

Report on Mining Properties Under the Management of F. J. Harlow Located in Bohemia Mining District, Oregon, by C. D. Groves, M. E.

The Vesuvius Mining Co.

LOCATION.

The mining properties comprising this group are situated in the center of the Bohemia Mining District, on Fairview mountain and the saddle between Fairview and Bohemia mountains.

These two mountains are the highest peaks of the district, or of the Chapoola range, and are the center of the vein area.

This group comprises some 300 acres of land, all contiguous, about one-half of which is patented. This land ranges from low down the south side of Fairview mountain to near the top and across the divide between Fairview and Bohemia mountains.

IMPROVEMENTS—THE MINING IMPROVEMENTS CONSIST OF

First: Known as Upper Tunnel, on Vesuvius vein, 70 feet of cross cut and 300 feet of drift.

Second: Vesuvius Tunnel, 300 feet vertically below the upper tunnel. This tunnel is driven along the Vesuvius vein 870 feet. From this level a raise, known as No. 4, was made 300 feet which connects with the upper tunnel. Two levels were run

near the breast of the Vesuvius tunnel. This vein has been drifted along or 419 feet with no upper workings. It is similar to main Vesuvius vein but smaller and less uniform in character.

On this level also are various small crosscuts and drifts, driven to define the outline of the vein where the ground is more or less broken.

Some 800 feet vertically below the Vesuvius tunnel is another tunnel known as the Wild Hog tunnel, driven 700 feet on the Vesuvius vein. The last 115 feet of this tunnel is a large strong quartz ledge, and shows gold values for this entire length. Work is being pushed in this territory at present with very bright prospects for good profits. No stoping has been done from this tunnel as yet. This tunnel is the logical point from which the ore from the various workings should be collected and conveyed direct to the stamp mill. When a connection is effected with the Vesuvius tunnel all the ore from the upper workings can be easily chuted to the Wild Hog and from there trammed directly to the mill. The Wild Hog tunnel is 150 feet vertically above the tram floor in the mill, and but 600 feet distant, so large storage bins

water, a saw mill, boiler, a large powder house, store house, various living houses, all strong and suitably built.

A good wagon road of uniform grade connecting with the railroad in the valley, electric light plant, telephone, freight team, etc., also tunnel house and blacksmith shop at each tunnel, and a mine ventilating blower driven by water power. Also an old stamp mill on Stocks and

Harlow property, I believe sufficient of the better grade ore will be encountered to realize a profit for a year's run and when a regular high grade shoot is found as has been in this property and others, large profits will rapidly accrue.

Another good quartz lead is shown by outcrop across this property on which no development has been done as yet. It is a promising vein, and



Riverside deep tunnel.

Harlow property that could be cheaply repaired and used if required.

GEOLOGY AND ECONOMICS.

The country rock is Andesite, its constituents being chiefly the Soda Lime Feldspar, Oligoclase and baste Hornblende. Little to no glass in base, no Blotter apparent, color from light to dark gray, fracture uneven from microscopic to large crystals. Little to no Orthoclase or Sanadlin replacing the Oligoclase. More Orthoclase at Oregon-Colorado and Riverside mines, there approaching Dioryte. Rarely spherulitic approaching porphyritic. No quartz as a rule, little in places.

The veins have a general northeast and southwest strike, are large and continuous, croppings in most cases traceable for thousands of feet, rarely a blind vein, they are true fissure veins with constant strikes and dips except in broken ground. The matrix is essentially quartz. In places pieces of the wall have broken off, and partially filled the crevice being altered to considerable extent by percolating solutions, and at times highly mineralized. The deposition of silica bearing the values, appears to have been continuous, followed to a slight extent by solutions depositing Iron Sulphide. No lime deposits apparent in these workings, showing that the surface leachings through the soda-lime feldspar did not enter the vein at this point or proving that this has always been near the apex of the upheaval and not subject to surface percolations.

Much iron sulphide was deposited with the quartz, less lead sulphide, and but little zinc or copper sulphide. The gold is in the quartz, silver is almost entirely absent from the quartz, but the lead carries high value in this metal. As much of the lead is in the form of carbonate, the zone of oxidation has not been passed through. When this is passed there is a likelihood of a considerable deposit of lead sulphide high in silver. This frequently occurs in such veins, the lead being replaced below by copper and the silver disappearing with a more constant value in gold, but the important value in this property will always be in gold.

In that portion of the Vesuvius tunnel now being worked the ground is considerably shaken up, making many crevices and covering a large area. This makes it difficult to follow the values. Near the breast the ground becomes firm and the vein well confined. I consider this a good point to work as the values will be more easily traced and to some extent concentrated.

It is certainly advisable also to work in the Wild Hog breast, for there is a large body of ore there, some of which will pay nicely. The veins are large and well defined, continuous and with little change in character, but are not uniform in gold values. In places ore has been taken running several dollars per pound in gold. This will immediately change to ore running but a few dollars per ton without any apparent change in the vein construction. This indicates that the large profits must be made on the high grade ore. To obtain this high grade ore the development must be carried on through the low grade product. Some of the low grade ore will more than pay its way, that is, expenses of mining and milling. Some of it is too low grade for

shows values in gold at the surface. Also another porphyry vein which has been worked to small extent. In all, five distinct veins are apparent and all gold bearing.

The contour of the country and easily traceable outcrops are such as to be peculiarly suited for tunnel development which is cheap in labor and requires no power, also affords natural drainage, while shaft development requires more labor, much power for hoisting ore and pumping water besides a costly outlay to begin operations with, and the danger of a mine being flooded and causing "cave-ins" when closed down even for a short period.

The mill is well suited for the economic and successful treatment of the ore, is connected with the Vesuvius tunnel by an aerial tramway run by gravity. There is sufficient water for milling and domestic purposes, and an abundance of timber for future needs. Enough lumber and mining timbers have been cut and delivered to last for a year. In fact everything is in good condition for future work and all past work is in good shape, safe, economically planned and executed, performed so as to give the greatest possible development and improvement with the least expenditure.

ORE TREATMENT.

The ore is susceptible to economic treatment and with resulting high extraction of the metal values. The gold occurs free and amalgamates readily except a small portion that is too "rusty" to dissolve into the mercury. This is collected on the concentrators.

The gold occurs in the quartz, and not in the iron sulphide or lead, so the concentrates may be run over the tables and just the extreme edge of the mineral saved; as this carries the gold this makes a high grade gold product for shipment and throws to waste a large bulk of iron sulphide. The mill as constructed at present is suited for the ore treatment and no alterations are necessary unless it be to increase its capacity when a higher tonnage of ore should be mined.

Oregon-Colorado Mining Co.

LOCATION.

This group of mining claims is situated on Grouse mountain in the eastern portion of the Bohemia Mining District. It comprises some 300 acres, about one-half of which is patented. The claims all lie contiguous and range from the bottom of the mountain on the west side, up and over the crest and far down on the east side.

IMPROVEMENTS—THE MINING IMPROVEMENTS CONSIST OF

First. An upper tunnel 450 feet long, driven on the vein and showing much ore of good paying values.

Second. A lower tunnel driven 1200 feet along the vein, 450 feet vertically below the upper tunnel. This tunnel opens in a number of places good paying ore, some very high grade. This level is about 1000 feet vertically below the outcrop of the vein on the top of the mountain. The outcrop is opened up at various points and shows pay ore almost its entire length. Three crosscuts are run from the lower tunnel in two of which a second vein is cut bearing good copper values. A single small slope is raised from the lower level and as it progressed some very rich

ore was encountered. The ore is richly impregnated with silver and copper, and is of a high grade.

About 500 feet additional work has been done on west side of the mountain and in many places rich ore exposed. On the east side of the mountain about 100 feet of cuts and drifts have been exposing the ore at various points. On the west side of the mountain about 500 feet below the lower tunnel is a drift tunnel known as the Frankle tunnel; it is run 200 feet along a strong vein and the mouth opens out directly onto a natural mill site, a comparative level tract of land of sufficient size for milling purposes at the confluence of two streams of water and in the heart of the timber belt, the Frankle tunnel could be connected with the lower Oregon-Colorado tunnel cutting that ore body at still greater depth, and in turn with the upper workings, thus collecting all ore from the mill by gravity to the mill site.

SURFACE IMPROVEMENTS.

The surface improvements consist of a good wagon road connecting different parts of this property with the Bohemia road 4 miles distant, a tunnel house, blacksmith shop, large living house, a ventilating blower run by Pelton water wheel with 1400 feet flume, track, ore cars, etc.

GEOLOGY AND ECONOMICS.

The geology of the country rocks is similar to that of the Vesuvius, except some of the oligoclase, is replaced by the potash feldspar, orthoclase, altering the rock from andesite to dioryte. The matrix of the vein is silicious but the copper values frequently penetrate the wall rock for a foot or more. The quartz however carries most of the values. The vein is a splendid specimen of a fissure vein, cutting a gap entirely through the mountain, and owing to its hard insoluble character, outcropping almost continuously. The vein, however, is not completely filled, leaving many crevices through which surface solutions have percolated and deposited much Calcite. This deposition is still progressing. The natural contour of the country is admirably suited for development with tunnels, and the handling of the ore from the various workings by gravity to its site for treatment.

ORE TREATMENT.

The ore is a characteristic ore of copper, the chief value being in Chalcopyrite; it also carries silver in variable but sufficient quantity to assure a good average value in this metal. Gold is also present.

Enough ore is exposed now to assure profits if properly treated on the ground. With the enormous portion of the vein and its uniformity and

Total.....	\$92.00
Total treatment and transportation.....	19.00
Total cost.....	\$61.00
Gross value.....	\$98.44
Net profit per ton concentrates.....	\$18.44
Net profit per ton ore.....	1.18
Net profit per day.....	\$9.78

This estimate is made to show that 2 percent copper ore will be profitably simple concentration in a small plant. A larger milling plant will cost but little more for operation and thus largely increase profits. It is not necessary to mine ore of this low grade, as it can be obtained much higher. I took samples as high as 9 per cent copper from this vein. When the grade of the ore increases, the profits increase rapidly, for the rate of concentration is then fewer tons into one and the cost of mining and milling is proportionately lessened. This method of treatment may be followed by treating the ore in a reverberatory furnace, using wood for fuel in a gas regenerating furnace. In this way only so much of the lower grade ore need be concentrated to furnish sufficient iron to flux the excess silica. This will reduce the metal loss as this method will recover 90 per cent of the copper, 95 per cent of the silver and practically all the gold, thus confining the excessive loss of these values to a comparatively small portion of the ore of the lowest grade, that must be concentrated to form a neutral furnace charge. Also the product will be a 50 per cent Matte, thus reducing by one-half the transportation and treatment. A further improvement may follow by converting this Matte into Blister Copper about 98 per cent pure. This may be done in similar furnaces, or better by modern Convertors. This will again cut in two the transportation and treatment charges.

Lastly the Blister Copper may be refined on the ground by electrolysis making refined merchantable bars of Copper in any shape, for any purpose, commanding the highest market price and refined Silver and Gold bullion.

Should it prove profitable to build a Railroad to the property connected with the Valley Railroad, it would probably be more economical to treat the ore in a Stack Furnace by the Pyritic method, thus receiving the benefit of the heat from the oxidation of the Iron and Sulphur and keeping the Coke consumption down to a minimum. In any case some concentration will be necessary to furnish sufficient Iron for flux.

The Lime will prove a valuable constituent, and the fact that much of the Copper is associated with base



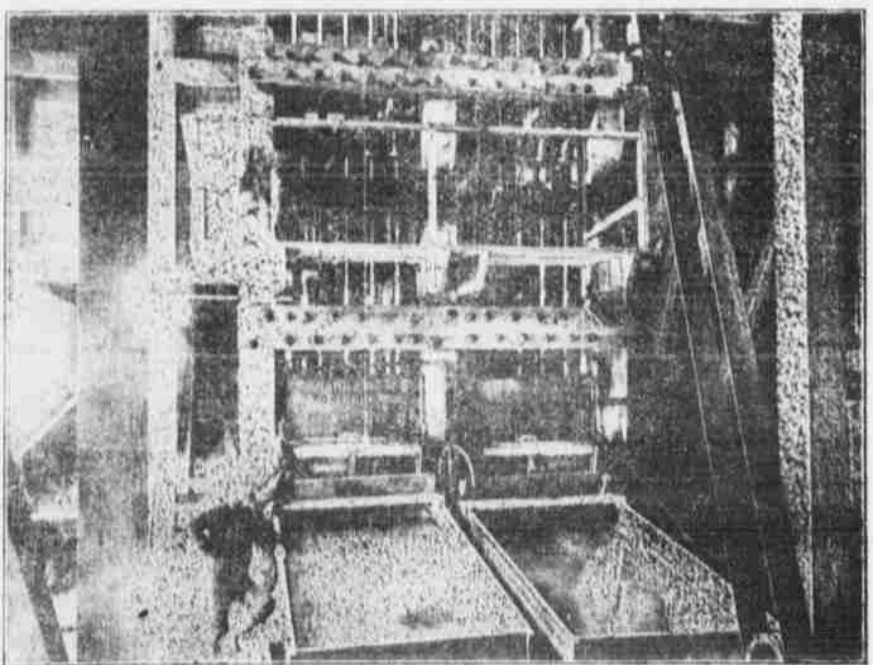
Vesuvius property

from this raise along the vein dividing the total raise into three blocks of 100 feet depth each, arranged thus for economical stoping. This was chuted down to the working level and conveyed from there by gravity tramway to the stamp mill.

There are four other raises located within convenient working distances along the main tunnel, ranging from 10 feet to 80 feet high. They each have a permanent chute and ladder-way and are securely timbered as are all portions of the workings where needed.

From raises Nos. 1, 2, and 3 considerable ore has been stoped. It is this ore that is feeding the stamps at present, but the area of undeveloped vein above the main tunnel is so extensive as compared with the small area worked out, that the latter

may be easily installed and still allow for an easy grade for gravity or other methods of tramming. Also a crosscut may be run from the Wild Hog to the Stocks and Harlow vein and connections made with the upper workings and thus all the ore from this property be cheaply concentrated for distribution at the Wild Hog bins. This latter connection will also cut a large porphyry dike that passes between these properties and traverses the entire camp. This dike is older than the veins as is evidenced by its bending the latter and causing them to follow its course. The veins along this dike have shown concentrated values in gold along their contact, and as much rich ore was abstracted in early days along this line of connection, it further ad-



Interior of Vesuvius Stamp Mill.

would scarcely represent 1 per cent of the total available ore body in this portion of the mine.

From the main tunnel a crosscut has been run 250 feet. This has cut two veins. The first, known as No. 1 vein is distinct, and independent of the Vesuvius vein, it is probably a blind vein or crops with the Vesuvius vein, the latter most probable, as it has a parallel strike and opposite dip intersecting the Vesuvius vein above this level and near the surface. This is a large, strong, well defined quartz lead at this level and may prove to be a valuable adjunct to the property, as a sample cannot be obtained from it that does not show gold. The drift extends along this vein 198 feet with no raises or stopes.

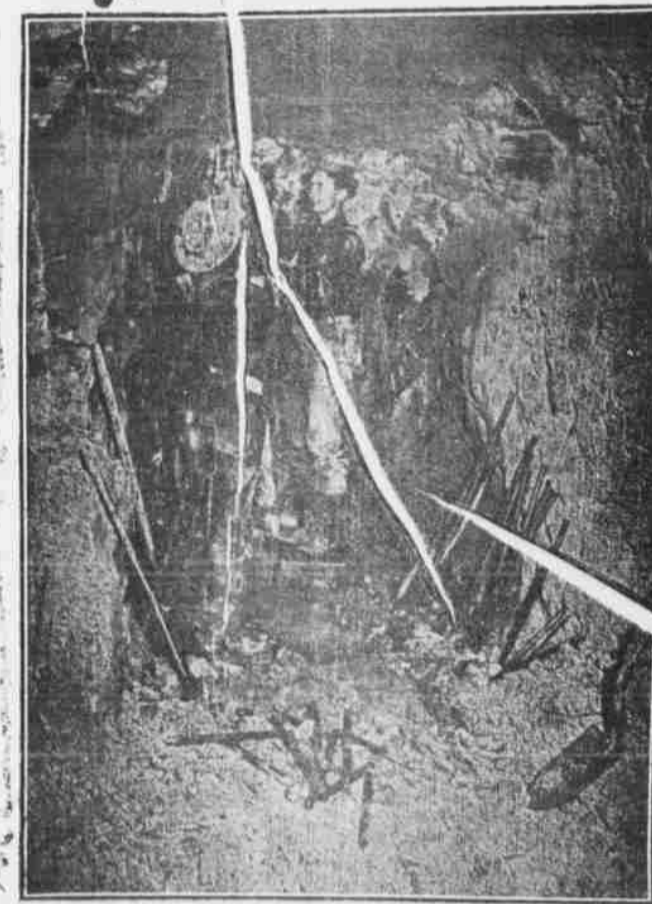
The second, or No. 2 vein cut by the main crosscut proves to be a branch of the Vesuvius vein and connects with it

vises this crosscut as good development.

To the north of the Wild Hog tunnel and some 200 feet above it are the Stocks and Harlow tunnels. They are in three levels, aggregating about 1000 feet. Much high grade ore has been taken from these workings and milled on the ground where the mill still stands. This is a distinct and separate vein from the others and lies on the north or opposite side of the porphyry dike. Besides these larger workings are various small surface cuts in the vein croppings.

SURFACE IMPROVEMENTS.

The surface improvements consist of a modern 10-stamp mill, fully equipped with boiler, engine, crusher, stamps, plates and concentrating tables. A secure building, ample



Flash light showing breast of Oregon-Colorado Deep Tunnel, 800 feet in and 400 feet under ground.

continuity, a large enterprise is certain to result if once a proper treatment is installed. I would recommend to begin with a 25 ton concentration plant. Then mine only such ore as will show 2 per cent copper or better.

Making a conservative estimate on 2 per cent copper, \$1.00 per ton in silver and gold, saving 80 per cent of copper values and 50 per cent of the silver and gold values in concentrating.

Copper netting 12c per pound at smelter, less freight and treatment concentrating 16 to 1 at the mill, the concentrates would run copper 25.6 per cent—\$61.44—silver and gold \$8. Total \$69.44 per ton.

Freight and treatment per ton concentrates: Wagon haul to railroad \$ 7.50 per ton R. R. freight to smelter 5.50 " " Smelter treatment..... 6.00 " "

Total.....\$19.00
16 tons ore equal 1 ton concentrates.
Cost mining 16 tons ore \$ 16.00

rock high in Iron will aid in slagging the mass, and by throwing the low grade of the Quartz ore to the contractor will reduce the quantity required in this department.

The Riverside Mining Company,

This group of claims comprise some 220 acres of land located on South East side of Grouse mountain in the Eastern portion of the Bohemia Mining District.

IMPROVEMENTS—THE MINING IMPROVEMENTS CONSIST OF.

A main drift tunnel 1200 feet. Other drifts and crosscuts, aggregating 700 feet.

Also several small cuts along the outcrop.

These various workings expose the vein thoroughly for 1200 feet. The vein is characteristic of this district, being large, well defined and continuous. The last 200 feet in the main tunnel shows good paying values in copper.

Continued on next page.