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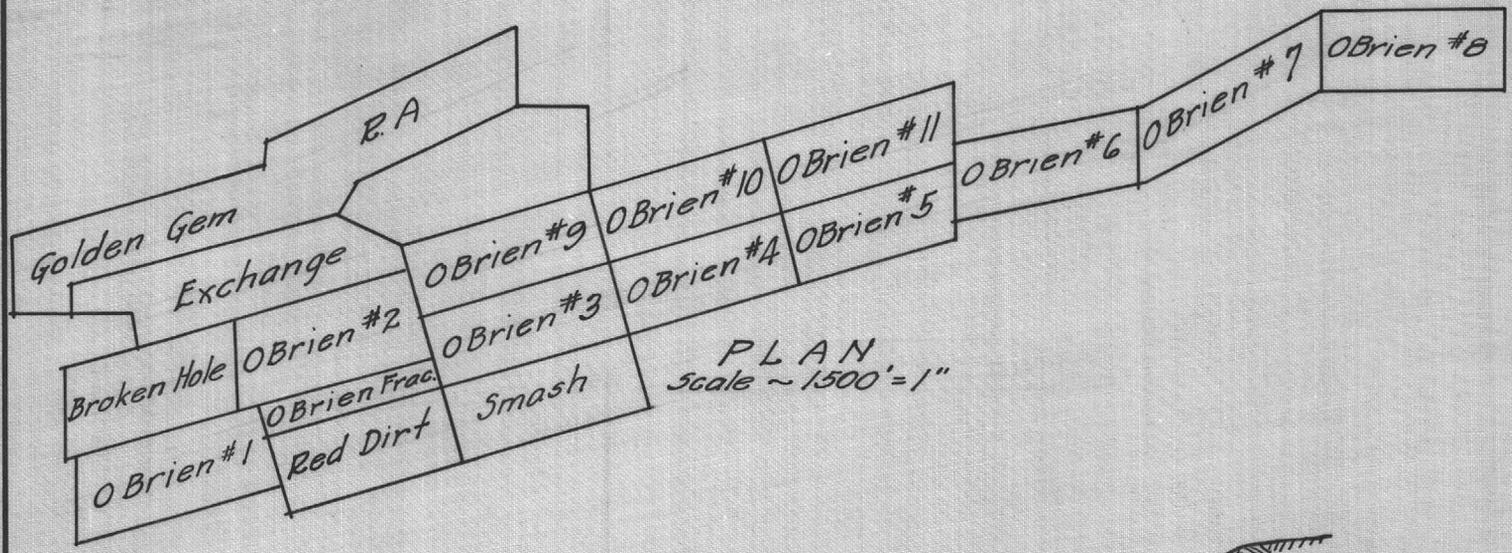
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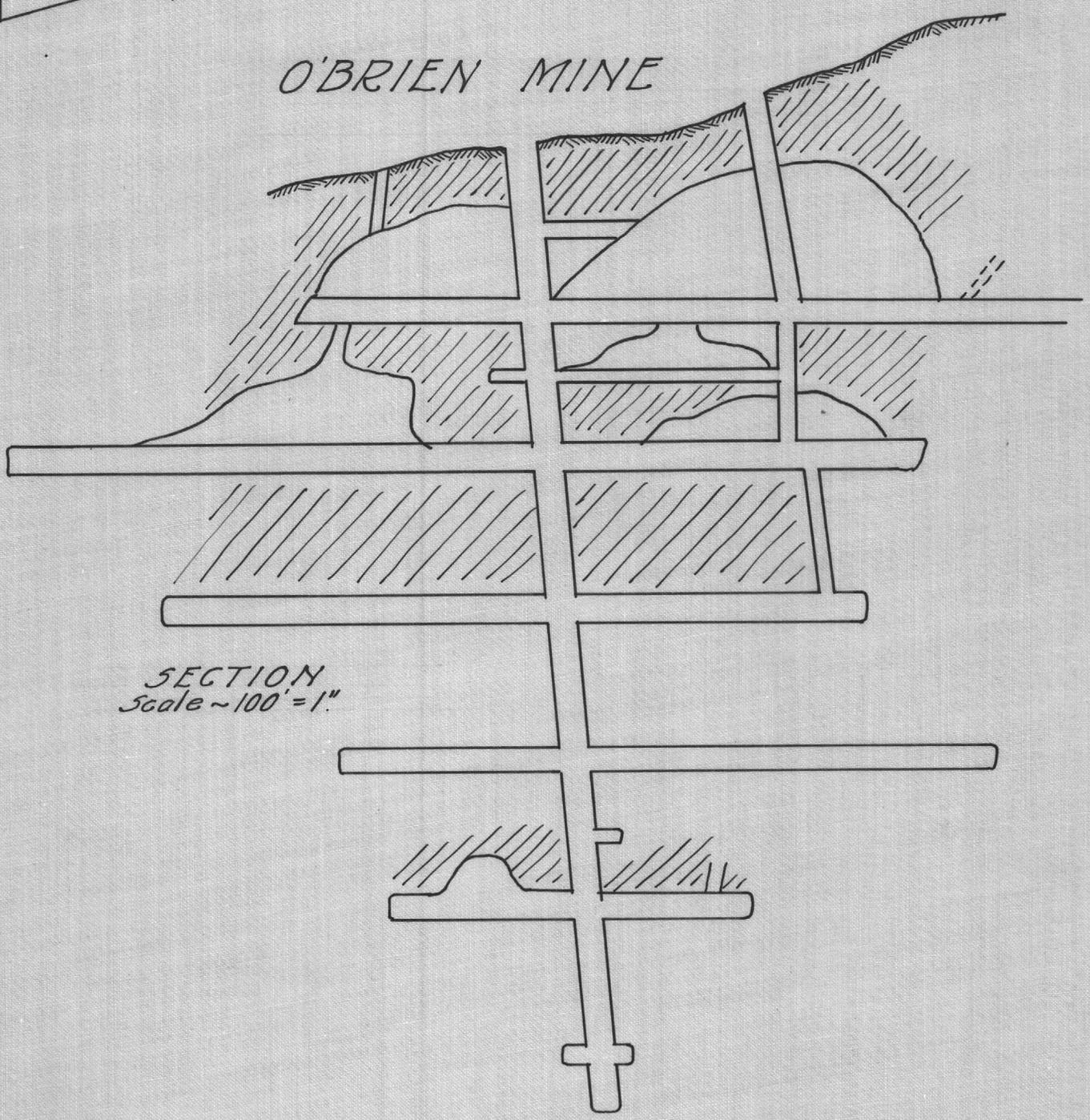
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O'BRIEN & GOLDEN GEM CLAIMS

O'Brien #12



O'BRIEN MINE



COPY

Chloride, Arizona
June 25, 1936

Mr. J. B. Cooper.
District Manager.
Allis Chalmers Co.
Luhrs Tower
Phoenix, Arizona

Copied

Dear Mr. Cooper:

Under separate cover am mailing to you the only engineers report available, together with maps. You may know Mr. Crabtree, who is now out at the Cyclopic. Where as the report sounds rather loud, I must say this; that where I have had a chance to check on his report I have found it to check within reason. On the Map No. I the large vein is really there and extends for 7000' on Q'Brieh property, as shown on the small colored map. Again referring to Map No. I, the 140' shaft is full of debris due to a cloud burst and a shaft located in a canyon unprotected.

The 36' shaft is badly caved, and the 12' shaft which is just under the surface does show lead-silver values. Have large samples and pieces of ore from dumps of the two shafts. Farther up the canyon can show good lead, silver at 6'.

On Map No. I, the cross section of the gold vein, this does sample very good, there is 2' of ore showing and my samples show 0.3 to 0.5 oz. in gold and the ore is exposed with open cuts.

The Blanket Vein lays on a hill side on the Summit and Red Seal claims, and covers an area of 300' by 400'. It is quartz and will average one foot thick, 6" to 9" along the bottom of the hill and 18" to 24" on the upper part. The lower part assay \$6 to \$9 in gold and on the upper portion the values are very good, in places up to once ounce. There is a quartzite capping a foot or more thick

over a portion of the upper part of the deposit which also carries very good values.

I made a flotation test on some of this ore as follows:

	Au. Oz.
Head	1.36
Conc.	28.00
Tailing	.025

R/C 30 to I Rec. 98%. All this Blanket ore can be handled very cheaply.

Just recently 100 tons was mined and custom milled at the Keystone Mill at Mineral Park, two men mined 10 ton per day without power of any kind and the ore by Keystone assay and umpire by Herman, L. A. ran over \$9 and was from the lower part of the deposit.

The Keystone a few days ago offered to handle all this ore on a flat milling rate of \$4 per ton.

Frank R. Wicks of L. A. whom you probably know reported on this property for the Keystone, and the Keystone and they wanted to lease, but could not make satisfactory deal.

The Gem mine of which a cross section map is enclosed is a good property. The samples where I have checked are all right. Outside of the Golconda and Tennessee the Gem is the deepest workings in the district. All the work has been on ore and was done before the price of gold advanced. I have quite a number of old assays and an average excluding all assays over one ounce and including all traces shows better than 0.3 ounces in gold and the silver of which there is a content not calculated. The main shaft is in very good condition but the drifts are full of muck, that is the 60' and 100' levels, the water stands^{at} about 150'. All the ore taken from these levels was high grade and there is still some left on the walls and as pillars, all this muck or fill is good mill ore. This property is really of such magnitude that it must be seen to be appreciated. The following

samples were taken May 10.

No.	Location	Au Oz.	Value
1	Blanket, Red Seal 100' N. E. of bin	.53	18.55
2	Overburden above quartz	.39	13.65
3	Hi-Grade Gem Mine 100' level	9.30	326.20
4	Ore Vein " " " "	.47	16.45
5	Waste in Stope under cross cut	.08	2.80
6	Ore in Stope	.21	7.35
7	80' level 80' north of 80' shaft 6' wide	.24	8.40
8	Vein across Gem to shaft (surface)	.22	7.70
9	Gold Vein O'Brien No. 3 24"	.24	8.40
10	Wall rock 100' level Gem Mine	.12	4.20

I am enclosing a copy of my calculations on the costs of handling the Blanket deposit and the Gem dump and fill. This program would take a years time and at that time development should be well under way. Would be glad to assist in any way should you send some one to look this over. Thanking you very much for your interest and hoping the data will be of some assistance. Hope to see you when you are up this way, let me know and I will see you in Kingman if you don't get out here. With kindest regards.

Yours very truly,

A. C. Dundas

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Yours very truly,
(Signed) A. G. Dundas.

O'BRIEN MINES & GOLDEN GEM

(Note by G. M. Colvocoresses - November 1937)

According to my latest information this mine has recently been taken over by parties who have undertaken to recondition, develop and operate.

I have not been able to learn anything concerning the standing of these people nor the results which they may have had to date.

My personal experience with E. H. Crabtree would make me very skeptical as to the accuracy of his reports although we have never checked him in regard to this particular property.

REPORT ON GOLDEN GEM MINE CERBAT, ARIZONA

(a patented mine controlled and under the management of O'Brien)
(Mines property, adjoining on the South*)

Copied

LOCATION

The Golden Gem Mine is situated at Cerbat, Mohave County, Arizona, in the Wallapai Mining District.

The mine adjoins the O'Brien Mines on the north and the foregoing report on those properties, which is a composite of this report, gives details which are also applicable to this property.

HISTORICAL

Some of the earliest discoveries of mineral in Northern Arizona were made at Cerbat which was at one time the County Seat of Mohave County and was very active through various mining operations.

Production from this immediate vicinity has been twelve to fifteen million dollars, the Golconda Mine having been the largest producer with a production record of about \$8,000,000.00

GEOLOGY

For information regarding the geology and ore deposits of this area, reference is made to a copy of the description given in F. C. Shraders U. S. Geological Report, Bulletin No. 397.

AREA:

The property comprises the following patented claims.

Golden Gem	Survey No.	1287
Exchequer	"	2779
R. A.	"	2779
Quaker	"	2779

DEVELOPMENT

The Gem Mine is developed by a shaft 628 feet in depth, a vertical shaft near the surface and changing to an incline of 80 degrees above the 100' level. A longitudinal section of the mine workings accompanies this report.

During the active operations of the mine a 4 stampmill was used in treatment of the ores, this containing stamps of the Nisson type which is now, however, obsolete.

Information obtained from a former Superintendent, which is perfectly reliable, give the following facts as to mining and milling.

"The ore shoots most extensively developed in the Gem Mine

2- G. G.

extended from the surface to a depth of 375', and for a lateral distance of 540'. A barren zone occurred from the 375' level, but heavy sulphide ores came in again at the 500' level. There was developed to the south for a distance of 75' with ore still showing at the heading."

"There is a parallel ore shoot to the one developed and worked on the upper levels both of which dip to the northwest. No drifting was done on the 600' level."

The following is a copy of portions of a letter written by one of the stockholders to the engineer in charge during 1915.

"Our values for the time we operated the mill will show that the ore averaged \$10.00 to \$18.00 per ton, and would make a general average of \$12.00 to \$14.00 per ton. We did not try to separate the waste from the ore we ran through the mill but broke down the entire ledge from wall to wall. We did have some very high grade ore in places and could have made a very fine average by carefully assorting the ore."

"We made extensive improvements such as enlarging the shaft from one to a two compartment shaft, which was well timbered and lagged with 2" O. P. from the surface to the 300' level, and then from the 400' level to the bottom at 628'. This was done with the expectation of running the 500' and 600' levels and thus provide for a much larger mill which we expected to have ready when development work was completed but; largely from the panic of 1907 -8 the plant was closed down and for the intervening years we have not been able to agree upon a price until the deal was made with a Mr. Clapp. We might have had better than \$400,000.00 for this property four years ago but the stockholders could not get together when the time came to sign the agreement. In closing I want to say to you that my faith has never been stronger in the final outcome of the Golden Gem property, if properly worked, than at the present time. War conditions in 1915 stopped with no prospect of any immediate resumption and no ability to finance.

"The Golden Gem was taken over in preference to the Blue Ridge, now the Tom Reed Mine. The Cerbat country impressed us as having the best geological formation for permanent mines and I am sure that with depth, our judgment will prove correct."

The above was copied from a letter from the principal stockholder by W. G. O'Brien in 1934.

"Excerpts from engineers letters to company financing the Gem Mine in 1915.

"At the Golden Gem Mine we are preparing to drive the 5th and 6th levels north to tap the ore bodies which produced so many thousands of dollars worth of shipping ore in the early days with the crudest of methods. We will also drive south on these levels and crosscut west to the parallel veins which show up very prominently on the surface and give every indication of making large ore bodies of very rich ore. We are doing some necessary repairing in the shaft and making some changes which will enable us to handle the ore in a more economical manner. We have plenty of men on the ground and are making good progress. I am anxious to get back down to that body of ore on the 460' level, which milled \$20.00 per ton, and I am also anxious to get under and come up on that \$20.00 per ton ore spoken of in Mr. Blantons report as Sample Nobb, 2'6" and the

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((Excepts from letter of engineer in charge of operations of the Gem Mine during extensive examination and testing period Nov. 9, 1915)))

"While recently in charge of the milling plant of the Golden Gem Mine near Kingman, Arizona, I ran about 100 tons of the ore thru the mill, which averaged very nearly \$10.00 per ton in gold saved by amalgamation, besides the concentrates, which should bring the values recovered up to \$11.50 per ton. I have on several occasions examined the accessible underground workings of the mine and believe there is a very large tonnage of blocked ore in the mine. Since deeper mining in this district has developed larger and better ore bodies, I see no reason why the Golden Gem Mine should prove an exception to this rule and I base this conclusion on a practical mining experience of 35 years. It certainly has a very strong showing for the making of a paying mine. I regard the Golden Gem as the backbone of the Cerbat section and as having unusual merit. How successful it becomes, depends upon the management."

Yours very truly,

(signed) G. E. Thede.

NOTE: All reference to values used above quotations are based on gold at the old price of \$20.67 per oz. and these prices are now increased by 75% in estimating present values of the ore mentioned above.

These reports are the exact copies of the original reports and copied December 12, 1934.

REPORT ON GOLDEN GEM MINE

(Cerbat, Arizona)

(A patented mine controlled and under the management of O'Brien) Mines property, adjoining on the South)

LOCATION:

The Golden Gem Mine is situated at Cerbat, Mohave County, Arizona, in the Wallapai Mining District.

The mine adjoins the O'Brien Mines on the north and the foregoing report on those properties, which is a composite of this report, gives details which are also applicable to this property.

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SUPPLEMENTARY REPORT ON THE
O'BRIEN MINES AND ADJACENT HOLDINGS.

Since the original report was made on the O'Brien Mines in March 1929, further development has been underway to a considerable extent which has proven the mine to be much more important as a gold property, in addition to the large tonnage of silver lead ores, than had heretofore been realized.

Continued development of the gold vein situated above and parallel to the large gold-silver-lead vein, has opened and exposed gold ore of exceptional value. This has been accomplished by the owner Mrs. W. G. O'Brien, since the original report was made on the property by the writer, and this has increased the value of the holdings to a very marked degree. This is especially true in view of the present activity in the quest and demand for gold and gold producing properties and the fact that the ores of these mines are found to contain gold of commercial quantities wherever the veins have been opened.

Prior to the development of that portion of the properties, where gold ore exposures are proven, its importance as a probable gold producer was not fully realized and was only partly recognized owing to the fact, that more attention had been given to the development of the silver-lead producing veins of the property at that time and to the fact that metal prices were at that time at a normal level.

Now, however, recent developments have proven that this mine will eventually become an important gold producer, and as soon as plans for proper development of the property and equipment of same, have been carried out, this will become an accomplished fact.

Subsequent to the original report on the property, operations at the O'Brien Mines have exposed commercial ores in larger quantities than had previously been known.

A large open cut (surface cut) has been opened along the vein in Charcoal Canyon, which has proven commercial ore along the lateral distance of 80' in addition to the tonnage previously mentioned.

The gold vein, situated a little south of the silver-lead vein has also been more extensively developed and some of the old workings cleaned out in order to permit of more systematic sampling.

A water supply of ample quantity for extensive milling operations is available for use whenever required, and the water problem has, therefore, been satisfactorily solved.

ORE VALUES: Repeated and revised results of sampling as shown in a previous report, we have the following:

GOLD VEIN

Sample No.	Description of Sample	Oz. Gold	Oz. Silver	% Lead	Value
0-105	Average of Gold vein	0.58	11.0	10.92	\$28.29
0-106	Open cut workings	0.62	0.74	2.24	12.79

Sample No.	Description of Sample	Oz. Gold	Oz. Silver	% lead	Value
0-119	Open cut workings	0.22	2.90		\$ 4.61
0-126	" " "	6.62	8.18	24.63	161.53
0-127	Quartz from shaft	1.00	0.84		20.21
0-128	Average of Dump	0.36	7.20	6.0	17.16
	Average of ore	0.40	3.68		9.10
	Shaft and vicinity	0.30	1.34		6.40
	" " "	0.36	1.04		7.51
	" " "	0.58	1.38		12.01
	" " "	4.76	2.73		96.02
	" " "	0.88	1.12		17.94

Average of above samples results are \$33.60

SILVER LEAD VEIN

Sample No.	Description of Samples	Oz. Gold	Oz. Silver	%Lead	Value
0-991	Surface workings	0.02	3.82	26.96	\$28.29
0-110	Open cut workings		0.64	9.39	9.74
0-124	Dump at 140' shaft	0.92	14.94	25.19	47.89
0-125	Upper end of surface		4.54		
	open cut	0.10	4.54		17.71

Average of above results \$25.93

Note: Since the above assays were made the price of gold has advanced to \$35.00 per ounce, the above results are based on the old \$20.67 per oz. price; therefore, for the true value of the gold in these samples, there must be added 75% of the value herewith shown (This is written Sept. 22, 1935, in making copy of original report.

As will be seen from the results of the samples of the gold vein, few of them have been assayed for lead content although this is a factor to be considered as some lead may be expected in the production of these ores.

Continued production of the gold vein should place this property on a production basis and in the dividend paying class within a comparatively short time, when a mill is installed for treatment of the lower grade ores.

METALLURGY

The metallurgy of the ores from the O'Brian Mines is simple, and a high recovery is obtainable from them by using bulk flotation preceded, in the case the ore from the gold vein, by amalgamation of the free gold. No detrimental elements are present in the ores, and for this reason, the milling costs will be lower than if the use of selective flotation were necessary. The required fineness of the grinding and

S3

determination of the required flotation reagents can be easily determined when necessary.

REQUIRED EQUIPMENT

Present plans for the equipment of the O'Brien Mines call for the installation of a mill of 50 tons daily capacity for treatment of the gold ores and this plant has already been designed. The mill will have a daily capacity of 50 tons with power plant capable of handling 50 tons per day and this tonnage will be treated as soon as conditions warrant.

Ore produced from the gold vein during the development period will be sent direct to the mill and is now in sufficient quantity to keep the plant in continuous operation. However, the management will purchase and treat ores from other mines in the vicinity, of which there are a great number that would be in production of commercial ores if there was a local market for them and the O'Brien plant will furnish this market for all ores within a radius of 20 to 30 miles.

MILLING COSTS

A careful estimate of the milling costs show that they will not exceed approximately \$2.00 per ton, and when a 50 ton daily capacity is reached, that cost will be materially reduced.

Customs ores that come to the plant, other than the ore produced at the O'Brien Mines, will be treated at a milling charge of approximately \$5.00 per ton. Assuming that only 20 tons per day were received from this source, this would mean an income of \$100.00 per day in addition to that received from O'Brien ores.

MINE DEVELOPMENT

Development of the gold vein will be started as soon as possible by sinking a shaft which is planned to go to 500'. This will be sunk on the gold vein on O'Brien No. 3 Claim at a point suitable to send all ores directly to the mill, and it is estimated that production from this work will be able to furnish the mill to its capacity within 60 days after installation of proper mining machinery which will include a suitable hoisting plant, headframe, and other equipment.

The handling and treatment of custom ores will be an important factor in reducing operating costs and in increasing revenues and will be a source of income entirely independent of the production of the O'Brien Mines. The capacity of the plant will be increased as rapidly as conditions warrant, with a consequently higher earning power.

Respectfully submitted

E. H. Crabtree, E. M.

June 4, 1933
Cerberat, Arizona

SUPPLEMENTARY REPORT ON THE
O'BRIEN MINES AND ADJACENT HOLDINGS

Since the original report was made on the O'Brien Mines in March 1929, further development has been under way to a considerable extent which has proven the mine to be much more important as a gold property, in addition to the large tonnage of silver lead ores, than had heretofore been realized.

Continued development of the gold vein situated above and parallel to the large gold-silver-lead vein, has opened and exposed gold ore of exceptional value. This has been accomplished by the owner Mrs. W. G. O'Brien, since the original report was made on the property by the writer, and this has increased the value of the holdings to a very marked degree. This is especially true in view of the present activity in the quest and demand for gold and gold producing properties and the fact that the ores of these mines are found to contain gold of commercial quantities wherever the veins have been opened.

Prior to the development of that portion of the properties, where gold ore exposures are prove, its importance as a probable gold producer was not fully realized and was only partly recognized owing to the fact, that more attention had been given to the development of the silver-lead producing veins of the property at that time and to the fact that metal prices were at that time at a normal level.

Now, however, recent developments have proven that this mine will eventually become an important gold producer, and as soon as plans for proper development of the property and equipment of same, have been carried out, this will become an accomplished fact.

Subsequent to the original report on the property, operations at the O'Brien Mines have exposed commercial ores in larger quantities than had previously been known.

A large open cut (surface cut) has been opened along the vein in Charcoal Canyon, which has proven commercial ore along the lateral distance of 80' in addition to the tonnage previously mentioned.

The gold vein, situated a little south of the silver-lead vein has also been more extensively devellped and some of the old workings cleaned out in order to permit of more systematic sampling.

A water supply of ample quantity for extensive milling operations is available for use whenever required, and the water problem has, therefore, been satisfactorily solved.

ORE VALUES:

Repeated and revised results of sampling as shown in a previous report, we have the following:

GOLD VEIN :

Sample No.	Description of Sample	Oz. Gold	Oz. Silver	% Lead	Value
0-105	Average of Gold vein	0.58	11.0	10.92	\$28.29
0-106	Open cut workings	0.62	0.74	2.24	12.79
0-119	Open cut workings	0.22	2.90		4.61
0-126	" " "	6.62	8.18	24.63	161.53
0-127	Quartz from shaft	1.00	0.84		20.21
0-128	Average of Dump	0.36	7.20	6.0	17.16
	Average of ore	0.40	3.68		9.10
	Shaft and vicinity	0.30	1.34		6.40
	" " "	0.36	1.04		7.51
	" " "	0.58	1.38		12.01
	" " "	4.76	2.73		96.02
	" " "	0.88	1.12		17.94

Average of above samples results are \$33.60

SILVER LEAD VEIN

Sample No.	Description of Samples	Oz. Gold	Oz. Silver	% Lead	Value
0-991	Surface workings	0.02	3.82	26.96	\$28.29
0-110	Open cut workings		0.64	9.39	9.74
0-124	Dump at 140' shaft	0.92	14.94	25.19	47.89
0-125	Upper end of surface open cut	0.10	4.54		17.71

Average of above results \$25.93

Note: Since the above assays were made the price of gold has advanced to \$35.00 per ounce, the above results are based on the old \$20.67 per oz. price; therefore, for the true value of the gold in these samples, there must be added 75% of the value herewith shown (This is written Sept. 22, 1935, in making copy of original report).

As will be seen from the results of the samples of the gold vein, few of them have been assayed for lead content although this is a factor to be considered as some lead may be expected in the production of these ores.

Continued production of the gold vein should place this

property on a production basis and in the dividend paying class within a comparatively short time, when a mill is installed for treatment of the lower grade ores.

METALLURGY

The metallurgy of the ores from the O'Brien Mines is simple, and a high recovery is obtainable from them by using bulk flotation preceded, in the case the ore from the gold vein, by amalgamation of the free gold. No detrimental elements are present in the ores, and for this reason, the milling costs will be lower than if the use of selective flotation were necessary. The required fineness of the grinding and determination of the required flotation reagents can be easily determined when necessary.

REQUIRED EQUIPMENT

Present plans for the equipment of the O'Brien Mines call for the installation of a mill of 50 tons daily capacity for treatment of the gold ores and this plant has already been designed. The mill will have a daily capacity of 50 tons with power plant capable of handling 50 tons per day and this tonnage will be treated as soon as conditions warrant.

Ore produced from the gold vein during the development period will be sent direct to the mill and is now in sufficient quantity to keep the plant in continuous operation. However, the management will purchase and treat ores from other mines in the vicinity, of which there are a great number that would be in production of commercial ores if there was a local market for them and the O'Brien plant will furnish this market for all ores within a radius of 20 to 30 miles.

MILLING COSTS

A careful estimate of the milling costs show that they will not exceed approximately \$2.00 per ton, and when a 50 ton daily capacity is reached, that cost will be materially reduced.

Customs ores that come to the plant, other than the ore produced at the O'Brien Mines, will be treated at a milling charge of approximately \$5.00 per ton. Assuming that only 20 tons per day were received from this source, this would mean an income of \$100.00 per day in addition to that received from O'Brien ores.

MINE DEVELOPMENT

Development of the gold vein will be started as soon as possible by sinking a shaft which is planned to go to 500'. This will be sunk on the gold vein on O'Brien No. 3 Claim at a point suitable to send all ores directly to the mill, and it is estimated that production from this work will be able to furnish the mill to its capacity within 60 days after installation of proper mining machinery which will include a suitable hoisting plant, headframe, and other equipment.

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E. H. Crabtree, E. M.

June 4, 1933
Cerberat, Arizona

REPORT ON THE

O'BRIEN MINES IN CONSOLIDATION
WITH
THE GOLDEN GEM MINES IN
CERBAT, MOHAVE COUNTY, ARIZONA*Copied*LOCATION:

The O'Brien Mines are situated at Cerbat, Mohave County, Arizona, fourteen miles west of Kingman, the county seat and only 2 miles north of the main Kingman-Boulder Dam Highway which is now being paved from Kingman to Boulder City, to connect with the main Highway to Salt Lake City.

With the completion of the paving of the Boulder City Highway there will be paved road from the O'Brien Mines to Los Angeles with the exception of the two miles up to the mines from the main road.

The mines are only $1\frac{1}{2}$ miles from the main Power Transmission Line of the Desert Power Co. and are easily accessible by automobile in a half hours drive from Kingman, the main supply point of the district.

AREA:

The holdings of the O'Brien Mine property comprise approximately 310 acres covered by seventeen claims as follows:

O'Brien No. 1	O'Brien No. 10	Primier Extension
O'Brien No. 2	O'Brien No. 11	Laddie Boy
O'Brien No. 3	O'Brien No. 12	O'Brien Fraction
O'Brien No. 4	Canadian	Silver Bell No. 2
O'Brien No. 5	Primier	Silver Bell No. 3
O'Brien No. 9	Silver Bell No. 1	

In addition to the above holdings there is also controlled by the same interests the Golden Gem property which will be described later in this report.

ECONOMIC CONDITIONS:

The location of the O'Brien Mines, as indicated above, is such that their development and operation can be conducted at a minimum expense.

Transportation of materials and supplies and outgoing shipment of ores and concentrates can be handled at much lower cost than mining operations at isolated localities where the advantage of railroads, good highways and electric power lines are unavailable.

The old camp of Cerbat, once the county seat of Mohave County, has formerly been the scene of very extensive mining operations and has produced a record of many millions of dollars. An ample water supply is available for whatever purpose required.

GEOLOGY AND VEINS:

The country rock of the district is, quoting from the report of F. C. Shrader of the U. S. Geological Survey, "the pre-cambrian granite gneiss and schist complex."

The formation is intruded by dikes of various igneous rocks some of which are associated with the extensive vein system which traverse the O'Brien group which is the subject of this report.

The principal vein, considered the Mother Lode of the district, extends through seven claims of the O'Brien Group or a total distance of 5,500'. Continuing on to the Northwest this vein system crosses two other mining claims where extensive and successful development has also been accomplished. A total distance of nearly 4 miles has been proven along the strike of this ledge which shows ore outcroppings of from 15 to 30 feet in width and crop boldly to as high as 30 feet above the surrounding country and following along the south wall of Charcoal Canyon where the principal development has been carried on.

The ore produced from this immense ledge carries gold, silver and lead in commercial quantities, and grade and systematic development of this ore shoot should rapidly expose an immense tonnage.

The vein is from four to 12 feet wide where exposed, at the point where most of the development has been concentrated an ore shoot has been proven to a length of 475' by underground development at certain intervals and croppings show an additional 200' or a total length of ore shoot of 675'.

Lying about 250' to the north of the main vein is another vein of similar character where development in an 80' shaft has exposed a good grade of shipping ore. This vein, called the Silver-Lead Vein No. 2 converges with the main ledge to a junction with it on the O'Brien Claim No. 4.

South of the principal vein an outcropping of gold quartz has been opened and a considerable quantity of ore has been milled from shallow surface workings. It is reported that this ore averages about \$20.00 per ton in gold, most of it being free milling, this average being only the value of the gold recovered by amalgamation and is, therefore, only 60% of the gross assay value, thereby making the ore have a real value of \$33.55 per ton.

DEVELOPMENT AND ORE VALUES

The principal development of the O'Brien Mines has been confined to a number of shafts and miscellaneous workings and where an ore shoot has been proven for approximately 600'.

Reference to Map No. 1, which is also an assay map, shows crosssections of various shafts and surface workings and the croppings of the main vein of Silver-Lead.

All these workings are in ore of commercial grade and have proven approximately 22,166 tons of ore of a gross value of \$664,989.00 assuming an average value of \$30.00 per ton as has been demonstrated by numerous samplings and shipments.

This estimate is also based on the assumption of an ore shoot

475' long, as indicated by various workings and an average width of only 4'. Both shipping and milling ores of excellent grade have been produced from the workings mentioned above but which, however, are inaccessible due to caving and filling as the result of cloudbursts.

Assays of the ore now on these dumps showed values of over 40% lead, \$5.00 gold and 30 ounces in silver per ton, making a very high grade and desirable shipping ore for which the smelters will pay a premium on account of the high lead content.

The deepest shaft on the ore shoot described above is 140' and west of this shaft is one 36' deep which has also produced very high grade silver lead ore but which is also now inaccessible for the same reasons as above mentioned.

On the gold vein lying south of the silver lead vein croppings, an open cut and a forty foot shaft has exposed free milling gold ore in a 6' vein which plated \$20.00 per ton in gold in the Gem Mill. This vein parallels the silver lead vein.

Lead is predominating metal in the silver lead vein of the O'Brien properties, while gold is the principal value in the gold vein mentioned above, as well as in the other veins lying further to the north known as the extension of the Golden Gem vein.

Extremely high grade silver gold ores have been produced from the various veins and their occurrence may be expected throughout the production period of the mines.

Ore shipments from the O'Brien Mines have averaged as follows

Gold	\$15.00	per ton
Silver		
(30 oz.)	18.00	per ton
Lead		
(48%)	62.40	" "
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When shipments are made from the gold vein, the average values will be higher than that shown above.

PROPOSED DEVELOPMENT AND EQUIPMENT

The immediate future development of the O'Brien Mines should be confined to the opening of the gold vein by a shaft located on the south side of Charcoal Canyon, at a point where valuable gold ore has been previously produced and shipped. Such a shaft can always be utilized in the development of the silver-lead vein by running short cross cuts to the north.

Development of this character will soon put the mine into production of gold ore of both shipping and milling grades and as the work progresses additional tonnage will be rapidly blocked out. This shaft should be sunk to at least 500' and drifts run each 100' intervals.

With an average width of 4' and levels run for a distance of 150' in each direction and located at the 100, 200, 300, 400, and 500 foot points there should be approximately 50,000 tons of ore blocked out which, at an average value of \$30.00 per ton would be, assuming only half the tonnage exposed to be ore of commercial grade, approximately \$750,000.00.

In addition to the short crosscuts to develop the silver-lead vein, drifting along the vein would block out additional tonnage. In the development and operation of the gold vein a large percentage of the ore would be suitable for direct shipment to the smelters and this would bring returns during the development period which should materially assist in that work, and increase as depth is attained.

Therefore, we must not lose sight of the fact that there are two strictly gold veins on this property, one lying parallel with the silver-lead vein and about 40' to the south, and one, the Golden Gem vein lying to the north.

Comparing the O'Brien Mine with some 15 or 20 other properties which the writer has had occasion to examine in this district during the past six months, the conclusion is reached that a systematic development of the property will prove more ore of a commercial grade that can be produced as rapidly as developments will permit, and at a less expense than any other property which has been under observation.

This conclusion, is based on the continuity of the vein system; the size of the ore croppings; the proven ore shoots, and the consistent values of the ore wherever it has been exposed. The mine is easily accessible for economical operation, and is located at a lower geological level than most mines of the district.

RECOMMENDATIONS:

The writer recommends the immediate installation of the machinery necessary to carry out the above proposed mine development, together with the erection of mine and camp buildings. This will prove the mine quickly and economically and place the property on a profitable basis in the shortest possible time. This installation should be on the gold vein for development by shaft as heretofore proposed and the production of gold ore will be of importance during the progress of the work.

Respectfully submitted:

(signed) E. H. Crabtree E. M.

Cerbat, Arizona
March, 1929.

Note* Since the above report was written the value of gold has increased to \$35 per oz., or 75% over the original price. Therefore, the values shown herein should be increased on above values.

COPY

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Gerbat, Arizona
March, 1929.

Note* Since the above report was written the value of gold has increased to \$35 per oz., or 75% over the original price. Therefore, the values shown herein should be increased on above values.

NOTE:

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You will observe, that the underground floor or plan map does not plot the assay results taken during the year 1929 when the mine was dewatered and sampled before the crash came and deferred a deal.

The following values and widths are taken from the mine assay record book, and were run by reliable Assayers at Kingman, viz. Jacobs and Everett and are authentic.

300' level

Sample No.	DESCRIPTION	WIDTH	AU. OZ.	AG. OZ.	VALUE
G-45	North Drift 42' from shaft	12"	0.40	Tr.	\$ 8.00
G-301	" 117' "	30"	0.56	1.40	11.20
G-302	" 127' "	34"	0.76	1.20	15.20
G-303	" 137' "	38"	0.82	0.80	16.40
G-304	" 147' "	36"	0.64	0.80	12.80
G-305	" 157' "	32"	0.76	0.90	15.20
G-306	" 167' "	38"	0.60	0.60	12.00
G-307	" 177' "	40"	0.88	1.30	17.60
G-308	" 187' "	46"	0.92	2.40	18.40
G-309	" 197' "	48"	0.90	2.80	18.00

Gold calculated @ \$20.00 per oz. Silver no calculated.

The following are the results of a mill run taken from old records in Assay Office.

SAMPLE NO.	DESCRIPTION	AU. OZ.	AG. OZ.	VALUE
G-78	Mill Heads	0.82	0.92	\$18.88
G-79	" "	0.54	0.74	11.20
G-80	Mill Tails	0.08	0.28	1.75
G-81	" "	0.12	0.44	2.73
G-82	Concentrates	5.76	14.08	114.65
G-83	"	2.92	10.84	64.15

Gold calculated @ \$20.00 per oz. Silver @ 54 $\frac{1}{2}$ @ per oz.

50' level of 80' shaft west vein Dec. 1934.

SA				
8748	Gem Shaft	0.54	2.52	\$19.82
8759	Drift Dump	1.64	7.08	61.92

Gold at \$35 per oz. Silver at 64 $\frac{1}{2}$ @ per oz. Note: Samples of ore being developed on another vein system

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G-82	Concentrates	5.76	14.08	114.65
G-83	" "	2.92	10.84	64.15

Gold calculated @ \$20.00 per oz. Silver @ 54½¢ per oz.

50' level of 80' shaft west vein Dec. 1934.

Sa				
8748	Gem Shaft	0.54	2.52	19.82
8759	Drift Dump	1.64	7.08	61.97

Gold at \$35 per oz. Silver at 64½¢ per oz. Note: Samples of ore being developed on another vein system.

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BRIEF DATA PERTAINING TO TONNAGE AND ORE VALUES
OF THE GOLDEN GEM MINE, CERBAT, ARIZONA

The data submitted herewith is based on information and results obtained during the actual operation of the Gem Mine by the writer in 1928 and 1929.

Accompanying this data is a longitudinal section and assay map of the mine which shows blocks of developed ore from which estimates are made to determine available tonnage.

A claim map is also submitted which shows the area of the property.

This data is not intended to be submitted in the form of a report but merely as a compilation of results obtained during operation of the property, as before stated. A formal and detailed report is available if required.

During the operation of which the writer was in charge the mine was unwatered and retimbered to the 300' level.

This furnished the opportunity to systematically sample and inspect the various ore showings with the results shown.

Drifting was carried on at the 300' level south of shaft where the best ore showings appeared to be.

A continuation of this level south and also north should develop valuable tonnage of commercial ore with comparatively small expense.

On the following pages is a record of samples taken during the operation mentioned and estimates of proven and potential tonnage.

ASSAY RECORD OF SAMPLES OF COMMERCIAL ORE**MISCELLANEOUS

Sample No.	Location	Width In.	Character of Ore	Gold Oz.	Silver Oz.	Gross ore value in \$\$\$'s
G-10	Main Shaft Dump		Sulphide	0.42	9.42	\$24.63
G-20	North Shaft Dump		Oxide	0.42	2.06	16.29
G-30	" " "		"	0.06	1.03	2.37
G-80	25' Shaft		Sulphide	1.64	9.88	55.01
G-8	Open cut N. of Sht.	60	Oxide	0.24	0.86	8.06
G-9	" " " " "	36	"	0.08	2.100	3.45
G-10	" " S " "	30	"	0.80	4.32	31.32
G-46	Mill Shaft @47'	8	Sulphide	0.84	4.20	32.62
G-51	" " @39'	6	Sul. & Oxi.	0.26	0.62	9.58
G-66	North Vein	6	Oxide	0.36	0.40	12.91
G-67	No. 2 dump		"	0.12	0.52	4.60
G-020	No. 2 open cut dump		"	0.42	2.06	16.28

Note: The above lot of "Miscellaneous samples show an average of \$18.11 On account of the character of the sampling no average width is given.

RECORD OF COMMERCIAL SAMPLES FROM MAIN GEM SHAFT:

Sample No.	Location	Width In.	Character of Ore	Gold Oz.	Silver oz.	Gross value
G-28	North end at 155'	20	Quartz	0.22	1.54	\$8.88
G-29	" " " 159	24	"	0.60	2.76	23.12
G-30	" " " 164.5	18	"	0.56	1.76	20.73
G-31	" " " 174.9h	12	"	0.54	0.48	19.30
G-32	" " " 174.9f	24	"	0.28	Tr	8.60
G-01	Main shaft dump		Sulphide	0.88	4.88	34.56
G-010	" " "		"	0.42	9.42	21.96

RECORD OF COMMERCIAL SAMPLES FROM 60' LEVEL

Sample No.	Location	Width In	Character of Ore	Gold oz..	Silver oz.	Gross value
G-25	9' S. of Shaft	12	Oxide	1.26	3.34	\$46.67
G-26	15.5 S. " "	12	Oxide	0.12		4.20
G-27	17.75 S. " "	21	"	0.18		6.30
G-70	16.5 S. " "	10	"	0.24		8.40

RECORD OF COMMERCIAL SAMPLES ON 100' LEVEL

Sample No.	Location	WIDTH	Character of Ore	Gold	Silver	Gross value
G-24	20' N. of Shaft	4	Sulphide	20.48	14.92	\$728.28
G-72	20' N. of Shaft Ck	4	"	29.64	30.92	1061.20

RECORD OF SAMPLES OF COMMERCIAL ORE ON 300' LEVEL

Sample No.	Location	Width In.	Character of ore	Gold oz.	Silver oz.	Gross Value
G-45	41' N. of Shaft	12	Quartz	0.42	Tr.	\$14.70
G-301	117' N. " "	30	"	0.56	1.40	20.68
G-302	127' N. " "	34	"	0.76	1.20	27.52
G-303	137' N. " "	38	Qtz. & Sul.	0.82	0.80	29.32
G-304	147' N. " "	36	" " "	0.64	0.80	23.01
G-305	157' N. " "	32	" " "	0.76	0.99	27.27
G-306	167' N. " "	38	" " "	0.60	0.60	21.46
G-307	177' N. " "	40	" " "	0.88	1.30	31.80
G-308	187' N. " "	46	" " "	0.92	2.40	34.04
G-309	197' N. " "	48	" " "	0.90	2.80	33.65

Record of Mill samples obtained from old mill files:

Mill Heads	Gold	\$28.70	
	Silver	<u>.71</u>	\$29.41

Mill Tailings	Gold	\$2.80	
	Silver	<u>.22</u>	3.02

Other results show

Mill heads	Gold	\$25.90	
Mill Tailings	"	<u>4.20</u>	\$21.70 recovery

Concentrates showed values			
of	Gold	\$201.60 and	
	Silver	<u>10.84</u>	\$212.44

Also			
	Gold	\$101.20	
	Silver	<u>8.35</u>	\$109.55

All above estimates and results are based on the \$35.00 price of gold and .77¢ oz. for silver.

A recapitulation of the various samples enumerated herein show weighted averages as follows:

Miscellaneous dump samples	\$19.69 per ton
Main shaft dump samples	28.26 " "
Miscellaneous shafts and open cuts	30.84 " "
Main Gem Shaft	15.75 " "
60' level in gem shaft	15.03 " "
100' " " " "	894.74 " "
300' " " " "	27.53 " "

The above, therefore, shows a safely assumed average ore value of \$22.84, omitting the high results obtained on the 100' level.

Estimates based on present development of the Gem Mine show the following tonnage developed and available for immediate production:

Proven Ore

Block "A" - - - - -	-2,344 tons
Block "B" - - - - -	-3,125 "
Block "C" - - - - -	-3,500 "
Block "D" - - - - -	-2,800 "
	<hr/>
	11,769 tons

Potential ore

Block "E" - - - - -	-15,208 tons
Block "F" - - - - -	15,208 "
Block "G" - - - - -	5,000 "
Block "H" - - - - -	6,083 "
Block "I" - - - - -	2,750 "
Block "J" - - - - -	-6,250 "
	<hr/>
	50,499 tons

The above tonnage estimated are based on areas of blocks of ground as shown on the accompanying longitudinal section and on the assumption that the values proven by samples are continuous throughout the block.

General Recapitulation

Number of Claims Four (patented)
 Area (approximately) 60 acres
 Total no. of feet of workings 6,669'
 Average width of vein 5 to 7 feet
 Average Ore value \$22.84
 Metallurgy Selective flotation.
 Costs of production (estimated) \$5.00 per ton

From the foregoing memoranda it will be noted that on the 300' level north over a lateral distance of 80' the ore is of quite uniform value over an average width of three feet.

The data pertaining to the old mill heads show a fairly close check against the average of the samples from the 300' level which are herein enumerated, and where the most systematic sampling was possible.

The average of the samples taken on this level is \$27.53
 while the average mill head obtained is 27.50
 making a difference in value of only \$.20
 per ton--a quite remarkable check.

This indicates that a fairly uniform mill/head may be obtained.

On the general average shown herein, viz \$22.84, and an estimated production cost of \$5.00 per ton, covering all mining, milling and fixed charges, it will be seen that this leaves a fairly satisfactory margin of profit.

Although the cost details have not been determined it is safe to assume that, with the mine placed in condition for production, the cost estimate of \$5.00 per ton is conservative. *Stops.*

The metallurgy of the Gem ore is not difficult as it is amenable to bulk flotation unless unforeseen zinc content should develop, in which case it is simply necessary to change to preferential flotation which, however, would not materially increase milling costs.

The ore is, apparently, free from any elements detrimental to flotation, such as antimony, arsenic or arsenical pyrites.

The predominating value is gold, as will be noted, and it has been demonstrated that the gold value increases in the heavier sulphides.

It is estimated that there is sufficient ore now available to furnish a 50 ton plant for about 2 and $\frac{1}{2}$ years although development ahead of production should always be prosecuted.

During the writer's operation of the mine the water supply in the vicinity was proven to be ample for a 50 ton operation and it was determined that more could be developed if required.

The flow sheet for treatment of the Gem ore should call for comparatively coarse preliminary crushing followed by tabling before going to flotation. The greater the bulk of concentrates that can be obtained before flotation relieves the flotation unit of a large amount of work. And, also, it is advisable to obtain all the extraction possible with the coarse mesh in order to not only facilitate the operation and increase mill capacity but also to avoid a fine grind which is one of the high cost items in milling.

Details of the proper flow sheet can only be determined by careful metallurgical tests which should by all means be done before plans for the mill are made.

A rough estimate of flotation costs in the average size plant in the U. S. at this time is as follows:

Crushing and grinding	\$0.40 to 0.60	per ton
Flotation and dewatering	0.10 to 0.15	per ton
Reagents	0.10 to 0.30	" "
Overhead	0.15 to 0.25	" "
	<u>0.75 to 0.30</u>	" "

Consumption of flotation reagents in various plants show an average as follows:

Frothers:

	Pounds per ton
Pine Oils	0.107
Cresols	0.024
Amines	<u>0.018</u>
Total	0.149

Collectors:

a- Oils

Coal Tar Creosotes	.275
Wood Tar Creosotes	.042
Crude Oils	.001
Miscellaneous	<u>.003</u>
Total	.321

b Chemicals

Di-thio-phosphoric acids	.021
Ethyl xanthates	.187
Thio-carbanilid	.024
Thio-ureas	<u>.004</u>
Total	.236

The above data is quoted from "The Trend of Flotation" issued by the Colorado School of Mines

It will, therefore, be seen that flotation costs, as far as reagents are concerned, are comparatively small.

Respectfully submitted:

(signed) E. H. Crabtree

BRIEF DATA PERTAINING TO TONNAGE AND ORE VALUES
OF THE GOLDEN GEM MINE, CERBAT, ARIZONA

* * * * *

The data submitted herewith is based on information and results obtained during the actual operation of the Gem Mine by the writer in 1928 and 1929.

Accompanying this data is a longitudinal section and assay map of the mine which shows blocks of developed ore from which estimates are made to determine available tonnage.

A claim map is also submitted which shows the area of the property.

This data is not intended to be submitted in the form of a report but merely as a compilation of results obtained during operation of the property, as before stated. A formal and detailed report is available if required.

During the operation of which the writer was in charge the mine was unwatered and retimbered to the 300' level.

This furnished the opportunity to systematically sample and inspect the various ore showings with the results shown.

Drifting was carried on at the 300' level south of shaft where the best ore showings appeared to be.

A continuation of this level south and also north should develop valuable tonnage of commercial ore with comparatively small expense.

On the following pages is a record of samples taken during the operation mentioned and estimates of proven and potential tonnage.

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Block "J"	- - - - -	<u>6,250 "</u>
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Consumption of flotation reagents in various plants show an average as follows:

Frothers:

	Pounds per ton
Pine Oils	0.107
Cresols	0.024
Amines	<u>0.018</u>
Total	0.149

Collectors:

(a) Oils

Coal Tar Creosotes	.275
Wood Tar Creosotes	.042
Crude Oils	.001
Miscellaneous	<u>.003</u>
Total	.321

Pounds per ton

(b) Chemicals

Di-thio-phosphoric acids	.021
Ethyl xanthates	.187
Thio-carbanilid	.024
Thio-ureas	<u>.004</u>
Total	.236

The above data is quoted from "The Trend of Flotation" issued by the Colorado School of Mines.

It will, therefore, be seen that flotation costs, as far as reagents are concerned, are comparatively small.

Respectfully submitted:

(signed) E. H. Crabtree

GEM MINE DATA AND COST OF TREATING MINE
FILL AND DUMP.

Original

Shaft 628' double compartment 67.5 degrees dip N. E.
Levels 60'-100'-200'-300'-400'-500'-
Drifting 2,246'
Winze No. Side 300'
Winze S. Side 200'
Stoping N. Side 100' level length, 300' by 75' high.
" " " 200' " " 100' " 50' "
" S " 100' " " 150' " 50' "
" " " 200' " " 100' " 25' "

Shaft newly timbered to 300' level.
Water standing in shaft 150' from collar,
25 H. P. Gasoline Hoist in good condition.
Head frame in good condition
Drifts full of muck
No heavy timbering required,

The following data taken from cross section map drawn by former
Mine Superintendent and Mining Engineer

Ore in place, calculated at 12. Cu. ft. per ton.
Dump fill " " 16 " " " "
Ore taken from mine, all workings 15.759 tons.
Fill in mine 4.825 tons
Shipped (estimate) 1.000 tons.
Milled " 1.000

Total 6.825

Balance on dump 8.934 tons
Plus the fill 4.825 T
Total 13.759 Available tonnage to mill

All work in mine has been done on ore.
Any ore shipped was from small highgrade vein on foot wall.
All records of past milling operation show mill heads \$17 to \$25
An average of all mine samples show 0.3 ounces gold per ton.
Although sampling shows better a profit can be realized on \$6 per ton
Accepting the above tonnage at \$6 the dump and fill have a gross
value of \$82,554.00

COSTS		
Loading and hauling	\$0.50 per ton	\$ 6,879.50
Milling	2.50 " "	34,397.50
10% loss in milling		8,255.00
	TOTAL	49,532.00

R/C. 25 50 I equals 550. tons of product.

Hauling \$1.00 per ton \$ 550.00

Freight	\$6.50 per ton	\$	4,440.00
Smelting	3.50 " "		1,925.00
Smelter Au Ag Deduction			
8% of \$33,012.00			2,640.96
	TOTAL		9,555.96

15% royalty		\$	3,519.00
10% safety and insurance			2,346.00
	TOTAL		5,865.00

Value of 13,759 tons of \$6 ore	\$82,554.00
Total cost of handling	64,952.96
Net profit	17,601.04

Possible profit from Silver, lead and iron not considered in this calculation.

GEM MINE DATA AND COST OF TREATING MINE
FILL AND DUMP.

Shaft 628' double compartment 67.5 degrees dip N. E.
 Levels 60'-100'-200'-300'-400'-500'
 Drifting 2,246'
 Winze No. Side 300'
 Winze S. Side 200'
 Stopping N. Side 100' level length, 300' by 75' high.
 " " " 200' " " 100' " 50' " "
 " S " 100' " " 150' " 50' " "
 " " " 200' " " 100' " 25' " "

Shaft newly timbered to 300' level.
 Water standing in shaft 150' from collar.
 25 H. P. Gasoline Hoist in good condition.
 Head frame in good condition
 Drifts full of muck.
 No heavy timbering required.

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The following data taken from cross section map drawn by former
 Mine Superintendent and Mining Engineer.

Ore in place, calculated at 12. Cu. ft. per ton.	
Dump fill " " 16 " " " "	
Ore taken from mine, all workings 15.759 tons.	
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Milled " 1.000	
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TOTAL

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Possible profit from silver, lead and iron not
considered in this calculation.

O'BRIEN BLANKET VEIN Data and cost of treating.

The O'Brien Blanket vein covers an area of 300' by 400' and averages one foot thick. On the upper part a capping which is also one foot thick also carries good values. The deposit shows approximately 12,856 tons of ore calculated a 14 Cu. ft. per ton.

Assay show the deposit to be better than \$10 per ton in gold value. One half mile haul to proposed mill site.

Value of deposit at \$10 per ton \$128,560.00

Costs.

Mining	\$1.00 per ton	\$12,856.00
Hauling	.30 " "	3,856.80
Milling	2.50 " "	32,140.00
Loss in milling	10%	12,856.00
TOTAL		61,708.80

checked

R/C 30 to I equals 428.5 tons of product.

Hauling	\$1.00 per ton.	\$ 428.50
Freight	\$10.00 " "	4285.00
Smelting	\$3.50 " "	1499.75
Smelter Au Ag deduction	of 8% of \$72,422.00	6273.76
TOTAL		12487.01

15% royalty	\$9,990.18
10% safety and insurance	6,593.45

Value 12.856 tons of \$10ore	\$128,560.00
Total cost of handling	90,779.44
Net profit	37,780.56

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Costs.

Mining	\$1.00 per ton	\$12,856.00
Hauling	.30 " "	3,856.80
Milling	2.50 " "	32,140.00
Loss in milling 10%		12,856.00
TOTAL		61,708.80

R/C 30 to 1 equals 428.5 tons of product.

Hauling	\$1.00 per ton.	428.50
Freight	10.00 " "	4,285.00
Smelting	\$3.50 " "	1,499.75
Smelter Au Ag deduction of 8% of \$72,422.00		6,273.76
TOTAL		12,487.01

15% royalty	9,990.18
10% safety and insurance	6,593.45

Value 12,856 tons of \$10 ore	\$128,560.00
Total cost of handling	90,779.44
Net Profit	37,780.56

VALID BOND