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Hunt - Ell Coll.

Some area discussed in 1913 report "Proposed Exploration on the Upper Level of Con-Virginia"

Au + Ag

ITEM 194

(309)

REPORT

ON

OPHIR MINE

AND

CALIFORNIA MINE

CONSOLIDATED VIRGINIA MINING COMPANY

BY: HOWARD W. SQUIRES,
Mining Engineer.

Virginia City, Nevada

May 30, 1934

Mr. Wm. H. Byington

1109 Alexander Bldg.

San Francisco, California

Dear Sir:

I herewith submit my report on the Ophir Mine, Ophir Mining Company, and the California Mine, Consolidated Virginia Mining Company, Virginia City Section of the Comstock Lode, Storey County, Nevada.

With the report are six maps. One compiled map of Ophir and Consolidated Virginia Workings.

Five maps of Assay Plans.

Respectfully yours,

Howard W. Squires,
Mining Engineer.

HWS:RM

INTRODUCTION:

The Comstock District is in Storey County. Virginia City and Gold Hill are the two towns on the Lode. It is sometimes subdivided into the Virginia City District on the North, and the Gold Hill District on the South. These towns are built on top of the Lode, and the mines are under the towns. Mt. Davidson rises to the west of the Lode, is the highest peak in the district, and has an altitude of 7870 feet, and the Comstock Lode outcrops on its east flank at elevations in the neighborhood of 6550 feet. During the Bonanza Days, these towns had a combined population of some thirty thousand people. The present population is estimated at fifteen hundred.

The Comstock Lode is connected by broad gauge railroad with Carson City, the Nevada State Capitol, by the Virginia and Truckee Railroad which also connects with the Southern Pacific Railroad at Reno. The Sierra Pacific Power Company serves the district with hydro-electric power. Telephone and telegraph lines connect with the outside world, and the Comstock has one of the best water supplies in the western country, water being brought through pipe lines and flume, some twenty-five miles from the Sierra Nevada Range.

DISCOVERY:

No one individual can be credited with the discovery of the Comstock Lode, nor any exact date given. It was through the activities of a large number of people extending over a long period of time. Abner Blackburn discovered placer gold near the present site of Dayton in July, 1849. The Grosh brothers discovered rich ore in the region in 1853, possibly at Silver City, or perhaps they located the outcrop of the Comstock Lode at the head of Gold Canon. But both died, before they could take advantage of their

find. James Fennimore, known as "Old Virginia" located Gold Hill Cropping of the Comstock Lode as placer ground in January, 1859. Peter O'Riley and Patrick McLaughlin digging a water hole at the head of Six Mile Canon, uncovered the Ophir Bonanza in June, 1859. Henry Comstock, for whom the district is named, bluffed his way into part ownership. Rich silver sulphide occurred with the gold but was not recognized as such until Judge Walsh of Grass Valley had it assayed and its real nature was discovered. This inaugurated the "Great Washoe Rush" and hundreds crossed the mountains from California that year, while thousands followed the succeeding years, and in 1864, Nevada had sufficient population to warrant making it a state.

GENERAL:

Without question, the Comstock Lode is one of the most extensive gold and silver deposits ever discovered in the Western Hemisphere. The Comstock mines were of great importance in their day, and no such volume of money had ever been produced from a single source up to the time of their operations. Most people have the conception that the Comstock was strictly a silver district. This, however, is decidedly an error. Reduced to dollars and cents, the actual gold content of the ore today, constitutes about 75% of the value.

From 1862 until 1886, the United States Government, first through the War Department, and later the Interior, took an active hand in the guidance of all underground work. Accurate underground surveys were made by Government Engineers and statistics of costs and bullion production were printed and distributed to the various mine managers. The Government Atlas of Hague, followed by Becker, are records of care and accuracy, and it is from these sources we are indebted today to much valuable information we possess concerning the Comstock mines.

PRODUCTION FROM SURFACE BONANZAS:

The recorded production furnished by the Director of the Mint, from 1859 to 1864, is as follows:

Year	Tons	Total
1859		$ 30,000.00
1860	10,000	750,000.00
1861	140,000	3,500,000.00
1862	250,000	7,000,000.00
1863	450,000	12,400,000.00
1864	680,000	16,000,000.00

There was no doubt, a large unrecorded production in the early days, which cannot be roughly estimated. By this time, however, the ore bodies first discovered, had begun to play out and we find a gradual decline in production from 1865 to 1871 as follows:

Year	Tons	Total
1865	430,745	$ 15,833,720.00
1866	640,282	14,907,895.00
1867	462,176	13,738,608.00
1868	300,560	8,779,769.00
1869	279,584	7,405,578.00
1870	238,967	8,704,325.00

During the above period, enormous sums of money had been spent in litigation. The V. & T. Railroad had been completed from Carson City to Gold Hill in 1869; and the same year, Adolph Sutro began work on the Sutro Tunnel, four miles from the Comstock Lode, which made connections with the Comstock Lode in the Savage Mine in 1878, at an approximate vertical depth of 1750 feet, and immediately became of great value for drainage purposes, although many mines had reached greater depths, and were forced to pump to the tunnel level.

DEEP BONANZAS:

From 1860 to 1870, Crown Point, Kentuck, and Yellow Jacket had their first bonanza ore body extending practically from the surface down to the 900 foot level. In 1871, Crown Point and Belcher encountered an immense body of high grade ore at a depth of 800 feet, which extended down to the 1600 foot level, being one of the biggest and richest bodies ever discovered and which produced in a very few years, $67,499,000.00 in bullion.

When Crown Point-Belcher discovered the large bonanza at depth, all other mining companies started shafts far out east of the Lode, with the intent to intersect the Comstock at depth on its downward 45° east dip. In 1874, the Big Bonanza in Con. Virginia was encountered first on the 1167 foot level. This extended in California ground adjoining on the north. It extended down to the 2060 foot level, and according to J. A. Church, the Big Bonanza yielded $104,007,653.00 from which was extracted an average of $93.35 per ton. All the bonanzas taken together, produced 6,350,520 tons yielding an average of $42.89 per ton. The average recorded value of all the ores mined from 1859 to 1921, including values recovered by re-treatment of tailings, is $31.16 per ton.

Bullion production rose with the discovery of deep bonanzas in Crown Point and Con Virginia from eight million dollars in 1870, to over thirty-six million dollars in 1877.

Year	Tons	Total
1871	409,718	$ 10,249,528.00
1872	384,668	12,236,399.00
1873	448,301	21,671,980.00
1874	526,743	22,476,785.00
1875	546,425	25,825,521.00
1876	598,818	31,618,660.00
1877	562,519	36,301,536.00

MEDIUM GRADE ORES:

Upon exhaustion of the Big Bonanza, the low grade ores in the mines were systematically worked. Production however, declined steadily to a trifle over one million dollars in 1881. In 1882 an immense flow of hot water drowned out the Gold Hill Mines below the Sutro Tunnel, and they were forced back to mining ore above the drainage level. The Virginia City Mines continued pumping until 1886, when they also, suspended work below the Sutro Tunnel, and worked above this horizon. However, production again rose to over seven million dollars in 1888, and declined to less than two million dollars in 1899. Pumping was resumed in 1899 by the Comstock Pumping Association and considerable ore mined before discontinuing in 1922. Production ranged from under four hundred thousand dollars per year, to nearly one million four hundred thousand, yearly.

GEOLOGY:

The latest important contribution to the geology of the Comstock, is that made by Professor Reid, of the University of California in 1905, California University Publication, Volume 4, Pages 177 - 199, 1905. Reid says in part, that the Comstock Lode is on the east flank of Mt. Davidson, which is composed of a mass of diorite bounded upon all sides by faults. The Lode occupies the great fissure made by the East member of this block faulting system, which is a normal fault with a movement of 3,000 feet. This movement resulted in the shattering of the hanging wall and the production of numerous nearly vertical fissuers, which join the Lode in depth, but pinch out in height. The Lode has a length of 13,000 feet, terminating by branching at both extremities, and varies in width from 100 to 1,400 feet. The strike of the Lode is N. 14° E., and its dip is 43° easterly. The country consists of late Tertiary igneous rocks ranging from diorite on the West, which forms Mt. Davidson, and the foot wall of the Lode, through a hanging

wall, consisting mainly of hornblend andesite, to angite andesite on the east.

ORE BODIES:

The country rock of the Comstock Lode has been highly altered by hydothemal action. The wide body of quartz and altered rock, which constitutes the Lode, contains rich ore chutes or "bonanzas" separated from one another by long irregular stretches of low grade material. In the north section, the principal bonanzas occur in the vertical hanging wall fractures, while in the south, or Crown Point section, they occur in the main Lode. The location of bonanzas appears to have been determined by Northwest and Northeast pre-mineral fractures intersecting the main Lode, and their size, by the strength of these fractures.

ORE MINERALS:

Typical Comstock ore consists of quartz and more or less calcite in which is disseminated a fine grained mixture of sulphides. According to Clarence King, "The Comstock Lode, in Hague, Mining Industry; U. S. Geological Exploration, 40th Parallel, Vol. 3, 1870, he says that the main ore mass of the bonanzas is composed of quartz (several generations) pyrite, sphalerite, galena, chalcophyrite, argentite, polybasite, stephanite, and calcite. Gypsum occuring locally. Gold and silver are the two minerals of economic value. Gold occurs in the native state, and associated with pyrite. Silver occurs mostly in the form of argentite, and with small quantities of native silver, horn silver, and stephanite occasionally in evidence.

In 1870, the original Con. Virginia Shaft was sunk to a depth of 500 feet. From the bottom of this shaft, a cross-cut west, was run 1107 feet, striking the so-called foot wall of the Lode, from which point, a drift south was run a distance of 700 feet to the end line of Con Virginia ground, and north a distance of over four hundred and fifty feet into California ground. (See Becker Atlas, U. S. Geological Survey, Comstock Lode.)

It was decided to sink the Con Virginia Shaft deeper in 1872 and on the 1167 foot level, the "Big Bonanza" was discovered. From then on, the upper levels on the main Comstock Lode in Con Virginia, California and Ophir have been neglected, above the 1400 foot level, as will be described later.

PRESENT ORE RESERVES:

About three years ago, the upper ore bodies on Ophir and California were opened by an incline shaft from the surface. Work has been carried on continuously with the result that several thousand feet of early day workings are now accessable. The result of this work, I am showing in detail in this report. An incline shaft has been sunk on Ophir Croppings to a depth of 146 feet. A plan of these workings accompanies this report, on which is outlined the area of seven ore bodies, also accompanied by detailed assay maps and description, which follow:

OPHIR AND CALIFORNIA MINES

LOCATION ON THE COMSTOCK LODE:

These mines are located on the north end of the Comstock, in Virginia City. They adjoin each other. Ophir U. S. S. Patent No. 171 is bounded on the north by the Mexican Claim, and owns 675 feet on the Comstock Lode.

California U. S. S. Patent No. 154 is bounded on the south by Consolidated Virginia Claim, and owns 600 feet on the Comstock Lode.

TITLE:

Title to the Ophir is vested in the Ophir Mining Company, and title to the California is vested in the Consolidated Virginia Mining Company. Both are listed on the San Francisco Mining Exchange and title

dating back to these companies for over a period of fifty years.

VEINS:

As described in general geology, the Lode is a series of parallel ore channels, each channel constituting what may be described as a large vein with porphyry filling between them. In California and Ophir there are a number of such veins or channels. In the early day development, Ophir had a bonanza ore body extending to the surface. This was developed to a depth of over five hundred feet for a greater length and is said to have produced about $20,000,000.00.

California developed a great deal of lower grade ore from the surface, between the years 1859 and 1872.

BLOCK A CALIFORNIA SOUTH ORE BODY

(See Assay Map No. 2; 104 Sub level and Assay Map No. 1 of the 75' level, 60 Sub level, 40', 32' and 20' Sub levels.)

This ore body of massive white quartz is irregular in shape, has a pitch to the west of about 40°, an apparent downward rake to the north, and widens as it goes down. Starting from the surface, the first level is but twenty feet underground. Here, the exposed ore is only 36 feet in length, having a width of 12 feet. The next sub level at 32 feet exposes ore 32 feet in length and 12 feet wide. The 40 foot level exposes ore 90 feet in length and 12 feet wide. From here on down, the ore body widens rapidly to 37 feet on the 60 foot sub level, and 90 feet in length. The 75 foot level shows ore 35 feet wide and 75 feet in length. The 123 foot level exposes ore 30 feet wide for a length of 50 feet. Two pits sunk in the floor, a depth of six feet each, show the same character of ore going down. Pilot samples taken south on the 123 foot level indicate a greater length of ore than has been sampled. No workings are below this block, so I am allowing an additional 100 feet.

This Block of ore, having a vertical exposure of 129 feet, with a pitch of approximately 45° gives a length on vein dip of 195 feet, plus 100 feet allowed as ore. Irregular in shape as it is now exposed, I calculate the tonnage as follows, 75 feet average length, with a 25 foot width, and 295 feet on ore depth.

75 x 295 x 25 = 553,125 cubic feet.

Of this area, I estimate one quarter has been removed by various workings, cutting up the ore body, and some small pulled stopes. This reduces the area to 414,844 cubic feet.

Divided by 13 : 414,844 ÷ 13 = 31,972 tons.

The ore value is calculated from 130 samples as follows:

On the 20 foot sub level:	Average	20 samples	$22.90
	"	4 "	14.88
On the 40 foot and 32 foot sub levels:	Average	38 samples	13.46
On the 60 foot sub level:	Average	51 samples	7.64
On the 75 foot level:	Average	41 samples	4.93
On the 123 foot level:	Average	20 samples	11.03
	"	5 "	6.04
	"	2 "	19.11

This gives a general average calculated value of $11.69 per ton. 31,972 x $11.69 = $373,752.00

BLOCK B CALIFORNIA NORTH ORE BODY

(See Assay Map No. 3, of 207'-187'-163' Levels.
" - " " " 2, Alum Stope 123' Sub Level.)

This ore body, composed of massive white quartz, is developed and sampled on the 207 foot level, the 187 level, the 163 sub level, and the Alum Stope 104 Sub level. The ore body is almost vertical and about as wide east and west, as it is long north and south. It is about 60 feet wide east and west, and about 60 feet long north and south. The area is approximately 3,000 square feet and the ore body is exposed vertically 202 feet. I

allow 50 feet upward and 50 feet downward extension as ore.

3,000 x 202 = 606,000 cubic feet.

Due to the fact that this Block has been so cut up with drifts, crosscuts, raises, and small stopes, I estimate one fifth of the ore has been extracted. This reduces the cubic contents to 484,800 cubic feet, divided by 13 = 37,292.

The ore value, calculated from 130 samples is as follows:

Average 17 Samples $ 7.52
" 38 " 5.11
" 75 " 5.80, giving a general calculated value of $5.82 per ton.

37,292 x $5.82 = $217,039.

OPHIR ORE BODY - BLOCK C

(See Assay Map No. 4 of Ophir and A and A workings.)

This Block is triangular in shape and extends 80 feet south of Block D on the 146 level, and to the incline shaft on the surface. The area is 146 feet by one half of 80 feet by 25 feet wide:

146 x 40 x 25 = 146,000 cubic feet, divided by 13 = 11,230 tons.

The only sampling possible on this Block is on the 146 level where 20 samples average $6.26. Two high grade samples eliminated, marked "x" on Map.

11,200 tons x $6.26 = $70,299.

OPHIR ORE BODY - BLOCK D

(See Assay Map No. 4 of Ophir and A and A workings.)

This Block is figured in two sections.

First: The ore and values above the 60 foot level to the surface. The length as shown by sampling, is taken as 120 feet. The width of ore exposed by two crosscuts, one at the north end and the other at the south, is taken as 25 feet. The height is 60 feet to the surface.

The value calculated from 119 samples is taken as an average of $8.80 per ton, as follows:

30 samples average $10.18, 16 samples average $3.20, 73 samples average $9.46.

120 x 60 x 25 = 180,000 cubic feet, divided by 13 = 13,846 tons.

13,846 tons x $8.80 = $121,844.

Four high grade samples eliminated, marked "x" on Map.

Second: The ore and values below the 60 foot level to the 146 level, a distance of 86 feet.

The length and width are taken the same as above. The value calculated from 223 samples is as follows:

Average 50 samples $5.79, average 12 samples $1.33, average 38 samples $6.57, average 50 samples $6.73, average 73 samples $9.46, giving a general calculated value of $7.09 per ton.

120 x 86 x 25 = 258,000 cubic feet, divided by 13 = 19,846 tons.

19,846 tons x $7.09 = $140,708.

TOTAL BLOCK D

Total calculated tonnage 33,692 tons
" " average value of $7.80 per ton.
33,692 tons x $7.80 = $262,797

OPHIR ORE BODY - BLOCK E

(See Assay Map No. 4 of Ophir and A and A workings)

As there has been no sampling done on the 250 foot level immediately below Block C and Block D, I believe it fair to allow 50 feet below the 146 level as ore, taking the average sampling for 200 feet in length as average ore value. This is assuming that the ore extends downward an additional one third the distance to the surface.

200 x 50 x 25 = 250,000 cubic feet, divided by 13 = 19,230 tons.

The value calculated from 108 samples is as follows:

Average 38 samples $6.57, average 50 samples $6.73, average 20

samples $6.26, giving a general calculated value of $6.58 per ton.

19,230 tons x $6.58 = $126,533.

MATHEWS ORE BODY - BLOCK F

(See Assay Map No. 4 of Ophir and A and A workings.)

From 146 foot level the "backs" are 62 feet above the level. An incline raise above the backs, now caved, is said to go 30 feet higher. The 190 sub level run under this block shows good values 44 feet below the 146 level. I am, therefore, allowing a height of 136 feet.

The ore body is proven for a length of 120 feet, with a width of 20 feet. As there are fills in this stope area, I am taking 15 cubic feet to a ton.

20 x 120 x 136 = 326,400 cubic feet

There were 55 samples in this area that average $19.43 per ton.

There were 12 samples taken in the "backs" averaging $82.22 per ton, and 4 wall samples averaging $299.91. I am eliminating the "walls" and "backs" samples, and taking the average as $19.43 per ton.

21,769 tons x $19.43 = $422.796.

The Mathews ore body, Block F, lies to the west, approximately 30 feet, of Block C and Block G, and apparently is a parallel ore body. It is my opinion that it will extend farther south than ore has been exposed at present.

OPHIR ORE BODY - BLOCK G

(See Map No. 5 North Extension of 146 foot level)

This Block runs north into ground having no workings between the 146 level and the surface, with the exception of a shallow crosscut tunnel now caved, driven across this ore body about 200 feet north of the north face of the 146 level. Eight carloads of ore were shipped from the dump of

this tunnel, in 1925 to the United States Smelting, Refining & Mining Co., Mammoth Plant, at Kennett, California. Following, are the dates, weight, and value per ton taken from the Smelter settlement sheets, now on file at the Ophir Company's office in Virginia City.

Date	Weight	Value per TON
April 11, 1925	54.0 tons	$ 13.80
" 5, "	54.31 "	10.57
" 8, "	41.03 "	19.91
May 5, "	43.44 "	12.54
" 12, "	44.36 "	7.61
" 20, "	51.06 "	5.75
" 20, "	51.39 "	5.54
" 26, "	48.43 "	5.86

The evidence is so conclusive this ore extends to the surface that estimated tonnage for this Block is taken 146 feet above this level and as in Block C and Block D, 50 feet below the 146 level. Ore is exposed and sampled on the 146 level, a distance of 90 feet. Indicated width is 20 feet.

196 x 20 x 90 = 352,800 cubic feet

Divided by 13 = 27,138 tons

Calculated value from 85 samples are as follows. Average 85 samples $5.01.

27,138 tons x $5.01 = $135,961.

SUMMARY OF ORE RESERVES AND VALUE

	Tons	Gross Value
Block A	31,972	$ 373,752
" B	37,292	217,039
" C	11,230	70,299
" D	33,692	262,797
" E	19,230	126,533
" F	21,760	422,796
" G	27,138	135,961
	182,314	$ 1,609,177

Average ore value - - - - - - - - - - - - $ 8.28

DUMP ORES: Gold @ $35.00 per ounce. Silver @ 64½¢ per ounce.

There are several large dumps of low grade ore on California and Ophir ground. Following are all the available samples at this time.

One dump estimated at 25,000 tons.

#1 Tunnel driven in 50 feet. 21 samples average $3.81 per ton.

#2. Tunnel driven in 60 feet. 24 samples average $6.64 per ton, average 45 samples $5.32.

Brewery Dump. Estimated at 70,000 tons.

Average 17 samples $ 4.85
" 79 " 2.39
" 26 " 3.80
" 52 " 3.20
" 14 " 3.38

These dumps are unquestionably an important asset, but a great deal more sampling and tunneling should be done to prove actual tonnage and large areas of commercial ore.

1934

DEEPER ORE BODIES:

Following the discovery of the Big Bonanza, the Consolidated Virginia shaft was sunk to the Sutro Tunnel level, called the 1750, This shaft intersects the main Comstock Lode between the 1650 and 1750 levels, but is west of the Big Bonanza. The Con. Virginia Company and California Company decided to sink a joint shaft about one thousand feet east of the old Con Virginia shaft. Consequently the C. & C. shaft was carried down eventually to the 2500 foot level, and became the main working shaft for both companies. Mining was carried on extensively at very deep levels for a period of over 20 years, but upper levels were neglected. Finally in 1925, Mr. Kendall, the President of Con. Virginia Company, and the Ophir Company, did a great deal of work above the Sutro Tunnel level on the 1750, 1650 and 1400 levels. A long crosscut was driven west on the 1400 level through the old Bonanza workings and on west through the Comstock Lode, and a raise connection made from the 1750 level. On the 1400 level and in the Comstock Lode quartz, miners working here, now report cutting a wide body of ore of excellent grade.

This part of the mine is not accessable now, but the C. & C. Shaft is open from the surface to the Sutro Tunnel and in fairly good condition. No work on the Comstock Lode has been done, above the 1400 level up to the 500 level on Con Virginia and California ground, and on Ophir no work has been done above the 1300 level to about the same horizon as on California. Careful examination of the maps of the Lode clearly show a great unexplored virgin territory.

In other words, here is virgin territory on the Comstock Lode on California and Ophir ground, with an area of approximately 1000 feet on the incline of the Lode, and 1275 feet along its strike. This area is certainly deserving of an intensive campaign of development, in new ground, and never explored previously.

METALLURGY:

Since 1931, I have been manager of the Arizona Comstock Corporation, the largest present operating Company on the Comstock Lode, where we are today mining and milling approximately 300 tons of ore daily.

So far, I am able to determine, to effect a saving of from 94% to 95% of the original value of the ore at least cost, a double treatment is necessary. Namely, concentration and cyanide the tails. Concentration, either by tabling or flotation, only recovers part of the values, and concentration is advisable simply for the purpose of eliminating from the tailings the concentrate that will not give up its value without special treatment. It is necessary to use cyanide in the treatment of the tailings from the concentration plant. The special treatment of the concentrates requires extremely fine grinding in cyanide solution, and giving it a long contact in a strong cyanide solution.

There is little doubt, but that all-sliming of the entire mass, if given a long time contact in a strong cyanide solution, will recover as much value of the ore as the double treatment. However, the percentage of concentrates, which requires very fine grinding is small: as an average, not 2% of the whole. Therefore, the saving is in the grinding, as it is apparent the increased cost of grinding the entire mass is beyond reason.

This resolves itself to a question of grinding the ore fine enough to satisfy the flotation or concentration plant (3% plus 60 mesh), eliminating the concentrate from the tailings, and agitate the tailings in cyanide solution. Fine grind the concentrate (98% minus 150 mesh) giving it a long contact in cyanide solution. This will effect a high recovery of values at a reasonable milling cost.

Herewith, are given two typical tests following this proceedure:

February 13, 1934

Arizona Comstock Corporation — Laboratory Test #60

Mine ore — Density 40 — Mechanic agitation

480 grams ore — Solution: 14 lbs. lime
720 cc of solution — .6 " sodium cyanide
.6 " added after 6 hrs.
.4 " " " 12 "

	GOLD		SILVER		TOTAL	EXTRACTION	
	Ozs.	$	Ozs.	$	$	Gold	Silver
Heads	.11	$3.85	6.2	$3.99	$7.84		
Flotation Tails	.03	1.05	2.32	1.49	2.54	72.5%	62.5%
Cyanide Tails 36 hours	.003	.10	.70	.45	.55	90.0%	69.8%
TOTAL EXTRACTION						97.7%	88.7%

Cyanide Consumption - - - - - - - - - - - - .8 lb. per ton of ore

Lime - - - - - - - - - - - - - - - - - - - 13.00 " " " " "

February 15, 1934

Arizona Comstock Corporation — Laboratory Test #53

Sample of table concentrates — Mesh 98% - 150.
Density in Cyanide agitation 25.
Solution 10 lbs. Lime per ton
5 " Sodium Cyanide to start, 2.6 lbs. added after 24 hours.

	GOLD		SILVER		TOTAL	EXTRACTION	
	Ozs.	$	Ozs.	$	$	Gold	Silver
Concentrate Heads	15.88	$555.80	216.68	$139.75	$695.55		
Cyanide Tails 48 hours	.18	6.30	16.14	10.39	16.69	98.8%	92.3%
Cyanide Tails 72 hours	.12	4.20	14.32	9.23	13.43	99.2%	93.3%

Cyanide consumption - - - - 8.94 lbs. per ton of concentrates

Lime - - - - - - - - - - - - 24.8 " " " " "

ESTIMATE ON COSTS:

Costs will slightly vary on the Comstock from one mine to another, depending on conditions of ore bodies encountered, surface equipment, and milling plants. I wish to particularly emphasize the importance of having intelligent, experienced, efficient operating management and to call attention to the fact that the costs and recoveries I am giving in this report, are based on the assumption that equipment is first class, organization given time to get evenly balanced, and operations running smoothly.

Most of the ore bodies on this property will have to be timbered. Ore body Block A can possibly be "shrunk". The very nature of this great lode, however, calls for "square sets". Size of timber can be greatly cut down by filling the sets before taking out too much ore, thus greatly reducing timber costs.

I am giving two cost set ups, and after three and one-half years active mining experience on the Lode, believe they will come very close to any organized operation in this district.

BASIS OF MINING AND MILLING 100 TONS DAILY

MINING EXPENSE

	LABOR	SUPPLIES	TOTAL	COST PER TON
Drilling	305.66	47.16	352.82	.114
Timbering	1043.65	896.68	1940.33	.624
Mucking & Tramming	2290.45	10.68	2301.13	.741
Stoping	1481.63		1481.63	.477
Hoisting	323.95		323.95	.104
Pipe & Track	24.75	59.56	84.31	.027
Power & Lights		152.33	152.33	.049
Water		71.25	71.25	.023
Assaying	97.21	65.23	162.44	.053
Compressor	139.50		139.50	.045

MINING EXPENSE (Continued)	LABOR	SUPPLIES	TOTAL	COST PER TON
Compressor Power		234.36	234.36	.075
Tool Sharpener	181.25		181.25	.058
Timber Framing	261.25		261.25	.084
Timber Framing Power		24.67	24.67	.008
Shift Boss & Foreman	513.95		513.95	.165
Miscellaneous	347.55	54.74	402.29	.130
Overhead	534.92	70.94	605.86	.195
Compensation Insurance		394.85	394.85	.127
Explosives		126.36	126.36	.040
	$ 7545.72	$ 2208.81	$ 9754.53	3.139

TONS MINED 3107

MILLING EXPENSE	LABOR	SUPPLIES	TOTAL	COST PER TON
Coarse Crushing	271.00	6.34	277.34	.088
Crusher Power		123.35	123.35	.039
Crusher Repairs	54.38	30.91	85.29	.028
Crusher Overhead	90.09	11.95	102.04	.032
Flotation	703.85	2.19	706.04	.224
Repairs	165.00	66.12	231.12	.074
Reagents		153.20	153.20	.049
Balls		452.51	452.51	.144
Power & Lights		678.41	678.41	.215
Water		629.20	629.20	.200
Assaying	73.23	49.13	122.36	.039
Foreman	100.00		100.00	.032
Miscellaneous	96.50	16.75	113.25	.036
Overhead	472.98	62.72	535.70	.170

MILLING EXPENSE (Continued)

	LABOR	SUPPLIES	TOTAL	COST PER TON
Compensation Insurance		48.42	48.42	.015
Handling Concentrates	122.50		122.50	.039
	$ 2149.53	$ 2331.20	$ 4480.73	$ 1.424

TONS MILLED 3164

SUMMARY: Mining $ 3,139 per ton
Milling 1,424 " "
$ 4,563

COST ON BASIS OF 300 TONS DAILY

MINE

1	Foreman	$ 6.67 per day	$ 200.00 month
3	Shift Bosses	5.50 " "	495.00 "
3	Hoist men	5.50 " "	495.00 "
1	Blacksmith	5.50 " "	165.00 "
1	Blacksmith helper	4.50 " "	135.00 "
1	Toolsmith	5.50 " "	165.00 "
1	Carpenter	6.00 " "	180.00 "
1	Mechanic	6.00 " "	180.00 "
60	Miners	4.50 " "	7100.00 "
18	Trammers	4.50 " "	3430.00 "
5	Service men	4.00 " "	600.00 "
½	Truck man	2.50 " "	75.00 "
3/4	Surveyor	5.00 " "	150.00 "
½	Assayor	2.50 " "	75.00 "
			$ 13,445.00 "

Per Ton $ 1,493

Mine Supplies:

Power	$ 50.00 per day	$ 1500.00 month
Timber	100.00 " "	3000.00 "
Explosives	35.00 " "	1050.00 "
Miscellaneous	40.00 " "	1200.00 "
		$ 6750.00

Per Ton 75¢

Total mine cost per ton $ 2.243

MILL

General Expense:	COST PER MONTH	COST PER TON
1 Mechanic	$	$
1 Laborer		
1 Mill Superintendent		
Lights & Misc. Supplies	900.00	.10
Total men employed - 11		
Total installed H.P. - 595		
Crushing	500.00	.055
Feeding, Conveying & Screening	255.00	.028
Grinding	2700.00	.30
Classifying	209.00	.023
Agitating	549.00	.061
Thickening	250.00	.028
Leaching, Pumping, etc.	720.00	.08
Water	300.00	.033
Chemicals	3200.00	.355
Assaying	150.00	.017
Clean-up and Refining	200.00	.022
Clarifying and Precipitation	450.00	.05
General Expense	900.00	.10
	$ 10,858.00	$ 1.252

OFFICE:

1 Accountant	$ 6.67 Daily	$ 200.00 Monthly
1 Stenographer & Storekeeper	5.00 "	150.00 "
Supervision	33.00 "	1000.00 "
Office, per ton 15¢		$ 1350.00

MISCELLANEOUS CHARGES:

Depreciation 12½% on $250,000 = $ 3125 yearly	$ 260.41 Monthly
Taxes - Assessed 4% on $45,000 = $ 1800 "	150.00 "
Interest 6% on $500,000 = $ 30,000 "	2500.00 "
Fire Insurance 10% on $75,000 = $7,500 "	625.00 "
Compensation Insurance Mine 6% on $13,445	807.70 "
" " Mill & Office 3½% on $2,740	95.90 "
Misc. charges per ton = .493¢	$ 4439.01 "

RECAPITULATION OF COSTS PER TON

Mine to Mill	$ 2.00 per ton
Development	.243 " "
Mill	1.252 " "
Office	.15 " "
Miscellaneous	.493 " "
	$ 4.138 " "

COST POWER SHOVELING FROM SURFACE OPEN CUT:

At the Arizona Comstock property, we are now delivering 300 tons of ore daily to the mill, from the surface open cut work. We do the sampling, drilling, and blasting, and direct the gaspower shovel as to ore and waste or overburden. The contractors furnish the shovel, an 7/8 yard tractor shovel with a swing of approximately 40 feet. They also furnish trucks and do the shoveling and deliver the ore directly to the mill for 50¢ a ton. Waste is shoveled and hauled away at a contract price of 50¢ a yard.

Ore in this manner is being mined, shoveled, and delivered to the mill for a trifle less than 60¢ a ton. To this cost is added the charge for removing waste, which, in our case has not exceeded an approximate additional 20¢ a ton of ore. These costs will be reduced materially within a short time.

RECOMMENDATIONS:

My estimate of upper ore bodies above the 250 foot level in California and Ophir is:

182,314 tons, gross value $1,609,177, average $8.28 per ton.

I estimate this is sufficient ore to supply a 300 ton mill running 90% of the time for a period of two years. I also feel safe in estimating a recovery of 95% of the ore value, at a calculated cost not to exceed $4.13 a ton.

$8.28 x 95% = $7.86 recovered value

Estimated cost 4.13 per ton

" Profit $3.73 per ton

182,314 tons x $3.73 = $680,031. Net.

I, therefore, recommend that the tunnel north of the present incline shaft on Ophir, locally known as the Wise Tunnel, be opened and sampled, and if, as reported, this cuts a very wide quartz body of mill ore, trenching on the surface should be vigorously pushed, along the strike to ascertain length. This may lead to open cut work and power shovel operation.

In order to work the upper ore bodies described previously, it is necessary to locate a site for a working shaft on the surface at a point where connections can be made by crosscuts and drifts to the various ore bodies, and at the same time, develop more ore at deeper horizons. This shaft should be three compartments, and equipped with substantial head frame, double drum electric hoist, air compressor of at least 500 cubic feet per minute, fully equipped, blacksmith shop, timber framing equipment with rip and swing

saw, jackhammers, stopers, steel, cars, and all tools, etc., comparable to a fairly good size operation. This shaft should be started at the earliest possible time.

A milling plant with capacity of from 250 to 300 tons daily should be planned, and site selected. This site in my estimation should be near the C. & C. shaft, in order to be near the dumps and convenient for deeper ores which in my opinion, will be the most important ore bodies of these properties in the future.

The mill should be designed in units so that in case of repairs or breakage, the whole mill is not shut down. In this manner, at least part of the mill can be kept running at all times.

Some test work on representative ore should be done in order to guide the mill flow sheet plan, before final mill plans are decided upon. I personally prefer concentrating tables to flotation cells, where the final tails are treated with cyanide, because in the long run, tables require less replacement parts and can be depended upon to run more hours without repair, than flotation cells. It is a point to stress, that when a mill shuts down for any cause, the income stops immediately.

CONCLUSION:

I am very much pleased with the general outlook of these properties. They are mines that have attained great depth in the development and production of high grade ore at a period when only high grade ore would pay. The very nature of the Comstock Lode is such as to guarantee large tonnages of lower grade ore left by former operators, which under present day conditions, if intelligently applied, become highly payable ore. The great unexplored area in California and Ophir on the main Comstock ore channel offers an opportunity not only for large tonnages of payable ore to be encountered, but perhaps for some of the high grade, such as was discovered on this Lode

in the past.

In closing I will state that it is my opinion, that with sufficient capital provided to properly prepare the present ore bodies for stoping, and properly install the property with efficient equipment, that a highly payable mine will be the result.

Yours respectfully,

Howard W. Squires,
Mining Engineer.

HWS:RM

Virginia City, Nevada

June 8th, 1934

Mr. Wm. H. Byington

1109 Alexander Building

San Francisco, California

Dear Sir:

Since writing my report under date of May 30th, 1934, another territory has been entered near the south end of California ground and 86 samples cut. This, I am designating as Block H.

As this part of the mine was not described in my report, because no samples had been cut and assayed, I am now making this a "Supplementary Report", to be attached to my report of May 30th, 1934, and become a part of same.

The Supplementary Report describes the ore body, its location with respect to Block A and Block B, estimated tonnage at this time and estimated ore value. An assay plan up to this date accompanies this report.

Yours very truly,

Howard W. Squires,
Mining Engineer.

June 8, 1934

SUPPLEMENTARY REPORT

BLOCK H

East Ore Body

California Claim

of the

Consolidated Virginia Mining Co.

LOCATION:

As described in my previous report dated May 30th, 1934, the Comstock Lode is a series of more or less parallel ore channels, especially where the Lode is as wide as it is on Consolidated Virginia and Ophir territory.

Block H is approximately 100 feet east of Block A and Block B, and is a separate and distinct ore body. So far as I can determine, at this time, it stands nearly vertical. If there is any dip, it is slightly to the west. The quartz body is so wide, until deeper levels have been entered and sampled, it is impossible to determine dip or strike of the ore shoot. Block H, I believe, is on what is locally termed the main east vein of the Comstock Lode.

Sampling to date indicates the south end of this ore body almost opposite the south end of Block A on the Compiled map of Workings. The north end is almost opposite the middle of Block B on same map.

As shown on the Assay Plan, this ore body is developed and partially sampled on the following levels:

111 Sub Level:---------- Some Sampling

138 Level: ---------- Some Sampling

163 Level: ---------- Some Sampling

197 Sub Level: ---------- Some Sampling

It will probably take two or three weeks more to complete the systematic sampling of this territory. However, 86 samples have been well taken. Enough to indicate length, height, and thickness, and a pretty good idea as to average value. There are two high grade samples marked by a star, which were eliminated in calculation.

The indicated length of this Block H, now, is 200 feet. Height between the 111 sub level and 197 sub level is 86 feet. It continues up and down, but until more workings are open, and for the present, I am calculating tonnage as 100 feet vertical height. Width is calculated as 30 feet, judged by three crosscuts.

The ore body is massive quartz, but somewhat different in character from the quartz of Blocks A and B. Average value is calculated as follows:

34 Samples average - - - - - - - - $ 6.70

52 " " - - - - - - - - 9.98

Average value of 86 samples:

Gold Value .17 ounces - - - - - - - - - $ 5.95

Silver " 4.24 " - - - - - - - - - 2.73

Total - - - - - - - - - - - $ 8.68

Indicated tonnage is 200 x 100 x 30 = 600,000 cubic feet;

Divided by 13 = 46,154 tons.

Possibly one tenth has been removed by workings.

46,154 tons less 4615 tons = 41,539 tons.

41,539 tons x $ 8.68 = $ 360,558 Block H.

Before Block H was calculated, upper ore bodies are estimated:

182,314 tons, gross value $ 1,609,177

Add Block H - - - - - - - - - - 41,539 " " " 360,558

Total Estimate - - - - - - - - 223,853 tons, gross value $ 1,969,735

Average value, $ 8.80 per ton.

Estimating a 95% recovery of ore value, at a cost of $4.13 per ton:

$ 8.80 x 95% = $ 8.36 recovered value.

Estimated cost 4.13 per ton

$ 4.23 per ton.

223,853 tons x $ 4.23 = $ 946,898 Net.

Yours respectfully,

Howard W. Squires,
Mining Engineer.