DATA

The data for this report was gathered by the author, during over a month's stay at the Property, in June and July, 1935. Also a careful study of the production report and milling records of the test mill runs has been made.

The tunnels and surface were surveyed by the author and the maps prepared by him. The samples were cut by an engineer from his office and under his supervision. The assays were run by reliable assayers and are certified to.

There has been no known material fact included or omitted that would change the conclusion to be drawn from the report.

The photographs were selected to show the topography of the country, and to give an idea of the buildings now on the property.

GEOGRAPHICAL

This report is confined almost entirely to the Ruth Vein and claims adjoining. This vein is located on Battle Axe Creek about a mile east of the point where it empties into the Little North Fork of the Santiam River, in Township 8 S., Range 5 E., W.M.

The country is very rugged, rising sharply from the narrow "V" canyon formed by Battle Axe Creek, on slopes that will average over 35 degrees. The elevation of the creek, where the Ruth vein crosses is about 2450 feet, while the southeast end lines of the Ruth claims are at an elevation of nearly 5000 feet.

The claims are heavily timbered with fir, hemlock and cedar, suitable not only for mine timbers, but for sawing into frame timbers and lumber.

The property is in the Willamette National Forest.

CLIMATE

The climate at the mine is such that operations can be carried on throughout the whole year. Being situated in Western Oregon, there is a wet and dry season. The summer has warm days and cool nights, so that the camp is a delightful place.

The winters are mild, but because of the surrounding high mountains, the snowfall is heavier than would be expected at an altitude of 3000 feet. But only after severe storms is it necessary to remove the snow by any other method than the usual daily operation of the ore trucks.

TRANSPORTATION - COMMUNICATION

The Mine Post Office is located at Mehama, Oregon, a small town situated on the main paved road from Salem to Mill City and Breitenbush Hot Springs. From Mehama a county road leads up the Little North Fork of the Santiam River to Elkhorn, and joins with a Forest Service road to the mouth of Gold Creek. From this point the mining company has built a good truck road through its own properties. At this time negotiations are under way for the Forest Service to take over this road and build on through to Elk Lake, connecting with the Elk Lake - Breitenbush Road and the Skyline Trail.

There are also side roads or trails to the tunnels so that timber, equipment and supplies are easily moved where needed.

There is a Forest Service telephone line leading from the Pearl Creek Guard Station through the property and on over to Detroit. When necessary this phone line can be connected at Mill City to the Tell telephone from the mine to the outside.

HISTORY

The ore in this district was discovered first during the gold activities of 1850 to 1860. Since that time several attempts have been made to work the deposits, but not until Mr. J. P. Hewitt became interested in the district was any great progress made in opening the ore bodies.

The Columbia Company has a test mill at the junction of Boulder and Battle Axe Creeks. This mill has both flotation and table concentration and the reports of the test runs show that a clean zinc concentrate can be made, and a lead concentrate containing the copper, gold, and silver, is produced that is a valuable by-product.

LABOR - TIMBER - POWER

Being only 100 miles from Portland, common labor is easily obtained.

Expert mining labor has to be imported from other mining districts.

Supplies are brought in from Portland by truck. It is about a four hour trip with a heavily loaded truck.

Mine timber can be cut on the company's own claims and the supply is sufficient for years to come.

Water power is available and can be cheaply developed from Battle Axe and Boulder Creeks and the river, but at present it is cheaper to use steam power generated from the abundant wood supply.

WATER AND POWER

There is ample water in Battle Axe Creek for all mining and milling purposes (60 second feet), but in order to get tailing storage for a mill and not pollute the stream, it will be necessary to do the milling at, or below, the junction of Battle Axe Creek with Boulder Creek on the Little North Fork of the Santiam River. This ground is controlled by the company.

Hydro-Electric power could be developed at a very reasonable cost, but at present there is so much ripe timber on the property that will be wasted if not used for fuel, that steam plants fired by wood are the most economical.

A further study of the water power possibilities of the property is needed.

BUILDINGS AND EQUIPMENT

The buildings on the property consist of a snowshed and shop, at both the 4th and 5th levels. A set of 4 ore bins below the portal of the 4th level. Three powder houses are provided with storage space for over a carload of explosives. There is a two story bunkhouse that will accomodate 50 men, cookhouse capacity for the same number, besides two smaller cabins. There is an office building and a house for the superintendent. Two store houses, one of which has sawdust filled walls.

There is a small generator house equipped with a light plant to furnish light for all buildings and the main tunnels. The generator is run by waterpower from "Ruth's Creek", which is also the supply for domestic and fire protection water.

In all, a rather well equipped camp, except for dry or change rooms and bath facilities.

The property is equipped with steam driven compressor plant and shops. The tunnels are all supplied with rails and air pipes. There are sufficient ore cars, etc., a mechanical mucker is used on the 5th level. An appraisal of this equipment was not made, but is all in working condition and suitable to the work demanded of it.

MINING METHODS

The mining methods used to date are open, timbered (square set) stopes. These stand very well and only in one instance have I found a place where the walls were slabbing off. This was due to heavy shooting and local faulting. Further development work might indicate the need and desirability of filling these stopes with development waste rather than hauling it to the surface.

Hand tramming has been sufficient to date although an air-driven mechanical mucker is used on the 5th level.

All drilling is done by compressed air drills. Ample room is to be found in the canyon for mine waste dumps and the mining company holds this land.

GEOLOGY

The entire area is composed of Andesite and andesitic tuffs. These andesites were later sheared and broken, along roughly, northwest, southeast lines, and the ore bearing solutions percolating through these breaks, have deposited their minerals, together with a silicious gangue, partially recementing them, and forming bodies of commercial ore.

The mineralized zones are, therefore, irregular, but quite consistant. The major breaks are easily followed and contain zones of commercial ore that are almost continuous and range in width from two or three feet to twenty or thirty feet.

The ore minerals are Sphalerite, Galena, Calcopyrite, Gold, and Silver; the gangue minerals are Quartz and Iron pyrite.

There has been movements of the walls along the ore bodies forming gouge and brecciated material along the wall. Cross faults are minor, and none have been found that have displaced the ore bodies.

VEINS

The Ruth vein is a large fissure that cuts through all the formations in a northwest - southeast direction. In places this fissure is confined to an area just a few feet in width while in other places multiple faulting along and in the fissure widens the area to over thirty feet. This fissure was mineralized by rising solutions and the results are seen in the ore bodies along the vein. The fissuer dips from 55° to 70° to the northeast and the ore bodies rake to the northwest along the vein. The ore is sphalerite, galena, calcopyrite, gold and silver, while gangue minerals are quartz and iron pyrite. The vein is followed underground for over 1500 feet, but neither end has been reached. Three ore bodies are exposed, two of these ore bodies are each about 100 feet long, while the third is now shown to be over 400 feet long and the northwest end is still 30 feet wide and in very fine ore.

While this report is supposed to cover only the Ruth vein, it seems to be only fair to mention that within 1000 feet in either direction, there are additional veins. The Blue Jay vein to the north is a very strong fissure, containing some high grade lead and zinc ore. The Little America vein to the south also is a strong fissure, and still further south the Bushe vein shows exceptionally strong where exposed on either side of Battle Axe Creek.

ASSAYS

The samples were all channel cut, under the author's supervision, except where otherwise noted. Where channels were cut other than continuously across the vein at a right angle to the walls, this fact has also been noted. I have done everything possible to make this representative of the deposits when they were taken, and inclusive of all the material that will be mined under regular production.

Montana Assay Office July 31, 1935.

Merritt-Montana No.	Gold No.	Gold oz.	Silver oz.	Copper %	Lead %	Zinc %	Value per ton	width	W. X value
104	830	.04	trace	.40	.50	9.60	$10.12	6'	$60.72
105	831	.04	1.20	.40	.40	11.00	11.60	12'	139.20
106	832	.02	trace	.24	.40	4.25	4.80	9'	43.20
107	833	.04	.80	.22	.40	4.50	6.18	2'	12.36
108	834	.20	.80	.42	.25	9.85	9.96	16'	159.36
109	835	.04	trace	.36	.75	12.50	12.57	4'	50.28
110	836	.02	trace	.26	4.00	11.50	13.51	3½'	47.29
111	837	.02	trace	.14	1.75	6.00	7.12	5'	35.60
112	838	.02	.20	.30	1.75	7.90	9.02	10½'	94.71
113	839	.02	.20	.28	.50	5.00	5.66	3½'	19.81
114	840	.02	trace	.20	.50	7.00	7.02	25'	175.50
115	841	.02	trace	.34	.50	5.40	5.96	16'	95.36
116	842	.02	.20	.24	.50	9.00	8.80	3½'	30.80
117	843	.02	trace	.28	.50	10.20	9.70	7'	67.90
								L"# 123'	1032.09

$\frac{123}{14}$ = 8.8' aver. width - $\frac{1032.09}{123}$ = $8.39 av. value.

Market Value				
Gold	Silver	Copper	Lead	Zinc
$35.00	.64	.08	.04	.04

The location of these samples is marked on the large plan and profile Map No. 2.

WORKINGS

See Maps 1 and 2.

There are five tunnels on the Ruth vein, all of which show commercial ore, except the 5th or lowest level, which is a crosscut that has not yet reached the vein.

Tunnel #R-1 - Elevation 2894 feet. Length 90 feet, with a 40 foot crosscut at southeast end. The Ruth vein shows here 9 feet wide. See sample #106.

Tunnel #R-2 - Elevation 2894 feet, length 80 feet, with ore 2 feet in width, see sample #107.

Tunnel #R-3 - Elevation 2754, Length 135 feet. The Ruth vein is here 16 feet wide and any ore shoot extends downward to the 4th Level. There is a raise through between the 3rd and 4th levels at this point which follows the ore part way and a fault the rest of the way.

Tunnel #R-4 - Elevation 2660, length over 2000 feet, including crosscuts. This is the main working level at present and most of the development work has been done on this level and directly above it. Ore has been developed and partially stoped in three district shoots. The first shoot extends from station 2+ 120' (map #2) to station 6 and has been stoped on for a distance of 150 50 feet above the level. This stope is partially caved, but the parts that are open are safely timbered and can be inspected. It is through this stope that the raise goes up to the 3rd level. At Station #6 the old drift caved and the ground was heavy so a second tunnel was run around the cave on the north side.

This tunnel encountered a mineralized fissure by station #7, but this was not investigated until recently called to the

WORKINGS

management's attention, when drift 7 - 41 was run to it. Some scattered ~~xxxx~~ ore was found, but no ore shoot as yet. At the same time the cross-cut 42 - 43 was run north east to open this vein between station 41 and the known ore at station 23. Thirty feet of good commercial ore has been opened here and this materially increases the ore reserves. (See Sample #117.

Before this last work was done, ore was foundat station 12 and followed 85 feet to the southeast and 195 feet to the northwest. The southeast end of the shoot has apparently been reached, but to the northwest at station 23, the vein is over 16 feet wide, and heavily mineralized across the full width. It appears that the foot wall has not been reached here by the stope, so its width is not definitely known. The raise between 12 and 15 in this ore body is up 90 feet, while the one between 14 and 21 is up 50 feet.

The ore encountered at stations 16 to 18 + 10' is not fully developed, but is of higher than average grade. (See sample 113). This looks like the top of an ore shoot and the 5th level may open a large commercial shoot here.

Tunnel #R-5 - Elevation 2464 is just being started and is designed for a main haulage level, its length July 27th, 1935, was 80 feet. It was then penetrating a very hard andesite.

All the openings on the property are in good working order and timbered where needed. The ladders are in good repair and manways and ore chutes in good shape.

The following assays are identical with those shown on the report of Sept. 7th, 1935, but with current market prices as of 9/2/37.

ASSAYS

The samples were all channel cut, under the author's supervision, except where otherwise noted. Where channels were cut other than continuously across the vein at a right angle to the walls, this fact has also been noted. I have done everything possible to make this representative of the deposits when they were taken, and inclusive of all the material that will be mined under regular production.

Montana Assay Office September 2, 1937.

Merritt-Montana-Gold-Silver-Copper-Lead-Zinc-Value per-Width- W. X value

No.	No.	oz.	oz.	%	%	%	Ton		
104	830	.04	trace	.40	.50	9.6	$16.56	6'	$99.36
105	831	.04	1.20	.40	.40	11.0	19.17	12'	230.04
106	832	.02	trace	.24	.40	4.25	7.80	9'	70.20
107	833	.04	.80	.22	.40	4.50	9.30	2'	18.60
108	834	.20	.80	.42	.25	9.85	22.78	16'	364.48
109	835	.04	trace	.36	.75	12.50	20.80	4'	83.20
110	836	.02	trace	.26	4.00	11.50	22.33	3½'	78.16
111	837	.02	trace	.14	1.75	6.00	11.59	5'	57.95
112	838	.02	.20	.30	1.75	7.90	14.83	10½'	156.13
113	839	.02	.20	.28	.50	5.00	9.21	3½'	32.24
114	840	.02	trace	.20	.50	7.00	11.66	25'	291.50
115	841	.02	trace	.34	.50	5.40	9.95	16'	159.20
116	842	.02	.20	.24	.50	9.00	14.68	3½'	51.38
117	843	.02	trace	.28	.50	10.20	16.36	7'	114.52
								123'	$1806.96

$\frac{123}{14}$ = 8.8' av. width - $\frac{1806.96}{123}$ = $14.64 av. value

Market Value

Gold	Silver	Copper	Lead	Zinc
$35.00	.64	.14	.06	.07

The location of these samples is marked on the large plan and profile map no. 2.

CONCLUSIONS AND RECOMMENDATIONS

The properties of the (Columbia Mines Development Co.) in Marion County, Oregon, contain a large store of potential mineral wealth. The principal value is in the Zinc ore, although commercial quantities of each, Lead, Copper, Gold and Silver are also present. With an average width of 8.8 feet carrying an average value of $8.39 at the present low prices of metals, I can see no possibility of there being any time when a profit could not be made from this deposit.

The general geology of the district, together with the presence of the Galena crystals in the ore, convinces me that this is a deep seated deposit, and the commercial value will continue to great depth. The fact that the fissure has been traced for over 3000 feet along its strike, and several hundred feet in vertical extent, leads me to conclude that an enormous quantity of commercial ore will be opened by further development. The driving of the 5th level to the vein and the drifting along same under the present ore body, should block out in round figures, about 60,000 tons of over $8.00 ore.

I believe that the Blue Jay vein will also make a very valuable ore body, when further development is done on it. The higher lead values found there will give a better balanced product when mixed with the high Zinc values of the Ruth vein. The Little America and Bushie veins are also commercial and need only to be developed to make producing mines.

CONCLUSIONS AND RECOMMENDATIONS

I recommend the immediate driving of the fifth level, with three shifts, if possible, to and along the vein with a raise through to the 4th level. I also think that several raises should be put up along the Ruth fissure into the present known ore, and elsewhere along the vein. The raise near survey station 12 that is now up 90 feet, should be repaired and pushed on out to the surface, which will materially improve the air in the present workings, and also explore a block of ground that should contain additional ore. The additional distance to be raised will be about 135 feet.

In as much as the present known ore and that ore between the 4th and 5th level can all be mined more cheaply through the 5th level, I want to stress, particularly, the need of drifting the 5th level at once. The Blue Jay vein could also be cheaply worked from the new Ruth 5th level, by the driving of a 1600 foot cross-cut. The need for this can better be determined when the ore from the 5th level has been studied.

There is no doubt in my mind and I can state without reservation, that there is a commercial Zinc mine on the Columbia property, on Battle Axe Creek, and it need only further development in accordance with accepted mining practice, to bring it to production. I believe that a mine of this size should at all times have at least 100,000 tons of ore, blocked out ahead of the reduction plant, so that a consistant head can be maintained by mixing and blending the ore. This makes for better recovery and cheaper mining.

Respectfully submitted,

WM. L. MERRITT

Ruth Property
Nov 21 1937.

Columbia Mines Development Co.,
Portland, Ore.

Gentlemen:

Herewith a summarization of 5th Level work to date:

The first Orebody on the 5th level assayed by Montana Assay Office
150 ft. long 8 ft. wide 150 ft. of back equals 15,000 tons

Figured Market Price Nov 20 1937	8.1	Zinc	.0585	$ 9.88
	.95	Lead	.0505	.96
	.36	Cu	.12	.86
12.86 X 15,000 = $192,900.00	.02	Gold	$35.00	.70
	.60	Silver	.77	.46
				$12.86

From the end of the Montana sample to our sample #65 which was taken across the face 1169 feet from the portal we have a composite sample assayed at the mine which values represent a cut on a body of ore
300 ft. long 8 ft. wide 200 ft. of back equals 40,000 tons

Figured at Market values of Nov 20 1937

4.9	Zinc	.0585	$ 5.73
.8	Lead	.0505	.80
.90	Copper	.12	2.16
.02	Gold	$35.00	.70
.30	Silver	.77	.23
			$ 9.62

9.62 X 40,000 = $384,800.00

Included in this second composite sample is eighty feet of barren vein matter that is not commercial ore and should not have been included as it can be left in the mine. This lowered the values in the second composite sample in metal content per ton.

Driving from the present face 300 feet further will bring the face under the first crosscut to the 900 ore body. At this point the ore is twenty feet wide on the 4th level. This will carry us one-third the distance through the 900 orebody. A raise should be put up at this point to the 4th level.

Judging from present widths and assays this work will definitely block out a half million dollars worth of ore in the 300 feet. With the 60,000 tons of ore above the 4th level, the 55,000 tons already blocked out on the 5th level and this additional ore we will have an available mill feed of 165,000 tons with an estimated value of one and one-half million dollars.

Respectfully submitted

Wm. A. Merritt

RUSSELL-RITTER MINE (Gold, silver, manganese) Marion County
North Santiam District

Ownership: Edward Russell and Carl Ritter.

Location: Sec. 4, T. 9 S., R. 6 E., about 13 miles N.E. of Detroit and 1 mile N.E. of Dunlap Lake in Marion County. Reached via Breitenbush Springs Road, Elk Lake Road and 100 yards on Gold Butte Lookout Road to sign, "Ritter Trail", and 1 mile on Ritter Trail Road. The Elk Lake Road climbs from 1800 ft. to 5000 ft. in 6 miles.

Area: 6 claims (unpatented)

History: Outcrops located 50 years ago by members of the Russell family. Not until 6 years ago, when Elk Lake Road was built, making property accessible, was any development undertaken. A milling plant rated at 20-ton daily capacity was built in 1937. ? Known as Humbug in 1903 (Stafford 04).

Topography: Mountainous, timbered area in Willamette National Forest. Elevations at the property range from 5000 to 5400 feet.

Development: The work done consists of a tunnel 70 ft. long on the first vein where ore is being taken out in drifting, and sent to the mill. A small amount of ore has been removed from an open cut on the vein above the tunnel. On the second vein, a crosscut tunnel about 86 ft. long intersects the vein in about 40 ft., and a short drift has been run about 20 ft. to S.E. at this point.

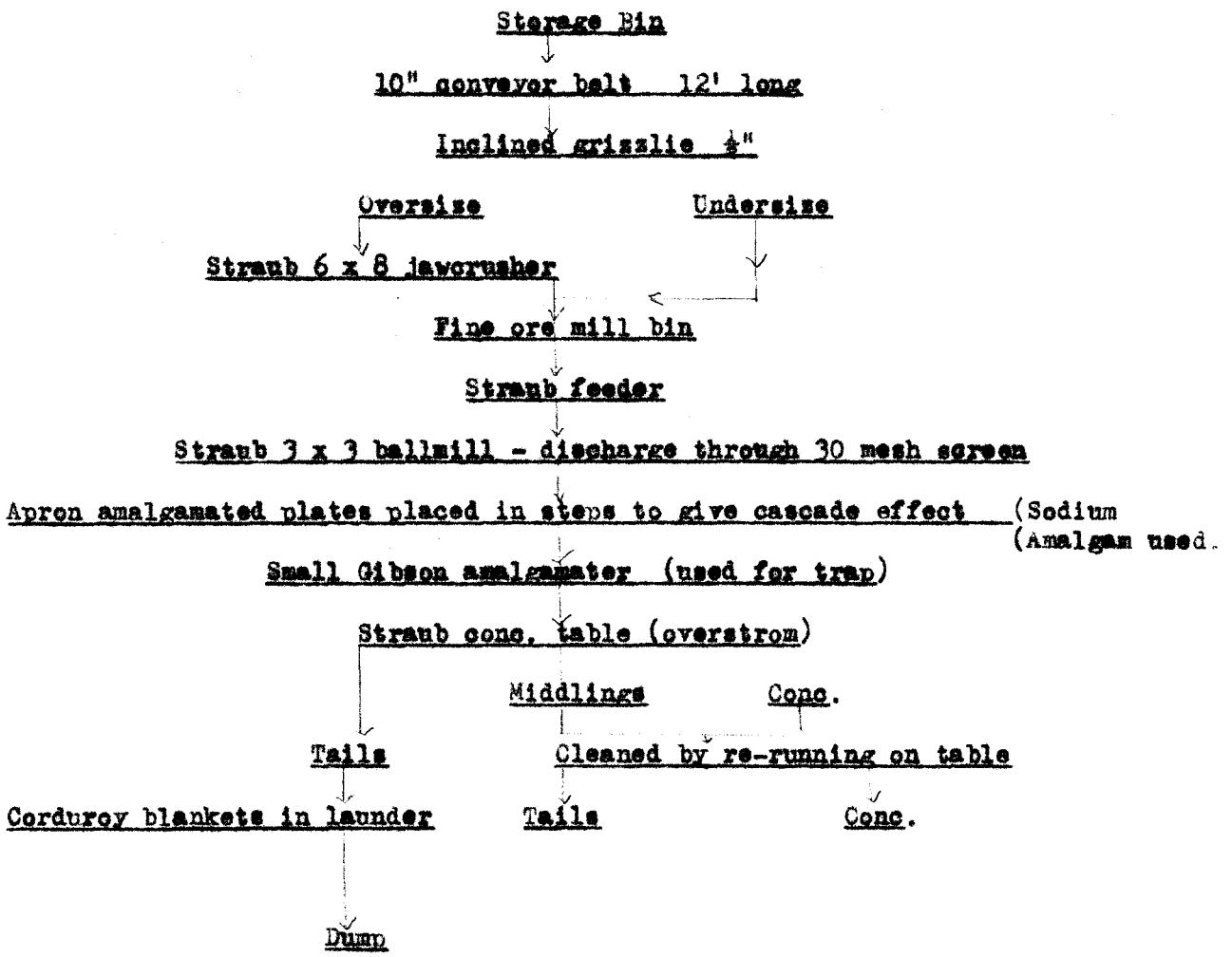
Geology: The immediate area shows andesitic lavas and a rhyolite dike or dikes. There are at least two veins. The one upon which work is being done is a siliceous breccia rhyolite, striking S. 20°-25° E. and dipping 60°-65° SW. It has a well-defined footwall, with the hanging wall more indefinite. The vein material consists of both angular and rounded pieces of quartz and rhyolite cemented by soft siliceous material. As exposed in a tunnel, started on the outcrop, the vein is over 6 ft. wide. The values are in free gold, rather finely divided, with a very small amount of residual pyrite showing occasionally. There is some manganese stain which, in places, becomes a sooty deposit.

About 500 ft. to the east of the first vein is a second vein with a similar strike and probably somewhat flatter dip. The outcrop shows very little oxidation and considerable pyrite. As exposed in a cross cut tunnel about 60 ft. below the outcrop, there appears to be more oxidation, less sulphides, and some free gold. The country rock is a hard andesite. The vein filling is a siliceous breccia. The footwall on the surface is well defined; in the tunnel where cut, the walls are somewhat broken and more indefinite.

Equipment, mining practice, and metallurgy: Ore is broken by hand drilling in the tunnel (on the designated first vein), taken out in a wheel barrow, and may, if desired, be dumped on a shaking screen with half-inch openings, operated by a small gasoline engine. If the screen is used, the oversize is thrown away and the undersize scraped from a platform into a bucket of a reversible, 2-bucket

Equipment: (Cont.)

gravity, areal tramway, the buckets of which have a capacity of 500 lbs. of ore. A loaded bucket going down raises the empty to the loading platform. The loaded bucket dumps automatically into a side-hill bin above the mill building. This bin is constructed of logs on two sides, with the contour of the ground forming the other sides. The ore from this storage bin travels as shown by the following flow-sheet:



Motive power = 25 H.P. rebuilt tractor engine (rated at sea level)
Should have about a 50 H.P. engine.
At present cannot crush and run ball mill at same time.

In the mill building there is a room for sleeping quarters and a clean-up room with retorting equipment.
Near the mill building is a small sawmill with which all the mill building lumber was cut.

Equipment: (Cont.)

A small dam in the gulch below the mill impounds water from a spring; and a small Meyers plunger pump, run by a gasoline engine, has been installed for pumping water to a 500 gal. water tank above the mill. Other equipment includes a 1½ ton motor truck and a small caterpillar tractor.

Present operations: There is a lack of water. Ore is mined and milled as sufficient water is accumulated. The two owners have done and are doing most of the work. An extra man is hired periodically.

General remarks: No systematic sampling has been done. The owners believe that their ore runs from $10.00 to $13.00 a ton. A sample from the tunnel from which ore is being mined was submitted to the Portland office of the State Department of Geology and Mineral Industries and returned 0.16 oz. gold and 0.175% manganese.

This vein is, as exposed in the tunnel, 6 ft. thick. It appears persistent, and, it is said, may be traced 500 or 600 ft. on surface. Above the tunnel would be possible backs of 100 ft. It is impossible to say how much deeper the oxidized zone would go.

No information is available concerning the values in the second vein. The chances are that this ore could not be satisfactorily treated by amalgamation alone, since probably a large proportion of the values are in the sulphides. The size and extent of this vein appear to be about the same as the first vein.

The owners reported that a large dike of (probably) rhyolite, perhaps 200 ft. wide, occurs on one claim, and that samples from this dike run $3.00 in gold and silver.

Report by: F.W.L. 1938.

Memorandum Concerning Ore Treatment

The following items were observed:

1. No sign of poor amalgamation was in evidence.

2. It is probable that, at the time the trouble was supposed to have occurred, the mill heads were lower grade than average, and, at the same time, may have carried an excess of sooty manganese dioxide. This may have "sickened" the quicksilver sufficiently to have allowed free gold to pass into the tails as reported.

3. The chances are that a considerable proportion of the gold in the heads is being retained in the ball mill and will not be recovered until old liners are renewed. This would be true in any event, but, in this case, sodium amalgam is used inside the mill which, of course, retains a large part of the gold, as amalgam, inside.

4. During the mill run on August 25th, the amalgam which formed on the plates below the ball mill looked and felt normal. There was no sign of sickened or flowered quicksilver and no abnormal staining. No gold could be seen in the tailings, nor in the concentrates from the concentrating table.

5. The concentrating table makes a very small percentage of concentrates, composed mainly of iron from the ball mill. They were said to assay $90.00 a ton. They, with cleanings from the corduroy blankets, are treated in an amalgamating barrel.

6. Altogether too much water was being used both in the mill circuit itself and in the ball mill. The very thin consistency of the ball mill lead prevented efficient grinding.

7. The concentrating table should be run at a greater speed and (probably) shorter stroke; also adjustment in the slope of the deck should probably be made.

8. The arrangement of the apron plates to get a cascading effect looks ingenious, and should be efficient for a small capacity plant.

9. Only a little amalgam shows in the Gibson amalgamater. This is an efficient amalgam trap.

10. As stated in the body of the report, the mill engine is under-capacity.

11. The mill building is very substantial and well constructed.