

W.A. NO. ....

NAME

*Ministry Refs.*

SUBJECT

COPPER CHIEF

82KNW004-02

PROPERTY FILE

003803

The veins occupy northerly striking fractures dipping 60 degrees or more to the east. The fracturing is rather light, and there is no indication of appreciable movement. The eastern vein zone is explored on four levels through a vertical range of about 240 feet, and from it came most of the ore mined before 1949. At present, this vein is not being mined.

The western vein zone is providing about 60 tons of ore per day. It is developed on three levels—on No. 5 at elevation 3,372 feet, on No. 6 at elevation 3,264 feet, and on No. 8 about 270 feet below No. 6.

On No. 5 level the hangingwall shear of the vein zone is followed by a drift for 100 feet, and on No. 6 level a length of 185 feet is indicated. No. 8 level crosscut was driven in the summer of 1952 and encountered the vein zone 560 feet from the portal. The vein was followed by drifts to both north and south for a length of 240 feet. On 8 level the mineralized zone had a maximum width of 18 feet.

The mineralization consists largely of pyrite, sphalerite, galena, and grey copper, occurring mainly as a replacement of carbonate rock. The mineralization lies along a northerly striking fracture and consists of sulphides in irregular masses, disseminations and narrow veinlets, accompanied by narrow stringers of mineral along joints and foliation planes in the rock. Only a small amount of quartz accompanies the sulphide mineralization. During the year some mining was done in the No. 1 zone, where a stope was mined through to surface from No. 4 level. Diamond drilling amounted to 725 feet in four holes. The number of men employed averaged forty-five.

[References: *Geol. Surv., Canada*, Mem. 161, pp. 85-88. *Minister of Mines, B.C.*, Ann. Rept., 1914, p. 258; 1926, p. 270; 1929, p. 340.]

#### *Gold-Silver-Lead*

**Silver Dollar**  
(**Monterey Mining**  
**Company Limited**) (50° 117° N.W.) Company office, 321 Pemberton Building, Fort Street, Victoria. J. W. Dalziel, president; C. G. Beeching, managing director. Capital: 3,000,000 shares, no par value. This company owns the Silver Dollar mine near the head of the east fork of Mohawk Creek, a northerly flowing tributary of Pool Creek.

A small camp, reached by 4 miles of narrow tractor-trail from the end of the truck-road at the Spider mine, was established near the old mine workings. In the summer of 1952 a few holes were drilled to test the veins to the north of the old underground workings. Northwest Drilling Limited contracted the drilling and the work was laid out by W. L. Sebolt. The total crew reached a maximum of twelve.

[Reference: *Minister of Mines, B.C.*, Ann. Rept., 1914, pp. 263-266.]

**Teddy Glacier**  
(**Columinda Metals**  
**Corporation**  
**Limited**) (50° 117° N.W.) Company office, 1519 Marine Building, 355 Burrard Street, Vancouver. J. G. Edison, Toronto, president; W. Blair, manager. Capital: 5,000,000 shares, no par value. This company purchased the Teddy Glacier mine at the head of a branch of the south fork of Sable Creek. A base camp was established at Ten-mile, 4 miles north of Camborne. The road to the camp was improved and then built up Sable Creek. Due to a fortunately late season a rough road to the mine was almost finished before winter conditions forced a shut-down.

#### *Tungsten*

**Lucky Boy and**  
**Copper Chief**  
(**Major Explorations Limited**)\* (50° 117° N.W.) Company office, 402 Ford Building, 193 East Hastings Street, Vancouver. R. L. Foster, president. Capital: 3,000,000 shares, no par value. Major Explorations Limited holds seventeen mineral claims on the north slope of Trout Mountain and lying due west of the settlement of Trout Lake. Four recorded claims are held by the company, and six Crown-granted

\* By S. S. Holland.

82KNW004 Copper Cliff (Chief)



claims and seven other recorded claims are under option. The two principal claims are the Lucky Boy, an old Crown grant (Lot No. 4743), and the Copper Chief, a relocation in 1939 of ground that was originally held under the same name. These two, as well as other old claims such as the Willow Grouse, Ruffled Grouse, and Molybdenum, are briefly mentioned in various Annual Reports of the Minister of Mines between 1898 and 1943.

The various claims were originally located on narrow, flat-lying quartz veins, from which small shipments of high-grade silver-lead ore were made. The following production is officially recorded:—

Date	Tons	Silver	Copper	Lead
<i>Lucky Boy</i>				
1903 .....	181	<i>Oz.</i> 45,788	<i>Lb.</i> 3,294	<i>Lb.</i> 93,838
1904 .....	125	24,659	.....	81,207
1905 .....	55	7,899	.....	24,205
1906 .....	23	4,096	.....	8,877
1912 .....	49	7,358	.....	13,054
<i>Copper Chief</i>				
1905 .....	2	423	.....	549
1917 .....	12	1,513	.....	2,123
<i>Ruffled Grouse</i>				
1901 .....	6	917	.....	1,117
1902 .....	3	529	.....	568

During 1942 and 1943 the Lucky Boy and adjoining claims attracted some attention because of the occurrence of scheelite in the quartz vein on the Lucky Boy and in skarn bands on the Copper Chief. No scheelite was mined at the Lucky Boy, but in 1942, 23 tons sorted from the old dump and shipped to Ottawa for treatment produced 650 pounds of concentrates assaying 69 per cent tungstic oxide. No further work was done on the properties until they were taken up by the present company in 1951.

Currently, work is concentrated on exploring showings of scheelite-bearing skarn on the Copper Chief. No examination of the Lucky Boy was made at this time, and for a description of that property the reader is referred to British Columbia Department of Mines Bulletin No. 10 (Revised), 1943, pages 131 to 133.

The company established a camp at the old cabins on the Lucky Boy claim. The camp is at an elevation of about 4,200 feet and is reached by 3 miles of narrow road on a moderate grade from the head of Trout Lake.

The claims lie mostly to the south of the camp and extend from Wilkie (Trout) Creek, at an elevation of about 3,000 feet, up the southeast side of the valley to the top of the ridge at an elevation of about 6,000 feet. The showings of scheelite-bearing skarn are on this steep slope that from top to bottom averages almost 40 degrees.

The claims are underlain by a succession of quartzites having one or more interbeds of limestone a few tens of feet thick. The quartzite, originally a grey and rather granular rock, over much of the area is silicified, fine grained, and contains finely disseminated pyrite and pyrrhotite which, on weathering, produce a variety of rusty-brown stains. The stained quartzite in places is difficult to distinguish from skarn.

Bedding in the quartzite is very seldom seen, but a steep northeasterly dipping foliation is common and a few small dragfolds were noted.

Grey limestone is interbedded with the quartzite and outcrops in a number of bands to the southwest of the camp. One band outcrops a few hundred feet southwest of the camp and lies on the hangingwall and southwest side of the Lucky Boy vein. Its full extent along strike to the northwest or southeast is not known. About 600 feet farther southwest on the Copper Chief another band of limestone, now very largely altered to skarn, is exposed through a vertical range of several hundred feet and may extend con-

claims and seven other recorded claims are under option. The two principal claims are the Lucky Boy, an old Crown grant (Lot No. 4743), and the Copper Chief, a relocation in 1939 of ground that was originally held under the same name. These two, as well as other old claims such as the Willow Grouse, Ruffled Grouse, and Molybdenum, are briefly mentioned in various Annual Reports of the Minister of Mines between 1898 and 1943.

The various claims were originally located on narrow, flat-lying quartz veins, from which small shipments of high-grade silver-lead ore were made. The following production is officially recorded:—

Date	Tons	Silver	Copper	Lead
<i>Lucky Boy</i>				
1903 .....	181	Oz. 45,788	Lb. 3,294	Lb. 93,838
1904 .....	125	24,659	.....	81,207
1905 .....	55	7,899	.....	24,205
1906 .....	23	4,096	.....	8,877
1912 .....	49	7,358	.....	13,054
<i>Copper Chief</i>				
1905 .....	2	423	.....	549
1917 .....	12	1,513	.....	2,123
<i>Ruffled Grouse</i>				
1901 .....	6	917	.....	1,117
1902 .....	3	529	.....	568

During 1942 and 1943 the Lucky Boy and adjoining claims attracted some attention because of the occurrence of scheelite in the quartz vein on the Lucky Boy and in skarn bands on the Copper Chief. No scheelite was mined at the Lucky Boy, but in 1942, 23 tons sorted from the old dump and shipped to Ottawa for treatment produced 650 pounds of concentrates assaying 69 per cent tungstic oxide. No further work was done on the properties until they were taken up by the present company in 1951.

Currently, work is concentrated on exploring showings of scheelite-bearing skarn on the Copper Chief. No examination of the Lucky Boy was made at this time, and for a description of that property the reader is referred to British Columbia Department of Mines Bulletin No. 10 (Revised), 1943, pages 131 to 133.

The company established a camp at the old cabins on the Lucky Boy claim. The camp is at an elevation of about 4,200 feet and is reached by 3 miles of narrow road on a moderate grade from the head of Trout Lake.

The claims lie mostly to the south of the camp and extend from Wilkie (Trout) Creek, at an elevation of about 3,000 feet, up the southeast side of the valley to the top of the ridge at an elevation of about 6,000 feet. The showings of scheelite-bearing skarn are on this steep slope that from top to bottom averages almost 40 degrees.

The claims are underlain by a succession of quartzites having one or more interbeds of limestone a few tens of feet thick. The quartzite, originally a grey and rather granular rock, over much of the area is silicified, fine grained, and contains finely disseminated pyrite and pyrrhotite which, on weathering, produce a variety of rusty-brown stains. The stained quartzite in places is difficult to distinguish from skarn.

Bedding in the quartzite is very seldom seen, but a steep northeasterly dipping foliation is common and a few small dragfolds were noted.

Grey limestone is interbedded with the quartzite and outcrops in a number of bands to the southwest of the camp. One band outcrops a few hundred feet southwest of the camp and lies on the hangingwall and southwest side of the Lucky Boy vein. Its full extent along strike to the northwest or southeast is not known. About 600 feet farther southwest on the Copper Chief another band of limestone, now very largely altered to skarn, is exposed through a vertical range of several hundred feet and may extend con-

siderably farther along strike to northwest and southeast, although definite continuity between skarn outcrops has not been established. The old Copper Chief main adit and other workings are in this skarn. Two other limestone bands lie southwest of the Copper Chief skarn band and not more than 500 to 600 feet across strike from it; the first is largely altered to skarn, and the one farthest southwest has skarn along its northeast contact. Several other limestone bands outcrop on the top of the ridge leading southward to Trout Mountain. Along strike, bands of grey limestone are seen outcropping in prominent bluffs on the northwest side of Trout Creek. On the map accompanying Memoir 161 of the Geological Survey of Canada, the quartzite is mapped as part of the Lardeau series and the limestone is correlated with the Badshot limestone.

In some exposures the alteration of limestone to skarn is complete, and in others a small lens of unreplaced limestone may be completely surrounded by skarn. In the southwestern limestone band a 25-foot width of skarn is developed along the northeastern side of the limestone which is locally thickened along the crest of an anticlinal fold.

The skarn varies somewhat in appearance, though in all places it is composed mostly of diopside, epidote, and light-brown garnet. Skarn in the lowest showing consists very largely of calcite and light-brown garnet and is very light in colour. A common variety is extremely dark coloured from having a high percentage of diopside and epidote and little or no garnet. It is commonly heavily mineralized with pyrrhotite. Such rock constitutes the skarn band at the Copper Chief adit and at one time\* was described as a "bedded vein of pyrrhotite." Other old reports refer to a diorite dyke which cuts across the formation and along which some molybdenite was found. It is possible that the skarn was mistakenly called diorite, because no dyke is known on the property.

No intrusives were seen on the claims, and the contact of the Kuskanax batholith lies several miles to the south. The alteration of limestone to skarn does not appear to be related to the exposed contact of any known intrusive.

The strike of the beds across the claims is rather uniformly about north 30 degrees west. Bedding within the quartzite is obscure, but it and most limestone or skarn contacts dip from 65 degrees to very steeply northeast. In several places small dragfolds plunging 20 to 30 degrees northwest were seen. At the lowest known showing the skarn occupies the crest of an anticlinal dragfold plunging 20 degrees northwest.

The form of the dragfolds and the parallelism of bedding and foliation are interpreted as meaning that the rocks are involved in close repetitive isoclinal folds whose axes plunge 20 to 30 degrees northwest. This kind of folding, combined with gentle northwesterly plunging fold axes, seems typical of the area which extends 15 miles across strike to the head of Gainer Creek.

The skarn is mineralized with pyrrhotite in varying amounts and with rather fine-grained scheelite. As a consequence of its fine grain, the scheelite is almost impossible to detect by unaided eye, and the use of an ultra-violet lamp is necessary. Although molybdenite has been reported, none was seen or detected by assay.

The known skarn occurrences all are on the southeast side of Trout Creek. The lowest exposure is at an elevation of 3,570 feet, about 500 feet above the creek, and the highest showing, at a short adit just below the top of the ridge, is at 5,350 feet. At the time of examination, sixteen different skarn occurrences were known. They appear to lie along three parallel lines, but a survey of the exposures is necessary, and continuity between them should be established. A possible interpretation is that all the exposures are outcrops of a single limestone bed that was rather intricately folded before being altered to skarn.

Five exposures of skarn lie on the southwest side of a steep gully that extends from the old Copper Chief adit at 4,830 feet elevation down to creek level. The lowest showing, at an elevation, is about 500 feet below an old low-level trail that leads south-

\* *Minister of Mines, B.C., Ann. Rept., 1914, p. 316.*

west from the old Lucky Boy camp along the side of Trout Creek. The skarn is rather light coloured and is composed mainly of calcite, with small amounts of garnet and diopside. It occurs on the northeast side of, and close to the top of, a band of grey limestone that extends uphill from the creek. The skarn is about 8 feet wide and is moderately well mineralized with scheelite. The skarn lies below an anticlinal fold of quartzite whose axis plunges 20 degrees northwest. As a consequence, the extension of the skarn uphill from this point does not appear in the gully and must lie on the south-west side covered by overburden.

The four other exposures of skarn are close to the point where a high-level trail from the Lucky Boy camp to the Copper Chief adit crosses the same gully at an elevation of 4,735 feet. In one exposure below the trail at 4,620 feet elevation, dark-coloured skarn is 11 feet wide and, although well mineralized with pyrrhotite, contains little scheelite. At 4,750 feet elevation on the southwest side of the gully, the skarn band is 52 feet wide. It is dark coloured because of the high proportion of diopside and epidote, and near its northeast side encloses a narrow lens of grey limestone. Scheelite is sparingly disseminated throughout the skarn, and a 12-foot width near the limestone lens displays a moderate amount of scheelite mineralization. At an open-cut at 4,820 feet elevation the band is cut by a few narrow quartz stringers, and the otherwise granular dark skarn is silicified. The skarn band is about 20 feet wide and contains finely disseminated scheelite, but near the quartz stringers the rock is well mineralized with scheelite across a width of about 8 feet.

At the portal of the Copper Chief adit at 4,840 feet elevation, the skarn is 2 to 4 feet wide and encloses several lenses of unaltered grey limestone. Both skarn and limestone are mineralized with scheelite, and a sample across 4 feet assayed 1.06 per cent tungstic oxide. Several hundred feet of underground work was done at the Copper Chief adit, which was driven on a narrow quartz vein dipping 10 degrees northeast. Underground the vein is cut off by a strong fault striking north 30 degrees west and dipping 85 degrees northeast, and most of the underground work was in search of the faulted segment of the vein. The fault cuts off the skarn band whose extension on the east side of the fault is not visible. The Copper Chief quartz vein and other narrow, flat-lying veins near by are rather sparsely mineralized with scheelite. These four skarn occurrences are believed to be exposures of a single band extending through a vertical range of 220 feet.

Uphill from the Copper Chief adit at 5,250 feet elevation, an isolated exposure of dark-coloured skarn is well mineralized with finely disseminated scheelite. A sample taken across a 4-foot width assayed 1.18 per cent tungstic oxide.

Farther uphill and across strike to the southwest is the highest of the main showings at 5,350 feet elevation. The skarn is 8.5 feet wide where it is crossed by an old adit 18 feet long. The skarn is dark, quartzose, heavily mineralized with pyrrhotite, and well mineralized with finely disseminated scheelite. Two samples taken on the north wall of the adit across widths of 4 and 4.5 feet assayed 1.62 and 1.02 per cent tungstic oxide respectively. Geological conditions around the showing are obscure, and its relation to the other showings is not immediately apparent.

Southwest of this first line of showings are three exposures that appear to be aligned. In one the skarn is 18 feet wide, and a sample across a 12-foot width, taken by Hedley in 1942, assayed 0.54 per cent tungstic oxide. The two other showings contain moderate amounts of disseminated scheelite across widths of 8 feet.

Farther to the southwest are three more skarn exposures which may be aligned. The skarn in one is 25 feet wide and lies on the northeast side of a considerable thickness of limestone. The true thickness of the limestone bed is obscured by flowage and intricate folding in the axial region of an anticline. Scheelite is disseminated through the skarn near the intersection of a narrow quartz vein.

\* In August, 1952, the showings were sampled by an examining engineer. The arithmetical average of ten samples taken by him at various showings is 0.78 per cent tungstic oxide.

Present information indicates that much of the skarn is mineralized with scheelite and that the scheelite mineralization is not related in amount to the intensity of the pyrrhotite mineralization. The presence of scheelite in quartzose skarn, in skarn cut by quartz veins, and in the narrow, flat quartz veins emphasizes the association between scheelite and quartz and suggests possibilities for the localization of scheelite mineralization. The possible effect of folds and of crosscutting faults remains to be determined, and much additional exploratory work remains to be done.

[References: *Geol. Surv., Canada*, Sum. Rept., 1903, Pt. A, pp. 71-72; Mem. 161, pp. 83-84. *B.C. Dept of Mines*, Bull. No. 10 (Revised), p. 131. Also references to Lucky Boy, Copper Chief, Molybdenum, Ruffled Grouse, and Willow Grouse in Annual Reports of the Minister of Mines, 1898 to 1943.]

### Silver-Lead-Zinc

(50° 117° N.E.) Company office, 214 Burns Building, Calgary, Alta. R. M. Patriquin, president; Brian Woolfe, manager; W. S. Hamilton, consulting engineer. This company holds ten recorded mineral claims and a number of Crown grants on the southwest slope of Nettie L. Mountain. The workings, which comprise the old Nettie L. mine, the several Ajax adits, and the G.Y.P. adit, are on the Nettie L. (Lot 4954), Ajax (Lot 4955), May Bee (Lot 4953), and G.Y.P. Fraction (Lot 5691). The camp, at an elevation of about 4,500 feet overlooking the town of Ferguson, is reached by about 1½ miles of road from Five-mile on the Lardeau Creek road.

The Nettie L. mine was one of the old producers in the Lardeau, and the following metal production is recorded from it:—

Year	Tons	Gold	Silver	Lead	Zinc
		Oz.	Oz.	Lb.	Lb.
1899	14	.....	7,000	2,800	.....
1900	172	23	13,627	39,364	.....
1901	699	114	84,312	240,392	.....
1902	528	95	85,590	232,452	.....
1903	1,019	149	151,120	435,607	.....
1904	10,168 <sup>1</sup>	362 <sup>1</sup>	87,316 <sup>1</sup>	261,487 <sup>1</sup>	.....
1912	28	6	4,308	8,618	.....
1916	48	12	7,694	42,057	.....
1917	50	5	4,062	9,179	28,239
1918	31	6	5,510	15,434	.....
1920	18	4	4,015	10,869	.....
1921	18	3	2,907	8,609	.....
1922	20	2	1,792	3,000	.....

<sup>1</sup> In 1904 ore from both the Nettie L. and Silver Cup mines was treated in the concentrator at Five-mile, and for that year the production of both mines is combined.

Most of the production came from the Cross Vein, which was discovered in 1900 during the course of drifting southward along the Main Lead on No. 1 level. The Main Lead occupies a strong fault having a large displacement. The Cross Vein was mined below No. 1 level and is said to have swung into and merged with the Main Lead on the No. 4 level.

During 1951 the company did about 2,000 feet of diamond drilling underground on the Nettie L. to test the Cross and Main veins in unstoped areas. No other work was done underground on the Nettie L. in 1952.

\* By S. S. Holland.

Prior to 1906, 400 tons of sorted ore were shipped, and assayed: silver 200 to 300 ounces; lead 20 to 35 per cent. In 1912, after six years of inactivity, 28 tons, assaying about the same, were shipped.

### Copper Chief

The Copper Chief claim is southwest of and above the Lucky Boy. Brock notes that the same minerals occur as are found on the Lucky Boy. Newton W. Emmens described the property in 1914 in the Annual Report, Minister of Mines, British Columbia. He notes the presence of a bedded vein of pyrrhotite, striking north 30 degrees west, dipping 80 degrees north-east, and from 8 to 14 feet wide. There are occasional specks of chalcopyrite in the pyrrhotite. He also mentions three nearly flat veins, striking north and from 3 to 8 inches wide; they contain narrow streaks, generally in the middle of the vein, of galena, grey copper, and sphalerite. The veins occur in a band of siliceous lime. Two short adits have been driven on the middle vein. A shipment of 3 tons assayed: silver 225 ounces; lead 16 per cent; copper 1.71 per cent; zinc 17 per cent. A fourth, similar, small vein lies 100 feet farther up the mountain side. From December 1, 1916, to November, 1917, the Copper Chief was worked by the Copper Chief Mining Syndicate and 6 tons of ore were shipped assaying 240 ounces silver, 12 per cent lead, and 23 per cent zinc per ton. An additional seven tons was shipped at a later date. It is noted, in the report of the Minister of Mines, British Columbia, 1917, that molybdenum was found on the property in a diorite dyke cutting obliquely across the formation. V. L. Eardley-Wilmot<sup>1</sup> states that in 1918 Mr. S. E. Slipper reported that the dyke had been traced for 1,500 feet and that an analysis showed 11.4 per cent MoS<sub>2</sub>.

### Horse Shoe, Ruffled Grouse, and Willow Grouse

The Horse Shoe, Ruffled Grouse, and Willow Grouse are old claims near the Lucky Boy that contain, according to Brock, the same minerals as that claim. On the Horse Shoe (or Horse Fly?) the ore occurs in limestone.

### Ethel

The Ethel mine, at the head of Glacier creek on the west side of Trout lake, is described by N. W. Emmens<sup>2</sup> as follows:

"..... there is a quartz vein from an inch to 18 inches wide, striking north 45 degrees west with a dip of 60 degrees northeasterly, in a belt of lime-schist. The ore occurs irregularly in the quartz as solid bunches and disseminated through the rock. The mineralization is galena, grey copper, zinc blende, and iron pyrites usually rich in silver. It has been developed by four adits, driven from the side of a steep draw, along its strike, the maximum difference of elevation between the highest and the lowest drift being 200 feet. The property has been worked spasmodically for a number of years, and several shipments made at different times, the records of some of which, only, are available. Five tons shipped in 1909 assayed silver 307.1 ounces, lead 28.2 per cent, zinc 1.4 per cent, a specially rich lot of 1,150 pounds assayed silver 560 ounces, lead 38.6 per cent, zinc, 2.3 per cent, and a third lot weighing 1,800 pounds assayed silver 171.0 ounces, lead 17.6 per cent, zinc 1.9 per cent."

<sup>1</sup>"Molybdenum", Mines Branch, Department of Mines, Canada, Pub. No. 592, p. 47 (1925).

<sup>2</sup>Ann. Rept., Minister of Mines, B.C., 1914, p. 317.