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PRINTED: 03/21/2002

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: MORMON GIRL - PLAT. 2678

ALTERNATE NAMES:

S&J COPPER PROP
HENRY M. GRADY PAT. CLAIM
MORMON MINE #2 PAT. CLAIM
MAMIE MAUDE PAT. CLAIM

MARICOPA COUNTY MILS NUMBER: 515

LOCATION: TOWNSHIP 5 N RANGE 4 E SECTION 4 QUARTER NE
LATITUDE: N 33DEG 48MIN 33SEC LONGITUDE: W 111DEG 56MIN 43SEC
TOPO MAP NAME: CAVE CREEK - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:

GOLD
COPPER SULFIDE
COPPER OXIDE
SILVER
LEAD
ZINC
SILICON

BIBLIOGRAPHY:

ADMMR MORMON GIRL FILE
ADMMR "U" FILE
ELSING M, ET AL, AZBM BULL 140, P 94
WILSON E, ET AL, AZBM BULL 137, P 164
E/MJ 10/9/20 P 715
PROPERTY HAS BEEN SUBDIVIDED & HOUSES BUILT

S. & J. COPPER MINES, INC., Clayton V. Lundeen, Pres.
Las Vegas, Nevada 4912 E. Picadilly, Phoenix, Ariz.

MINE: MORMON GIRL, CAVE CREEK MINING DIST., Maricopa Co.- 29 Mi. N
of Phoenix. 4 patented claims.

HENRY M. GRADY

MORMON MINE #2

MAMIE MAUDE MINE

10-1955

Nicholas, R. W.

6-26-42

~~3331 East Lowell Road~~ ~~311 North Fremont Ave.~~
~~Tucson, Arizona~~ 509 Ellis Bldg., Phoenix, Ariz.

See N File

Re - Loan

See MORMON GIRL MINE - Re terms. 4-28-44

See MONITOR GROUP - re examination of property 509-44

See N file - re gas.

BRADFORD MINE

MORMON GIRL MINE

MARICOPA COUNTY
CAVE CREEK DIST.

INTERVIEW WITH JOHN BUTTERMORE

Mr. Buttermore reported that he planned to board up the entrance to the Mormon Girl adit to keep intruders out. He recently tested some white material, below the adit and is trying to market it as an oil absorbent. The material appears to be a highly siliceous tuff. It was analyzed with the following results:

Silica	89.70	percent	CaO	0.35	percent
Alumina	3.72	"	MgO	6.65	"
FeOxide	1.09	"	Alkalies	0.82	"
Titanium	0.10	"	Ignition Loss	3.70	"

Reported to be non-toxic.

Buttermore is having it tested as a soil conditioner.

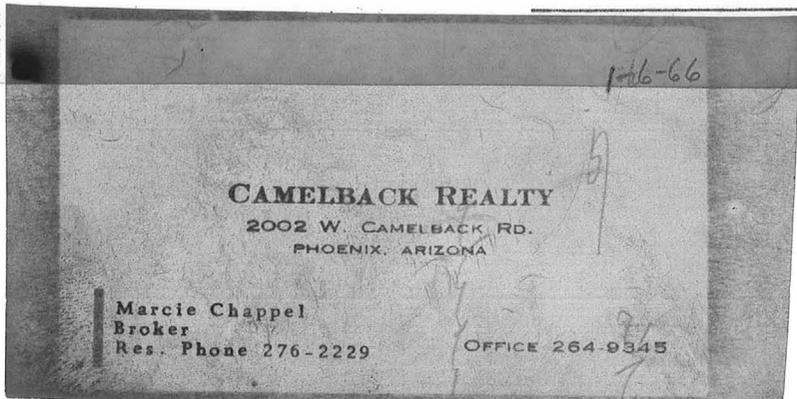
MEMO LEWIS A. SMITH 6/14/63

John J. Buttemore, 5527 N. 62nd Ave. , reported he was negotiating for the sale of the surface of the Mormon Girl Claims, Cave Creek, but would retain the mining right. He has a cuttable, apple green mineral he wishes to take out.

Lewis A. Smith - Weekly Report 9/19/63

Mr. Buttermore stated that he had completed a deal with R. H. and Marcia Chappel, 5418 S. 3rd Street, Phoenix, for the patented claims (6) and that the papers were in escrow at present. The deal also includes mineral rights. Mr. Buttermore said that he did not know whether the Chappel group were going to mine or just wanted the property for land development. In a later conference with Mr. R. H. Chappel he indicated that he planned to have an engineer make a report on the mine. The Chappels work for Camelback Realty Co. (264-2717).

LAS Memo - Sept. 29, 1964 Conference with John Buttermore, 5527 N. 62nd Ave., Gendale.



MORMON GIRL MINE

MARICOPA COUNTY
CAVE CREEK DIST.

Visited Mormon Girl Mine 2 miles south of Cave Creek revealed that no one was there. Preparations for what appeared to be for a house or perhaps a tourist attraction as both the dump and the lower "turn-around" where the bin had been were leveled off and several newly painted rustic-type tables and chairs were installed as was a stairway up the dump to the portal of the adit which had a newly painted gate.
GW WR 12/11/70

Mr. J. Buttermore, phone 488-3776, who owns the Mormon Girl mine near Cave Creek, Was in with samples from his claims in E $\frac{1}{2}$, Sec: 35, T6N R3E. Samples show considerable oxide copper mineralization and are reported by him to assay 12% Cu. He says the vein is 5-6 feet wide and 1500 feet long and he has sank 30 feet on the vein. KAP Report of 5/18/73

Offered: MORMON GIRL MINE, High Grade Silver and Lead with much Zinc.
Near Prescott, Arizona. 5 veins, 100 acres. 5 claims. Water and power,
Price: \$200,000.

The Timshell Newsletter, July(?), 1975, p. 3

5/4 NE 1/4 Sec 4, 5N, 4E (KAP 9-17-76)

MORMON GIRL MINE

MARICOPA COUNTY
CAVE CREEK DIST.

see: ABM Bul. #137 p 164

E/MJ Oct. 9, 1920, p. 713,714,715 Cave Creek District (geology file)

E/MJ Feb.2,1910, p. 7,8,9 " " " " "

April 28, 1944

Mr. R. W. Nicholas
311 North Fremont Avenue
Tucson, Arizona

Dear Mr. Nicholas:

Regarding the Mormon Girl Mine, I have talked with Mr. Hokett, 2322 North Ninth Street, Phoenix, and find that he wants a down payment of three or four hundred dollars before making a lease.

-I do not consider the deal at all justified and doubt if it would pay to give it further consideration.

Very truly yours,

J. S. Coupal, Director

JSC:JES

March 10, 1944

Mr. A. S. Lewis
Chloride, Arizona

Dear Alf:

I have just been out over the Mormon Girl with Mr. W. G. Hockett. I took one or two samples on the first and second level below the adit tunnel. At the bottom of the incline and at the portal of the second level there is a large caved area which has evidently closed up the incline below that second level.

My trip was only a hasty one just to see what his problems were and find out what amount of work would be necessary to properly dress up the mine.

I told Hockett that with your knowledge of the property I believed you could put in a little time gathering together all of your old information and then that you and I would jointly put this material together and assist him in any of his plans. He has agreed to this and would be willing to cut you in on any deal he made.

If you are not going to be in Phoenix shortly, please make an effort to get together as much information as you have on this property and I will gladly assist in getting it into the shape necessary to make a good presentation.

With best wishes, I am

Yours very truly,

J. S. Coupal, Director

CC: Yucca, Arizona

Alfred Strong Lev
Consulting Mining Engineer
Phoenix, Arizona

Dec. 9, 1930

Mr. C.C. Barrett,
Cave Creek,
Arizona.

Dear Sir:

In answer to your request that I write a letter supplemental to a report, upon the Mormon Girl Mine, I wrote under date of Oct. 23rd, 1919, the following is submitted.

This mine has been idle during the 12 year period between 1917 and 1929. It was re-opened in 1929 and has been operating upon a small scale since then.

Since writing the afore mentioned report, I have had occasion to examine or investigate the value of nearly all the small mining properties and prospects in Arizona and New Mexico and in the light of the experience gained in this work, I can state that, with very few exceptions, the Mormon Girl property presents the most favorable chance to become a large profitable producer of any undeveloped mine I know of in either State.

My explanation of the ore occurrence in the Mormon Girl is that an immense ore deposit exists at a depth of from 700 to 1000 ft. The continuous ore shoot which has been worked from the 280 ft. level to the surface is simply a neck, chimney or vent leading to the surface from the main ore deposit existing at depth.

The highest grade ore was found at the 280ft. level which indicates increased values as depth is gained.

Half of the necessary work has been done to open up the ore deposit at the 400 ft. level.

The shaft has been sunk to within a few feet of the 500 ft. level.

At nominal expense the 400 ft. and 500 ft. levels could be completed and the character, value and size of the ore chimney determined. An additional 100 feet or the 600 foot level would be about the commercial limit of depth with the present shaft and equipment, but with the ore shoot cut at the 600 ft. level, there would be sufficient knowledge of the trend, as well as the value of the deposit, to determine proper and justifiable future development of the property.

While a report that I would write today would be considerably different from the one written in 1919, I

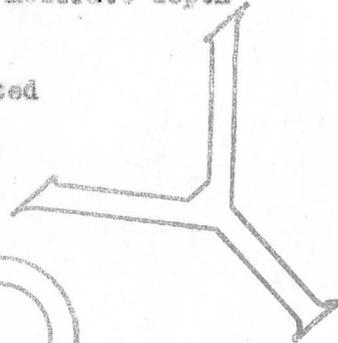
C. C. B. #2

can state that with my more definite present knowledge of the interpretation of the various geological conditions encountered in this property, there is strong reason to expect a very large and valuable mine at a moderate depth below the present workings.

Respectfully submitted

Alfred Strong Lewis

C O R P



The Southwest ILLUSTRATED Magazine

Vol. II.

FEBRUARY, 1896.

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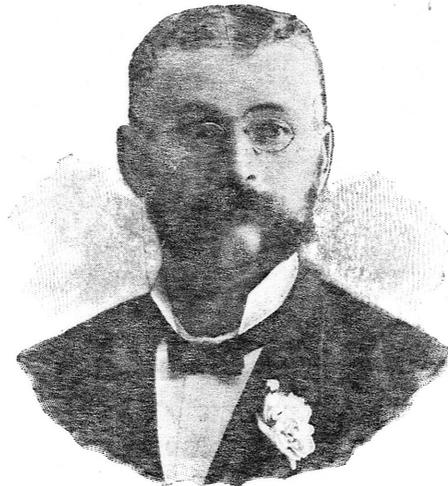
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a graceful, easy and forcible writer. To him belongs the honor of originating and promoting the Phœnix Carnival, which takes place the 19th to 22d of February inclusive. Mr. Dunbar is a jolly and most agreeable gentleman to meet, and he has that reputation throughout the Territory.

The mentor of the medical profession in Phœnix is Dr. H. E. Stroud. While not the oldest physician in the city, he has in the course of a few years become one of the Territory and city. He has performed many difficult surgical operations and had referred to him many most serious cases, attesting the faith of the people and confidence of other doctors in his ability. The doctor is meeting with gratifying success just now with the



DR. H. E. STROUD.

new consumptive cure discovered by Dr. Cyrus Edson. In speaking of the new discovery, Dr. Stroud says that it may solve the problem of the cure of tuberculosis, and in order to understand Dr. Edson's discovery it is well to bring to mind that Pasteur and Koch discovered and established the fact that germ diseases had as their ultimate cause the presence in the body of minute organisms by scientists styled microbes. The scientific men found that disinfectants would kill the germs. They found that if a mixture of one part phenol to three thousand parts of water would kill the germs outside the body, it would kill them inside and hence would cure the cause of the disease. Dr. Edson made this discovery in the fall of 1895. Dr. Stroud is the only physician in Arizona that has procured Aseptolin, and the result so far has been far beyond the doctor's most sanguine expectations. In connection with the doctor's office on Washington street there is Stroud's Sanatorium on North Center street. It is the only one in the city and the number of patients being cared for points very strongly to the fact that the doctor is doing noble work for the human family.

"THE MORMON GIRL" GOLD MINE.

The mineral resources of Arizona are so varied and so rich that they have given the Territory a wide reputation as a producer of wealth. Copper, gold and silver bullion are produced from ores that are mined in almost every part of the Territory. Bisbee, Globe and Clifton, Jerome, Prescott, Tombstone, Kingman and innumerable other camps are by-words with the mining man familiar with the Southwest, that are synon-

ymous with the new wealth that every year is dug up out of the bowels of the earth.

It is said with much truth, that, while the mineral regions of the North and of the high mountain regions are covered with snow, so that they are inaccessible and work is dangerous and unhealthful, the milder climate and lower altitude of the Arizona ore belt allows them to be worked for twelve months in the year, so that prospecting and development suffer



THE MORMON GIRL MINE.

no interruption. For this reason Arizona's record as a producer of precious metals is as remarkable as her copper and lead deposits are inexhaustible.

Among the numerous camps where the production of gold has been successfully engaged in since the sudden depreciation of silver in 1893, is the Cave Creek district, which is situated about thirty miles north of Phœnix. Among the mines of Cave Creek, one that is attracting much attention and that has forged rapidly to the front is the Mormon Girl, which is owned by Isaac W. Taylor and sons and E. P. McCormack. Not many months ago extensive operations were begun and development work has been rapidly prosecuted of late. A stamp mill has been put in and is now at work on the ore of the Mormon Girl. The company, since first obtaining possession, has acquired seven or eight adjoining claims, but the greater part of the work has been expended upon the Mormon

Girl proper. A tunnel has been run a distance of 400 feet, and from this a shaft has been sunk 300 feet.

The geological formation is regular in the main, more so than is usual in Southern Arizona. The foot wall is eruptive diorite, having a uniform dip to the southeast of forty degrees, while the hanging wall is carboniferous limestone. Between these lies the vein or ledge, separated from the diorite by means of a regular and ever present talc slip. The quartz vein is the more regular of the two, but is so slightly impregnated with copper that it can only be classed as a low grade ore. These ore bodies are tenticular in shape, very extensive in size and richer in the lower levels of the mine. At the present time there is sufficient ore in sight to keep twenty-five stamps running night and day. The assays show an average value of \$12 per ton, while in numerous single instances streaks have run as high as \$200 per ton. Only a short time ago one mine in this district sold for \$40,000.

From Ash Fork to Albuquerque.

FROM Ash Fork to Albuquerque the Atlantic & Pacific railroad passes through a country which at this season of the year is not attractive to the eye, but which furnishes a very considerable amount of business to the road and supports a number of lively little Western towns far above the average in the standard of improvements and conveniences which one looks for in communities of their size.

Ash Fork is the junction of the Atlantic & Pacific railroad with the Santa Fe, Prescott & Phoenix line, from which fact it derives most of its life and commercial activity. East of Ash Fork the next place of importance is Williams, which is a distributing and shipping point for the immense cattle and sheep interests which are spread for miles to the north and south.

Then we come to Flagstaff, which ranks perhaps second only to Gallup in appearance and from a solid business standpoint. The quarries of the well-known sandstone which figures in so many of the new buildings throughout the country, are situated here. The fineness of the texture of this stone, the manner in which it lends itself to the cutter's chisel, its delicate tint and its durability all tend to bring it into more general use every year. But undoubtedly the largest business in any one line which is conducted here is the lumber trade. From the San Francisco mountains near by is procured the best quality of pine accessible to Northern Arizona and Central New Mexico. Some of the largest mills of the Southwest are in operation here, and from them the markets are supplied clear through to Southern California on the west and as far east as the Rio Grande Valley. Perhaps the reason of all that Flagstaff is best known to the tourist is because it is from this point that one leaves the railroad to visit the famous Grand Canyon of the Colorado, which lies about seventy miles to the north.

Then follow Winslow and Holbrook, the former an active little town, at which the railroad company has lately built new shops, and the latter

one of the largest shipping points for wool, sheep and cattle in Arizona. In fact all four of the last named places send out carload after carload of the products of the practically unlimited grassy ranges which are tributary to them. Last year the shipments of live stock surpassed all previous records from these points.

Before reaching Gallup we entered the Territory of New Mexico. Basing its existence upon the extensive coal deposits which underlie the surface of the ground for several miles in the vicinity of the town, Gallup, after a torpid existence of some years, has suddenly, within the past twelve months, shot up into a little city with almost metropolitan airs. After a visitation by fire which wiped out a great part of the business portion of the town, with an enterprise and self-confidence unusual in these days of financial distress, the property owners have set themselves to the work of reconstructing the destroyed blocks, giving to them an air of substantiality and permanence which one seldom sees in a town of the size of Gallup. That their faith is well founded is evidenced by the long trains of coal that leave here daily for the east and west and by the growing pay rolls of the mines. On its face Gallup wears an air of prosperity beyond that of any small Western town that I have seen in my travels.

Just east of Gallup begins what is said to be one of the most remarkable formations of red sandstone in the world. As the train begins to climb up the Rio Puerco Valley to the Continental Divide, to the north, at no great distance from the track, rising sheer from the level bottomland of the valley, stand precipitous bluffs of rock from 100 to 500 feet high. This red sandstone skirts the Puerco clear to the divide and down the opposite side for more than forty miles. On the south rise the Zuni mountains to an elevation of more than 9,000 feet, with their slopes and summits heavily clothed with timber. As we draw nearer our destination we pass the interesting village of Laguna, with its clustering rock houses, each one overtopping its neighbor on the steep hillside, and the farms and irrigating ditches of the Pueblos, showing a certain degree of thrift and acquaintance with agriculture. Then the immense beds of lava, through which the train winds its way, reveal the mighty forces of nature which were once at work here and have left their black track the length of the valley. Then the sun sets and after an hour of darkness we find ourselves once more in Albuquerque.

A Prominent Educator.

ONE of the rising young men of Arizona is Mr. George U. Young, superintendent of the Williams, Arizona, public schools, and also editor and proprietor of the Williams News, a weekly publication. Mr. Young is an Indianan by birth, born at Hamburg, a small hamlet several miles north of New Albany, February 10, 1867.

After completing his education, he was principal of the Strong City, Kansas, high schools; then with a view to practicing at the bar, he read law under W. T. Righmeis, candidate for chief justice of the Kansas Supreme court, and was admitted, after passing a creditable examination, to

MORMON GIRL

MARICOPA COUNTY
CAVE CREEK DIST.

S. & J. Copper Mines, Inc. - owners,
Las Vegas, Nev.

Clayton V. Lundeen, Pres.
4912 E. Picadilly
Phoenix, Ariz.

Sec 4, 5N, 4E (RAP)
23, 51

Sec. 33, T3N, R4E - Some claims patented,
rest being patented.

Copper - (Chalcopyrite and Brochantite.)
Gold - (HW streak in quartz)

6-1957

John Buttermore and asso., - new owners
(Jay and Sylvia Buttermore)
3901 W. Berridge Lane
Glendale, Ariz.

70112
Concord
2333
4/12
FTD
2001
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BJS

A

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine MORMON GIRL, Cu., Au.

Date April 2, 1944

District Cave Creek

Engineer Earl F. Hastings

Subject: Reconstruction Finance Corporation
 Mine Loan

Docket No:

Phx C-269

Date Application Received:

March 27, 1944

Date of Report:

April 2, 1944

1. Name and address of applicant (Correspondent):

Alfred Strong Lewis, Box 67, Yucca, Arizona

2. Character of project and estimated cost thereof:

Rehabilitate and equip for exposure of bottom of 120 ft. level where previous sampling by the applicant indicates $3\frac{1}{2}$ ft. of copper-gold ore. \$3,785.00.

3. Location of property:

Cave Creek Mining District, Maricopa County, Arizona.

4. Applicant's interest in or ownership of property:

Applicant is owner of $1/3$ interest in mine and has lease and option on the balance.

5. Loan requested:

\$3,785.00

6. Loan recommended:

None.

7. Comments:

(A) There is one known ore shoot along the strike of the vein. At its largest this shoot is 35 ft. in length and $4\frac{1}{2}$ feet in width. Below a fault on the 120 ft. level the width is 3.75 ft. and the length of the shoot is unknown. Assuming a length equivalent to that above the level there are about 10 tons of ore, or 900 lbs. of copper, per foot of depth to be gained.

(B) There is insufficient development by which to judge deposition habits. The shoot is persistent in quality and strength over the limited length to the 120 ft. level. While ore has been located below the fault, its lateral extent is, as stated, undetermined; nor has the ore been encountered on the 240 foot level, a fact which can possibly be explained by both the rake and fault displacement.

General formation is tending to converge both vertically and laterally in the area of this ore shoot and more serious vein displacement and complete loss of ore is as possible as is the deposit plotted on Exhibit "C".

(C) Even assuming the continuation of the shoot and a persistence of metal content the net metallic gain is not in favorable proportion to development requirements. This ratio will be increasingly unfavorable due to the rake of the shoot in relation to the shaft.

(D) Between the 120 and 240 foot levels, the section most readily reached, the capital requirements for production are in excess of the amount requested and further funds would be ultimately required. On the other hand, the funds requested are excessive for the accomplishment of the stated objective, namely to expose the areas of "V" and "H" sampling.

Two courses then present themselves:

1- Reduce the amount of the loan to a maximum of \$500.00 to check samples "V" and "H" or,

2- Assume the accuracy of the sampling and statements of the applicant and anticipate an increase of the amount of the loan necessary to change the objective to a production point.

(E) It is the opinion of the writer that the facts as stated by the applicant would be verified in close tolerance and that this evidence would still be insufficient upon which to base recommendation of a loan in an amount sufficient to equip, develop and reach possible production.

ARIZONA DEPARTMENT OF MINERAL RESOURCES

Earl W. Hastings, Projects Engineer

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

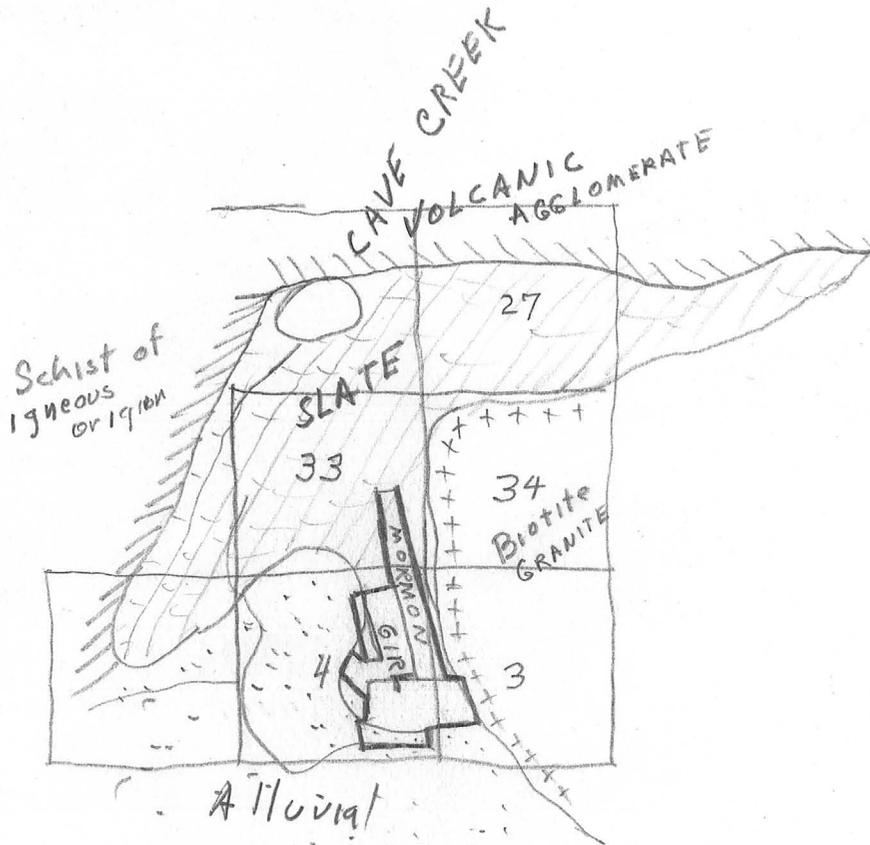
Mine **MORMON GIRL**

Date **March 7, 1956**

District **CAVE CREEK**

Engineer **B. J. SQUIRRA**

Subject:



Copy of Geological Sketch
by Milton L. Rose
June 1953

Mormon Bible

C O P Y

Received
Jun 15, 1953
8:30 AM
Securities and Exchange Commission
San Francisco Regional Office

E N G I N E E R ' S R E P O R T

✓
S. & J. COPPER MINES, INC.

Cave Creek Mining District.

MARICOPA COUNTY, ARIZONA

Date:

June 12, 1953.

INTRODUCTION: This report is based upon data gathered by a visit to the S. & J. Copper Property, and from other sources, namely, Arizona Bureau of Mines publications; Mineral Resources Department of Arizona; Geological Maps of Arizona, and with men who are acquainted with the property.

LOCATION: The S.⁺ & J. Copper Property is twenty-nine miles north of Phoenix, Arizona and is reached from there by a paved road which passes within one mile of the property. The mine is about two miles from the settlement of Cave Creek, Arizona.

ELEVATION: The elevation of the property is about two thousand (2000) feet.

WATER SUPPLY: There is no water supply at the Mine. During rainy seasons, there may be some seepage into the bottom, but it is very minor. Depth may, or may not increase this source of supply. Water could be developed from a well in the lower valley if need arose.

TOPOGRAPHY: The property lies along the western slope of an irregular chain of hills which rise about one thousand (1000) feet above the surrounding valleys. Erosion has been great, as evidenced by the depth of the valley fill. These hills which now stand out alone and disconnected have once been a part of a mountain system of much higher elevation. Much of the material from these higher mountains has been eroded away and washed down into the valleys which are now filled and are the level, or almost level valleys of the surrounding desert. The veins and outcrops of ore bodies have thus been exposed by the weathering action of the past ages. Part of the veins thus exposed are on the property of the S. & J. Copper Mines.

HOLDINGS: There are four (4) patented mining claims in the original property holdings, to-wit:

✓ Henry M. Grady	15.9 acres
✓ Mormon Girl	17.9 acres
✓ Mormon Mine #2	17.8 acres
✓ Mamie Maude Mine	9.0 acres
	<u>60.6 acres</u>

MINE WORKINGS: The mine workings consist of five (5) shafts, five (5) open cuts and one (1) tunnel. The main inclined shaft is about 475 feet deep and the adit tunnel, which intersects the shaft at 160 feet in depth, is 507 feet in length, with the incline going down about 100 feet from the end of the tunnel or adit.

CHARACTER OF THE ORE: The ore is siliceous, containing copper, gold and silver. The copper is in the form of carbonates and sulphates on the upper levels. On the lower levels there is some bornite or copper sulphide showing. Occasional kernels of glance are also present. Free gold is very apparent in many of the hand samples. The free gold appears to be of secondary origin, and indicates that strong leaching action has been present.

The strong leaching action that has taken place with the gold is further borne out by the presence of manganese in the vein as well as in the surrounding wall rock. Manganese is the most powerful oxidizer and carrier of dissolved gold and silver.

The secondary enrichment of gold has been carried downward to a great depth as free gold is still found in the ore on the lower levels, where sulphide copper is now appearing. Water level must still be at a greater depth, as a full face of sulphides has not shown as yet.

Lean and rich zones of ore as depth is reached can be explained by the fact that both copper and gold precipitate out of the solutions which are carrying it when it hits favorable precipitating agents on the downward move. Since there are hard and soft spots in all rocks the favorable channels could have unfavorable places between and so no solutions would travel in certain parts and there would be no precipitation or enrichment at these unfavorable places.

The most favorable place for precipitation is at or near the water level, which level might be variable, and in most mines this is the level of

greatest enrichment, and widest width of enrichment.

GOLD AND SILVER VALUES: The gold and silver values in the ore which has been shipped from the property, as well as the ore which is left in the workings, are very encouraging, and, as will be seen from the Smelter returns would represent about a little over one-half the value of the ore at today's prices for the metals contained. There is good reason to suppose that the values will continue at the same rate down to the permanent water level. There is ore left on the lower or 3d level, which has yielded some very good assays.

S. & J. PROPERTY ORE DEPOSIT: This deposit occurs along an inclined fault zone which shows evidence of several distinct movements with the consequent crushing and recementation. A white quartz with streaks of manganese and iron was apparently first deposited; this was crushed or sheared and a black quartz deposited filling solidly around the crushed angular deposit of white quartz. This hard black quartz, several feet in thickness, forms the foot wall of the ore deposit. It has a hard smooth, unbroken surface, and can be best observed in an east cross-cut from adit level about 40 feet south of the inclined shaft, as well as in the open cut where the shaft comes to the surface. The ore deposit is siliceous, containing copper carbonates, a small amount of copper sulphate and an appreciable proportion of chalcocite. The ore rests directly on top of the hard black quartz breccia, with a very thin clay selvage between.

The south end of the ore shoot has been abruptly cut off, but the displacement has not been great; drifting in this direction at the tunnel and lower levels has encountered discontinuous lenses of good ore occurring in steps, each step slightly to the west of the preceding step.

The north end of the ore shoot was encountered suddenly in the tunneling operations showing that it might also have been cut off or thrown by a fault. The cut off theory sounds more reasonable to me. The ore shoot looks as though it might be a chimney of ore which filled a hole at that particular part, or place.

This broken area containing the lense or chimney, is exposed for a distance of about thirty feet in each of the various levels. These ore lenses are floating in the inclined material of the hanging wall. In some instances, just underneath the lenses, occur loose porous fragments of the displaced footwall. The various levels have drifted through the ore zone, encountered and followed the hard, smooth footwall, but have failed to expose other lenses. Further drifting or cross-cutting may expose more ore shoots.

All of the claims lie in what is designated as slate or schist. This schist or slate has an area just the width of the claims over the length of the claims as is shown on the attached sketch. The schist does, however, stretch in a long finger-like shape to the north and east.

What is locally called Granite-Biotite, occurs to the east of the claims, and the schist area. This intrusion of granite has doubtless been an important factor in the general deposition of the ore deposits.

The rocks encountered are granite-Biotite, slate, schist, and an epidotized rock which may be an intrusive. All are highly altered or weathered. The slate has been rendered schistose on its eastern edge. It is completely kaolinized in places, and where massive, shows considerable seritization and silicification.

The alluvial stretches over the ground to the west of the claims, but I have no doubt that at depth it will be found that the schist or slate is underneath.

MINERALIZED FORMATION: The outcrop of this formation shows mineralization. Green copper stain can readily be seen and occasionally, a little free gold can be found in the quartz, along with the copper.

Proceeding from the vein at the surface, in a westerly direction about two hundred feet of shale and schist is passed over, then comes a Rhyolite like rock that is altered and schistose for about fifty feet, then about forty feet of epidote with gash veins of quartz; then a series of schists and epidote ledges for an indefinite distance, west. The dip of these formations is less

than the dip of the vein at the surface. The intersection of the vein and rhyolite-like and epidote formations at depth, should be explored for valuable ore.

This intersection should be found at a depth of about 700 feet in the present inclined shaft, which is about 450 feet in depth. Exploration to each side of the shaft should be done by cross-cuts.

From the map of the claims and the course of the veins on the Mormon Girl and Mormon Mine No. 2, it could be expected to find that the two at depth either come together or come up from a common origin. The vein on the Mamie Maude also heads toward the other veins. A series of faults could be the answer to the direction and course of all veins on the property.

The width of the quartz vein will average about four feet, but the hanging wall is so soft, altered and kaolinized that an ore vein of considerable width could easily be formed. The actual width has varied from several feet up to four feet in width. Lenses of ore can be of any size and width in accordance with the degree of hardness of the inclosing rocks.

PRODUCTION RECORD: There has been \$50,000.00 worth of silver, copper and gold ore shipped from the property since it was first discovered. Three Smelter sheets from the American Smelting and Refining Company, Hayden Plant, show that former operators in 1940 shipped ore that gave a steady copper content of about 3%, plus, or average of 3.5%, plus. The silver content was three ounces, and the gold content average about .475 ounces. Much better copper and silver prices can be obtained for the same class of ore today. There is no reason why the average of ore shipped from the property now should be under the same average, yet the dollar and cents value is almost double today.

AVAILABLE ORE: There is available ore on the third level of the mine in the workings off the inclined shaft. Several assays from here turned out very good, as shown below:

	Gold	Value	Silver	Value	Cop. %	Value
#1 - 3rd Level	5.28 oz.	\$184.8	7.20 oz.	\$6.48	12.10	\$69.6
#2 - 3rd Level	1.84 oz.	\$64.40	2.80 oz.	\$2.52	4.20	\$23.2-

If we assume that the ore will average no better than that shipped

by the former operators, then there are a number of car-loads of good ore ready to be mined from the third level. The money obtained from such shipments will then pay for the work of rehabilitating the shaft and workings in order to get same.

Actual amount of ore that can be obtained from this level can not be determined until further drifting and stoping is done.

EQUIPMENT ON PROPERTY: There is no equipment now on the property and the access road will have to be repaired.

SUMMATION OF DATA: There is extensive mineralization on the S. & J. Property, which is now held by the S. & J. Copper Mines, Inc. This mineralization is shown in three veins outcropping on the claims. There is an ore shoot or chimney on the Mormon Girl Claim, and said ore body has produced considerable commercial ore with values in gold, silver and copper. The ore shoot still persists at depth and contains commercial ore which can be removed after necessary work of rehabilitation of tunnel and shaft has been done, and after necessary equipment has been acquired and installed.

Further exploration of the property in length and in depth must be carried forward to expose further commercial ore. This exploration can be best done by sinking the shaft to a greater depth, and running cross-cuts out laterally along the vein. Since permanent water level is probably some distance down, as no appreciable amount of water has been encountered in the workings to date, it can be assumed that the secondary enriched ores will continue on down to the permanent water level, which is probably in and around the 700 foot level. It is possible that it is even deeper, and also possible that it may be shallower than the 700 foot level. Some good commercial ore should be found as depth is increased, as well as found as the lateral works are extended.

A program of diamond drilling should be set up and carried out at a

greater depth than 700 feet, to determine the grade and extent of any primary ores which must be present below the permanent water level. Such drilling should be done from either the Mormon Mine #2 or the Mamie Maude, so that the drill would cut the veins showing on those claims, and also cut the area where the veins converge at depth. Diamond drilling is the cheapest method of exploration at depth.

Some drilling should also be done on the Henry W. Grady claim to explore the ore possibilities there. Also, below any other outcrop showing values at the surface. A very careful engineering estimate and survey should be made to locate the right places for the drilling, and the angles at which the holes should be drilled. This would avoid duplication of knowledge gained and assure the maximum of worthwhile exploration for monies expended.

It is quite within the realm of possibility that the values in the ore will increase from the third level down to water level, as is indicated by the high assays obtained from the ore on the third level as given above. The greatest enrichment of ores takes place at or very near the permanent ground water level of the area being explored.

Outcroppings of quartz extend over a distance of 3000 feet or more on and through the Henry W. Grady, Mormon Girl and the ground extension south of the Mormon Girl. All the outcrops examined showed mineralization. No attempt was made to sample these outcrops as such had been done by former examiners. Gold, silver, and copper values persist throughout the total length of the quartz outcroppings.

There is no local data to use as a base for estimating the vertical extent of the high grade secondary ores in the Cave Creek District, but it is safe to assume that the secondary enrichment will continue down to the permanent ground water level, and that they should be richest at or near that point.

CONCLUSION: Monies for further exploration of the property, as is outlined above, should be raised. The necessary equipment to deepen the present inclined shaft on the S. & J. Property, and run exploratory lateral drifts should be obtained and

installed. Such work should uncover some very good commercial ore which will be of shipping grade. Diamond drilling to explore the possibilities of other high grade ore bodies, both above and below the water level should be done at earliest possible moment under the supervision of a highly skilled engineer. Such drilling should be done so as to explore all veins and intersections of veins on all of the patented claims belonging to the Company. This later work has the possibilities of finding many bodies of commercial grade ore, which can be worked from the present workings now available.

Since a large proportion of the value of the ore is represented in the copper content, the work should be done as quickly as possible so as to take advantage of the present very favorable price of the red metal.

Respectfully submitted,

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E N G I N E E R S ' S R E P O R T

MOEDON GIRL and
Other Properties

Owned By

CAVE CREEK CONSOLIDATED COPPER COMPANY

Cave Creek Mining District,

Maricopa County, Arizona

C O P P E R

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INTRODUCTION: This report is based upon data gathered from numerous visits to the Mormon Girl property during the past two years.

LOCATION: The Mormon Girl Property is twenty-nine miles north of Phoenix, Arizona, from which point supplies can be readily obtained by wagon, freight or motor truck. The road has easy grades and is a very creditable freight road. The trip from Phoenix to the mine can be traveled by automobile in two hours time.

A bond issue of \$4,000,000. for building permanent roads in Maricopa County has been voted. This will mean that the first one-third at least of the Cave Creek road will be paved in the near future.

The Cave Creek road is one of the main roads leading out of Phoenix and will be among the first roads to be improved.

ELEVATION: The elevation of the property is about two thousand feet.

TIMBER: No timber is available for power purposes, but the supply is ample for domestic uses.

WATER SUPPLY: Water can be developed at the mine by cleaning out the main incline shaft, which is caved for about fifty feet, and then sinking some fifty to one hundred feet deeper. Water for milling purposes could be secured from this source.

TOPOGRAPHY: The property lies along the western slope of an irregular chain of hills which rise about one thousand feet above the surrounding level valley.

Erosion has been very great, as evidenced by the depth of the valley fill. These hills which now stand out alone and disconnected have once been part of an enormous mountain system extending from the interior of Mexico, diagonally across Arizona and continuing through Nevada. Many thousands of feet have been torn from this mountain system by powerful forces of Nature operating through millions of years. This material has been washed down into the great chasms at their feet. The chasms have been filled and leveled into broad valleys of great agricultural activity, the once lofty peaks have been dwarfed and diminished into low hills of insignificant magnitude.

These tremendous destructive agencies of nature have finally exposed at the surface mineralized zones which were originally concealed at profound depth.

The mineral zones, when exposed to surface oxidizing conditions were rendered soluble by chemical action and migrated downward, but certain residual products of decomposition have been left behind at the surface. It is this evidence which has led to the uncovering of many of Arizona's greatest copper mines, and lends great encouragement to the deep development of the Mormon Girl.

CLIMATE: The winter climate is ideal for mining operations. The summer months of June, July and August are hot, but this condition is not felt in the underground workings of a well ventilated mine.

With buildings of proper construction, the summer heat is not oppressive. Heat prostrations are unknown. The summer is usually broken by several rainy periods of a week or ten days each with temperatures ranging from 60° minimum to 95° maximum.

GEOGRAPHY: The accompanying map gives the geographical location of the holdings. It appears that the property is about midway between Jerome and Globe. The mineralized zone indicated on the map is the greatest copper producing zone in the world. The fact that the Mormon Girl is in this zone is sufficient in itself to induce confidence, but when it is considered that the identical formation and local features characteristic of the United Verde and United Verde Extension properties of Jerome are apparent, with even a greater display of copper and gold values for the amount of development done, it cannot be doubted that development in depth will produce the same results in the Mormon Girl which were produced in the United Verde Extension.

HOLDINGS: There are four patented mining claims, one patented mill-site claim and two unpatented mining claims in the original property to-wit:

Mormon Girl - patented	17.9	Acres
Mormon Mine - "	17.8	"
Mamie Maud - "	9.0	"
Henry W. Grady "	15.9	"
Mormon Girl Mill Site - patented	5.0	"
Washington - unpatented	15.0	"
American "	20.0	"
Total	100.6	"

ADDITIONAL
CLAIMS
ACQUIRED :

There are seven of these claims, containing about 140 acres, to-wit:

Rochester No. 1
Rochester No. 2
Red Cross
Mormon Girl Extension
Mormon Girl Extension No. 2
Mormon Girl Extension No. 3
Little Hope.

These claims have been acquired by purchase and location.

All requirements have been performed.

ADDITIONAL
CLAIMS
CONTROLLED:

There are twenty-eight of these claims, embracing about 550 acres. These claims are unsurveyed and unrecorded and will require a certain expenditure before the title is perfected.

MINE
WORKINGS:

The mine workings consist of eleven shafts, five open cuts and one tunnel. The main inclined shaft is 475 feet deep and the Adit Tunnel, which intersects the shaft at 160 feet of depth is 507 feet in length.

At this intersection of the shaft with the tunnel, a spacious station has been cut and a Fairbanks-Morse gasoline engine hoist installed. The material and labor cost of these workings, as appraised by government engineers at the time of the survey for patent, is given as \$16,280.00. Since the survey and appraisal by the Surveyor's General's office, made during the year 1911, there has been a considerable amount of money spent upon the property, not only in the development of same but in the purchase and installation of additional equipment.

EQUIPMENT
ON THE
PROPERTY:

A small mill was placed upon the property several years ago for the purpose of reducing the surface ore. While certain machinery of this mill might be of future use to the property and can be regarded as an asset, it is altogether probable that the character of the ore will change below water level and be amenable to a simpler milling process.

The mill equipment consists of the following:

- 1 - 40 x 60 sheet iron building
- 1 - 5-stamp battery 850 lb. stamps.
- 1 - 10 x 10 jaw crusher
- 1 - Huntington Mill
- 1 - 6 foot Vanner (without belt)
- 1 - Amalgamating Pan
- 2 - Steam Boilers
- 2 - Steam Engines
- 1 - Steam Pump
- 1 - Ore Bin
- 1 - Unloading Platform

The mine equipments consists of the following:

- 1 - Gas Engine, 40 H.P.
- 1 - Air Compressor, 8 x 9
- 2 - Large capacity water storage tanks
- 1 - Tank wagon for hauling water
- 1 - Fairbanks-Morse Hoist, 12 HP
complete with cable and skip
- 2 - Machine Drills complete with drill steel
Complete mining tools for hand work
- 1 - Ore storage bin for loading by gravity
- 1 - Mine car
- 1 - Blacksmith outfit and building
- 400 feet steel mine track from incline shaft
to ore bin at surface.

The above list is not complete but will show the general nature and extent of the present equipment.

CHARACTER
OF ORE :

The ore is siliceous, containing copper, gold and silver. The copper is in the form of carbonates and sulphates, with occasional kernels of glance.

Free gold is very apparent in many of the hand samples. It is of secondary origin and indicates that strong leaching action has been present, which fact supports the prediction that secondary deposits of copper will be found at or near permanent water level.

The fact that a lean zone of copper ores exists on the third level might be explained by the fact of its proximity to the present water level, which has fluctuated greatly during recent geological time with a consequent almost complete leaching of copper ores from its zone of fluctuation.

GOLD AND
SILVER
VALUES :

The gold and silver values in the ore which has been shipped from the property, as well as the ore which is left in the upper workings, are very encouraging, and, as will be seen from the following table, represent on the average a value equal to that of the copper content. There is good reason to suppose that very attractive values of gold and silver will be found in the secondary deposits of copper below water level. These values, however, will probably not exceed those found in the ores of the surface deposits, while the copper percentage may increase to several times the amount found in the surface ores.

In this connection I submit statement of gold, silver and copper recoveries per ton from the ore shipped to the American Smelting and Refining Company.

Picked samples were taken with the view of determining the distribution and relationship of the values at the surface over a distance of 3,000 feet following along the quartz veins as exposed at the north end on the American claim and extending through the Henry W. Grady and Mormon Girl claims and into the Mormon Girl Extension, on the south. These values are very encouraging and are representative of a score or more of outcroppings from which equally good samples could be obtained. See table below:

ASSAY VALUES PER TON
SURFACE WORKINGS

No.	Taken from	Gold at \$20.67	Silver at \$1.00	Copper at \$.20	Total Values
1	:D S American	\$ 3.30	\$ 3.70	\$ 26.52	\$33.52
2	:Quartz Outcrop	.82	1.35	14.64	16.81
3	:Shaft H.W.G.	1.90	3.10	20.00	25.00
4	:Open Cut shaft	1.48	- -	9.80	11.28
5	:Saddle H.G.	3.80	3.30	15.52	22.62
6	:Prospect Hole	2.48	.20	26.52	29.20
7	:DS -M G NX	3.46	.70	20.80	24.96
8	:Tunnel-Washing	21.29	7.00	35.88	64.17
9	:Prospect Hole	.20	.10	32.64	32.94
10	:Rochester Shale		1.90	26.22	28.12
11	:Red Cross Tunnel	8.92	4.25	43.52	56.69

This intrusion of granit has doubtless been an important factor in the general deposition of the ore deposits. The rocks encountered are granit, slate, schist, crystalline dolomite - a most completely altered to epidote - and a formation which will be referred to as rhyolite. This rhyolite has been rendered schistose on its eastern edge. It is completely kaolinized in places, and where massive, shows considerable seritization and silicification.

NORMAN GIRL
ORE DEPOSIT:

This deposit occurs along an inclined fault zone which shows evidence of several distinct movements with consequent crushing and recementation. A white quartz was apparently first deposited; this was crushed and a black quartz deposited filling in solidly around the crushed angular deposits of white quartz. This hard black quartz breccia several feet in thickness forms the foot wall of the ore deposit. It has a hard, smooth unbroken surface and can be best observed in an east cross cut from Adit level about 40 feet south of the inclined shaft. The ore deposit is siliceous, containing copper carbonates, a small amount of copper sulphate and an appreciable proportion of chalcocite. The ore chimney rests directly on top of the hard black quartz breccia with a very thin clay salvage.

The south end of the ore shoot has been abruptly cut off, but the displacement has not been great; drifting in this direction at the tunnel and lower levels has encountered discontinuous lenses of good ore occurring in steps, each step slightly to the west of the preceding step.

This broken area containing the lenses is exposed for a distance of about thirty feet in each of the various levels. These ore lenses are floating in the inclined material of the hanging wall. In some instances, just underneath the lenses occur loose porous fragments of the displaced footwall. The various levels have drifted through the ore zone, encountered and followed the hard, smooth footwall, but have failed to expose other ore deposits.

MINERALIZED
FORMATION

The outcrop of this formation indicates extensive mineralization and holds the promise of a big deposit of copper ore.

Proceeding from the vein at the surface in a westerly direction, about two hundred feet of shale and schist is passed over, then comes the rhyolite altered and schistose about fifty feet wide then about forty feet of epidote with gash veins of quartz; then a series of schists and epidote ledges for an indefinite distance west. The dip of the rhyolite and epidote formation is much less than the dip of the vein and an intersection of the two should be encountered at a depth of several hundred feet below the present bottom of the shaft. This would be an ideal place to look for valuable ore deposits.

This intersection should be found at a depth of about 700 feet in the present incline shaft, which is now 475 feet in

lower grade ore of a width corresponding with the "epodote" vein, which is thirty or forty feet in width.

There is no local data to use as a base for estimating the vertical extent of high grade secondary ore deposits in the Cave Creek district, but judging from the nature of these deposits in the same mineral belt, both to the north and south, it would seem safe to count upon several hundred feet. The grade of ore would range between ten and thirty per cent copper. Assuming that the processes of secondary enrichment have proceeded in the Mormon Girl Mine in the same manner as in other Arizona copper properties, it is justifiable to expect a million dollar ore deposit in this property, and possible for a deposit of many times that value to exist.

MINERALURGICAL PROCESSES: The general character of copper ores found below water level in Arizona are easily handled through simple milling operations. As a rule, there are sufficient bodies of high grade copper to justify shipping direct to the smelter, and especially is this true in formations such as the Mormon Girl. These ores have a value which will stand the freight and treatment charges without serious depletion of the gross value. The larger bodies of low grade ore, however, require some kind of concentration, the most modern and practical means being the oil flotation process.

The operation of a mine during the shipment of the high grade ore results in a general systematizing of operations and a reduction of cost, which together with the amortization of the capital invested in the general development and equipment of the mine.

depth. It is claimed by former operators that water was just beginning to seep into the shaft when work was discontinued. This would mean that with an additional depth of 100 feet or more, permanent water level would be reached and high grade copper deposits should be found. It is a coincidence that the natural depth at which to expect secondary enrichment of copper ore is the same as the depth of the probable juncture of the vein with the mineralized zone of epidote-quartz. This fact gives a double justification to the prediction that commercial ores will be encountered at that depth.

POSSIBLE
SIZE OF
SECONDARY
ORE BODY

The quartz vein upon which the main workings have been made is distinguishable at the surface for a distance of 2,000 feet or more. In the workings it has been traced for a bout 1,000 feet with no signs of weakening.

The quartz dolomite-epidote veins have not been developed either at the surface or underground. These veins do not show values at the surface but contain possibilities for big deposits at depth. The intersection of the quartz vein with these veins at a depth of about 700 feet not only presents the possibility for a rich ore deposit but promises a very extensive one.

The width of quartz vein will average about four feet, but the hanging wall is so soft, altered and kaolinized that an ore deposit of considerable width could easily be formed. A reasonable width to predict high grade ore deposits would be four feet in thickness or about the same as the quartz vein where it is not broken up.

There would also be a good chance for an extensive deposit of

often make the final stages of a copper mine profitable upon a grade of ore which could not be expected to pay the initial costs of development and installation.

The immediate consideration and expectation in the Mormon Girl property is copper-gold ores of sufficient value to justify profitable shipment direct to the smelter, and it is this character of ore which can be confidently expected. The profits from this ore must be depended upon to repay many times the original investment and also provide a working capital to continue production from the low grade ores which should be encountered during the extraction of the high grade ore.

DEVELOPMENT PROGRAM

It would be advisable to confine all work to sinking the shaft. Unless some special unforeseen conditions should arise, the shaft should reach a total depth of about 1,000 feet before any drifting or crosscutting is undertaken.

The location, direction and distance of the drifts and crosscuts could only be determined by conditions as exposed through actual operations. A total of 500 feet of this work should be contemplated from the outset.

ESTIMATE DEVELOPMENT COST

The following list of men would be required for the operation of the property:

DAY SHIFT

1 - Hoisting Engineer and Timberman	\$ 6.50
1 - Blacksmith and Air compressor Man	6.50
1 - Trimmer	5.00
3 - Shaft Men	21.00
Total Day Shift	<u>\$39.00</u>

Brought forward - - Total Day Shift

\$39.00

NIGHT SHIFT

1 - Foreman	\$ 7.50
1 - Hoisting Engineer	6.50
1 - Trimmer	5.00
3 - Shaft Men	21.00

Total Night Shift \$40.00

GENERAL EXPENSE PER DAY

Fuel, Expense	15.00
Steel, Coal and Powder	8.00
Timbers	10.00
Cook	3.00
Overhead	8.00

Total General Expense \$44.00

Total Per Day \$123.00

An average of three feet advance per day should be made

in sinking the shaft, which would make the cost \$41.00 per foot. These figures should hold until it becomes necessary to install a pump, which will add an expense of \$10.00 per foot, including the first cost of pumping equipment and additional cost of timbering below water level, provided the cost is distributed over 500 feet of work or more.

New equipment necessary would require about \$3,000.

An allowance of \$500.00 should be made to cover proper ventilation of the mine station and bottom of the shaft.

Surface improvements, such as cook houses, bunk houses office and superintendent's house, etc., should not cost to exceed \$1,500.

Re-timbering, catching up, and cleaning out shaft would cost about \$1,000.

A re-adjustment might show a little more expense or cost in

some of these items and a little less in others, but I think the totals as tabulated below, will compensate and yield a conservative estimate for the total amount that will be required.

The total capital required would be:

500 feet of shaft sinking (including pump) at \$41.00 per foot	\$20,500.00
500 feet of pumping equipment and handling water at \$10.00 per foot	5,000.00
500 feet drifting and crosscutting at \$14.00 per foot	7,000.00
New Equipment	3,000.00
Ventilation	500.00
Surface Improvements	1,500.00
Cleaning shaft to 475 feet	1,000.00
Road building	1,000.00
Incidentals	500.00
Total Estimate	<u>\$40,000.00</u>

NEW EQUIPMENT REQUIRED

The general nature of the new equipment advisable for the future development of the property can be outlined, but it should be understood that a careful study of the conditions at the mine, cost of various kinds of equipment and delays in delivery of materials might cause changes.

My idea would be to bulkhead the shaft above the tunnel level and use it as a chimney to carry off exhaust gases from the engines and foul air from the mine workings.

The hoist now installed could be used for doing the development work without change.

The air compressor could be moved into the tunnel and set up in the station now out at one side of the hoist. A new engine,

either of the Wisconsin or Victory type of light, highspeed, internal combustion engine, burning "Tops" would be installed to run the Air Compressor and a small electric generator. This engine would be about 50 HP. The electric generator would furnish power to run an electric driven sinker pump, which would be arranged to lower as the shaft is sunk. A storage battery would take care of lighting.

By running an 8-inch galvanized air pipe down to the bottom of the shaft and carrying its upper end above the bulkhead in the shaft above the hoist, natural ventilation would take place, keeping the air fresh at the bottom of the shaft.

There would be a number of blacksmith's and carpenter's tools necessary, and another mine skip. Practically all of this equipment would be necessary at the outset. It could be installed while the shaft was being cleaned out and re-timbered and should be ready for action just as soon as actual sinking began.

MILLING
PRESERVE
WORKINGS The ore body which is exposed by necessary drifts and mine workings for its economic mining contains about 1200 tons of ore of an average value of \$33.50 per ton. The value is distributed as follows:

Gold - - -	\$16.00
Copper - - -	13.50 (at 20% per lb.)
Silver - - -	4.00

These values were obtained by careful measurement and systematic sampling. The total value of this ore is in the neighborhood of \$40,000.00.

The following table of costs should cover the mining and

treatment of this ore:

ESTIMATE COSTS

Mining Per ton	\$3.00	
Wagon haul to mill 1 1/2 Mi.	1.00	
Milling-per ton	2.00	
		<hr/>
Total Per ton		\$6.00

Total cost for 1200 tons
at \$6.00 per ton \$7200.00

Concentrating five tons of mine ore into one ton of concentrate, during which process about 70 per cent of the gold and silver would be amalgamated and then reduced to Bullion would leave 240 tons of high grade copper concentrate for shipment to the smelter.

ESTIMATE COSTS

Wagon haul to railroad - per ton	\$7.00	
R.R. Freight to Smelter " "	1.50	
Smelter treatment and Deductions " "	6.00	
		<hr/>
Total	\$14.50	

Total cost for 240 tons at \$14.50 \$3,480.00

TOTAL COST ESTIMATE

Mining, etc.	\$7,200.00	
Smelting, Etc.	3,480.00	
10% losses in treatment	4,000.00	
		<hr/>
	\$14,680.00	
Value of ore reserves	\$40,000.00	
Total Costs	14,680	
		<hr/>
NET PROFIT		\$25,320.00

On the face of it, this would make a very attractive little business proposition. But in going into details further, it is found that the present mill would require the expenditure of about \$4,000 to complete necessary repairs and alterations. The surface equipment

of a camp would cost \$4,000. The miscellaneous expenses of establishing the camp and securing a good crew would amount to \$1,000 or more. The substitution of modern machinery, overhauling and renewing the mine plants would cost \$5,000.

These items alone would have an estimated cost of \$14,000. If this entire expense is charged against the present ore reserves, a very small margin of profit would be shown. With this in view, I have previously advised that you should not commence operating the Mormon Girl Mine until you are prepared to carry the development of the mine forward. In this case the \$14,000 initial expenses would be partly charged against the present ore reserves and partly charged against development.

DEVELOPMENT
PLAN

In contemplating a development plan for this property, I have advised that the shaft should be sunk to a depth of 1,000 feet before any considerable amount of drifting and crosscutting is done. This figure of 1,000 feet depth was arbitrarily decided upon more from the standpoint of conservatism than from any geological data. The logical depth at which to expect commercial ores is about 700 feet in depth, as has been explained in the preceding pages. In the event that commercial ores are encountered at 700 feet or any other depth, it would still be advisable to continue sinking the shaft, because each foot of depth gained in the commercial ore deposits would greatly enhance the value of the mine, and while the cost per foot of shaft sinking would exceed the cost per foot of drifts, the shaft sinking and determination of the vertical extent of the secondary ore would increase the value of the mine at a greater rate than would be accomplished by lateral work.

In view the situation from this standpoint, it is quite probable that by the time \$25,000.00 has been expended upon the property there will have been sufficient encouragement in the way of metal values and ores to very materially increase the value of the Company's holdings.

RECOMMENDATION: This total of \$40,000.00 should be available for the proper exploration of the Mormon Girl property.

I have not included any estimate of capital required to repair the mill or treat the ore in same, as any necessary amounts for this purpose could be temporarily obtained from the development fund and returned as bullion was produced or concentrated marketed.

Encouragement in the way of small patches of high grade copper ore should be in evidence by the time the shaft is sunk 300 feet deeper, and there should be sufficient ore exposed by the time the shaft is completed to relieve all doubt as to the value of the mine; but, on the other hand, even if there is not, it would not be fair to pass judgment upon the property until all the drifting and cross-cutting outlined above had been completed.

By carefully weighing the geological evidence of extensive mineralization; considering the persistency of the vein; the altered and leached hanging wall; the impervious inclined foot wall, dipping into the rhyolite-dolomite-epidote formation; the depth to water level; the isolated and protected location of the surface ore deposit which has escaped leaching; the occurrence of small patches of chalcocite in the vein at various levels; the present equipment and mine workings available for use; and the easily workable character of the ground; I believe that the Mormon Girl will prove as great a copper mine as many of her sister mines in Arizona that hold much less promise

and much greater obstacles when in their project state.

My judgment is that the development program outlined above is advisable and will be profitable, and I herewith recommend that it be carried forward.

Respectfully submitted,

Alfred Strong Lewis

Dated October 22nd, 1919.

Note by W.S. Hockett, Owner:

There has been \$50,000.00 worth of silver, copper and gold ore shipped. He has copies of assays available showing over \$20,000 worth of shipments.