



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

The following file is part of the Edwin Noel Pennebaker Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

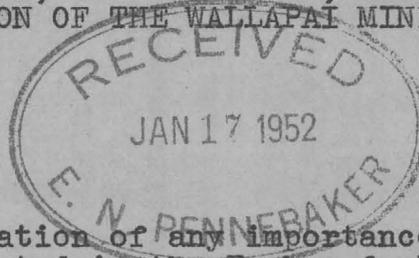
The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

FROM R. W. Ludden CITY Prescott, Arizona
TO F. Sharp, Exploration Superintendent DATE January 15, 1952
SUBJECT EXAMINATION OF THE CHARITY GROUP, COUSIN JACK COPPER GROUP,
LADY BUG GROUP, TYLER GROUP, J AND J GROUP, AND D AND H
GROUP, MINERAL PARK SECTION OF THE WALLAPAI MINING DISTRICT,
MOHAVE COUNTY, ARIZONA



Conclusions:

The only mineralization of any importance observed on the claim groups was noted in the Evahom fault zone. The outcrops and metallization, however, indicate that the potentialities of the zone are too small to warrant further investigation.

I recommend that the claim groups examined receive no more consideration.

Introduction:

The following groups of claims are in the Mineral Park section of the Wallapai mining district, Mohave County, Arizona: (1) Charity group; (2) Cousin Jack Copper group; (3) Lady Bug group; (4) Tyler group; (5) J and J group; (6) D. and H group. The Wallapai mining district is about 15 miles northwest of Kingman, Arizona.

The claim groups were examined by my assistant, S. Brown, and me on January 3 and 4, 1952. We were accompanied on our examination by C. L. Lind, Box 224, Chloride, Arizona, representing the owners and lessees.

Charity group:

The Charity group consists of 13 contiguous unpatented claims in sections 19 and 20 of T. 23 N; R. 17 W., in the Mineral Park section of the Wallapai mining district, Mohave County, Arizona. This group is owned by A. Jagerson and has been leased by G. Patterson and C. L. Lind.

The Evahom mine comprises the major development work in the group. It consists of two levels having a total of about 1300 feet of drifts, crosscuts, raises, and stopes. The upper workings are stoped to the surface. They are in the oxide zone and were worked for gold and silver. The lower level exposes both oxides and sulfides. Several small stopes suggest that a few hundred tons of ore were shipped.

The fault zone containing the Evahom mineralization strikes about west, dips 50-70 degrees north, and occurs in

FROM R. W. Ludden CITY Prescott, Arizona
TO F. Sharp, Exploration Superintendent DATE January 15, 1952
SUBJECT EXAMINATION OF CLAIM GROUPS IN WALLAPAI MINING DISTRICT,
MOHAVE COUNTY, ARIZONA

Page 2

a medium- to coarse-grained granite. It is mineralized for about 1200 feet in length and an average of three to four feet in width. The ore mined on the lower level occurred in small shoots where the zone widens to approximately 12 feet. The aggregate length of the shoots is about 300 feet. Generally, wall rock alteration consists of chloritization, sericitization, silicification, and occasionally kaolinization. The gangue minerals are largely quartz and pyrite. Primary metallization consists of galena, sphalerite, chalcopyrite, gold, and silver. The average depth of oxidation is estimated to be from 50 to 70 feet.

Cousin Jack Copper group:

This group consists of seven contiguous unpatented claims and lies directly southeast of the Charity group. The claims are owned by W. Bolinger, C. L. Lind, A. Jagerson, of Chloride, Arizona.

The major outcrops are medium-to coarse-grained granites, gneissoid granite, and a coarse-grained gabbro. A minor amount of metallization was observed in the group. A heavily pyritized and sericitized fault zone, which is sparingly and sporadically metallized with galena, sphalerite, and chalcopyrite, is one of the most prominent zones. It occurs in the gabbro, strikes north 40 west, and is about vertical.

Lady Bug and Tyler groups:

Each group is composed of three claims, and the two groups form a block of six contiguous unpatented claims. They are about $\frac{1}{4}$ mile east of the Charity group in section 20, T. 23 N.; R. 17 W., and owned by A. Jagerson.

The predominant rock type is a coarse-grained granite. The outstanding mineralization in these groups is contained in a fault zone which occurs in a coarse-grained granite, strikes north 25 west, and dips about 65 degrees east. Galena, sphalerite, gold, and silver in a gangue composed of quartz, pyrite, sericite, and clay minerals comprise the major portion of the mineralization. Metallization occurs sporadically along the mineralized zone, which is estimated

FROM R. W. Ludden CITY Prescott, Arizona
TO F. Sharp, Exploration Superintendent DATE January 15, 1952
SUBJECT EXAMINATION OF CLAIM GROUPS IN WALLAPAI MINING DISTRICT,
MOHAVE COUNTY, ARIZONA

Page 3

to be 800 feet long and three to four feet wide. The depth of major oxidation in the zone is about 50 feet.

D and H group and J and J group:

The D and H group is composed of nine claims and the J and J group of six claims. They form a block of 15 contiguous unpatented claims located about $1\frac{1}{4}$ miles northwest of the Charity group in section 13, T. 23 N.; R. 18 W. They are owned by J. H. Hagey, Chloride, Arizona.

The major rock type is a coarse-grained granite, which is cut by several mineralized fault zones. Typical of these is the zone which is explored by the Snafu workings. The mineralized zone strikes north 30 west and dips about 60 degrees east, is two to three feet wide, and approximately 1,000 feet long. Alteration minerals noted were chlorite and sericite. The common gangue minerals, quartz and pyrite, are occasionally metallized with small amounts of galena, sphalerite, gold, and silver.

Summary:

The fissure vein, occurring in fault zones which strike from northwest to west and dip 50-70 degrees northerly, is the predominant type of mineralization in these groups. The oxide zones with good silver and gold values created the original interest; however, as the sulfide zone is penterated the silver and gold values decrease. Mineralization consists of rock alteration whereby sericitization, chloritization, kaolinization, and silicification have taken place, and of primary metallization in which galena, sphalerite, gold, silver, and occasionally chalcopryrite were deposited with the gangue minerals quartz and pyrite. Mineralization occurs in all the major rock types which are: (1) medium- to coarse-grained granites; (2) gneissoid granite; (3) coarse-grained gabbro.

An examination of the underground workings and the outcrops of most of the mineralized zones on the claims indicates that the metallization associated with them is of insufficient quantity and too sporadic to warrant further consideration.

FROM R. W. Ludden CITY Prescott, Arizona
 TO F. Sharp, Exploration Superintendent DATE January 15, 1952
 SUBJECT EXAMINATION OF CLAIM GROUPS IN WALLAPAI MINING DISTRICT,
 MOHAVE COUNTY, ARIZONA

Page 4

I recommend that all of these claims be turned down.

Sampling:

Sample no.	Description
4217	Au - .01 ozs., Ag - 1.87 ozs., Cu - .300 %, Zn - 3.06 %, Pb - trace; Charity group, Evahom workings; four foot chip sample across west face of stope 185 east of crosscut, twenty feet above drift; 50 percent oxides.
4218	Au - .03 ozs., Ag - 17.83 ozs., Cu - .460%, Zn - 2.47%, Pb - trace; Charity group, Evahom workings; three foot chip sample across west face of stope, thirty feet above drift, 246 feet east of crosscut; 10 percent oxides.
4219	Au - trace, Ag - trace, Cu - .036%, Zn - trace, Pb - trace; 2½ foot chip sample from east face of main drift; 50 percent oxides.
4220	Au - trace, Ag - .12 ozs., Cu - .096%, Zn - trace, Pb - trace; five foot chip sample from west face of main drift (at crosscut); 50 percent oxides.
4221	Au - .01 ozs., Ag - 1.23 ozs., Cu - .060%, Zn - trace, Pb - trace; Cousin Jack Copper group, Cousin Jack tunnel; six foot chip sample across face of Cousin Jack drift; 250 feet from portal; sulfides, heavy pyrite.
4222	Au - trace, Ag - trace, Cu .010%, Zn - trace, Pb - trace; Lady Bug group, Lady Bug mine; five foot chip sample across back of drift, 150 feet from portal; oxides.

R. W. Ludden
 s/ R. W. Ludden

January 22, 1952

Mr. A. J. O'Connor
General Manager
Consolidated Coppermines Corp.
Kimberly, Nevada

Dear Art:

Enclosed herewith is copy of the
report by R. W. Ludden on a claim group in
the Chloride area north of Kingman, Arizona.

Yours very truly,

ENP:mc
encl.

cc - Mr. J. Frank Sharp
Mr. C. P. Jenney

AMCO EXPLORATION, INC.

61 BROADWAY
NEW YORK 6, N. Y.

SALT LAKE OFFICE
912 KEARNS BUILDING
SALT LAKE CITY 1, UTAH

TORONTO OFFICE
68 YONGE STREET
TORONTO 1, CANADA

TGM/lw
March 9, 1953

Mr. E. N. Pennebaker
P. O. Box 817
Scottsdale, Arizona

Re: Cleopatra Mine, Mohave County, Arizona

Dear Penny:

I have your letter of March 3 addressed to Phil Jenney, in which you make mention of the Cleopatra Mine and C. L. Lind, Box 224, Chloride, Arizona. Our files show that Phil Jenney wrote Lind on February 25 advising him that we would not be interested in the Cleopatra Mine, copy of which letter you received.

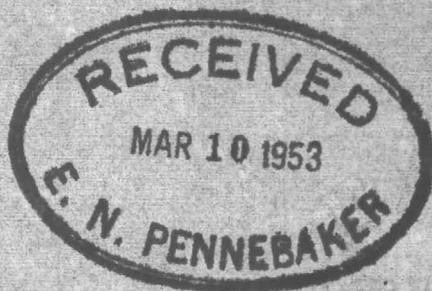
The Cleopatra Mine itself, according to Lind's letter, is located near Swansea, Mohave County, Arizona and was churn drilled back in the 1930's and later looked into for us by Mr. J. T. Matson in 1940. We have quite a file on it here in case you are interested. You may also be interested to know that the property was first brought to the attention of the Metal Company in 1913 and later in 1925. The official title of the company, by the way, is Cleopatra Copper and Gold Mines Company, Owens Mining District, Mohave County, Arizona.

Kind regards,

Sincerely yours,



T. G. Moore



FROM John Hope, Chief Geologist CITY Kimberly, Nevada
TO G. I. Cook, General Manager DATE January 4, 1946
SUBJECT Memorandum on the Moss and the Black Dyke Mines. *Arizona*

MOSS MINE:

On December 15th and 16th, 1945, Mr. Lester Kitch and I briefly examined the Moss Mine which is located some seven miles to the northwest of Oatman, Arizona, in the San Francisco Mining District of Mohave County, Arizona.

The geology of the mine and the immediate area is essentially as was described in my earlier report of November 16th, 1945. However, it was noted that several northwest faults offset the vein which would tend to increase any estimated mining costs.

It was discovered that a Mrs. C. B. Dickie of Kingman, Arizona, was the principal owner, holding title to eight claims on the strike of the Moss Vein. Also, three other individuals own four additional claims. It would be necessary to acquire all of these claims to completely control the property. Mrs. Dickie has optioned her claims to a Mr. J. W. Reed whose address is 7922 Beverly Blvd., Los Angeles, 36, California. We could not discover whether or not Mr. Reed holds options on the other four claims.

In 1939 a Mr. Hillier had an option on Mrs. Dickie's property, and during the period of that option Mr. Hillier thoroughly sampled the mine and also spent considerable money in development. His work showed a moderate tonnage of \$3.00 ore available; however, the deposit is not amenable to a large scale mining operation, selective mining would be the only system that could be used.

The vein becomes poorer at depth, and the fact that faulting offsets the vein, would tend to make the mining operations more costly than it was first assumed.

Two samples of the vein outcrop were taken for petrographic work. These averaged 0.175 oz. gold/ton and 1.21 oz. silver/ton. Further sampling did not seem justified in view of the above given data.

Since the property is already under option, further investigation does not seem warranted.

BLACK DYKE MINE:

The Black Dyke Mine is situated five miles east of the Colorado River due west of Kingman in the San Francisco Mining District of Mohave County, Arizona. Some difficulty was encountered in locating the mine and its owners since the area is covered with small properties. While Mr. Kitch and I did visit the property, we did not know it until later.

Evidently the mine was last operated by the Princess Gold Mining Co. of which a Mr. F. T. Mullen was president and owner. Upon Mr. Mullen's death, so we were informed, the title passed on to a Mrs. E. R. Williams of Los Angeles, California. In answer to an inquiry as to the present status of the property,

FROM

CITY

TO

DATE

SUBJECT

Memorandum on the Moss and the Black Dyke Mines.

Page 2.

the recorder of Mohave County has advised that a Mr. E. A. McVicar of Kingman, Arizona, can supply all the information we need. I have written Mr. McVicar requesting that information and am now waiting for an answer.

JH/mc

John Hope

Mohave Co ?

CPJ/ms
January 28, 1953

Mr. C. L. Lind
Chloride, Arizona

Dear Mr. Lind:

This will acknowledge your letter of January 21st enclosing an engineer's report on the Old Roth Copper Group and also informing us of another property which you have in the same area. We would be interested to have you forward the data on this second property, as well as any further information you have on the Old Roth. After studying it here in New York, we will forward it to our consultant in Phoenix and instruct him to take the matter up with you. However, our consultant will not be in Phoenix until about February 20th so that we would appreciate the chance to study this material in New York before sending it on to him.

Yours very truly,

C. P. Jenney

*Nothing in
our files.*

Chloride, Ariz.
Box 224
Jan. 21st. 1953

Rec 1-26-53

American Metal Co.
61 Broadway, N. Y.

Gentlemen;

I have known a mining engineer here in Arizona for a number of years that worked for your company down in Chile, many years ago. Recently upon learning that I had some copper properties for sale suggested that I contact you. I am enclosing a mining engineers report on one of these properties. I also have an option on a large copper property that lies near the one I have enclosed the report on. This property does not have any development work done on it however, only assay samples cut here and there; which shows 3% copper, \$4.50 per ton in gold, 5 ozs. of silver. Engineers estimate there is thirty some odd million tons of ore in sight, of course without any diamond drilling done on it one would not know to just what extent this huge deposit would run. However if interested in these properties let me know at once and I can give you further particulars.

Sincerely

C. L. Lind

C. L. Lind

CPJ/ms
February 10, 1953

Mr. C. L. Lind
Chloride,
Arizona

Dear Mr. Lind:

Thank you for your letter of February 3 with further information on the copper properties in Arizona. I am forwarding copies of our correspondence to Mr. E. N. Pennebaker Box 817, Scottsdale, Arizona, our consultant in the southwest, and am asking him to get in touch with you further regarding this matter.

Yours very truly,

C. P. Jenney

cc: Mr. E. N. Pennebaker ✓

Box 224
Chloride, Arizona
Feb. 3rd. 1953

Mr. C. P. Jenney
61 Broadway
New York 6, N. Y.

FEB 9 1953

Dear Mr. Jenney:

In answer to your letter of Jan. 28th. concerning the Old Roth copper property, and the second property in the same area; I am sorry to say that I am unable to locate one other engineer's report that I had. On the second property there has been no development work, this property has been held in the same family since Indian days and nothing done but assessment work; now it has been decided upon to sell the entire property.

I contacted the well known American Smelting and Refining Co. and they in turn placed the investigation in the hands of an engineer in Las Vegas, Nevada. He has written me twice and said he would be over and check these properties, but he is so busy right now over a milling problem for the Key West Nickel & Copper Co. that he now does not know just when he can get here.

I have grown tired of waiting and want some action on these properties, hence my writing to your Co. Now just yesterday while in Kingman, Arizona an old friend of mine Bill Howard, a Mineralogist, informed me that he has had a very large copper property placed in his hands for sale. It has not been worked for years. The overall average of this ore is 1 1/2 % copper, and there has been several thousand tons shipped from this property several years back and some of it ran as high as 6 % copper, but as I said the average of everything is 1 1/2 % copper, and it is an open pit job. My friend said that he would have the papers and engineer reports on this property within the next few days, so if and when your consultant in Phoenix gets in touch with me I can place all of this information at his disposal.

I know of another deposit here close to Kingman of copper that is thirty feet wide on the surface and runs 6 % in copper, however, I do not think you would be interested in that small a deposit. The others I have mentioned concerns vast tonnage into the millions of tons. Now when your consultant wished to get in touch with me, he had better write me first as I do not live in Chloride. I am up at some mines I have under lease about 15 miles between Kingman and Chloride, in the Mineral Park district, where Uranium was just recently found; field crews for the ATOMIC ENERGY COMM. are now going all over this district.

Sincerely

C. L. Lind

C. L. Lind

A REPORT ON THE OLD ROTH COPPER GROUP

BY

WALTER W. WISHON
MINING - ENGINEER

I have made an examination of the Old Roth Group, located about 20 miles northerly from Vidal California, a station on the Parker cut off of the Santa Fe System, over which a branch line could be very economically built.

Preliminarily, I may state that this is a large group of claims, covering one of the greatest mineralized outcrops that it has ever been my lot to see. The mineralized area is very wide, approximately 400 feet, one half of which, or 200 feet, is intensely mineralized with iron sesqui-oxide, (red hematite) in fact frequently found in pure state for considerable width, and where not pure, the gangue is a kindly, soft, decomposed porphyry, in which ore bearing solutions can easily permeate. This intense mineralization has a length of fully seven hundred and fifty feet, in the center of the group, while the general mineralization can actually be traced for at least a mile in either direction along the strike- east or west- from this point.

This immense fissure or zone appears to be almost vertical- the north wall apparently a granite schist- while the south wall is apparently an altered andesite, which would account for the kindly gangue of the vein filling.

A vertical shaft has been sunk to a depth of 150 feet in the center of the most intense mineralization. At the 100 foot level, a 60 foot crosscut, southerly from the shaft showed 1% copper, 2 oz. silver, and \$1.60 (old price) gold per ton.

Fissures of 18 inches to 4 feet in width, which strike into this great intense mineralization above mentioned, at a slight angle, on both walls- showing bornite, or peacock copper ore, assaying as high as 10% copper.

To the south of the Old Roth Group, at a distance of about 4 miles, lies a parallel mineralization- known as the American Eagle Group, which is not nearly so great in width and length but showing 10 feet of copper ore from the 80 foot level to the 300 foot level, from which a large number of car loads have been shipped to the smelter, that assayed 10% copper or better, the remainder being splendid concentrating ore.

The Old Roth Group, will develop into a similar property to the American Eagle Property, with the exception that it is so much greater that it will require proportionately greater development.

The conditions described are those that make huge copper mines upon judicious development, depth being the chief feature desired. The fissure or zone is so great that I would advise first, that several deep churn drill holes be put down upon it and thereafter the shaft sunk to a greater depth than the churn drill holes, drive and crosscut from the bottom of same. The churn drill holes should be at least 600 feet.

W. W. WISHON -2-

After an experience in the copper Industry for 30 years, first in the smelters, then in mining and milling, then in the field, I can unhesitatingly say that this showing is one of the greatest I have ever seen and it is bound to show enormous ore shoots of concentrating with the usual accompanying shipping grades.

Water level has been ascertained to be about the 100 foot level, therefore, it is developing its own water supply for all concentrating purposes.

I would like to have advisory charge of the development work from its inception on this property, if properly financed.

For your information, I may state that I have developed a somewhat similar showing to this property, the Speculator Mine in Butte, Montana to the 2,000 foot level. I extracted from it \$5,000,000. in 5 years 60% or \$3,000,000. of which was net profit. At that time the Speculator Mng. Co., disposed of it for \$5000,000. in cash.

I firmly believe that you have a similar opportunity at the Old Roth Group and due to its greater extent probably much more.

Yours very truly,
(signed) W.W.WISHON

SUPT.	SPECULATOR MNG. CO.	for 5 years
SUPT.	RAMSDELL PARROT MINE	for 4 years
SUPT.	MINNIE HEALY MINE	for 2 years
GENERAL MGR.,	AUSTIN NEV MINES	for 4 years

FROM J. Frank Sharp, Exploration Superintendent
 CITY Kimberly, Nevada

TO A. J. O'Connor, General Manager
 DATE July 29, 1952

SUBJECT J. H. COWAN PROSPECT, OWENS MINING DISTRICT, MOHAVE COUNTY, ARIZONA

Mr. J. H. Cowan of Blythe, Arizona, owns the prospect which is located approximately 50 miles north of Wenden, Arizona, in Mohave County and on the north side of Bill Williams River.

The property consists of 12 claims that are not contiguous and are surrounded by claims of other ownership.

Gold and copper mineralization occur in shear zones that cut across the gneissoid structure of a granite gneiss, - probably of Precambrian age. These zones are widely spaced over the area but are quite continuous but relatively narrow with the mineralization locally tending to follow out along the banding in the gneiss. Gold has been the principal mineral of interest and it is associated with copper oxides in most instances, locally chalcopyrite and minor amounts of chalcocite can be found.

Samples were taken of a number of the superficial cuts and trenches scattered over the property. The results are as follows:

Sample No.	Location	Oz.Au.	Oz.Ag.	% Cu
5083	5' Bulldozer Cut	Tr	Tr	0.02
5084	5' Chip Silicified zone in Cut	0.02	0.08	0.03
5085	Grab from Surface	Tr	Tr	0.04
5086	High Grade Bulldozer Cut	0.04	0.14	10.63
5087	18' Chip of Old Glory Vein	Tr	Tr	0.04
5088	3' " " " "	0.18	0.12	0.45
5089	5' " " " "	Tr	0.09	0.31
5090	3.5' Chip Gold Link No. 2	Tr	0.02	0.10
5091	2.5' " " " "	Tr	Tr	0.08
5092	4' " Gold Link No. 1	Tr	0.08	0.10
5093	0.8' " High Grade in Cut Face	0.79	0.25	0.30
5094	Grab Ore Midas Fraction shaft	0.04	0.17	0.10
5095	5' Hangwall 3.5' on foot wall shear zone Wonder No. 3	Tr	Tr	0.16
5096	3' Center Shear Zone Wonder No. 3	Tr	Tr	0.08
5097	4.5' Brecciated Gneiss Wonder No. 3	Tr	Tr	0.10
5098	Ore Dump - Sally Ann	0.03	0.19	0.34

In summary, the mineralization is too weak, and the metallization too scattered to be of further interest to us.

JFS/ps
 cc - Mr. E. N. Pennebaker
 Mr. J. McLaren Forbes



FRED SEARLS, JR.
14 Wall Street
New York 5, N. Y.

Enclosed file

Mohave Co

H. D. S.

January 4, 1950.

Mr. Alan M. Bateman,
Yale University,
New Haven, Connecticut.

Dear Alan:

In the interest of accuracy, the enclosed "discussion" is offered of the thesis of Mr. Thomas on "Ore Deposits of the Hualpai District in Arizona," which occupies forty pages in the recent No. 8 of ECONOMIC GEOLOGY.

If you care to insert it in the next issue, you are free to do so.

Sincerely yours,

Enclosure

FS:imd

FRED SEARLS, JR.
14 Wall Street
New York 5, N. Y.

January 3, 1950.

The Emerald Isle Copper Deposit.

Sir:

Mr. Thomas, in publishing his thesis on the ore deposits of the Hualpai District, Arizona, could not have been advised of certain information concerning the interesting Emerald Isle copper deposit, which he describes at the end of his paper, because the facts were not fully demonstrated until 1949, whereas Mr. Thomas advises that his field work was completed in 1948.

The Emerald Isle deposit having been known for many years, has been visited by a fair proportion of the active geologists of the United States; many of whom, like the writer, have long been puzzled as to the source of the abundant chrysocolla and other secondary copper minerals that have given the locality its name, and which coat the pebbles and occur in--and perhaps to an extent replace--the finer materials in the bottom layer, or horizon, of the Gila conglomerate or cemented alluvium that covers the bedrock of this pediment of the Cerbat Range.

Interest in the occurrence is heightened by the wagon-drilling performed in 1947 and 1948 by Lewin-Mathes of St. Louis, which expanded the area of known chrysocolla-bearing material to the extent of indicating in the neighborhood of a million tons of gravel containing as much copper per ton, as is afforded by much of the commercial ore being mined elsewhere in the state.

Rather than to have unchallenged in the record the rather startling suggestion that this chrysocolla "resulted from deposition by ascending hypogene solutions that rose along one large and many small fissures and spread out into the adjacent alluvium," the writer begs leave to contribute the following:

Churn drilling by the Calumet and Arizona and development by many individuals and groups (some listed

by Schrader), have demonstrated these many years that important, although probably non-commercial, amounts of disseminated copper are contained in "The Bronco" or mineralized belt associated with the granite-porphry intrusions of Mineral Park, and covered by Mr. Thomas as the "Ithaca Peak disseminated sulphide deposit."

The higher elevation of this belt and the present occurrence of soluble copper in the run-off from it, through Mineral Park wash (to the extent that copper has been and is still recovered from it, by precipitation on scrap in certain seasons), has convinced many geologists that Emerald Isle chrysocolla originally derived from the sulphides connected with this mineralization a mile or more distant.

This writer shared the skepticism of Mr. Thomas as to likelihood of the transfer, and still more of the localization, of the (circa) ten thousand tons of copper now known to exist in the secondary ore of Emerald Isle, from the Mineral Park disseminations; the more so as on the basis of present topography, higher bedrock separates the discharge of Mineral Park wash and the Emerald Isle deposit, a mile to the north of it. No chrysocolla deposits are known to exist in the bottom of the Gila conglomerate in the area currently receiving the waters of Mineral Park wash.

Equally unacceptable is the theory that the "vein" at Emerald Isle was the source of primary ore. The "vein" is one of a series of post-Gila faults that step down the pediment of the Cerbat Range and develop the graben of the Sacramento Valley, where the Gila and other agglomerate is very deep. Several of these faults are nearly parallel; and while only two are indicated by the topography, seismic work discloses others, successively stepping the bedrock down to the west and deepening the overburden on the basal layer.

As has been pointed out by several engineers, the "vein" ceases to be a vein below the depth at which it ceases to have the Gila conglomerate on one wall. Below its dip shift, the fault is unmineralized. Whatever the source of the copper, the emplacement of the

January 3, 1950.

chrysocolla (and copper pitch) in its present position has been brought about by a process equivalent to that, under which the African and Australian laterites accumulate. Acid copper-bearing solutions have at certain seasons over a long period of years, trickled along the bedrock of this area and, as the rainy season yielded moisture to the pull of the sun, have been raised by capillary action into the lower layers of the gravel. Banding in the distribution suggests that certain of the layers contained a little calcium carbonate--as caliche--but not enough to exhaust the acid supply. Not only at the intersection of the "vein", but also at other small slips and irregularities in the conglomerate, the capillary action and perhaps osmosis has sucked the green water higher along these avenues of better circulation and, as Thomas says, the "veinlets pinch out upward" and "the chrysocolla filling apparently was deposited by ascending solutions." They ascend, however, only from the top of bedrock.

As this conclusion, amply supported--in the writer's judgment--by observation in the present workings, leaves unanswered the ultimate source of the copper, Mr. Arthur Storke and the writer, last year, in behalf of Climax Molybdenum Company and Newmont Mining Corporation, conducted geophysical surveys over the area, using a method that detects disseminated sulphides--whether of iron or copper. Briefly, the work resulted in the discovery of a large mass of "protore," lying adjacent to and east of the chrysocolla deposit. This rock carries from 1% to 2½% sulphide, and is too low in copper content to warrant drilling. At one small area, this remnant of a "porphyry copper" actually emerges east of the cover, and presents the gossan of a disseminated body of pyrite carrying perhaps 0.2% Cu.

There is little doubt that this dissemination (extending over several hundred acres) constitutes the roots or protore of a more important--and possibly at one time commercial--"porphyry," of which the secondary enrichment occurred, as elsewhere in Arizona, in pre-Gila time. Despite its destruction, the verdure deriving from its wasting chalcocite still adorns the residues of its former cap and enclosing host rocks.

Fred Searls, Jr.

FS:imd

CONSOLIDATED COPPERMINES CORP.

Florence, Arizona
May 30, 1949

FROM: F. V. Tompkins, Asst. Chief Geologist

TO: Mr. John Hope, Chief Geologist

MINERAL PARK AREA, CERBAT MINING DISTRICT, ARIZONA

Mohave County

Introduction

On May 6 and 7, I visited the Mineral Park area of the Cerbat Mining district. Mr. Floyd Brown of Globe who brought this area to Coppermines attention accompanied me during this reconnaissance.

Conclusion

Strong disseminated-type mineralization occurs in an area of quartz-sericite alteration which is south of Mineral Park. Leached outcrops indicate that a relatively large amount of pyrite and a small amount of copper sulfides were present. Samples from the dumps of workings which enter the sulfide zone assay less than 0.01% in copper. Because of the small amount of copper that is indicated, the area does not warrant further consideration from Coppermines.

Location

The area which was examined is three to five miles southeasterly of Chloride, Arizona between Mineral Park and the front of the Cerbat Mountain Range. It comprises about two square miles and lies within the four sections, Sec. 19 and 30, T 23 N, R 17 W, and Sec. 24 and 25, T 23 N, R 18 W, (see sketch).

Geology

The oldest rocks south and east of Mineral Park are pre-Cambrian in age. These are granite which generally is more or less foliated and locally has been metamorphosed to a schist, and diorite. An irregular area of quartz-sericite alteration lies within the pre-Cambrian rocks. This area of alteration which encompasses about one square mile is perhaps a Tertiary granitic intrusion. Highly siliceous veins which cut the pre-Cambrian rocks are probably younger than the altered rock. At least one acid dike is intruded into the altered and pre-Cambrian rocks and is reported to be several miles in length. The most recent rock, a conglomerate which is cemented with iron oxides, occurs as isolated remnants along the sides of the canyons.

Mineralization

Two general types of mineralization are present in the Mineral Park area. The first is the siliceous veins which are cutting the pre-Cambrian rocks and lie within the northwesterly striking vein pattern of the Cerbat Mining District. Valuable deposits of lead, zinc, gold, silver, and a small amount of copper occur as pockets or shoots in some of these veins.

The second type of mineralization is a dissemination of pyrite which occurs in the quartz-sericite rock and is limited to the area of quartz-sericite alteration. This alteration and mineralization covers an area of about one square mile. Most of the rock shows evidence of pyrite and much of it may be considered as heavily mineralized. Associated with the pyrite are chalcopyrite, chalcocite, and locally molybdenite.

Surface indications of mineralization are seen in the leached outcrops which have limonite occurring both in fractures and in the rock between as disseminated grains. The limonite is the type which is derived from a large amount of pyrite such as pseudomorphic limonite and pyrite "boxwork". In many places fractures containing limonite are spaced at relatively frequent intervals. A small amount of limonite after chalcocite and an even lesser amount of chalcopyrite boxwork indicate that copper was present. Other surface indications of copper are turquoise which is found throughout much of the rock and a small amount of copper carbonates which was seen in one location.

Except for shallow prospect pits, the only workings seen in the quartz-sericite area were a shaft and two adits. These workings were driven by the Calumet and Arizona Copper Co. in Bismark Canyon a few hundred feet above the Goose Ranch. Sulfides were encountered in these from 20 to 30 feet below the surface. Rock on the dump contain heavy pyrite, sparse chalcocite, and occasionally molybdenite. Mr. Brown said that some of this rock was reported to assay 0.5 % in copper.

Assays

The following samples were taken from the Mineral Park area for assay.

Sample No.	Assay				Location
	Oz Au	Oz Ag	% Cu	%MOS ₂	
3951	Tr.	Tr.	.092		K shaft, 1/4 mi S of mill, pyrite in Tgr (?), dump grab.
3952	Tr.	Tr.	.023		Ithaca Peak, leached outcrops, visable turquoise.
3953	Tr.	.02	.046		Along N-S road, SE part Sec. 24, leached outcrops.
3954	Tr.	.02	.089	.017	Goose Ranch, shaft dump, strong pyrite, grab.
3955	Tr.	Tr.	.044	.085	do , dft E side Bismark Can., strong pyrite, dump grab.
3956	Tr.	Tr.	.057	.063	Goose Ranch, Dft W side Bismark Can., strong pyrite, dump grab.
3957	Tr.	Tr.	.031	.061	Goose Ranch, leached outcrops.

Sample No.	Assay			Location
	Oz Au.Oz	Ag.%	Cu.%MOS ₂	
3958	Tr.	.04	.25	Southern edge, quartz-sericite area, leached outcrops.
3959	.02	.90	.028	Southern edge, shaft dump grab, visible pyrite, vein in pre-G granite
3960	Tr.	Tr.	.011	NE side quartz-sericite area, leached outcrops.

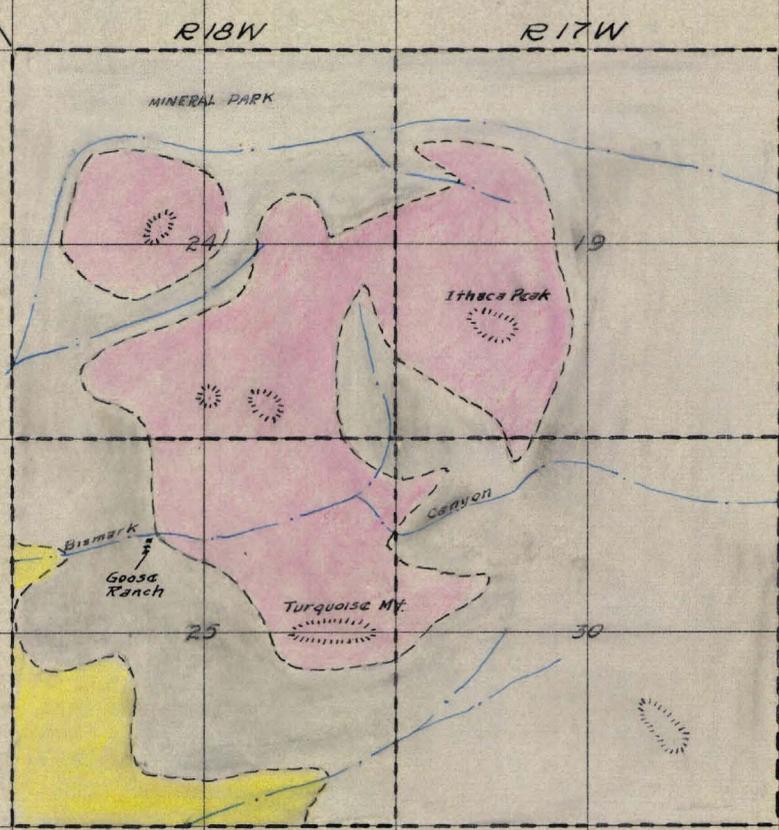
The prospects driven by the Calumet and Arizona Copper Co. should give the most reliable indication of the amount of copper present. Samples Nos. 3954, 55, and 56 were taken from the dumps of these workings.

Possibility of Enrichment

The possibilities of a copper deposit formed by enrichment will be considered. Other conditions unfavorable for the formation of such a deposit are the lack of structure and the wastage of copper. During the reconnaissance, no structure was seen that would aid in the concentration of copper. The small amount of copper in the rock is easy to leach and probably difficult to precipitate. Mr. Brown stated that during wet seasons the water of Bismark Canyon has a visible copper content. In this canyon copper was seen replacing iron pipe and scrap iron. About two miles west of a point from where Bismark Canyon leaves the front of the range, the Emerald Isle Mine is located. In this mine a bed of conglomerate about 6 feet thick contains copper salts. The property has been operated intermittently with ore being mined from an open pit and copper recovered by acid leach. This wasting of copper through runoff will lessen the chances for the formation of an economic secondary copper deposit.

P. W. Tompkins

3 MI TO CHLOREIDE



GEOLOGIC SKETCH
OF THE
MINERAL PARK AREA
CERBAT MINING DISTRICT
ARIZONA
Scale: 1" = 1/2 MI.

LEGEND

- Pre-Cambrian rocks: granite, schist, and diorite.
- Rock altered to quartz and sericite.
- Valley fill.