

famous mineral localities:

the New Cornelia mine Ajo, Arizona

by William J. Thomas
P.O. Box 202
Ajo, Arizona 85321

and Ronald B. Gibbs
210 La Mina Avenue
Ajo, Arizona 85321

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[REDACTED]

The following is a copy of mining reports made by Engineers
Danehy and Mitchell, on the property belonging to the company.

THE COPPER DEPOSITS

AT

AJO, PIMA COUNTY, ARIZONA

BY

GEORGE W. DANEHY, E. M.

GENERAL DESCRIPTION

The copper deposits at and near Ajo, Pima County, Arizona, which lies 45 miles south of the town of Gila, on the main line of the Southern Pacific Railway, have been known for a number of years, and at many points were worked in former years for their silver or gold contents. As a general rule the ores were considered to be too low grade to be utilized for the copper content, and for that reason development in the district has been slow. Also, since Ajo had poor transportation facilities, copper ores which might have been worked at a profit were considered of no commercial value.

A railroad has now been built from Gila into the Ajo district, the terminus being at Cornelia, the new townsite located about two miles from the old Mexican village of Ajo. The building of the rail connection has given new life to the camp and during the past two years development has been extensive and the district gives promise of developing into one of the best copper camps in the southwest.

The two properties that have been extensively developed by drilling and shaft sinking are, the New Cornelia, and the Ajo Consolidated. The former property is owned and controlled by interests closely associated with the Calumet and Arizona Company, and it is understood to have developed ore reserves approximating - 20,000,000

tons of copper carbonate ores, and about 40,000,000, tons of disseminated copper sulphide ores in a metamorphosed granite. The average copper content in this ore is about 1.5 per cent, and a large plant is being constructed which will be in operation some time in March, 1917.

This plant has been built at a cost of about \$7,500,000, for the treatment of the carbonate ores, no provision as yet having been made for the treatment of the underlying disseminated low grade sulphide ores. The crude ores will be crushed to a size to pass a $\frac{3}{8}$ inch mesh screen, and the copper will be leached in a sulphuric acid solution consisting of one part of acid to two of water in 5,000 ton leaching vats. After leaching has been continued for ten days the copper bearing solution will be removed and passed through percolation chambers where sulphur dioxide gas will change the included salts in solution from the ferric to the ferrous state. The ferrous solution will then be pumped into precipitation tanks where the copper will be precipitated electrolytically.

Extensive tests have been made in the old test plant, and the extraction of copper obtained has averaged between 80 and 90 per cent from the crude ores. It is expected that the new plant will extract on an average of 90 per cent or better of the copper values.

Surrounding the granite belt of the New Cornelia, the deposits occur in a metamorphic diabase which extends for miles. Copper values show at many points.

The Ajo Consolidated property lies in the diabase, and it is claimed about \$10,000,000, to \$15,000,000, of ore has been proven by drilling operations during the past two years. Some of this ore is a high-grade sulphide, and it is reported that large interests are negotiating for the purchase of the claims with a view of opening the ground for large scale operations.

It has been the general belief that the Ajo district was entirely a low grade district, owing to the results obtained in the development of the New Cornelia deposits in the granite. The development work at present tends to show that the deposits in the diabase will produce much high grade shipping ore. Active work is being carried on at a number of properties in the diabase belt, and the results to date seem to show low grade disseminated copper values in the diabase and fissures, at intervals filled with copper ores of a grade that will stand direct shipment. So far, the values obtained from the fissure deposits have run from 4 to 40 per cent copper, and up to 30 ounces of silver to the ton. Some car lot shipments of about 30 tons of this class of ore have netted about \$750.00 per car.

Silicates of copper predominate in the diabase from the surface down to about 100 feet where sulphides are now coming in, although a little sulphide shows in samples taken and examined from points nearer the surface.

The Cardigan and the Myers properties, located about two miles westerly from Ajo, are actively engaged in - developing the diabase deposits. The New Cornelia West property, is also in the diabase belt, and will be described below. This property is adjoined by the Cardigan on the Southwest and runs in an east-northeasterly direction almost to the side lines of the New Cornelia.

THE NEW CORNELIA WEST LOCATION

The New Cornelia West group of mining claims consists of twelve claims, lying in the diabase belt of the Ajo district, about $1\frac{1}{2}$ miles in a north-westerly direction from the old Mexican town of Ajo. It is separated on the east by the width of two claims or 1200 feet from the New Cornelia, lying in the granite belt, and is adjoined on the southwest by the Cardigan group, lying in the diabase belt.

A good wagon road with slight grades runs to within one-half mile of the group from Ajo, and rail connections.

TOPOGRAPHY

The elevation of the district ranges from about 1500 to 3000 feet. The country is mountainous, but not rugged, and most points can be easily reached. The vegetation is scant, consisting chiefly of plants of the cactus variety.

GEOLOGY

The country rocks of the district are granites, diabases, schists and porphyries, and are greatly metamorphosed. Other rocks of volcanic origin occur and are hard to classify in a hand specimen, on account of the extreme alteration.

The mineral deposits lie in the granites and diabases, and the mineralization may have been induced by intrusions of porphyries, although it was not noticed that the porphyries themselves contained workable minerals.

It is probable that the deposits were made by hot uprising solutions at the time of volcanic activity.

CLAIMS OF THE NEW CORNELIA WEST

The property of the New Cornelia West consists of twelve claims, and are held by right of location. They are the "MANSION HOUSE NO. 1", "MANSION HOUSE NO. 2", "COPPER NO. 1", "COPPER NO. 2", "DAISY", "WHITE APEX", "ALFRED", "WEDGE", "DAISY NO. 1" "PHILA NO. 1", "PHILA NO. 2".

For the most part they lie in the diabase belt extending in a general southwesterly direction from the contact with the granite on the northeast across the northeast-southwest strike of the diabase formation to the contact with granites and schists on the northwest. The last named granites and schists are not mineral bearing as far as known.

DEVELOPMENT

The development work on these claims consists of location and assessment holes on the different claims, many of them showing copper values in the form of silicate of copper. No sulphide is showing although several pieces of the float picked up on the claims showed some disseminated sulphides of copper and iron.

No true fissure or vein could be seen, and the copper values appeared to be disseminated throughout the diabase, as the location and assessment work has been done not along any definite vein or strike, but at widely separated points.

FUTURE DEVELOPMENT

At the Cardigan property adjoining this group on the southwest, a shaft has been sunk at the intersection of two fissures, one striking northeasterly and southwesterly, and the other in a northerly and southerly direction. The former fissure, if continuous, will strike directly through the claims of the New Cornelia West, but cannot be traced into this ground from the Cardigan on the surface.

It is the opinion of some geologists and engineers that the deposits are not disseminated in the diabase, but confined entirely to the fissures, while others hold a contrary view. It is my opinion that the values will be found throughout the diabase with enriched fissures at intervals, that will contain ores of a shipping grade. Only further development on the part of operators in the district will prove up the true nature of the deposit. The chief development work to date has been the sinking on some well defined fissure showing on the surface.

In developing and proving the character of the deposit on the ground of the New Cornelia West, I would advise sinking a shaft to 100 or 200 feet at one of several points where the assessment work has shown copper values on the surface, and then cross-cutting in both directions. From surface indications a good deposit should be encountered at this depth.

This work can be done on any of the following claims, as copper values show on all of them: "WEDGE", "COPPER NO. 1", "COPPER NO. 2", "DAISY", "WHITE APEX" or "ALFRED". Probably the last named claim is the best location for the shaft, as it is easily accessible, and lies in such position as to aid later development on the other claims.

These six claims in my estimation are the valuable claims of the group, and workable copper values should be encountered at small expenditure of capital.

After several days spent making a superficial examination of this property and the district, I would advise that this group is worthy of vigorous development.

(Signed) GEORGE W. DANEHY, E. M.

Febry. 1917

REPORT

SAYERS GROUP OF CLAIMS

The SAYERS group of mining claims is situated in the Ajo Mining District, Pima County, Arizona, about 35 miles north of the Mexican line and 43 miles south of Gila Bend, a station on the main line of the Southern Pacific Railway. The Tucson, Cornelia & Gila Bend Railway, 43 miles in length, connects the Ajo mining camp with the main line at Gila Bend. With the exception of a few small cattle ranches, Ajo is the only settlement in the immediate vicinity. The Little Ajo mountains rise a few hundred feet above wide desert valleys, beyond which are lava mesas. The camp of Ajo lies at an elevation of about 1,900 feet above sea level, in a basin on the east side of the range. Water for camp is obtained from wells and shallow prospect holes. Cornelia, the nearest railroad station to the Sayers property, is about one mile in a northeasterly direction, by good automobile road.

PROPERTY

The Sayers group consists of eight mining claims (160 acres), and described as follows: MANSION HOUSE NO. 1, MANSION HOUSE NO. 2, COPPER NO. 1, COPPER NO. 2, DAISY NO. 1, DAISY NO. 2, WHITE APEX and ALFRED.

TITLE

The title to the property is held by location under the mining laws of the United States, all the provisions thereof having been fully compiled with.

GEOLOGY

The geology of the Sayers property is very similar to that of the other big proven mines of the Ajo District. The earliest formation exposed in the Ajo District is a series of rhyolite lava, breccia, and tuff beds. Next in age is an intrusion of monzonite porphyry, which cut and uplifted the rhyolite forming domes along the course of the intrusion for a distance of about 25 miles. The most important feature of the geologic structure is the great intrusion of monzonite which cuts and uplifts the rhyolite forming the domes. The crests of these domes have partly eroded away exposing the monzonite in which the great ore bodies are found. There are several of these domes along the course of the intrusion, the first of which occurs about six miles in a northwesterly direction from the camp of Ajo and forms what is known as the Walsh group of claims; the next dome is in the Ajo basin where the New Cornelia, Ajo Consolidated, Pittsburg and Sayers groups are located. In this basin over 60,000,000 tons of commercial ore has been proven by diamond drill-

ling on the New Cornelia and Ajo Consolidated. The next dome is three miles south of Ajo on the trend of the mineral zone and forms the property of the South Cornelia Copper Mining Company and the Gillard Group. About twelve miles still further southeast and near the end of the mineral belt another dome forms the Copper Mountain Mine. The valley surrounding these domes is covered with rhyolite and a shallow conglomerate made up from fragments of monzonite and rhyolite and evidently caused by the rapid erosion of the high domes in comparatively recent times. It is not my intention to enter into a lengthy discussion as to how the mineralization occurred, but it seems that the cooling of the monzonite was accompanied by considerable contraction. This resulted in a jointing and fissuring of the monzonite and the overlying rhyolite. Mineral bearing solutions arose along the deep fractures and deposited the copper in the shattered monzonite and in many instances in contraction fissures in the rhyolite. The ore bodies continue to an unknown depth along the intrusion.

DEVELOPMENT

The development of the Sayers property consists of a number of shallow shafts and surface cuts on the numerous large ore croppings exposed practically all over the property. There is a considerable amount of ore exposed on the property, assaying from 2 per cent to 6 per cent in copper.

REMARKS

The splendid surface showing and the location of the Sayers property, situated as it is on the west rim and extending down into the Ajo Basin where the great mines of the camp are located, will commend itself to anyone interested in mining. From all indications the great ore bodies extend into the Sayers group, and it is only a question of drilling or sinking shafts through the shallow rhyolite capping to reach them. I do not hesitate to recommend it as one of the best investments in the Ajo Mining District.

Respectfully submitted,

J. DONALD MITCHELL,

Consulting Mining Engineer.

P. O. Box 186, Ajo, Ariz.

Ajo, Arizona, October 31st, 1916.

THE AJO CORNELIA COPPER COMPANY'S property is located in the famous Ajo District at Ajo, Arizona, and adjoins the Ajo Consolidated Mines, which has recently been sold as reported by the press, for \$12,000,000.00.

The Ajo Cornelia is within three-fourths of a mile of the New Cornelia which is selling for about \$18.00 per share.

The Ajo Cornelia lies in the same copper basin, has identically the same formations as the Ajo Consolidated and New Cornelia properties, and should, according to expert opinion, be as big a producer with proper development. In view of the fact that the Ajo Consolidated and the New Cornelia have developed such an enormous tonnage at a comparatively shallow depth, the directors of the Ajo Cornelia Copper Co. have decided to continue the present two compartment shaft and also to diamond drill without delay.

The Ajo Cornelia Copper Company

Capitalization - \$1,500,000
Shares, par value - - \$1.00

"Keep Your Eyes on Ajo"

MINES AT AJO, ARIZONA

MAIN OFFICE
MIAMI, ARIZONA

P. O. Box 78

OFFICIALS OF COMPANY

ED. J. GRANT, President.
E. B. SCHOCKLEY, Vice-President.
J. D. ELLIOT, Secretary and Treasurer.

DIRECTORATE

ED. J. GRANT, fifteen years experience in mining and mine examinations.
E. B. SCHOCKLEY, contractor and builder
I. L. GRENINGER, general foreman Inspiration Consolidated Mines.
J. B. JOHNSTON, ex-superintendent Nacozari Consolidated Copper Co., of Mexico.
J. D. ELLIOT, Secretary and Treasurer.

Excerpts from Mining Report on Ajo Cornelia Copper Co.'s Property
at Ajo, Arizona, by Chas. W. Carpenter, E. M.

"Your property consists of 13 full sized mining claims and one fraction. This fraction, claim No. 1, is cut off by the south side line of the Ajo Consolidated Mining Co., leaving about the south half."

"Your claims adjoin the Ajo Consolidated on the south and east and your new shaft is distant from their main shaft about three quarters of a mile. Your camp is only about a mile from Ajo postoffice and you have a good auto road."

ASSAYS

| SAMPLES— | Gold Oz. | Silver Oz. | Copper Pet. |
|--------------------------|----------|------------|-------------|
| Rhyolite Dyke | 0.10 | 3.2 | 18.64 |
| Heavy Iron | 0.13 | 4.1 | 32.00 |
| Center Hole No. 4 | 0.10 | 3.4 | 26.20 |
| Sorted Ore on Dump | 0.12 | 3.2 | 30.24 |
| Conglomerate No. 4 | 0.08 | 2.4 | 12.09 |

"All samples taken and assayed under my personal supervision. All samples except No. 4 are of distinct ore types and are not averages."

"If you should so desire you could make a nice profit mining and shipping these surface ores."

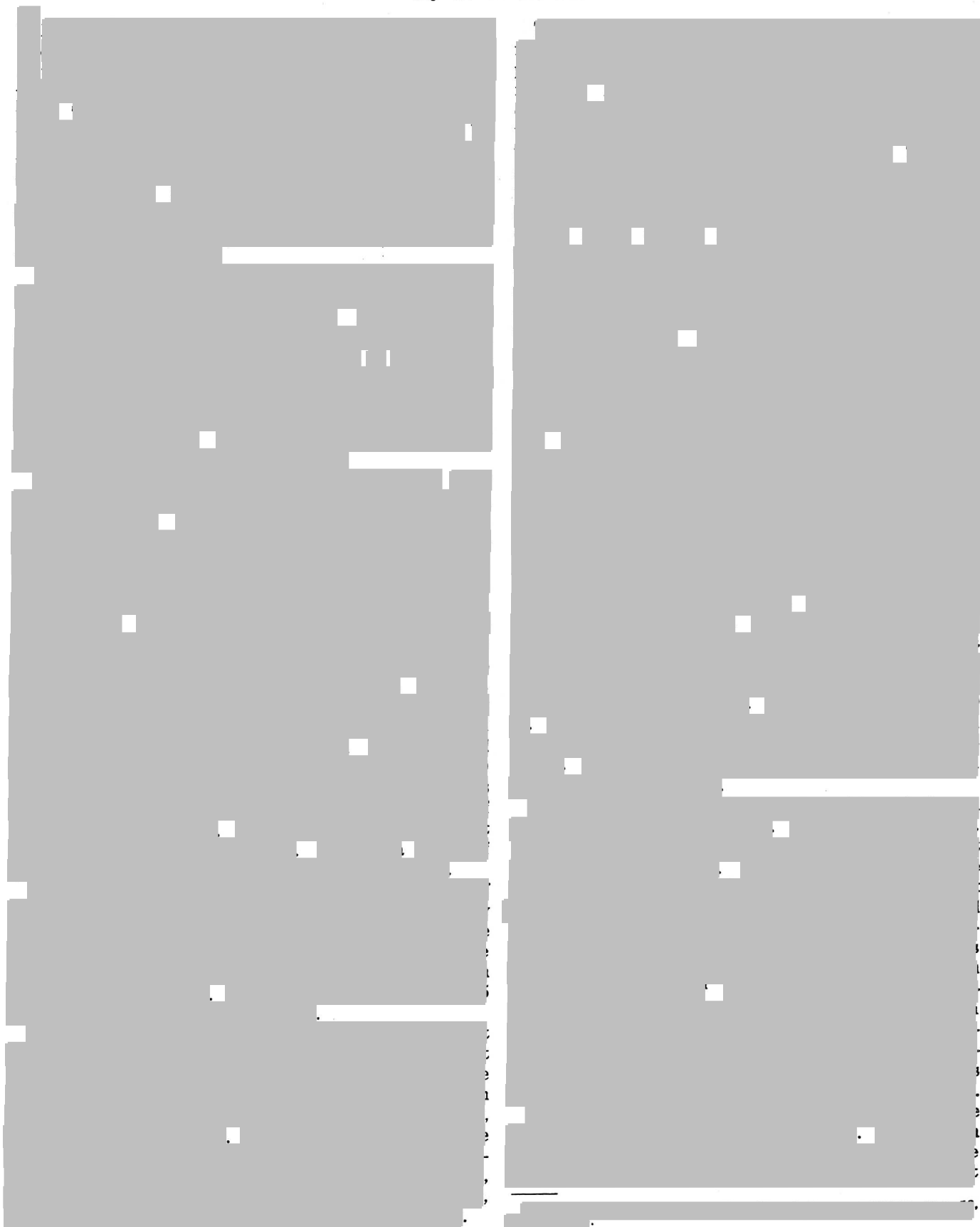
"The proximity of your property to the Ajo copper basin is a favorable factor. The fact that the rhyolite formation that forms the basin's rim passes through your property augurs well, but to my mind the one great factor is the good ore. It is remarkably high in copper and it persistently carries practically \$5.00 in gold and silver values. This gold and silver value is a tremendous item when future tonnage is considered."

"Your location is good, your geology is good, your outcrop is good, your values are more than good."

The Later Story of the New Cornelia Enterprise

An Outline of the Mining and Metallurgical Development in Recent Years, with Some Details of Present Leaching and Electrolytic Precipitation Practice

By T. A. Rickard



I-12-109

REPORT
of
NEW CORNELIA COPPER COMPANY
For the Year ending December 31st, 1920.

RH

NEW CORNELIA COPPER COMPANY
INCORPORATED SEPTEMBER 1909.
UNDER THE LAWS OF DELAWARE.

CAPITAL STOCK.

Authorized and Issued.

1,800,000 shares at \$5.00 each, \$9,000,000.00

OFFICERS.

CHARLES BRIGGS - - - - - President
JAMES HOATSON - - - - - Vice President
THOMAS HOATSON - - - - - Vice President
GORDON R. CAMPBELL - - - - - Secretary
PETER RUPPE - - - - - Treasurer
HENRY B. PAULL - - - - - Auditor

DIRECTORS.

FLOYD B. AUGUSTINE - - - - - St. Louis, Mo.
CHARLES BRIGGS - - - - - Calumet, Mich.
GORDON R. CAMPBELL - - - - - Calumet, Mich.
THOMAS F. COLE - - - - - New York City
THOMAS H. COLLINS - - - - - Princeton, Mass.
WALTER B. CONGDON - - - - - Duluth, Minn.
JOHN C. GREENWAY - - - - - Warren, Ariz.
JAMES HOATSON - - - - - Calumet, Mich.
THOMAS HOATSON - - - - - Calumet, Mich.
WILLIAM B. MERSHON - - - - - Saginaw, Mich.
GEORGE A. NEWETT - - - - - Ishpeming, Mich.
JOHN C. OLIVER - - - - - Pittsburgh, Pa.
JAMES PHILLIPS, JR. - - - - - New York City
LOUIS D. RICKETTS - - - - - Warren, Ariz.
PETER RUPPE - - - - - Calumet, Mich.

OFFICES.

GENERAL OFFICE - - - - - CALUMET, MICH.
MINE OFFICE - - - - - AJO, ARIZONA

GENERAL MANAGER.

JOHN C. GREENWAY - - - - - WARREN, ARIZONA

SUPERINTENDENT.

M. CURLEY - - - - - AJO, ARIZONA

TRANSFER AGENT.

STATE STREET TRUST COMPANY., 38 State St. BOSTON, MASS.

REGISTRAR.

AMERICAN TRUST COMPANY - - - - - BOSTON, MASS.

NEW CORNELIA COPPER COMPANY
BALANCE SHEET—DECEMBER 31st, 1920.

ASSETS.

| | | |
|--------------------------------------|-----------------|------------------------|
| Mining Property | \$28,075,880.55 | |
| Less Reserve for Ore Depletion..... | 3,210,860.14 | \$24,865,020.41 |
| Construction | 6,740,099.87 | |
| Less Reserve for Depreciation..... | 2,419,375.62 | 4,320,724.25 |
| Investments (At Cost) | | 554,684.00 |
| New Cornelia Co-operative Mer- | | |
| cantile Company Stock..... | 100,000.00 | |
| Ajo Improvement Company | | |
| Stock | 60,500.00 | |
| Liberty Bonds and War Savings | | |
| Stamps | 250,184.00 | |
| Ajo School District Bonds..... | 108,000.00 | |
| Miscellaneous Securities | 36,000.00 | |
| Accounts Receivable | | 174,793.14 |
| Supplies | | 750,496.60 |
| Cash | | 64,474.97 |
| Copper on Hand | | 4,589,691.75 |
| Deferred Charges to Operations | | 238,612.04 |
| Items in Suspense | | 1,330.63 |
| | | <u>\$35,559,827.79</u> |

LIABILITIES.

| | |
|-----------------------------------|------------------------|
| Capital Stock | \$ 9,000,000.00 |
| Notes Payable | 649,564.29 |
| Accounts Payable | 606,966.68 |
| Reserve Items | 159,080.68 |
| Surplus | 25,144,216.14 |
| Earned Surplus Dec. 31, 1919..... | \$ 2,857,463.46 |
| Net Earnings Year 1920..... | 991,136.58 |
| | <u>3,848,600.04</u> |
| Less Dividends Paid in 1920..... | 900,000.00 |
| Earned Surplus Dec. 31, 1920..... | 2,948,600.04 |
| Paid in Surplus " 31, 1920..... | 22,195,616.10 |
| | <u>\$35,559,827.79</u> |

Copper on hand estimated at 12½ cents per pound.

NEW CORNELIA COPPER COMPANY
STATEMENT OF INCOME AND EXPENDITURES

For the Year Ending December 31st, 1920.

INCOME.

| | | |
|--------------------------------|-----------------|-----------------------|
| Total Earnings on Metals | \$ 7,089,512.99 | |
| Dividends | 5,100.00 | |
| Other Income | 60,724.26 | |
| | | <u>\$7,155,337.25</u> |

EXPENDITURES.

| | | |
|--|--------------|-----------------------|
| Operating Expenses | 3,220,422.31 | |
| Salaries, Office and General Ex- penses | 43,760.04 | |
| Freight, Refining and Marketing.. | 671,548.99 | |
| State and Federal Taxes | 594,939.22 | |
| | | <u>4,530,670.56</u> |
| | | <u>\$2,624,666.69</u> |

Less:

| | | |
|-----------------------------|------------|---------------------|
| Depreciation Charges | 692,582.68 | |
| Ore Depletion Charges | 921,028.75 | |
| Interest | 19,918.68 | |
| | | <u>1,633,530.11</u> |

| | |
|------------------|---------------|
| NET INCOME | \$ 991,136.58 |
|------------------|---------------|

DIRECTORS' REPORT

To the Stockholders of New Cornelia Copper Company:

The Board of Directors presents the following report of operations for the year ending December 31st, 1920:

The production of copper for the year was as follows :

| | |
|---------------------------------|------------------------|
| Electrolytic Copper | 37,331,586 lbs. |
| Copper in Cement Copper Shipped | 2,113,985 " |
| Copper in Ore Shipped | 249,353 " |
| Copper in Concentrates Shipped | 409,569 " |
| TOTAL | 40,104,493 lbs. |

Deliveries of copper during the year amounted to 34,146,769 pounds, for which an average price of 18.56 cents per pound was received.

Market conditions for copper during the year have been unsatisfactory.

Decreased demand and falling price at the close of the year forced a further curtailment in production and a reduction in wages of all employees.

A revival of business throughout this country and improvement in Europe, should result in a greatly increased demand for copper and copper products.

Every person interested in copper should endeavor to educate his friends and associates to demand the use of copper and brass instead of inferior substitutes.

The following dividends were paid during the year:

| No. | Date | Per Share | Amount |
|--------------|-------------|----------------|----------------------|
| 2 | May 24th | \$ 0.25 | \$ 450,000.00 |
| 3 | August 23rd | .25 | 450,000.00 |
| TOTAL | | \$ 0.50 | \$ 900,000.00 |

The Directors wish to express their appreciation of the faithful service and cooperation of all employed in the service of the company.

Financial statements and reports of the year's operations are submitted herewith.

For the Board of Directors,
CHARLES BRIGGS,
President.

Calumet, Michigan, March 15th, 1921.

The following dividends have been paid since the organization of the company:

| Year | Per Share | Amount |
|--------------|----------------|-----------------------|
| 1918 | \$ 0.25 | \$ 450,000.00 |
| 1920 | .50 | 900,000.00 |
| TOTAL | \$ 0.75 | \$1,350,000.00 |

Warren, Arizona, February 1st, 1921.

MR. CHARLES BRIGGS, PRESIDENT,
NEW CORNELIA COPPER COMPANY,
CALUMET, MICHIGAN.

Dear Sir:—

I submit herewith report on operations of the New Cornelia Copper Company for the year 1920. A detailed report by Mr. Curley, General Superintendent, is attached.

Operations were on a basis of about 3,000,000 pounds of copper per month during January, increasing to nearly full production from February to October. In November production was ordered cut to 2,500,000 pounds of copper per month and in December to 2,000,000 pounds per month. Due to the large amount of copper in solution more than a month passes before a cut in production takes full effect.

The total production in 1920 was 40,104,493 pounds of copper, compared with 39,509,461 pounds in 1919.

On account of high freight rates and low price of copper, shipment of high grade ore to the Calumet & Arizona Smelter at Douglas became unprofitable and was discontinued in the month of January, 1920.

The only noteworthy change in the process at Ajo has been the success in returning a large proportion of the cement copper to the solution, reducing some of the ferric iron in solution to ferrous iron and recovering the copper again as electrolytic copper. While the agitators for mixing the cement copper with the solutions were in place, they did not work satisfactorily until early in 1920. Since then they have been most successful. The solution has been improved, and a much greater proportion of the total copper from the leaching plant has been recovered as electrolytic copper. In 1920 only 7.0% of the copper from the leaching plant was in the form of cement copper as compared to 17.7% in 1919 and 25.8% in 1918. The production of electrolytic copper in the month of May was 3,613,985 pounds or about 400,000 pounds more than the previous high record. Since the cost of producing electrolytic copper is nearly three cents per pound less than that of cement copper, a great saving was effected by this operation.

The consumption of sulphuric acid in leaching has decreased from 2.314 pounds acid per pound of copper in 1919 to 1.69 pounds in 1920. This decrease was largely due to the fact that the deeper ore contains less dirt and soluble impurities than the surface ore.

The grade of ore and the recovery continue satisfactory. The increasing proportion of sulphides in the lower portion of the carbonate zone has not lowered the recovery as much as was feared.

In spite of high wages, prices for supplies, exorbitant taxes and freight rates, the cost of copper from the leaching plant was nearly a cent per pound less than in 1919. This improvement was very largely due to the larger proportion of electrolytic copper, although the crushing cost, leaching cost and cost of electrolytic decreased considerably.

It is worthy of note that the New Cornelia Copper Company now pays 40% of the State and County Taxes in Pima County and that the State, County and local taxes in 1920 amounted to about \$1.85 for every shift worked by wage and salaried employees.

The experimental flotation mill was closed down at the end of February, after a successful six months' run. During the last two months, an effort was made to make the concentrates as nearly self fluxing as possible. It was proved that very little flux need be added and that therefore the concentrates can be smelted economically at Ajo. Detailed results of the experimental work are given in Mr. Curley's report.

Sulphide ore is already being exposed in No. 2 Hill. Within two years, at normal production, the mine will be in shape to produce 5,000 tons of sulphide ore per day. As soon as financial conditions permit, the producing capacity of the mines should be doubled by the construction of a 5,000 ton per day flotation mill for the treatment of this sulphide ore.

I wish to thank all department heads at Ajo, as well as those under them, for their efficient and loyal work during the year.

Yours truly,

JNO. C. GREENWAY,
General Manager.

Ajo, Arizona, February 1st, 1921.

MR. JOHN C. GREENWAY, GENERAL MANAGER,
NEW CORNELIA COPPER COMPANY,
WARREN, ARIZONA.

Dear Sir:—

I submit the following report covering operations for New Cornelia Copper Company for the year ending December 31, 1920:

MINING.

There were mined and delivered to the crushing plant during the year 1,727,859 tons of ore, averaging 1.525 % total copper. The soluble copper in the ore was 1.396 %; insoluble copper .129 %. The insoluble content has increased over the ore produced in 1919 0.051 % or 1.02 pounds copper per ton. This increase is because our mining operations are approaching the line between the carbonate and sulphide ore bodies in various parts of the mine. The carbonate ore reserves as of December 31st are estimated as 8,234,460 tons of 1.49 % ore.

The greater portion of the high bank on Hill No. 3 has been mined and the great danger from these high banks is about over.

Our mining equipment is in good condition. The locomotives, after about four years' of service, are being refueled and given a general overhauling. The steam shovels and cars are in good working condition.

There were mined and shipped to Douglas from the underground workings 3,597.7 tons of ore averaging 3.26 % copper. About 4,566 tons of low grade sulphide ore were mined for the experimental concentrating plant. This ore averaged 1.327 % copper of which 1.299 was sulphide and .023 oxide.

A total of 614 feet of drifting and raising was done on the 150-foot and 250-foot levels. This work was principally in developing low grade sulphide ore for the experimental concentrator. A small amount of drifting was done on the high grade ores. All underground work was stopped on March 1st and all cars, rails, etc. brought to the surface.

CRUSHING PLANT.

The No. 24 and the four No. 8 gyratory crushers at the coarse crushing plant operated satisfactorily.

At the fine crushing plant the operations were an improvement over previous years.

The conveying systems have operated satisfactorily. Replacement No. 3 and No. 4 conveyor belts was made. The No. 4 belt was replaced late in the year. This belt has conveyed all the ore to the leaching tanks since the beginning of operations, or a total of 5,866,506 tons.

LEACHING TANKS.

The lead tank linings, lead piping and lead-lined pumps have shown no appreciable wear.

The six-compartment settling tank was completed and put into service March 24th. The slimes are settling as well as expected.

REDUCTION PLANT.

The Wedge furnaces have operated satisfactorily.

The reduction towers have again become clogged with slimes and it is necessary to clean them. It is expected that hereafter

cleaning will be at longer intervals as the new settling tanks should do their part in keeping the slimes from the towers.

ELECTROLYTIC PLANT.

The operations have been satisfactory. The hard lead anodes show but very little corrosion after forty-four months of service.

A concrete floor above the asphalt floor in the cellar of the tank house was completed October 5th.

CEMENTING LAUNDERS.

A 60-foot addition to our present cementing launders is under construction and will be put into service in the near future. This addition will give capacity to take care of all cement copper and the wooden cementing launders can be dismantled.

POWER PLANT.

This plant has operated in a satisfactory manner and delivered, net, to the power house switchboard 304.98 K. W. hours of alternating current per barrel of oil used.

PUMP STATION—NO. 1 WELL.

The two motor driven pumps have operated satisfactorily. One pump is used as a spare unit. A total of 330,335,418 gallons of water was pumped during the year.

The timbers in the shaft and pump stations were covered with metal lath and plastered with cement to fire-proof the shaft and pump stations.

ICE PLANT.

This plant has operated satisfactorily. A total of 1,340 tons of ice were manufactured during the year.

BORING MILL.

A 10-foot Betts vertical boring mill was installed in machine shop and put into service on March 24th.

SWIMMING POOL.

A two-compartment, open-air, concrete swimming pool with shallow side for children and non-swimmers and deep side for swimmers was put into service September 1st. The pool was largely patronized and enjoyed by the employees and the public. It was closed on November 11th for the winter months.

FLOTATION PLANT.

This plant was closed down on February 28th. The following results were obtained on all tonnages treated during this experimental period:

| | |
|---------------------------------|----------|
| Tons of ore treated, wet | 24,964.5 |
| Tons of ore treated, dry | 24,657.6 |
| Mill feed, % copper as sulphide | 1.298 |
| Mill feed, % copper as oxide | 0.034 |
| Tailings, % copper as sulphide | 0.206 |
| Tailings, % copper as oxide | 0.021 |
| Concentrates, dry tons produced | 1,642.62 |
| Concentrates, % total copper | 16.808 |
| Concentrates, % insoluble | 34.82 |
| Concentrates, % sulphur | 18.63 |
| Concentrates, % iron | 22.03 |

| | |
|---|---------|
| Concentrates, oz. per ton gold | 0.081 |
| Concentrates, oz. per ton silver | 0.85 |
| Recovery, % of Total Copper | 84.070 |
| Recovery, % of Sulphide Copper | 85.139 |
| Silver, % recovery | 67.32 |
| Gold, % recovery | 60.77 |
| Ratio of concentration | 15.011 |
| Pounds of copper produced (estimated) | 552,181 |

COPPER PRODUCTION.

The production for the year was as follows:

| | |
|---------------------------------------|------------|
| Electrolytic copper | 37,331,586 |
| Copper in cement copper shipped | 2,113,985 |
| Copper in ore shipped | 249,353 |
| Copper in concentrates shipped | 409,569 |

| | |
|-------------|------------|
| TOTAL | 40,104,493 |
|-------------|------------|

Precious metal production from concentrates:

| | |
|--------------|---------------|
| Gold | 98.79 ozs. |
| Silver | 1,016.00 ozs. |

In addition to the above, there is locked up in the process the following:

| | |
|---|----------------|
| As unfinished cathodes and copper in all solutions..... | 2,422,581 lbs. |
| As cement copper on hand and in transit..... | 335,000 lbs. |
| As copper in partly leached ore | 653,120 lbs. |

| | |
|-------------|----------------|
| TOTAL | 3,410,701 lbs. |
|-------------|----------------|

NEW CORNELIA COOPERATIVE MERCANTILE COMPANY.

The store operations continue to be satisfactory. On December 20th, a discount of 15% on the purchases for the year ending November 30th, 1920, was paid to employees of the New Cornelia Copper Company and allied companies, and the employees of the Tucson, Cornelia and Gila Bend Railroad Company. The amount paid was \$42,998.16 and was participated in by 535 employees, 314 of whom were American and 221 Mexicans. The average rebate paid to Americans was \$88.35 and to Mexicans \$69.03.

The average per cent of employees participating in the payment was 76.21% of the total number of men employed as of November 30th.

Yours truly,

M. CURLEY,

General Superintendent.

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Geology of the
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DEPOSITS**
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*Edited by
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