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#### CONSOLIDATED COPPERMINES CORPORATION

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MEMORANDUM

FROM

F. V. Tompkins, Asst. Chief Geologist

Kimberly, Nevada CITY

C. I. Cook, General Manager

DATE April 6, 1948

TO

SUBJECT

COPPEROPOLIS PROPERTY, YAVAPIA COUNTY, ARIZONA

### INTRODUCTION:

On March 21 to 23, Walter Beckwith and I examined the Copperopolis property in Arizona. Returning on March 25, we were accompanied by John Hope. This property was brought to Coppermine's attention by Mr. Thomas Dalton, one of the owners, who also accompanied us.

### SUMMARY:

Mineralization of Copperopolis is extensive in relatively large shear zones. It is present as secondary iron oxides, high temperature specularite. and secondary copper silicates. Since mineralization is high temperature. and since only a sparse amount of copper sulfide boxwork is present, there is little possibility of the occurance of a chalcocite blanket at the base of oxidation. Small lenses of chalcocite possibly may occur along favorable fractures, but exploration for these is not economically attractive. No further work is recommended on the property.

#### LOCATION:

The Copperopolis property is located in southern Yavapia County, Arizona. about 17 air line miles northeast of Wickenburg. The property is reached by taking the Castle Hot Springs road for 22 miles from Morristown, going up Castle Creek for about 7 miles, and going over 3 miles of bad mountain road.

### OWNERSHIP:

Mr. Thomas Dalton, Box 821, Tonopah, Nevada, holds the major interest in a corporation which was formed to exploit Copperopolis. The property consists of 16 claims, 3 of these are patented. Mr. Dalton will give option to buy the property for \$350,000, the only stipulation being that the exploration is started within a reasonable time.

## GEOLOGY:

The rocks of Copperopolis are termed "Crocks complex" which seems to be an erratic mixture of Yavapia schist (Pre-Cambrian) and younger granite, andesite and pegmatite. The general trend of the schist as shown in U.S. G. S. Bradshaw Mountain folio is northeasterly.

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COPPEROPOLIS PROPERTY, YAVAPIA COUNTY, ARIZONA

Mineralization of the area is concentrated in shear zones which maybe roughly grouped into those which strike east of north, those which have a northwesterly strike, and those with an east-west trend (see map). The Mommoth lead, which is the strongest shear zone of the area, is in the last group. This east-west trending zone is over 5000 feet long and has a maximum width of 200 feet.

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The mineralization in these zones consists of secondary iron oxides which occur as "paint", high temperature specularite, and narrow stringers containing the secondary copper minerals - chrysocolla, malachite, some cuprite, and perhaps a small amount of chalcocite. In the zones south of the Mammoth lead, cerussite and galena drc found in small isolated pockets.

Although the iron oxide is distributed throughout the rock of the shear zones, it has a tendency to concentrate on fracture planes. Even the schist and andesite adjacent to the zones contains a minor amount of iron oxides on such planes. Major source of this secondary iron was probably the specularite. A minor source for the iron oxide dig pyrite as was shown from spare pyrite boxwork.

Since the secondary copper minerals are present, there is no doubt as to the existance of copper mineralization. Frimary mineralization is indicated by the existance of high temperature specularite but was weak in copper. Boxwork in the zones shows that a little chalcopyrite and chalcocite has been leached from the rocks. However, the boxwork was too sparse to indicate that a copper sulfide blanket of secondary origin exists at the base of oxidation. Small lenses of chalcocite possibly exist along favorable fractures in the shear zones, but exploration of such would not be economically attractive.

### PREVIOUS NORK:

In 1946, Magma Copper Company, Superior Arizona, took option on the property. One diamond drill hole was put down to a distance of over 300 feet. (See map) The hole was placed to cut the Mammoth lead and reached a depth greater than 210 feet below the elevation of Copperopolis Creek. Mr. Dalton claimed to have a log of this hole which he said assayed no copper and showed a fragment of schist from the bottom of the hole which contained a little pyrite. Presumably the hole gave no attractive results and Magma dropped the option.

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### ONSOLIDATED COPPERMINES CORPORATION

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SUBJECT

# COPPEROPOLIS PROPERTY, YAVAPIA COUNTY, ARIZONA

# SAMPLES:

The copper in the samples is "holdup material" of crysocolla and malachite. As these occur in narrow stringers, they only indicate that the small amount of copper originally present in the rock has concentrated along favorable fractures.

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Sample No.	Location	Oz.Au.	Oz.Ag.	<u>% Cu.</u>	<u>% Pb.</u>
2601	Dft. 350' SE House Specimans	.015	.60	1.05	2.28
2602	Dft. 360: W Melinda Jane Shaft.	Contraction of the			
	4t Cut	.01	1.26	.10	5.35
2603	Dft. 500' W Melinda Jane Shaft,				
	4' Cut	Tr.	.14	.08	Tr.
2604	Mammoth Lead at Copperopolis				
	Creek, W Side, S 2, 70' Cut	Tr.	.04	.35	Tr.
2605	Same as 2604, N 2, 70' Cut	Tr.	.02	.13	Tr.
2606	Drift 250' E of House, 20' from				
	adit, 6' Cut	Tr.	.05	.13	Tr.
2607	Same as 2606, at Adit, Hi-grade	.01	.46	.17	3.47
2608	Amity No. 3 Pit, Hi-grade Grab	.34	.33	4.33	Tr.
2609	Amity No. 3 Pit, Dump Grab	.02	.06	.45	Tr.
2610	In Creek N of Amity No. 3, Schist				
	with Pyrite	Tr.	.02	.13	Tr.
2611	Briton Shaft Dump, Hi-grade Grab	olala	2.16	19.88	Tr.
2612	Mammoth Shaft Dump, Grab, S 2	Tr.	.03	.08	Tr.
2613	Same as 2612, N ±	Tr.	.02	.42	Tr.
2614	Amity No. 12, Dump, Grab	.01	.05	1.00	Tr.
2615	Amity No. 12, Pit, Hi-grade grab	.01	.04	2.38	Tr.
2616	Amity No. 12, W Side ridge, Dump				
	Grab	Tr.	.03	.07	Tr.
2617	Amity No. 7, N Saddle, Dump Grab	.015	.05	.20	Tr.
2618	Pit 150' W of House Hi-grade Grab	.01	.13	3.90	Tr.

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Report on AMITY GROUP OF MINING CLAIMS, Castle Creek Mining District, Yavapai County, Arizona,

### by

J. S. Coupal, Mining Engineer, Phoenix, Arizona. December 29, 1945.

### CONCLUSIONS:

The Amity Group is well located in a highly mineralized area which justifies systematic exploration and development.

The occurrence and persistence of the iron gossan in a wide shear zone, carrying veins and stringers of non-ferrous mineralization, some in mineable widths and of paying value, justify exploration in depth by diamond drilling.

Some of the good showings of pay ore in other outcrops warrant exploration by either sinking or drifting on the ore.

Inaccessibility has held back development of the area and the proposed road connection should be made prior to other work.

#### PROPERTIES:

The Amity Group consists of 3 patented and 13 unpatented claims, located in Sections 27, 28, 33 and 34, Township 9 North, Range 2 West, in the Castle Creek Mining District, Yavapai County, Arizona. These claims are owned by Amity Exploration, Inc., an Arizona corporation, Thomas S. Dalton, Sr., President and present manager, P. O. Box 384, Prescott, Arizona.

## TITLE:

The patented claims, Mamoth, Wild Bird, and Melinda Jane, were purchased from the former owners who acquired tax title by purchase from the State of Arizona. Abstract of title was made by the Guarantee Title & Trust Company, Prescott, Arizona, and was found free and clear from all encumbrance.

Twelve of the thirteen unpatented claims, namely, the Amity, and Amity #1 to #11, inclusive, were located by Thomas S. Dalton, Sr., and Evelyn F. White, discovery work completed, monumented and recorded in Book of Mines No. 152, pages 252 to 263, inclusive, on March 29, 1945.

Claim Amity #12 was located and recorded by the same parties on November 30, 1945, in Book of Mines No. 152, page 526, at Prescott. The various claims were visited and examined during my visit to the properties, and the discovery holes were excavated in conformity with the State Mining Code, and properly monumented.

# GEOGRAPHIC LOCATION AND ROADS:

The properties center around the major workings on the Mammoth patented claims, formerly known as Copperopolis. It is about 2g miles up Copperopolis Creek from its junction with Castle Creek. Mt. Lehman is about 1 mile north of the camp on the adjoining Amity claim. Silver Mountain is 5 miles north, 70° east from the camp.

At present the properties are accessible by road, via Morristown, located on U. S. Highway #70. From Morristown, via the Castle Hot Springs road, the distance over graded road is 22 miles to the turn-off of the mine road. It is then 92 miles from this turn-off to the property. Of this 92 miles, 7 miles are practical to use it for preliminary work, a new, year-around road is recommended.

Reconnaissance work shows a more feasible route for a road which will be passable at all seasons of the year, and which can be made by connecting with the end of the old road leading to the Lehman Mill; this road connects with the Fenton Ranch and the Wagoner Road, which connects with U. S. Highway 89 at Kirkland, Junction, a paved road to Prescott. The distance from the mine to U. S. Highway 89 will be approximately the same as the distance from the mine to U. S. Highway #70. The new road to be constructed will be about 3 miles in length and indicates a maximum grade of about 12%, with no river crossing, and a road easily maintained.

There are numerous other properties within a short radius from Copperopolis. The Britton patented claim adjoins the Amity Group on the west; the Arizona-Virginia group is about 1/2 mile west; the Duco Boy group, about the same distance to the northwest. The old town of Briggs is 15 miles southwest of the claims, on Castle Creek, and it is at this point that the present mine road leaves the creek bed and crosses on higher ground to Copperopolis Creek on the Mammoth claim. At Briggs was a smelter in the early 90's, serving the Copperopolis and other mines in the area.

### HISTORY:

The Castle Creek mining District was active in the early 1880's, and at this time a large amount of exploration and prospecting work was started. The work on Copperopolis was started at this time, although the claims were not patented until 1897 by the American Group Mining Company. The major part of the work was done in this district in the 1890's, and since that time only sporadic operation by leasers, seeking high grade shipping ore, was carried on.

### CLIMATIC AND GENERAL CONDITIONS:

The Amity Group ranges in elevation from about 3000 feet above sea-level at camp to around 4000 feet at some of the highest points. The topography is rather rugged, due to the stream erosion, but the side slopes from the hill-tops have a substantial amount of subsoil, and the typical southwest vegetation is of mesquite, various kinds of castus, catsclaw, greasewood, etc.

There is ample water for domestic use in the various creek beds, which rises to the surface where bed-rock is exposed. Shallow wells carry water the year around. Ample water could probably be developed for milling operations.

The climate is ideal for year-around operations; little or no snow falls in the immediate area, although at the higher elevations of 4500 feet and above, a moderate snow falls in the winter. The summer weather is hot and dry, but not uncomfortable, as the evenings are cool enough for sleeping under light cover.

There are two rainy seasons -- the summer rains in July and August, and the winter rains from December to February.

### GENERAL GEOLOGY:

The general geology of the Castle Creek Mining District is described by Waldemar Lindgren in United States Geologic Survey Bulletin #782, "Ore Deposits of the Jerome and Bradshaw Mountains Quadrangles, Arizona", published in 1922, on pages 183 and 184 as follows:

### " GEOLOGY "

" Much of the district is covered by Tertiary volcanic flows, including volcanic agglemerate, andesite, and rholite tuff. These materials were poured out on the pre-Cambrian deeply eroded basement and are now dissected by the post-Tertiary erosian. The flows reach up to an altitude of about 3500 feet, and between Fenton's and Donnelly's to 4500 feet. North of the flows the southwestern outliers of the Bradshaw Mountains rise abruptly to 4500 feet, and their brushy ridges connect with the complexes of Silver Mountain, Minnehaha, and Grown King.

The pre-Cambrian consist of a belt of Yavapai schist trending diagonally to the southwest corner of the quadrangle. On both sides of this is normal Bradshaw granite and in places the mixture of schist, diorite, and granite known as the Crocks complex.

The ore deposits are fconfined to the pre-Cambrian and include a few placers, now exhausted, the best of which were worked in American Gulch north of Brigg's ranch; pre-Cambrian gold quartz veins, represented by the Lehman deposit; gold-copper veins, deeply oxidized, with chrysocolla and specularite and in places carrying gold and silver, exemplified by the Swallow, Whipsaw, Jones, and Copperopolis properties; and lead veins, represented by the long vein that trends westward from Copperopolis.

Regarding the affiliations of the gold-copper veins and the lead veins there is much uncertainty. The only verdict possible is that they are pre-Tertiary. The copper-bearing veins differ from those seen elsewhere in that the oxidized ore always contains much bright-blue chrysocolla, intergrown with specularite in thin plates.

A supergene origin is ascribed to the specularite because of its very intimate intergrowth with chrysocolla. As shown in Plate 15, A, it develops in the copper silicate as minute radiating plates, many of which follow the direction of cracks in the chrysocolla. It is believed that this peculiar variety of exidized ore owes its origin to the higher temperatures prevalent in this district of low altitude (1500 to 3000 feet).

Owing to the situation of the district the production has naturally been small. Some rich ore has been shipped, and some ore has been milled at the Lehman and Whipsaw mills. The total production is probably well below \$500,000 gross value.

A little smelting plant was erected many years ago at Briggs to treat Copperopolis ore, but there is no record of production.

Lately 800 acres of nitrate land has been located just north of Briggs on volcanic agglomerate and rhyolite tuff. It is not uplikely that the tuff has yielded traces of nitrate, but the probability that commercial deposits will be developed here is very small."

The outstanding characteristic of the local geology of the Amity Group is the occurrence of various iron gossans in sheared areas, carrying well-defined zones of non-ferrous mineralization.

The major showing is on the Mamoth claim where the iron gossan comprises two small hills rising 100 to 150 feet above the creek level, 300 to 400 feet in diameter, with a general north 60° west strike.

Another striking feature is an open fissure, with walls 50 to 60 feet apart, showing iron gossan on both walls with the central portion eroded and filled with subsoil. The general strike of this fissure is north 30° east, or about at right angles to the Mammoth showing.

There are other minor gossan outcrops which do not conform to these general strikes.

The alteration of the gossan material is such as to make the classification of the rock in the field doubtful, but it is probably an altered andesite.

To the southeast of the Mammoth gossan we find andesite, and to the northwest a high altered grano-diorite, with an irregular pegmatite dyke, having the same general strike as the gossan, in the granodiorite.

The gossan shows a shearing along the strike, with irregular occurrences of non-ferrous veins and stringers.

### COPPEROPOLIS MINE:

A brief description of the Copperopolis Mine, which is now part of the Amity Group, occurs in United States Geologic Survey, Bulletin #782, "Ore Deposits of the Jerome and Bradshaw Mountains Guadrangles, Arizona," by Waldemar Lindgren in 1922, on page 186, which is inserted at this point. Other mention of the Castle Greek District is contained on pages 182 to 187, inclusive, of the same bulletin.

### "COPPEROPOLIS".

"The locality with the ambitious name Copperopolis is 2 miles northeast of Briggs, at an altitude of 3,200 feet, at the north edge of the Tertiary lava and at the foot of the granite mountain that rises 1,300 feet above the town site. At present there is just one house in the town, and that is deserted.

The remarkable outcrops at this place long ago attracted attention. At present the five or seven claims are said to be held by R. D. O. Johnson and looked after by Dr. Morrison, of Phoenix.

There are two prominent outcrops at Copperopolis. The upper one is 1,000 feet north of the town and is trenched 100 feet deep by Copperopolis Creek, It is developed by irregular workings and a 200-foot shaft, sunk in 1880 and now caved, The country rock consists of granite and pegmatite, greatly oxidized. The ledge seems to be 100 feet wide with many seams. It strikes N. 60°W., and dips southwest. The ore consists of limonite and bright-blue chrysocolla. Some ore is said to have been shipped to the Briggs smelter and some shipped to outside points. The production was probably small.

Below this outcrop the rock is andesite for 400 feet, to the point where the so-called "great lead vein" crosses. This is a zone perhaps 75 feet wide and whether the country rock is andesite or granite could not be definitely decided. At any rate the ledge matter contains granitic material. An old tunnel opening this lode from creek level is caved, but on the dump is a considerable amount of black oxidized lead ore, probably carbonate and sulphate mixed. This lead wein crops out also in the low saddle half a mile toward the west, where it strikes about N. 70 W. A little work has been done here, but the openings are caved. The ore shows galena and anglesite with some manganese dioxide in barite gangue. The width is not shown but is probably 8 or 10 feet. The ore is said to assay about 4 ounces of silver to the ton. More work has been done on this vein a mile farther to the west, and it is said to be traceable to Crown Point, in the Congress quadrangle."

### ORE OCCURRENCE:

The major occurrence is in the gossan just north of camp on the Mammoth claim. The creek erosion exposes a vein from 3 to 6 feet in width, carrying copper in the form of chrysocolla and some copper carbonates. This has been explored by a vertical shaft, now partially caved, so as to be inaccessible, a crosscut tunnel and a drift tunnel. The shaft, which is vertical, evidently passes out of the mineralized zone, as the gossan dips about  $70^\circ$  to the southwest, and the shaft was sunk near the footwall.

Evidence of stoping from the tunnel work indicates from 5,000 to 6,000 cubic feet of excavation. There are practically no dumps at the tunnel portals, so the ore stoped was undoubtedly shipped.

The main gossan, occurring on the Mammoth claim, can be irregularly traced from 3 to 4 claim-lengths, 4,500 to 6,000 feet in length.

To the northwest, beyond the point where the open fissure should intersect the major gossan, which intersection is hidden by subsoil, numerous shallow openings show the occurrence of lead minerals, as carbonates, in the veins and stringers occurring in the gossan.

There are numerous shallow holes in various portions of the gossan, where either copper or lead mineralization has shown on the outcrop. None of these workings have attained any appreciable depth.

The property must be considered as a prospect. The strong showing of gessan, with the occurrence of non-ferrous mineralization along with the occurrence of the highly oxidized and leached condition of the area, indicates a deposit which justifies exploration in depth with the expectation of finding a zone of enrichment or of a payable primary ore.

No workings on adjacent or nearby properties give any definite indication as to the depth to sulphide or primary ore zones, or to zones of enrichment.

The quickest and most economical plan to determine this is by diamond drilling. I can and do recommend the drilling of several holes to a depth of from 500 to 1,000 feet, so located as to cross cut the general strike of the gossan formation on the Mammoth claim. Meanwhile, it is possible that some of the shallow workings on other good mineral showings on the Amity Group can be extended with the chances of opening up good shipping ore.

### SAMPLING:

Only a limited amount of sampling was done, and that only to guide in forming conclusions, as no claim is made to ore developed.

The samples ran as follows;

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No. 1. Open cut on Melinda Jane, 6 feet in width. This ore carried some lead, and assay will be added.

- No. 2. Amity #10. Grab sample from about 5 tons of sorted ore from a 10-foot open cut.
- No. 3. 3 feet of copper ore at portal of tunnel on the Mammoth claim, about 6 feet above creek level.
- No. 4. 4 feet on either side of the heavy copper mineralization which was 6 feet wide at the No. 3. sample. This was the iron gossan which showed no copper coloring or indication.

## RECOMMENDATIONS:

1. Make property easily accessible by road connection with the extension of the Wagoner road.

2. Diamond drill to a depth of at least 500 feet below the heavily mineralized iron gossan on the Mammoth claim, crosscutting the shear zone by at least 3 holes.

3. Consider development by sinking or drifting on some of the more favorable mineralized outcrops on the extensions of the Mammoth shear zone on the adjoining claims.

4. Plan future operations on the results obtained from the drilling on the Mammoth.

In conclusion I can state that I believe the properties of the Amity Exploration, Inc., fully justify a systematic exploration.

Respectfully submitted

by /S/ J. S. Coupal

J. S. Coupal, Mining Engineer.

# MAGMA COPPER COMPANY

Report on the

# AMITY GROUP OF CLAIMS

# COPPEROPOLIS

(Copper-Gold-Lead Veins)

Castle Creek Mining District,

Yavapai County, Arizona

by

Wilson D. Michell

Superior, Arizona

July 1, 1946

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## INTRODUCTION

### Location and Accessibility

The Amity Group of sixteen mining claims, three of which are patented, is located around the common intersection of Secs. 27, 28, 33, and 34 in T. 9 N., R. 2 W., Gila and Salt River B. L. & M., in the Castle Creek Mining District of Yavapai County, Arizona. The claims include the old camp of Copperopolis, and are about 1-1/2 miles northeast of the site of Briggs, former location of a small smelter operated in the early 1890's. The area is within the U. S. G. S. topographic map of the Bradshaw Mountains quadrangle.

The property at present is accessible by road from Morristown, located on U. S. Highway 70. The total distance from Morristown is 31-1/2 miles, which includes 22 miles on the Castle Hot Springs graded highway, 7 miles of difficult road in the bed of Castle Creek, and 2-1/2 miles of steep dirt road crossing a ridge from Castle Creek at Briggs to the property in the canyon of Copperopolis Creek. In dry weather most passenger cars and ordinary trucks cannot approach closer than about 7 miles from the property, although a four-wheel-drive army reconnaissance car such as that used by the present owners is able to negotiate the road without undue difficulty. The entire trip to the main highway at Morristown consumes, at best, 2-1/2 hours.

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The property at Copperopolis has always been difficult of access since the time of discovery in the early 1880's. Very little work, consisting only of the production by leasers of small amounts of oxidized copper-gold ore mined at the surface, has been done in the vicinity of Copperopolis for the past 50 years.

The question of a usable all-weather road to the Amity group will be considered later in this report.

### Topography and Climate

The country in the vicinity of the Amity group is not of extreme relief, but is rugged and highly dissected by steep-walled washes. The camp is located in the canyon of Copperopolis Creek, a tributary of the Castle Creek which it joins at Briggs. The elevation at Copperopolis camp is 3200 feet. The hills rise steeply northward about one mile to the peak of Lehman Hill, a prominent landmark at an elevation of approximately 4450 feet.

The climate is typical of southern Arizona at moderate elevations, being very much the same as at Superior, so that surface drilling or other operations could be carried on throughout the year. Access is easier under existing road conditions during the winter and summer rainy seasons than it is in the dry periods, but flash floods are a menace during the summer rains.

Most of the hill slopes are covered with mesquite,

-2-

Gatsolaw, various kinds of cactus, and greasewood. Rattle-

### EXAMINATION

The writer examined the property from June 11 to 14, 1946. The examination was facilitated by the guidance and courtesy of two of the owners, Thomas S. Dalton, Sr., and Jack M. Dalton.

A report made for Amity Exploration, Inc., by J. S. Coupal, mining engineer of Phoenix, in December, 1945, was of assistance in the present work.

### Ownership

The thirteen unpatented claims of the Amity Group, which are properly monumented and recorded and to which title is clear, were located by the present owners in 1945. The three patented claims were bought from the former owners, who acquired tax title by purchase from the State of Arizona. The entire group is now owned by Amity Exploration, Inc., an Arizona corporation, Thomas S. Dalton, Sr., President, Box 85, Morristown, Arizona. A one-fourth interest in the corporation is held by each of Thomas S. Dalton, Sr., his sons Jack M. Dalton and Thomas S. Dalton, Jr., and Edward C. White.

Mr. Dalton, Sr., is a practical mining man who has been engaged in mining work in the Western States for 45 years, and his sons have been associated with him in these

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activities for a considerable period.

# Amity Group and Duco Boy Group

Amity Exploration, Inc., has obtained a 90-day option from June 12, 1946 on the ten patented claims of the Duco Boy Group, the center of which is one mile west of the central portion of the Amity Group. Since, in my opinion, the Duco Boy claims contain part of the extension of the main shear zone of the Amity Group, I believe that consideration should be given to the Duco Boy in conjunction with the Amity. However, because different ownership and option conditions are involved in the two properties, the Duco Boy is reported upon separately.

Attention is called to the fact that the maps accompanying these two reports have been made at the same scale and caused to overlap, so that they can be studied together. <u>CONCLUSIONS AND RECOMMENDATIONS</u>

1. Wide shear zones cross-cutting the regional rock structure are occupied at the surface by prominent leached iron gossans which contain narrow oxidized copper-gold bodies of good value. The strongest shear zone can be followed for perhaps as much as 11,500 feet, of which 5,400 feet is in Amity ground. The shear zones are in a complex of Pre-Cambrian intrusives with schist inclusions.

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- 2. Development is insignificant because of inaccessibility of the deposit, and the property is purely a prospect.
- 3. There is a good possibility that the leached gossan represents the top of sizable bodies of copper-gold ore, with some erratically distributed lead values, and the oxidized copper 'showings may be residual from the leaching of the larger bodies.
- 4. Diamond drilling is recommended to explore first the parts of the major shear zone beneath the most extensive area of iron gossan (on the Mammoth claim) in order to get information eventually on the grade, size, and distribution of possible sulphide orebodies. Conditions should be good for diamond drilling.
- 5. An all-weather road will have to be constructed by means of about 2 miles of bulldozer work, making the distance to Wickenburg some 18 miles.
- 6. Consideration should be given to exploration of the Duco Boy Group one mile west and containing the probable extension of the major Amity shear zone. Additional ground may be located to cover this shear zone between the two properties.
- 7. Water supply can readily be developed on the property for drilling and mining purposes.

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## MINE WORKINGS AND EQUIPMENT

As shown on the map accompanying this report, shallow pits, cuts shafts, and short tunnels constitute the only mining development on the Amity Group. The Mammoth shaft, reportedly 200 feet deep, is the most extensive working on the property. The purpose of the mine openings was solely for the removal of small amounts of oxidized shipping ore found at the surface in narrow bands within the major leached gossan zones. The samples recorded on the accompanying map represent such stringers of oxidized ore.

A cabin capable of accommodating six men is located at the old camp of Copperopolis. This cabin is now in use by the owners, and is in fair condition. Recently the owners have built a substantial and well-equipped small assay office some 250 yeards north of the cabin. The assay office, where running water is available pumped in from the nearby well, serves also as sleeping quarters for two men and as a general office. It is equipped with a shower bath. Lighting, cooking, and assay equipment in the camp use Coleman type gasoline burners.

The owners have a saddle horse at the property, and the reconnaissance car which is used to travel to Morristown. GENERAL GEOLOGY

# Rock Types and Distribution

The Amity property lies within a northeast-trending belt of complexly related intrusives of various types contain-

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ing inclusions of pre-Cambrian Yavapai schist. This belt, about five miles wide at Copperopolis, is a screen between (1) two great masses of Bradshaw granite. The mixture of schist and intrusive rocks, all considered pre-Cambrian, (2) has been lumped together by Lindgren under the term "Crooks complex." On the Amity and Duco Boy properties the igneous intrusives predominate greatly in areal extent over the schist, which is present only as inclusions of relatively small size.

The eroded pre-Cambrian complex has been overlapped south of Copperopolis by Tertiary volcanic flows, including agglomerates, andesite, and tyolite tuff. These volcanics, which are post-ore in age, touch the extreme southern part of the Amity property (see accompanying map).

No attempt has been made to prepare an areal geologic map on the rock types in the Amity Group, because the distribution is extremely complex and extensive metamorphism has made identification difficult. Notes have been placed on the accompanying map, however, to indicate the larger areas of different rocks where they were encountered in the present examination.

The igneous rocks, which are believed to represent phases or differentiates of the Bradshaw granite magma, include normal granite, diorite, andesite, and dikes of coarse tourmaline-bearing granite pegmatite. In addition

<sup>(1)</sup> N. H. Darton et al, "Geologic Map of the State of Arizona" (1924).

<sup>(2)</sup> Lindgren, W. - "Ofe Deposits of the Jerome and Bradshaw Mountains Quadrangles, Arizona" (U.S.G.S. Bull. 782, pp. 183-4, (1922)

to these rocks are dikes of rhyolite, porphyry, and basalt, which are probably younger than the Bradshaw intrusives.

The Yavapai schist is represented by inclusions of dark-colored quartz-mica schist and bodies of black gneiss. There appear to be two principal belts of schist: A westerly one crossing the American and Amity No. 10 claims, and an easterly one in parts of Amity No. 2 and Amity No. 3 claims.

The tertiary volcanics in the southern parts of Amity and Amity No. 11 claims consist of gray andesite flows and tuff, and rhyolite agglomerate.

### Geologic Structure

The prevailing rock structure of the "Grooks complex" on Amity ground is NNE. The structure is indicated by the strike of schistosity, the elongation of schist inclusions within the intrusive bodies, and the trend of bands of different igneous rock types. Insufficient data were secured to permit a generality as to the dip of schistosity or intrusive contacts. The interpretation by Jaggar and Palache (1)

that vertical close folding of the schist in the NNE regional trend guided the igneous intrusive bodies, seems to provide a good explanation for the structure and rock distribution as we see them today.

(1) Jaggar and Palache, "Bradshaw Mountains, Arizona" (U.S.G.S., Folio 126, p. 9, 1905).

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Crossing the prevailing northeast structure at nearby right-angles (average strike N  $60^{\circ}$  W) are numerous, wide, and in places prominent, steeply dipping iron gossan zones carrying copper, gold, lead, and silver mineralization. Some of the mineralized zones are associated with rhyolite porphyry dikes.

# MINERAL DEPOSITS

# Vein Structure

The strongest gossan zones, as has been stated, cut at right angles across the prevailing regional structure. The most important of these zones is prominently developed on the Mammoth claim. As the accompanying map shows, it can be followed on Amity property continuously from Amity No. 1 claim through Amity No. 10, a distance of 5,400 feet. I believe, also, that the same leached gossan continues westward into the Duco Boy property; and, in fact, on our return from the Duco Boy to Coppe: opolis we encountered showings between the two properties which are presumably on this same structure. If that is the case, the total length of this leached gossan is about 11,500 feet. The iron gossan seems to terminate eastward rather abruptly in massive granite on Amity No. 1 claim.

The Mammoth gossan zone dips steeply south. It reaches a maximum width of 200 feet at the Mammoth shaft. Along the footwall of the leached gossan is a vein of oxidized copper minerals 5 feet to 6 feet wide on which some tunnelling

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has been done from creek level (see map). The wall rock is granite and granite pegmatite.

Data concerning other gossan zones are recorded on the accompanying map, and no further description is necessary here. The gossans lie in well-defined shear zones which show evidence of movement, and mineralization has been confined to the channel-ways which the shear zones provided.

As shown on the map, another set of leached mineralized gossans follow the NNE reginonal structure. These are less numerous and less strong than the WNW shear zones. The most prominent of the NNE zones is an "open fissure" on Amity No. 6 and Amity No. 5, so called because erosion has removed most of the central part of the fissure to a depth of 50 feet where the zone crosses a low ridge on Amity No. 6 (see map). There is little evidence of copper mineralization on this fissure.

## Vein Mineralogy

No workings have penetrated through the oxidized and leached zone of the deposits. Exposures of the shear zones contain quartz, silicified and altered country rock, and much porous cellular brown and red limonite and hematite. Within the wide leached zones in places are narrow bands of oxidized copper minerals, which I believe are residual and have escaped the general leaching. This oxidized copper ore, some of which has been shipped, consists of chryscocolla and malachite with hematite and limonite in quartz gangue, and carried gold values with some silver.

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In some cases on the same shear zones with the copper mineralization are lead deposits which contain oxidized lead minerals (probably cerussite and anglesite), residual galena, and vanadinite in a gangue of quartz associated with limonite and hematite.

In the opinion of the writer the lead mineralization represents a minor, and probably somewhat later, phase of the copper ore deposition, and the same channelways were utilized. If such is the case, lead values are probably erratic in distribution on the shear zones, except possibly in certain veins (such as the one just south of Copperopolis camp - see map) which happen to have been occupied solely by lead-bearing mineral assemblage.

# Leached Gossan and its Significance

A careful search was made for limonite "boxwork" which might indicate what, if any, copper minerals had been removed from the leached gossan. Some boxwork derived probably from chalcopyrite was found at widely distributed places on the property, and a little chalocite boxwork was seen. The great abundance of iron suggests the presence originally of much pyrite, and many examples of pyrite boxwork were found. The floods of pyrite-derived limonite (and hamatite) would be expected to obscure much evidence of copper sulphide leaching.

My interpretation of the gossan is that sulphide ores containing copper minerals and also a great deal of pyrite

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were subjected to strong oxidizing conditions, with leaching and transportation of copper values favored by acid and ferric sulphate derived from the decomposition of pyrite. The oxidized copper ores remaining in the leached zone are not continuous or extensive. They seem to me to be possibly residual portions of larger copper bodies, and have survived the strong leaching perhaps because of chemical reaction with inclusions of altered granite or with local occurrences of calcareous gangue minerals. Under such strong leaching conditions, if these small bodies were the <u>only</u> concentrations of copper sulphide in the shear zones, I would not expect them to have survived.

It is not possible to say whether the ores of which samples are recorded on the map represent oxidation of a secondary enriched zone or of primary sulphides, but the values are sufficient to arouse interest under eithe possibility. The latter case would be more favorable for good sulphide ore at depth. Some chalcocite boxwork is present in the leached gossan, but I would expect evidence of much more chalcocite if the surface exposures represent oxidation of a secondary chalcocite zone.

### ORE POSSIBILITIES

The Amity deposit is an essentially undeveloped prospect. The previous discussion has attempted to give reasons for believing that possibilities are good for large copper-gold orebodies beneath the spectacular iron gossan in the shear zones, but no statement more definite than that seems warranted at present.

There is no <u>assurance</u> that the narrow bands of oxidized copper ore now showing are remnants of originally larger bodies which have been mostly leached out, but for reasons previously discussed, I believe that this may be so.

The surface samples, although covering only narrow widths, are fairly attractive in themselves. It cannot be determined for certain what they indicate as to the grade of primery and secondary sulphide orebodies at depth. A straight unweighted average of the samples on the main, or Mammoth, shear zone for 5,400 feet on Amity property is as follows:

7.12% Cu. 0.55 oz. Ag 0.55 oz. Au

As indicated on the map, there are also some erratically distributed but fairly high lead values, with the best lead-bearing vein showing on Amity and Amity No. 11 claims near the old camp.

No workings in the district have gone deep enough to give us an indication of the possible depth of exidation on (1) the Amity deposits. Lindgren suggests an exidized zone in that general area of 100 to 400 feet deep, but this is based on work at other types of deposits at some distance from Coppercepolis.

(1) Lindgren, W., op. cit., p. 49.

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## RECOMMENDED EXPLORATION

## Road Building

If any work is done on the Amity Group, a road will have to be built to the property to avoid the long and difficult present trip in Castle Creek wash. One suggested route north from the property was made by Mr. Coupal. By this route the distance to U. S. Highway 39 at Kirkland Junction would be some 30 miles, and about 3 miles of road would have to be built from Copperopolis to the end of the old road to Lahman's Mill.

A better road connection has been suggested by Mr. Dalton southwest to Wickenburg, a distance of some 18 miles. About 2 miles of road would have to be built from the Welinda Jane claim to the Abe Lincoln Mine, from which fairly good roads lead to Wickneburg. Grades on the road to be built would not be excessive, and a bulldozer could **Go** the work.

### DIAMOND DRILLING

It is recommended that exploratory diamond drilling be done on the Amity ground, giving attention first to the strongest part of the Mammoth shear zone near the Mamoth shaft. No attempt is made in this preliminary report to lay out specific proposed holes. The essential thing will be to determine the character and grade of sulphide mineralization beneath the strongest parts of the gossan, and then establish the size of orebodies if commercial grade sulphide

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## material is found.

The topography is suitable for diamond drill exploration of the shear zones. The first holes would probably not have to exceed 700 feet in length. Wall rock on the eastern part of the Mammoth shear zone, where the first drilling would be done, is coarse granite, and should drill fairly well.

# Location or Purchase of Other Ground

The American and Britton claims do not have any immediate interest, and the showings on the American, particularly, are not very good, If the Britton claim can be cheaply secured, it might be worth purchasing, but it does not cover any of the main shear zone.

Consideration should be given to exploration on the Duco Boy property, on what is presumably the extension of the major shear zone on the Amity Group. If so, and perhaps in any case, intervening ground on the main shear zone between the properties might well be secured. Some or all of it is probably open to location.

### WATER SUPPLY

A 7-foot well has been sunk in the bed of Copperopolis Creek on Amity No. 8 claim. Water from this is pumped to a 750-gallon tank and used for the assay office and domestic purposes. Water was standing in this well even after the long period of drought this year. There are also two springs along the creek near the old camp.

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Ample water for drilling and mining should be available if deeper wells are sunk in Copperopolis Creek, which has a fairly large drainage area to the north.

Penny: 1 Cash upsigning to send you this but Mrs. cook had another strake. She's still bod aff. Willlet you know how she gets along. I row what I understand, Magnia sailled and hale in this prospect then backed off. Cook will probably Call you soon. It wonto to know what you think of this property. John



