greenstone which apparently is not the lamprophyre dyke.

The upper adit is 176 feet higher and 488 feet distant along a direction of 251 degrees from the portal of the lower adit. It is 150 feet long, follows a direction of 330 degrees, and exposes a small fracture dipping 42 degrees to the northeast. A breadth of 2 inches of galena a few feet in length has been exposed about 50 feet from the portal.

Since the property was visited a new showing farther up the hill has been discovered and some small shipments of gold ore have been made.



BOULDER MILL CREEK.

1934 - E 15.

**Clubine
Comstock
Gold Mines, Ltd.**

This company's property on Boulder Mill creek now consists of nineteen claims held on location, including the *Boulder City* group of eight claims under option to purchase. The *Maggie* Crown-granted claim is under lease from the British Columbia Government and the *Snow Slide* and *Snow Slide No. 1* on Hall creek are held on location. The *Boulder City* group, 3 miles north of Salmo, is described in Geological Survey of Canada Memoir 172 and its precise location is shown on the accompanying Map 299A. The property is now connected by branch road, 1.5 miles in length, with the highway near Boulder Mill Station on the Great Northern Railway. The *Boulder City* group has been under development by L. R. Clubine for the above company since 1931 and references to progress of development-work are contained in Bulletin No. 1, 1932, "Lode-gold Deposits of British Columbia," and in the Report of the Minister of Mines for 1932 and 1933. First appreciable production was made in 1931, when 24 tons was shipped. In 1932 shipments aggregated 174 tons, 57 tons in 1933, and 100 tons in 1934. Camp buildings include bunk and cook house, office, garage, and blacksmith-shop. The mine plant consists of an 80-horse-power Junkers truck type Diesel engine belted to a 348-cubic-foot capacity Sullivan compressor, together with a 35-horse-power Le Roy gasoline-engine and a 100-cubic-foot capacity Canadian Ingersoll-Rand compressor, all housed in one building. The transmission-line of the West Kootenay Power and Light Company, passing along the highway to the east, is conveniently accessible whenever the provision of electric power becomes desirable. Operations were handicapped due to the necessity of sending to Germany for new parts for the Junkers engine, work latterly having been carried on by hand. The accompanying illustration shows the present extent of the workings, stoped areas, and assays in ore-shoot areas. The newly opened-up mineralization on No. 5 level differs in character from that exposed in the upper levels in this respect: that, whereas the mineralization in the latter is largely oxidized down to the No. 4 adit, there is practically no oxidation in evidence on the bottom level. Here the quartz contains chalcopyrite, pyrite, and pyrrhotite, with occasional specks of galena and sphalerite. The gold content in the primary mineralization appears to vary directly with the proportion of sulphides present, the best values being where the quartz contains a mixture of the different sulphides. A more extended programme of development is under consideration to include extension of No. 5 adit to the north-west, raising in the ore-shoot from No. 5 to No. 4 level, and sinking a winze below No. 5.

1935 - page E28 - Clubine Comstock Gold Mines, Ltd., Development at the Boulder City Group, 3½ miles north of Salmo, was continued during the early part of the year, but the property was shut down during the summer. About 29 tons of ore was shipped to Trail.

1936 - E 3

LODE-GOLD DEPOSITS.

NEWER MINES AND PROSPECTS IN THE SALMO MAP-AREA.

The properties described in the following reports are situated in the Nelson Mining Division, in the section which is the subject of "Memoir 172, Geology and Mineral Deposits, Salmo Map-Area," by John F. Walker, published by the Geological Survey of Canada in 1934. For the general geology of the area and for descriptions of most of the properties the reader is referred to the Memoir and its accompanying map.

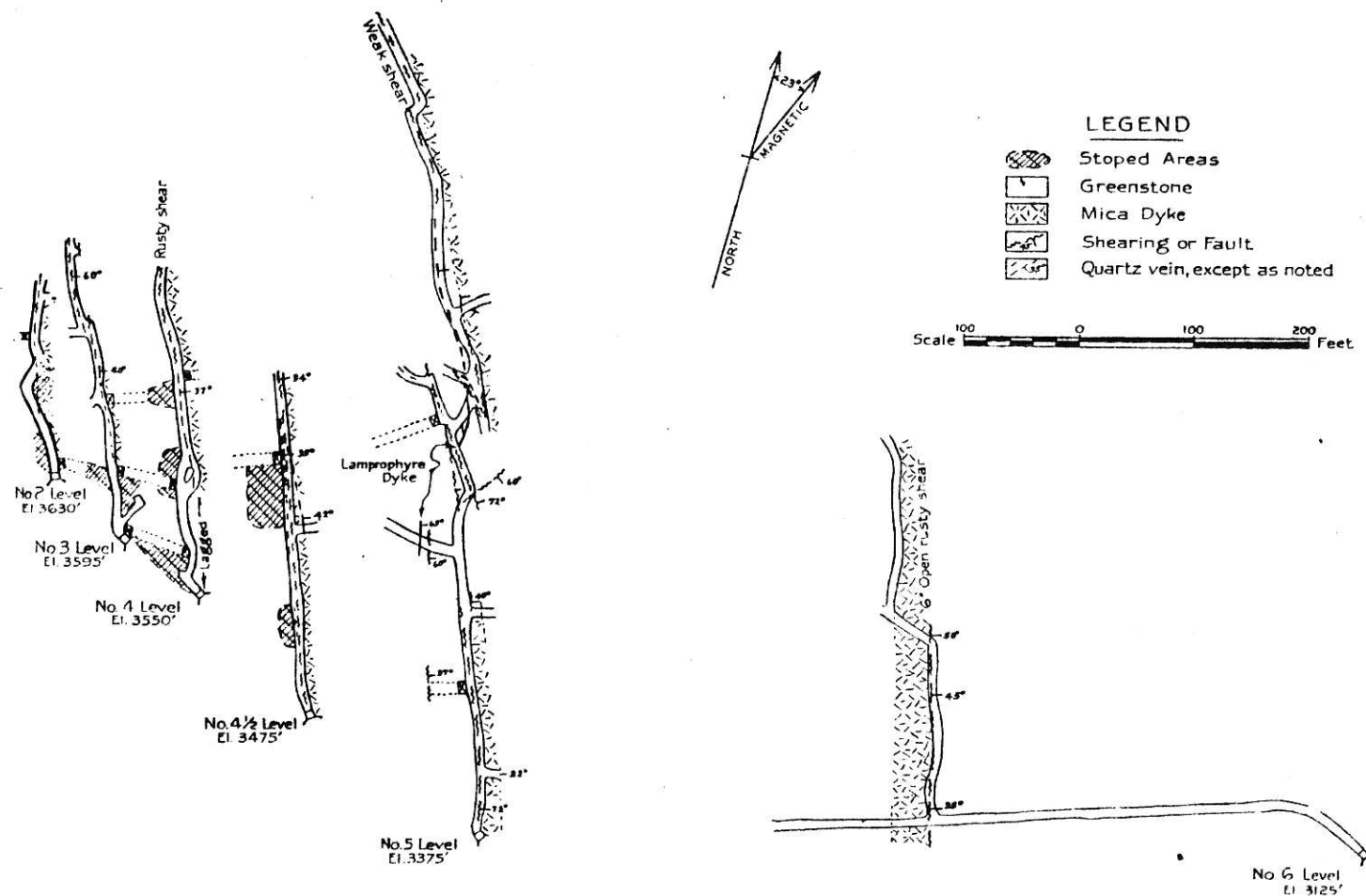
**Clubine
Comstock Gold
Mines, Ltd.**

The property consists of nine located claims, formerly known as the *Boulder City* group, held in the name of the Consolidated Mining and Smelting Company, which claims Clubine Comstock Gold Mines, Limited, is acquiring by purchase and an additional eleven located claims. The company, incorporated in the State of Washington, is registered in British Columbia and has an office in Victoria. The claims are situated some 3 miles north of Salmo, west of the Salmo River, on the north-east slope of Keystone Mountain. The location and general geology are shown on Map 299A of the Geological Survey of Canada. The ground held slopes steeply to Boulder Creek. The workings, which extend from approximately 3,125 to 3,630 feet elevation, are situated along Key Creek, a small tributary that enters Boulder Mill Creek from the south-west between one-half and three-quarters of a mile from the confluence of Boulder Mill Creek with the Salmo River. The surface consists of overburden with some rock-outcrops. The country has been burned off generally, but there is some timber toward the top of the mountain.

Leaving the highway about 3 miles north of Salmo, the road crosses a flat for two-tenths of a mile; then, by several switchbacks, in 1½ miles climbs the steep side-hill to the mine camp at about 3,600 feet elevation, roughly 1,000 feet above the flat.

The property is underlain by rocks of the Beaver Mountain-Rossland group, consisting in the vicinity of the workings of some argillite and possibly impure tuff, but principally of greenstone, intruded by lamprophyre dykes which vary materially in composition and texture.

A large mass of Nelson granite east of the property extends to within half a mile of the workings, which are close to a wide brown-mica dyke of greenish-grey colour. Frequently



Clubine-Comstock Mines, Ltd. Plan of Underground Workings from Company's Plan.

along the foot-wall of this dyke there is a width of several feet consisting largely of brown mica. This may be a phase of the wide dyke, but it seems more likely that the dark mica has been developed in shearing along the foot-wall of the wide dyke. Elsewhere in narrower fractures there is dark, basic, porphyritic dyke-matter containing light-greenish phenocrysts. Similar material occurs locally with the dark mica and may be a phase of a dyke at the foot-wall of the wide dyke. The lower contact of the wide dyke strikes about north 20 degrees west and has an average dip of 38 degrees easterly. Shearing, which in general follows the foot-wall of the dyke, is locally confined to a width of 1 or 2 feet, but elsewhere shear-strands extend over widths up to 10 feet in the wide dyke, the brown-mica material at the foot-wall and greenstone in the foot-wall. There is shearing along the hanging-wall of the wide dyke also.

Elongated quartz-lenses have been developed somewhat irregularly in the shears and greenstone in the sheared ground has been silicified locally. The wide dyke has been offset by faulting which may be later than the deposition of the quartz. The quartz-lenses are somewhat irregular in outline and are usually less than 1 foot in thickness, though in places they reach a thickness of 1½ feet. In some parts of the mine there are parallel lenses in the shearing. Two such lenses are being stoped above 4½ level in a width of 5 to 7 feet. The degree of mineralization varies greatly. At some places the quartz is glassy and slightly mineralized; elsewhere it may be heavily mineralized. Some parts of the vein consist of brecciated quartz cemented by chalcopyrite and pyrrhotite. Near by the vein may consist of quartz mineralized with medium-grained galena and fine-grained dark-brown sphalerite. In places brecciated fragments of white quartz are cemented by almost black quartz containing some galena and chalcopyrite. In places sulphides have been developed in the greenstone and dyke rocks close to the quartz. Moderate gold and silver values appear to be associated with the sulphide minerals. Selective mining of unoxidized ore yields a shipping product which in 1936 ranged from 0.65 to 1.4 oz. gold per ton and from 1.5 to 3.4 oz. silver per ton. Earlier shipments consisting largely of oxidized ore were of higher grade. Above No. 4 level the vein-matter is largely oxidized.

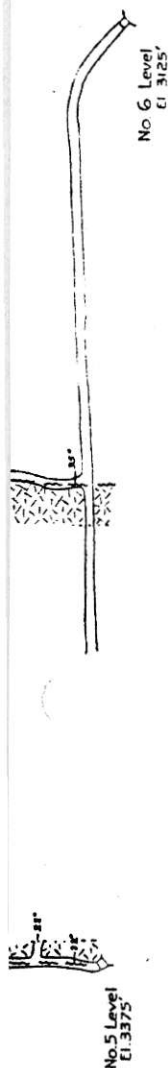
The above description applies to the principal workings shown on the plan herewith. No. 1 level, not shown on the plan, is a drift along a shear parallel with, but about 200 feet to the west of, the shear in the principal workings. In No. 1 level the shear follows the contact between a dyke and argillite. Mineralization consists of narrow lenses of lead and zinc sulphides reported to be low in gold. No. 1 level portal is about 330 feet south of No. 2 portal.

The property had been under development for some time prior to 1926, when 300 feet of tunnel and 30 feet of raise on the *Boulder City* claim were recorded by L. R. Clubine, of Salmo. In 1931 work was commenced by the present company under L. R. Clubine. In the years from 1931 to 1934 shipments were made to the smelter at Trail, the ore coming from 2, 3, and 4 levels principally. During this period drifting was done on No. 5 level. In 1935 a new deep level, No. 6, was started. After a period of inactivity work was resumed in January, 1936. Drifting and raising have been done on 4½ and 5 levels, while a considerable quantity of ore has been stoped above 4½ level. Late in the year a new level, referred to as the "475 level," was started.

During the year 698 tons of ore containing 740 oz. gold and 1,515 oz. silver were shipped. This ore came from the stope on 4½ level and from development-work. The property is equipped with a compressor, but the stoping and a good deal of the development is done by hand.

No. 2 level has a length of 180 feet. The outer 40 feet has been stoped above the drift and in this section a raise comes through from below. For the next 40 feet the drift is in the foot-wall, but swings to the right and re-enters the vein. At 150 feet from the portal there is a raise. For 60 feet south of the raise the vein has been dug out for a few feet below the level; a pillar separates this work from part of the drift which is in the foot-wall. In this section there is 1½ to 2 feet of rusty shear, containing 2 to 8 inches of quartz and some dark sulphides. North to the face there is less quartz in the shear.

No. 3 level, 270 feet long, is stoped below and partly stoped above for 65 feet from the portal; two raises come through from below in this section and another raise comes through at about 120 feet from the portal. The shearing here is rather tight and the black-mica



dyke is squeezed. At 190 feet from the portal the drift is offset to the west, leaving one shear-strand at the offset to follow another. The foot-wall formation here exposed in the drift appears to be silicified argillite or tuff. There is a little quartz in the shear.

No. 4 level, about 300 feet in length, is lagged and apparently stoped above for most of the first 90 feet from the portal. In the 110 feet beyond there are two raises with some stoping above the drift. At the end of this section is a winze down about 15 feet. From the winze south for a length of 100 feet at or below the floor there is from 6 inches to 1 foot of quartz or quartz breccia.

No. 4½ level also had a length of about 300 feet when the property was last visited. It follows shearing throughout its length. From 75 to 100 feet from the portal a little stoping has been done; here on the hanging-wall of the drift 2 to 6 inches of quartz is to be seen. At 185 feet from the portal is a crosscut to the hanging-wall 20 feet long. In the crosscut 8 inches of well-mineralized quartz goes down into the floor. This is a hanging-wall lens occurring along shearing within black-mica dyke-matter. It is traceable for 80 feet northerly along the drift, the thickness varying from 6 inches to 1 foot. There is also a foot-wall quartz-lens in a shear in greenstone below the dyke. For 60 feet north of the crosscut the ground is being stoped above the level. At the north end of the stope is a raise which was up about 60 feet at the middle of September. At the bottom of the raise the hanging-wall lens is from 6 inches to 1 foot thick and is mineralized with fine pyrite. This lens pinches out about 20 feet up the raise. The foot-wall lens has a thickness of about 4 inches at the bottom, but increases above and is more persistent than the hanging-wall lens. The foot-wall lens, varying in thickness from 4 to 15 inches, is traceable for about 50 feet north and the same distance south of the raise. At the face of the adit, about 75 feet north of the raise, the shear in the greenstone, 3 feet below the dyke, again contains quartz, here 9 inches thick. There is also rusty shearing along the contact.

No. 5 level is the longest drift on the shear-zone. It follows shearing in the greenstone and in the wide dyke close to its lower contact with the greenstone. Crosscuts to the hanging-wall indicate that the width of the dyke varies from 12 to 20 feet. About 125 feet from the portal is a raise or a short stope, up about 40 feet, following about 3 feet of shearing near the contact. Near the hanging-wall at the top of the raise is 6 inches of rusty gouge. At the foot of the raise there is 2 inches of quartz with some sulphides. At 250 feet from the portal there is a 65-foot crosscut to the foot-wall, cutting a basic dyke 9 inches thick, 33 feet from the drift. Under the dyke is 3 inches of shear-gouge with some quartz. The dip of the shearing and of the dyke is 65 degrees to the east. The drift swings to the east at a fault 60 feet past the crosscut. The wide dyke is displaced to the east, north of the faulting; basic dyke-matter occupies fractures curving to the east in the fault-zone. Shearing, however, continues and has been followed about 160 feet past the first faulting, the drift then swinging north-westerly to follow another shearing. About 70 feet past the first faulting is a raise which follows some shearing. The raise was up about 60 feet at the middle of November. At the top the ground is disturbed. Rather glassy white quartz up to 1½ feet thick was apparently faulted. Dyke-matter similar to the dark basic dyke exposed on the level occupied some irregular fissuring.

From a point 10 feet south of the raise a crosscut has been driven 30 feet north-easterly, where it intersected an irregular quartz vein squeezed between fault-strands. The quartz has been followed by drifting to the north and for a short distance to the south. A crosscut from the north drift exposes some of the quartz at a bulge between fault-strands. Over a length of about 30 feet the quartz is very irregular, varying in attitude and in thickness, the latter varying from 8 inches to 3 feet. Here the hanging-wall of the drift is the wide dyke. The drift to the north follows a somewhat irregular course for a distance of about 300 feet from where the quartz was first encountered. For most of this length the drift follows shearing in the greenstone in the foot-wall of the wide dyke. Quartz apparently in the foot-wall north of the crosscut to the north-east is exposed 50 feet from the crosscut. From that point north the shear contains from 2 to 11 inches of quartz for a distance of 100 feet. Thence to a bend in the drift 90 feet farther there is 2 to 11 inches of shear-gouge containing a little quartz. Beyond the bend the shearing followed by the drift is rather weak.

No. 6 level, 250 feet below No. 5, shows a drift. Key to the level is as follows:

course north of west to south 70 degrees west at 80 feet and continuing this course to the

face at 540 feet from the portal. Near the portal it crosscuts schistose greenstone, beyond which the greenstone is massive with some shearing. At about 400 feet from the portal shearing along the hanging-wall of a wide, green, mica dyke similar to that found above was encountered. There is also parallel shearing 30 feet to the west near the foot-wall of the dyke. From the crosscut a drift extends 150 feet northerly following the rather open shearing, 6 inches wide, along the hanging-wall, the dip varying from 30 to 50 degrees easterly. Thence a crosscut extends 50 feet westerly and from it a drift for 160 feet curving somewhat west of north, following shearing in the greenstone below the dyke. These shears apparently contain little or no quartz.

1937 - page E47 - Clubine-Comstock - On Boulder Creek, about 4 miles north of Salmo. Operated by Clubine-Comstock Gold Mines, Ltd., with L. R. Clubine as manager. A crew of fifteen (eleven underground) was employed throughout the year, most of the work being done by hand. The production amounted to 998 tons, which yielded 956 oz. gold and 1,669 oz. silver.

1938 - page E39 - Clubine-Comstock - Situated on Boulder Creek, about 4 miles north of Salmo. Operated by the Clubine-Comstock Gold Mines, Ltd. 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.

1939 - page A82 - Clubine-Comstock - Company office, 616 Stock Exchange Building, Vancouver, B. C. Charles F. Hunter, Secretary. Capital: 2,000,000 shares, 50 cents par. The company owns and operates the Clubine-Comstock on Boulder Creek, about 4 miles north of Salmo. The property was operated continuously throughout the year, employing a total of seven men, with four underground. Development-work included 152 feet of drifting, 12 feet of crosscutting, and 577 feet of raising. A total of 711 tons of ore, mined and shipped to Trail, yielded 578 oz. of gold and 1,483 oz. of silver.

1940 - page A67-A68 - Clubine Comstock Gold Mines, Ltd., - Company office, 616 Stock Exchange Building, Vancouver, B. C. Charles F. Hunter, Secretary. Capital: 2,000,000 shares, 50 cents par. This company owns and operates the Clubine-Comstock mine on Boulder Creek, about 4 miles north of Salmo. Mining was carried on for the first eight months of the year. Of the seven-man crew, four were employed underground. A low level crosscut was completed and some drifting done on the vein. Total development included 75 feet of drifting, 269 feet of crosscutting, and 176 feet of raising.

1941 - page A66 - Clubine-Comstock Gold Mines, Ltd., - Company office, 618 Stock Exchange Building, Vancouver, B. C. C. F. Hunter, Secretary. Capital: 2,000,000 shares, 50 cents par value. This company owns the Clubine-Comstock mine on Boulder Creek, about 4 miles from Salmo. The property is equipped with a complete small mining plant. During the year it was operated under lease by the former manager, L. R. Clubine, three men being employed.

1942 - Clubine Comstock Gold Mines Ltd., - page A63 - Company office, 618 Stock Exchange Building, Vancouver, B. C. C. F. Hunter, Secretary. Capital: 2,000,000 shares, 50 cents par. This property, on Boulder Creek was leased for a short time by R. Hansen and J. Herman, of Rossland. A total of about 33 tons was mined by hand-steel and reported as shipped to Trail.

1958 - page 39 - Clubine Comstock- This property is 4.8 miles north of Salmo on the first north-flowing tributary of Boulder Mill Creek, a tributary of Salmo River. It is owned by L. R. Clubine and underlease to Darrell Fisher and Davis Bonfield, all of Salmo. On the surface the road to the mine and ore-bin was re-opened, while underground No. 5 and No. 6 levels were re-opened to provide ventilation. Some ore was recovered above No. 5 level at its northwest extremity.

Memoir 308 - H.W.Little - 1960 - page 170:

The Clubine-Comstock property, consisting of several claims held by location, is on the west side of Salmo River valley about 3 miles north of Salmo, from where it is accessible by road. The Boulder City and adjoining claims were staked in 1925 by L. R. Clubine of Salmo on an old prospect abandoned long previously. Initial development in 1925 and 1926 was done by the Consolidated Mining and Smelting Company of Canada, Limited. The property was acquired in 1932 by Clubine-Comstock Gold Mines Limited, who operated the mine from that year until 1940. In 1941 and 1942 it was operated by lessees. In 1946 further development work was done by the owners, but no shipments of ore are recorded.

During the years 1926 to 1942 inclusive, a total of 3,986 tons of ore was shipped. This yielded 3,964 ounces gold, 7,699 ounces silver, and 1,804 pounds zinc. The property was examined by the writer in June 1948.

The country rock is porphyritic augite andesite and non-porphyritic andesite of the Rossland formation. Less than a mile to the southeast is the contact of a large stock of Nelson granite that intrudes the Rossland formation and may lie at no great depth below the property. The andesites are cut by lamprophyre dykes, the most prominent of which is exposed in the workings. These comprise at least seven levels accessible by adits, and one sublevel, and explore the vein between the 3,125-foot and 3,630-foot elevations.

The vein is irregular in width, and occurs along the hanging-wall of a lamprophyre dyke that is at least 25 feet wide. The lamprophyre is strongly sheared especially along the foot-wall where irregular pods consisting largely of biotite occur within the dyke. The vein consists of a series of lenticular masses of quartz up to a foot or more thick that are apparently elongated down the dip. Its strike varies from N10° to 20°W and it dips about 40°E. Little vein material was visible in the workings examined. It consists of quartz, mainly brecciated, containing various amounts of pyrrhotite with minor chalcopyrite, galena, and sphalerite.