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ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: MAMMON MINE

ALTERNATE NAMES:

MAMMON ZEOLITE
W AND O

LA PAZ COUNTY MILS NUMBER: 35

LOCATION: TOWNSHIP 10 N RANGE 18 W SECTION 34 QUARTER SW
LATITUDE: N 34DEG 09MIN 37SEC LONGITUDE: W 114DEG 07MIN 10SEC
TOPO MAP NAME: BLACK PEAK - 15 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:

COPPER OXIDE
GOLD LODE
SILVER

BIBLIOGRAPHY:

KEITH, S.B., 1978, AZBM BULL. 192, P. 142
ADMMR MAMMON MINE FILE

NINE OF MINE: MAMMON
OWNER:

COUNTY: Mohave
DISTRICT:
METALS: Cu

OPERATOR AND ADDRESS

MINE STATUS

| Date: | OPERATOR AND ADDRESS | Date: | MINE STATUS |
|-------|------------------------------------|--------------|------------------|
| 1/45 | H.A. Lorang, 16 - 2nd St., Yuma | 1/45 6/45 | Shipping Idle |

MAMMON MINE

LA PAZ COUNTY

RRB WR 7/17/87: Noranda is active at the Gilbralter Mtns (Mammon Mine - file)
La Paz County.



MAMMON MINE

YUMA

Charles Ellis, Phoenix, came in to discuss the Mammon Cu mine 10 miles east of Parker. He said the 3 patented claims had been offered him for his 1958 dozer or \$50,000. GW WR 4/14/76

Interviewed Harry Osborne also Clara Botzum. They report that a Mr. Jocelyn of Denver has taken an option on their properties - Sue, Mammon, Rico and Rio Vista - and will explore by drilling. TPL WR 10-15-60

Nov. 28, Don D. Jocelyn, 8799 W. Colfax, Denver, Colorado, visited re the Osborne properties - Rio Vista, Sue, etc. near Yuma. He and associates are planning to develop the properties. TPL WR 12-3-60

Interviewed Harry Osborne who said that his and Clara's properties - the Sue, Rio Vista, Mammon and Rico - were under lease and option to Anaconda Lead and Silver Mining Co. of Denver, Donald Joslin, Pres. A geologic study and economic evaluation are being made. Diamond drilling is planned. Mr. Osborne said his iron properties in the Swansea-Planet area - the Dome, El Molino and Mineral Zone - were under lease to Alexander Preston who hopes to ship to Japan. TPL WR 2-18-61

Property: 3 patented claims - once consisted of 32 claims - 1924

Location: S15 SW $\frac{1}{4}$ T10N R18W

Owners: A. J. Eddy, Lawyer, 67 2nd, Yuma (office) - Phone: 783-3881
581 S. 7th Ave., Yuma - Phone: 783-5464

Harry Osborne, Parker

They report that this property was discovered and located in 1892 or at about the same time that the Planet was found. Several carloads of ore reported shipped in 1904 and this was mostly oxidized copper (by Mammon Gold and Copper Co.) The mine is developed by a 178 foot shaft, 2000 feet of tunnels. Reportedly opened up 13 veins of copper ore. Churn drilling said to have reached depth of 420' (1917) Sporadic production.

The deposit consists of these veins in an area that is largely capped by late Tertiary basalt. This is a bedded deposit in calcareous rocks that are apparently conformable with overlying gneiss. Fractures (veins) are narrow but fairly persistent. The copper minerals are associated with hematite. LAS Memo 10-1965

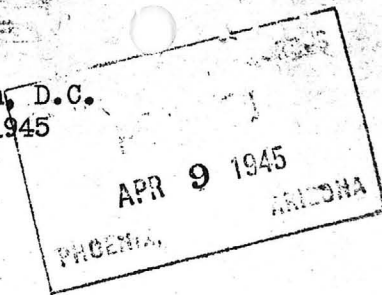
Interview with Harry Osborne, Parker

Mammon leased to M. F. White, a mining man. Tom Beard, consultant having a look-see. White sampled the claims - nothing heard of it yet. Memo LAS 2-10-66

Interview with Duncan E. Harrison, V.P., Planet Ranch and Metals Co.

Mr. Harrison said that Planet Ranch and Metals has taken an option on the Mammon mine in the Cienega District. They have located a group of lode claims known as the Zeolite Group which surrounds the Mammon Group. Drilling and geological mapping are planned. CLH Conf. 2-14-68

Washington, D.C.
April 7, 1945



TO: C.H.DUNNING
FROM: W.C.BROADGATE
ABOUT: MAMMON MINE ACCESS ROAD

I am quite sure that I have recommended that the department not sponsor any new operations, at least operations which must have government money and which cannot get along on "A" premiums at the worst. I renew this recommendation.

Of course, I realize that many will take the plunge without consulting you and that we must try to help them. However, as I have remarked, things are definitely on the downhill pull and there is deliberate intent to not encourage new mines which need government help.

Well, to return to the Mammon, I have had it up with the Copper Division, which must give the basic authorization and have lost the first round at least. A turnaround letter will state that the project is not in the war interest.

Copper Division states the reason for its disapproval is;

1. It is likely that the copper could not get into use in the war program in much less than six months and maybe seven months, and it is ~~is~~ not known if copper will be required then.
2. The owner claims, I understand, 5% copper, and it is doubted that the Bureau of Mines has checked sufficiently to determine if this is so.
3. If the grade of the dump is lower, it is not eligible for extra premiums and could not dig out.
4. The terms of the extension of the premium price plan are not now known.
5. If the copper situation proved critical later the applicants can reapply.
6. The manpower can be better used in a mine which will give immediate production which will benefit the war effort immediately while the demand for copper is strong.

I got the above in conversation and did not get to examine the file. If the statements above are substantially untrue or some argument can be evolved that I missed, I shall be glad to go after it again.

The above statements are, of course, for our guidance and are not for publication as the official letter to the applicant makes the official statement of position.

The Copper Division always mentions that it is a shame to get any of the little fellows involved in an investment at this late date as it is most unlikely they can bail out, so should be discouraged. Somewhat inconsistently, however, an RFC loan was suggested!

From Mining World magazine - September 1950 issue

FIVE ARIZONA MINES REACTIVATED

Development of copper-gold mines in the Cienega Mining District near Parker, Arizona, has been started by the Associated Mining Company. It has taken long-term leases on the Rio Vista, Billy Mack, Sue, Capilano, Mammon and Lion Hill mines, owned by the Osborne family of Parker and comprised of some 50 claims. The properties will be consolidated into one large operation directed by A.P. Lofquist, mining engineer. A.C. Burger of St. Louis, Missouri, heads Associated. The initial development work will be concentrated on the Rio Vista and Lion Hill Mines. The picture (which was just above this write-up on the page) shows the mill building at the Rio Vista, which is the key property in the group. The building is capable of housing a 300-ton plant. Unwatering of the 287-foot double compartment shaft at the Rio Vista South mine has started, the headframe is being rebuilt, and the shaft repaired and retimbered. New cages, pump, ventilating equipment and air lines will be installed in the shaft and then exploration by core drilling on the 250 level will begin.

A new change room is to be constructed and all mine buildings will be modernized with cooling systems and other accommodations, as this camp will be headquarters for all of the company's operations in the district. At the Rio Vista North the 244-foot incline will be extended. At the Lion Hill mine the main adit is to be continued for about 600 feet with several hundred feet of drifts and cross-cuts. At the Capilano additional development work will be done in the 90-foot vertical shaft. At the Sue a new double-compartment shaft will be sunk to avoid flood waters in the old workings. At the Mammon core drilling is planned. A large quantity of machinery already has been moved to the camp; road building and power line installation are under way. These old mines once were good producers and the Rio Vista particularly has quite a history. However, there has been little activity in them since the beginning of the last war.

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON ACTIVE MINING PROJECT

Date..... 1/4/45

Name of Mine..... Mammon

Owner or Operator..... H A Lerang

Address..... 16 2nd St, Yuma, Ariz

Mine Location..... 14 mi East Parker Agency

Filing Information

File System.....

File No.....

This chart to be used for gallons of gasoline required per month.

PRESENT OPERATIONS: (check X)

Production.....; Development.....; Financing.....; Sale of mine.....;

Experimental (sampling).....; Owner's occasional trip.....;

Other (specify).....

PRODUCTION: Past and Future.

Tons

Approx. tons last 3 months.....

Approx. present rate per 3 months.....

Anticipated rate next 3 months..... see tons

If in distant future check (X) here.....

EQUIPMENT OPERATED:

| Type | Quantity or Horse Power | Miles or Hours Per Month | Gallons Required Per Month |
|--------------------------|--------------------------|--------------------------|----------------------------|
| Personal Cars | | | |
| Light or Service Trucks | <u>1938 Chev PU 3/4t</u> | <u>1000</u> | |
| Ore Hauling Trucks | <u>1939 Chev dump</u> | <u>500</u> | |
| Compressors | | | |
| Other Mine or Mill Eqpt. | | | |

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals.

..... Copper

REMARKS:

These trucks are to be used in this operation.
Ore is ready to ship. Copper needed in war effort.
About mileage recommended.

ARIZONA DEPARTMENT OF MINERAL RESOURCES

By.....

Joseph R. Ballou

No. 151 De

Phoenix, Arizona, .

CHAS. A. DIEHL

July 13, 1944.

ARIZONA ASSAY OFFICE

Phone 3-4001

815 North First Street

P. O. Box 1148

DEPARTMENT OF MINERAL RESOURCES.

[illegible]Charges \$ 6.00

Assayer ARIZONA ASSAY OFFICE

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DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

✓
Mine MAMMON

Date July 24, 1944

District Cienega, Yuma County.

Engineer Elgin B. Holt

Subject:

R E P O R T

OWNERS: Harry M. Osborne, Parker, Arizona, and H. A. Lorang, Yuma, Arizona.

METALS: Copper, with small values in gold and silver.

AREA & LOCATION:

This mine, consisting of 3 patented claims, is situated 10 miles easterly from Parker. It is reached by following a county-maintained road for 5 miles east from Parker, and thence around another five miles up a sand wash to the mine. This latter part of the road is in bad condition and would have to be repaired before cars and trucks could be driven to the property.

EXAMINATION:

On July 11, 1944, I visited the property, in company with Harry M. Osborne and J. S. Coupal. With some difficulty, Osborne drove the car we were using to a point about one mile from the mine. We then walked the rest of the distance to it and back. As we spent less than 3 hours at the property, this report, at best, is merely a brief description of the same.

HISTORICAL:

The Mammon mine was worked from time to time by E. S. Osborne, father of Harry M. Osborne, from around 1905 to 1917. During the latter year, it was sold to Boston people who carried out further work in the mine to about 1921, at which time it was closed down due to the slump in copper during that year. The property later was sold to the State of Arizona to cover unpaid taxes and was purchased by present owners during April, 1944.

During the operations of E. S. Osborne and his successors, some ore was shipped to the Clarkdale and Hayden smelters; but no records of these shipments were available at the time of visit.

OTHER MINES:

Other mines in the Cienega District, in which this property is located, are as follows: Rio Vista, Billy Mack, Lion Hill, Sue, and the Empire mine.

The latter property, situated some 3 miles northwest of the mine under discussion, according to W. W. Harritt, produced 2,270 tons of hand-sorted copper-gold ore averaging around \$30.00 per ton. Also it produced from April 27, 1941, to May 1, 1942, 956 tons of shipping ore averaging \$14.74 per ton in copper and gold; this being mine run ore with light sorting. Ore is still being mined and shipped by "leasers" from this property in a small way.

All of these mines have been worked from time to time during the last 60 years and considerable ore has been shipped or milled therefrom.

MINE WORKINGS:

1. The Upper Tunnel, which is open for inspection and which we entered, was driven through a schist formation S. 22 degrees W. about 400 feet. At 50 feet from the portal of this tunnel a flat dipping vein of oxidized copper ore was cut; said vein striking, more or less, from NW to SE, and dipping around 30 degrees to the SW. Here was found a lens of ore, most of which has been stoped out, measuring from 4 to 10 feet wide and 70 feet in length. This lens was stoped to the surface an inclined distance of 60 feet and partly to a depth of 40 feet. After the tunnel passed through the flat dipping vein mentioned it was driven to its end in barren country rock.

2. At an elevation about 30 feet below the portal of the Upper Tunnel, the Lower Tunnel was started and was driven S. 5 degrees W. about 50 feet; thence southwesterly about 550 feet, cutting a number of small veinlets of no importance and containing bunches and streaks of oxidized copper ore. Also three or four raises were run from this tunnel level to the Upper Tunnel level. Again, several shallow winzes were sunk on the streaks of copper ore mentioned with nil results. Furthermore, lateral work was done on the Lower Tunnel level in the nature of two cross-cuts to the southeast and these were connected at the back end forming a loop. This "loop", I would say, is about 300 feet in length and intersects a number of copper-bearing stringers ranging from inches to say two feet in width; copper ore occurring in bunches and kidneys of negligible importance. At one point this "loop" cuts a small flat-dipping copper-bearing vein, which may or may not be the flat-dipping vein mentioned as occurring in the Upper Tunnel workings .

All in all, no vein of commercial importance was found in the Lower Tunnel workings. However, at one point in these workings I noticed a wide fissure filled with iron-stained leached vein material, which might lead to ore at a greater depth.

3. Also an inclined shaft was sunk on another vein to a depth of 255 feet, per H. M. Osborne, with some drifting on vein. This vein strikes NW-SE and dips around 45 degrees to the SW. It is in the nature of a mineralized fault zone, showing considerable shearing and brecciation, with a width in excess of 12 feet and shows copper stains at surface. Osborne stated that some ore had been shipped from this shaft; but no records were available of such shipments. The shaft is caved in and, hence, not accessible. The vein in question, geologically speaking, is the most promising

showing over any other vein of property, in that it is of goodly width, well-defined, has distinct hanging and foot walls, and evidently deep-seated. Should operations be resumed at property, the shaft mentioned should be cleaned out with a view to making a careful study and examination of the vein referred to and its possibilities.

ASSAYS:

I made no attempt to sample the mine in detail; but I cut three pilot samples with a view to determining the character of the ore. These were run by the Arizona Assay Office, Phoenix, Arizona, on July 13, 1944, with the following results:

| <u>No.</u> | <u>Place-width</u> | <u>Silver-oz.</u> | <u>Gold-oz-val.</u> | <u>Copper-%</u> |
|-----------------------------|--------------------|-------------------|---------------------|-----------------|
| 1. Vein, Lower Tunnel - 8" | | Trace | Trace | 1.51 |
| 2. Vein, Upper Tunnel - 4' | | 0.1 | 0.04 - \$1.40 | 4.47 |
| 3. 200 tons dump ore - grab | | 0.1 | 0.01 - .35 | 5.00 |

ORE RESERVES:

Referring to the Upper and Lower tunnels above described, there are only small amounts of ore blocked out in these workings, as such ores as were encountered by the former operators of this property were mostly stoped out and shipped. However, by selective mining and close hand-sorting it might be possible to remove from these openings several car loads of ore possibly running four or five per cent in copper.

Also there are around 200 tons of sorted ore piled on the dumps from which a grab sample was taken with results above noted.


CONCLUSION:

The Mammon mine, as it now stands, is a prospect, on which considerable money would have to be expended in order to prove whether it is of any importance or not. By no means is it my desire in this

MAMMON MINE

report to turn the property down. I merely want to point out that at the present time there is no great amount, or rather considerable amount, of commercial ore blocked out or indicated in the mine. On the other hand, all mines were once prospects, and as such the property has potential value. Furthermore, it is my firm opinion and belief that if ample venture money could be found with which to develop and explore this property to a depth of 500 or 600 feet deep, or to some point to the permanent water level of the mine, that thereby it is possible to uncover important underground reserves of sulphide ores, of shipping or milling grade, out of which considerable money could be made.

The above opinion is based on the fact that the surface veins so far exposed are filled with secondary oxidized copper ores, as well as with leached vein material, indicating a downward migration of copper values. Hence, at some deeper level there should exist in this property bodies of secondary sulphide ores, such as chalcocite, bornite, etc.


Elgin B. Holt.

DEPARTMENT OF MINERAL RESOURCES

State of Arizona

MINE OWNER'S REPORT

Date March 15, 1958

1. Mine: MAMMON MINE
2. Location: Sec. _____ Twp. _____ Range _____ Nearest Town Parker Distance 12 miles
 Direction N.E. Nearest R.R. Santa Fe - Parker Distance 12 miles
 Road Conditions County graded road
3. Mining District and County: Cienega
4. Former Name of Mine: Mammon Mine
5. Owner: Harry M. Osborne and Marion P. Eddy
 Address: Box 1623 - Parker, Arizona
6. Operator: _____
 Address: _____
7. Principal Minerals: Copper-gold
8. Number of Claims: Lode Three Patented Yes Unpatented _____
 Placer _____ Patented _____ Unpatented _____
9. Type of Surrounding Terrain: rolling foothills of the Planet Range of Mountains.
10. Geology and Mineralization: Igneous rocks - Copper-gold metals.
11. Dimension and Value of Ore Body: Vein structure approximately 16 feet wide and
outcrops about three thousand feet in length. Dip of vein about 30 degrees.
Explored to a depth of about 200 feet. Assays run from 3% to 30% in copper.
Gold between two and three dollars.

Please give as complete information as possible and attach copies of engineer's reports, shipment returns, maps, etc. if you wish to have them available in this Department's files for inspection by prospective lessors or buyers.

(over)

12. Ore "Blocked Out" or "In Sight": About 10,000 tons.

Ore Probable: Undetermined.

13. Mine Workings—Amount and Condition: About 3,000 feet underground workings.

| No. | Feet | Condition |
|-----------|------|-----------|
| Shafts | | |
| Raises | | |
| Tunnels | | |
| Crosscuts | | |
| Stopes | | |

14. Water Supply: About two miles from mine.

15. Brief History: The mining claims known as the Mammon Mine was first located between 1901 and 1904 by Jack Glennon, and about 1905 was purchased by E. S. Osborne. Mr. Osborne and business associates carried on quite an extensive development program and old records show shipments made ran from 9.25% to 14.19% in copper during the many years while operated by Mr. Osborne. At the present time the mine is patented and owned by Harry M. Osborne of Parker, Arizona, and Marion P. Eddy of Yuma, Arizona. Mr. Harry M. Osborne is the son of the late E. S. Osborne.

16. Remarks:

17. If Property for Sale, List Approximate Price and Terms:

18. Signature Clara Osborne Bateman

March 1st, 1917.

Mammon Gold and Copper Company,
Cienega Mining District,
Yuma County, Arizona.

Gentlemen:-

I beg to submit herewith my report upon the property of your Company based upon my recent inspection made on the 23rd ult. In submitting this report I shall pass over all matters pertaining to title to the ground, which I assume have been fully covered by you, and shall confine myself to the consideration of its possibilities from a mining standpoint alone.

General location and
physical surroundings:

The property comprises some eighteen full and fractional mining claims, with an aggregate acreage of three hundred and sixty more or less. It is situated about ten miles north-easterly from the town of Parker, a station on the Arizona and California branch of the Santa Fe Railway. At this point the Railway crosses the Colorado River. Parker is the local supply point for the general mining locality. The actively developing property of the Empire-Arizona Consolidated Company is situated about two and one-half miles north-westerly from the Mammon-Zeolite Group, the local name of the ground belonging to your company, and the so-called Billy Mack Mine, operated by a Chicago Syndicate at about the same distance westerly. A few miles to the south-east, the Clara Consolidated Company's property is being actively worked with a substantial production of marketable copper ore. Just across the Colorado River to the west, in the same general mineral belt, drilling operations are being pushed by Messrs. Long, McIver and associates, connected with the famous United Eastern Gold Mine at Oatman, Arizona.

A good road with generally easy grade connects your company's property with the town of Parker, over which transportation can be cheaply maintained, both for mine supplies in and ore shipments out. This road is readily negotiated by automobiles.

The topography is somewhat rugged and broken at the property, but the general configuration of the ground lends itself well to the work of development.

The property is well equipped with the necessary housings for miners and management. For the present water must be brought in from neighboring wells, but will without doubt be supplied from the workings when these have attained the proper depth. This, in the writer's opinion, should not exceed a vertical depth of over five hundred feet below the present surface.

Fuel for all purposes must be brought in, wood being obtainable at reasonable cost for camp purposes, while Distillate, Tops, or Gasoline are best suited to the development of power, and are readily obtainable from the neighboring California Oil Fields at reasonable cost.

A new, fifteen h.p. distillate engine is now being installed for hoisting purposes and a suitable air compressor for drilling is projected.

Blacksmithing and timber framing facilities are adequate for the present.

The climate for the greater part of each year is almost ideal. During the mid-summer months discomfort is experienced from the heat, but not such as to oppose a serious obstacle to continuous work.

Geology:

Geologically the locality is very old and consists of a basal series of Schists and Granitic Rocks overlain by a highly metamorphosed sedimentary series comprising limestone, quartzite and shale members. The latter have been deeply carved and eroded and have been recently buried beneath a heavy flow of Basalt which caps the higher elevations. Stream action has cut through this Basalt Capping extensively, exposing the older formation in the valleys and along the flanks of the hills.

The entire country has been much broken and faulted in a manner characteristic of pretty much the entire south-west Copper Belt. The dominant dislocations and fissuring trends generally north-westerly by south-easterly, but minor dislocations and faults with almost every conceivable trend are common. The blocks between the faults are tilted as a rule, each independently of the others, but generally from northwest to southeast so that for mining purposes each block must be considered separately as a single working unit. They are, however sufficiently large as a rule to make this entirely feasible.

Ore occurrence and Vein showing:

The showings of copper ore so far found occur in a wide belt or zone of shearing having a width at the surface of fifty to one hundred and fifty feet or more and trending about North-60° West. This Shear Zone outcrops for a distance of six hundred feet more or less, and to the south-west probably continues under the Basalt Capping for a considerable distance the full extent of which cannot be determined at this time. The outcrop of this Shear Zone is characterized by a heavy Gossan Capping, such as is generally found in connection with copper bearing veins in this part of Arizona. The Dip of this Shear Zone is to the north-east at an angle of approximately forty-five degrees. It is intersected at frequent intervals by a series of cross-fractures which trend to the north-west and intersect the Shear Zone at an acute angle. The effect of this has been to greatly crush and shatter the adjacent wall rocks and to form a sheeted structure highly favorable to replacement with ore.

Where exposed the Shear Zone is in Schist heavily stained with iron oxides often carrying copper in commercial quantity and grade. Lime is present as Calcite in seams and stringers, and limestone itself has been encountered close by in the underground workings. The iron frequently appears as specular Hematite which occurs in large bunches and kidney-shaped masses more or less accompanied by copper minerals. The ordinary earthy forms of Hematite and Limonite form by far the larger part of the Gossans, and plainly point to the former existence of copper bearing iron sulphides which have

suffered later oxidation and the leaching of its copper contents. This was, in all probability, the primary ore deposition, which will be encountered when development has penetrated below the zone of surface oxidation and leaching. Two outstanding features of this process are here to be especially noted. In the oxidation of copper bearing sulphides the iron is largely left behind in the form of its insoluble oxides to form the so-called gossan cap of the miner and to stain up the rocks within the oxidized zone. The copper is, however, converted into the form of soluble sulphates largely. These pass into solution with the percolation of surface waters down along the vein and through the rocks adjacent and as these surface waters come from falling rains and occasional snow, followed by periods of drouth and high temperature, some of the water works back up the vein by capillary action carrying its contained copper during the dry seasons and by evaporation at and just below the surface, precipitates the copper which thus accumulates into sometimes very considerable bodies of oxidized copper ores. These are the so-called surface concentrations or enrichments. Another and much the greater portion of the copper-bearing underground water works on down the vein until it reaches the level of the permanent standing groundwater below which it cannot go very far. Here the contained copper is precipitated and unites with the primary unoxidized copper-iron sulphides. In this manner the latter are frequently enriched and form the most important ore bodies known to copper mining in the Southwest. It is at the level of and just below the permanent standing ground water that the best and largest bodies of copper ore are to be anticipated, and this is the horizon to be reached as rapidly as possible in the work of development.

Both the copper forming the surface enrichment and that forming the secondary sulphide enrichment at groundwater level are derived largely from a middle zone lying between the two. This middle zone being largely robbed of its original copper contents, is apt to be lean and poor, if not entirely barren for the greater part. It is due to failure to recognize or understand this that many promising copper properties fail through discouragement of their operators on entering the barren middle zone of impoverishment. It is the permanent groundwater level below this barren middle zone that affords, under such conditions, the greatest promise and all effort should be directed to exploring this horizon as soon as possible.

The copper ores so far disclosed in the Mammon-Zeolite Group are characteristic, and consist of the carbonates, oxides and perhaps silicates of the metal in a gangue composed chiefly of iron oxide with Calcite as accessory. Some Quartz is usually present. These ores all occur in the zone of surface enrichment and may be expected to extend to a vertical depth of from one hundred to two hundred feet. The water level has not been reached yet. Under existing conditions in your property the amount of ore in the zone of surface enrichment bears directly upon that to be anticipated at the groundwater level and the writer therefore regards the probability of finding large bodies of commercial copper ore at the watter level as very promising.

Present Workings:

Two tunnels have been driven through the Shear Zone-- for the present purposes to be called a vein--at a maximum depth of about one hundred and eighty and one hundred and forty feet respectively. Considerable exploratory work has been done from these tunnels and considerable oxidized copper ore uncovered, some of which has been shipped. All this work has been done in the zone of the surface enrichment. An inclined shaft is being sunk to cut this vein at greater depth. This incline is on the north side of the vein distant therefrom about three hundred feet and dips towards the vein at an angle of about fifty degrees from the horizontal. It is now down some seventy-one feet and should intersect the vein in a further distance of about one hundred and forty feet from the bottom of the incline on the pitch of the incline. If continued to water level, assuming this level to lie at a depth of five hundred feet, the incline will pass into the foot-wall of the vein and a cross-cut about six hundred feet in length will be required to be driven back to catch the vein. In order to accomplish the same exploratory object--which is to determine first the character of the vein at this level--at less expense to your company and in much quicker time, the writer begs to suggest the use of drills for the purpose.

Suggested development:

The incline should be continued to crosscut the vein and all workings connected therewith extended to enable the ores now exposed in the surface zone of enrichment to be mined and delivered through it to a centralized loading station from which they can be delivered for haulage to the railroad. Further exploratory work along the trend of the vein in this horizon should result in a substantial increase in the available supply of oxidized copper ores, all of which would be tributary to the incline.

Before extending the incline to groundwater level, if indeed it should be done at all, it seems to the writer advisable to sink a series of well placed drill-holes along the north side of the vein at such points and at such distance therefrom as, considering the dip of the vein, shall intersect it at a depth of five hundred feet more or less as the results in the first drill-hole suggest. These holes can be sunk vertically and at a cost of probably less than four dollars per foot of hole drilled, whereas the sinking of the incline will cost in the neighborhood of thirty to forty dollars per vertical or rather per foot measured on the incline.

Predicated upon the success in disclosing bodies of copper sulphide ores in the drill-holes, a vertical shaft will then be found, probably, the most efficient, and the proper location of such a vertical shaft will be facilitated. The writer believes that not to exceed five drill-holes will be required to adequately determine the nature of the vein at the groundwater level. With a competent drill crew this work can be done in one third the time required to sink a shaft and drive the necessary cross-cuts and levels. The cost of sinking the incline to groundwater level will be in the vicinity of twenty-two thousand and fifty dollars for seven hundred feet, the approximate distance that it will be necessary to sink to attain a vertical depth of five hundred feet. The drilling--five holes each five hundred feet--will

cost approximately one half this amount, or from ten to twelve thousand dollars. As the work now to be done is essentially for exploratory purposes drilling appears, under the circumstances, to be much the better and cheaper method to pursue.

Present ore supply;

There is no ore blocked in the strictly technical sense--that is exposed and measured on three sides. There is, however, a considerable showing of ore in faces exposed in several parts of the present shallow workings, such that it is entirely probable that a considerable tonnage of shipping ore can be mined and shipments continued indefinitely. At present selective mining must be resorted to to bring the grade of the ore up to the shipping requirements, but with the development of a larger tonnage the costs should be measurably lessened admitting of the mining and shipment of a lower grade of ore than at present. No estimates of reserves are at this time possible and the future of the property depends entirely upon development work still to be done. Expenditures should be held down to include only such work and equipment as will serve the relatively temporary purpose of proving up the possibilities of the locality in the vicinity of the incline now being sunk as the showing at this point is exceedingly promising and much the best seen by the writer on the property. If successful in proving the ores at the groundwater level, the work of equipping the property for operations and production can be taken up to correspond with the indicated requirements.

Summary:

The Mammon-Zeolite Group consists of about three hundred and sixty acres of ground, located well within the recognized Copper Belt of Arizona. Neighboring properties working in the same general formation are, some of them, already in production, and daily growing in importance. The property has a strong, well defined vein within which good copper ores have been and are being developed. It affords strong indications of large and commercially valuable bodies of copper ore in the zone of sulphide enrichment and also in the zone of surface enrichment. It is easily accessible and can be worked at a cost comparing favorably with any in this part of Arizona. A substantial tonnage of oxidized ores at and near the surface has been disclosed but not blocked, and further extension of the work will undoubtedly greatly increase this showing. These ores are in large part of commercial grade under existing cost conditions. The cost conditions ~~xxx~~ now entailed can be measurably reduced to take in a still greater tonnage of ore available for mining. Development of the enriched sulphide ores at groundwater level should receive immediate attention and their presence fully determined at the earliest possible moment. Drilling is suggested as the quickest and cheapest method of accomplishing this. There is abundant warrant for this expenditure as the formation is very favorable, the indications pronounced and unmistakeable. Work and the expenditures entailed should be concentrated and strictly limited to the smallest requirements adequate for preliminary exploratory work, and permanent installations avoided until this has been accomplished.

In view of the foregoing the writer regards the property of your company as one of great promise fully justifying such expenditure as shall be needed to prove its unmistakeably great possibilities.

(Signed) Edward W. Brooks
Consulting Engineer.

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REPORT ON THE PROPERTY
✓ of the
MAMMON GOLD & COPPER CO.
at
Parker, Arizona.
by
Walter Harvey Weed.

REPORT ON THE PROPERTY

of the

MAMMON GOLD & COPPER CO.

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3 HOLDINGS:-

4 The property consists of 32 lode claims in one
5 group of about 600 acres, in the Senator mining district, Yuma
6 County, Arizona. The claims comprise the Mammon, Mammon Extension
7 and the Mammon Extensions No. 1 to 15 inclusive, also the
8 Mammon Zeolite Nos. 1 to 15 inclusive. The claims are not
9 patented, but are relocations made in the present year of the old
10 Wardwell & Osborne group.

11
12 LOCATION:-

13 The property is situated ten miles east of Parker,
14 a town on the Phoenix branch of the Santa Fe Railway, on the
15 eastern side of the Colorado River bridge. Parker is eight
16 hours ride by train from Los Angeles and five from Phoenix.

17 The Bill Williams river lies a few miles to the
18 north, the claims being in a very rugged, eroded country,
19 forming the western end of the mountainous tract designated as
20 the Buckskin mountain on some maps of the State.

21 ECONOMIC CONDITIONS:-

22 The property is without water or fuel. Palo Verde
23 trees grow in the big stream wash that crosses the eastern
24 claim of the group. An alluvial flat of this stream course
25 is a good camp site, but the mine buildings, comprising mess-
26 house, store house, smithy, office building and numerous tent
27 houses, with board roofs, are built in the niche of a tributary
28 drainage close to the mine workings.

29 Water is hauled from Parker where there are good
30 stores and mine supplies are purchasable at a small advance
31 over Los Angeles prices.

32 HISTORY:-

33 The claims were located between 1901 and 1904 and
34 have been known ever since as the Wardwell & Osborne property,
35 or mine. The presence of high grade, oxidized copper ore at
36 many points over the property, led to considerable shallow work
37 and the shipment of several carloads of ore. In 1909 the mine
38 was examined by the writer for the Lewisohn interests. Since
39 that date it has been under option to a Mr. Getchell, and a
40 lower, new tunnel driven beneath the known ore deposit.
41 Through the failure of Mr. Wardwell to keep up the annual assess-
42 ment work required by the law, the title was lost in 1916 and
43 the entire group relocated in January, 1916, by Mr. Osborne and
44 associates. The new title has been perfected by doing the
45 usual required amount of location work and has, I am told,
46 been duly transferred to the present company. Mr. Ed Osborne
47 is president and Dr. H. H. Stone, of 1130 Van Nuys Bldg.,
48 Los Angeles, is secretary-treasurer.

49 NEIGHBORING MINES:-

50 The property is in a well known and widely mineralized
51
52

1 district. The nearest working property, that held by the
2 Arizona Empire Co., more commonly known as the Empire group,
3 formerly called the Carnation mine, lies three miles to the
4 north. The Quartz King mine nearer the Colorado River and the
5 Billy Mack mine, both fairly well known, but only intermittent-
6 ly productive, properties are but a half dozen miles or so
7 distant; they cannot be considered as yet as successful mines.
8 The Planet mine, further east, on the banks of Bill William
9 river, is one of the oldest copper mines of the State and is
10 reported to have shipped over \$300,000 worth of ore in 1916.
11 The Clara, or Swansea mine, a few miles farther east, is
12 connected with the Santa Fe by a 30 mile railway line. The
13 mine has shipped between three and four carloads, or 150 to
14 200 tons of ore daily during 1916. The entire intervening
15 country where not concealed by basalt, shows more or less
16 mineralization.

17 GEOLOGY:

18 The copper ores of Yuma County show a typical
19 association of chrysocolla and malachite with specular hematite.
20 If sulphides are exposed as at Planet and Swansea, the copper
21 occurs as chalcopryite in a mass of hematite. At most of the
22 many properties visited by the writer, the very bunchy, but
23 rich surface ores also contain copper glance, but neither
24 this ore nor the rich oxidized ores continue uninterruptedly
25 downward. As a result prospecting has been mostly shallow and
26 has stopped when the bunches and streaks of oxidized ore were
27 bottomed. At the Swansea property development to a depth of
28 several hundred feet has shown a large deposit of rather friable
29 hematite, micaceous and containing balls and tiny aggregates
30 of chalcopryite, the ore averaging better than 2% copper.

31 The rocks containing the ores in the vicinity of
32 Parker, in northern Yuma county, are schists and gneisses with
occasional intercalated lenses of limestone forming the Parker
series of pre-Cambrian schists. The rocks show considerable
variety in color, texture and composition. Pale gray, flaky
schists are of common occurrence, but seldom carry ore,
mineralization favoring the more massively bedded gneisses
and still more congenial limestone. The gneiss shows by its
mineral composition that it is formed from sedimentary rocks
intruded by rocks of igneous origin, diorite and more basic
rocks being common. These ancient intrusives are however
profoundly altered and are now in large part gneissoid. The
old limestones are marmorized but show less apparent alteration
than the other types. The whole series has been greatly altered
and apparently tilted and deformed by pressure.

33 Throughout the Bill Williams region, of which the
34 Mammon group is a part, there is widespread, but usually non-
35 commercial mineralization of veins and lesser fractures and
36 of breccia zones, by specular hematite which ~~usually carries~~
37 usually carries segregations of copper ore. At Planet, Mineral
38 Hill and Swansea large bedded deposits of very pure hematite
39 occur and oxidized copper ores are found in commercial quantity.
40 These three deposits are however due to replacement of limestone,
41 though minor amounts of hematite and the accompanying oxidized
42 copper minerals occur in fractures. At the Mammon property, as
43 at many other localities, the copper and iron minerals occur
44 localized and are not uniformly distributed, occurring only

1 in the gneissoid rocks. Limestone occurs, but is so badly
2 shattered and silicified that it is only recognizable with
3 difficulty and has not, so far as known, been visibly mineral-
4 ized enough to make ore.

5 Throughout the higher country between Mineral Hill,
6 the Empire and Mammon claims, the country is all basaltic.
7 Basalt lava flows and the tuff beds made of volcanic dust and
8 ejectamenta, cover the entire country. It is only where
9 erosion has cut down into this basaltic mass and has revealed
10 the basal Parker schist series, that ore deposits are found.
11 The basaltic area is entirely barren of useful minerals.

12 The Mammon group is largely covered by basalt, at
13 least two thirds of the total area of the group being mantled
14 by this recent volcanic rock.

15 The schists show however in many of the stream
16 courses and on the lower slopes. In the series observed on
17 the Mammon group, no granitic rocks are recognized, but old
18 intrusives occur. The gneissoid rocks and the ore deposits in
19 them are cut by a basalt tuffs and flows on the Mammon claims.

20 ORE OCCURRENCE:-

21 Copper ores occur on the property in natural ex-
22 posures and artificial openings over a considerable area.
23 The most promising part of the group is however an area about
24 500 or 600 feet wide and 1200 feet along, covering parts of
25 four claims, in the easterly half of the group. In this area,
26 the copper and accompanying hematite occur in distinct, but
27 rather small fractures and also in a persistent, bedded, or
28 blanket vein which appears to be conformable to the overlying
29 gneiss. The bottom, or footwall of this mineralized layer
30 is a very dark brown mass of jasper hematite, 2 feet to 6
31 feet or so thick, that is quite distinct and unlike the under-
32 lying greenish rocks, or the layer of irregularly blotched,
bleached red, brown and cream colored rocks which lie between
the iron bed and the massive greenstone gneiss.

Above this ironstone layer, the rocks are crackled,
irony and silicified, so that the horizon may be readily
traced from the mine workings around the hillside to the open
quarry a thousand feet or more to the west, where the iron bed
is lost beneath the basalt cap. Above this basal ironstone
bed, or layer, there is a thickness of from 15 to 50 feet of more
or less shattered gneiss, irregularly netted with hematite
threads and in places carrying copper ores in nests and layers
conformable with the bedding. The outcrop of this bed is
opened at several places along its course and shows copper
minerals at every place opened. These openings and the under-
ground exposures show that the steeply dipping fissures having
a general northerly and southerly course, influence the mineral-
ization and are in fact themselves mineralized.

This bedded vein is however the source of the ore
thus far mined and so far as can be deduced from any observations,
this flat vein must be relied upon as the main known source of ore.

In the original location work and in all the openings

1 above tunnel No. 3 (the uppermost tunnel), the ore so far found
2 comes from minor development along cross fissures.

3 From my observations, it appears that while ore
4 occurs both in cross fissures and in the flat vein, or ore bed,
5 it is only where the fissures cross the ore bed that ore occurs
6 in promising amount. I believe however that future development
7 should be planned to explore this bed. If an orebody of any
8 magnitude is found, it will probably be where the bed is cut
9 by more or less vertical fissures.

10 Both surface and underground exposures show that
11 fissuring of the ground occurs and that the ore bed is somewhat
12 displaced by faulting. The fractures are of two distinct ages.
13 The more recent is post mineral, cutting through the ore bed
14 and being itself devoid of mineral. A fracture of this sort,
15 filled by barren schist fragments, is seen at the portal of the
16 upper tunnel at the mine and is cut by both of the lower tunnels.
17 It has probably faulted the ore bed, dropping it to a lower
18 level eastward and it is possible that the ore horizon on which
19 the new shaft was started, represents the downthrown, or
20 eastern continuation of the main ore bed.

21 PROGNOSIS:

22 In view of these facts and the known eastward dip
23 of the older, mineralized fractures, it is evident that further
24 shallow exploration of the known ore horizon will not lead to
25 any conclusive result, and that tunnel work is not advisable
26 unless it is desired to merely open up possible extensions of
27 the oxidized orebody, opened between the uppermost and the lower
28 tunnels, a vertical height of but 46 feet and a length on the
29 dip of the bed of but 100 feet. Drilling is therefore prefer-
30 able as a means of deep exploration, for despite the shallow
31 dip of the orebody, there is a chance of getting sulphides on
32 its downward extension.

33 DEVELOPMENT WORK:

34 Underground development, other than the usual
35 shallow shafts, assessment tunnels, etc., of all mining claims,
36 consists of three tunnels with open stope workings connecting
37 the three and a couple of short air shafts. The vertical
38 distance between the uppermost and lowest tunnels is but 46½
39 feet and the distance along the dip of the ore bed but a little
40 over 100 ft.

41 The upper, or No. 3 tunnel encountered ore at the
42 portal but the old level is gone as a result of stoping opera-
43 tions. No. 2 tunnel, 18 ft. lower than No. 3, is 389 ft. long,
44 running in a southwesterly direction into the hillside, passing
45 through the orebed at 65 feet from the portal and crosscutting
46 rather barren but slightly altered and quite unpromising looking
47 gneissoid rocks, showing occasional stringers and threads of
48 hematite, but no copper ore. Short drifts were run to the
49 south on cross fissures that showed hematite. This work is of
50 negative value and carefully taken samples show an entire lack
51 of copper values and but a trace of gold. (Samples Nos. 84 to
52 92 inclusive of Mr. Crossleys' list.)

53 Tunnel No. 1 is 28½ ft. lower than No. 2. It is in
54 barren and but slightly altered gneiss for 86 feet south of

1 the portal. At 65 feet from the entrance, a crosscut runs
2 almost due west for 110 feet, then turns southwesterly for
3 208 feet to the present face, passing directly beneath tunnel
4 No. 3 and the stoped area connected with it. At a point 105
5 feet from the turn, a fault fracture carrying copper ore was
6 cut and a drift was run on this fissure. This drift turns
7 southeast and cuts the downward continuation of the ore bed, thus
8 proving the mineralization continues downward to this horizon.

9 An irregular sub-level, or drift, parallels the
10 tunnel working at a height 12 feet or so above it and this
11 connects by an opening with a large stope chamber whose irregular
12 floor is from 24 to 35 feet above the lower tunnel. This stope
13 extends continuously upward on ledge matter, showing more or
14 less ore. The various other workings on the property all show
15 some ore, but are of no especial significance in reference to
16 the deep development of the ground.

17 Detailed sampling of the mine having been recently
18 done, I find it unnecessary to repeat the work. The sample
19 channels were carefully cut, either vertically or at right
20 angles to the bedding planes and across the roof. The low
21 values shown on the assay list are the natural result of these
22 grooves having been cut across the entire width of the exposures
23 and not confined to the copper ore. In a number of instances,
24 much higher results would have been obtained if the sample had
25 not been diluted by adding so much waste from the material which
26 would be sorted out in ore extraction.

27 It is apparent from a study of these assays that the
28 best ore is found near the portal of No. 3 tunnel and extends
29 downward almost due south. It is believed that the incline shaft
30 at the bottom of the stope could be profitably cleaned out and
31 continued to a connection with the lower level.

32 Samples cut along the lower tunnel at the points
marked 7, 8 and 8A, represent the ore bed exposed in the walls
and roof of the tunnel. There are two beds or bands, each over
two feet thick of commercial grade, but the ore would require
sorting before it could be shipped. Owing to the length of the
channels cut in sampling, the results shown in the assay list
are less than one percent copper.

In general it may be said that if selective mining
is adopted and ore is sorted, the ground available for extrac-
tion will be much greater than is indicated by the assay list.
As already noted, the existing workings show that the ore
deposit is leached and oxidized and that only local segregations
of copper, probably but a small part of the original copper
content of the deposit, was left behind.

All the evidence, the spongy iron goossan found in
places, the general permeation of the rock by limonite, the
white, bleached condition of rock fragments, included in
the deposit, prove that sulphides formerly existed and that
in part at least the ore was copper sulphide. It is geologi-
cally indicated that if the deposit continues downward below
the old water level, it will carry copper sulphide.

SUPPLEMENTAL REPORT

will probably afford an outlet close at hand
for the ore of the Mammoth Group giving it a certain value
in this regard. May 1st, 1917.

Mammoth Gold and Copper Company, at Jerome, Arizona. Important and extremely favorable results of
the probability of encountering similar ore when the
Gentlemen: has been penetrated in the Mammoth workings, as
said above, inasmuch as the latter is close by and working in
the same general I beg to submit the following supplemental report
covering the conditions on your property as they now are:
The copper ore disclosed in your property under like or similar
ecological conditions. Since the original report was written, a definite
plan of operation has been worked out. This calls for a series of
drilling a series of holes below and in the vicinity of the
present Incline Shaft for the purpose of determining the
character of the vein, or ore-zone at the permanent water level.
This will, it is believed, afford data which can be advantage-
ously used in locating the permanent working shaft; the
depth to which it will be necessary to sink it, and the
definite pitch or dip of the vein and its contained ore-shoot
at this point. It will also afford an adequate water-supply
on the property and do away with the present and costly
necessity of bringing it in from a distance. A complete
survey of the existings workings and maps have been completed together with a systematic sampling
of the various openings, the entirely satisfactory results
of which are now in your hands. In conducting the sampling
of the workings, not only the ore itself was sampled, but
the drifts, cross-outs and tunnels were also sampled at
intervals for the purpose of ascertaining the full extent over
which mineralization has occurred at this horizon.
With these matters in shape, the Company is now in
a position to prosecute the work of further development in-
telligently and systematically. Also, if it appears advisable,
to block out and mine the ore-bodies known and exposed in
this portion of the mine.

The camp equipment has been put in excellent shape
for the accomodation of the working force, and that part of
the development work to be immediately accomplished; namely;
the drilling of the ground and sinking of the Incline Shaft
to intersection with the ore-zone, provided for.

Since the taking over of the property by you,
parties connected with the Clark Interests at Jerome have, it is
stated on good authority, taken over the Swansea Mine and
Smelter situated a few miles to the East of the Mammoth Group.
Recent developments in the way of drilling and other underground
exploration have disclosed bodies of good commercial copper ore
at depth, proving conclusively the deep-seated character of the
deposition in this locality. This is especially important in
its bearing on the deep developments in your property.

The writer further is advised that one condition of
the deal with the Swansea people embodied in the transfer, is
that the new Company shall undertake the rehabilitation of
the smelting plant which has been standing idle for some time
past. This should, and, if the above information is correct