

The Hudson Bay Mine

Summer Essay

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Submitted by

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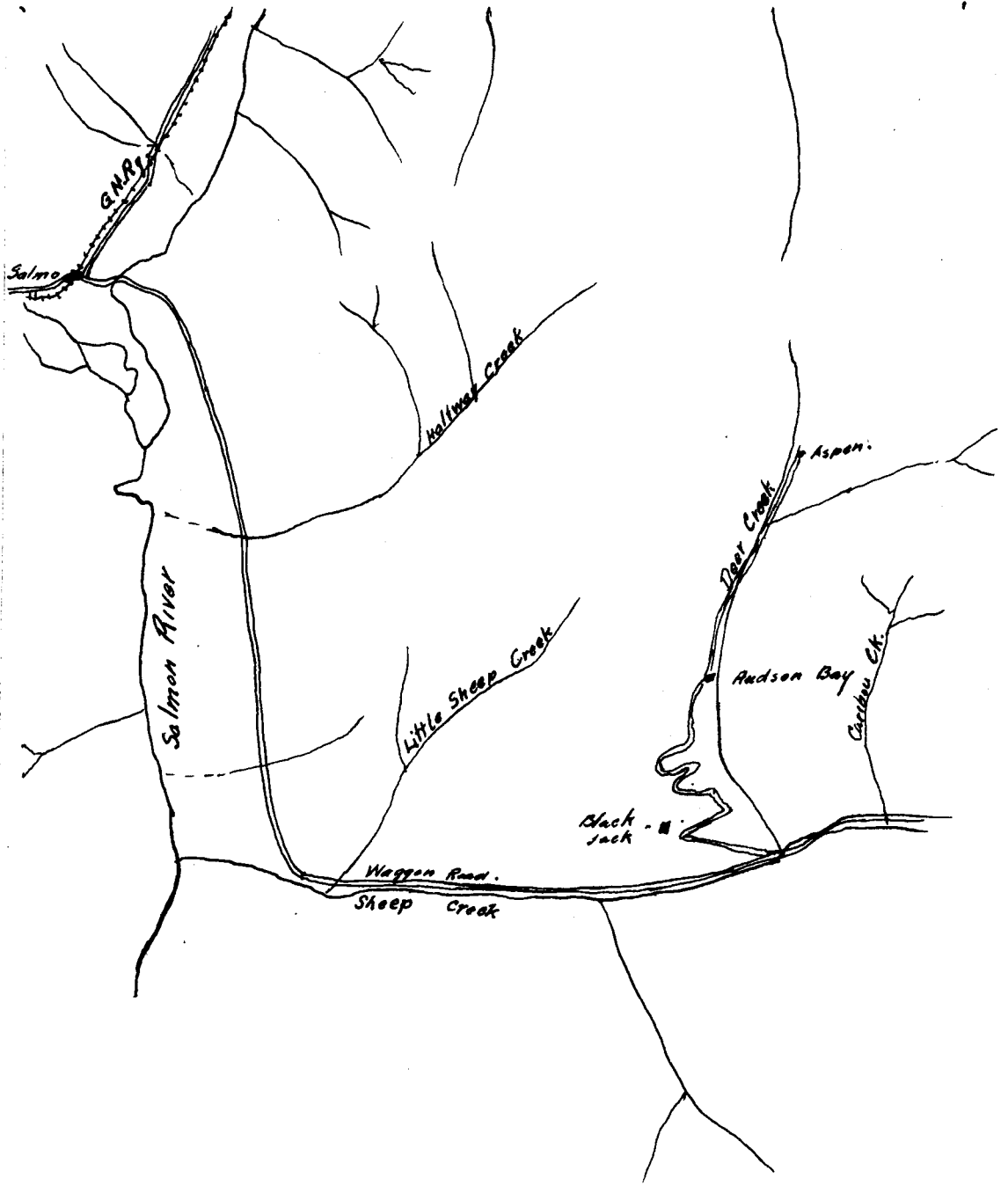
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Map I

Emerald Group

Sketch Map of Surrounding Territory
Scale Approx 1 mile to 1 inch.

THE HUDSON BAY MINE

LOCATION AND HISTORY

The Hudson Bay mine, or H.B., as it is generally called, is one of the mines of the Sheep Creek camp, in the Nelson Mining Division, Province of British Columbia. The cabins are built on a flat on the hillside, above the west bank of Deer Creek. This is about a mile and a half from the junction of Deer and Sheep creeks. (Map I). The elevation of the mine is about 3,500 feet above mean sea level. A wagon road about two and a half miles long connects the property with the main Sheep Creek road. The Great Northern Railway passes through Salmo, eight miles distant.

This group of claims was staked, about the year 1910 by Horton, Billings, and others. The Consolidated Mining and Smelting Company took out a lease and bond on the property. They did some development, and shipped some ore; but allowed the bond to lapse. In 1914 Salibury and Larson leased the property and shipped a considerable tonnage of zinc ore. In the summer of 1915 the Zincton came under the same control as the H.B. Both were bonded by R.K. Niell who represented American capital.

1. Report of Minister of Mines, 1915 - p.160

During 1916 they shipped over six thousand tons¹ of ore. Much development work was done. The No.7 tunnel, 1906² feet long, was driven in an effort to find the extension of the ore body, at a depth of 650 feet below the main workings. 1553 feet of diamond drilling was done from this new level in a further attempt to locate the ore shoot. In 1917, about 1500² tons of carbonate ore, averaging 32.7% zinc, were shipped. The mine then closed down, probably due to the low price of zinc. It was not reopened until 1925 when the Victoria Syndicate commenced work. In 1926, for development, they drove over 3000 feet of tunnel. This was the No.4 level, driven for the purpose of obtaining depth on the ore body. In 1927 P.F. Horton, past owner of the mine, shipped 15 cars of lead carbonates. The Consolidated Mining and Smelting Company purchased the property that autumn. No further work has been done.

DESCRIPTION OF MINE.

The workings consist mainly of three levels opening to the surface by adits. These levels are numbered in order (from top to bottom), 2, 4 and 7. Two sub-levels, Nos. 1 and 3, lying respectively above and below No.2, connect through it to the surface. Along the zone of mineralization the surface is cut by a network of glory holes and trenches.

1. Report of Minister of Mines, 1916 - p.205
2. Report of Minister of Mines, 1917 - p.170

Some of these have been stoped downwards. To the south of, and somewhat higher than No.2, is the old Zincton tunnel.

No. 2 level, the oldest and main working is at an elevation of 3850 feet above mean sea level. The bearing of this adit is 219° (Map 2 in pocket). The adit runs straight for about 500 feet, then swings slightly to the right, and continues for another 150 feet. At 370 feet and 425 feet, there are drifts to the north along veins. These drifts are connected by a crosscut 130 feet from the adit. The drift at 425 feet continues beyond this crosscut, but is caved 100 feet further. These drifts have been stoped for ore.

At 400 feet along the main adit is a drift to the south along a wide replacement band. This drift widens to form the high stope. In this neighborhood it opens out into a maze of tunnels and stopes. The high stope is about 15 feet wide. Here also are shafts to levels ~~one~~^I and ~~three~~^{III} but these shafts, like the levels, are caved. At 450 feet along the main adit is another short drift to the north and to the south. Stoping was done here on two feet of oxides.

No.4 level, consisting of about 3500 feet of tunnel, is about 300 feet below No.2. The direction of the adit is 238° . This adit, 1100 feet long, has at 790 feet drifts running north and south into the ore zone. These drifts are tortuous and have many short crosscuts exploring the rock on each side.

No. 7 level is a straight adit running, without any crosscuts, 1900 feet into the hill. This portal is the lowest of all, and is 650 feet below No.2.

GENERAL GEOLOGY

The mine is in the "lime belt," a band of limestone extending more or less continuously across the country from the Aspen to the Emerald¹. The rocks consist mainly of grey marble which Daly and Le Roy named the Pend d'Oreille limestones.² In the absence of fossils, all correlations were based on lithology alone. The age of this formation was placed as Palaeozoic, probably Carboniferous.

The whole area is underlain by biotite granite, a phase of the Nelson batholith. No granite outcrops on the property.

LITHOLOGY AND STRUCTURAL GEOLOGY.

The sediments consist of crystalline limestones varying in color from black to white, the prevailing color being grey. Some of these limestones are narrowly banded, (Spec. 1). In places they are much broken, the very black carbonaceous limestones generally being converted into limy schists.

The general trend of the strata is North-South, approximately parallel to the side of the hill. The strike

1. Report of Minister of Mines, 1915 - p.160.
2. Geological Survey of Canada. Explanatory notes on map 1068 - "Sketch Map of Sheep Creek Mining Camp, West Kootenay, B.C."

tends to swing considerably, due, no doubt, to the proximity of the granite. The dip is away from the hill, that is, to the east. The dip varies considerably but is generally steep (from 40° to 70°).

Some of the strata are much contorted and folded. This is very noticeable above the Zincton in some of the narrowly banded limestone outcrops. To a lesser extent the same thing may be observed in No.7 adit.

This mine shows considerable evidence of igeous intrusions. A very small tongue of the biotite granite is cut by No.7 adit. This is the only granite showing on the property. There are many basic dikes. These cut the beds usually at low angles. The composition and texture of these dikes varies considerably. Some are fine grained, others are relatively coarse. Some contain so much mica that they may be called mica porphyry. These dikes cut across the mineral-¹ization and are therefore post mineral.

There are many faults and slips. Some of these are evidently later than the dikes, as is seen by the displacement of the dikes. The movement as measured by the displaced dikes is not large. These slips have little bearing on the occurrence of ore.

MINERALIZATION

The ore bodies are of the replacement type, but are

1. Report of Minister of Mines, 1915 - p.161

so regular that they are called veins.¹ These "veins" lie along the bedding and strike with it. There are several more or less parallel veins, all striking North and South. The ore bodies lie wholly in the limestone and seems to be a replacement along a favorable band. The transition from ore to limestone is not sharp; but, as would be expected in a replacement deposit, is graded. This gradation zone is usually wide. The ore bodies extend to the surface where they are uncovered by large surface cuts and glory holes. The depth of the ore bodies is not great, the ore dying out rapidly at No.4 level. No.7 level is quite barren.

The ore is of two types, sulphides and carbonates. Most of the commercial ore of the mine is of the latter type. The carbonates are found mainly in the upper workings; the sulphides, in No.4 level.

Mineralization extends more or less continuously to the Black Jack group, a half mile to the south. Mineralization of the same type is also seen on the south side of Sheep Creek. The mineral appears to be mainly zinc blende deposited along the bedding planes. The values are low as the mineral is much disseminated. This mineralized zone is quite wide and runs in a north-south direction.

In No.4 level of the H.B. the ore is predominately sulphide. It consists almost entirely of zinc blende and pyrite in a limestone gangue. The two minerals may occur

1. Minister of Mines Annual Report, 1915, p.160

together or separately. The pyrite is apt to occur as coarse crystals, and where it occurs alone and in quantity is often massive. This is illustrated in its occurrence in the beginning of the north drift. (See map III, in pocket). The blende is of the medium brown variety and rarely is massive. Usually it is found with pyrite. When it occurs alone it generally appears as laminae along the bedding of the limestone, (Specimen II). This formation furnishes additional evidence that it is a replacement deposit. Occasionally we find small nodules of galena in the ore.

The carbonate ores in the upper workings were evidently formed by oxidation of the sulphides by the action of descending ground water. Secondary enrichment undoubtedly took place. Evidence in support of this, is the fact that the oxidized ores are richer than the unoxidized ores.

The oxidized zone extends from the surface down almost to No.4 level. ~~Some~~ ^{Partial} oxidation has taken place there, but this is only partial. In No.2 (the main level) there appear to be several well defined bands carrying carbonate ore. The two main bands appear to coalesce and widen to the south. A considerable quantity of ore has been taken out, especially in the region of the high stope. Along the leads to the north are two drifts which have been extensively stoped. Other, smaller bands of oxidized ground and carbonate ore are found. (See Map II in pocket). In No.4 level the oxidation is greater in the broken ground along the north

drift. Most of this however is not commercial ore.

The ore is almost completely oxidized and consists principally of zinc carbonate. It is earthy in texture and, is as a rule, of a brownish red color, due no doubt, to the limonite present. (Specimen No.3). The zinc bearing minerals are zinc, carbonates and oxides, with a minor amount of silicates and phosphates. The main No.2 drift opened into a large cave, from the floor and roof of which were stalagmites and stalactites of calamine, a silicate of zinc. This calamine is a pearly white material with a vitreous lustre. Some of this supposed calamine was found by Dr. Walker of the University of Toronto, to contain a large percentage of phosphate of zinc. To this new mineral he suggested the name "lusitanite"¹. Other minerals discovered were a series of hydrozincites, composed of hydrated oxide of zinc and silicate of zinc in varying proportions.

A minor amount of lead minerals are also found in the ore; namely, lead carbonate and galena. Near the surface and also at the south end of No.2 the lead minerals predominate over the zinc. The vein filling here is lead carbonate with some limonite. It contains small nodules of galena. The gangue minerals of the carbonate ores consist mainly of limestone, limonite and a small percentage of silica.

²
It was thought by Galloway that the silicification of some of the ore was accomplished by hot alkaline waters,

1. Report of Minister of Mines, 1915 - 161.
2. Report of Minister of Mines, 1915 - 161.

carrying silica in solution, rising and attacking the carbonates. Silicates were thus formed. The alkaline waters were the result of igneous activity and probably followed in the wake of the basic dikes which cut the ore.

It is an interesting fact to note that the zone of oxidation ends at about the same elevation on the Black Jack ^{as} and on the H.B.; that is, about 3500 feet above sea level. Mineral above this horizon is usually oxidized, while that below is not, though, as on the Black Jack it may be uncovered by shallow surface cuts. This fact would appear to suggest that much of the oxidation took place before the country attained its present topography. This is quite ~~feasible~~ ^{possible}, as it is evident that much erosion must have taken place since mineralization, in order to uncover the ore and to carry away the ground which was leached by descending ground waters.

CONCLUSION

Geologically, the mine is interesting. Many agencies were involved in the formation of the ore deposits. Magmatic fluids brought in the ore, dykes were intruded and silicification was brought about by magmatic waters. The ore was exposed by erosion; and since then the atmosphere and ground water have had their effect on the ore, causing concentration and oxidation.

As a commercial mine it is a good, though small property. The possibility of new ore shoots is small. There

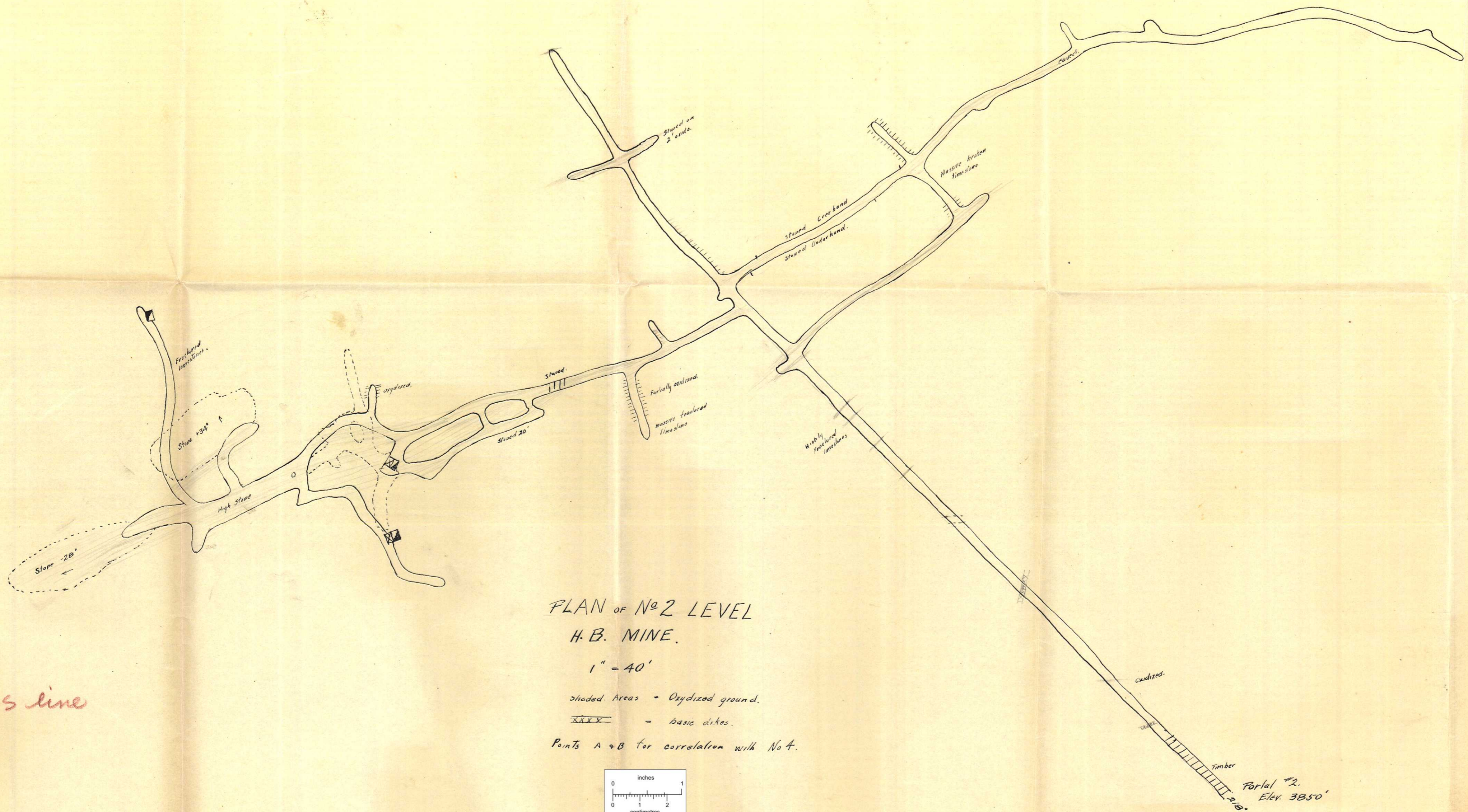
is a considerable amount of ore left between levels, and also along the drifts, especially to the south. This ore, on account of its character is easily and cheaply mined. There are no great transportation difficulties with which to contend. The mine is undoubtedly a success.

ACKNOWLEDGMENTS

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7.

8B



no NTS line

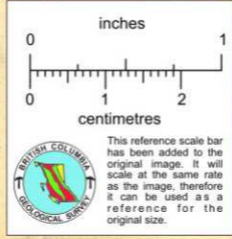
PLAN of No 2 LEVEL
H. B. MINE.

1" = 40'

shaded Areas - Oxydized ground.

XXX - Basic dikes.

Points A & B for correlation with No 4.

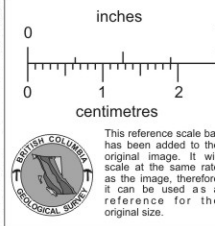


No. 4 Level. H.B. Mine.

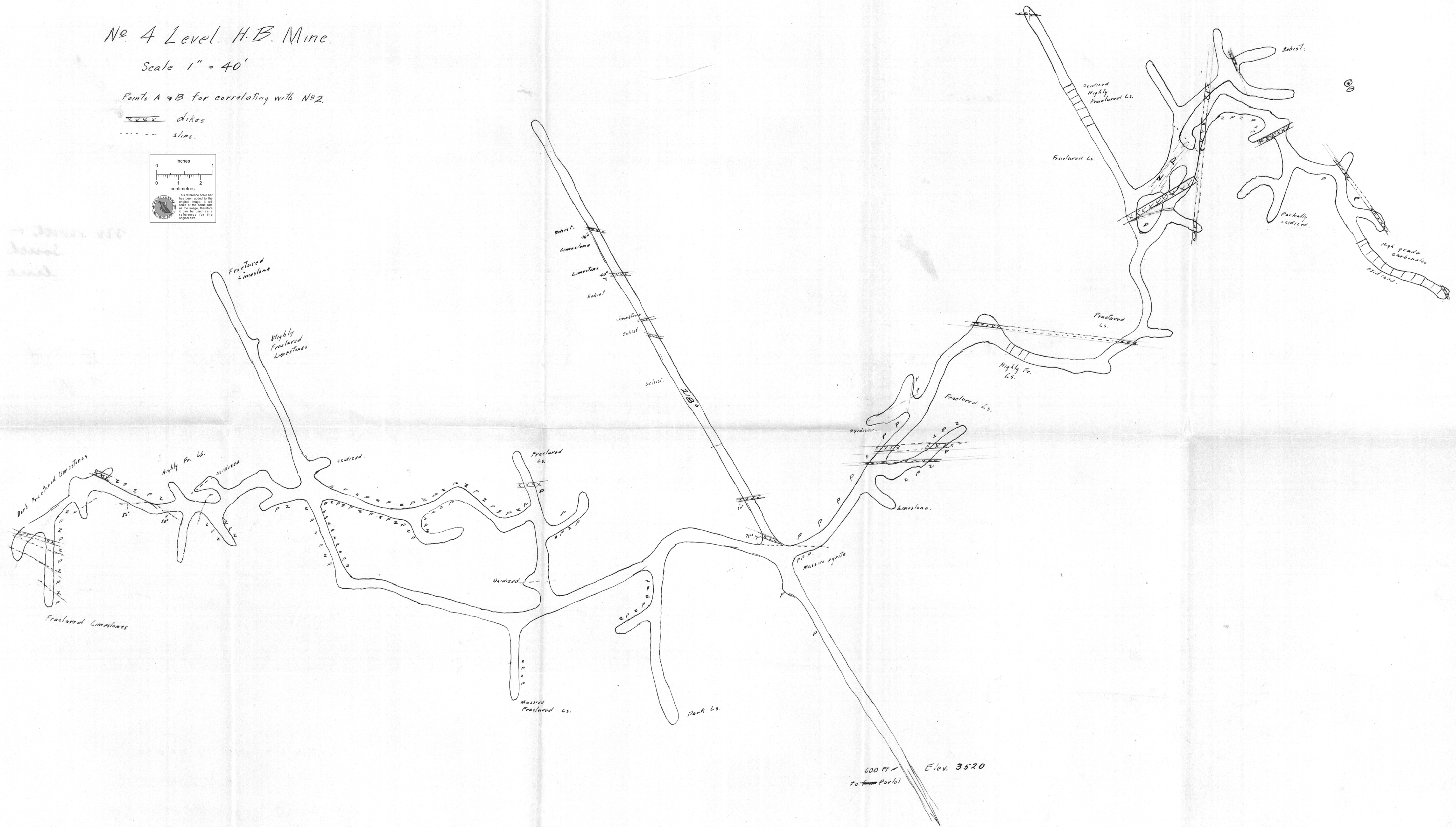
Scale 1" = 40'

Points A & B for correlating with No. 2

XXXX dikes
----- slips.



→ Jones off level and



600 FT. Elev. 3520
to Portal