

REPORT BY B. T. O'GRADY, ASSISTANT RESIDENT ENGINEERDEPARTMENT OF MINES

This group consists of the following seven crown-granted claims: Excelsior, Lot 12657; Fern, Lot 12656; Standard IVA-FERN, 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 $5\frac{1}{2}$ 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 ten 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 has 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 further 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 ~~xx~~ 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 percent.; 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 chalcopyrite 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 semi-circular 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 very 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. 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.