672896 SILVER LEAF

REPORT

ON THE SILVER LEAF GROUP OF CLAIMS IN THE COWICHAN DISTRICT OF VANCOUVER ISLAND, B. C.

LOCATION:

The group of claims consists of the Silver Leaf, Mountain Ash, Hemlock Fraction, ~~Rough Rock~~, ~~Cypress & Blue Bird~~, and is situated near the divide between the Nanaimo and Chemainus Rivers about 7 miles in a straight line from the North Shore of Cowichan Lake from which it is separated by a ridge having an elevation of 3750' rising to over 4000'.

ACCESSIBILITY:

The claims are reached by trail up the East Fork of Cottonwood Creek, a mountain stream that flows into Cowichan Lake from the North, and thence round the Eastern slope of the ridge above referred to, which is crossed at an elevation of 2700', into the valley of the Chemainus River; a distance of about 11 miles.

OWNERSHIP:

The claims were originally located by T. Service about the year 1912, and are now held by a syndicate composed of E. F. Miller and associates of Duncan, B.C.

WORKINGS:

The principal workings are on the Silver Leaf

claim, and consist of two tunnels 72' and 15' respectively and several open cuts.

ORE DEPOSITS:

The deposits are of the copper-gold class, the mineral being pyrrhotite, chalcopyrite, and pyrite carrying values in gold, silver, and copper in shear zones and fractures that are characterised by the occurrence of quartz, calcite and sericite.

GEOLOGY:

The area is occupied by the andecitic volcanic rocks of the Vancouver group, and there are nearby exposures of the underlying intrusive granodiorite;- a tongue of dioritic rock that is probably a branch from this igneous rock passes through the Silver Leaf claim; and the characteristic feature of the ground is the fracturing and shearing of the intruded rocks.

There are several iron stained bands of fractured rock, and three notable zones of shearing, two of which, on the Silver Leaf claim are about 5' wide, and one on the Mountain Ash claim over 20' wide. The direction of these Zones is approximately E. & W. and their dips vary; of the two on the Silver Leaf claim the Northern one is almost vertical, while the other has a dip of about 50° to the South.

While it is true that these Zones may be traced for considerable distances, the whole system is one of minor dislocation rather than of persistent shear zones with which

the mineralization may be definitely identified.

ORE OCCURRENCES:

Chief interest has been attracted by a seam in the Southerly dipping Zone in the Silver Leaf claim. This seam outcrops on the steep side hill for about 70' in one place where it is 30 inches wide. It is highly oxidised, but with the iron there is a good deal of chalcopyrite.

A sample across the full width assayed:-

		GOLD		SILVER		COPPER
	Marked	Ounces per ton	Value per ton	Ounces per ton	Value per ton	Per cent
H.	Chalcopyrite & oxide of iron	0.92	18.40	2.96	1.86	12.9

The Total (Approximate) Value of this Sample equals $57.67 per ton

Immediately below this outcrop the 72' tunnel has been driven along the zone and for some distance followed a two foot seam of calcite impregnated with iron and copper minerals from which a sample assayed:-

		GOLD		SILVER		COPPER
	Marked	Ounces per ton	Value per ton	Ounces per ton	Value per ton	Per tent
G.	Copper & iron pyrites	0.46	9.20	1.32	0.83	9.3

The Total (Approximate) Value of this Sample equals $37.00 per ton

At about 40 ft. from the portal this seam gives place

to bands of solid pyrrhotite following one another, first on one side and then on the other, of the zone of fractured and slickensided rock; a representative sample of this pyrrhotite, which widens to 16" in places, assayed as follows:-

		GOLD		SILVER		COPPER
Marked		Ounces per ton	Value per ton	Ounces per ton	Value per ton	Per cent
F.	Pyrrhotite, copper & arsenoprites	0.76	15.20	1.08	0.68	8.7

The Total (Approximate) Value of this Sample equals $41.11 per ton

About 50 ft. below, a second tunnel has been driven in the zone for 15 feet, and the same conditions of included bands of pyrrhotite are found in the shattered rock, through which knife-blade seams carrying chalcopyrite also occur. The vertical zone above referred to has been exposed at half a dozen places over a distance of about 400 feet, and at elevations varying from about 2700' to 3100' above sea level up to the ridge of a spur of the hill which is occupied by the tongue of intrusive rock above referred to.

Three samples were taken of seams of mineral, from an inch or two up to 18" wide, that are found throughout this zone, and these assayed as follows:-

Marked	GOLD Ounces per ton	GOLD Value per ton	SILVER Ounces per ton	SILVER Value per ton	COPPER Per cent
A. Arseno-pyrite	0.96	19.20	0.20	0.13	Trace

The Total (Approximate) Value of this Sample equals $19.33 per ton

B. Copper & iron pyrites (little arseno-pyrite	0.34	6.40	0.88	0.55	8.9

The Total (Approximate) Value of this Sample equals $32.76 per ton

C. Copper & arseno-pyrites; iron oxide	0.28	5.60	1.04	0.65	13.2

The Total (Approximate) Value of this Sample equals $44.53 per ton

A fourth sample in this zone was taken from the highest point at which it is exposed, about 200' distant from the tongue of intrusive rock. The zone is 5 ft. wide, and the sample was taken over a width of 18". The highest values obtained were found at this point, due to inclusion of some bornite in the sample.

Marked	GOLD Ounces per ton	GOLD Value per ton	SILVER Ounces per ton	SILVER Value per ton	COPPER Per cent
D. Chalcopyrite bornite, oxide of iron	1.40	28.00	1.48	0.93	15.1

The Total (Approximate) Value of this Sample equals $72.72 per ton

The 20' zone in the Mountain Ash claim is exposed near the top of a box canyon, and the upper part is inaccessible.

The rocks are shattered and iron stained and there are many veinlets of chalcopyrite running through them. The mineralized part seems to fray out into narrow seams towards the top, but the whole occurrence is so covered with debris that it was not possible to determine whether there are distinct bands of mineral included or not. A sample of some of the broken ground assayed -

		GOLD		SILVER		COPPER
	Marked	Ounces per ton	Value per ton	Ounces per ton	Value per ton	Per cent
E.	Oxidised with copper stain	Trace		0.04		0.3

The fracture in which this occurrence is found is very pronounced and it would be well to make a cut right across it to the depth of a few feet in order to ascertain what the surface indications of mineralizations in it amount to.

GENERAL CONDITIONS:

The claims occupy the steep sides of a ridge cut by two streams flowing into the South Fork of the Nanaimo River. The ground is heavily timbered; on the Silver Leaf claim alone there is probably a million feet of timber that is mostly cedar of good quality. At the time of examination there was a flow of about 75 inches of water in the main stream

stream on which a head of over 100' could be obtained,- this is probably near the minimum flow & it is likely that there would be a sufficiency of water power to run a three drill compressor for the greater part of the year.

As stated, the property is on the North side of a steep ridge that lies between it and the head waters of Cottonwood Creek which flows into Cowichan Lake; transportation is impossible in this direction except by means of aerial ropeway. A logging road is already under construction to a point 4 miles from the lake, and a graded wagon road might be carried on further, three quarters of a mile, towards the ridge.

The present transportation facilities are also inadequate, although it would not be impossible to construct a wagon road over the divide into the Chemainus valley. An alternative route might be up the Chemainus valley from Chemainus Station on the E. & N. Rly, taking advantage of the logging road that is already constructed and may be extended.

In any case the question of access and transportation is a serious one, and has to be considered in relation to the possibilities of the property.

SUMMARY & RECOMMENDATIONS:

This is a good prospect. The individual showings are attractive, but so far as they have been opened up, do not afford sufficient evidence to warrant a prediction of tonnage. The extent to which the shear zones are mineralized is not proved, and the course of the shearing is erratic; there is however sufficient encouragement to be found in the Gold and Copper content, especially in the pyrrhotite and arseno-pyrite, for further investigation.

The igneous rock that forms the apex of the ridge above the workings is not a later dyke, but is related to the intrusion with which the mineralization is associated. Some development in this direction is advisable,- a tunnel driven in on the Northern Shear Zone about 50' below the uppermost exposure and continued towards the diorite for 200 to 250 feet might throw a good deal of light upon the occurrence; this work is to be recommended as a first step towards a realization of the property.

It is possible that there are limestone inclusions in the meta andesite,- if there are, it is important that they should be located. The value of the ore where it occurs is admitted; the problem is to determine whether the shear zones contain more than narrow and occasional bands and lenses.

The indications are in favor of the idea that the

mineral deposits are largely in the nature of replacements of limestone bands in the shear zones, and it is quite possible that larger and more continuous bodies of ore may be discovered than have been opened up so far. The available evidence points to small inclusions only, and no big float was seen in the Creek bottoms, but the grade of the ore and the possibilities above referred to justify further expenditure on prospecting.

It is recommended that a sum of $10,000.00 be devoted to driving the tunnel on the North zone up to the contact with the intrusive, stripping the same zone in a series of open cuts to a depth of about 6 ft., continuing the 72' tunnel for a further 50', cutting a face across the Mountain Ash zone and thoroughly prospecting the ground on the "Cypress" claim with a view to determining the continuance of the shearing to the west of the diorite intrusion, and locating any occurrence of unaltered limestone.

August 3rd. 1923

A.R.S.M., M.I.M.M.

in the Herald Block, Nanaimo. The holdings consist of 95 acres of shale lands at East Wellington, about 4 miles from Nanaimo, on the railway owned by the Nanaimo Lumber Company, Limited. Bricks made from this shale some years ago by a former company were of exceptionally good quality, as evidenced by such buildings as the Bank of Commerce, Nanaimo; Post-office, Duncan; Normal School, Presbyterian Church, and other buildings in Victoria; and several school buildings in Vancouver. It is the intention of the company to install an up-to-date brick- and tile-making plant.

Nanaimo River Section.

Silver Leaf. There are three claims in this group—*Silver Leaf*, *Mountain Ash*, and *Hemlock Fraction*—situated on the divide between the heads of the Chemainus and Nanaimo rivers. The owners are E. F. Miller and associates, of Duncan, forming the Silver Leaf Syndicate. The ore-showings and workings on the property are on the Nanaimo River slope at an elevation of about 2,300 feet, at the head of Jump creek, a south branch of Nanaimo river. The most accessible route at present is by way of the trail up Cottonwood creek from Cowichan lake, a distance of about 10 miles. For ore-shipping both routes would have to be investigated for the more feasible one, whether over the summit, which is over 4,000 feet elevation, and down Cottonwood creek to the Canadian National Railway on Cowichan lake, a straight distance of approximately 5 miles; or down Jump creek and the Nanaimo river to the coast, a distance of 18 miles.

The general rock formation is andesite of the Vancouver volcanics, in which occur on these claims three shear-zones striking S. 60° W. (mag.) into the hill and dipping between 75° and 80° to the east. Some surface work has been done on two of these zones by way of open-cutting and stripping, tracing them for a considerable distance up the hill. On the south zone, at about 400 feet above the cabin, a tunnel has been driven 70 feet, with a crosscut of 10 feet into the hanging-wall about 10 feet back from the face, under an outcropping of good-looking copper ore exposed for about 70 feet in length, with a width of 30 inches. This tunnel shows the vein to be continuous to the face, where it is about 3 feet wide, though showing little mineralization at this point. The tunnel starts in a shoot of good ore about 2 feet wide composed of quartz and calcite, well mineralized with pyrrhotite, arsenopyrite, and chalcopyrite, assaying: Gold, $10 to the ton; silver, 1.5 oz. to the ton; copper, 9 per cent. At 50 feet in the tunnel a lens of solid sulphides, pyrrhotite, and chalcopyrite, about 20 feet long, or nearly to the face, and up to 16 inches wide, has been left standing on the hanging-wall side of the vein. An examining engineer's sample of this assayed: Gold, $15 to the ton; copper, 9 per cent.; while a piece of the pure chalcopyrite assayed: Gold, $1.20 to the ton; copper, 17.5 per cent. A short crosscut shows a seam of oxides on the hanging-wall of the shear, and while the face of the tunnel shows about 3 feet of slighly mineralized vein-matter, it warrants driving ahead and widening to the left to cut into the hanging-wall seam with the expectation of encountering more lenses of ore.

About 200 feet north of this zone is another shear about 10 feet wide, showing about 2 feet of oxidized material on the foot-wall side. The balance of the zone is a fine-grained, dark-coloured argillaceous rock in which are veinlets of sparsely mineralized calcite. Lumps of sulphides are found in the oxidized portion; a few pieces of arsenopyrite from here assayed $28 to the ton in gold. I learned later that this north zone had been open-cut higher up the hill and looks very promising. I considered it well worth driving a tunnel at the point I saw it.

There is another wide zone on the *Mountain Ash* showing some mineral, but very little has been done on it.

Though in the Esquimalt & Nanaimo Railway belt, this property was staked prior to the land-grant and therefore holds all surface and mineral rights. Altogether the property has very attractive possibilities, with transportation the main handicap.

Cameron Lake Section.

Arrowsmith. The only property examined this year in this section was the *Arrowsmith* group, which is comprised of two claims, the *Arrowsmith* and *Outlook*, situated above the lower end of Cameron lake, about 1½ miles from Chalet Station. There is a good foot-trail from the highway. The claims were staked by M. L. Douglas, of Duncan, and are now owned by a Duncan syndicate of E. F. Miller and associates. The

and eighth, were opened by tunnels from the surface; the tenth and twelfth by sinking a 3-compartment shaft from the eighth level.

The underground work in 1928—3,413 feet of drifting, 240 feet of crosscutting, and 110 feet of raising—has been confined chiefly to the two lower levels, which are 200 and 400 feet respectively below the eighth. About 4,000 feet of diamond-drilling also was done this year. Altogether there are about 4 miles of underground work.

The result of the work on the lower levels has been satisfactory in that the downward extensions of the ore-bodies exposed in the levels above have been proven, with the additional encouragement, as stated, of a greater bornite content and an increase in gold values. Besides the underground development, the shaft has been double-tracked for counterbalance hoisting, the ore-pockets enlarged, and an electrical hoist installed, and electrical haulage-motors are being installed on the No. 8 level.

This has necessitated the enlargement of the Raging River power plant by the addition of a 200-horse-power a.c. electrical generator driven by direct-connected Pelton wheel. The flume was also enlarged to provide the extra supply of water for the units. The truck-road was completed from Kathleen lake through the camp to the No. 8 tunnel, and there is now uninterrupted truck and boat transportation from Jeune Landing, the port of call for Coast boats, to Quatsino sound.

C. A. Seaton is superintendent in charge at the mine and of the company's operations on the north end of the island.

Yreka. This property, situated on the South-east arm of Quatsino sound, is comprised of two groups of eight Crown-granted mineral claims each. The original claims were staked in 1898 and developed up to 1903, when operations stopped, to reopen again in 1916, when additional extensive work was done.

W. M. Brewer, Resident Mining Engineer at that time, reporting on the property in the fall of 1916, makes the following concluding remarks: That the new work done on the Yreka has exposed a large ore-body, especially important when the extremely favourable transportation facilities by which ore could be freighted to smelters at a very low cost are considered. That probably 20,000 tons of ore can be quarried for shipment, with a reasonable possibility that further work will expose much greater tonnage. That while sampling shows the ore to average 3 per cent. copper, a higher grade could be hand-sorted out for shipment.

A more recent independent examination in 1927 describes the mineralization as veins from 5 to 14 feet wide, up to 200 feet long, occurring across a width of 200 feet of a contact-belt between limestone and igneous rocks extending for a length of 2,000 feet. The ore will average about 3 per cent. copper and 3 oz. silver. This report also mentions an occurrence of lead-zinc ore as a replacement in limestone at 1,500 feet elevation, between the copper-belt and the lake.

From these reports I judge that the property has prospective merit and is therefore mentioned here for the consideration of the reader.

NANAIMO MINING DIVISION.

This is the largest Division in the district, containing about one-third of Vancouver island and one-half of the Mainland portion of the district. With practically the whole of the east coast of Vancouver island and 160 miles of the west coast of the Mainland, it is probably the most ideally located Division in the Province.

Government office statistics are distinctly encouraging, as they show an increase in 1928 over 1927: In miners' licences, from 130 to 301; claims recorded, from 124 last year to 370 this; assessments, from 175 to 229; and 36 reverted Crown-granted claims redeemed.

Nanaimo River Section.

Silver Leaf. (*See* 1927 Annual Report.) The three claims comprising this group—*Silver Leaf*, *Mountain Ash*, and *Hemlock*—are situated at the head of Jump creek, a south branch of Nanaimo river. They are owned by T. Service, the original staker; E. F. Miller, of Duncan; and others, forming the Silver Leaf Syndicate. The best way to reach the property is from Youbou, the last station on the Canadian National Railway on Cowichan lake, and then up Cottonwood creek, a distance of about 10 miles. One may also go over the divide at 3,625 feet elevation from the *El Capitan* trail on the Cowichan Lake slope, but it is a hard trip from the summit down to the cabin at 2,000 feet elevation.

The showings consist of three shears in the andesite of the Vancouver volcanics, mineralized with pyrrhotite, arsenopyrite, and chalcopyrite. Two of these have had considerable work done on them, while the third one, on the *Mountain Ash* claim, has not been prospected to any extent. The first two are about 50 feet apart on the level of the tunnel driven on the south vein. The south vein strikes S. 30° W. (mag.) and dips south-east; the north vein strikes east-west and dips east; and therefore the veins will come together a short distance down the hill from the tunnel, and, judging from the mineralization of both, their intersection should be worth prospecting.

A tunnel has been driven 70 feet on the south vein under a surface ore-showing. This work cuts an ore-shoot, about 50 feet in length, of from 16 inches of clean chalcopyrite to 2 feet or more of mixed ore, assaying: Gold, $10 to $15 to the ton; silver, 1.5 oz. to the ton; copper, 9 to 11 per cent. This year a winze was sunk, 25 feet back from the face, to a depth of 6 feet, showing the downward continuation of the clean chalcopyrite in a vein-width of 2 feet. The clean ore does not show in the 3-foot vein in the face of the tunnel, but I think can be picked up by cutting over to the hanging-wall. This tunnel should certainly be extended.

On the north vein, 50 feet from the mouth of the tunnel, a few shots put in this season show the vein to be 2 feet wide, of streaks of chalcopyrite and oxidized material. A sample across the 2 feet gave assays of: Gold, $13 to the ton; silver, 2.2 oz. to the ton; copper, 16 per cent. About 500 feet above this showing, at 2,800 feet elevation, an open-cut on this vein shows the width to be 5 feet, of which 18 inches on the hanging-wall is clean chalcopyrite. Another stripping 200 feet above this shows the same width of vein, but it has not been broken into.

These two veins, though small so far as opened up, make a very attractive property that could be profitably operated under favourable transportation conditions. If the three properties, the *Silver Leaf*, and *El Capitan* and *Cottonwood* on the Cowichan Lake slope, were worked in combination it might be feasible to tram the *Silver Leaf* ore over the summit and down to the Canadian National Railway on Cowichan lake.

Campbell River Section.

There are two old properties in this section, the *Big G.* group and *Sumpter* group, on which considerable amount of development-work was done some years ago.

From the 1916 Annual Report I gather that the *Big G.* group is situated at Little Campbell River, on Greenstone creek, reached from Forbes Landing by launch to the corduroy road at Campbell River, from which point the road was built 6 miles to the mine. In 1916 40 tons of chalcopyrite ore was shipped. Quoting in part from the Government report, "The mine-workings are on the side of a deep precipitous canyon through which the Little Campbell (Greenstone creek) flows and about 100 feet above the river-bed. They consist of several large open-cuts and two adits: one of the latter is 60 feet long, with an upraise about 30 feet high at the face of the adit, and the other is 80 feet long. Outcroppings of considerable extent made up of pyrite and pyrrhotite with some chalcopyrite form the summits of bold bluffs. The occurrence of ore exposed by the workings has the appearance of being a blanket outcrop, covering a bluff, rather than a deposit filling a fissure in a shear-zone in igneous rock. The country-rock resembles andesite, but is very much altered and fractured. In the first-mentioned adit no well-defined ore-body occurs, but the country-rock is mineralized to some extent with iron pyrites, some chalcopyrite, and pyrrhotite. In the other adit there is a lens of ore that is about 3 feet wide at the entrance, but this width gradually contracts until at the face of the adit the ore is only a few inches wide. This ore is an association of pyrrhotite and chalcopyrite."

Sumpter. This group is situated on the north-westerly shore of Upper Campbell lake, near the north-east end of the lake. The Annual Report for 1916 states in part: "An occurrence of mineral, made up chiefly of copper carbonates developed between two limestone walls in a gangue chiefly composed of garnetite with some iron-stained, crushed limestone, occurs at a slight elevation above the lake and within 300 feet from the shore the width of mineralized material is about 9 feet.

"On another claim there is a lens of copper ore that outcrops in limestone at a point about 200 feet from the shore and about 200 feet elevation. There is a shaft sunk on this outcrop 8 feet deep, on the bottom of which is a stringer 18 inches wide, of bornite mixed with chalcopyrite. After the shaft was sunk the owners drove an adit 150 feet long from a point about

The location of the samples is shown on Figure 8. In No. 1 adit the shear zone containing sheared basalt and rusty oxidized material is 2½ feet wide at the portal, 4 feet wide 25 feet from the portal, and branches to two zones 6 to 8 inches wide near the face. No. 2 adit follows the same shear zone for about 90 feet, and in it the zone varies in attitude and width, and the oxide-bearing zones are discontinuous. No. 3 adit was driven in the hope of finding the shear zone exposed in No. 1 and No. 2 adits. The hornblende porphyry dyke and shear zone are not exposed in No. 3 adit but are reported to have been found about 20 feet north of the adit in two crosscuts now filled with waste rock. The adit follows a continuous shear zone, parallel to the main shear zone and containing sheared basalt but no rusty oxidized material. A little copper stain shows on the wall of the adit about 20 feet from the portal, and a small chalcopyrite-bearing quartz stringer is exposed in the face.

[References: *Minister of Mines, B.C.*, Ann. Rept., 1927, p. 337; 1928, p. 364; 1932, p. 202; 1935, p. 52.]

Cottonwood

Workings on the claim, referred to in old reports as the Cottonwood, are between elevations of 3,850 and 4,000 feet above sea-level about 1,500 feet northwest of Lomas Lake. In recent years the claim has been relocated under several different names, and in 1954 the ground was open.

The workings expose a more or less continuous shear zone in the porphyritic basalt that strikes about north 70 degrees east and dips steeply northward. The upper adit, at an elevation of 3,975 feet, has been driven in the general direction of north 80 degrees east a distance of 60 feet along the shear zone. Sheared basalt containing porous iron oxides and a few lenses of quartz is exposed throughout the length of the adit, and two irregular quartz veinlets about 6 inches wide occur in the face. A sample taken across 2.5 feet in the face contained no gold or silver, and one taken about 20 feet from the face, across 2 feet, made up of heavily oxidized material assayed: Gold, 0.12 oz. per ton; silver, 0.60 oz. per ton.

Two open-cuts and two short adits have been made in the hillside below the upper adit and expose several minor faults containing 6 to 8 inches of sheared basalt and local concentrations of iron oxides. In the lower of the two cuts some pyrite and pyrrhotite are disseminated through the basalt. The lowest adit, at an elevation of 3,850 feet and about 200 feet south 80 degrees west of the portal of the upper adit, is about 50 feet long and follows what is probably the same shear zone as that in the adits and open-cuts above. Sheared basalt is exposed in the adit, and material on the waste dump, reported to have been taken from a small lens of sulphides near the portal, contains massive sulphides. These include pyrite, pyrrhotite, arsenopyrite, chalcopyrite, and probably cobalt sulphides as some samples are coated with erythrite. Two specimens were tested with a Geiger counter but no radioactivity could be detected.

[Reference: *Minister of Mines, B.C.*, Ann. Rept., 1927, p. 338.]

Silver Leaf

The Silver Leaf group consists of two Crown-granted claims, the Mountain Ash (Lot 28G) and Silver Leaf (Lot 29G), and the Hemlock Fraction (Lot 30G), owned by R. G. Gore-Langton and associates, of Duncan. The Mountain Ash claim was staked in 1911, and the others shortly after by the late Thomas Service, of Lake Cowichan. The workings are between elevations of 2,400 and 2,600 feet above sea-level on the west side of a creek flowing northward from the pass west of El Capitan into a tributary of Jump Creek. A trail, originally used for pack-horses, extends from the logging-road near the head of Widow Creek to a cabin at an elevation of 2,200 feet on the creek east of the Silver Leaf workings. The workings include three adits driven westward at the base of a bluffy hillside to follow two shear zones (*see* Fig. 9). No. 1 adit was driven before 1923, and the other two are reported to have been driven during the summer of 1945.

The shear zones cut massive Franklin Creek basalt. The most southerly zone, exposed in Nos. 1 and 2 adits and on the surface above the adits, strikes westward and

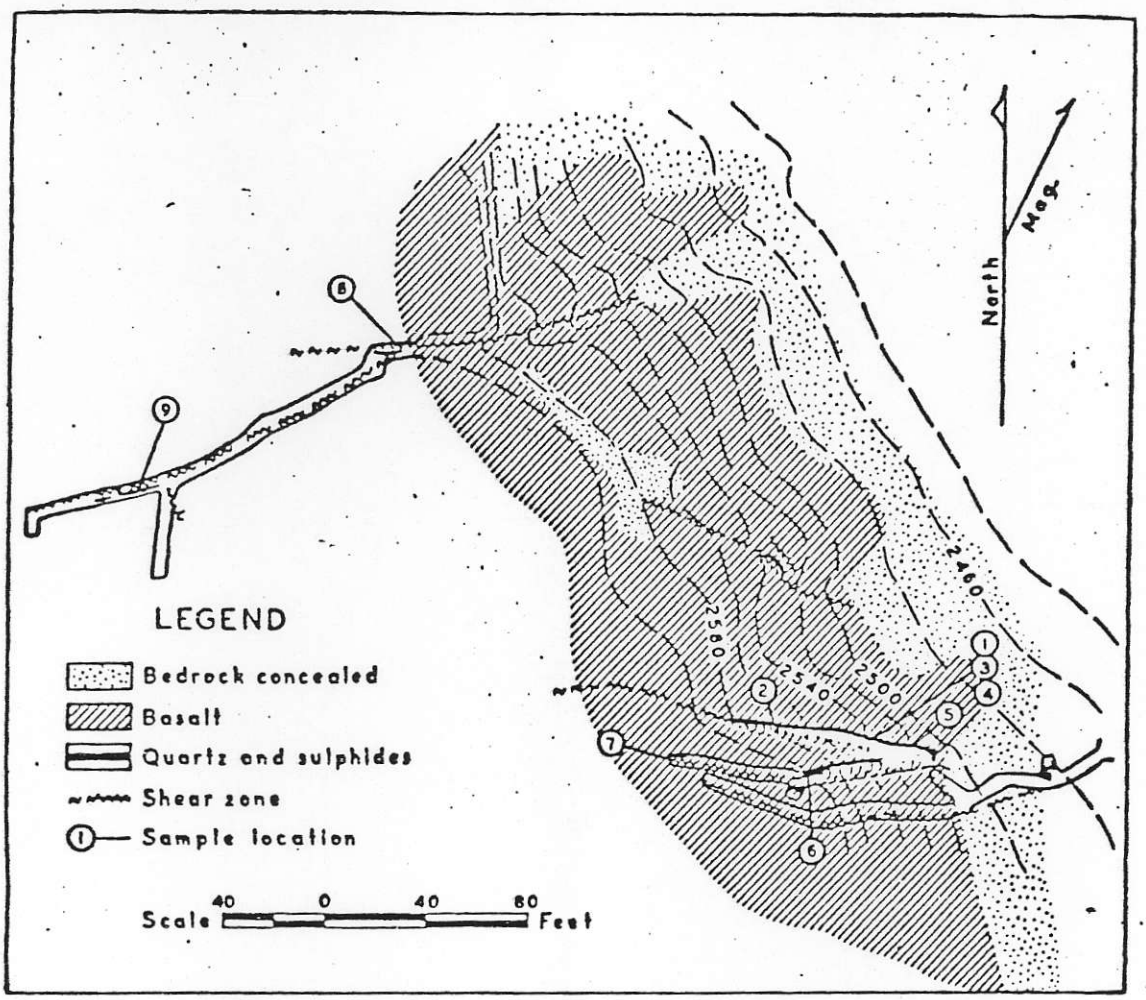

Figure 9. Silver Leaf—composite plan of workings and geology.

dips 65 degrees to the south. On the surface a lens of oxidized sulphides in the shear zone is exposed at the portal of No. 1 adit and extends westward up the steep slope above the portal a horizontal distance of 95 feet. The sulphide zone is 4 feet wide at the portal and maintains this width for about 50 feet but tapers to nothing to the west. The shear zone continues for several hundred feet up the hill, but very little sulphide was seen west of the main showing. The sulphide zone occurs in No. 1 adit extending from the portal to a shallow winze about 60 feet from the portal. Talus covers the hillside below No. 1 adit, and in No. 2 adit lagging covers the walls near the portal, but sulphides are exposed in the back of No. 2 adit a distance of about 20 feet from the portal. No. 2 adit follows the shear zone to the face, about 150 feet from the portal, but very little sulphide was seen in it beyond about 30 feet from the portal. Thus the sulphide zone in general appears to form a lens, thinning to the west and downward.

The mineralized parts of the shear zone contain massive fine-grained sulphides including pyrite, chalcopyrite, pyrrhotite, and minor arsenopyrite. Quartz, calcite, and sheared basalt make up the gangue. Lenses of greenstone low in sulphides are present in some parts of the sulphide zone. Assays in the following table give values in copper, gold, and silver and spectrochemical analyses indicate that no other metals are present in significant amounts.

Sample No.	Width	Gold	Silver	Copper
	Feet	Oz.	Oz.	Per Cent
1[1]	2.7	0.24	0.6	—
2	3.5	1.14	2.8	12.9
3	1.2	0.68	1.9	15.3
4	2.0	0.52	1.7	14.5
5	4.0	0.10	0.2	2.3
6	4.5	0.50	4.4	4.5
7[1]	1.5	Nil	Trace	—
8	1.0	0.18	0.2	3.1
9[1]	1.0	1.22	0.2	—

[1] Contains no visible chalcopyrite.

No. 3 adit, about 250 feet northwest of No. 1, follows first a westerly trending shear zone for about 20 feet, then follows a zone trending south 60 degrees west a distance of 150 feet to the face. The westerly trending zone dips steeply southward and the other zone is vertical. Sulphides including pyrite, chalcopyrite, and arsenopyrite occur locally across widths of as much as 1½ feet. Two assays of samples (Nos. 8 and 9) taken in No. 3 adit are given in the table above (*see* Fig. 9).

The rock chimney above No. 3 portal exposes a shear zone, probably the same one as that trending south 60 degrees west in the adit. The zone ranges from 3 to 4 feet wide and contains lenses of sulphides as much as 6 inches wide. A sample of this material about 120 feet from No. 3 portal across a 4-foot width assayed: Copper, 7.2 per cent, and traces of silver and gold. Another taken about 250 feet up the chimney from the portal across a 3-foot width assayed: Copper, 2.5 per cent; gold, 0.24 oz. per ton; silver, trace.

A mineralized zone on the Mountain Ash claim is reported to occur at an elevation of 3,100 feet, about 1,000 feet south of No. 1 adit.

[References: *Minister of Mines, B.C.*, Ann. Rept., 1923, p. 243; 1927, p. 348; 1928, p. 376.]

MANGANESE DEPOSITS

Manganese minerals occur at several places in the cherty members of the Sicker group north of Cowichan Lake. The most westerly occurrence, known as the Black Prince, is near the head of Shaw Creek; the most easterly, the Hill 60, is about 4 miles east of Lake Cowichan. Between these, in a belt about 4 miles wide, along the north side of Cowichan Lake, six other occurrences are known.

The Hill 60 deposit was first staked in 1918, and in 1919 and 1920 is reported to have shipped 1,117 tons of ore. This production stimulated prospecting, and by 1920 several other occurrences including the Black Prince and the Cottonwood deposit on Widow Creek had been found. No ore was shipped from Hill 60 after 1920, and little interest was taken in any of the deposits until about 1939. In 1939 trainees of the Dominion-Provincial Mining Training Project cleaned out and extended trenches on the known occurrences and found several others, which they explored by trenching and stripping. In 1954 none of the deposits was staked. Most of these occurrences are shown on the map (*see* Fig. 2), though the Hill 60 and one or two small occurrences west of Hill 60 are east of the east edge of the map. The writer visited most of the occurrences in 1948.

The manganese deposits occur in cherty members of the Sicker group, principally within the lower part of the 600 feet of cherty tuff immediately above the marker described on page 18. The manganese deposits are associated with massive brick-red jasper occurring in beds 6 inches to 3 feet thick, or with red, pink, and white cherty sediments interbedded with less brightly coloured cherty tuffs. These red sediments, rich in hematite, are present at all the manganese deposits seen by the writer but also occur locally in the cherty members of the Sicker group, where no manganese deposits are known. Under the microscope, cherty rocks in which manganese occurs appear to be