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REPORT

BY

CECIL M. HANSELMAN E.M.

ON THE PROPERTIES OF

THE ROBERTS MINING AND MILLING CO.

ALSO THE

JOHN SCOTT GROUP

THE SCHULTES GROUP

AND

THE MAHONEY GROUP

LOCATED IN MILL CANYON
EUREKA COUNTY, NEV.

*****

REPORT ON THE MILL CANYON GROUPS OF MINING CLAIMS.

In accord with your instructions I have examined the following groups of mining claims owned by the Roberts Mining and Milling Company; the Crescent Group; the Reserve Mining Group; the Bullion Hill Group; and the Emma E. Group. Also properties are located in the Cortez Mountains near the Western Boundary line of Eureka County, Nevada, in the Cortez Mining District, and the different groups of claims lie in what is known as MILL CANYON, having obtained this name in 1864 through the erection of an eight-stamp mill in the Canyon by Simeon Wemban and George Hearse, the Father of the present Wm. R. Hearst.

These men were partners and the original owners of the famous Cortez Mine, of which statistics show a production of upwards of Eighteen Millions of Dollars, ($18,000,000.00) to date. It is stated in a bulletin published by the State of Nevada, and by Francis Church Lincoln, that this early production helped to found the Hearst Fortune.

The Cortez mining properties lie on the Southwest slope of a high peak, known as Mount Tenabo, which has an elevation of 9200 feet, and is near the Southwest end of the Cortez Range, while the Mill Canyon properties lie on the Northeast slope of the same peak. In an air line over the mountain the two camps are about four and a half miles apart. The elevation of the camp at the Mill Canyon Holdings is 5750 feet above the sea level.

Beowawe is the nearest town to the Mill Canyon properties and has a population of about 100 people. It is thirty-two miles from this town in a Southwesterly direction down a broad valley to the property, and Mt. Tenabo can be seen in the distance. The main automobile highway between the cities of Reno and Salt Lake is about four miles Northeast of the town, and the town of Beowawe can be seen from the highway off to the right when travelling East before coming to the branch road leading to it. However, Beowawe is traversed by the main lines of the Southern Pacific Railroads.

The road leading down the valley to the properties feeds numerous mining properties and several large cattle ranches. It is a good desert road which was graded last fall and only needs to be gravelled to be put into first-class shape, and there is plenty of gravel available within a few miles of any part of this road.

The groups of the different properties and the names of the claims comprising them are representative (see Mapl) showing their relative position as to location. They represent as a whole 79 claims in number. While some are claim fractions and others overlap, they represent approximately 1400 acres.

The majority of the claims are held by possessory title, while a number of key claims have been patented. The patented claims are known as the EMMA E., the Maid Queen, Ventura, and the Bullion Hill Group.

However the balance of the claims are so situated that they can be paired off in groups and the necessary expenditure required by law can be made at one place, or at the most logical point to be of benefit in the necessary preliminary research work required of all mining properties. To do this the groups must have a connection at any end or side line, and if ten claims are so situated they can be grouped as a whole, then the annual assessment required by law of $100.00 per claim can be used on one stipulated claim.

The steep slopes of the mountains up from the canyons and the general contour of the district makes cheap mining possible. The entire holdings can be developed by a gravity system of tunnel levels and this system can be carried of for a great number of years, before any sinking and hoisting would have to be resorted to. This property can be developed to a depth of nearly 2000 feet by the gravity system.

The property does not produce any large timber. However, on the high slopes some very fair timber is available and suitable for mining purposes. The general condition of the stratified formation is such that very little timber is required. Most of the old workings, which have been standing for forty years or more, are still accessable with not a stick of any kind of timber placed.

The camp is well improved, and consists of the following buildings; cookhouse and dining room, with living quarters for cook and helpers, equipped with large hotel range, 250 gallon hot water tank, tables etc., capable of handling forty to fifty men. Bunk house with ten rooms arranged for two beds to the room.

Bath house with two tubs, and modern plumbing. Commissary building 15 by 25 feet. Large office building with from office room, private office, and two bed rooms. One modern five-room cottage. One modern thre-room cottage. Assay laboratory 15 by 20 feet completely equipped. Blacksmith shop fully equipped with compressed air tool sharpener. Machinery and supply storage house. Compressor house. Galvanized sheet-metal mill house, well constructed, One one-car garage. Two two-car shed garages. Sheet-iron horse stable for two horses with hay storage room. Several other small buildings. These buildings are well situated in a wide part of the canyon.

The milling and mining machinery on the property is high-standard, late design and modern in every respect. In the reduction plant the power unti is a Fairbanks-Morse designe, 120 H.P. Model 32, stationary upright two-cycle Diesel engine. The grinding units consist of one 40-ton capacity Rib-Cone Straub Ball Mill, and one 40 ton Marcey Ball Mill, 100 ton Jaw Crusher, classifier, and a battery of of Flotation cells, Ventura make. The Air Compressor is an Ingersoll-Rand 660 cubic feet capacity direct driven Diesel plant. Also a direct-driven 220 cubic foot portable Sullivan Compressor. The mine equipment consists of air drills, spacing bars, and carriages for same, stopers, car, track, pipe, 200 air drills or more; in fact, everything necessary to carry on an extensive mining campaign. In addition to this equipment there is also one two-ton Ford truck, and two Big Six Studebaker cars.

The climatic conditions are not severe. Although there are times when there is quite a bit of snow and some very cold days. But there has never been a time during the 75 years of operation of the district that mining operations were curtailed through weather conditions.

The development of the district up to date has been accomplished and performed for the sole purpose of mining the high-grade shipping ores, with the exception of the Cortez holdings, which I stated along at the beginning of my report, as having produced, as per records to date, $18,000,000.00. This is the only property in the district that has had any systematic development work performed. It is the writer's opinion that if the same procedure were to be carried out on the Mill Canyon properties the result would be far gre ter than that of the Cortez holdings, which id due to certain geological contacts that exist.

The most extensive development performed on the Mill Canyon properties was directed on what is known as the Bullion Hill Group. This work was under the management of Mr. Mike Hough, now living in the town of Beowawe, Nevada. He makes the statement that he operated the group continuously from 1898 to 1906, and that all of his work was done by hand power, that the ore was worted and sacked, and packed by burros down the canyon for a mile and a half, then hauled by wagon 32 miles to the railroad and shipped to Salt Lake City. He makes the statement that the lowest grade ore he ever shipped gave values of $4.00 Gold, old price, and 240 ounces of Silver, and that the highest gave values of $8.00 Gold, and 550 ounces of Silver. He claims, during this space of time, and thru these crude methods, to have produced better than $130,000.00;

There is much more ore to be had in these workings for immediate extraction, of which I will speak further along in my report. I will at this time, however, refer you to a report by Mr. Beauchamp of San Francisco, in 1928. In this report he speaks of this immediate tonnage very conclusively.

It has been stated that, in the early seventies and eighties, several hundred thousand dollars were taken from the cross-fissure veins (shown on map ONE). The old workings, in my opinion, justify this statement; for this is one of the most interesting areas in Mill Canyon.

The Falconer and Erwin workings which lie on the East side of Mill Canyon proper are supposed to have produced $25,000. to $30,000. in shipping ore a good many years ago, and these workings give ample evidence of this statement. However, these holdings shortly after came into the possession of Capt. J.B. Menardi, and were operated by him for a number of years under the name of the Cortez Mining and Reduction Company. During this time Capt. Menardi erected a reduction paltn on the property. The mill, I have been told was a gravity concentration mill built for the purpose of separating the lead-silver minerals from zinc minerals. The mill was only partially successful, and, as these ores are somewhat base, I can readily understand this condition. The mill later on burned down and was never rebuilt. I was unable to gain any data on Capt. Menardi's production, but have recently learned that he is still alive and living in Los Angeles,

and can be interviewed as to his operations.

Across the Canyon from the Falconer and Erwin workings and right back of the present new mill is what is known as the Berlin vein. I understand that it derived it's name from the fact that an old German, after taking out his money, went back to Berlin and never returned. It is stated that he shipped high-grade ore from this vein to the extent of $40,000.00, and these workings also give ample evidence to substantiate this statement.

All of these different workings, as the writer observed them, give conclusive evidence of being worked as individual projects, and were carried on as long as the contour of the slopes would afford short tunnel sites for gravity operation. Beyond this point the water problem was a big hazard to a profitable output. Under these conditions further development work was prohibitive, and would necessitate the development of a major working tunnel to serve the entire workings as a whole. In all of the workings there have been winzes sunk in the floors from 25 to 50 feet below the gravity tunnels. The winzes are all filled with water and flowing out of the portals. The evidence hereby given is conclusive that the water problem was serious.

From the date collected, and as near as the writer can determine, the production of the Mill Canyon properties to date, is half a million dollars, more or less. However, the production would have been about three times this amount if the ore of the Emma E. had been extracted. However, litigation that has existed for many years has prevented this. Now there is available for immediate production in the Emma E. property close to three quarters of a Million Dollars in gold ore.

The present reduction plant on the property was completed just a few weeks before the financial crash of the Roberts Mining and Milling Company, due to causes other than their mining explorations. Due to these causes they were compelled to cease operations. Therefore, there are no records of any mill runs, and their campaign was purely a development and improvement procedure.

GEOLOGY.

The writer does not intend to give a complete description of the geology of the district in this report. To do so would cover several typewritten pages, and, since much has been said by other engineers along these lines, I will touch only on the principal phases of it. (See Pamphlet No. 187101, AIMME). However, in brief; the mountains in Mill Canyon district consist of limestones and quartzites. A large quartzite, some 200 to 300 feet thick and several miles long is underlaid with a series of gray limestones of the Carboniferous Age, which has been intruded and domed upwards by many igneous rocks, principally granitic grano-diorite, presumably of the Archean era. This area of intrusives include quartz diorites, quartz monzonites, adecites, and dacites. Likewise, there have intruded the sedimentary beds causing much movement and breaking up of the formation. This, however, is essential for a mining district.

The quartzite dike liew high up on the mountain on the East side of Mill Canyon and is very massive. To the Northeast side of Mill Canyon the quartzite is in the form of massive beds. This seems to be it's origin, and it continues far up the mountain and towards Mt. Tenabo, with a dip of about 65' to the East.

The sedimentary series is continuous also from Mill Canyon, and on up into Tenabo and Cortez. Due to these later intrusives which are in the form of dikes, there have been formed numerous veins of Gold and Silver-Lead ore. This area is far greater than that of Cortez, from which a very large mine has been developed, so Mill Canyon should produce a greater mine than that of Cortez, and I believe it will.

The veins of Mill Canyon are that of replacement in limestone, and the fissure type of veins, the latter are the more prominent of Mill Canyon. The theory of replacement vein is that, in connection with other agencies, the metalliferous content of deposits were obtained metasomatically, that is, there was a molecular substitution of the minerals contained in the circulating waters for particles of the wall rocks. Thus, the interchange was atom for atom, until the walls of the fissure were impregnated with metaliferrous substances, which now form the ore deposits.

Of the fissure veins, they can be described as the natural agencies, or genetic, whereby the vein material, or ores, filling the cavaties are derived from great subterranean depths and deposited through the agency of circulating waters, which include all agencies which aid and operate in effecting thermal, or solfataric action of the subterranean waters that circulate through and deposit the ore by precipitating their metallic burden in the previously formed cavaties. The Mill Canyon properties cover a large area, and through certain geological features that exist it is possible to draw commercial ore from a great many points. However, the writer will only touch on the most important portions of the properties, and will base his potential valueation upon these results. The property so happens to be in position to be placed upon immediate production.

IMMEDIATELY AVAILABEE TONNAGE.

THE ERWIN WORKINGS.

The Ewrin ore shoot (shown on Map 2) (Ore Shoot A) is fairly well developed. The workings consist of two upper tunnels and an upraise through the footwall the Mays Tunnel (not yet completed). However, this upraise connects with that of the ore shoot, so that any ore extracted can be handled through this upraise. The high tunnel was run as a drift on the vein from the outcrop, and the ore encountered here was an oxidized ore and somewhat leached. The values are of a much lower grade than that of the lower depth.

The second tunnel is 120 feet below the high tunnel, and is known as the Erwin Tunnal. It has been run as a cross-cut to the vein, and is located 228 feet above the Mays Tunnel (not yet completed). The Erwin Tunnel cut the ore shoot at about 100 feet in, and then

drifted in and through the shoot which, at this point is about 55 feet long. From this level and up to the high tunnel the ore has been stoped out, and was extracted by Capt. J.B. Menardi. There are 800 tons of this ore at the site of the mill that burned down. An assay of this ore gives a value of $16.00 per ton of the three metals, Gold, Silver, and Lead.

At a point in the center of the ore, and in the flor of this Erwin Tunnel, a winze was sunk 20 feet deep, The ore from this winze averages $20.00 per ton. The ore at this point is a sulphide ore and much richer as it gets out of the oxide condition. The stope shows the vein to be from 8 to 12 feet wide. From the bottom of this stope the winze was sunk on down 20 feet more, and this is where the upraise through the foot-wall connects with the ore. Forty-three feet below in the upraise a crosscut was run 25 feet to the ore. The work was ontinued for only 10 feet into the ore when the operation ceased. The ore is of a very good grade, and is 10 feet wide. This work is known as the Casey Drift, and it is from this point up to the bottom of the stope that there is ready for immediate extraction 2346 tons.

This area was sampled very consistently, and gave an average value of $20.00 per ton, Gold, Silver, and Lead; the values ranged Gold .20 to .60; Silver 8 to 10 ounces; lead 2 to 4%. This leads to the following conclusions:

2346 tons of ore in sight @ $20.00 per ton	$46,920.00
800 tons on the Menardi Dump @ 16.00 per ton	12,800.00
Value of ore.....	$53,748.00

Cost connected with mining and milling ore plus royalty charges;

Mining and milling cost 2346 tons @ $5.00	11,730.00
Handling and milling cost 800 tons $3.50	2,800.00
Raoylty charges 10% of 2346 tons.	4,692.00
Royalty charges 10% of 800 tons.	1,280.00
Total cost.....	$20,502.00
Total net profit.....	$33,246.00

AURORA VEIN -- BULLION HILL GROUP

This vein outcrops for about 2500 feet on the surface from what is known as the Water Tunnel, and on Northward, but all of the development work has been confined to the Southern end. The Water Tunnel follows the vein for about 400 feet. In this tunnel the vein is lenticular and varies in width from one foot to 5 feet and consists of white quartz with stringers and veins of rich sulphides. It has been stoped out for nearly 250 feet in length and about 75 to 100 feet in height in places. No work has been done on this vein below this tunnel. Mr. Mike Hough directed this work, and all of the ore taken from here was sorted and shipped. Mr. Hough claims that his ore ran from 240 to 550 ounces in Silver, and from 2 to 4% Lead. From these shipments there remains on the dump about 600 tons of the sortings and cobblings that will average $13.00 per ton.

There is available in the Water Tunnel for immediate extraction approximately 3000 tons of second grade ore that will average $16.00 per ton. (I will refer you to Mr. Beauchamp's report on these workings.)

From these conclusions the ore which can be counted on is:

3000 tons of ore in sight @ $16.00 per ton.....	$48,000.00
600 tons of ore on the dump @ $13.00 per ton.....	7,800.00
	$55,800.00
Less 10% loss in milling.....	5,580.00
Value of ore.....	$50,220.00

COST CONNECTED WITH MINING ANDMILLING PLUS ROYALTY CHARGES:

Mining and milling 3000 tons @ $5.00 per ton.....	$15,000.00
Handling and Milling 600 tons @ $3.50 per ton.....	2,100.00
Royalty charges 3000 tons 10%	4,800.00
Royalty charges 600 tons 10%.....	780.00
Total cost.....	$22,680100
Total Net profit.....	$27,540.00

THE EMMA E. VEIN.

The main workings of this vein are concentrated on the West end of the claim and consist of shafts, drifts, and winzes. (See Map Four). The West shaft goes down on the vein at a dip of 42' f for the balance of it's length. It's true depth is not known, as it is partially filled with water. The shaft is in ore all the way, and at no place in it has the hanging wall been exposed. East of this shaft 170 feet is a cross-cut tunnel to the vein which cuts the vein at 50 feet in and 30 feet under the surface.

The vein at this point is 12 feet wide. This cross-cut Tunnel cuts through the vein to the hanging wall. Back in the cross-cut where the veiniis 12 feet from foot-wall to hanging wall, a station has been cut and a drift run West for fifty feet, which encountered a small fault. The ore continues in width all the way. This drift was continued through the fault and on into the ore for about 15 feet. Back of this fault a winze was sunk on the ore following the hanging-wall side. This is on a dip of 32' for 50 feet in length, all in ore and runs over the lower drift, of which a vertical shaft sunk to the lower drift shows the ore to be 16 feet wide.

Back at the station in the cross-cut tunnel an incline shaft was sunk at a dip of 25' on the foot-wall and in ore for 50 feet. The ore at this point pinches down, but opens up again, as a cross-cut to the hanging wall shows. From the bottom of this winze a drift was run 220 feet long and in ore all the way. From this drift four winzes were sunk in the ore 10, 15, and 20 feet deep. The hanging wall was not encountered at any place in this drift. 155 feet West of the East incline a ten-foot hole, known as the Porcupine Hole, was sunk in the floor of the drift. This shows the ore here

to be 20 feet thick. The drift runs on past the East Shaft 35 feet, and is in ore all the way.

A complete assay map (Shown on Map Six) shows the values and the calculations of the same; this, however, shows the ore only as far as it was exposed. From these calculations, the following is estimated value ready for immediate extraction in addition to the 1800 tons on the dump:

18,483 tons in sight @ $33.00 per ton.....	$609,939.00
Less 10% Milling Loss.....	60,993.90
Value of ore.....	$548,945.10

COST Connected with Mining and Milling plus royalty charge:

Mining and Milling cost @ $5.00 per ton.....	$92,415.00
Royalty Charge of 10%.....	60,993.00
Total Cost.....	$153,408.00

TOTAL NET PROFIT.....$395,536.00

DEVELOPMENT.

Above the Falconer and Erwin Shoots A. and B. lies the large quartzite dike spoken of earlier in my report. Under this dike and dipping very strongly towards it is the bedded limestone, and under this is the intrusive grano-diorite which placed the stratified formation in it's position. The ore shoots like in and on this bedded lime which is the foot-wall of the veins, Im mining there is term used for this condition, spoken of as "the contact. 2.

Geologically, when this contact is reached indepth, it should, and will produce very large ore bodies, or, in other words, when the vein becomes associated with the quartzite dike as a hanging wall, and the grano-diorite becomes the foot-wall, this condition will take place.

The Falconer and Erwin Shoots A. and B. (see map Three) longitudinal Section will, no soubt, become one large ore body! You will note on Map Three that the Falconer and Erwin Shoots A are implacements in limestone, it appears to be an offshoot from the large shoot B, and was caused by a monzonite dike which has intensified the fracturing of the bedded limestone. The dike runs parallel with the vein system cutting off the lime as it comes in contact with the quartzite dike far up the mountain side.

The Erwin shoot B lies East of the last two mentioned shoots and in the area between the contact of the monzonite and quartzite dikes. On it's outcrop the vein is 750 feet long and 20 feet wide and shows no surface indications of any faults but shows every aspect of a very true and strong origin of a shoot. The East end, as it comes nearer the contact gives surface indications of being very heavily mineralized. There has been no work done on this shoot of ore, except on it's West end, where a drift was run in following a fracture which cut the shoot at a very shallow depth some 60 feet perpindicular. The ore at this point was from 25 to 30 feet wide, much oxidized and somewhat low grade, five to seven dollars per ton.

However at this point the ore has a very heavy gossan and much iron, meaning oxidized pyrites, indicating an underlying metallic vein. This condition is indicative of a very extensive sulphide body at depth. It is the writer's firm conviction that this one ore body will make history for Mill Canyon, and will produce an ore body of not less, and to exceed $10.00 a ton.

A metallurgical test made a few days ago showed that to volatilize this ore under vacumn and eliminate the gasses through different units ofheat, gave a 100% increase in values above that of the regular fire assay. To accomplish this operation onthe property will cost $0.75 per ton.

Two hundred and twenty-five feet below the Erwin tunnel, a cross-cut tunnel has been driven in some 650 feet towards the contact. This is the same tunnel that the upraise runs from (spoken of earlier in my report) to ore shoot A. The tunnel is known as the Mays Tunnel and through a rough survey it will require 250 feet more to reach this contact. When completed this development will afford 450 feet of backs on the dip of the vein from all shoots for stoping operations. From these conclusions the following potential tonnage and profits are shown:

8654 tons Falconer Shoot @ $20.00 per ton.....	$173,080.00
8654 tons Erwin shoot A. @ $20.00 per ton.....	173,080.00
519230 tons Erwin shoot B @ $10.00 per ton.....	$5,192,300.00
VALUE OF ORE.....	$5,538,460.00
Less 10% loss in milling.....	553,846.00
TOTAL VALUE OF ORE.....	$4,974,000.00

Cost connected with mining milling plus royalty charge:

Mining and Milling Falconer Shoot @ $5.00 a ton	$43,270.00
Mining and Milling Erwin Shoot A @ $5.00 a ton	43,270.00
Mining and Milling Erwin Shoot B @ $5.00 a ton	2,596,150.00
Royalty charge Falconer 10%.....	17,308.00
Royalty charge Erwin Shoot A 10%.....	17,308.00
Balance of Royalty to complete purchase.....	76,421.50
Total cost.....	$2,792,727.90
TOTAL NET PROFITS.....	$2,181,886.50

CROSS FISSURE VEINS.

These veins are a very intersting feature and are capable of producing very large tonnages. The general trend of the stratified formation of the district is Northwest and Southeast, while these fissures run within 20' of being at right angles to this strike, there being a distinct, pronounced unconformity between the two series. The veins outcrop for several thousand feet and are well defined, showing good movement, with a selvage of koalinite on each wall, giving evidence of plant faulting. They are eight in number, and the ore shoots show to be from two feet to six and seven feet wide in many places; they will average four feet wide throughout.

As I stated farther back in my report, there has been a great deal of money taken from these shoots and from shallow workings which have been concentrated principally on the Liberty Bell and Ventura claims. These workings consist of five large stoped areas 250 feet long, and from the surface down 75 to 100 feet in depth. The stopes stand almost vertical, 80' to 90'. The ore taken from here is said to have been very rich, $60.00 to $70.00 per ton. (See the J. O. Greenan report in reference to this regions.)

The writer was able to obtain a few samples from this region which assayed quite high, $36.00 to $49.00 per ton, but will base his estimates on $20.00 rock.

I recommend a preliminary development program here that will require 90 days time to put it on a production basis. This will include building a short road a quarter of a mile long. This will give a potential tonnage, as shown below, until such time as the Berlin Tunnel can be pushed far enough ahead to connect with the region. This will be spoken of later on.

19,230 tons Liberty Bell preliminary @ $20.00 per ton	$384,600.00
Less 10% Milling Loss.....	38,460.00
Value of Ore.....	346,140.00
Cost Connected with mining and milling @ $5.00 per ton.....	95,750.00
Road Cost.....	457.00
Cost of Drifting 200 feet.....	1,500.00
Total cost.....	97, 807.00
TOTAL NET PROFIT.....	$248,333.00

BERLIN TUNNEL DEVELOPMENT.

This is one of the major developments that I recommend be pushed forward at once. The site is located right back of the mill and forms an adit that will be used for several years. to come. The tunnel can be driven for it's entire length, some 5000 feet, all in ore. Just as the Mays Tunnel will serve the East side of the Canyon so the Berlin Tunnel will serve the entire Southwest district at depth. It is a development that affords the opportunity through cross-cutting to tap all known veins and shoots, eliminating all the hazards of the water encountered in the upper workings. The tunnel will tap the following groups at the following depths:

The Cross Fissures Region at	200	feet perpendicular;
The Berlin at it's apex	650	" "
The Bullion Hill Group	825	" "
The Mahoney Group.	1075	" "
The Emma E. Group	1450	" "

Back of the mill on the Berlin vein is a known ore shoot, which the writer called attention to early in this report. It is said to have produced $45,000.00 in shipping gold ore in the early days. 100 feet above this shoot is elevation and 400 feet up in the mountains appears to be another shoot coming in through the development of a short tunnel 40 feet long. The vein averages three to four feet in width

and dips to the East at 80' with a strike of N. 15W. The few samples that could be obtained in this area gave an assay value of $22.75 Gold, with some Silver.

The known shoot is 75 feet long. The second is as yet unknown, but, according to the rest of the district, would be about the same length. The tunnel will afford for stoping on the known shoot 100 feet of backs, and on the second one 200 feet of backs. The operation of driving this tunnel under these two shoots 500 feet will require less than three months time and will cost $5,000.00.

The operation will afford a potential tonnage of the following results:

8653 tons, Berlin major tunnel @ $20.00 per ton	$173,060.00
Less 10 % loss in mining and milling.	17,306.00
Value of ore.....	$155,754.00

Cost connected with development, mining and milling.

Mining and Milling cost at $5.00 per ton	$43,265.00
Tunnel cost for 500 feet @ $10.00 per ton	5,000.00
Total cost	$48,265.00
Total Net Profit.	$107,489.00

The Berling vein runs up the mountain on its' strike of N.15' W. for 1000 feet. At this point it intersects another vein of equal proportions with a strike of N. 75' E. This vein intersects the Fissure Veins 800 feet Northwest on their Northerly end. The first to be intersected is the Maid Queen vein running through the Ventura claim. The Liberty Bell vein and the Maid Queen vein run parallel with each other 375 feet aprt. Three of the large known ore shoots are on the Liberty Bell vein, while the others have five known shoots. Two of these shoots are on the Maid Queen vein, and, as far as they have been worked, have been very profitable.

Upon the completion of the Berlin Tunnel to this point there will be afforded the following backs to the different shoots:

Liberty Bell shoots 200 feet additional backa; Maid Queen shoots (Ventura Claim) 200 feet additional; Maid Queen shoots (Maid Queen Claim) 400 feet backs.

To complete this development will require 500 feet more drifting in the major Berlin tunnel (Berlin Vein), 800 feet of drift on the vein running N. 75' E. to the Maid Queen vein (Ventura claim), 1600 feet drifting Southwest on the Maid Queen vein (Maid Queen Vein). 175 feet cross-cut to the Liberty Bell shoots, and 800 feet of drifting on the Liberty Bell vein. This development will require two years in time and will cost $38,750.00 The time, however, can be cut in half with two working shifts.

Upon the completion of this development program the available potential tonnage will give the following results:

Liberty Bell Region.

85,384 tons Berlin major tunnel @ $20.00 per ton	$1,707,680.00
Less 10% loss in milling	170,768.00
Value of the ore.....	$1,536,918.00

Cost connected with development, mining andmilling:

Mining and Milling Cost @ $5.00 per ton	$26,920.00
Development Cost $10.00 per square foot	38,750.00
Total Cost.....	$465,670.00

Total Net Profit.....$1, 061,330.00

BULLION HILL GROUP

Some years ago Mr. Mike Hough drove a cross-cut tunnel under the Rhode shaft for the purpose of taking care of the water which was bothering him in his upper workings. The tunnel is over 900 feet long and was120 feet vertical below the deepest Rhode workings and 250 below the Aurora shoot which is South of the Rhoda vein 300 feet.

The Rhoda shoot is toped out from this tunnel level to the grass roots, but the tunnel lacks 125 feet of cutting the Aurora shoot. As a preliminary developement I recommend that this tunnel be pushed on through to the Aurora shoot (See report of Mr. Beauchamp in reference to Bullion Hill) This will afford 250 feet of backs for stoping. To continue this tunnel on will require 60 days to cross-cut and drift on the shoot, and will cost #3,750.00, giving a total potential tonnage of the following estimate:

RHODA TUNNEL LEVEL

14,423 tons potential Aurora Shoot @ $20.00 per ton	$288,460.00
Less 10% loss in milling	28,346.00
Value of the ore	$259,614.00

Cost connected with development, mining and milling:

Mining and Milling cost @ $5.00 per ton	$72,115.00
Development Cost @ $10.00 per foot	3,750.00
Total cost...	$75,865.00

TOTAL NET PROFIT.....$183,749.00

THE EMMA E. SHOOT

East of the Emma E.'s present workings and on down to the east slope is a block of ore on a level with the present deepest workings that is undeveloped. The ore at the East shaft carries values on the surface the same as it does on the surface of the present development. This gives evidence that the ore shoot of the Emma E. extends from the west shaft to the east shaft, making the ore shoot 420 feet long (See W.A.Pray's Report on the Emma E., March 20, 1926).

This ore has not been developed to the geological condition, a twist in the vein with reverse dips, causing the ore to have been lost at the east end of the present development. A cross-cut tunnel at the east end of the lowest level of the present development drives through the wall with a strike of N. 60'E. for 75 feet will pick up this ore. This operation will require 60 days time and cost $2,250.00 and will furnish the following potential tonnage:

12,933 tons potential Emma E. @ $ 20.00 per ton	$258,460.00
Less 1-% loss in milling - - - - - - - - - - - -	45,846.00
Value of ore - - - - - - - - - - - -	$222,614.00

Cost connected with development, mining and milling:

Mining and Milling Cost @ $5.00 a ton - - - - - - -	64,615.00
Development Cost @ 10.00 per foot - - - - -	2,250.00
Total Cost - - - - - - - - - - -	$66,865.00
Total net profits - - - - -	$155,749.00

THE EMMA E.

Exploration work recommended: The west shaft should be carried down 100 feet or more and cross-cut south to determine the true position of the ore body back of the fault zone. When this is finished I recommend that the Aurora drift be continued on east under the Emma shoot. This development will require approximately 2600 feet of drift and will allow a position to cross-cut the Harrison vein at depth, also the Emma extension on the west. (See Mr. Beauchamp's report of this under the heading, "Mahoney Gold Claim"). This development program will require two and one half years and will cost $42,000.00. The operation will afford the following potential tonnages and give depths on the different depths as shown:

Harrison shoot	350 feet
Emma Extension shoot	625 "
Emma E. shoot	750 "

Potential tonnages from the Aurora Drift east on the vein:

137,308 tons @ $20.00 per ton - - - - - - - - -	$2,746,160.00
Less 10% loss in milling - - - - - - - - - - -	274,616.00
Value of ore - - - - - - -	$2,471,544.00

Cost connected with development, mining and milling:

Mining and milling @ $5.00 per ton - - - - - - -	686,540.00
Development cost @ 10.00 per foot - - - - - -	42,000.00
Total cost - - - - - - -	728,540.00
Total net profit - - - - - - -	$1,743,004.00

To drive the Berlin major tunnel up under these workings will require 4750 feet of tunnel, and will cost $47,500.00. It will furnish the following backs on these groups:

Rhoda and Aurora shoots	825 feet
Harrison shoot - - -	825 "
Emma Extension - - -	825 "
Emma E shoot - - - - -	825 "
Mahoney Group - - - -	1125 "

The Potential Tonnage

346,267 tons @ $20.00 per ton $6,925,240.00

The lowest tunnel level that can be obtained on this property is known as the Idaho tunnel. This tunnel has been started and is in some 250 feet. It leads in from the valley about a quarter of a mile from the Northeast mouth of Mill Canyon at an elevation of 5180 feet above sea level.

This tunnel is the ultimate future development and offers an ideal setting for mill and town site. It will furnish additional backs to all the shoots mentioned in this report of 420 feet perpendicular. It will require approximately 15,000 feet to reach all the workings and will give a potential tonnage of the following estimate:

Potential of the Idaho Tunnel

850,183 tons @ $20.00 per ton $17,003,660.00

WATER SUPPLY

The main water supply is derived from a spring up Mill Canyon about three-eights of a mil above the camp at an elevation of 6215 feet above sea level. At this elevation the supply is above the camp 465 feet perpendicular and above the mill 615 feet. The location of the water source is ideal for any kind pf pressure or gravity system. This can be better understood by referring to Map 1. (Shown on the map as Highland Lassie Claim).

The spring at its source covers a large area where it heads 200 by 600 feet and is now flowing 40 miners' inches of water. From what information I could obtain the supply has never gone more than half this amount during the driest of seasons. There are however numerous other springs higher up the canyon, and, by piping them down the mountains, this supply can be doubled

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In conclusion the writer feelsaand believes that his estimate which gives the property a potential value of $28,184,405.00 is very conservative, as I have taken into consideration only

such development which is sufficient and extensive enough to warrant a definite opinion as to its ultimate future.

In figuring most of my valuations I have used the figure of $20.00 per ton, while the sampling shows substantially higher values. Also, I believe, when operations are gotten under way, the costs will be materially lower than the figure used. The property is in such shape that the usual financial hazard in mining is positively eliminated.

There are numerous places in the area of the property not taken into consideration in this report that are geologically right and the deposition of them such that large ore tonnages can be developed.

Respectfully submitted,

Cecil M. Hanselman, E. M.

Dated at Inglewood, California,

May 29, 1935

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REPORT ON THE

MILL CANYON MINES, EUREKA COUNTY, NEV.

HISTORY

Silver-lead ores of unusual richness were discovered in 1863 at Cortex, a mining camp situated on the Western slope of Mt. Tenabo, the highest peak in the Cortex Mountains, about 35 miles south of the Beowawe, a small town on the Southern and Western Pacific Railroads.

Mill Canyon is 5 miles north of Cortex and 30 miles south of Beowawe. It lies on the northerly flank of Mt. Tenabo and discharges its waters into the braad valley to the west. Its elevation is about 1000 feet above the railroad.

GEOLOGY

Briefly speaking, the structural composition of the Mill Canyon environs or district consists of an uplifted body of carboniferous limestone and quartzite, through which an enormous body of igneous rock, principally granite and grano-diorite has been thrust for several miles, thereby causing much metamorphism, crushing and fissuring; the latter occuring quite extensively in the igneous as well as in the sedimentary rocks.

The fissured and crushed zones so formed have become the preferred and natural sited for, and of, rich and extensive ore bodies, many of them carrying silver and lead in paying quantities; also some gold in places. The ore bodies are of two kinds or types, namely, true fissure veins, which occur principally in the granite, and replacement ore bodies, which occur principally in the limestone. Both carry ores which avera e in value from twenty to forty dollars per ton. Considerable rich ore is frequentl encountered in the fissures, from which many shipments have been made, the smelters fiving returns as high as two undered and forty dollars ($240.00) per ton. Specimen ore assaying over one thousand dollars ($1000.00) per ton is sometimes found in the rich chutes.

All the ore bodies so far developed show a tendency to increase in value and size with depth, and the main geological conditions are recognized by scientific and practical mining men as most favorable for the existence of ore-bodies that will make good paying mines.

PRODUCTION

The old Cortez Mine, five miles south of Mill Canyon, was worked for many years but only to a depth of seven hundred feet, yet so rich was the ore and so extensive the ore-body that it produced ten million dollars ($10,000,000.00) from that superficial area alone.

The Mill Canyon Mines, which have only been operated in a

small way, principally by poor lessees, have nevertheless produced nearly four hundred thousand dollars ($400,000.00) eventually they will produce more than the old Cortex mine, for their mineralization is more extensive.

PROPERTIES.

The principal properties in Mill Canyon are:

Cortex Mining and Reduction Co.	(possessory)	6 claims
Mt. Tenabo Mining Co.	(possessory)	3 claims
Bullion Hill Mining Co.	(patented)	8 claims
Mill Canyon Reduction Co.	(town & water sites)	3 claims
Goodhue Group	(possessory)	7 claims
	Total (of 20 acres each)	27 claims

The Cortex Mining and Reduction Company claims cover the lime-granite contact for a distance of 4500 feet on the east side of the Canyon.

The two principal ore-bodies are the Falconer and the Ervin. The former has been opened to a depth of 520 feet, on the dip, and is now 50 feet long and 8 feet wide, and carries ore valued at thirty dollars ($30.00) per ton. The Ervin ore-body is very much larger, being on the surface 30 feet wide and three hundred feet long. The ore in the lower workings averages twenty dollars ($20.00) per ton in value. There are three other ore-bodies further up the mountain side. The upper one has a very extensive surface showing or iron cap. It undoubtedly is a very valuable asset. All of these ore-bodies can be opened up, with theexception of the Falconer, by pushing ahead the lower Ervin tunnel which would tap the upper ore-body at a depth of a thousand feet. This is avvery valuable property, over 2000 feet of development has been done. Considerable good ore is ready for the mill. As a tonnage producer it will be the largest in the Canyon.

The Tenabo property consists of three claims upon which there are three veins. Two of these veins parallel each other, and out-crop as the scale the steep mountain side. They are somewhat shattered on the surface, but improve in compactness and increase in size in the lower tunnel. From the superficial cuts, tunnels and winzes on these veins the lessees took out about forty thousand dollars ($40,000.00) in high grade shipping ore, These veins form part of the general fissuring system of the district and will undoubtedly prove good producers and persist to a great depth as their walls are well defined and show fault movements. They vary from 2 to 5 feet in width; length of chutes undetermined. The ore has an average value of thirty dollars ($30.00) per ton.

The third vein or body lies on the north side of the Tenabo gulch only a hundred feet or so from the road. In many respects it resembles the large Ervin ore-body just across the main canyon or road. It has the same surface value $30.00 to $6.00 per ton and ths aame disintegrated iron capping. I believe, after the leached or oxidized zone has been passed through, a fine commercial body of

sulphide ore will be found, similar in character to the large ore-bodies found beneath the iron cappings of the Falconer and Ervin.

The value of the Tenabo property is further enhanced in that it holds the key position or only economic site for the development of the Bullion Hill property. By driving ahead the Tenabo main working tunnel at a cost of $10,000.00 and for a distance of 1000 feet, that rich territory which lies at the Northern end of the Bullion Hill and Southern end of the Tenabo ground would be entered at a depth of 600 feet and as there are no less than five veins in that area I estimate that a large amount of ore would be thus made available and of a tonnage value of close to a million dollars.

The Bullion Hill property has the best defined and the richest veins in the district. It has produced about two hundred thousand dollars ($200,000.00) from the ores shipped from its numerous workings, the deepest of which are 150 and 250 feet respectively, the former being cross-cut, with a drift on the vein for 600 feet, and the latter a shaft. There are also several other shallow oppnings and cuts most of which are now caved in, but which furnish positive evidence on their dumps of having yielded rich shipping ores. Average value of the ore $40.00 per ton.

There are several good veins on the Bullion Hill ground, and their past history of ore shipments, when taken in conjunction with their well-defined nature and persistency, justifies my belief in saying that they will yield, when opened up, several million dollars worth of ore. Veins average two feet in width, approach the vertical and can be traced for long distances. This property will also be a big producer.

VALUE OF THE ORES.

A composit value of the ores from the different properties in the Canyon is represented by the following analysis:

Gold	.07 to .83 oz.
Silver	11 to 40 oz.
Lead	3 to 12%
Zinc	2 to 8%
Iron	3 to 22%
Sulphur	7 to 18%
Antimony	Negligible
Arsenic	"
Lime	3 to 12%
Silica	5 to 70%

MINING

The climatic conditions do not interfere with mining at any time. The roads are good. There is enough small timber on the hillsides to furnish fuel for camp purposes. Crude oil or its refined products would have to be used for power-producing. By conserving the water in the Canyon a reduction plant or mill of one hundred tons daily capacity can be kept steadily running. Should

more water at any time be required it can be developed at shallow depth in the flat or valley near the mouth of the Canyon.

The costs of mining, owing to the steepness of the mountains will be far less than at most places in Nevada, as almost all the veins can be developed to depths varying from 300 to 1200 feet through tunnels.

The ores are of a well-inown type or character so there will be no difficulty for those who operate these properties to determine what kind of mill or reduction plant is needed. The ores should yield a profit of ten to twenty dollars per ton.

CONCLUSION.

Sufficient work has been done on the numerous ore-bodies in this Canyon to prove that they can be worked profitably. To further increase the profits all the properties herein described should be consolidated and worked as a unit, for, by so doing, overhead and development costs would be cut practically in two and a big mining industry could be built up and operated for many years.

(Signed) Frederick Bass, Geologist
2057 Green Street, San Francisco

February 19, 1919