CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
3550 N. Central Ave, 2nd floor
Phoenix, AZ, 85012
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

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REPORT ON COPPER QUEEN GOLD MINING COMPANY

STODDARD, ARIZONA

Mr. G. M. Colvocoresses, General Manager,
Consolidated Arizona Smelting Co.,
Humboldt, Arizona.

Dear Sir:

Mr. Rocca and I visited the Copper Queen Mine at Stoddard, Arizona, on April 13th. 1918 We were shown over the surface and through the mine down to the 500 foot level by the Manager, Mr. Claude Ferguson. The 700 foot level is being used as a tank to hold the water back from the shaft while sinking and was not accessible.

Mr. Ferguson extended us every facility and furnished all information in detail. He has all his data in splendid shape and I believe his report can be relied upon as to the facts.

Surface & Outcrop

The property lies along a narrow ridge extending north from Agua Fria Creek and just east of Stoddard. Its crest is marked by a very hard siliceous zone of Yavapai schist, which is almost a quartzite. Its strike is north and it dips west at an angle of about 60°. Lying just west of this silicified schist are patches of a black rock containing vesicles filled with iron oxide and blackish schist which contain malachite and azurite.

The best copper outcrops occur near the north end of the property, just south of the Gracie claim and directly over the main adit or 400 foot level. Further south the silicification of the schist is not so marked, but there are numerous quartz veins, showing oxidized copper numerals.

On the Gracie claim a basic dyke which strikes east and west cuts across the croppings. This dyke appears similar to a number that have been cut by the underground workings. These run in all directions and cut across the orebodies without any noticeable effect or displacement.

Orebodies

The orebodies occur along fissures in the schist which are practically parallel to the cleavage. They are confined to the dark colored portions of the schist with a fine grain and smooth texture. The prevailing type of schist is light colored and consists of crystals or pebbles of quartz enclosed in sericite and chlorite with associated pyrite.

The principal orebody is longest on the adit or 400 foot level, where its length is 160 feet and its maximum width about 16 feet. This orebody is cut off by a fault on the north end. This fault has a northwesterly strike and dips to the southwest. On the adit level its dip is about 28° while on the 500 foot level, 100 feet below, it dips only 12°. This orebody has probably been cut on the 700 foot level below the fault but is much smaller than above.

On the 300 foot level this orebody is shorter and not as wide as on the 400 foot level. On the 500 foot level it is not more than 100 feet long and appears to be lower in grade.

Ore Reserves

Mr. Ferguson claims that the ore reserves amount to 33,000 tons, of which all but 1700 tons are in the principal orebody. The average grade is 2.35% copper. The average of the ore shipped to the Arizona Binghampton Mill was 2.32% copper.

Future Prospects

Below the fault no workable orebodies have been developed, although the workings on the 700 foot level extended 1000 feet along the strike and the formation was crosscut about 400 feet easterly and about 200 feet westerly. The south shaft is about 1000 feet south of the main shaft and on the same level. Development from this shaft for about 500 feet along the strike failed to find anything of value.

Between the 800 and 900 foot levels the shaft cut a fissure showing chalcopyrite in a quartz gangue, showing that no change in minerlization had occurred down to this depth.

The orebodies so far found in the property are so small and low grade and the development work so extensive, amounting to over 10,000 feet, that I do not believe that much

additional ore will be developed. I do not believe the property justifies development below the present workings.

Yours respectfully,

Morris Englehart

MINING ENGINEER

Brief note

Copy

REPORT ON CONDITIONS AT THE COPPER QUEEN MINE AT STODDARD, OCT. 13th, '25

UNDERGROUND WORKINGS

The 400 ft. level, or main haulage level, is in good condition except where blocked by broken ore caved down from stopes. The stopes north of the winze station and part of the stope south of the station are in bad shape due to the decay of the stope timbers which has allowed the broken ore to drop down to the floor of the level. About 100 ft. of the south stope, which was the last stope opened up, seems to be in workable condition and contains six chutes. this stope is up only a few feet above the timbers and the ore in it seems to be of a good milling grade.

The winze which extends from the 400 ft. level to the 900 ft. level, has caved around the collar as several sets of timbers have rotted out and fallen down the winze. The water in the winze is now about 40 ft. below the collar. The collar set is still in place. The main haulage level is dry except for a small seepage north of the winze station.

The 300 ft. level could not be reached on account of the entrance to the raise being blocked by the caved stope north of the shaft.

SURFACE PLANT AT MINE.

The surface plant and machinery seem to be in fair condition but, no doubt, would need an overhauling. The camp buildings are run down and much in need of repairs. The road into camp from the town of Stoddard is in bad condition and is impassible at present.

MILLING PLANT

The flotation plant was designed to treat 100 tons per day, while the crushing plant was designed for 200 tons capacity. The milling machinery has never been used and is all in good condition. The plant was wired up ready to run but was never operated. There will probably have to be some changes made in the mill after it has operated a short time as it was built in a hurry and contains several objectionable features such as a chain drive on the ball mill and a chain elevator for fine ore.

The machinery includes the following equipment:

Blake type ore breaker, Telsmith Reduction Crusher, 6 ft. Hardinge Ball Mill, Dorr Classifier, Inspiration Type Pneumatic Flotation Cells with separate cleaner cell, Root Blower for flotation, Dorr Thickener for concentrates, American Filter with Vacuum Pump. All machines are driven by General Electric motors and are equipped with starting switches.

ORE RESERVES

The ore chute on the 400 ft. level is about 250 ft. long and will average about five feet in width. Only one raise has been driven to the 300 ft. level on this ore body and the 300 ft. level extends less than 100 ft. into it, but the ore body can reasonably be expected to have a height of at least 100 ft. above the 400 ft. level. There is possibly 12,000 tons of ore above the 400 ft. level and broken on the dump that will assay 2½% Cu.

Before the ore below the 400 ft. level could be mined the winze would have to be retimbered for at least 50 ft. below the collar and the water would have to be pumped out. The stope on the 500 ft. level was not very long on account of a fault, so that repairing and unwatering the winze will not be justified at a normal price of copper.

Note:- Property later operated by Squires & Gemmil in 1926 at a loss.

G.J. Harbauer

GEOLOGY

The geological formation at the Copper Queen Mine, in the main, is entirely similar to that of the other properties mentioned as being on this copper belt, consisting primarily of various phases of the formation known as "Yavapai Schist". Certain phases of this schist, under the influence of circulating waters, faulting, intrusions of quartz-porphyry, basic dykes, and other geologic agencies, have undergone radical changes, completely altering their original character. The most important of these changes, at certain favored points, has been the deposition of sulfide minerals, including the minerals of copper, and in places (where are now encountered high grade ore bodies) the original schist has been almost entirely replaced with chalcopyrite and other sulfide minerals.

On the surface, where mineralized schist of this general character has been subjected to the influences of the weather, the original character of the rock manifests itself in iron-stained and copper-stained croppings, and a pitted or honeycomb structure, due to the oxidation and leaching of the sulfide minerals.

A wide zone of schist answering closely to the above description strikes through the Copper Queen group of claims in a northerly and southerly direction. This schist, which is harder and more resistant to erosion than the surrounding formation (also schistose), forms the apex of a high ridge upon which a considerable part of the property is located. Evidences of a widespread mineralization such as above described are abundant along the apex of this ridge, and include, in addition, numerous exposures of carbonate ore. At various placed on the surface, as well as in the underground workings, the geologic influences mentioned, or their traces, are frequently in evidence. Basic dykes cut the formation in various directions, and faulting, both prior and since the intrusions, is much in evidence. Much of this faulting, however, is secondary, and the result of what appears to be a main fault, which striked east and west through the property and dips to the south at anangle which flattens perceptably in depth. This fault is believed to apex near the south end of Gracia No. 2 Claim.

Numerous intrusions of quartz-porphyry are also exposed in the underground workings, notably in the region of the orebodies, and this rock, which also frequently accompanies the orebodies in other mines in this belt, has doubtless had an influence of their formation.

Not the least influential in the work of alteration and mineralization has been the agency of circulating waters, many evidences of the work of which, in the shape of heavily oxidized water-courses, are exposed in the workings. These water-courses, some of which are of large size and wide influence, have been especially active in carrying the sulfide minerals, particularly those of copper which are especially soluble in water, downward. This activity of aqueous solutions has been proved to be of prime importance in the formation of concentrations and replacements in depth in those properties on this formation in which deep level mining has been prosecuted.

OCCURRENCE OF ORE

The ore occurs as lenses in the schist, of various lengths and widths; at times with distinct walls, with slight, or no mineralization in the walls, but more frequently with slightly defined walls, in which the ore gradually grades into waste. The

orebodies are generally accompanied with more or less quartz, and frequently have a banded, or "ribbon" structure, due to alternate strata of sulfides, quartz and schist. As a general thing, all of the schist in the proxminity of the orebodies is more or less mineralized, the minerals occurring as laminations in the blading of the schist. Occasionally complete replacements of the original schist by the sulfide minerals are encountered, with a small proportion of quartz (insoluble).

The general strike of the ore strata is with the schistosity, approximately, in this belt, north and south. The average dip is generally somewhat steeper than the dip of the formation, and ranges from 65° to 80° to the west, while the general trend of the ore shoots in the orebodies is to the southwest.

A more complete description of the form and size of the orebody opened in the workings from Adit No. 2 will be given under the title of Development work.

DEFINITIONS

Ore: The term "ore" in this report is used exclusively to designate material that, under existing conditions, can be mined at a profit. All else is "waste". Thus, under the conditions obtaining during March, April, May and June, 1917, with a total cost for mining, milling and smelting of $7.88 per ton (See Statement 11-B-3), and an average price for copper of 28.35¢ per pound, the dividing line between ore and waste was 1.40% copper. With the same costs, and the present price of copper (23½¢), this dividing line becomes 2.00% copper.

Orebody: The term"orebody" is used to designate the particular mineralized zone in which the ore is found. This may, or may not, according to the average percent of copper content, all be ore. The ore usually occurs in "shoots" in the orebodies.

DEVELOPMENT

In addition to 78 more or less shallow surface workings, consisting of prospect holes, cuts, short tunnels and shafts, including an eighty-foot shaft and a 170 ft. tunnel on the Rubidoux Claim, development work on the Copper Queen group consists primarily of three adits (tunnels) driven to cut the zone of mineralized schist above described.

Adit No. 1, the portal of which is on the south end of the Little Ella claim, crosscuts the formation in an easterly direction for a distance of 593 feet, and attains a depth of 300 feet below the crest of the ridge on the Copperopolis claim. Lateral work here consists of four drifts upon different mineralized strata, with short crosscuts. The total length of workings on this level is 1380 feet. 100 feet within the portal of the adit there is a vertical shaft extending from the surface (65 ft. above) to a point of 300 feet below the adit level. At the bottom of this shaft there are crosscuts 130 feet west, and 494 feet east, and a north drift from the latter 123 feet long, with crosscuts east and west from its breast. There is also a drift extending south from a point near the bottom of the shaft for a distance of 241 feet., and crosscuts driven east and west from the face of this drift for a total distance of 83 feet. The total footage of workings of this level is 1100 feet. Further reference to the south drift will be made in the description of operations during 1917.

Adit No. 2, at the portal of which, on the north end of the Little Ella claim, the camp and mine buildings are situated cuts the formation in a northeasterly direction for a distance of 635 feet. There is extensive drifting and crosscutting on this level, making the total footage, as measured from the portal, 2300 feet. These workings may best be understood by reference to Map No. 4, accompanying this report, showing the underground workings at Adit No. 2. Like Adit No. 1, the ground here is extensively mineralized, and at least one well defined ore-shoot has been exposed. This appears as a vein of schist and quartz averaging, on this level, about 6 ft. wide, impregnated with copper and from sulfides. From the hoist station (see Map) it is opened for a distance of 150 feet. to the north, at which point it is cut off by a fault plane which here crosses the vein and dips south at an angle of 28° from the horizontal. This is the main fault mentioned above, under the title of "Geology". Going south, this ore-shoot seems to split, as it is exposed in two places in the main adit, and stopes have been started on a good grade of ore on both branches of this shoot, a short distance, each, north of the main crosscut (4-53-S), and an upraise of 60 feet north from the hoist station shows a good grade of ore for a distance of 120 feet above the adit level. Drifts north and south from the top of this raise prove the ore-strata continuous, and a considerable tonnage of ore has been opened on the ("300") level. 100 feet north from the fault there is a 180 ft. raise which connects with adit No. 3 (described below), and a crosscut from this raise connecting with the north drift on the "300" level, provides excellent ventilation for all of the workings just described. The fault plane mentioned above cuts across this raise about 30 feet above the adit level. At this point it shows a dip to the south of 32°.

From the hoist station a 300 ft. winze is sunk on a fairly uniform pitch of 60° from the horizontal, to the west. It follows the dip of the vein for 65 feet, at which point it cuts the fault-plane found on the adit level. Just above the fault, a short drift to the north exposes a good grade and width of ore, upon which stoping has been done. Below this point, 100 feet from the collar of the winze, levels are run north and south with considerable crosscutting. To the south, after cutting through the fault, 30 ft. from the winze, the drift comes into ore which is proved continuous for a distance of 160 ft. on this level. This ore is opened by drifts on both the footwall and hanging wall sides, and stopes have been started on same. Near the south end of this showing a winze is sunk on the ore until it reaches the fault, which crosses it 31 ft. from the collar at a dip of 12° from the horizontal. Crosscutting at this point shows mineralization 12 ft. wide. North of the main winze a crosscut shows what is supposed to be the north extension of the faulted orebody, the horizontal offset of which, measured along the fault-plane is 70 feet. This agrees with the amount of offset shown on the "700" level, where what is supposed to be a portion of this same orebody is exposed, 300 ft. below the adit level. Some ore was found in the north crosscut on the "500" level, but development is not sufficient to prove its importance. The total footage of workings on the "500" level, including the winze, is 1030 feet.

A detailed statement of the amount and value of the ore which is exposed in all of the above described workings is given under the title of Ore Reserves, in Statements 11-A-2 and 11-A-2-a.

On the "700" level, 300 ft. below the adit, of "400" level (measured along the slope of the winze) a crosscut is carried west from the winze for 525 feet. About 120 ft. from the winze in this crosscut, drifts are run north and south on mineralized strata, opening about 400 feet and 470 feet in each direction, with numerous crosscuts east and west

including a crosscut of 332 ft. to the east from the south drift. The latter crosscut exposes ore (supposedly the faulted orebody mentioned above) 34 ft. from the main drift. 44 ft. of drifting and 20 ft. of raising at this point show the ore-strata continuous as far as development has gone. In the main north drift, 35 ft. north of the main crosscut from the winze, a 23 ft. winze (7-60-W) is sunk, and an upraise made of 23 ft. (7-61-R). There is also a short crosscut from the top of the raise. This work is done on what is supposed to be the continuation of the mineralized strata exposed in the east crosscut above mentioned.

The faultplane above described does not appear on this level, as its increasingly flat dip carries it too far to the south. The total length of workings on the "700" level is 2258 ft. A further description and discussion of ore conditions here disclosed will be given under the title of 1917 Operations.

Adit No. 3, which lies about 750 ft. northerly from Adit No. 2, and 190 ft. higher in elevations, crosscuts the formation in an easterly direction from the northeast corner of the Fraction Claim, for 270 ft. 190 ft. from the portal of this tunnel there is a short drift to the north, and a winze, which, as before mentioned, is connected through a raise with Adit No. 2 for ventilation of the lower workings. This adit was driven a number of years ago to cut the downward extension of an outcrop showing carbonate ore 100 ft. above. No ore was found here in commercial quantities, though there are small streaks containing more or less copper mineral, upon one of which the winze is sunk. It is somewhat questionable as to whether or not the crosscut was driven far enough to the east to intersect the ore which one might expect to find under the surface showing mentioned; and, too, the comparatively shallow depth which the tunnel attains would tend to discourage this expectation, as all of the ground through which the tunnel is driven shows strong leaching.

GENERAL COMMENTS AND RECOMMENDATIONS

The planning of further development work on the Copper Queen property must necessarily be influenced largely by the matter of finances. Although there are numerous places where work might be done to advantage, which have been referred to in passing, under the title of "Development Work" in Section 11-A of this Report, few of these places give any great promise of "quick" results, with a small expenditure of money. The immediate zone in which most of the work has been done has been fairly well explored, with the exception of further work upward from the "700" Level on the showings of ore that have been exposed there. Aside from this work, which of course should be continued, our best chances for opening new ore would seem to be in deeper work on this zone, and in prospecting some of the other favorable ground on the property; notably the Gracie ground to the north, and the Copperopolis and Missing Link country to the South.

If expenditures must be limited to the present monthly amount of about $3,500, there is no more valuable work, for either immediate or future plans which can be carried on for this sum, than the work of deepening the winze, upon which we are now engaged. Working two shifts, as at present, an advance of 75 to 100 ft. per month can be made, at a cost ranging from $35 to $45 per foot. As suggested, this work will be of permanent value, no matter what future work is undertaken. Stations should be cut at intervals of 100 to 150 feet, and crosscuts driven from each station to cut the orebody. With our present equipment this zone can be explored for at least 200 ft. below the present lower workings.

Should finances be arranged for development work on a larger scale, allowing an expenditure of, say, double the above amount, exploratory work could then be undertaken in either one or both of the unexplored zones indicated above, as well as in the zone lying between the workings of Adit No. 2 and those of Adit No. 1. This would involve extensive drifting and crosscutting, for which latter work, by reason of the general character of the formation, and the mode of occurrence of the ore-strata, a diamond drill outfit, it is believed, would be by far the most economical agent.

The northern exploratory work would involve about 1000 feet of drifting, and an amount of crosscutting which would depend altogether upon the conditions exposed in the course of the development. 2000 feet of the lateral work, however, should explore the ground under consideration with a fair degree of thoroughness.

The work between the two Adits would involve about 1500 ft. of drifting, and a commensurate amount of crosscutting. A connection on the lower levels between these workings would prove of great value to future operations, especially should mining on a scale of appreciable magniture from either Adit be carried on.

To the south of Adit No. 1, 1500 ft. of drifting in addition to that already done, would afford a means for the thorough exploration of this zone, which would involve, possibly an equal amount of crosscutting.

Under present working conditions, the drifting above outlined could be done for approximately $15.00 per ft; but the cost per ft. as explained in detail in the discussion of Costs in this Report, will depend largely upon the amount of work carried on.

The cost of diamond drilling at the property of the Arizona Binghampton Copper Company, adjoining ours, is about $3.00 per ft., including cost of carbons. Under favorable conditions, this cost may possibly be reduced.

If any considerable amount of diamond drill work is undertaken say, 2000 ft. or more, it is strongly recommended that a machine for this work be purchased outright. A suitable diamond drill, complete with carbons and all necessary accessories, will cost $3,500 to $4000, set up for work at the mine.

For the extensive exploration work above outlined, additional shop equipment, especially an oil forge for the utilization of crude oil instead of coal, and a small power drill, would pay for themselves in a comparatively short time. This additional equipment could be installed for about $500.

With reference to the matter of a mill, this is not recommended at this time unless ample funds were assured in advance, not only for the erection of the mill, but also for the prosecution of the exploratory work suggested above. If it is a question of having sufficient funds for either the mill alone, or the development work alone, then the latter should come first; as the amount of ore which is now developed in the mine would unquestionably prove insufficient to pay both for a mill and for the additional amount of work necessary to develop the further ore reserves essential to assure continuous operation. Under present conditions, not less than 100,000 tons of ore should be in sight, of the present average grade, before it would be wise to enter upon the construction of a mill without, while the mill was building, prosecuting futher development work; and then, as soon as the mill was put in operation, an adequate amount of development work, it goes without saying, should be carried on in connection with the regular mining operations, to keep the ore reserves well in advance of the capacity of the mill.

On the other hand, should the suggested funds be assured, there are several important considerations urging the erection of a mill at this time, notably the following:

1. The price of copper, which, while now comparatively high, connot be depended upon to remain so indefinitely. Each cent that copper declines in price, means the loss of 39 cents per ton upon our present grade of ore. The converse of this statement, however is also true, and while the present price of copper, as fixed by the Government, is 23½¢, it was well over 31 cents earlier in the year, and the average price for 1916 was 27.20 cents per pound.

2. The interest on the money represented by our ore reserves is no inconsiderable sum, even at 4%, and would, of course, pay the interest on an equal amount of money invested in a mill.

3. Owing to the present congested conditions of all manufacturing plants, and especially to the shorage of motors and other electrical material, as well as the uncertain transportation facilities, it would be well to allow fully a year for the erection of a mill and placing same in operation, after its construction had been definitely decided upon. During this time, finances permitting, a large amount of exploratory work could be performed, and it is not unreasonable to expect that a sufficient tonnage of new ore could be developed by this work to assure the return of the investment involved.

As to the capacity of the suggested mill, while this also, is somewhat a matter of funds available, it is believed that it would be economical to start with a unit of about 100 tons daily capacity, so planned that additional units could be added as required. A flotation mill of this capacity will cost, under present conditions, probably between fifty and seventy-five thousand dollars.

COPPER QUEEN GOLD MINING COMPANY

STODDARD, ARIZONA

Report by Claude Ferguson, Supt., Sept. 1917.

CLAIMS

The holdings of the Copper Queen Gold Mining Company, in Yavapai County, adjoining the property of the Arizona-Binghampton Copper Company, at Stoddard, Arizona, consist of the following named Lode Claims.

	NAME	SURVEY NO.	AREA ACRES	
1.	Lightning Bug	1854	20.661	
2.	Gracie No. 2	1854	11.035	
3.	Copper Queen	1854	17.861	
4.	Fraction	1854	6.188	
5.	Little Ella	1854	16.336	
6.	Copperopolis	1854	20.690	
7.	Highland Chief	1854	16.730	
8.	Fraction No. 2	2548	6.180	
9.	Fraction No. 3	2548	1.175	
10.	Gray Eagle	2958	20.507	
11.	Pride of Yavapai	2958	11.964	
12.	Golden Star	2958	11.934	
13.	Iowa	2959	17.929	
14.	Robin	2959	20.548	
15.	Toughnut	2959	20.387	
16.	Missing Link	2959	9.605	
17.	Rubidoux	2959	8.632	
18.	Copper Bucket	2959	13.024	
19.	Surprise	2959	20.031	
20.	Copper Iron	2959	20.016	
				291.433
21.	Louise	3429	5.013	
22.	Martin Fraction	3430	5.634	
23.	Martin Fraction Extension	3430	0.244	
				10.891
	Honeymoon Group:			
24.	No. 19	1864	20.449	
25.	Kid	2543	9.980	
26.	Honeymoon	2543	20.660	
				51.089
	Total Acerage			353.413

STATEMENT 11-A-2-a

VALUATION OF ORE RESERVES

Ore Reserves, Total tons, as per Statement 11-A-2		33,612
Average Assay, total copper,	2.32%	
Less Avg. oxide contact and tailing Less (Statement 11-B-2)	0.38	
Net recoverable copper	1.94%, or 38.8 lbs. per ton	
Recoverable Cu in Reserves, 33,612 X 38.8 - - - - - -		1,304,146 lbs.

1,304,146 lbs. Cu @ 23½¢ per lb. (present price)	-	$306,474.30
Less cost of mining, milling and smelting (Statement 11-B-3) 33,612 tons @ $7.88 per ton		264,862.60
		41,611.70
Assumed net value of Silver content, at 20¢ per ton (Statement 11-B-3)		6,722.40
Add cost of breaking 4000 tons now broken, @ $2.347 per ton (Statement 11-B-3-a)		9,388.00
TOTAL estimated profit in Ore reserves		$57,722.10
Estimated profit per ton		1.71

NOTE: See Remarks under Sec. 11-A-2 in Report, and in connection with statement 11-B-3.

STATEMENT 11-B-3-a

COST OF MINING

NOTE: The following Statement gives the actual cost of breaking ore in the mine, and delivering same to the mill, for the period of March 1, to Aug. 8, incl.

Extraction:

Labor	Total,	$11,933,91	Per	Ton	1,409
Supplies & Power	"	5,637.96	"	"	.666
General Expenses*	"	2,301.00	"	"	.272
Ore Transportation	"	1,736.77	"	"	.389
	Total cost per ton,				$2.736

*Includes proper pro-rata of office expense, assaying, insurance, and all other overhead expense distributable to this account.

NOTE: The cost per ton of Ore Transportation is based on the tonnage delivered. The basis for the other three items is the total tonnage broken during this period.

STATEMENT 11-A-2

ESTIMATE OF ORE RESERVES SEPTEMBER 1,1917

AVERAGE OF 140 SAMPLES

PLACE	Average Width	Length	Height	Cu Ft	Tons	% Cu	Tons Cu
3-74-S	3.6	45	50	8100	675	3.20	21.60
3-64-S	8.6	50	50	21500	1790	3.08	55.20
4-43-S	4.6	25	50	5750	480	2.27	10.90
4-44-S	6.7	45	50	15000	1250	2.02	25.20
4-53-S	5.5	15	78	6400	537	1.87	10.00
4-53-S-N	5.0	15	106	7950	663	2.23	14.70
4-63-S	5.4	22	44	5230	434	3.61	15.65
4-73-S	3.5	49	73	12500	1040	2.98	24.50
4-73-S-S	3.5	6	73	1530	128	2.52	3.80
5-53-S	14.0	90	90	113500	9500	2.00	190.00
					16497	2.25	371.55
INACCESSIBLE FOR COMPLETE SAMPLING							
4-63 Pillar-N	5.0	7	106	3710	310	2.00	6.20
4-63 Pillar-S	5.5	6	100	3300	275	3.00	8.25
4-53-S Pillar to 4-63-S	5.5	40	100	22000	1800	2.50	45.00
4-53-S,Extn	5.0	20	100	10000	830	2.00	16.60
46-63-S	9.0	100	20	18000	1500	2.50	37.50
	9.0	45	40	16200	1350	2.50	33.75
5-63-S	10.0	25	6	1500	125	2.50	3.12
5-53, Winze, to 5-53-S	10.0	53.3	90	48000	4000	2.50	100.00
5-43-R	5.0	30	90	13500	1125	2.00	22.50
Below 500	10.0	145	15	21750	1800	2.00	36.00
					15115	2.35	308.92
BROKEN ORE							
3-64-S					210	3.08	6.47
3-74-S					60	3.20	1.92
4-63 & 4-73-S					1630	2;72	44.50
4-53-S					150	1.87	2.81
4-43-S					100	2.27	2.27
46-63-S					644	2.50	16.10
5-53-S					1200	2.00	24.00
					4000	2.45	98.07
SUMMARY							
Completely sampled					16497	2.25	371.55
Incompletely sampled					13115	2.35	308.92
					4000	2.45	98.07
TOTALS,					33612	2.32	778.54

REPORT ON COPPER QUEEN GOLD MINING COMPANY

STODDARD, ARIZONA

Mr. G. M. Colvocoresses, General Manager
Consolidated Arizona Smelting Company
Humboldt, Arizona

Dear Sir:

Mr. Rocca and I visited the Copper Queen Mine at Stoddard, Arizona on April 13, 1918. We were shown over the surface and through the mine down to the 500 foot level by the Manager, Mr. Claude Ferguson. The 700 foot level is being used as a tank to hold the water back from the shaft while sinking and was not accessible.

Mr. Ferguson extended us every facility and furnished all information in detail. He has all his data in splendid shape and I believe his report can be relied upon as to the facts.

SURFACE & OUTCROP

The property lies along a narrow ridge extending north from Agua Fria Creek and just east of Stoddard. Its crest is marked by a very hard siliceous zone of Yavapai schist, which is almost a quartzite. Its strike is north and it dips west at an angle of about 60°. Lying just west of this silicified schist are patches of a black rock containing vesicles filled with iron oxide and blackish schist which contain malachite and azurite.

The best copper outcrops occur near the north end of the property, just south of the Gracie claim and directly over the main adit or 400 foot level. Further south the silicification of the schist is not so marked, but there are numerous quartz veins, showing oxidized copper numerals.

On the Gracie Claim a basic dyke which strikes east and west cuts across the croppings. This dyke appears similar to a number that have been cut by the underground workings. These run in all directions and cut across the orebodies without any noticeable effect or displacement.

OREBODIES

The orebodies occur along fissures in the schist which are practically parallel to the cleavage. They are confined to the dark colored portions of the schist with a fine grain and smooth texture. The prevailing type of schist is light colored and consists of crystals or pebbles of quartz enclosed in sericite and chlorite with associated pyrite.

The principal orebody is longest on the adit or 400 foot level, where its length is 160 feet and its maximum width about 16 feet. This orebody is cut off by a fault on the north end. This fault has a northwesterly strike and dips to the southwest. On the adit level its dip is about 28° while on the 500 foot level, 100 feet below, it dips only 12°. This orebody has probably been cut on the 700 foot level below the fault but is much smaller than above.

On the 300 foot level this orebody is shorter and not as wide as on the 400 foot level. On the 500 foot level it is not more than 100 feet long and appears to be lower in grade.

ORE RESERVES

Mr. Ferguson claims that the ore reserves amount to 33,000 tons, of which all but 1700 tons are in the principal orebody. The average grade is 2.35% copper. The average of the ore shipped to the Arizona Binghampton Mill was 2.32% copper.

FUTURE PROSPECTS

Below the fault no workable orebodies have been developed, although the workings on the 700 foot level extended 1000 feet along the strike and the formation was crosscut about 400 feet easterly and about 200 feet westerly. The south shaft is about 1000 feet south of the main shaft and on the same level. Development from this shaft for about 500 feet along the strike failed to find anything of value.

Between the 800 and 900 foot levels the shaft cut a fissure showing chalcopyrite in a quartz gangue, showing that no change in mineralization had occurred down to this depth.

The orebodies so far found in the property are so small and low grade and the development work so extensive, amounting to over 10,000 feet, that I do not believe that much additional ore will be developed. I do not believe the property justifies development below the present workings.

Yours respectfully,

/s/ Norris English

MINING ENGINEER.

BRIEF NOTE ON CONDITIONS AT THE COPPER QUEEN MINE AT STODDARD

OCTOBER 13th, 1925

UNDERGROUND WORKINGS.

The 400 ft. level, or main haulage level, is in good condition except where blocked by broken ore caved down from stopes. The stopes north of the winze station and part of the stope south of the station are in bad shape due to the decay of the stope timbers which has allowed the broken ore to drop down to the floor of the level. About 100 ft. of the south stope, which was the last stope opened up, seems to be in workable condition and contains six chutes. This stope is up only a few feet above the timbers and the ore in it seems to be of a good milling grade.

The winze which extends from the 400 ft. level to the 900 ft. level, has caved around the collar as several sets of timbers have rotted out and fallen down the winze. The water in the winze is now about 40 ft. below the collar. The collar set is still in place. The main haulage level is dry except for a small seepage north of the winze station.

The 300 ft. level could not be reached on account of the entrance to the raise being blocked by the caved stope north of the shaft.

SURFACE PLANT AT MINE.

The surface plant and machinery seem to be in fair condition but, no doubt, would need an overhauling. The camp buildings are run down and much in need of repairs. The road into camp from the town of Stoddard is in bad condition and is impassible at present.

MILLING PLANT.

The flotation plant was designed to treat 100 tons per day, while the crushing plant was designed for 200 tons capacity. The milling machinery has never been used and is all in good condition. The plant was wired up ready to run but was never operated. There will probably have to be some changes made in the mill after it has operated a short time as it was built in a hurry and contains several objectionable features such as a chain drive on the ball mill and a chain elevator for fine ore.

The machinery includes the following equipment:
Blake type ore breaker, Telsmith Reduction Crusher, 6 ft. Hardinge Ball Mill, Dorr Classfier, Inspiration Type Pneumatic Flotation Cells with separate cleaner cell, Root Blower for flotation, Dorr Thickener for concentrates, American Filter with Vacuum Pump. All machines are driven by General Electric motors and are equipped with starting switches.

ORE RESERVES

The ore chute on the 400 ft. level is about 250 ft. long and will average about five feet in width. Only one raise has been driven to the 300 ft. level on this ore body and the 300 ft. level extends less than 100 ft. into it, but the ore body can reasonably be expected to have a height of at least 100 ft. above the 400 ft. level. There is possibly 12,000 tons of ore above the 400 ft. level and broken on the dump that will assay 2½ Cu.

Before the ore below the 400 ft. level could be mined the

Winze would have to be retimbered for at least 50 feet below the collar and the water would have to be pumped out. The stope on the 500 ft. level was not very long on account of a fault, so that repairing and unwatering the winze will not be justified at a normal price of copper.

/s/ G. J. Harbauer

NOTE: Property later operated by Squires & Gemmil in 1926 at a loss.

STATEMENT 11-A-2

ESTIMATE OF ORE RESERVES SEPTEMBER 1, 1917

AVERAGE OF 140 SAMPLES

PLACE	Width	Average Length	Height	Cu Ft	Tons	% Cu	Tons Cu
3-74-S	3.6	45	50	8100	675	3.20	21.60
3-64-S	8.6	50	50	21500	1790	3.08	55.20
4-43-S	4.6	25	50	5750	480	2.27	10.90
4-44-S	6.7	45	50	15000	1250	2.02	25.20
4-53-S	5.5	15	78	6400	537	1.87	10.00
4-53-S-N	5.0	15	106	7950	663	2.23	14.70
4-63-S	5.4	22	44	5230	434	3.61	15.65
4-73-S	3.5	49	73	12500	1040	2.38	24.50
4-73-S-S	3.5	6	73	1530	128	2.52	3.80
5-53-S	14.0	90	90	113500	9500	2.00	190.00
					16497	2.25	371.55
INACCESSIBLE FOR COMPLETE SAMPLING							
4-63 Pillar-N	5.0	7	106	3710	310	2.00	6.20
" " S	5.5	6	100	3300	275	3.00	8.25
4-53-S " to 4-63-S	5.5	40	100	22000	1800	2.50	45.00
4-53-S, Extn	5.0	20	100	10000	830	2.00	16.60
46-63-S	9.0	100	20	18000	1500	2.50	37.50
	9.0	45	40	16200	1350	2.50	33.75
5-63-S	10.0	25	6	1500	125	2.50	3.12
5-53, Winze, to 5.-53-S	10.0	53.3	90	48000	4000	2.50	100.00
5-43-R	5.0	30	90	13500	1125	2.00	22.50
Below 500	10.0	145	15	21750	1800	2.00	36.00
					13115	2.35	308.92
BROKEN ORE							
3-64-S					210	3.08	6.47
3-74-S					60	3.20	1.92
4-63 & 4-73-S					1630	2.72	44.50
4-53-S					150	1.87	2.81
4-43-S					100	2.27	2.27
46-63-S					644	2.50	16.10
5-53-S					1200	2.00	24.00
					4000	2.45	98.07
SUMMARY							
Completely Sampled					16,497	2.25	371.55
Incompletely Sampled					13,115	2.35	308.92
					4,000	2.45	98.07
TOTALS,					33,612	2.32	778.54

STATEMENT 11-A-2-a

VALUATION OF ORE RESERVES

Ore Reserves, Total tons, as per Statement 11-A-2		33,612
Average Assay, total copper,	2.32%	
Less Avg. oxide content and tailing Loss (Statement 11-B-2)	0.38	
Net recoverable copper	1.94%, or 38.8 lbs. per ton	

Recoverable Cu in Reserves, 33,612 x 38.8 - - - - - 1,304,146 lbs.

* *

1,304,146 lbs. Cu @ 23½¢ per lb (present price) -	$306,474.30
Less cost of mining, milling and smelting (Statement 11-B-3) 33,612 tons @ $7.88 per ton	264,862.60
	41,611.70
Assumed net value of Silver content, at 20¢ per ton (Statement 11-B-3)	6,722.40
Add cost of breaking 4000 tons now broken, @ $2.347 per ton (Statement 11-B-3-a)	9,388.00
TOTAL estimated profit in Ore Reserves,	$ 57,722.10
Estimated Profit per Ton	1.71

NOTE: See Remarks under Sec. 11-A-2 in Report, and in connection with Statement 11-B-3.

STATEMENT 11-B-3-a

COST OF MINING

NOTE: The following Statement gives the actual cost of breaking ore in the mine, and delivering same to the mill, for the period of March 1 to Aug. 8, incl.

Extraction:

Labor	Total,	$11,933.91	Per Ton	1.409
Supplies & Power	"	5,637.96	" "	.666
General Expenses*	"	2,301.00	" "	.272
Ore Transportation	"	1,736.77	" "	.389
	Total Cost per Ton,			$2.736

* Includes proper pro-rate of office expense, assaying, insurance, and all other overhead expense distributable to this account.

NOTE: The cost per ton of Ore Transportation is based on the tonnage delivered. The basis for the other three items is the total tonnage broken during this period.

STATEMENT 11-B-1

ORE RECORD --- WET TONS TO MILL

PLACE	March	April	May	June	July	August	TOTAL
3-64-S			145.00	38.13		27.80	210.93
3-64-D	241.23	521.65					762.88
3-74-S			118.60				118.60
4-63-S 4-73-S	252.42	401.31	176.79	56.23	141.63	117.92	1146.30
4-53-R	11.27	138.31	6.94	42.63			199.15
4-53-S					97.40	52.74	150.14
4-53-DA	133.86	9.78					143.64
4-53-DB	89.36						89.36
4-43-R			114.13	33.63			147.76
4-43-S					64.82	58.13	122.95
4-33-R					4.55		4.55
4-44-R						15.94	15.94
Hoist Sta.	90.07						90.07
46-63-S	34.18	145.95	148.25			92.71	421.09
5-43-R	6.77	97.30					104.07
5-53-S		48.65	167.20	159.32	270.08	225.28	870.53
Dump		8.22	20.72				28.94
TOTALS	839.16	1371.17	897.63	329.94	578.48	590.52	4626.90

SUMMARY BY LEVELS

"300" Level	1092.41
"400" "	2109.86
"460" "	421.09
"500" "	974.60
Dump	28.94
	4626.90

STATEMENT 11-B-2

STATEMENT OF ORE TREATED

	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	TOTAL OR AVERAGE
Dry Tons Milles	681.69	1332.01	859.78	327.35	554.30	712.25	4467.38
Avg. Assay, Total Cu %	2.234	2.200	2.288	2.547	2.632	2.060	2.279
Less Ox. Cu ** %	0.031	0.028	0.018	0.020	0.025	0.013	0.023
Less Cu in Tails *	0.350	0.350	0.350	0.379	0.391	0.307	0.351
	0.381	0.378	0.368	0.399	0.416	0.320	0.374
Net % Sulfide Cu**	1.853	1.822	1.920	2.148	2.216	1.740	1.905
Net Lbs. " "	25,263	48,538	33,016	14,063	24,567	24,786	170,233
Avg. Assay, Ag.oz.	0.310	0.286	0.353	0.385	0.346	0.351	0.328
Ounces Silver	212	381	304	126	192	250	1465
Avg. Price Cu for Final Settlmt ¢	27.935	28.788	29.962	26.620	25.380	25.073	27.963
Silver, ¢ per oz.	73.875	74.745	76.971	79.010	85.407	100.74	81.791

NOTE: **The percentage of oxide copper as shown by assay is deducted for the reason that the oxides of copper are not recovered in the flotation process.

*The tailing loss is here figured on the basis of 85% recovery, with a minimum deduction of 7 lbs. Cu per ton.

The smelters settle for metals on Engineering & Mining Journal figures for the average price obtaining during the month following that in which the concentrates are delivered to the smelter.

The net recovery on silver, after deducting milling and smelting loss, is 80.75% of the above figures.

STATEMENT 11-B-3

COSTS AND RETURNS, MARCH TO JUNE (INCL.)

		MARCH	APRIL	MAY	JUNE	AVERAGE
Avg Cost of Mining:						
Per Lb Copper	¢	7.250	7.250	7.250	7.250	7.250
Per Ton Ore	$	2.736	2.736	2.736	2.736	2.736
Milling Charges	$	1751.94	2997.02	1960.30	779.04	7488.35
Per Lb Copper	¢	6.935	6.175	5.937	5.543	6.195
Per Ton Ore	$	2.570	2.250	2.280	2.380	2.340
Smelting, Frt & Hauling	$	1806.80	3591.81	2467.62	1114.35	8980.58
Per Lb Copper	¢	7.152	7.400	7.474	7.924	7.429
Per Ton Ore	$	2.680	2.695	2.870	3.404	2.806
Total Costs:						
Per Lb Copper	¢	21.337	20.825	20.661	20.717	20.874
Per Ton Ore	$	7.986	7.681	7.886	8.520	7.882
Returns, per ton:						
For Silver	$	0.185	0.173	0.220	0.246	0.200
ForCopper	$	5.133	5.544	6.355	5.652	5.682
Total	$	5.318	5.717	6.575	5.898	5.882
Deddcting Avg Cost of Mining		2.736	2.736	2.736	2.736	2.736
Net Returns per ton (profit)	$	2.582	2.981	3.839	3.162	3.146

Lowest grade of ore which can be mined at a profit under above costs, at present price of Cu (23½¢) - - - 2.00%

NOTES:
(a) Cost of Mining; See Statement 11-B-3-a.
(b) The term "per lb copper" refers to recoverable copper, after deducting oxide and tailing loss. (See Statement 11-B-2)
(c) The term "per ton ore" refers to dry tons of ore treated by mill. (See Statement 11-B-2)
(d) Returns per ton, refers to the net returns, after deducting milling costs, and cost of transporting and smelting concentrates.
(e) The last item indicates the final, net profit.

August 31, 1943

Copper Queen Gold Mine File

Mr. Ralph H. Pfeffer
14 Valley National Bank Building
Prescott, Arizona

Dear Mr. Pfeffer:

Yesterday I received a letter from your associate, Mr. Francis, enclosing your check for $25.00, and I am pleased to herewith send you the copies of the reports on the Copper Queen Gold Mine. These are being sent in duplicate in case you might wish to forward one copy to Washington, or elsewhere. I hope that these will serve to give you much useful information.

Wishing you the very best of luck in your operations at the Binghampton and Copper Queen, I remain

Yours very truly,

GMC:b
Enclosures

P. S. I have in my files a great deal of data and many engineers' reports relating to other mining properties in the vicinity of Prescott, Mayer and Stoddard. I shall always be glad to furnish you with copies of these on terms similar to those arranged for in this particular instance.

R. H. Pfeffer
MINING

VALLEY BANK BUILDING
PRESCOTT, ARIZONA
TELEPHONE 66

August 28, 1943

8/31/43

Mr. George M. Colvocoresses
1102 Luhrs Tower
Phoenix, Arizona

Dear Mr. Colvocoresses:

Many thanks for your kind letters of August 24th. Your letter in reference to the Arizona Binghampton is a splendid letter and we should be able to use it to advantage for the purpose we have in mind.

As soon as convenient we would appreciate your sending us copies of the reports and any other information you can give us on the Little Copper Queen Mine. I am enclosing Mr. Pfeffer's check in the amount of $25.00 as per his arrangement with you.

We have been out of town the greater portion of this week and yesterday we were very happy to see more Binghampton ore move by rail from Mayer to the Smelter. We have not had returns yet from previous shipments.

Mr. Pfeffer joins me in sending you our very best regards.

Yours very truly,

Glenn S. Francis

COPPER QUEEN GOLD MINING COMPANY

STODDARD, ARIZONA

Report by Claude Ferguson, Supt. Sept 1917

CLAIMS

The holdings of the Copper Queen Gold Mining Company, in Yavapai County, adjoining the property of the Arizona-Binghampton Copper Company, at Stoddard, Arizona, consist of the following named Lode Claims:

	NAME	SURVEY NO.	AREA ACRES	
1.	Lightning Bug	1854	20.661	
2.	Gracie No. 2	1854	11.035	
3.	Copper Queen	1854	17.861	
4.	Fraction	1854	6.188	
5.	Little Ella	1854	16.336	
6.	Copperopolis	1854	20.690	
7.	Highland Chief	1854	16.730	
8.	Fraction No. 2	2548	6.180	
9.	Fraction No. 3	2548	1.175	
10.	Gray Eagle	2958	20.507	
11.	Pride of Yavapai	2958	11.964	
12.	Golden Star	2958	11.934	
13.	Iowa	2959	17.929	
14.	Robin	2959	20.548	
15.	Toughnut	2959	20.387	
16.	Missing Link	2959	9.605	
17.	Rubidoux	2959	8.632	
18.	Copper Bucket	2959	13.024	
19.	Surprise	2959	20.031	
20.	Copper Iron	2959	20.016	291.433
21.	Louise	3429	5.013	
22.	Martin Fraction	3430	5.634	
23.	Martin Fraction Extension	3430	0.244	10.891
	Honeymoon Group:			
24.	No. 19	1864	20.449	
25.	Kid	2543	9.980	
26.	Honeymoon	2543	20.660	51.089
			Total Acreage,	353.413

GEOLOGY

The geological formation at the Copper Queen Mine, in the main, is entirely similar to that of the other properties mentioned as being on this copper belt, consisting primarily of various phases of the formation known as "Yavapai Schist". Certain phases of this schist, under the influence of circulating waters, faulting, intrusions of quartz-porphyry, basic dykes, and other geologic agencies, have undergone radical changes, completely altering their original character, The most important of these changes, at certain favored points, has been the deposition of sulfide minerals, including the minerals of copper, and in places (where are now encountered high grade ore bodies) the original schist has been almost entirely replaced with chalcopyrite and other sulfide minerals.

On the surface, where mineralized schist of this general character has been subjected to the influences of the weather, the original character of the rock manifests itself in iron-stained and copper-stained croppings, and a pitted or honeycomb structure, due to the oxidation and leaching of the sulfide minerals.

A wide zone of schist answering closely to the above description strikes through the Copper Queen group of claims in a northerly and southerly direction. This schist, which is harder and more resistant to erosion than the surrounding formation (also schistose), forms the apex of a high ridge upon which a considerable part of the property is located. Evidences of a widespread mineralization such as above described are abundant along the apex of this ridge, and include, in addition, numerous exposures of carbonate ore. At various places on the surface, as well as in the underground workings, the geologic influences mentioned, or their traces, are frequently in evidence. Basic dykes cut the formation in various directions, and faulting, both prior and since the intrusions, is much in evidence. Much of this faulting, however, is secondary, and the result of what appears to be a main fault, which striked east and west through the property and dips to the south at an angle which flattens perceptably in depth. This fault is believed to apex near the south end of Gracie No. 2 Claim.

Numerous intrusions of quartz-porphyry are also exposed in the underground workings, notably in the region of the orebodies, and this rock, which also frequently accompanies the orebodies in other mines in this belt, has doubtless had an influence in their formation.

Not the least influential in the work of alteration and mineralization has been the agency of circulating waters, many evidences of the work of which, in the shape of heavily oxidized water-courses, are exposed in the workings. These water-courses, some of which are of large size and wide influence, have been especially active in carrying the sulfide minerals, particularly those of copper which are especially soluble in water, downward. This activity of aqueous solutions has been proved to be of prime importance in the formation of concentrations and replacements in depth in those properties on this formation in which deep level mining has been prosecuted.

Occurrence of Ore

The ore occurs as lenses in the schist, of various lengths and widths; at times with distinct walls, with slight, or no minerlization in the walls, but more frequently with slightly defined walls, in which the ore gradually grades into waste. The orebodies are generally accompanied with more or less quartz, and frequently have a banded, or "ribbon" structure, due to alternate strata of sulfides, quartz, and schist. As a general thing, all of the schist in the proximity of the orebodies is more or less mineralized, the minerals occurring as laminations in the blading of the schist. Occasionally complete replacements of the original

schist by the sulfide minerals are encountered, with a small proportion of quartz (insoluble.)

The general strike of the ore strata is with the schistosity, approximately, in this belt, north and south. The average dip is generally somewhat steeper than the dip of the formation, and ranges from 65° to 80° to the west, while the general trend of the ore shoots in the ore-bodies is to the southwest.

A more complete description of the form and size of the orebody opened in the workings from Adit No. 2 will be given under the title of Development Work.

Definitions

ORE: The term "ore" in this report is used exclusively to designate material that, under existing conditions, can be mined at a profit. All else is "waste". Thus, under the conditions obtaining during March, April, May and June, 1917, with a total cost for mining, milling and smelting of $7.88 per ton (See Statement 11-B-3), and an average price for copper og 28.33¢ per pound, the dividing line between ore and waste was 1.40% copper. With the same costs, and the present price of copper (23½¢), this dividing line becomes 2.00% copper.

OREBODY: The term orebody is used to designate the particular mineralized zone in which the ore is found. This may, or may not, according to the average percent of copper content, all be ore. The ore usually occurs in " "shoots" in the orebodies.

Development

In addition to 78 more or less shallow surface workings, consisting of prospect holes, cuts, short tunnels and shafts, including an eighty-foot shaft and a 170 ft. tunnel on the Rubidoux Claim, development work on the Copper Queen group consists primarily of three adits (tunnels) driven to cut the zone of mineralized schist above described.

Adit No. 1, the portal of which is on the south end of the Little Ella claim, crosscuts the formation in an easterly direction for a distance of 593 ft., and attains a depth of 300 ft. below the crest of the ridge on the Copperopolis claim. Lateral work here consists of four drifts upon different mineralized strata, with short crosscuts. The total length of workings on this level is 1380 ft. 100 ft. within the portal of the adit there is a vertical shaft extending from the surface (65 ft.above) to a point of 300 ft. below the adit level. At the bottom of this shaft there are crosscuts 130 ft. west, and 494 ft. east, and a north drift from the latter 123 ft. long, with crosscuts east and west from its breast. There is also a drift extending south from a point near the bottom of the shaft for a distance of 241 ft., and crosscuts driven east and west from the face of this drift for a total distance of 83 ft. The total footage of workings of this level is 1100 ft. Further reference to the south drift will be made in the description of operations during 1917.

Adit No. 2, at the portal of which, on the north end of the Little Ella claim, the camp and mine buildings are situated, cuts the formation in a northeasterly direction for a distance of 635 ft. There is extensive drifting and crosscutting on this level, making the total footage, as measured from the portal, 2300 ft. These workings may best be understood by reference to Map No. 4, accompanying this report, showing the underground workings at Adit No. 2. Like Adit No. 1, the ground here is extensively mineralized, and at least one well defined ore-shoot has been exposed. This

appears as a vein of schist and quartz averaging, on this level, about 6 ft. wide, impregnated with copper and iron sulfides. From the hoist station (see Map) it is opened for a distance of 150 ft. to the north, at which point it is cut off by a fault-plane which here crosses the vain and dips south at an angle of 28° from the horizontal. This is the main fault mentioned above, under the title of "Geology". Going south, this ore-shoot seems to split, as it is exposed in two places in the main adit, and stopes have been started on a good grade of ore on both branches of this shoot, a short distance, each, north of the main crosscut (4-43-S and 4-44-S, respectively). A stope in ore has also been started in a drift south from the hoist station (4-53-S), and an upraise of 60 ft. north from the hoist station shows a good grade of ore for a distance of 120 ft. above the adit level. Drifts north and south from the top of this raise prove the ore-strata continuous, and a considerable tonnage of ore has been opened on the ("300") level. 100 ft. north from the fault there is a 180 ft. raise which connects with adit No. 3 (described below), and a crosscut from this raise connecting with the north drift on the "300" level, provides excellent ventilation for all of the workings just described. The fault plane mentioned above cuts across this raise about 30 ft. above the adit level. At this point it shows a dip to the south of 32°.

From the hoist station a 300 ft. winze is sunk on a fairly uniform pitch of 60° from the horizontal, to the west. It follows the dip of the vein for 65 ft., at which point it cuts the fault-plane found on the adit level. Just above the fault, a short drift to the north exposes a good grade and width of ore, upon which stoping has been done. Below this point, 100 ft. from the collar of the winze, levels are run north and south with considerable crosscutting. To the south, after cutting through the fault, 30 ft. from the winze, the drift comes into ore which is proved continuous for a distance of 160 ft. on this level. This ore is opened by drifts on both the footwall and hangingwall sides, and stopes have been started on same. Near the south end of this showing a winze is sunk on the ore until it reaches the fault, which crosses it 31 ft. from the collar at a dip of 12° from the horizontal. Crosscutting at this point shows mineralization 12 ft. wide. North of the main winze a crosscut shows what is supposed to be the north extention of the faulted orebody, the horizontal offset of which, measured along the fault-plane, is 70 ft. This agrees with the amount of offset shown on the "700" level, where what is supposed to be a portion of this same orebody is exposed, 300 ft. below the adit level. Some ore was fiund in the north crosscut on the "500" level, but development is not sufficient to prove its importance. The total footage of workings on the "500" level, including the winze, is 1030 ft.

A detailed statement of the amount and value of the ore which is exposed in all of the above described workings is given under the title of Ore Reserves, in Statements 11-A-2 and 11-A-2-a.

On the "700" level, 300 ft. below the adit, or "400" level (measured along the slope of the winze) a crosscut is carried west from the winze for 325 ft. About 120 ft. from the winze in this crosscut, drifts are run north and south on mineralized strata, opening about 400 ft. and 470 ft. in each direction, with numerous crosscuts east and west, including a crosscut of 332 ft. to the east from the south drift. The latter crosscut exposes ore (supposedly the faulted orebody mentioned above) 34 ft. from the main drift. 44 ft. of drifting and 20 ft. of raising at this point show the ore-strate continuous as far as development has gone. In the main

north drift, 35 ft. north of the main crosscut from the winze, a 23 ft. winze (7-60-W) is sunk, and an upraise made of 23 ft. (7-61-R). There is also a short crosscut from the top of the raise. This work is done on what is supposed to be the continuation of the mineralized strata exposed in the east crosscut above mentioned.

The faultplane above described does not appear on this level, as its increasingly flat dip carries it too far to the south. The total length of workings on the "700" level is 2258 ft. A further description and discussion of ore conditions here disclosed will be given under the title of 1917 Operations.

Adit No. 3, which lies about 750 ft. northerly from Adit No. 2, and 190 ft. higher in elevation, crosscuts the formation in an easterly direction from the northeast corner of the Fraction Claim, for 270 ft. 190 ft. from the portal of this tunnel there is a short drift to the north, and a winze, which, as before mentioned, is connected through a raise with Adit No. 2 for ventilation of the lower workings. This adit was driven a number of years ago to cut the downward extension of an outcrop showing carbonate ore 100 ft. above. No ore was found here in commercial quantities, though there are small streaks containing more or less copper mineral, upon one of which the winze is sunk. It is somewhat questionable as to whether or not the crosscut was driven far enough to the east to intersect the ore which one might expect to find under the surface showing mentioned; and, too, the comparatively shallow depth which the tunnel attains would tend to discourage this expectation, as all of the ground through which the tunnel is driven shows strong leaching.

GENERAL COMMENTS AND RECOMMENDATIONS

The planning of further development work on the Copper Queen property must necessarily be influenced largely by the matter of finances. Although there are numerous places where work might be done to advantage, which have been referred to in passing, under the title of "Development Work" in Section 11-A of this Report, few of these places give any great promise of "quick" results, with a small expenditure of money. The immediate zone in which most of the work has been done has been fairly well explored, with the exception of further work upward from the "700" Level on the showings of ore that have been exposed there. Aside from this work, which of course should be continued, our best chances for opening new ore would seem to be in deeper work on this zone, and in prospecting some of the other favorable ground on the property; notably the Gracie ground to the north, and the Copperopolis and Missing Link country to the south.

If expenditures must be limited to the present monthly amount of about $3,500, there is no more valuable work, for either immediate or future plans which can be carried on for this sum, than the work of deepening the winze, upon which we are now engaged. Working two shifts, as at present, an advance of 75 to 100 ft. per month can be made, at a cost ranging from $35 to $45 per foot. As suggested, this work will be of permanent value, no matter what future work is undertaken. Stations should be cut at intervals of 100 to 150 feet, and crosscuts driven from each station to cut the orebody. With our present equipment this zone can be explored for at least 200 feet below the present lower workings.

Should finances be arranged for development work on a larger scale, allowing an expenditure of, say, double the above amount, exploratory work could then be undertaken in either one or both of the unexplored zones indicated above, as well as in the zone lying between the workings of Adit No. 2 and those of Adit No. 1. This would involve extensove drifting and crosscutting, for which latter work, by reason of the general character of the formation, and the mode of occurrence of the ore-strata, a diamond drill outfit, it is believed, would beby far the most economical agent.

The northern exploratory work would involve about 1000 feet of drifting, and an amount of crosscutting which would depend altogether upon the conditions exposed in the course of the development. 2000 feet of the lateral work, however, should explore the ground under consideration with a fair degree of thoroughness.

The work between the two Adits would involve about 1500 feet of drifting, and a commensurate amount of crosscutting. A connection on the lower levels between these workings would prove of great value to future operations, especially should mining on a scale of appreciable magnitude from either Adit be carried on.

To the south of Adit No. 1, 1500 feet of drifting in addition to that already done, would afford a means for the thorough exploration of this zone, which would involve, possibly, an equal amount of crosscutting.

Under present working conditions, the drifting above outlined could be done for approximately $15.00 per foot; but the cost per foot, as explained in detail in the discussion of Costs in this Report, will depend largely upon the amount of work carried on.

The cost of diamond drilling at the property of the Arizona Binghampton Copper Company, adjoining ours, is about $3.00 per foot, including cost of carbons. Under favorable conditions, this cost may possibly be reduced.

If any considerable amount of diamond drill work is undertaken, say, 2000 feet or more, it is strongly recommended that a machine for this work be purchased outright. A suitable diamond drill, complete with carbons and all necessary accessories, will cost $3,500 to $4000, set up for work at the mine.

For the extensive exploration work above outlined, additional shop equipment, especially an oil forge for the utilization of crude oil instead of coal, and a small power drill, would pay for themselves in a comparatively short time. This additional equipment could be installed for about $500.

With reference to the matter of a mill, this is not recommended at this time unless ample funds were assured in advance, not only for the erection of the mill, but also for the prosecution of the exploratory work suggested above. If it is a question of having sufficient funds for either the mill alone, or the development work alone, then the latter should come first; as the amount of ore which is now developed in the mine would unquestionably prove insufficient to pay both for a mill and for the additional amount of work necessary to develop the further ore reserves essential to assure continuous operation. Under present conditions, not less than 100000 tons of ore should be in sight, of the present average grade, before it would be wise to enter upon the construction of a mill without, while the mill was building, prosecuting further development work; and then, as soon as the mill was put in operation, an adequate amount of

development work, it goes without saying, should be carried on in connection with the regular mining operations, to keep the ore reserves well in advance of the capacity of the mill.

On the other hand, should the suggested funds be assured, there are several important considerations urging the erection of a mill at this time, notably the following:

1. The price of copper, which, while now comparatively high, cannot be depended upon to remain so indefinitely. Each cent that copper declines in price, means the loss of 39 cents per ton upon our present grade of ore. The converse of this statement, however, is also true, and while the present price of copper, as fixed by the Government, is 23½¢, it was well over 31 cents earlier in the year, and the average price for 1916 was 27.20 cents per pound.

2. The interest on the money represented by our ore reserves is no inconsiderable sum, even at 4%, and would, of course, pay the interest on an equal amount of money invested in a mill.

3. Owing to the present congested condition of all manufacturing plants, and especially to the shortage of motors and other electrical material, as well as the uncertain transportation facilities, it would be well to allow fully a year for the erection of a mill and placing same in operation, after its construction had been definitely decided upon. During this time, finances permitting, a large amount of exploratory work could be performed, and it is not unreasonable to expect that a sufficient tonnage of new ore could be developed by this workto assure the return of the investment involved.

As to the capacity of the suggested mill, while this, also, is somewhat a matter of funds available, it is believed that it would be economical to start with a unit of about 100 tons daily capacity, so planned that additional units could be added as required. A flotation mill of this capacity will cost, under present conditions, probably between fifty and seventy-five thousanddollars.