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Message From The Chairman

During the past years, Global Platinum + Gold has continued its progress of moving from research and development to production. This has proven to be a challenging objective. Nevertheless, we have made significant progress toward our goal. Our achievements are highlighted by:

- The consummation of an Agreement with Mike McKay, who has extensive and varied experience in the industry, to direct our activities to reach our production goal quickly by redirecting our resources
- The hiring and training of additional staff
- Bringing in the required specialists and consultants
- The purchase and installation of additional equipment and the integration of our efforts with various state agencies

We have achieved encouraging results along the way with several shipments to our refiner. The results from our refiner confirm the presence of platinum group metals in our ore and that our process extracts them. Our present emphasis is proving that we can process the complex ore in a production mode and can do so profitably. I am confident that we can and will.

The recent addition of the Oro Grande Mine to Global's holdings represents a significant increase in our potential and reserves. The Oro Grande is thought, by some, to be the source of the platinum group metals in the ore at the Weaver Creek and its exploration and development will be a high priority in 1999.

We have had our successes and set backs, all part of the sometimes painful process of giving life to a new mining technology. Both have provided valuable feedback and helped us in forging our future which is very exciting. Our present accomplishments have been reached without a joint venture partner or long term debt.

We want to thank each of our shareholders for their support of Global Platinum + Gold and confirm once more our confidence that our future prospects are exciting and hold substantial opportunities to increase shareholder values.



Richard E. Jensen
President and CEO

MANAGEMENT

Richard E. Jensen, President and CEO: Dick has over 27 years project management experience in the resource industry. The last 20 with GPG have been difficult to say the least. His persistence and vision have maintained the company during this most difficult research and development period.

Russell H. Twiford has been a mining consultant since 1956 and owns and operates Global Ventures, a private consulting company. He has developed, managed, and promoted various North American precious metals mining projects and was instrumental in GPG property acquisitions.

E. Wayne Palmer, President, C & W Mining Company, has been involved in research, technical and administrative aspect of the mining industry since 1965. He has been an independent precious metals producer since 1979.

MDM Insurance Services Inc., of Canada has assumed management responsibility for getting Global's Hassayampa Mining facility into commercial production and developing a refining process for the ores found at the Oro Grande and Weaver Creek.

Mike McKay, President, MDM, has extensive experience in chemical metallurgy. His experience in projects ranges from the treatment of slags/dross, the addition of titanium/boron compounds to aluminum, wetting agents to remove non-metallic inclusions from molten metals, sulfur removal in steel and iron and molding parting agents for anode casting machines.

PROCESS PROCEDURE

1. The ore is pulverized
2. The ore is roasted
3. The ore is then fired along with fluxes and a copper alloy as a collector
4. The copper is then cast into anode bars
5. These anode bars are electrowinned producing anode slimes
6. The anode slimes are then sold to Sabin Metal Corporation for final refining

CURRENT EVENTS

Mr. McKay first became involved with Global Platinum + Gold, Inc. (Global) in late summer of 1997, and has a significant monetary investment in the future of Global. Since that time he has visited the Hassayampa facility on several occasions and has been instrumental in incorporating a number of material and significant changes in Global's method of operations.

A complete review of all facets of the Hassayampa Facility has been completed. Production began on April 19, 1999. Production will be increased with the hiring and training of additional employees. The facility will be operating on a 20 shift per week basis by the end of May. The average recovery to date indicated by our extensive sampling program shows 7.96 oz of precious metals per ton of screened head ore. Regular shipments to Sabin Metal Corporation are scheduled to start on May 17, 1999.

In addition to our present process, R&D is finalizing a method of concentrating our ore through leaching and precipitating. Some of our ores are very amenable to this process. Once this process is finalized, production will be implemented at an initial rate of 15 tons per day with the aim of processing 100 tons per day within two months.

Global Platinum + Gold, Inc. A High Tech Natural Resource Company

The company has spent 12 years in research & development perfecting a process that enables the user to recover the precious metals from complex ores and ores not amenable to the standard methods of assay and recovery.

GPGI has a pilot plant capable of processing up to 150 tons per day of precious metal bearing material, located on the Hassayampa project, 120 acres of leased land with over 500,000 tons of screened material stockpiled on site.

GPGI has purchased the Oro Grande mining property, 150 acres of fee land and 35 unpatented mining claims, for cash and stock. The Oro Grande mine is located about 4 miles north of Wickenburg, Arizona. Numerous high grade gold shipments, also containing platinum, were made to the U.S. Mint in San Francisco, in the early 1900's.

GPGI leases 2 sections of BLM unpatented mining claims known as the Weaver Creek project, containing 14,000,000 tons of placer ground carrying free and very fine gold and over 200,000,000 tons of reserves, amenable to the process used by gpgi at their Hassayampa plant.

Property and equipment is debt free except for a \$200,000 mortgage on the Oro Grande.

General Information

Corporate Information: Global Platinum + Gold, Inc. was incorporated in Nevada on 06/01/78, is listed on the OTC Bulletin Board as GPGI.

Executive Officers: Richard E. Jensen, President & CEO
Robert G. Maples, Director & VP
Frank Fornelius, Sec./Treasurer

Corporate Offices: 4625 S. 2300 E., Suite 103
Salt Lake City, Utah 84117
(801) 277-0744
Fax (801) 277-0799
Web page www.globalplatinum.com

Shares Authorized: 50,000,000
Stock Issued: 32,687,122
As of April 1, 1999 Estimated Float: 19,520,000

Shareholders as of 1998: Estimated 3,200

Transfer Agent: American Registrar & Transfer Company
P. O. Box 1798
Salt Lake City, Utah 84110
(801)363-9065

Note: The above information regarding shares and number of shareholders may or may not be accurate.

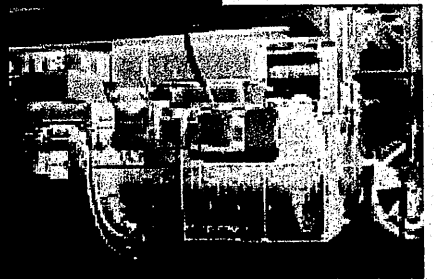
The Hassayampa

is located about 60 miles west of Phoenix on the Hassayampa River.

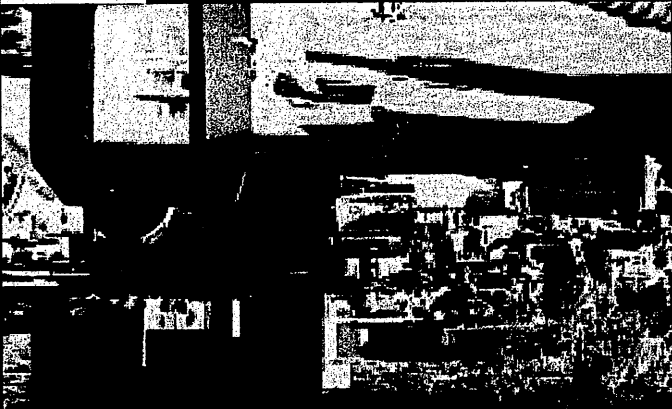
GEOLOGICAL SUMMARY

The Hassayampa Project consists of some 120 acres of leased land owned by C & W Mining Company, Inc. and operated by Wayne Palmer. It has been a known fact for many years that gold in commercial form exists in the ores on the property but it wasn't until 1993-94 that the platinum group metals were found to exist also in commercial quantities. Originally Global Platinum + Gold, Inc. leased the mill from C & W Mining Company to process some 200 tons of ore hauled from the Weaver Creek Project to the mill site, a distance of some 120 miles round trip. During this time the

Tanner company leased the gravel from Mr. Palmer in order to use the gravel on a State highway project. This left an enormous tonnage of about 500,000 - 1,000,000 tons of stockpiled and screened ore containing values comparable to the Weaver Creek Project. Global made the decision to process the Hassayampa ores and

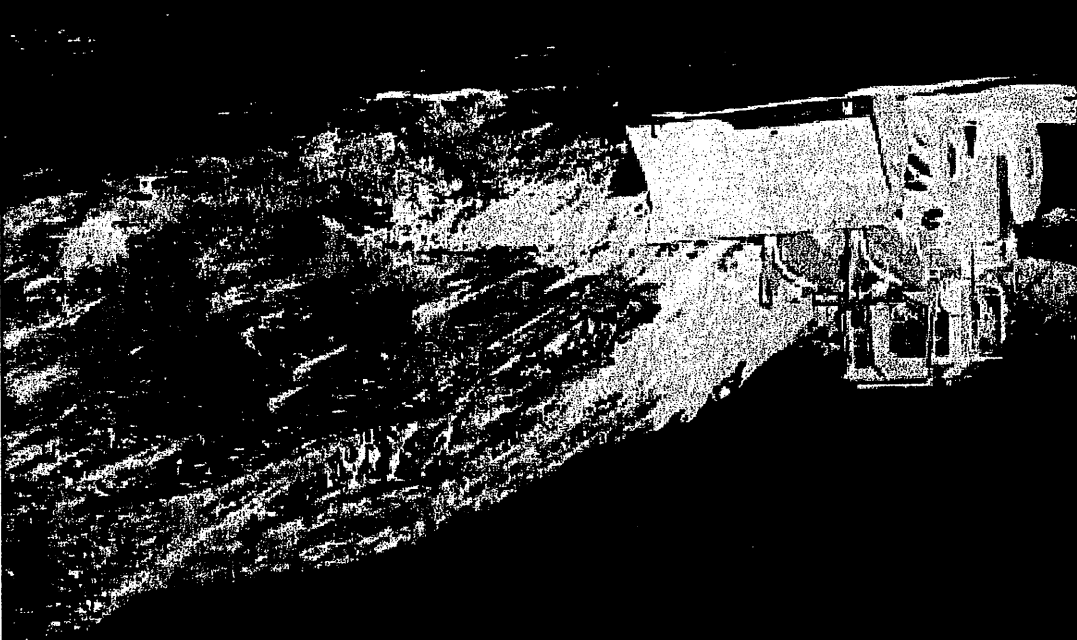


Ball mill/crusher



Hassayampa mill — metal building contains smelting and refining facilities

leased the ore and mill site from C & W Mining Company. The present facility capacity has been upgraded and a small refinery erected.



Part of Hassayampa ore pile and Michigan 5 yard loader

Oro Grande

The Oro Grande is located approximately 70 miles northwest of Phoenix and about 4 miles from the Weaver Creek.

GEOLOGICAL SUMMARY

The geology of the area is extremely complex. The oldest rocks exposed are a mafic schist and a granite. The mafic schist appears as huge blocks within the diorite and are mineralized, carrying commercial values of the noble metals, proven by recent sampling and assaying. The main ore body is a hydrothermally altered and mineralized. Gold, silver and the platinumoid mineralization occurs along three main shear zones in a Late Cretaceous diorite pluton.

The shear zones are intensely to moderately brecciated and traceable for over 3,000 feet in length and 200 feet in width. The width of the main shear seems to increase with depth as evidenced by exposures at the 100 and 200 foot levels of the mine. The shears are characterized by intense hematitic alteration after pyrite, silica and calcite flooding, copper, tourmalene and epidote mineralization. The shears appear to be epithermal and have been altered

62,109,152 short tons in his report of January 29, 1988.

ACS, AIME of M.H.S. Laboratories, Denver, Colorado conducted extensive assays in 1987. He estimates reserves of 62,109,152 short tons in his report of January 29, 1988.

Michael P. Thomas, BA., MS., concentrations of sulfides.

deepened to 750 feet showed commercial values and contained fairly heavy

Samples taken when the water well was

to the northeast of the main shear.

and also in the drilling done about a mile

hole cuttings adjoining the main shears

zones. Free gold has been found in drill

apparent "halo" around the main shear

some 1 mile to the northeast, forming an

abuts the main shear zone and extends

mineralization in the mafic schist that

shown commercial

assaying programs have

Sampling and

platinumoid mineralization.

be responsible for the

Cretaceous and could

invaded in the Late

trending hornblende dikes were

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by hydrothermal fluids. A few NE

The Weaver Creek

is located approximately 77 miles northwest of Phoenix on the headwaters of the Hassayampa River.

GEOLOGICAL SUMMARY

The ore body consists of "tan

sands" located about 10 miles north of Wickenburg, Arizona, and appears to be centered in a gigantic basin where

Weaver Creek abuts

the granite and lime-

stone of the Round

Mountain complex on

the far western edge of

the property. The ore

body, an alluvial deposition of fairly

fine-grained sand with cementations of

"caliche", lies under a 2-6 foot clay

"barrier". The tan sands exposed in

eroded creek banks on the southern

side of Weaver creek show it to be at

least 50 feet deep. There is some

evidence that it is considerably deeper

including the fine sands found at the

bottom of a 513 foot well.

The deposit appears to extend the

length of the property, a distance of

two miles, and is exposed in certain

areas with an overall width of 500 to

perhaps 2,000 feet. Sampling was done

primarily on the far western portion of

the deposit but a few samples were

taken in various areas along the entire

property. All samples showed

commercial values and appears to

compare in values to the Hassayampa

property.

The ore contains platinum group

metals and small amounts of chrome,

nickel, copper, titanium, iron and other

base metals.

Surficial area: 1,280 acres.

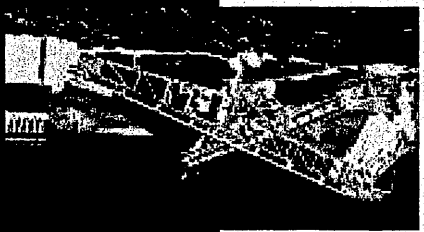
Potential yardage well over a billion

yards. Of this total, only a small

portion has been proven to contain

commercial values.

Weaver Creek
screening operation



Weaver Creek sands
deposit



ORO GRANDE FILE

THE PETROLOGY, STRUCTURE AND ALTERATION
OF THE ORO GRANDE MINE,
YAVAPAI COUNTY, ARIZONA

Mary K. Post
Geologist
May 20, 1984

HAS TRENDS ON AREA AT
COLORADO STATE UNIVERSITY
PORTION ATTACHED

THE PETROLOGY, STRUCTURE AND ALTERATION
OF THE ORO GRANDE MINE,
YAVAPAI COUNTY, ARIZONA

Introduction

The thesis area of study centers around the Oro Grande Mine located in T8N, R5W, section 24 of south-central Yavapai County, Arizona. The mine is located approximately 4.5 miles northeast of Wickenburg, Arizona, in the Black Rock Mining District. A surface area of approximately one square mile around the mine has been mapped at a scale of 1"=500'. Another more detailed map of the fault zone was constructed at a scale of 1"=200'. The 100' level of the mine was mapped at a scale of 1"=30'. The 200' and 300' levels of the mine were not mapped due to their inaccessibility. Detailed geologic, structural and hydrothermal alteration maps will be drafted and an overall interpretation of the petrology, structure, alteration and mineralization comprising the Oro Grande Mine will be determined.

The Black Rock Mining District is characterized by mid-Tertiary Au mineralization with or without Cu and Pb. The district has also produced significant Ag. Production figures for the Black Rock District for 1902 through 1976 list 40,000 tons of base and/or precious metals mined. Of this, 400,000 lbs. were Cu, 444,000 lbs. Pb, 9,700 oz. Au and 110,000 oz. Ag. There were no figures reported for Zn, Mo, Mn, W, U or V.

The Box Canyon District is located along the Hassayampa River, north and west of the Black Rock District. This district is characterized by Mn veins with or without Ba, Pb and Ag. The mineralization is mid-Tertiary. Production figures indicate 1,002,000 lbs. of Mn mined.

The Blue Tank District is south of the Black Rock District. Late-Cretaceous to early-Tertiary porphyry Cu deposits with or without Mo, Mn, Au and peripheral Pb-Zn-Ag are common in this district. Production figures list 100 oz. Au, 200 oz. Ag and 11,000 lbs. Cu mined. The production figures cited above were taken from the Arizona Bureau of Geology and Mineral Technology Bulliten #194.

Published literature on the Oro Grande Mine is slim to non-existent. A brief description of the deposit is given in the Arizona Bureau of Mines

Bulliten #137 and appears below.

BLACK ROCK DISTRICT

ORO GRANDE MINE

The Oro Grande property of fifteen claims in southern Yavapai County is about a mile east of the Hassayampa River and 4½ miles by road north of Wickenburg.

This deposit is reported to have been prospected in a small way for copper and silver during the seventies. In 1900, it was acquired by G. B. Upton and associates who, during the following three years, sank a 340-foot shaft, did a few thousand feet of de-

velopment work, and built a 10-stamp mill. In 1904, they milled about 8,600 tons of ore which yielded an average of \$5.32 worth of gold per ton.⁶⁵ Water for this operation was pumped from the Hassayampa River. The present company, Oro Grande Consolidated Mines, was incorporated in 1929. When visited in February, 1934, the workings below the 240-foot level were under water.

The mine is in a moderately hilly area composed of altered diorite with lenses of basic schist and irregular dikes of aplite and pegmatite. At the mine, a fractured to brecciated zone, in places more than 100 feet wide, forms the southeastern wall of a nearly vertical fault that strikes N. 37° E. As seen in the outcrops, portions of this zone are cut transversely by narrow, irregular veins and stringers of white quartz in the walls of which are developed pseudomorphs of limonite after pyrite. Dry-washers have recovered a little coarse placer gold from this vicinity.

The principal ore body found in the mine occurred near the southwestern exposure of the brecciated zone. More or less discontinuous stopes between the surface and the 200-foot level indicate that it was of irregular shape and several tens of feet in maximum width. This ore consists of brecciated country rock cemented with brown to black limonite, calcite, and coarsely crystalline, glassy quartz. The gold occurs as ragged particles, mainly in the limonite associated with the quartz. The silver content is reported to be low except where local concentrations of oxidized copper minerals are present.

According to Mr. Upton, a considerable amount of low-grade gold-bearing material was exposed by the drifts that explored the breccia zone east and northeast of this stoped area.

⁶⁵ Oral communication from G. B. Upton.

Other information on the mine in the form of company reports and personal letters is available for public viewing at the Arizona Bureau of Geology and Mineral Technology in Phoenix or Tucson. Caution should be used when reviewing these articles as the reported geologic setting, ore grade and ore tonnage vary greatly from article to article.

Geology of the Oro Grande Mine and Surrounding Area

The oldest rocks exposed in the map area are a Precambrian (Pc)

(~1.75 b.y. B.P.) biotite schist and amphibolite. The schist probably belongs to the Yavapai Series, which is composed of marine sediments interbedded with volcanic ash. These beds were then metamorphosed, deformed and intruded by several generations of plutons. The biotite schist resembles the schist of the Vulture Mine area which hosts Au-quartz veins. The biotite schist is locally altered to chlorite along the shear margins in the map area. The amphibolite is an ortho-amphibolite (igneous parentage) and belongs to the epidote-amphibolite facies. The foliation of both the schist and amphibolite trends N50-60°E and dips steeply to the southeast. The P_C metamorphics were intruded by and incorporated into a diorite pluton 1.7 b.y. B.P. The diorite is composed of hornblende, oligoclase, and andesine with minor biotite, sphene and epidote. The diorite is weakly to moderately foliated and the foliation parallels that in the metamorphics. The texture and percentage of mafic minerals in the diorite varies greatly within the map area.

Approximately 1.65-1.7 b.y. B.P. a granite was intruded to the southeast. The granite is composed of orthoclase, albite, biotite, muscovite, quartz and epidote. Locally the granite is porphyritic with the orthoclase crystals reaching 4 cm in length. The granite is weakly foliated and the foliation parallels that of the P_C metamorphics and diorite. Outcrops of granophyre occur along the ridge to the northwest of the granite-diorite contact. The granophyre consists of graphic quartz and albite-oligoclase. These are mapped as aplitic or alaskitic dikes probably of late-P_C age.

A small plug of diorite porphyry of late-Cretaceous(?) age outcrops in Miller Creek. Minor hematitic alteration occurs on the northwest side of the plug. Mafic dikes, pegmatites and bull quartz veins also intrude the diorite. The mafic dikes are very fine grained and often have hematitic alteration and/or Au mineralization associated with them. The pegmatites consist of quartz, K-spar, plagioclase, muscovite, biotite, tourmaline, garnet and epidote. Although there have been a few shafts sunk along the bull quartz veins, little or no Au mineralization is associated with them.

(The Tertiary section of rock exposed in the map area is well documented in other areas of west-central Arizona (Reynolds, 1980, Shafiqullah et.al., 1980, Rehrig et.al., 1980). The basal Tertiary unit is a red arkosic conglomerate which contains abundant clasts of granite and metamorphic

rocks. Cross-bedding reveals that it was deposited from the northwest. Overlying this unit is a buff colored ash flow, tuff, locally a lithic tuff. Above this is a dark grey, very fine-grained andesite flow and flow breccia. The capping unit is a vesicular, reddish-brown andesite. Volcanic bombs of 1' or more in length are evident in this unit and must have originated from a volcanic vent nearby. Scarborough and Wilt (1979) have mapped a relict cinder cone to the northwest of the map area, on the north side of the Hassyampa River. This could be the source vent of the bombs. The youngest unit in the map area is a gravel composed of pebble-to-boulder size pieces of PE metamorphics, diorite, granite and Tertiary volcanics. The gravel attains a thickness of 50' in the western part of the map area. The gravel was probably deposited in response to the faulting and tilting episode of 16 m.y. B.P.

Structure

The structure in the map area is extremely complex. The structures responsible for localizing mineralization were a result of mid-Tertiary NE-ESE extensional forces. These forces were associated with the emplacement of a NW trending belt of metamorphic core complexes of 30 m.y. B.P. These core complexes are located 60 km west of Wickenburg, Arizona and comprise the Rawhide, Buckskin, Harcuvar and Harquahala Mountains.

At the time these core complexes were being formed the regional NE-ESE extensional stresses produced cataclastic dip-slip faulting in the map area. These normal faults were localized along areas of previous weaknesses in the PE basement. There was prior mylonitic deformation along these faults as evidenced by the stretched quartz grains visible in pegmatites and aplites along the shear margins. Therefore, the type of faulting was predominately dip-slip (there might be a minor strike-slip component), the fault geometry is en echelon and the deformation was cataclastic.

Figure 1 is a schematic representation of the fault geometry for an idealized normal dip-slip fault. High angle conjugate shears may develop at 60° to the main shear or fault. These may host minor mineralization. High angle extension fractures develop at 90° to the extensional axis. These constitute a possible zone of high permeability and they may host disseminated ore and occasionally major mineralization. Quartz veining

of this type is clearly illustrated in a dozer cut behind the LaMont home.

During mid-to-late Tertiary time (26-16 m.y. B.P.) the arkosic conglomerate and subsequent volcanic sequence were deposited. They were originally conformable flat-lying beds and flows. At this time the stress field was being rotated so that extension was occurring along a N-NE axis. This continued extension caused listric normal faults and concurrent antithetic rotation of the fault blocks. This occurred approximately 15-16 m.y. B.P. The extensional axes for mid and late Tertiary time are plotted on figure 2. The fault block was tilted approximately 50° to the northeast. This type of structure is typical for west-central Arizona and references to listric faulting and rotation are numerous in the literature.

Figure 3 illustrates some types of listric normal faults. Note that in the middle diagram the faults all join on a detachment surface at depth. Figure 4 shows two schematic cross-sections of the map area. The listric fault to the northeast has not been mapped. An attempt was made to illustrate the rotation of the mineralized zones. Mineralization occurred sometime between 30-15 m.y. B.P. and probably lasted for a period of 10's of thousands of years.

Mineralization and Alteration

The Oro Grande Mine is an example of an epithermal Au deposit. Fluid inclusion analysis of quartz is currently underway to determine the temperature, pH, salinity and pressure under which the deposit was formed. Judging from the character of the ore, the Au was carried in hydrothermal solutions as a bisulfide complex, probably as $\text{Au}(\text{HS})_2^-$ or $\text{Au}_2\text{S}(\text{HS})_2^{-2}$ at a near neutral pH, temperature between 200° - 300°C at less than 3 km depth. The Au seems to be closely associated with the sulfides in the system. The highest Au values come from pockets of oxidized Fe and Mn. There is abundant silicification, hematite, limonite and goethite alteration, MnO_2 , chlorite and sericite. There is moderate to minor montmorillonite and late-stage dolomite-ankerite, siderite and calcite.

No evidence of boiling has been detected. The deposition of the Au as free particles was probably due to a change in pH or oxygen fugacity (the activity of oxygen).

The paragenetic relationships established thus far by polished section

analysis indicate an early episode of open spaced fill quartz, then deposition of pyrite with quartz (pyrite inclusions seen in quartz), then galena(?), and another stage of quartz veining and open space filling, then dolomite-ankerite deposition and late stage siderite and calcite. Sericite, montmorillonite and chlorite are early stage alterations and the sericite is quite pervasive. Supergene alteration is also quite extensive. Supergene alteration products are the Fe oxides, Mn oxides, malachite, chalcanthite and chrysocolla. As yet no fresh Cu sulfides have been detected. No sphalerite, marcasite or bornite have been found although they have been noted in old mining reports.

The mineralization could conceivably extend to the northeast below the volcanic cover but recovery of the ore would not be economical. To the southwest the ore body has been faulted downward a few thousand feet making recovery uneconomical. The width of the mineralization varies from 50'-120'. In its current position the ore body is laying on its side. Its current depth was its former strike length and therefore the ore body could be much larger than it appears. An extensive drill and sample program should be undertaken to determine the extent and grade of this mineralized zone. The alteration and structure of the area indicate that the Oro Grande Mine deserves a closer look.

REFERENCES

Rehrig, W.A. et. al., 1980, Geochronology, geology, and listric normal faulting of the Vulture Mountains, Maricopa County, Arizona, in Arizona Geological Society Digest, Vol. XII

Reynolds, Stephen J., 1980, Geologic framework of west-central Arizona, in Arizona Geological Society Digest, Vol. XII

Scarborough, Robert and Jan Carol Wilt, 1979, A Study of Uranium Favorability of Cenozoic Sedimentary Rocks, Basin and Range Province, Arizona, Part I: U.S.G.S. OFR 79-1429

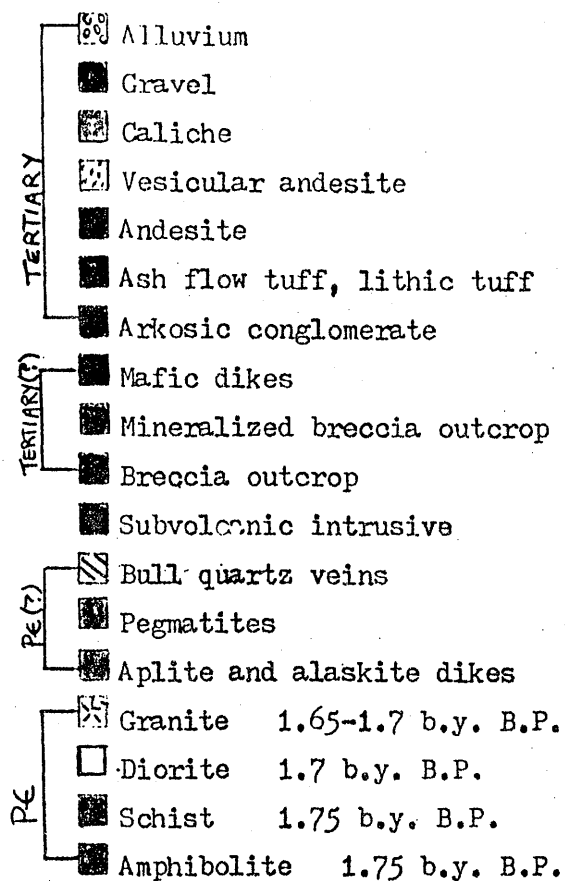
Shafiqullah, M., et. al., K-Ar geochronology and geologic history of southwestern Arizona and adjacent areas, in Arizona Geological Society Digest, Vol. XII, 1980

Wernicke, Brian, and B.C. Burchfiel, 1982, Modes of extensional tectonics: Journal of Structural Geology, Vol. 4, No. 2

Wilson, Eldred D. and J.B. Cunningham and G.M. Bulter, 1967, Arizona Lode Gold Mines and Mining: Arizona Bureau of Mines, Bull. 1137

Wilson, Eldred D., 1962, A Resume of the Geology of Arizona: Arizona Bureau of Mines Bull. 171

EXPLANATION



ALTERATION

- Hematitic
- Chloritic
- MnO₂
- Epidote

Quartz veins asso. with Au min.

- Outline of shear zones
- Brecciated aplite
- Contact
- Inferred contact
- Fault, dot on downthrown block
- Strike and dip
- Strike and dip of foliation
- Strike and dip of veins and dikes
- Strike and dip of joints
- Prospect pit

- Adit
- Shaft
- Mine dump
- Mine tailings
- Sample location

Geology by
Mary K. Post
May 20, 1984

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REPORT ON THE ORO GRANDE
MINE

Yavapai County, Arizona

By

J. CARLTON BRAY

International Engineering Company

Dallas National Bank Building

Dallas, Texas

El Paso

Texas

REPORT ON ORO GRANDE CONSOLIDATED MINES

LOCATION:

The Oro Grande mine lies $4\frac{1}{2}$ miles due North of the town of Wickenburg, Arizona. It consists of nine patented and five unpatented lode claims, and three mill sites on the Hassayampa River, one and one-half miles Northwest of the mine; all in Black Rock Mining District, Yavapai County, Arizona. The mine is reached by a fair road from Wickenburg. No power line is close to the mine, but a Diesel engine plant can easily be installed at Wickenburg.

DEVELOPMENT:

The mine consists of a vertical shaft 340 feet deep, and inclined air shaft 100 feet deep and three levels. The 100 foot level connects the two shafts, and consists of 900 feet of drifts and 300 feet of cross-cuts, of which 600 feet are in ore of good grade.

The 300 foot level consists of 220 feet of drifts and 370 feet of cross-cuts, 400 feet of which are in ore. At the bottom of the shaft, (340 ft.) a drift 85 feet long penetrates a fault and shows the ore body.

The 200 foot level consists of 900 feet of drifts and crosscuts, 700 feet of which are in ore.

Short levels at 20 and 50 feet, raises and stopes comprise at least 500 feet of workings not mapped to date,

-2-

making a total of over 3600 feet of workings.

These workings prove the Ore Shoot on the Copperhead Claim to be 435 feet long and from 90 to 190 feet in width to the 300 foot level. The Ore Shoot on the Frenchman Claim is over 300 feet long on surface, but only developed by a short drift and winze.

EQUIPMENT:

Equipment consists of Pumping Plant, 8,000 feet of 4 inch water line, 100,000 gallon steel water tank, 25 H.P. gasoline engine; 25 H.P. Hoist, gasoline type, cage and buckets, blacksmith shop and tools, 4 drill Sullivan Air Compressor, 1-Sullivan diamond drill, ore cars, tracks and mining tools, 50 ton capacity 10 stamp mill, bunkhouses and camp buildings.

GEOLOGY:

The country rock is diorite on the west wall of the main vein and Hornblend and other Schists and Diorite on the East wall. All these rocks are metamorphosed and are probably pre-Cambrian in age.

The Diorite seems to be intrusive and consists of Hornblend and a soda-lime feldspar, probably Labradorite. It varies from as much as 90% hornblend and to as low as 40% hornsblend. Accessory original minerals such as Pyroxene are scarce, but secondary minerals; such as Epidote are

-3-

common, due to the metamorphism. The diorite carries inclusions of schists which may have been sedimentary rocks originally, or may have been developed by sheering and metamorphism of the diorite itself.

DYKES:

The Diorite is intruded by a series of Aplite and Pegmatitic dikes which have a general East-West strike, and consist of Quartz, Orthoclase and black Tourmaline, and are extremely irregular in shape and composition. There are also small intrusions of basic Pegmatite, consisting of Plagioclase Feldspars, Pyroxene and Hornblende.

A series of small, nearly vertical dykes of hard, fine-grained, dark rock, locally called "Syenite" has an East-West trend, dipping north. These rocks may be Andesite, Trachyte or Diabase, but require a microscope for determination. They are evidently associated with the ore deposition, and are much younger than the Diorites.

METAMORPHISM:

The Diorite was metamorphosed at the time of the Aplite intrusion, forming Epidote, Chlorite and other minerals along the joint planes; but the most important results was the changing of the diorite to Schists along shearing planes having a Northeast-Southwest trend.

VEINS:

The veins are zones of shearing in the schist and

diorite. The Oro Grande vein is from 100 to 200 feet wide and traceable on surface for more than 3,000 feet, being terminated on the South by a fault and covered on the North by Tertiary Andesite flows. The strike is N. 30 degrees E. and dips approximately vertically or nearly parallel to the schistosity. Two other similar veins outcrop on the property.

Ascending solutions in these shear zones decomposed the broken schists and diorite, forming Sericite and Kaolin and depositing Quartz, Calcite, Pyrite, Chalcopyrite and Gold; thus forming the ore bodies. These ore bodies are elliptical in shape on any level and rake to the South at about 40 degrees. There followed a long period of oxidization by surface waters which completely removed the sulphides and copper, leaving oxides of iron and native gold, with a few small bunches of rich oxidized copper ores and small amounts of silver chlorides to indicate what the original sulphide ores were. This oxidation is known to continue to 625 feet vertical depth, or more than 300 feet below the present water level in the Hassayampa River Valley, one mile to the west. After the oxidization, the veins were broken and displaced by Post-Miocene faults which trend N. 40 degrees W. and dip both South and North.

ORE BODIES:

Two such ore bodies are known, one on the Copperhead

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Claim and one on the Frenchman Claim. The Copperhead Shoot is developed to a depth of 340 feet by the Oro Grande Shaft and its three levels. It is from 90 feet wide, on the 200 foot level to 150 feet wide on the 300 foot level. Its greatest proven length is 435 feet on the 100 foot level, where it is terminated on both ends by faults. No attempt has been made to find the ore beyond these faults, but there is every reason to believe that it does continue both North and South. The 300 foot level has not been driven far enough to the South to determine the length of the ore at this depth. The ore body contains "Horses" and small bunches of wall rock, forming as much as one-third of the mass above the 200 foot level, but less in proportion as depth is attained, being less than 20% on the 300 foot level.

This shoot contains at least 635,000 tons of proven ore above the 300 foot level, of an average value of \$5.27 per ton in gold. This value was determined by milling 8,861 tons of ore which yielded \$45,709.81 in bullion, the tailings contained only 20¢ per ton.

The west wall is solid diorite, but the East wall contains stringers, bunches and fair sized bodies of rich ore for at least 300 feet beyond the wall of the ore shoot proper. It is probable that part of this great mass can be profitably mined. It contains more than 2,000,000

tons and may average from \$1.50 to \$2.00 per ton. It can be caved and the waste removed at a small cost per ton.

The Copperhead Ore Shoot is known to continue below the 300 foot level. It is shown in a drift at 340 feet depth, the present bottom of the shaft. It was also picked up in a diamond drill core to a depth of 325 feet below the 300 foot level, where it is still oxidized and the gold in a free state. It contains at least 900,000 of Probable Ore to this depth. The values are as yet unknown, but there is no reason to believe they will decrease to any great extent.

OTHER ORE RESOURCES:

Pay ore is now exposed North of the fault, on the 200 foot level, and on the surface. It is probable that nearly as much ore lies to the North of this fault. It can easily be picked up by cross-cutting on the 100 foot level.

The same condition exists at the South end of the Copperhead shoot on all levels.

The Ore shoot on the Frenchmen Claim lies, 1,100 feet North of the Copperhead Shoot. It outcrops for more winze shows 6 feet of excellent ore. This shoot may be equally as important as the Copperhead shoot when developed.

These ore shoots are known to extend to great depth and hold their values. The Congress Mine, 14 miles Northwest, was mined to 4,200 feet depth.

CONCLUSION:

The Oro Grande Consolidated Mine is probably the most valuable semi-developed, free milling gold mine in the Western United States. It has proven ore reserves of 635,000 tons, of a gross value of \$3,175,000.00 above the 300 foot level. By sinking the Oro Grande shaft 100 feet and extending the 400 foot level, more than 340,000 tons of the same ore will be added to this figure, or a gross value of \$1,700,000.00, for each 100 feet of this ore shoot along. By continuous development, ore reserves can easily be kept ahead of a 1,000 ton mill on the Copperhead shoot alone. The certainty of developing ore beyond the North and South faults and in the Frenchman Claim, makes this mine as valuable as was the Vulture Mine to the south and the Congress Mine to the Northwest, when they were in a similar stage of development. The Vulture produced \$16,000,000.00 and the Congress \$14,000,000.00.

COSTS:

Careful records of the cost of mining and milling of 5,645 tons of ore were kept by the former owner, Mr. George B. Upton. These records show an average cost of \$1.04 for mining and \$1.16 for milling, with an extraction

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of 98%. One test run of 660 tons shows a cost of \$0.85 for mining and \$0.83 for milling, a total of \$1.68 per ton. These results were obtained without the use of air drills. The old fashioned stamp mill treated 50 tons per day. Gasoline was used for power. It is reasonably certain that these costs can be greatly reduced with cheap power and a modern mill of large capacity, together with a caving system of mining the ore. The writer predicts a total cost of not to exceed \$1.75 per ton can be obtained on a 1,000 ton per day basis.

RECOMMENDATIONS:

The writer recommends the purchase of control of this mine and the expenditure of at least \$400,000.00 for a new Power Plant new working shaft and new equipment of the mine together with a new mill of at least 500 tons capacity initial, to be increased to 1,000 tons at a later date. Detailed recommendations will follow as work now being done is completed.

INTERNATIONAL ENGINEERING COMPANY,

By: J. CARLTON BRAY

Mining Engineer

El Paso, Texas,

September 15, 1931

GENERAL STATEMENT COVERING ENGINEERS REPORTS, TITLE, ORE OCCURRENCE, EARLY HISTORY, ORE BODY AND ORE AVAILABLE FOR SURFACE MINING BY STEAM SHOVEL METHODS.

EARLY HISTORY.

The property now owned by this corporation and the claims upon which the main workings are situated, were known as copper prospects for many years; They were first located by a miner by the name of Copeland in 1872 and some high grade copper ore was mined from a shaft 24 ft. in depth and a 20 ft. cross-cut; about 2,000 ft. North of this shaft, another cropping of high grade copper ore was exposed by an open cut; Had the original owner sunk another eight feet in his first shaft, he would have encountered the free gold ore body that was discovered by the writer and his partners when they located the property in 1900.

A trail between the Vulture mine, Wickenburg and Rich Hill passed over the dump of the old shaft; In the early eighties a nugget picked up on the trail led to the discovery of rich placer ground on the cropping of the ore body and in the gulch; this discovery was made by Mexicans; the dirt was of sufficient richness to justify packing it to the Hassayampa River, two miles distant and running it through rockers: Some years later the gulch was worked by Chas. Minetti, a miner who had worked at the Vulture Mine for some years; In the nineties the property was located by a Mexican and a Negro; they held it for several years but let their title lapse and it remained open until located by the writer in 1900.

In January 1901 the writer succeeded in interesting some eastern friends and they bought out one of the locators for \$8,000; The Oro Grande Mines Co. was then incorporated and took over the property, the two original owners taking stock in the company for their two thirds interest. Active work was started and in sinking the old shaft the great value and worth of the property was made apparent by the presence of visible coarse gold disseminated all through the formation and this class of ore was encountered in many places throughout the mine workings. In many places large lenses of ore have carried high gold values and pannings taken from the buckets as ore came to the surface all showed coarse gold and many showed free platinum.

In the spring of 1901, W. E. Defty, E. M. was sent to the mine by a Denver mining syndicate and after a brief examination the owners were offered \$250,000 for the mine; This offer was promptly rejected; later an offer of \$600,000

was made and rejected by those in control of the company; my remaining partner in the original location of the property was willing to sell; he had retained a one sixth interest; this interest was bought by the company for \$100,000 cash.

Before buying the Hatfield stock the company decided to have an engineers report on the mine; Mr. Lamb who represented controlling interest, thought it best to secure a man who had no interest in the property; he commissioned Mr. W. E. Defty, E. M. to make the examination: Mr. Defty's ability and integrity as a mining engineer, expert and geologist, was well known in the west and perhaps he knew Arizona and its geological and mineral formations, as well as, if not better, than any other mining expert. Mr. Defty's examination was rigidly careful and crucial: Later, after thousands of feet of development work had been done and it was decided to equip the mine with a large reduction plant, Mr. Defty made a supplemental report: His predictions that the ore body in depth would have wide ramifications had been proven when it was found that the ore body on the three hundred foot level was eighty feet wider than on the first and second levels; while he did not find the high values throughout the mine that was encountered in the early stages of development, he stated that the great value of the mine had been proven and justified the equipment of the mine with a large milling plant.

The management decided that before equipping the mine with a large plant, to put on a pilot mill consisting of ten stamps; the mill consisting of ten 1050# stamps was installed; several test runs were made during which additional amalgamation plates were added; After changing the pitch of the plates several times, using 24ft. of apron plates, lip plates, chuck block plates and back plates, it was found that ore was absolutely free milling and as high as 97% could be saved by straight amalgamation. Over 8,000 tons of ore was milled during the several mill runs; all ore was stoped by hand drilling as property was not equipped with air compressor; operating cost sheets, during these mill runs are attached to this statement.

Before provision had been made for funds to cover the cost of a large mill, three of the largest stock-holders died; the Trustees of the several estates could not provide the necessary money for this purpose and it became necessary to close down the mine.

In the spring of 1907 the writer secured an option from the Trustees and other stockholders for their holdings, amounting to two thirds of the capital stock, or 200,000 shares, par value \$10.00 per share; the consideration was \$275,000 cash; this block of stock was submitted to a mining syndicate at the same price, on condition that they expend \$25,000 in making mill tests and running certain cross-cuts and raises in the mine, on the 100 ft. level, to further open up a large ore body that crops on the surface; and the further sum of \$145,000 to

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be used for working capital; the syndicate sent Mr. F. S. Parrish, E. M. to examine the mine; upon receipt of Mr. Parrish's report I was notified that conditions were acceptable and work would be started shortly upon the mine and that Mr. Parrish would be put in charge of the work.

On August 1st, 1907, or about two weeks after receiving their letter accepting the conditions of the deal, the financial panic started; a short time after, I was notified that until conditions became normal, they would not start work upon the property but it was not their intention to drop the deal; the effect of the 1907 panic on gold mining was a serious blow to the industry and but little money for development purposes has been available until the past year.

In 1921 the several estates that held most of the 200,000 shares of stock, notified the writer that they could not provide further funds for the care-taker, upkeep of the property and taxes and suggested that I take over the property; this I agreed to do and in 1922 I cleared up the indebtedness, paid the taxes and took over the property.

ENGINEERS REPORTS.

Mr. Defty's two reports were made for the company and were made at a time when there was no stock for sale, nor would the owners sell the mine: Had the report been made for the company as a basis for stock sales, those to whom Mr. Defty was a stranger, would naturally discredit portions of the report, but as the company had no intention of financing by sale of stock, his report should be given serious consideration.

Mr. Parrish's report was made for certain stock-holders of The Tonopah Mining Co. He was selected to make the examination by Frank Keith, General Manager of The Tonopah Mining Co. Mr. Keith stood very high in the mining industry and would hardly show poor judgment in selecting an engineer to make an examination for himself and friends; Mr. Parrish was probably selected on account of his broad experience in the mining industry: He was for some years the general manager of the Le Roy Mine, B. C. and he occupied the same position with the New Elkton Mining Co., Leadville, Col. Mr. Parrish spent several weeks at the mine and had access to all books and mine records. His report covers these records, including mint receipts, and we were very fortunate in securing a copy of his report some years later, as our office, including all books, mine records and one of the finest free gold collections ever gotten together in the State, were destroyed by fire. As no work has been done in the mine except necessary repair work, the mine is in the same condition as when Mr. Parrish made his report in 1907.

Upon receipt of a copy of Mr. Parrish's report, I noticed that he gave the total amount received for bullion as \$40,888.74; He arrived at these figures by checking U. S. Mint receipts and the cash book showing the amount received for bullion; I did not know at the time that he had overlooked a charge in the ledger, against the eastern stock-holders, covering a gold brick that was sent to the home office.

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Tonopah, Nevada, June 10, 1907

Frank A. Keith Esq.,
General Manager,
The Tonopah Mining Co. of Nevada
Tonopah, Nevada

Dear Sir:

I beg to submit the following report on the result of my trip to the property of the Ore Grande Mines Company in the Black Rock Mining District, Yavapai County, Arizona, near the town of Wickenburg.

After talking the matter over with you and receiving your memorandum of the information you desired re the above property, I left Tonopah the morning of May 29th inst., and arrived at the mine June 1st, twenty-four hours late on account of delays caused by two freight wrecks.

Wickenburg is a station on the Santa Fe Prescott and Phoenix Railway, a part of the Santa Fe system branching from the main line at Ash Fork and running south. It is 140 miles south of the main line and 54 miles north of Phoenix and is a town of a few hundred inhabitants where all ordinary mine supplies can be had at reasonable prices.

The property of this company is located $4\frac{1}{2}$ miles north of Wickenburg and is easily accessible by a good wagon road with good grades. It fords the Hassayampa River but this, excepting at very high water, which is rare, and for a few days at a time only, is not an inconvenience.

The property consists of nine mineral claims (See Exhibits A, part of this report) all of which are covered by United States Patent; they are named as follows: the Copper Head, May, Dutchman, Frenchman, Nigger Ben, Collassel, Alma, Montana and Oro Grande. In addition to these are three mill sites belonging to the company which are also patented. These are located on the Hassayampa River about a mile and a half northwest of the above group of mineral claims and from the pumping plant located on them an ample water supply for the mine and mill is conveyed through a four inch pipe line.

All of the underground development upon the property is on the Copper head claim and has been done through and from the main Copper Head shaft.

The elevation of the collar of this shaft is 2500 feet above sea level and its depth is 300 feet. The flow of water in sinking was inconsiderable and I do not think serious trouble from this cause need be anticipated for at least several hundred feet deeper, and may not be then; the ground is open and does not appear to be wet.

There are three levels turned from the shaft at 100, 200 and 300 feet respectively. The shaft was sunk in an ore body

nearly to the bottom and the levels and the cross cuts from them have almost entirely been driven in the same ore body as shown on the plan of the mine and the longitudinal and cross sections herewith. (See Exhibits B, C, & D). The location of this shaft is an excellent one for the purpose of prospecting the ore body but to extract the ore it will be found advantageous, I believe, to sink a new shaft in the country rock near the ore body.

The work done has disclosed a mass of low grade gold ore with a varying width and a depth limited by what appears to me to be an intruded sheet of diorite, the thickness of which has not been satisfactorily determined. I have classed this as an intrusion because of its regularity and the constancy of its dips. At the same time I have found no evidence of it in the country rock on either side of the ore body on the surface. There is considerable wash here, however, and it may be covered up. By referring to the longitudinal section herewith (Exhibit D) I can more easily make myself understood.

The intruded sheet rises from a depth of about 415 feet from the surface under the most southerly limit to which the ore body has been explored; this is on the 2nd level about 260 feet south of the shaft, to the surface about 315 feet north of the shaft, at an angle of 38 deg. from the horizontal; this varies but slightly, at times it is 35 deg. and near the surface it is 40 deg. This for present purposes I shall assume as the floor of the ore body although there is strong evidence from croppings still further to the north that the ore exists under this intrusion. The horizontal measurement of the ore body I shall take as extending from its vertical measurement to the south of the shaft described above as the southernmost limit to which the ore had been followed, north to the outcrop of the intrusion described above, drawn through the collar of the shaft. This gives a right angled triangle having an area of 119,808 square feet. This is not entirely accurate as it will be seen on the longitudinal section that on the 1st level the ore does not extend quite so far south as it does on the 2nd level, but as it does extend considerably further south on the 3rd level in all probability, and is there much wider, I am safe in making the estimate I have.

The width of the ore body is a much more difficult figure to determine with accuracy, indeed with the present development it can only be approximated. On the west is a well defined and quite regular wall of quartz-diorite as will be seen by the cross section, Exhibit D; against this lies the ore body. Both the wall rock and the ore are somewhat altered near the line of contact but not materially so. On the east the country rock is schist, and bands of coarsely crystallized quartz and feldspar and fine silvery shales. Between these two walls and occupying widths averaging over 100 feet lies the ore mass. As stated above the west line is well defined while the east is indeterminate, for extending far beyond the limits I have in a more or less arbitrary manner determined upon adopting as the east wall, bunches of rich gold ore have been extracted. In this connection it might be well to state here that the owners have been obliged in order to obtain funds to work with, to gouge out pockets of rich ore found in various places, mostly on and above the first

level, and near and to the north of the shaft, and north of the shaft on the second level. What has been done in this way however has not materially reduced the value of the whole ore body as in all only 8861 tons of ore have been mined; 2000 tons of which was material that had been sorted from the run of the mine ore and put on the dump as waste.

With a width of 100 feet of ore, and the area of this triangle as above described there is in the mine now a mass of ore containing 11,980,800 cubic feet, or 998,400 tons, estimating 12 cubic feet to the ton. I figure on 35% of this being waste, leaving 648,900 tons net.

The ore body is a brecciated and conglomerated mass held together with quartz and clay and calcite. The boulders are mostly of diorite and quartzite and the broken and angular pieces of schist and quartz more or less decomposed and of all sizes, mostly small.

The cementing material carries the gold values. There is a very little silver associated with the gold. In places apparently without relation to the gold ore, high grade copper ore mostly oxidized is found, carrying scarcely any gold but some silver, in one instance as high as 31 ozs. per ton.

Following are a few assays I found recorded in the mine office made in January and March 1901.

Gold Ozs.	Silver Ozs.	Copper %	Gold Ozs.	Silver Ozs.	Copper %
1972.20	329.4	----	1.44	None	---
163.55	5.7	----	1.16	"	-----
---	--	20.	0.60	"	----
---	--	4.	7.88	"	----
---	--	22.	6.26	"	----
None	1.0	2.	.50	"	----
"	31.0	24.	8.92	"	----
"	3.0	15.	0.32	"	----

Owing to the physical character of the ore mass and also to the coarseness of the gold in many instances, it is impossible to hand sample the mine and obtain results which can in any manner be relied upon; they are either entirely too high to base any calculations upon or so low that a margin of profit in mining and milling the ore would appear to be out of the question. When it is considered that the rocks of which the boulders in the ore body are made, and the pieces of schist and quartz composing the breccia are barren, this can be appreciated. The only method of determining the value of the ore is by carefully weighing the ore as it is delivered to the mill and as carefully valuing the gold recovered from the plates, and assaying the tailings.

So far the ore run through the mill has shown a greater value than the cost of mining and hoisting and delivering it to the mill and milling it. From the information I obtained at the mine I should judge the value to be in the neighborhood of \$5.00 per ton. The following statement is from the figures I obtained there.

Mining and delivering ore to mill,	Cost per ton	\$0.917
Milling	" " "	1.116
Blacksmithing	" " "	0.029
Water, including entire camp supply	" " "	0.295
Stable, one-half	" " "	0.074
General, legal, office exp., salaries, assaying, taxes & ins., Trav. etc. (one Half "		0.360
		<u>\$2.791</u>

I examined and copied bullion receipts for bullion sold from October 19, 1903 to April 14, 1906, amounting to \$40,888.74

Tons of ore milled 8861 - Received per ton \$4.61

Of this 8861 tons milled, 2000 tons came from the dump; material that had previously been sorted from the ore and which I was told yielded but \$1.11 per ton; deducting this amount would leave 6861 tons milled for which was received \$38,668.74 or \$6.6336 per ton.

As will be noted I have not included on the statement of the cost of mining and milling the ore any charges for exploration work. As the mill has in the main been used to sample the ore and as its capacity in no way equals an ordinary output for the mine, such a charge seemed unwarranted.

The tailings assays show a good saving by straight amalgamation. Any other or any additional method of milling will not be necessary so long as the ore retains its present character. Of 128 tailings assays I examined, 84 showed a trace only of gold, and the rest, with 13 exceptions, taken at times when the screens had burst or very bad milling had been done, showed a loss of 20¢ per ton. 113 tailings samples showed a saving with the ore valued at \$6.00 per ton of 96% of the gold.

The fuel used in gasoline, which, if extensive operations were carried on could be replaced by electricity if desirable.

The water supply is ample at all times of the year for present purposes, and could be largely increased by impounding dams if it became necessary, both at the source of supply, the Hassayampa River, and below the mill. At low water now there is a flow of 400 inches in the Hassayampa River and at higher stages of the water an almost unlimited supply. After being use for power and milling purposes this water is again returned to the river it came from with but a few miles intervening between the points of out-take and delivery. A 4" wrought iron pipe line 1½ miles long now conveys the water to the mine from the river. After pumping from the river to the necessary elevation it is delivered by gravity. The cost of the water plant and line was as follows:-

Pumping engine and house ready to start	\$4,144.12
Pipe Line	3,550.51
Storage Tank at Mine, 35,000 gallons	282.68
Water Line Telephone	<u>13,199.44</u>

\$10,196.75

A ten stamp mill, 980 lbs. to the stamp, with a capacity of 45 to 50 tons of the mine ore in 24 hours, is in order and ready to start up. It is run by a 40 HP gasoline engine.

Cost of Mill Building	\$5,069.30
Machinery and Tools	10,060.95
	<u>\$15,130.25</u>

A four drill Sullivan Air Compressor is connected to the mill engine and furnishes compressed air for diamond drilling and machine drilling and other purposes. This, with two 2 $\frac{1}{2}$ " Sullivan drills cost, put in place ready to run, \$3,104.08. A practically new Sullivan "Champion" Diamond Drill cost \$1,128.85. The diamond drilling cost \$2.454 per foot.

The above drilling has materially aided in determining the extent of the ore body and the drill will doubtless be useful in the future as a valuable aid in prospecting and development work.

At the Copperhead shaft is a gasoline hoisting engine powerful enough for the present. The mine buildings, including residence and offices and mine bunk house and boarding house and storage cellar, club house, good stable and corral are all in excellent order.

Although the heat is great, with care and the use of some ice there is not much loss of boarding house supplies.

Finally in regard to the mine equipment and buildings everything is of the best quality and in first class condition.

On the Frenchman claim, about 900 feet north of the Copperhead shaft, there is a good shaft sunk in the country rock to the East of the croppings of apparently the same ore body as I have above described. It was intended to use this as the main working shaft of the mine. It is down 100 feet but has not been connected with the vein.

There are a number of gold bearing quartz ledges on the property, none of which however, have been worked further than to obtain government title. That some of these may prove of value is quite possible.

This property lies at the Southern extremity of the Bradshaw Mountains, in the foothills of the range, and is on the southerly slope of a divide, the summit of which is on the Frenchman claim at an elevation of 3200 or 3300 feet above sea level.

In the forgoing I have endeavored to convey to you the conditions existing at the Oro Grande property and trust you have been enabled to grasp the situation existing there. The Company is capitalized for \$8,000,000.00, having 300,000 shares of par value of \$10.00.

The proposition as given me by Mr. George B. Upton, one third owner in the property, is as follows.

The Lamb estate has invested in the property \$275,000.00 and owns 200,000 shares of the stock, upon which Mr. Upton has an option. He desires to sell this stock for \$420,000. Of this amount \$275,000 goes to the Lamb estate and \$145,000 into the treasury of the company to be used for developing the mine. Whoever should accept the proposition would be bound to expend \$25,000.00 or such part of it as was deemed necessary, in prospecting the ground. Any ore extracted in this work to be milled if it is so desired. Eighteen months, or any time within reason so long as the intending purchasers show good faith in prospecting or presecuting development work, will be allowed in which to decide whether they will accept this proposition or not. If it is accepted the money expended will apply to the purchase price of the property. Mr. Upton does not ask for anything for himself but to have the property developed, having faith in its values.

After a careful investigation of the mine I feel entirely justified in recommending it to your favorable consideration. There is a very large tonnage of ore exposed now which, judging by what has been done, can be mined and milled at a substantial profit; how much per ton I do not feel that I have a right to estimate until the value of the mine run of the ore is more definitely known.

Nearly nine thousand tons of ore have been mined and milled showing a profit of \$1.82 per ton but I do not feel satisfied that this ore represents in value the ore left in the mine. It may be more or less, but 2000 tons of it represented material thrown away as waste, and a considerable portion of it was ore known to be rich, or at any rate richer than the general ore body. The remainder came from sinking and running drifts and crosscuts in the mass of ore; and this is what will have to be depended upon for profit until further ore bodies are developed. The limits of the present ore body have not been found and that a very large amount will be disclosed by further development is a reasonable deduction. In the prosecution of this work a more definite knowledge of the origin of the existing ore body will be obtained and intelligent prospecting for further bodies made more possible.

If you decide to go to work here, and as I said I feel entirely justified in recommending your doing so, I should advise a careful sampling of the exposed ore body by mill runs made one ore taken from different parts of the mine, and the opening up of the ground in such favorable places as are indicated on the surface; and of carefully exploring by diamond drill at first so far as possible the country underlying the present floor of the ore.

Thanking you for this expression of your confidence in my judgement, believe me,

Yours Sincerely,

S. F. PARRISH (Signed)

Mining Engineer

Oro Grande Mines Co.

Incorporated under the Laws of Arizona.

CAPITAL \$3,000,000
300,000 Shares at \$10.00 per Share

MINES, YAVAPAI COUNTY, ARIZONA.



OFFICES:
Clinton, Iowa, and Wickenburg, Arizona

ORO GRANDE MINES CO.

Incorporated under the Laws of Arizona

POSTOFFICE ADDRESSES:

Clinton, Iowa, and Wickenburg, Arizona

CAPITAL \$3,000,000

300,000 Shares at Ten Dollars per Share

MINES, YAVAPAI CO., ARIZONA

Officers and Directors

GARRETT E. LAMB, President and Treasurer.
President of People's Trust and Savings Bank.
CLINTON, IOWA.

GEO. B. UPTON, Vice-President.
Resident General Manager.
AT THE MINES.

FRANK W. ELLIS, Secretary.
Law Firm of Barker, Ellis & McCoy.
CLINTON, IOWA.

J. DWIGHT LAMB,
President Clinton Separator and Engine Works.
CLINTON, IOWA.

MARVIN J. GATES,
Real Estate and Insurance.
CLINTON, IOWA.

JOHN C. HERNDON,
Law Firm of Herndon & Norris, and Director Prescott National
Bank.
PRESCOTT, ARIZONA.

THOMAS J. NORRIS,
Firm of Herndon & Norris, Attorneys and Counsellors at Law, and
Director and Member of Executive Committee
Commercial Trust Company.
PRESCOTT, ARIZONA.

The Purpose of This Statement.

In offering this stock to the public, it is proper to preface the same with an intelligent statement of what is to be sold and what is to be done with the money realized.

Of the capital stock of this corporation 48,000 shares of the par value of \$10.00 each, have been donated by the holders to the corporation for its treasury stock. None of this stock will be sold for less than par. The entire proceeds to be used to carry out the business of the company, the development of the property, the erection of improvements including reduction plants, and all things essential to the successful consummation of the enterprise proposed to be carried on by the corporation, the ultimate object being to pay earned dividends to the stockholders within the shortest possible time. No dividends will be paid on treasury stock not sold, but the company reserves the right to set aside in the future from earnings, such surplus as may be deemed reasonable and expedient for proper development *so that it cannot become a mine without capital for its successful conduct.*

No salaries will be paid to the officers, except to the Manager, until such times as dividends are earned and paid, and not then without the consent of the stockholders.

All applications for stock shall be mailed to Frank W. Ellis, Secretary Oro Grande Mines Co., Clinton, Iowa.

General Statement.

The property now owned by this corporation and the claims upon which the main workings are situated, were known as prospects for many years, and only very shallow shafts were sunk on the various claims and no systematic development work was done. Had this work been performed, "as the law" demands, the property would not have been in possession of the present owners to-day, for its great richness and value would have been laid bare many years ago. A trail between Wickenburg and Stanton and Rich Hill passing within a few feet of the present shaft, was travelled over by hundreds of prospectors and others who never dreamed of the immense deposit of gold ore below them. The predecessors of this corporation became owners of the property about eighteen months ago, and at once began systematic development work upon the croppings by sinking a shaft. At a depth of 34 feet the great value and worth of the property was made apparent by the presence of visible coarse gold disseminated all through the formation. This class of ore was encountered in all the workings of the mine as far as developed. Anywhere in the workings high values can be obtained, and pannings, picked promiscuously from any portion of the dump, readily prove the presence of rich gold values.

To more fully understand and make clear the amount of improvement and development work accomplished, and the extent of the proven ore body, we specially refer to Mr. W. E. Defty's report, which accompanies this statement, and was made at the request of one of the shareholders, who has up to the present, solely financed this enterprise.

Mr. Defty's ability and integrity as a mining engineer and expert is well known in the West, and perhaps he knows Arizona and its geological and mineral formations, as well as, if not better, than any other mining expert. Mr. Defty's examination was rigidly careful and crucial, and his moderate and conservative figures have been exceeded by every other professional man visiting the property.

Report on the "Oro Grande" Gold Mine.

GARRETT E. LAMB,

CLINTON, IOWA.

DEAR SIR:—

In conformity with your request to make a thorough examination and detailed report on "Oro Grande" mine, I hereby submit the result of my investigations and conclusions.

Situation: This property is situated about four and one-half miles due North of the town of Wickenburg on the S. F., P. & P. R. R. and one and one-half miles from the Hassayampa River.

Location: The Claims are all located in the Black Rock Mining District, Yavapai County, Arizona, and comprise nine mining claims, named as follows:

Copper Head	Frenchman	Alma
May	Nigger Ben	Montana
Dutchman	Colossal	Oro Grande

Mill Sites: In addition to the above is also three mill sites connected with the property and named: Copperhead, Frenchman, and Dutchman respectively. All the above claims are surveyed and completed for patenting.

Roads: A good wagon road extends from Wickenburg right to the dump of the mine, which makes it very accessible.

Water: Sufficient amount of water exists in the Hassayampa River for reduction and all other purposes. On the Copperhead mill site claim on the river at the head of Box Canyon, is a flow of water equivalent to about 400 miners inches. This point is distant from the principal claim that now has the works upon it, just 7,446 feet. The elevation from the bed of the river to the claim is 360 feet.

Fuel: The most effective and efficient fuel for the generation of power is gasoline and is generally used in this district.

Conditions: The economic conditions for working the property are all that could be desired, being in close proximity to railroad and supplies, and abundant water supply.

SURFACE IMPROVEMENTS.

The surface improvements at the shaft, comprise shaft house with 6 H. P. Fairbanks, Morse Gasoline hoist, carpenter's and blacksmith's shop.

Bunk house 26 x 56 feet, containing 14 rooms, and office.

Dining room and kitchen 16 x 40 feet.

Two dwellings 24 feet square.

All the buildings are of lumber, neatly and well finished and accommodatively situated.

Topography: The majority of the claims are situated in a broken chain of abrupt hills transverse to the water course, and intersected occasionally by deep gulches. Behind these foot-hills the surface rises quite acutely to the crown of the range.

Geology: The country rock on the west of the ore-bearing zone is micaceous dioritic schist, and on the east diorite and feldspathic porphyritic granite, from which the feldspar has been greatly decomposed. There are occasional spots and outbursts of rhyolite and clear quartz silica; these occur irregularly and have no uniformity of trend.

As far as the works have proven in depth, the formation on the west holds its original characteristic. On the east however, the diorite has lost its originality and merged into horn-

blendic quartz syenite. It is evident the change of feldspar, orthoclase in the syenite to oligoclase has formed the diorite.

Vein Trend: Through this formation courses the main auriferous bearing vein system with a trend of N. E. 37 degrees S. W.

CROPPINGS.

The main croppings on the Copperhead and Frenchman can be traced from below the present working shaft to almost the apex of the range, and are composed chiefly of red and black ferruginous quartz, strong in brown hematite; they are very bold, persistent and continuous, and hold their good general character wherever exposed.

As the more abrupt slopes are approached, the ground is detritus and talus capped obliterating the croppings at intervals, but in all instances have been found existent where this capping has been removed. Outside and below this main cropping proper, where the gulches have deeply cut the formation, is exposed large croppings of ledge matter identical with the material forming the ore body. These croppings are especially prominent at the apexing of the fault thrust which has been encountered in the vein, and which has an inclination of 45 degrees to the south. At the north end of the Frenchman location, and about 1,600 feet from the shaft, and on a continuation of the main lead, a drift has been run mostly all in ore for about 30 feet; midway in the drift, a winze has been sunk 18 feet deep; this shows quite a strong body of good quality ore.

Running at right angles to the main lode are numerous small ore veins, varying in width from a few inches to 2 feet wide.

On the Dutchman claim the croppings are quite prominent and continuous and show ledge material 4 to 5 feet wide, heavily charged with pyrolusite (Manganese dioxide). An incline shaft has been sunk on the croppings to a depth of 20 feet, showing the same nature of ore. This cropping is suggestive of a silver bearing lode.

Montana is a cross claim transverse to the Frenchman and Dutchman claims, and abutting their side lines. The outcroppings show stringers of carbonate copper ore, but are mainly composed of prominent outbursts of quartz.

Colossal shows a vein on the surface similar in its nature to the main lode. On this a shaft has been sunk 20 feet deep, the vein is visible the full depth, and it can be traced on the surface for fully 1,500 feet.

Oro Grande has broken croppings but not at all clearly or well defined, and sufficient work has not been performed to demonstrate the vein in place.

Nigger Ben appears to be a spur from the main ledge, coursing a little east of north. On this cropping a shaft has been sunk to a depth of 60 feet. Approaching the bottom of this shaft the quartz contracts, but the ledge space nearly the full height of the shaft is charged with ledge matter similar to the main exposed body.

Alma and May Claims have stringers and ribbons of quartz upon them, but only possessory work has been performed. These two claims were located mainly for the protection to the adjoining ground. All the surface has an excellent appearance and exhibits a strength of mineralization to a very marked degree.

MAIN WORKINGS.

On the "Copperhead" claim the main shaft has been sunk to a depth of 300 feet.

At a Depth of 18 Feet from the collar of this shaft a crosscut has been run for 20 feet to the east, all in ore.

At 50 Feet in Depth a crosscut exists 40 feet to the west, all in very high grade ore.

At 100-Foot Level crosscut from the shaft to the east 54 feet, all in high grade ore.

To the west 67 feet, all in high grade ore.

Drift south from the shaft 265 feet penetrates solid ore for 142 feet; at this point the ledge appears to be split by an intrusion of diorite; this has an appearance of a horse, and probably ore will be found on both sides.

From 142 feet the drift has followed a seam of vein material for the remainder of the distance.

North from the shaft extends a drift for 400 feet, 210 feet of which is in solid ore.

At 160 feet north from the shaft in this drift are crosscuts to the east 62 feet, and west 75 feet, driven entirely in ore.

At 335 feet from the shaft is a crosscut 46 feet in length following an ore stringer, and from the face of the crosscut the north drift is continued for 65 feet.

A new shoot of high grade ore was encountered on the last day of my examination; its continuity and extent will be proved by continued development.

200-Foot Level: A drift continues north 34 degrees west for 80 feet; at a point 50 feet from the shaft in this drift the workings continue in ore; also at this point a spur drift penetrates the formation to the north 32 degrees east for 98 feet; both of these workings are in high grade ore; at the end of this spur drift crosscutting is being performed each way for 16 feet, all of which is in high grade ore. From the shaft is a drift running 24 feet to the north; from the face of this drift is a crosscut east, continuing for 34 feet; both of these workings are in ore with no wall yet encountered. Drift south 140 feet is entirely in ore. From the face of this drift is a crosscut 48 feet to the west in ore, encountering diorite at the face. To the east is a crosscut 30 feet, all in ore.

300-Foot Level: At a depth of 270 feet the shaft penetrates the diorite. In drifting south 73 feet the ore was met with 30 feet from the shaft; the remainder of the working for 43 feet is in ore.

From this drift a crosscut is started to the east 25 feet in length, all in ore.

From the drift a crosscut is run west for 114 feet, all in country rock. This was run for demonstration purposes only and ascertainment of the permanency or otherwise of the intrusive diorite.

ORE OCCURRENCE.

The ore body is mainly constituted of a yellow ochrous friable porphyry quartz, with innumerable pockets of brown and black ferruginous oxides.

The entire ore system is a regular breccia mass composed of the porphyry as above stated, decomposed diorite and silvery talcose schist; all the component parts have undergone a strong action of kaolinization which makes the ore very easy to mine or mill.

The highest auriferous values are found in the oxide pockets, which completely crumble on being disturbed. These pockets carry heavy and coarse gold. In fact, all through the formation, free gold can be discerned by the naked eye.

The talcose schist appears to carry the lower values in the ore structure. In the vein material are found rounded boulders from 8 to 18 inches in diameter, and occasionally even larger.

That the vein has undergone and been subjected to movement is sufficiently exemplified by the nature of the breccia; and that it has emanated from below is beyond question. There is very little doubt in my mind that the vein will extend to depth and probably be more defined as depth is attained.

However, within two or three hundred feet of the surface (taking the surface indications for my conclusions) I think the ore body will have wide ramifications, and other bodies will be encountered outside of the large ore body already uncovered.

ORE VALUES.

The number of assays taken proves the presence of high values in the mine, the lowest averages amounting to about \$6.20 per ton. It is needless to append any results, as there is lit-

the question about the ore body or values as far as developed. Taking the measurements of the ore body as given under the head of workings, returns a presumed tonnage of 503,166 tons of available ore to be mined. Premising this to only give a net return of \$5.00 per ton, it would leave the very substantial amount of \$2,515,830.

FUTURE WORKINGS AND DEVELOPMENTS.

I would suggest a shaft being sunk about midway between the present workings and the workings on the Frenchman claim; the shaft to follow the ledge or ore body to depth, and drifts run to connect with the present workings. This, in my opinion, should be the main and primary object in view.

Eventually this shaft to be enlarged to triple compartment and made the main working shaft of the system.

Immediately below this, at a point designated to your manager, Mr. Upton, should be the reduction works.

The ore could be gravitated to be crushed, plated, passed over the concentrators (if found necessary) and finally cyanided and disposed of with very little handling.

This position would also afford ample dump room on both sides of the benches.

ORE TREATMENT.

On account of the quantity of coarse gold found in the ores, it will be absolutely essential (for the closest recovery to be made) to pass them through the mill for plate amalgamation, where the preponderance of the gold values would be saved. In my opinion, a 20-mesh screen would be sufficiently small to pass this class of ore, and for the release of the coarse gold.

The effect of cyanidation on this ore, I think, would percolate perfectly through a much larger grain than that passing a 20-mesh screen.

My reason for suggesting space for concentrators to be installed is founded on the belief that sulphides will be encountered at depth; this is suggested already by the cubes of marcasite being prevalent through the lower ore formation.

Also through the country rock passes numberless seams and veinlets of pyritic deposition.

CONCLUSION.

The natural position of this property could not well be surpassed for its easy and economical working, being in such close proximity to a town, railroad facilities, supplies in general and water.

The future of the mine is already established and ensured beyond doubt by the proving of the present large ore zone. This in itself, without any further exploration or proving the future extent of the ore bodies, is sufficient to establish it as a very large property. However, the size of the property is difficult to portend, and its huge ore system can only be proven by systematic and extensive exploratory work, for all the surface shows great strength of character and other bodies of ore will undoubtedly be uncovered outside of the predominating ore system.

The mine has a great future before it, is my decided opinion, and at present it only awaits the installment of a sufficient sized plant commensurate with the mine's extensive magnitude.

My recommendation would be a plant treating not less than 100 tons per diem. But economy would be exercised by the handling and reducing of 250 tons per day. And this sized plant, I feel sure, will not be sufficiently large after the main works and shaft have been opened up, as previously suggested. In fact, I think it would be a wise discretion to await the installment of reduction works, until the above exploratory work has been accomplished.

(Signed) W. E. DEFTY, M. E.

Dated at Phoenix, March 24, 1902.

What Improvements the Corporation Contemplates.

In the developments contemplated the company will follow as close to the lines suggested by Mr. Defty as possible.

Reduction works conformable to proper treatment of the ore, with a capacity of at least from 300 to 500 tons per day, will be erected. In connection therewith cyanide or other correct treatment for tailings will be installed of size sufficient to economically handle same.

A power plant will be erected at or near Wickenburg, Arizona, to generate electricity sufficient to operate the mill and pumping plant, including furnishing electric lights and electric power to others. This will save the expense of hauling fuel.

New buildings, in addition to the present commodious buildings, will be erected.

A laboratory commensurate with the demands of the company will be constructed.

A pumping plant will be built on the Hassayampa river, one and one-quarter miles from the mine, for water supply.

Other improvements, which are absolutely essential to a modern mine, will also be installed as occasion demands.

The new three-compartment shaft will be at a point 1,000 feet further up the hill and probably 75 feet higher than the present prospect shaft and where the vein is shown to be in place by an erosion of the vein surface and exposures by the cutting of the gulches, proving its existence. The main shaft will be sunk in the diorite, outside of the vein line.

The reason for sinking in the diorite is to keep the main working shaft free from disturbances connected with working the ore body.

From this shaft the ore will be hoisted and passed through all the processes of treatment by gravitation.

The present prospect shaft connected with the main workings would insure perfect ventilation, besides being serviceable for the lowering of timbers and material into the mine.

Even taking Mr. Defty's very conservative figures as a basis, there is sufficient ore in sight to keep a plant in full operation for nearly 14 years, treating 100 tons of ore every 24 hours. These figures do not take into consideration at all the portion of the ore system still untouched or undeveloped and which is sure to be penetrated and exhibited by the sinking of the new working shaft and its necessary and contemplated workings in connection with the present developed ore body.

The reputation of this property has become widely known and it requires very little expression from us to present its great intrinsic worth. Free access and inspection has been open to everyone, and a great many mining engineers, experts, miners and every class of people from all parts of the world have visited the property, and accompanying we give only a few unsought opinions expressed regarding it and which have been given after the great impression made upon those visiting the mine. Such expressions require no comment from us. A great many more statements have been made by responsible parties, but they appear so extravagant that we refrain from quoting them.

The personnel of this company is sufficient guarantee of the standing merit and worth of the undertaking.

Prescott Prospect, April 6th, 1901.

**The Prospect's Representative Visits the Great
Strike at Wickenburg and Gives the Facts
Concerning the Discovery—\$300,000 Worth
of Ore Already in Sight at a Depth of
100 Feet and the Surface Indications
Give Reason to Believe That
Millions Will Be Found
by Exploitation.**

The great gold strike that has been made in the Oro Grande company's properties, situated six miles from Wickenburg, can be safely said to be one of the greatest mining discoveries that has ever been made in the west. Although only a prospect at present it is yet a great mine with its present development. With less than 200 feet of work already done on the property it has from actual measurement, at a conservative estimate, over one-quarter of a million dollars worth of ore in sight. It would be impossible to make an estimate of what the property is really worth, but from surface indications it will go high up into the millions. The ore shoot, on which the present shaft has been sunk, is of vast extent. Up and above the present workings the surface ground for a distance of 500 feet in length on the vein and 300 feet wide, is one mass of ore, the croppings covering the surface demonstrating that there is a great ore body beneath. From what can be seen from the present workings in the mine it can be said that it is a great auriferous fissure which has come up through the country rock in times gone by and has been lying dormant for thousands of years waiting the touch of the prospector's pick to give its golden values to the world.

The vein at the point where the strike has been made is of such vast proportions that no one except an expert thoroughly acquainted with geology and mining engineering can thoroughly realize its importance. It is too large for the layman to understand its value. All of the ore that comes up out of the shaft is impregnated with gold, which everyone can see, but its main values, however, are carried in the decomposed mass of quartz porphyry and can only be found by sampling or assaying. The vein runs from northeast to southwest and is a mass of quartz porphyry lying in between a dyke of micaceous diorite on the west and a massive belt of granite and mica schist on the east. These two dykes form the walls in which the vein is included and can be traced for a distance of 3,000 feet through the country. Wherever openings have been made the gold values have been found in sufficient quantities to show that where the present workings are is not simply a blow-out but a great ore shoot in a strong vein, which, when developed, if it carries the same values as already found, will make one of the greatest gold mines in the world. Everything that has been brought up from the mine at the present time is ore. The shoot in which the great gold values are found was encountered six feet below the surface, and at the time of its discovery was considered a copper prospect. It was through this false impression of its being a copper mine that the real values in gold were not discovered until after the copper had disappeared from the ore. It was then that the value of the mine became to be known and the exploitation work was carried on to develop its gold values.

The present workings consist of a shaft 100 feet deep, at the bottom of which is a crosscut 40 feet to the west and 20 feet to the east. These cuts, with the shaft included, give an opening 64 feet wide, all in ore. Drifting has also been done north and south 15 feet each way, being in ore the same as the crosscuts. At a fair estimate

the ore in sight can be placed at 12,000 tons, with an average value of \$25 per ton, a total valuation of \$300,000. This estimate gives the value of the strike at the most conservative figures taken from pan samples made both from the underground workings and grab samples taken from the dump. No walls have been found up to the present time, and from the surface indications will probably not be, until from 100 to 200 feet of crosscutting is done.

While the general average of the ore from present development can only be given at an average of \$25 per ton, the rich pockets which occur in the ore body may put up the value of the mine at a much higher figure with further development. The bottom of the shaft is in a wonderfully rich streak of ore, which, sampled in the usual way for fair valuation, gave returns of 1968 ounces in gold. The gold is of a high fineness, and if the streak should hold its value with further exploitation the ore in that part of the workings could be estimated as being worth nearly \$30,000 per ton. Pockets like this, however, are frequently found through the present workings, so no one can really form an idea of what the mine will do when deeper openings are made.

The property lies in a mineral zone, in which the great Vulture mine and Rich Hill occur. It is midway between these two points, being about 16 miles from each. Standing on the brow of the hill in which the workings are, the Vulture can be located in a straight line to the south, and to the north, if the vein continued through the box canyon of the Hassayampa river, it would find its ending in Rich Hill. A half million dollars worth of nuggets were found on the surface of Rich Hill in the pioneer days, and the Vulture produced over twelve millions in gold from its upper workings. The Oro Grande seems to belong to the same auriferous belt and may possibly be a direct continuation of the Vulture vein. The history of the discovery is similar to many of the great strikes in the west. The owners have received a cash offer of \$350,000 for the property, but declined to entertain any offer. They allowed the *Prospect* reporter to go through the mine so that the facts given could be published from personal observation, and what is incorporated in this article can be relied upon as the exact truth concerning the great strike. Over 7,000 feet of surface ground has been located on the vein, and if the gold values continue into the unexplored ground it would make a mine of such immense proportions that it would be impossible to estimate the value. It is in Yavapai county, three miles north of the Maricopa county line, and from present indications will probably be the means of making a great mining camp out of the ancient pueblo of Wickenburg.

Los Angeles Herald, March 24th, 1901.

PHOENIX, Ariz., March 24.—The greatest gold strike ever made in Arizona has occurred in the hills of central Arizona, four miles from the camp of Wickenburg. The find was made last December, but the owners kept the discovery entirely secret for months.

A week ago rumors started and the *Herald* printed a brief account of the find. Investigation shows that the mine, now Oro Grande, has since its discovery developed into an enormous bonanza, destined to become famous.

It is located only a few miles from the Vulture, which became famous on a similar showing of ore, and also in the vicinity of the Congress, now regarded as the most important gold producer of Arizona.

Eight claims, covering the entire cropping of a mammoth ledge of free gold, have been located. Small deposits of the ore run as high as \$40,000 to the ton. Not enough assays have been made to determine the average value of the ore, but there are numerous quantities in sight which will carry \$100 to the ton.

The contact ledge is traceable by outcroppings over a distance of 4,000 feet, bordering in a dyke to 300 feet

in width at the center and tapering toward the ends to a 100-foot vein.

The end shafts and drifts in the few weeks of development have outlined \$1,500,000 of gold rock and the ledge without doubt contains many millions more.

The marvelous feature of the discovery is the extreme richness of the vein throughout, nearly every piece of quartz fairly glittering with color.

PHOENIX, Ariz., March 24—A special to the *Republican* from an expert at Wickenburg, 65 miles northwest of here, announces a gold strike in that field. The mine is five miles north of that town, four miles from the railroad and one mile from water.

The vein at the surface is from 20 to 30 feet wide. On this is sunk a shaft 100 feet deep, and from the bottom of the shaft a crosscut runs for 60 feet, all in ore. The walls have not been reached by the crosscut.

From every carload of ore brought to the surface free flake gold can be picked up by hand, and the crosscut glistens with the sparkling precious metal. Free gold can be picked up anywhere on the dump, at the bottom of the shaft, or along the crosscut.

It now promises to prove the richest mine in the territory, perhaps in the world, and there is great excitement over the strike. The owners of the property have been made offers already, but refuse to consider any proposition.

Los Angeles Daily Herald, March, 1901.

Col. Thos. Ewing Tells of What He Saw Recently.

Col. Thomas Ewing, who has just returned from Arizona, where he has spent four weeks, is much pleased with the condition of mining affairs in the territory.

Col. Ewing said that he had visited the Oro Grande mines, where a great strike was recently made, and though the present owners bought the property, a few months ago, for \$2,600, they could sell it quickly now for \$300,000. The workmen have crosscut the vein 61½ feet without coming to either wall, and both faces are in fine ore, which horns free gold.

Prescott Prospect, April 6th, 1901.

WILL MAKE A GREAT MINE.

Mr. W. E. Defty, a Prominent Mining Engineer, Gives His Opinion on the Valuable Strike at Wickenburg—He Says That It Will Probably Make the Largest Gold Mine in Arizona When Fully Developed—The Present Valuation of the Ore in Sight, Mr. Defty Says, Can Be Estimated at \$250,000.

Mr. W. E. Defty, a well known mining engineer, who has been examining and operating properties in this district for a number of years, made a special examination of the property for capitalists of Denver, who wished

to purchase. He had authority to buy at a very liberal figure, if he thought it advisable, but was not able to do any business with the owners, as they absolutely declined to give any price on the mine. They allowed Mr. Defty, however, to examine it, and as a personal favor he gives the *Prospect* a report regarding its geological formation and its probable value when developed. The report is herewith submitted:

"The Oro Grande mine lies about one and one-half miles east of the Hassayampa and in a broken chain of abrupt hills, transverse to the water course. The vein runs northeast and southwest and is very prominent in places. The croppings consist of a quartz porphyry very strong in brown hematite of iron. These outcrops can be easily traced for fully two claims' length, and the strippings that have been made show the same nature of ore as found in the workings. The main workings are about 60 feet above the level of the gulch and consist of a shaft 100 feet deep, all in ore. One crosscut on the west about 40 feet, crosscuts both east and west at the bottom of the shaft 40 feet and 20 feet all in ore, and being the same character as found all the way down the shaft. Neither walls of the vein have yet been reached, so only exploration work can prove the width and extent of the ledge. All the ore is of good quality and, as far as developments prove, retains its high values.

"The country rock on the west is a micaceous diorite schist, and on the east a feldspathic porphyritic granite from which the feldspar has been greatly decomposed. The ledge matter is constituted of a porous friable porphyry quartz heavy in brown and black ferruginous oxides containing very prevalently pockets of soft oxides heavy in the precious metal. The ore is a regular breccia kaolinized very frequently, and in this feature resembles the O'Brien gold mine, about six miles distant; in fact the ores from each mine have a very strong resemblance to each other and are especially characteristic as regards the above feature. By all appearance, the nature and quality of the ore, this mine has certainly a great future before it and has all the belongings to make an immense property, and, perhaps it would not be the least straining to say, the largest in Arizona."

Arizona Republican, June 13th, 1901.

WICKENBURG, Ariz., June 13.—(Special correspondence of the *Republican*.)—Your correspondent was a visitor at Oro Grande yesterday. They now have the shaft down 190 feet, at which depth the ore body continues the same as when the rich strike was first announced. On the 100-foot level they are working two shifts in the drift running up the hill, it being in now over 100 feet. As soon as the blower is installed and the good air problem solved, they will be able to put on two shifts with four sets of men drifting each way with the ledge and crosscutting each way, and until this is done no one is able to estimate this mammoth ore body.

Few people realize the magnitude of this strike from the reports that have come out. It has been variously estimated by mining experts as being worth from \$200,000 to \$500,000. A simple way of expressing what they have, would be that a body equal to a cube 100 feet square has been opened up so far, without reaching any walls of any kind. This body of ore at any point will assay \$30 to the ton, and as high as \$500 to \$600. A safe figure is that the whole body is \$60 rock, which brings the value of the ore in sight at about \$600,000, to say nothing about the possible extent of the ore body the last 80 feet.

As soon as the 200-foot level is reached and crosscuts run, a plant of the right size and kind can be figured on; anything less than 80 stamps would be a waste of very valuable time. Work is being pushed to the limit, and they now have employed all of the men they can possibly use, the number being over 20.

A REGION OF RICHES

Including Wickenburg, Octave and Congress.

It's 60 miles from Phoenix to Wickenburg via the S. F., P. & P. railroad. From Wickenburg to Octave and Weaver it's 16 miles by private conveyance, and from Octave and Weaver to Congress some say it's a long twelve miles, but it is really nearer 17. From Congress one can catch the regular southbound passenger train at the junction, which is called Martinez, and reach Phoenix at 2:40 a. m., or a little more than 24 hours after leaving the capital city. A trip like this involves no hardship or discomfort providing the traveler telegraphs ahead from Phoenix to Wickenburg for sleeping accommodations. Unless he does, there is a strong probability that he will be elected to admire the scenery of that budding city by starlight until the wiser traveler, who has used the wire, arises in the morning and makes room. For Wickenburg is growing. Still there is no boom and the residents do not want one. They are perfectly satisfied with the merits of their district, and feel confident that a year's time will do permanently for the town what a hundred booms could never do. There are more buildings than there were four months ago, but not many more than a month ago. Still real estate is selling, but the buyers are not rushing things. They are waiting for legitimate growth. There are many more people, though, and the number is growing constantly. While there are but two hotels in the place, their capacity would accommodate the guests of at least four similar hostleries in any ordinary town of the size of Wickenburg. But in Wickenburg it's different. People are coming into that district daily and the hotels are often overworked. Only the other night no less than 14 people left the north-bound train at that station.

Everything is mining; neither residents nor visitors talk anything else. And why should they? The Wickenburg and adjoining districts are going to prove shortly the treasure house of Southwestern America. The Oro Grande strike has done more to develop mining in that section than all other agencies combined. The wonderful Oro Grande! No one knows yet, unless it is the owners, whether it is a ledge or a mammoth pocket, but anyone knows who has visited the mine that there is visible to the naked eye many comfortable fortunes, and even Wickenburg is satisfied with that. But besides the Oro Grande there are many other great mines in that locality in various stages of development.

The Middleton, the Keystone, the O'Brien and numerous others are working good-sized forces with flattering results. The Oro Grande people are steadily sinking and are rapidly nearing the 200-foot level. When that depth is reached drifting will begin and the size of the pay streak be determined. Upon this knowledge will depend the capacity of the stamp mill that will be erected. For the Oro Grande owners are not "fly-up-the-creeks." They are "on to their job." They are going to do their own developing as well as their own mining. Mr. George B. Upton, the present manager of the property, is a practical mining engineer and superintendent, which, around a mine, is next to being as valuable as the fellow with the money.

Henry Wickenburg, the father of Wickenburg and the discoverer of the Vulture mine, said many years ago that the town would some day be the largest in Arizona. This is by no means an improbability. It will take some time yet, but present indications are good. With a big stamp mill at Oro Grande, which is less than six miles from the town, a big smelter at the Keystone, and mills and reduction works at a dozen other camps, all within 20 miles, and all good paying properties now, no man

can guess the population of Wickenburg a few years hence.

The whole section is certain to be gridironed with railroads eventually. Frank M. Murphy, president of the S. F., P. & P. railroad, has said repeatedly that he would build branch roads into the various camps from his main line as soon as development warranted. Wickenburg will be the starting point, and to Wickenburg will flow the pomp and circumstance of a flourishing mining town.

It is a curious fact that the Vulture peak, which is a landmark for a hundred miles in every direction, and at the foot of which is the famous Vulture mine, from which has already been taken \$16,000,000, is in a direct line south of the town of Wickenburg and of the Oro Grande. About 20 miles beyond the latter, in a direct line to the north, is the Weaver district and Rich Hill, renowned in the old days for their fabulous wealth in placer gold. And the end is not yet, for at the very foot of Rich Hill is the Octave mine, now working 150 or more men, day and night the year round. The dull roar of the quartz mill never ceases, and while nothing is known on the outside regarding the profits, the mine is considered one of the very richest in Arizona. The camp is a model one. All of the buildings have the appearance of having been "cut to measure." Everything is trim and neat, and the streets rival those of Phoenix for straightness and width. No saloons or "rough houses" are allowed, consequently Weaver, which is just across the gulch, has become the tenderloin of Octave. But even there everything is quiet and orderly, and water sells for 2 cents a gallon, or three buckets for two bits. Diagonally across the desert from the foot of Rich Hill is the great Congress mine, only three miles from the main line of the S. F., P. & P.

The overland traveler from Wickenburg via Octave can reach Congress before sundown and in plenty of time to return to Phoenix by train the same day. He will also have time to look to his fill at the works of the deepest mine in Arizona and to mingle with the life of a typical western mining camp, which by lamp light on the evening after pay day (when I saw it) is well worth the "price of admission."

All between Wickenburg and Octave and Congress, and far to the north and west of the latter place, the country is alive with miners and capitalists. Properties are being opened in every direction and new and rich strikes are reported constantly.

Martinez, which is the railroad station for Congress, is the center of as rich a section as Wickenburg, and in time will be the starting point of railway lines into the adjacent mining country. The immensity of this great district can scarcely be realized. Its wealth cannot be estimated.

H. J. L.

Phoenix Enterprise, June 22nd, 1901.

RICH ORO GRANDE.

Wickenburg's Great Bonanza Prospect Rapidly Reached Stage to Be Called a Mine.

Editor Enterprise:—In answer to your inquiry concerning my recent visit to the Oro Grande mine, I would say: While in the Wickenburg district examining a group of mining claims, I met, in the town of Wickenburg, Mr. Upton, one of the owners of the Oro Grande, who very kindly invited me to visit his property and directed me to Mr. Hatfield, another of the owners, and in charge of the development work now going on. My first impression of the permanency of the property was received as I approached the camp and looked upon the boarding house, lodging quarters, residences and office buildings, all of which were substantially built and nicely painted, all suggesting the thought of durability, and this thought was again suggested when I reached their hoisting plant

securely sheltered and working without the slightest friction, and still further, when I saw their double compartment shaft safely timbered from top to bottom with the best of material. It is encouraging to know that miners and mining men, capable of doing such work, are coming to Arizona, and still more encouraging to learn that they recognize and appreciate our great surface showing, which suggest such great possibilities, and are not afraid our veins will "play out," but will sink on them until candles become an important item in their expense account.

I found Mr. Hatfield at the shaft, carefully watching the landing of his ore bucket and the dumping of the ore. He received me very pleasantly and kindly gave me permission to examine their surface ground. The Oro Grande ledge crops for a very great distance and is of a phenomenal width, so common in eruptive formation. The croppings and surface indications generally are of a character which are almost certain to lead to great mineral bodies. Upon my return to the shaft I accompanied Mr. Hatfield into the underground works. My surface observations had prepared me for the great ore body I saw below. The main shaft was then down 180 feet. At the 100-foot there is a large crosscut run from the shaft 40 feet on one side of the shaft and 30 feet on the other, making 70 feet of a crosscut, and neither wall is reached, and no evidence of their appearance is to be seen in the breast of these cuts. From this point there is also a 75-foot level run on the vein. All these openings are in ore. When the 200-foot is reached they will crosscut again for the walls and at the same time continue sinking until water level is reached, at which point large values may appear. There are many indications throughout the entire workings and on the surface which indicate this conclusion.

The Oro Grande is certainly a very big prospect, if it is not already a mine. I am not advised as to the value of the ore, but it is safe to say the owners are entirely satisfied as to this. I understood from the management that the question of a mill or treatment plant of any kind had not and will not be considered until water level is reached. Mr. Hatfield, though a young man, has had long and valuable experience in mines and mining, which fact is abundantly shown by the systematic work so far done and now being directed by him. Remembering the command, not to covet thy neighbor's property, etc., I can only say I wish I had a prospect as big and as good as the Oro Grande.

J. W. EVANS.

Wickenburg News, 1901.

WORK ON THE ORO GRANDE.

Ore Body Over One Hundred Feet Wide and Shaft Still in Ore.

Mr. George B. Upton, general manager of the Oro Grande company, reports the finding of very coarse gold ore in the shaft at its present depth of 215 feet, which is as rich and extensive as the reported strike of three months ago, which caused the stir among mining men and mine owners, and started the activity in this section that is now being felt in all lines of business. This will be lasting from the fact that the developments prove it to be greater than the predictions that have been made. The vast body of ore in sight can be calculated by the list of openings they now have, all of which are in ore. At a depth of 20 feet an assay of the rock as it came out of the shaft went \$2.70 in gold. At a depth of 50 feet it had been increased to about an average of \$12.00. At the 50-foot level there is now about 60 feet of crosscutting, which will give a fair average of about \$15.00, with veins running higher. But it never was valued as a gold

property until a depth of about 90 feet was attained, when rich ore containing coarse gold was struck. Previous to this time the work was done with hopes of striking the copper ledge that crops on the surface, at 100 feet by crosscutting.

At the depth of 100 feet the value of the property as a gold mine was first appreciated. At the 100-foot level a crosscut has been run 60 feet one way, encountering a very well defined wall. A crosscut being run on the other side of the shaft directly opposite, now in 40 feet, is still in the ore. This proves that the dyke has a width of not less than 100 feet at the 100-foot level. The value of the ore has been estimated by reliable mining engineers as going from \$20.00 to \$80.00. To be absolutely safe, start your calculations on a \$20.00 basis and cease wondering whether Wickenburg is going to be the town we Hassayampers expect it to be. At the 200-foot level a station has been put in and drifts started both ways on the ledge, and both will probably now measure 60 feet. In the drift south some of the best ore they have had was encountered the first of the week, which, together with the last strike at 215 feet, makes the future look decidedly bright.

Y. Garcia just finished hauling out one carload of lumber, which will be used putting a cross-head in the shaft, so that they can run the hoist faster, as they expect to have as many men at work as they possibly can make room for. This is the proper thing, as they will then be able to put on a large plant and not be hampered by not being able to take out the ore fast enough. They are also enlarging the bunk house and adding to the boarding house many improvements for convenience. Also have just added two large storage sheet-iron tanks, one at the boarding house and the other at the hoisting works. For the present these will be supplied with a wagon tank by the Garcia team, which is the best possible arrangement until they install their plant and pipe line from the river.

Mr. G. E. Lamb, the president of the company, will be out the latter part of this month, and the development work will probably be far enough along to decide on the plant to treat the ore.

The ore already in sight leaves no doubt about the size of the plant; the question still undecided is as to the exact kind best adapted.

In one way the foreman has a snap at this property. No pay streak to keep track of, as all of the work is in pay ore. No loss of time by the men taking down ore, when great care and close attention is necessary to get it out free from waste, as they have no waste. All ore, nothing but ore, and lots of it. The property was certainly well named, as it is a grand property and the gold is there, gold enough for us all, which reminds me of the fact that it is doing us no little good already, as they are now spending over \$6,000.00 per month, or over \$200.00 per day, which increases every day. When the property is equipped it will mean not less than \$50,000.00 per month in the town (city) of Wickenburg. Who said there was too many "Barometers of Prosperity" here? Better hurry, fellows, as there will be room for several more.

Tucson Star, July 20th, 1901.

High Assays of Oro Grande Mine Ore.

TUCSON, Ariz., July 20.—(Special.)—The magnitude of the strike at the Oro Grande mine, near Wickenburg, is greater than at first announced. It has been variously estimated as worth from \$200,000 to \$500,000, but later developments show that the mine has been greatly undervalued. It is said that this body of ore at any point assays over \$30, and runs as high as \$600.

Wickenburg News-Herald, March 1st, 1902.

EXPERT MINING MAN'S OPINION.

**P. C. Bicknell, of the Prescott Prospect, Says
There Are Millions in Sight—One of the
Most Comfortable and Best Managed
Camps in Arizona.**

The *News-Herald* has said so much regarding the great richness and extent of the Oro Grande ore body, and received so little credence, that we take pleasure in reproducing the following description from the pen of P. C. Bicknell, the well known mining man connected with the *Prescott Prospect*. If anything, the account of Mr. Bicknell is conservative, as all who have visited the property admit.

Since starting work last year, development has proceeded at such a rate as to make old-timers pause for breath, and too much cannot be said in praise of the work of Manager Upton and Superintendent Hatfield, who make a combination impossible to beat, as an inspection of the camp and mine testifies. The remaining owners of the property, Frank W. Ellis and G. E. Lamb, of Clinton, Iowa, are in town this week, deciding as to the future working of this bonanza, and while the *News-Herald* is not authorized to say so, it is very probable that a large mill, of 100 stamps or more, will be installed very shortly and the thousands of tons of rich ore on the dump and in sight turned into bullion, amply rewarding the fortunate owners for their unremitting toil and energy. Mr. Bicknell says:

"Were there no other producing mines save the Oro Grande group within 50 miles of Wickenburg that group of mines alone would insure the future growth of the town. They belong to that fortunate class that, in the whole history of mining, have been so few that their names stand out in the record like points of light on a dark background.

Situated on the east side of the Hassayampa, four and a half miles north of Wickenburg, the little group of tents and buildings that form the camp are plainly visible from the upper portion of the town, and the only practicable route from the mines to the railroad lies through the ancient camp of Henry Wickenburg.

There are nine claims in the Oro Grande group in addition to three water rights on the Hassayampa river, which encircles the camp on three sides at a minimum distance of one and a quarter miles. All of these locations, however, are contiguous and all will be worked from the great main working shaft on the Copperhead, one of the central claims, which is now down 300 feet with levels at 50, 100, 200 and 300 feet, amounting in all to 913 feet. Moreover, there has been much crosscutting in many directions both from various points on the levels as well as from the shaft itself.

In every part of the mine, as work progresses, it is all in ore, and very much the same kind of ore at that. The amount of development now accomplished, since work was started, just twelve months ago, is figured at 1,775 feet. This is an undoubted proof of the industry of the working force and the energetic and systematic methods of the manager. This amount of work seems the more surprising when one knows that all the openings, each drift, crosscut and tunnel are two-thirds larger than is customary in mines.

There is no need of dodging or ducking here to avoid bumping one's head or, at the very least, knocking off one's hat against the roof, for the roof is far above one's head, even too high to touch with the hand. Furthermore, one may stand in any drift or crosscut and extend his arms to their full reach without so much as touching the walls on either side. But the miner will soon see that there is method in this, and several good reasons for these broad and high openings.

First of all, they do not entail the handling of an extra amount of waste; all of the ore, whether in drift or crosscut, goes onto the first-class ore dump. Next, this ore, in particular, breaks much better to the drill on a broad face than a narrow one, and, lastly, the miner, not being cramped in his movements, can handle himself much better and thus accomplish more work. In marching freely through these high-ceilinged levels, one might fancy himself in the subterranean corridors of some great fortress.

The trite saying that gold is where you find it, was never, to my knowledge, more exemplified than here in the Oro Grande. The entire body of gangue, whose limits, by the way, have been undefined in 60 feet of crosscutting and 900 feet of tunneling, is of talc, and few miners or prospectors would go to the expense of having an ordinary piece of talc assayed for gold values.

I suspect that this is one of the reasons why the value of this deposit remained so long undiscovered. At the 300-foot level, the lowest depth yet reached, a crosscut each way, indicates the width of the ore body to be 120 feet wide, between diorite walls. This space encloses a noble body of ore. Even should the ore go no deeper than this level, there is enough ore blocked out above it—10,800,000 feet, or say 600,000 tons—to keep the mine running several years. And the ore averages \$12 per ton, the value of the block being about \$7,200,000.

The ridges that enclose this talc body at a little distance are mainly of diorite (so called) and I noted a good sized cropping of black quartz that evidently strikes southeast across one of the claims, in which, on breaking a fragment, quite a good sized speck of gold was discovered.

Oro Grande camp is a model of neatness and convenience. The hoist is the central figure and around it cluster the various other buildings needed in a camp like this, while at a higher point on the hill, commanding an easy view of the entire camp, is the office and dwelling house of Manager Upton, who is also vice-president of the company. Here I found Mr. Upton and family, and, after a short and pleasant call, joined them at lunch, after which Mr. Upton took me through the mine and afterwards through the camp generally.

Here I was particularly attracted by the cleanliness and well kept air of the miners' sleeping rooms. They were all in one house, whose dimensions I have forgotten, but at any rate, it was wide enough to contain a wide hallway running through from east to west, on both sides of which doors opened into double and single rooms to the number of 14. The bedsteads are all of white painted iron, such as our Prescott hotels are furnished with, and each room has a table, two chairs and a washstand. There are eight double rooms with two beds each, and six single rooms with one bed.

An interesting hour or more was spent panning out the fine stuff that came up, bucket after bucket, from the bottom of the 300 foot level. We would dip into the ore bucket each time it came up, before it was dumped, and discarding all but the finest, we would wash it out, without pulverizing. Any miner knows that it takes good rock to assay well under such conditions, yet we got many coarse colors in each trial.

On the whole, I consider Oro Grande a very comfortable as well as a very lucky camp, and one with an interesting financial history ahead. May its comfort and luck long continue, and may we all get a whack at something of the same kind as soon as possible.

Wickenburg News-Herald, March 8th, 1902.

When Judge Campbell, of Prescott, published a story some time since, wherein he depicted the principal character as coming into a mining camp, starting a brokerage office and displaying a sign with the admonition, "Keep Your Eye on the Oro Grande," he wrote wiser than he knew. Like this man, we say keep your eye on the Oro Grande and witness the development and working of one

of the greatest, if not the greatest, and richest gold mines discovered for years.

On Tuesday the force being worked was doubled, a night shift being put on, making about 30 men now employed in the mine. This force will be increased as fast as room can be made. Work is now being pushed on the north drift, and when the point selected for the mill site is reached a three compartment upraise will be started and a large hoisting works erected as soon as the surface is reached, the future working of the mine being through this shaft. Everything under and around the present shaft is rich ore and will all be taken out, rendering it an unsafe location for machinery, as the rich ore body nearly a hundred feet wide reaches within a few feet of the surface. It has not been definitely decided as yet as to the kind of machinery which will be installed, but the plant will have a capacity of 400 or 500 tons a day.

This will make the minimum production of the mine (estimating the ore at \$12.00, which is considered low by experts who have examined it,) not less than \$4,800.00 per day of 24 hours, or a yearly production of approximately \$1,728,000.00.

The Oro Grande has attained little fame solely because the owners are undemonstrative men who have private means amply sufficient to develop it, which they have done so far at an expense of many thousand dollars, there being about 2,000 feet of work done, every cent of which has been paid by them, no stock ever having been put on the market. The present capital stock of the company is \$60,000.00, but it is very probable that the company will be reorganized with a capitalization of \$3,000,000.00, or more, and a few shares sold to friends of the present owners at par or over.

The members of the company have now transferred five more claims to the company, making fourteen in the group. They also own four water rights on the Haysampa, and have the ore, water and money necessary to make the Oro Grande as famous over the world as the Vulture was in the days of old, and those who are in a position to know say that the Oro Grande ore body exceeds the Vulture in size, regularity and richness, and will be a larger producer. What other section of the United States can show two such mines as the Vulture and the Oro Grande? And Wickenburg not only has these, but numerous other rich mines and partially developed ones.

To say nothing of the countless prospects with showings as good as the Oro Grande had, less than two years ago—and all this with the country around here not prospected even on the surface one-tenth as much as it should be. For the past eight months we have been prophesying Wickenburg as the coming Cripple Creek of the southwest, and once more we stake what little reputation we have that five years from now will see Wickenburg the largest, liveliest and richest mining center in Arizona.

The working of the Oro Grande of itself means much to the town, as it will employ from 300 to 500 men when running full force, and this, with the population always necessarily adhering to such a band of workers, will make Wickenburg a town of 4,000 or 5,000 people. Besides this, a mine producing the amount of bullion the Oro Grande will, always induces and encourages greatly increased activity among the prospectors and developers in any section, and others are liable to be exposed at any time. If anyone had advised a mining man to come here two years ago and discover a rich mine, he would have been told that Wickenburg was dead; there were no good properties here, and that the camp was worked out when the Vulture suspended operations; yet since then the Oro Grande has been discovered on ground walked over hundreds of times.

Colorado Springs Daily Mining Record, March 28th, 1902.

WICKENBURG, Ariz., March 27.—Your correspondent has visited the property of the Oro Grande company and has made a personal inspection of the various workings of the mine. The showing is indeed a remarkable one

and justifies the claim that the Oro Grande is one of the richest gold mines in the world.

Your correspondent saw some 2,000 feet of development work, all in ore. At the 300-foot level about 250 feet of work has been done. Here sulphide ore has been encountered and water reached. At the 200-foot level nearly 600 feet of development work has been done, all in ore.

The 100-foot level shows more work, there being about 1,300 feet, all in ore. The company has a map of all underground workings, and as work progresses these maps are amended. This, coupled with what one can see going through the shafts, drifts and crosscuts, give some idea of the real magnitude of this truly rich and wonderful deposit.

At the surface the company has enough work done to show the continuity of the vein for about 4,000 feet. The underground workings show a width of 120 feet. The character of the ore is a porphyritic breccia between walls of diorite. The breccia is mostly porphyry, and other vein filling is talcose and oxides. The oxides are the richest, carrying high values in free gold. The president and vice-president of the company took a fair average sample of the ore by extracting some from each bucket hoisted. This was quartered down in the usual way. By pan test the ore went \$45 per ton. To prove the test an assay was made on a check sample. This showed \$184.40 per ton. If the entire width of ore carried only one-fourth of this value, the amount now in sight would run into tremendous figures. Your correspondent procured several handsome specimens rich in free gold. These were dug indiscriminately by him from the walls of crosscuts and drifts.

The present shaft is located near the center of the deposit. Miners are pushing work in every crosscut and drift, at the 200-foot level, the intention is to drive a drift 1,000 feet to the north. Here a crosscut will be driven to the country rock and an upraise made to the surface. This upraise will constitute a three-compartment working shaft.

The company owns water rights, controlling 400 inches of water. A mill is to be ordered in the near future. It will have a capacity of 400 tons a day. The ore body throughout is free-milling.

Offers to buy the property have been frequently made, but in every case they have been refused. The company prefers to develop its own find. Those in control argue that if the mine is worth big money to some one else, it is worth as much or more to them.

The showing on this property is the reason for the great amount of development now being done on the many good prospects found near and around Wickenburg. This place is the natural shipping point for many properties now taking out ore in large quantities and building mills.

To say the average of all ore in this mine is \$12.00, would not be giving a fair statement, as all indications and tests find better results.



William E. Defty, M. E., who reported on the Oro Grande about one year ago, is expected to make another examination.

By all appearance, the nature and quality of the ore, this mine has certainly a great future before it, and has all the belongings to make an immense property, and, perhaps it would not be the least straining to say, the largest in Arizona.

The Oro Grande company owns fourteen claims, being five claims long and situated in the Black Rock district, Yavapai county. A. B. NOXON.

Colorado Springs Daily Mining Record, March 29.—Editorial.

The story of the riches of the Oro Grande mine, at Wickenburg, Ariz., as published in the *Daily Mining Record*, has created a deal of interest. The report has been verified by a cursory examination of the property made by our special Arizona correspondent. The showing of the mine is indeed remarkable. The Wickenburg district has undoubtedly an enviable future.



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GRANDE
MINES
COMPANY

ORO GRANDE MINES COMPANY

INCORPORATED UNDER THE LAWS OF ARIZONA

300,000 SHARES CAPITAL \$3,000,000 AT \$10.00 PER SHARE

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CLINTON, IOWA.

GEO. B. UPTON, Vice-President
Resident General Manager,
AT THE MINES.

FRANK W. ELLIS, Secretary
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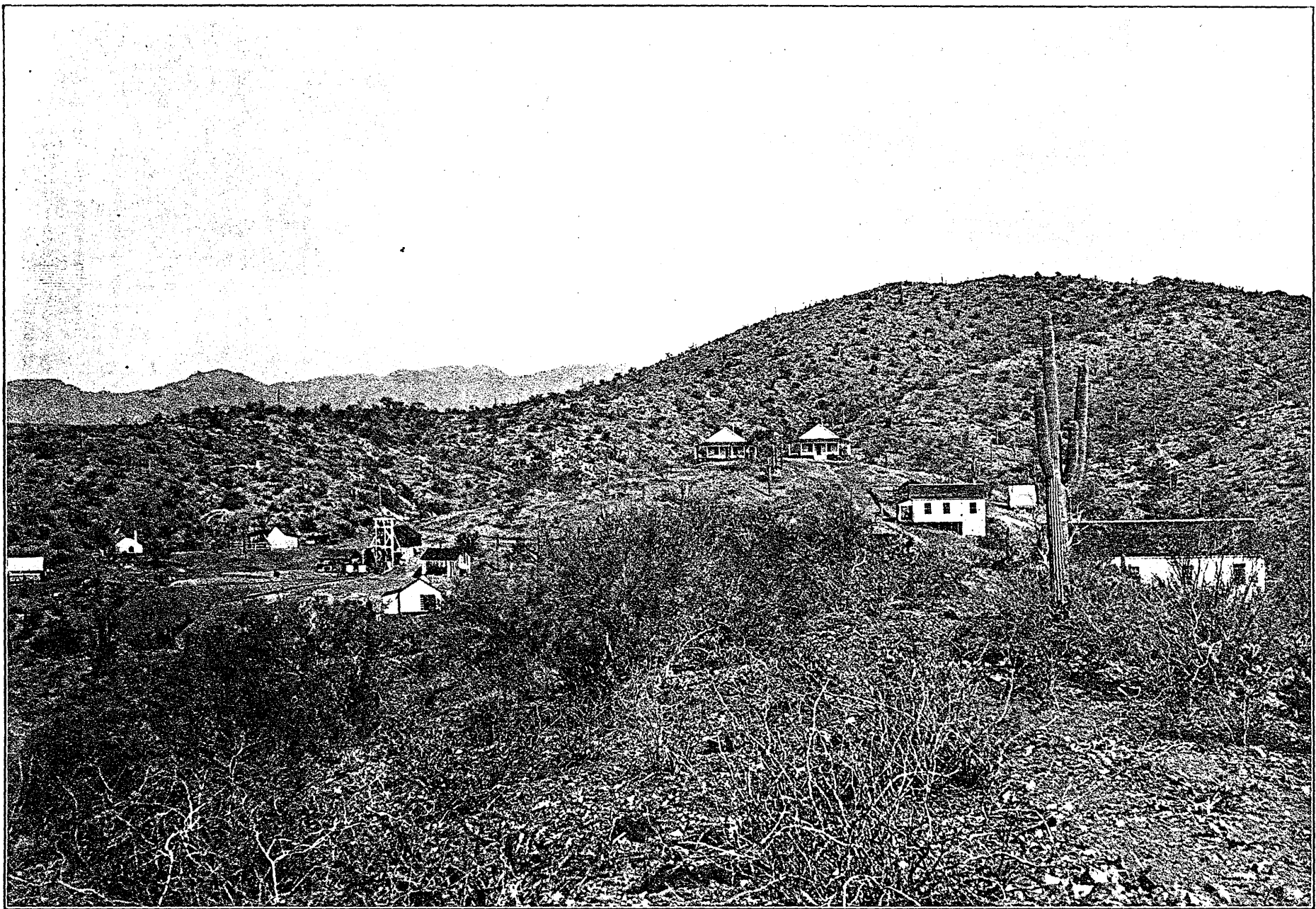
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NEW YORK, N. Y.



GENERAL VIEW OF ORO GRANDE CAMP, SHOWING PART OF THE IMPROVEMENTS.

Organization.



The Oro Grande Mines Co. is a duly organized corporation, organized under and existing by virtue of the laws of Arizona.

Its capital stock is \$3,000,000.00, which is divided into 300,000 shares at \$10.00 each, of which 50,000 shares is Treasury Stock.

The officers and directors are business and professional men well known in Iowa and Arizona. Their standing and integrity is unquestioned, as investigation will substantiate. Their ability to successfully handle a mining proposition is shown by the condition of their affairs and the admirable condition of the mines.

Their faith in this undertaking is best shown by calling attention to the large amount of money they have expended in the mines' development, demonstrating their high value before going to the public for any assistance whatsoever.

PURPOSE OF THIS STATEMENT.

This statement outlining the Oro Grande Mines and showing its present value and future prospects is for the purpose of calling the attention of the investing public to the Oro Grande Mines Company's stock as a desirable investment. We think the reader will find in these pages proof of its unquestionable merit and value based on the ore ready to be milled, with proper facilities for handling it on a large scale.

The members of the corporation have developed and financed the mines up to the present time independent of outside assistance.

As the equipment of this property requires a large outlay of money, they set aside a block of stock as Treasury Stock to be sold at par \$10.00 per share on a low capitalization, put so because of their abhorrence of the methods used so often by brokers and promoters with good results to the broker but disastrous results and disappointments for stockholders.

The entire proceeds of the sale will go towards improvement of the property and the successful consummation of the undertaken enterprise of this corporation. The present development already guarantees this success in the form of dividends out of ore bodies that are already available, to say nothing of the increase value that the stock will have aside from a prospective value, which is so great that it means that an interest in these great mines will be nothing short of a bonanza to investors.

Aside from the improvements, the Treasury Stock will go to provide for a sufficiently large sinking fund *so that it cannot become an enterprise without capital for its successful conduct.*

The importance of this will be apparent to any business man, and a gratifying substitute for excuses and delays.

None of the officers of this corporation are to draw any salary except the manager, which is nominal, until such time as the property is earning and paying dividends to stockholders, or not then without the consent of stockholders.

PROPERTY OWNED BY THE COMPANY.

The property of this corporation, briefly stated, consists of nine mining claims and three mill sites, for which a United States patent has been obtained and is vested entirely in the corporation.

The patented claims are described in the report of Mr. Defty following. The three patented mill sites control a stream of flowing water in the Hassayampa River, located in what is known as Box Canyon, about $1\frac{1}{4}$ miles from the mine. There is a continuous flow and ample supply for needs of the mine and plant at all times.

In addition to the foregoing the company has five claims of 20 acres each for which patent has not yet been obtained, but held under laws governing such locations, all of which have been complied with.

On the patented claims are located many valuable and necessary improvements that were erected as the occasion of the development of as large a property as the Oro Grande Mine would naturally require.

To the foregoing can be added that the mine is thoroughly equipped up to the point it has now reached, as well as offices, boarding and lodging houses, etc. In fact, the business has been conducted in such a way that nothing was lacking to carry out the work undertaken, all of which is not only an excellent start for large additions which will shortly be added, but it means much as a convenience and saver of time.

The mines of this corporation and upon which the main workings are situated, were known as prospects for many years, and only very shallow shafts were sunk on the various claims and no systematic development work was done. Had this work been performed, "as the law" demands, the property would not have been in possession of the present owners to-day, for its great richness and value would have been laid bare many years ago. A trail between Wickenburg and Stanton and Rich Hill passing within a few feet of the present shaft, was travelled over by hundreds of prospectors and others who never dreamed of the immense deposit of gold ore below them. The predecessors of this corporation became owners of the property about two years ago, and at once began systematic development work upon the croppings by sinking a shaft. At a depth of 34 feet the great value and worth of the property was made apparent by the presence of visible coarse gold disseminated all through the formation. This class of ore was encountered in all the workings of the mine as far as developed. Anywhere in the workings high values can be obtained, and pannings, picked promiscuously from any portion of the dump, readily prove the presence of rich gold values.

To more fully understand and make clear the amount of improvement and development work accomplished, and the extent of the proven ore body, we specially refer to Mr. W. E. Defty's report, which accompanies this statement, and was made at the request of one of the shareholders, who has up to the present, solely financed this enterprise.

Mr. Defty's ability and integrity as a mining engineer and expert is well known in the West, and perhaps he knows Arizona and its geological and mineral formations, as well as, if not better, than any other mining expert. Mr. Defty's examination was rigidly careful and crucial, and his moderate and conservative figures have been exceeded by every other professional man visiting the property.

/ / /

REPORTS ON THE PATENTED ORO GRANDE MINES

MADE BY

W. E. DEFTY, M. E.

WITH HEADQUARTERS AT PHOENIX, ARIZONA.

About Mr. Defty.

Mr. Defty is one of the best known and most able Mining Engineers in the Southwest and his selection by the President of the Oro Grande Mines Company was due to his high character and fitness for the work.

As Mr. Defty has spent years in the Southwest and Northern Mexico, he is justly considered the best authority on its formation and its possibilities, of its resources and values, having had the opportunity of seeing the different theories as to the mineralization, worked out and proven, which is best shown by his successes in the form of good mines in the territory.

The greatest compliment that can be paid Mr. Defty as a Mining Engineer is that it is his sole occupation, and he has more actual field work than many others combined.

He holds his profession above all things, which means that his findings in all cases are conservative. The truly professional man of Mr. Defty's character acquires his standing on successes, and to insure success he must in all cases look into all propositions as a critic, allowing none of the miners' enthusiasm and knowledge of a property's possibilities to enter into his findings.

Therefore in Mr. Defty's reports and findings on the Oro Grande Mines you have the facts and the **CONDITION OF THE MINES AS THEY ARE AND FROM A NON-EXCITABLE, AND CONSERVATIVE PROFESSIONAL GEOLOGIST, AND MINING ENGINEER'S STANDPOINT.**

Report on the "Oro Grande" Gold Mine.

GARRETT E. LAMB, PRESIDENT,
CLINTON, IOWA.

DEAR SIR:—

In conformity with your request to make a thorough examination and detailed report on "Oro Grande" mine, I hereby submit the result of my investigations and conclusions.

Situation: This property is situated about four and one-half miles due North of the town of Wickenburg on the S. F., P. & P. R. R. and one and one-half miles from the Hassayampa River.

Location: The Claims are all located in the Black Rock Mining District, Yavapai County, Arizona, and comprise nine mining claims, named as follows:

Copper Head	Frenchman	Alma
May	Nigger Ben	Montana
Dutchman	Colossal	Oro Grande

Mill Sites: In addition to the above is also three mill sites connected with the property and named: Copperhead, Frenchman, and Dutchman respectively. All the above claims are surveyed and completed for patenting.

Roads: A good wagon road extends from Wickenburg right to the dump of the mine, which makes it very accessible.

Water: Sufficient amount of water exists in the Hassayampa River for reduction and all other purposes. On the Copperhead mill site claim on the river at the head of Box Canyon, is a flow of water equivalent to about 400 miners inches. This point is distant from the principal claim that now has the works upon it, just 7,446 feet. The elevation from the bed of the river to the claim is 360 feet.

Fuel: The most effective and efficient fuel for the generation of power is gasoline and is generally used in this district.

Conditions: The economic conditions for working the property are all that could be desired, being in close proximity to railroad and supplies, and abundant water supply.

SURFACE IMPROVEMENTS

The surface improvements at the shaft, comprise shaft house with 6 H. P. Fairbanks, Morse Gasoline hoist, carpenter's and blacksmith's shop.

Bunk house 26 x 56 feet, containing 14 rooms, and office.

Dining room and kitchen 16 x 40 feet.

Two dwellings 24 feet square.

All the buildings are of lumber, neatly and well finished and accommodatively situated.

Topography: The majority of the claims are situated in a broken chain of abrupt hills transverse to the water course, and intersected occasionally by deep gulches. Behind these foot-hills the surface rises quite acutely to the crown of the range.

Geology: The country rock on the west of the ore-bearing zone is micaceous dioritic schist, and on the east diorite and feldspathic porphyritic granite, from which the feldspar has been greatly decomposed. There are occasional spots and outbursts of rhyolite and clear quartz silica; these occur irregularly and have no uniformity of trend.

As far as the works have proven in depth, the formation on the west holds its original characteristic. On the east, however, the diorite has lost its originalty and merged into horn-

blendic quartz syenite. It is evident the change of feldspar, orthoclase in the syenite to oligoclase has formed the diorite.

Vein Trend: Through this formation courses the main auriferous bearing vein system with a trend of N. E. 37 degrees S. W.

CROPPINGS.

The main croppings on the Copperhead and Frenchman can be traced from below the present working shaft to almost the apex of the range, and are composed chiefly of red and black ferruginous quartz, strong in brown hematite; they are very bold, persistent and continuous, and hold their good general character wherever exposed.

As the more abrupt slopes are approached, the ground is detritus and talus capped obliterating the croppings at intervals, but in all instances have been found existent where this capping has been removed. Outside and below this main cropping proper, where the gulches have deeply cut the formation, is exposed large croppings of ledge matter identical with the material forming the ore body. These croppings are especially prominent at the apexing of the fault thrust which has been encountered in the vein, and which has an inclination of 45 degrees to the south. At the north end of the Frenchman location, and about 1,600 feet from the shaft, and on a continuation of the main lead, a drift has been run mostly all in ore for about 30 feet; midway in the drift, a winze has been sunk 18 feet deep; this shows quite a strong body of good quality ore.

Running at right angles to the main lode are numerous small ore veins, varying in width from a few inches to 2 feet wide.

On the Dutchman claim the croppings are quite prominent and continuous and show ledge material 4 to 5 feet wide, heavily charged with pyrolusite (Manganese dioxide). An incline shaft has been sunk on the croppings to a depth of 20 feet, showing the same nature of ore. This cropping is suggestive of a silver bearing lode.

Montana is a cross claim transverse to the Frenchman and Dutchman claims, and abutting their side lines. The outcroppings show stringers of carbonate copper ore, but are mainly composed of prominent outbursts of quartz.

Colossal shows a vein on the surface similar in its nature to the main lode. On this a shaft has been sunk 20 feet deep, the vein is visible the full depth, and it can be traced on the surface for fully 1,500 feet.

Oro Grande has broken croppings but not at all clearly or well defined, and sufficient work has not been performed to demonstrate the vein in place.

Nigger Ben appears to be a spur from the main ledge, coursing a little east of north. On this cropping a shaft has been sunk to a depth of 60 feet. Approaching the bottom of this shaft the quartz contracts, but the ledge space nearly the full height of the shaft is charged with ledge matter similar to the main exposed body.

Alma and May Claims have stringers and ribbons of quartz upon them, but only possessory work has been performed. These two claims were located mainly for the protection to the adjoining ground. All the surface has an excellent appearance and exhibits a strength of mineralization to a very marked degree.

MAIN WORKINGS.

On the "Copperhead" claim the main shaft has been sunk to a depth of 300 feet.

At a Depth of 18 Feet from the collar of this shaft a crosscut has been run for 20 feet to the east, all in ore.

At 50 Feet in Depth a crosscut exists 40 feet to the west, all in very high grade ore.

At 100 Foot Level crosscut from the shaft to the east 54 feet, all in high grade ore.

To the west 67 feet, all in high grade ore.

Drift south from the shaft 265 feet penetrates solid ore for 142 feet; at this point the ledge appears to be split by an intrusion of diorite; this has an appearance of a horse, and probably ore will be found on both sides.

From 142 feet the drift has followed a seam of vein material for the remainder of the distance.

North from the shaft extends a drift for 400 feet, 210 feet of which is in solid ore.

At 160 feet north from the shaft in this drift are crosscuts to the east 62 feet, and west 75 feet, driven entirely in ore.

At 335 feet from the shaft is a crosscut 46 feet in length following an ore stringer, and from the face of the crosscut the north drift is continued for 65 feet.

A new shoot of high grade ore was encountered on the last day of my examination; its continuity and extent will be proved by continued development.

200-Foot Level: A drift continues north 34 degrees west for 80 feet; at a point 50 feet from the shaft in this drift the workings continue in ore; also at this point a spur drift penetrates the formation to the north 32 degrees east for 98 feet; both of these workings are in high grade ore; at the end of this spur drift crosscutting is being performed each way for 16 feet, all of which is in high grade ore. From the shaft is a drift running 24 feet to the north; from the face of this drift is a crosscut east, continuing for 34 feet; both of these workings are in ore with no wall yet encountered. Drift south 140 feet is entirely in ore. From the face of this drift is a crosscut 48 feet to the west in ore, encountering diorite at the face. To the east is a crosscut 30 feet, all in ore.

300-Foot Level: At a depth of 270 feet the shaft penetrates the diorite. In drifting south 73 feet the ore was met with 30 feet from the shaft; the remainder of the working for 43 feet is in ore.

From this drift a crosscut is started to the east 25 feet in length, all in ore.

From the drift a crosscut is run west for 114 feet, all in country rock. This was run for demonstration purposes only and ascertainment of the permanency or otherwise of the intrusive diorite.

ORE OCCURRENCE.

The ore body is mainly constituted of a yellow ochrous friable porphyry quartz, with innumerable pockets of brown and black ferruginous oxides.

The entire ore system is a regular breccia mass composed of the porphyry as above stated, decomposed diorite and silvery talcose schist; all the component parts have undergone a strong action of kaolinization which makes the ore very easy to mine and mill.

The highest auriferous values are found in the oxide pockets, which completely crumble on being disturbed. These pockets carry heavy and coarse gold. In fact, all through the formation, free gold can be discerned by the naked eye.

The talcose schist appears to carry the lower values in the ore structure. In the vein material are found rounded boulders from 8 to 18 inches in diameter, and occasionally even larger.

That the vein has undergone and been subjected to movement is sufficiently exemplified by the nature of the breccia; and that it has emanated from below is beyond question. There is very little doubt in my mind that the vein will extend to depth and probably be more defined as depth is attained.

However, within two or three hundred feet of the surface (taking the surface indications for my conclusions) I think the ore body will have wide ramifications, and other bodies will be encountered outside of the large ore body already uncovered.

ORE VALUES.

The number of assays taken proves the presence of high values in the mine, the lowest averages amounting to about \$6.20 per ton. It is needless to append any results, as there is lit-

the question about the ore body or values as far as developed. Taking the measurements of the ore body as given under the head of workings, returns a presumed tonnage of 503,166 tons of available ore to be mined. Premising this to only give a net return of \$5.00 per ton, it would leave the very substantial amount of \$2,515,830.

FUTURE WORKINGS AND DEVELOPMENTS.

I would suggest a shaft being sunk about midway between the present workings and the workings on the Frenchman claim; the shaft to follow the ledge or ore body to depth, and drifts run to connect with the present workings. This, in my opinion, should be the main and primary object in view.

Eventually this shaft to be enlarged to triple compartment and made the main working shaft of the system.

Immediately below this, at a point designated to your manager, Mr. Upton, should be the reduction works.

The ore could be gravitated to be crushed, plated, passed over the concentrators (if found necessary) and finally cyanided and disposed of with very little handling.

This position would also afford ample dump room on both sides of the benches.

ORE TREATMENT.

On account of the quantity of coarse gold found in the ores, it will be absolutely essential (for the closest recovery to be made) to pass them through the mill for plate amalgamation, where the preponderance of the gold values would be saved. In my opinion, a 20-mesh screen would be sufficiently small to pass this class of ore, and for the release of the coarse gold.

The effect of cyanidation on this ore, I think, would percolate perfectly through a much larger grain than that passing a 20-mesh screen.

My reason for suggesting space for concentrators to be installed is founded on the belief that sulphides will be encountered at depth; this is suggested already by the cubes of marcasite being prevalent through the lower ore formation.

Also through the country rock passes numberless seams and veinlets of pyritic deposition.

CONCLUSION.

The natural position of this property could not well be surpassed for its easy and economical working, being in such close proximity to a town, railroad facilities, supplies in general and water.

The future of the mine is already established and ensured beyond doubt by the proving of the present large ore zone. This in itself, without any further exploration or proving the future extent of the ore bodies, is sufficient to establish it as a very large property. However, the size of the property is difficult to portend, and its huge ore system can only be proven by systematic and extensive exploratory work, for all the surface shows great strength of character, and other bodies of ore will undoubtedly be uncovered outside of the predominating ore system.

The mine has a great future before it, is my decided opinion, and at present it only awaits the installment of a sufficient sized plant commensurate with the mine's extensive magnitude.

My recommendation would be a plant treating not less than 100 tons per diem. But economy would be exercised by the handling and reducing of 250 tons per day. And this sized plant, I feel sure, will not be sufficiently large after the main works and shaft have been opened up, as previously suggested. In fact, I think it would be a wise discretion to await the installment of reduction works, until the above exploratory work has been accomplished.

(Signed) W. E. DEFTY, M. E.

Dated at Phoenix, March 24, 1902.

APPLICATION FOR STOCK

FRANK W. ELLIS,
Secretary of Oro Grande Mines Co.,
Clinton, Iowa:

I hereby subscribe forshares of the
capital stock of Oro Grande Mines Co., fully paid and non-assessable, and en-
close herewith draft for \$.....in payment therefor.

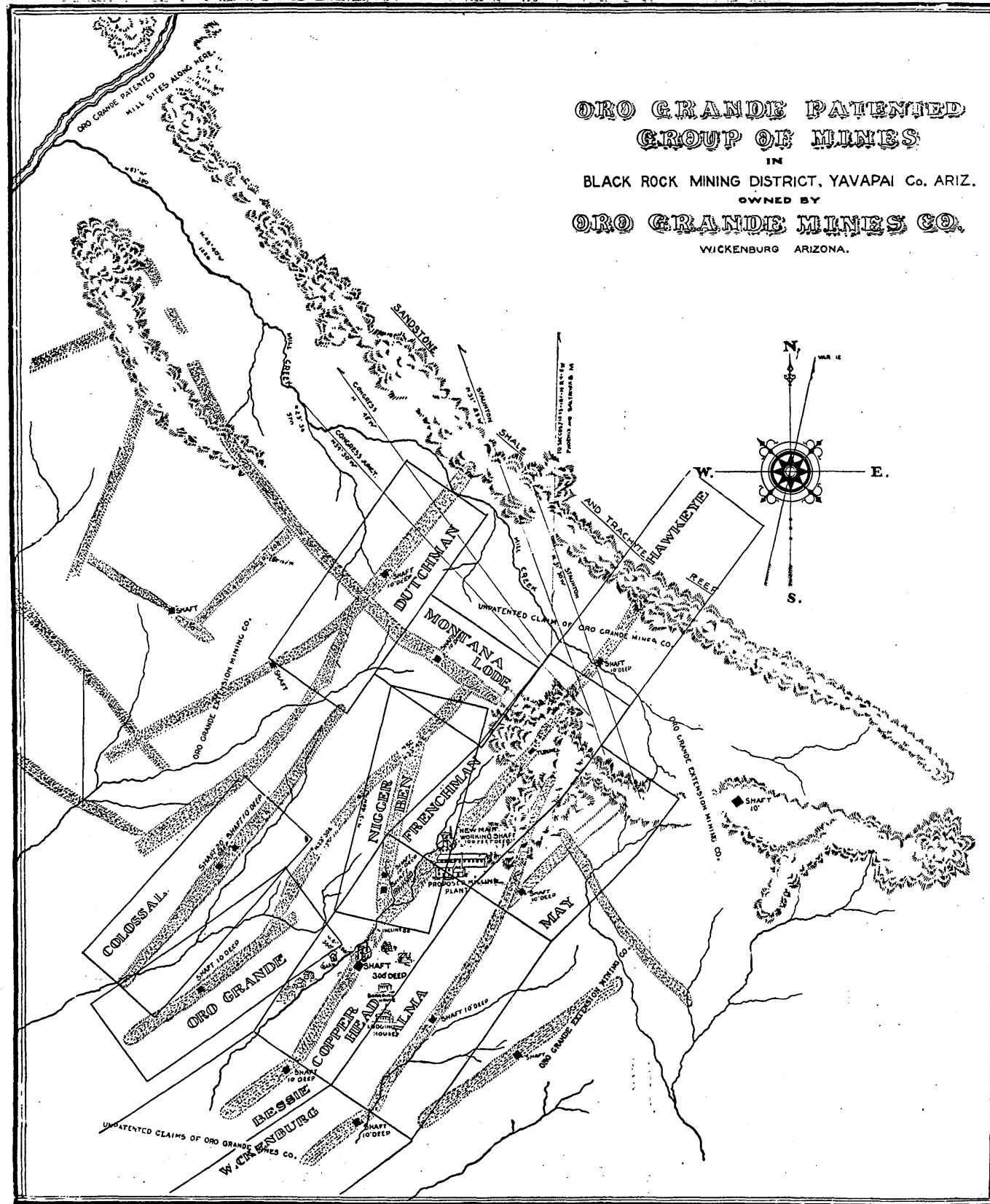
Certificate to be issued in the name of

P. O. address.....

Yours truly,
.....
.....

All drafts should be made payable to Oro Grande Mines Co.

ORO GRANDE PATENTED
GROUP OF MINES
IN
BLACK ROCK MINING DISTRICT, YAVAPAI Co. ARIZ.
OWNED BY
ORO GRANDE MINES CO.
WICKENBURG ARIZONA.



Supplemental Report on
Property of Oro Grande Mines Co.

Mr. G. E. Lamb,

Pres. Peoples' Trust & Savings Bank, Clinton, Iowa.

DEAR SIR:—

In compliance with your instructions, to fortify my previous examination by a supplemental report on the Oro Grande, I have this past week again visited and examined the property; paying especial attention to the new workings, taking samples and other data, and I herewith submit the results of investigations and conclusions, with a geological cross section, showing the sequence of the formations.

In addition to the improvements in the approaches to the mine, the triple compartment shaft on the hill has been sunk to a depth of 100 feet in the country rock, and will have to be continued 96 feet further in order to reach the 100 foot level.

By a careful comparison of this supplemental report with my original recommendations for continued development, you will observe that my conclusions as expressed at that time are now fully confirmed.

DEVELOPMENT.

100 foot level.

The 100 foot level north, now extends 756 feet in the direction of the working shaft, 210 feet of which is in ore. The additional length of drifting since my first examination is 356 feet. It is heading and being driven to connect with the main working shaft, now being sunk. About 200 feet further drifting will have to be accomplished before the connection is made.

(Note 1.) A body of low grade ore was pierced in this working, measuring 20 feet in width, but this body of ore is not included in my estimate of the total increased tonnage in the mine.

Outside of this occurrence of ore, through all the country rock is found seams and ribbons and small kidneys of ore, oxidized. There is also extensive areas of ground having diffused all through it marcasite, pyrite and spar. I mention these facts simply to show the mineralization to which the ground has been subjected. The head of this drift is in hornblendic diorite, alternating with the change of feldspar, into syenite, with bands of compact feldspar and schists of varying lithological characters.

(Note 2.) In the lower grade of ores, not under \$3.00 in value, the gold tenor would be sufficient to admit of very profitable mining. As, undoubtedly, this huge ore body can be mined and milled at a cost of \$1.50 per ton.

(Note 3.) At a point 460 feet from the shaft, an upraise of 105 feet has been made to the surface. This upraise is in ore for 75 feet, when a set-off is made into the country rock, in order to connect with the drift.

This ore is not included in my estimate of the additional ore in sight.

200 foot level.

The drift south which was previously 140 feet in length, is now 270 feet, making 130 feet of additional opening on the lode. This work is all in ore with the exception of the last 15 feet, and makes a continuous run of ore for 225 feet. 139 feet from the shaft, the cross-cut east measured 30 feet. An additional 30 feet of work has been accomplished, making 69 feet over all. The whole of this cross-cut penetrates the usual class of oxidized ore holding the general average values.

At the face of this cross-cut, diorite is encountered, marking and defining the boundary of the ore body on the east.

300 foot level.

On this level, an additional length of drifting of 174 feet has been performed since March last, making a total length of 220 feet. Within 15 feet of the drift face, the ground is broken and crushed country rock (diorite) with horizontal and transverse seams, showing the crush to be the result of an uplifted intrusion from the south and east.

Very little question exists in my mind as to the ore making behind this crushed area. My conclusions are based on thrusts of a corresponding nature which have in several instances penetrated the mine, having ore found behind them. Already on the parting lines and on the arch of the drift, the general character of the ore is making its appearance and is now 12 inches wide, with other seams and streaks along the planes of the breaks. The fractures are filled and are especially strong in heavy patches of hematite.

An entirely new piece of exploration work is south from the shaft 200 feet. A cross-cut has been driven 105 feet to the east, all in ore. For the full length of this cross-cut and at the face, the working exhibits the same extent of oxidization and the general physical features are identical with the ore body from the surface down to the 300 foot level, and are especially characteristic as regards the red and black ferruginous pockets found in drifting on the 100 and 200 foot levels. This ore body is excellent in appearance and has all the attributes for continuance to a considerable distance. It is only reasonable to presume that a cross-cut to the west from the drift on a line with the previously mentioned cross-cut will open up an extensive body of ore, the dimensions of which can only be ascertained by such exploration. By the pitch of the formation, it is very likely that at least 30 feet of ore will be encountered, for the west wall has a very low angle of dip to the east and is not steeply inclined.

The additional work and ore in sight is summarized as follows: 200 foot level. The drift south has been run an additional 115 feet, which is all in ore. 139 feet south from the shaft a cross-cut to the east of 30 feet has been extended 39 feet, making a total of 69 feet, all in ore.

300 foot level. 132 feet in south drift, all in ore.

200 feet south from shaft, a cross-cut to the east, driven 105 feet, all in ore and still holding out in face.

(Note 4.) Calculating the above extensions of work as only reaching half way between levels and the ore at 15 cubic feet per ton, will give an increased ore tonnage in sight of 168,500 tons, or a total of ore in sight in the mine of 671,666 tons.

Appended please find geological sketch; also assay results from 130 samplings.

Trusting the above and foregoing will be sufficiently clear and explicit, I beg to remain,

Yours very truly,

W. E. DEFTY,

Mining Engineer.

Dated at Phoenix, Arizona, December 20th, 1902.

ASSAY RETURNS.

EIGHTY-ONE SAMPLES AVERAGE

\$28.00 Per Ton.

SHOWING THE ASSAY VALUE OF THE ORE BODY CONTAINING 671,666 TONS OF
ORE ACCORDING TO MR. DEFTY'S REPORT AND
SUPPLEMENTARY REPORT.

AVERAGE OF ONE HUNDRED AND THIRTY SAMPLES, \$18.00.

IT will be seen by the report preceding that none of the lower grade ore indicated by Note 1, 2 and 3 of Supplementary Report, or mixed stuff was included in the above ore body as it was considered first-class milling ore and the sampling was done to show what could be expected from mill returns as well as to determine true character and mode of treatment.

These samples were taken in a thorough manner from every part of the mine. Care was taken to avoid the extremely rich places on the 100 foot level as samples from those places have run \$41,000.00 per ton. That this was accomplished it would be well to add that the highest of the lot was from the 200 foot level.

A. VON SCHULZ.

NORRIS WILCOX.

A. H. LOW.

VON SCHULZ & LOW,
Chemical Laboratory and Assay Office,
1746 CHAMPA STREET,
P. O. Drawer 1537.

DENVER, COLORADO, December 23d, 1902.

Results of assays made for Mr. Geo. B. Upton, Manager Oro Grande Mines Co. Samples taken by W. E. Defty, M. E. Tonnage, 671,666. See Note No. 4.

<i>No. of Sample.</i>	<i>Gold, oss. per ton.</i>	<i>Value per ton.</i>	<i>No. of Sample.</i>	<i>Gold, oss. per ton.</i>	<i>Value per ton.</i>
1.	0.28	\$5.60	42.	1.08	\$21.60
2.	0.08	1.60	43.	0.74	14.80
3.	1.20	24.00	44.	0.72	14.40
4.	1.54	30.80	45.	0.36	7.20
5.	0.38	7.60	46.	0.52	10.40
6.	4.56	91.12	47.	0.48	9.60
7.	3.38	67.60	48.	0.52	10.40
8.	3.88	76.60	49.	0.54	10.80
9.	1.18	23.60	50.	0.10	2.00
10.	0.52	10.40	51.	0.16	3.20
11.	1.54	30.80	52.	0.04	0.80
12.	5.68	113.60	53.	0.04	.80
13.	3.42	68.40	54.	0.38	7.60
14.	1.64	32.80	55.	0.36	7.20
15.	0.24	4.80	56.	0.98	19.60
16.	0.14	2.80	57.	1.24	24.80
17.	0.12	2.40	58.	1.68	33.60
18.	0.28	5.60	59.	0.46	9.20
19.	0.26	5.20	60.	1.72	34.40
20.	0.16	3.20	61.	0.44	8.80
21.	0.16	3.20	62.	0.80	16.00
22.	0.40	8.00	63.	0.38	7.60
23.	0.08	1.60	64.	0.36	7.20
24.	0.06	1.20	65.	0.34	6.80
25.	0.04	.80	66.	0.40	8.00
26.	0.14	2.80	67.	0.12	2.40
27.	0.64	12.80	68.	18.32	366.40
28.	0.94	18.80	69.	0.12	2.40
29.	1.00	20.00	70.	3.80	76.00
30.	0.60	12.00	71.	3.24	64.80
31.	1.14	22.80	72.	0.70	14.00
32.	1.04	20.80	73.	4.96	99.20
33.	2.16	43.20	74.	2.18	43.60
34.	1.82	36.40	75.	0.24	4.80
35.	0.08	1.60	76.	1.32	26.40
36.	0.14	2.80	77.	0.08	1.60
37.	0.62	12.40	78.	1.88	37.60
38.	0.60	12.00	79.	0.92	18.40
39.	0.36	7.20	80.	0.12	2.40
40.	0.36	7.20	81.	0.32	6.40
41.	0.64	12.80			

(Signed) VON SCHULZ & LOW.

SAMPLES TAKEN OF POOR AND LOW GRADE STUFF,
NOT INCLUDED IN MEASUREMENTS OF ORE AND
MORE PARTICULARLY REFERRED TO IN SUPPLEMEN-
TARY REPORT DESIGNATED AS NOTE NO. 1 AND 2. 🌿 🌿

✓ ✓ ✓

These assays have no particular value except that they show the extent and thorough mineralization.

When samples were taken no returns were expected, as the majority were country rock and intrusions around edges of ore bodies.

These assays were made by a different firm to prevent any possibility of confusion with each other.

A. D. BARNHART'S ASSAY OFFICE

AND CHEMICAL LABORATORY.

PRESCOTT, ARIZONA.

*Oro Grande Mines Co.,
Wickenburg, Arizona.*

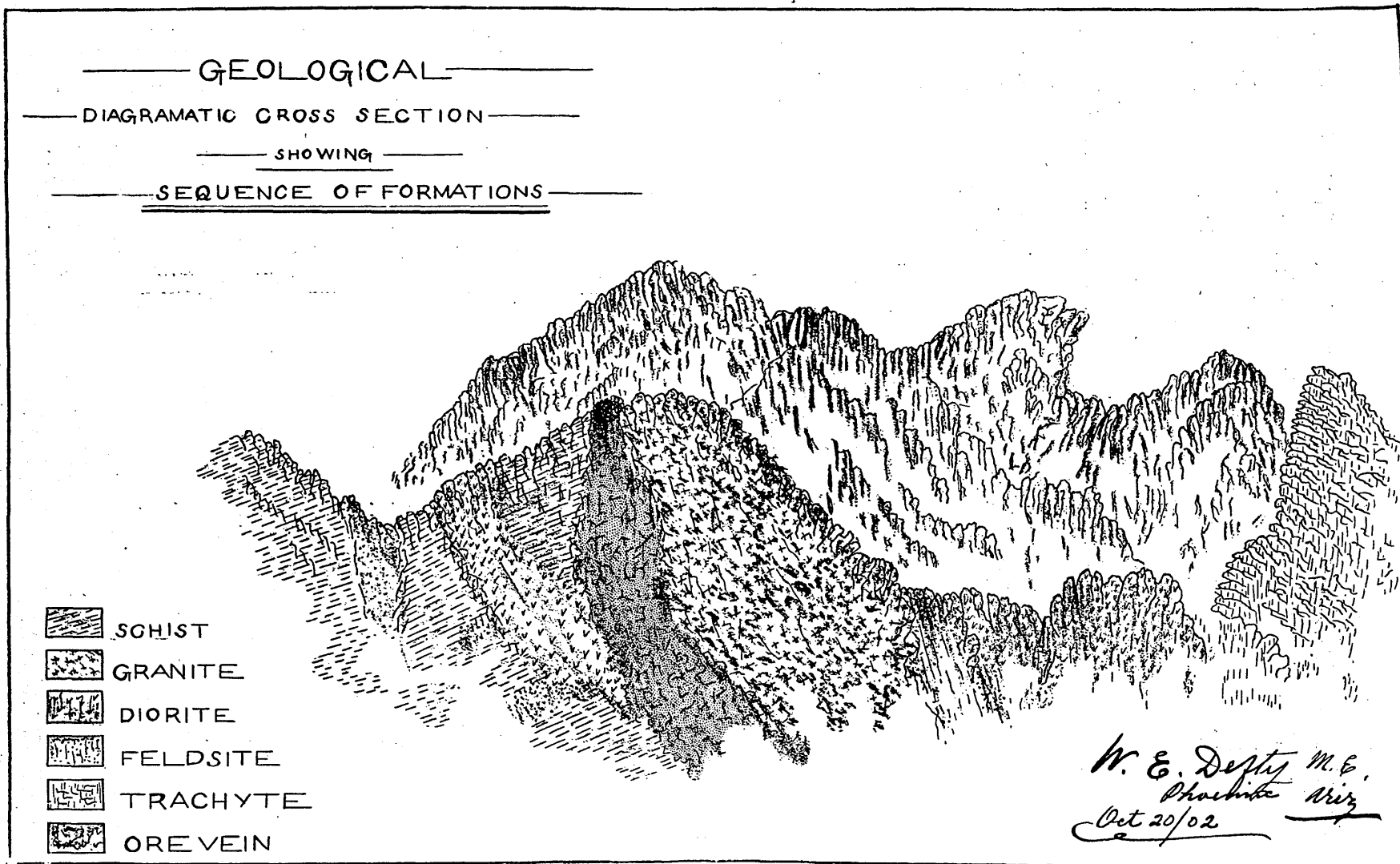
DEAR SIR:—

Results of assays on 49 samples of ore from W. E. Defty for Oro Grande Mines Co., as follows:

No. 82	.11 oz.	\$2.27	No. 107	Trace	....
No. 83	Trace	....	No. 108	.04 oz.	\$0.82
No. 84	.10	2.06	No. 109	Trace	....
No. 85	Trace	....	No. 110	.03	.62
No. 86	.06	1.24	No. 111	Trace	....
No. 87	.22	4.54	No. 112	"	....
No. 88	1.04	21.50	No. 113	"	....
No. 89	.28	5.78	No. 114	.18	3.72
No. 90	.12	2.48	No. 115	Trace	....
No. 91	.08	1.65	No. 116	"	....
No. 92	Trace	....	No. 117	.04	.82
No. 93	"	....	No. 118	Trace	....
No. 94	None	....	No. 119	"	....
No. 95	"	....	No. 120	"	....
No. 96	Trace	....	No. 121	"	....
No. 97	None	....	No. 122	"	....
No. 98	"	....	No. 123	.14	2.89
No. 99	"	....	No. 124	Trace	....
No. 100	Trace	....	No. 125	"	....
No. 101	"	....	No. 126	"	....
No. 102	"	....	No. 127	"	....
No. 103	"	....	No. 128	"	....
No. 104	"	....	No. 129	"	....
No. 105	"	....	No. 130	"	....
No. 106	"	....		

Yours truly,

(Signed) A. D. BARNHART.



Geological Sketch of Formations at Oro Grande Mines, which is part of Mr. Defty's Reports. The sketch shows the main Ore Vein, which nearly 4,000 feet of drifts and cross-cuts shows to be 110 to 170 feet wide. These immense Ore bodies owned by Oro Grande Mines Co.

Future Operations.

We have reached a point where we need a large plant for the reduction of our ores as we have developed our mine, giving us an ore reserve which will run a plant of from 500 to 600 tons daily capacity for about five years, therefore, we have decided on the erection of a suitable plant of the above mentioned capacity, and the ore body only opened up to the 300 foot level and about 1,200 feet along the ledge, while the cropping shows it continuously for over 4,000 feet. This plant will be a thorough up-to-date plant, consisting of Crushers, Rollers and Huntington Mills with a cyanide plant in connection therewith, the process being amalgamation and cyaniding. We will erect our power plant near the railroad in Wickenburg to generate electricity sufficient to operate the mill and pumping plant, including furnishing electric lights and electric power to others, as well as a trolley line connecting the mine with the Santa Fe Railroad; this will save the expense of hauling fuel. The mill will be erected just below a new three compartment shaft that we have just sunk and is now 100 feet and nearly connected with the other workings. From this shaft the ore will be hoisted and passed through all the processes of treatment by gravitation. An electric pump will be put upon one of our mill sites in Box Canon, one mile distant from the mine, and a pipe line will be laid from the pumping plant to the mine. This will give us a bountiful supply of clear pure water for mining and camp purposes. A new store building, boarding house, lodging houses, cottages and a laboratory in addition to the present commodious building will be erected. Other improvements which are absolutely essential to a modern mine will also be installed as occasion demands. With this equipment we are in position to insure the production of over one million dollars a year, taking our lowest grade ore as a basis in figuring said production. This will mean handsome earned dividends in a very short time, and among other things the employment of sufficient number of men to support a town of from 3,000 to 4,000 inhabitants.

The reader will note that we have not enlarged at all upon our proposition, but have operated our mines as well as made all of our estimates upon sound, conservative business principles. We can further state that good conservative business methods are almost as valuable as the mine itself, and in this case we can assure the reader that we have both. We have not attempted in any way to dwell upon the immense possibilities of our property, although we appreciate what they are. We have seen from time to time statements made by men well known in mining circles and whose judgment is considered valuable, that we have the prospect of one of the largest gold mines in the world, but we feel that without such prospects being taken into consideration our showings are such that recommend the Oro Grande stock as one of the best investments.

WORKING CONDITION.

The working conditions are excellent, such as will not cause delays, setbacks or heavy expense.

The company's water rights give a supply of good pure water for all time, the supply being only $1\frac{1}{4}$ miles distant, with a raise of less than 400 feet, which is much better than to have it in the mine to retard work, cause "drawndouts" and expensive mine equipments.

The location of the mine solves the transportation question, now being only $4\frac{1}{2}$ miles from the Phoenix branch of the Santa Fe Railroad, which can be connected with the mine by a branch.

In the development of power crude oil will be used as fuel, as the oil fields of Texas and California supply it at low prices, the consumption of oil being about equal to good coal at \$5.00 per ton, besides oil makes the cost of attendance much less and requiring only half the number of boilers that are needed with wood or coal.

Another good feature is the fact that the climate in that section is an ideal one, as work can be carried on uninterrupted every day in the year.

Management of Mines.



We wish to call the attention of the reader to the importance of good management in mining as well as manufacturing or any other productive industry.

The management of the mines will be as before under the supervision of Mr. Geo. B. Upton, of Arizona, who is one of the most practical mining men of the southwest, with many years of experience in legitimate mining, and in this particular instance has been with the development of the Oro Grande from the start, knowing the mine from A to Z, as well as its possibilities.

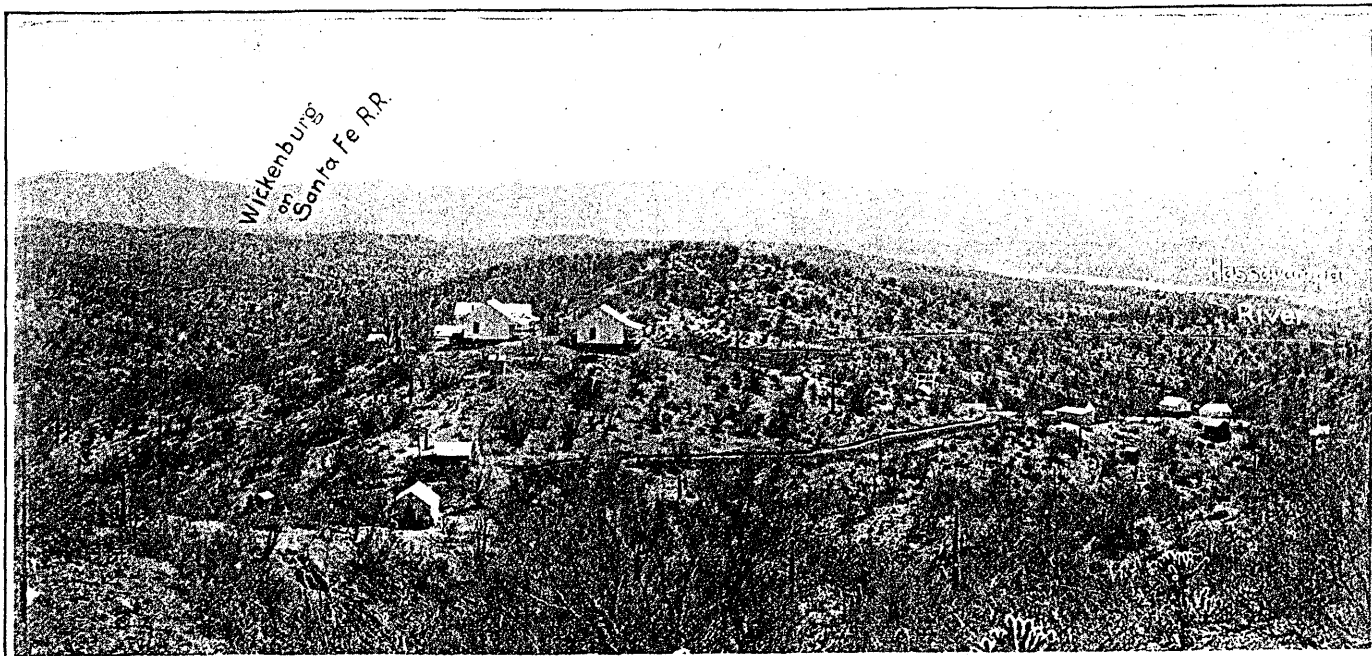
An inspection of the property shows how ably it has been conducted. Mr. Upton's conservativeness does not admit of any useless expenditure of money or what are often disastrous experiments. In a word, he can be depended upon to do things right and to guard the interests of each and every stockholder by the expenditure of all money along proper lines in a way that must bring rewards.

In outlining all of the corporation's plans they have had the advice of Mr. Upton and the consummated plans have all been carried out under his directions.

To absolutely prohibit any errors the president of the company called in the assistance of Mr. W. E. Defty, as they desired to have the advice of a cool, conservative and non-interested professional man.

Mr. Defty being a thorough geologist and mineralist, he is well adapted to pass on what is right and prevent any possibility of error as regards treatment of ore, etc., or a wrong estimate of the future of the mine.

As Mr. Defty and Mr. Upton have agreed on all phases of the proposition before it, we feel able to assure stockholders against any errors or mistakes, as in Mr. Upton and Mr. Defty we have men who are the best in their line, Mr. Upton repressing in one hand all that is practical and good business methods, while Mr. Defty is not only practical but is all that could be asked for as a scientific and professional man.



FROM TOP OF RANGE SHOWING PART OF ORO GRANDE CAMP AND LOCATION, WICKENBURG, ARIZONA, FOUR MILES AWAY.

Suggestions Worth Consideration.

We would suggest to the reader to note the fact that in the preceeding pages we have endeavored to give a clean concise outline of what pertains to the Oro Grande properties and the Oro Grande Mines Co., the owners, which should show **the great individual worth of the Oro Grande Mines**, which means that when you make an investment in the Oro Grande Mines Co., you become a co-owner in an actual mine, one that does not require any more time and development to prove that **your stock is worth what you pay for it**. With our knowledge of the uncertainty of many propositions we appreciate the great value of this feature of our stock as an investment and think that you will.

We have solved all uncertainties, overcome any obstacles there may have been, which means that the mine only requires the installation of the reduction plant to make it a **dividend payer** and to enhance the value of all holdings of stock.

MR. DEFTY'S REPORT.

We will call your attention to the Defty Reports on the Mines and their development.

It will be noted that these reports are very full as well as being confined strictly to what exactly exists and does not deal in futures, or any but a direct manner with the subject of **PRESENT VALUE, which is all important to an investor**. These reports are often the most highly approved form adopted by the best experts on mines and mining.

These reports deal only with the patented ground of the company while they own five additional claims with more or less mineral value, and additional of being suitable for the surface improvements contemplated and needed.

It should be carefully noted that in measurements of ore bodies no low grade ore was estimated and further that only half way between levels was used as a basis, while in reality the ore extends from level to level, which makes the actual tonnage at least one-third more—quite an item as Mr. Defty's tonnage is given as 671,666 tons, which increased one-third means 895,555 tons of milling ore without the lower grade stuff and small veins being taken into consideration.

ABOUT CAPITALIZATION.

Capitalization of the company in which you invest is an important part of the enterprise, to you as an investor.

In a great many cases the capitalization is a matter that is "fixed" as an affair of convenience rather than based on the actual values. This is done so as to make the selling prices of the stock appear to the investor as cheap. In the present instance we wish to make it clear to you that our capitalization **was based on available net profits** and the stock placed on the market at par to reach an intelligent class of investors.

To such investors it is a known fact that the real value of stock purchased depends entirely on the value of the mine.

In the Oro Grande, by Mr. Defty's report as a basis, we have 671,666 tons that will at the lowest estimate return in net profits **\$5.00 per ton** or **\$3,358,330**, while the actual measurements are **895,555 tons**, or **\$4,477,775.00**, and the assays give an **average value of \$28.00 per ton**. Cutting it down to **\$10.00 per ton** to be safe, there is a gross value of **\$8,955,550.00**.

Considering the gross value as a basis for capitalization it would mean that the stock would have to be sold for **\$3.50 per share** for you to own as much as you would by buying at **\$10.00** on the present capitalization.

We do not give the foregoing figures with any desire of confusing the reader, but to make clear to you that **over capitalization is dangerous** and should be taken into consideration, as many mines will pay on one capitalization and not on a higher one. A man or a railroad can be overworked and make a greater showing during certain periods, while a mine can only produce what it contains and no more, as the gold must be there and cannot be earned in the shape of dividends unless it is. An important feature that should not be overlooked is the fact that with a share at a conservative capitalization **you have a larger proportion of the whole** and future prospective value of mine, makes this correspondingly greater.

About Arizona as a Location of Mines that Give Results.

We are inclined to refrain from going into the greatness of Arizona as a mineral producer or its possibilities.

We feel this way because we notice on all hands a habit of promoters to dwell on its mines (not always their own) and the great production of precious metals which means the use of their space working on your natural enthusiasm for the greatness of the mining industry. It is well (as there is less risk) to be in a good State or a good district and to have good mines nearby which shows the right kind of formations exist, and that its mineral bearing lodes attain depth, but this alone **does not mean earned dividends** on investments unless the property of which you are a co-owner has that **great individual worth** which leads to handsome results.

We take pride in the fact that the **Oro Grande Mine** has such an individual worth, which **has been proven**.

More than that it is in a country that is noted for its numerous great producers of gold and copper. These mines are too well known to enumerate here, besides this it is in the County of Yavapai, Arizona, the banner county of the Territory and in the Wickenburg District, which **is considered the richest and most promising gold section in the Territory**.

That its mines have gold is shown by one, the Vulture, nearby, that has produced \$16,000,000.00 to say nothing of the new mines, Congress, Octave and others.

The Congress now has a depth of 3,200 feet and the Octave over 1,000. Within a radius of 20 miles of Wickenburg, has been recovered more placer gold than any part of the Southwest.

FUTURE OF MINES.

What the future of a mining property is, always must be of interest and important to stockholders.

In the case of the Oro Grande we have not attempted to dwell on the greatness of our future.

We have given you the facts and what actually exists. We feel that it alone is sufficient to warrant investments in Oro Grande Mines Co. Stock.

When you consider that the Oro Grande has a net value of \$3,358,330.00, according to Mr. Defty's report and all of this developed with a depth of 300 feet, it means that the continuance of the present ore body (without further development along the ledge) will net the company \$1,119,400.00 for every hundred feet in depth.

Starting with the present cash value of ore body developed, \$3,358,330.00, the mine at 1,000 feet could return to stockholders in profits \$11,193,333.00.

The ore body is so large and so wide that this can be brought about in a very short time, as the plant can be 2,500 tons daily capacity, as well as 500 tons.

Opinions of Prominent Mining Men and Others who have Visited the Oro Grande Mine.



The future of the Oro Grande Mine is already established and insured beyond doubt, by the proving of the present large ore zone. This in itself, without any further exploration or proving the future extent of the ore bodies, is sufficient to establish it as a very large property.—W. E. Defty, M. E., Phoenix, Ariz.

The Oro Grande has an immense ore body. I was surprised at the coarseness of the gold. The mine will become a great producer.—Col. Thos. E. Ewing, President Southwestern Miners' Association.

The Oro Grande is one of the largest free milling gold properties that I have ever seen. It is such a property as our company would like to handle. We own a property in Australia in which the formation is very similar to the Oro Grande, but is much lower grade. Our property has been a great producer.—Mr. G. Pitcairn, Edinburgh, Scotland, Consulting Engineer with Rio Tinto Mine, Spain.

The Oro Grande is one of the biggest free milling properties I have ever visited. The coarse gold that is disseminated throughout the ledge is something very unusual for a ledge of such wonderful proportions. It will make one of the greatest producers in the Southwest.—Henry C. Car. M. E., with Joshua Hendy Machine Co., San Francisco, Cal. Formerly with W. A. Clark, United Verde.

The Oro Grande mine will make a great producer. The development work so far shows a wonderful ore body with shoots of exceptionally rich ore. I corroborate Mr. Defty's report upon the mine.—T. C. Archer, M. E., Prescott, Ariz.

The ore body in the Oro Grande mine is one of the largest that I ever saw in any mine. I have been more or less interested in mining and have visited large mines during the past 25 years. I was very much surprised at the wonderful showing made in the Oro Grande.—Judge Wm. H. Stillwell, Phoenix, Ariz., Ex-Chief Justice.

I had heard considerable about the Oro Grande mine during the past year and I must say that I have doubted the statements, as I am a practical miner, and

during my experience have never seen anything such as the Oro Grande was reported to be. I made a special trip down from the northern part of the territory to look at the mine and I am more than satisfied that the truth in regard to the property has not half been told. I do not believe that the owners of the Oro Grande realize the magnitude of the mine.—Mr. Halladay, Chloride, Ariz.

The Oro Grande group of mines is one of the largest, if not the very largest, in Arizona.—J. C. Martin, Prescott, Ariz.

The Oro Grande mine is located very favorably near Wickenburg on this line. Reports of responsible mining engineers give most flattering accounts of this property. Extensive improvements have been made and a large amount has been invested in preliminary work by the company. They are all gentlemen of integrity, held in high esteem in Iowa and in Arizona. I shall be glad to answer any inquiries concerning them or their proposition.—H. P. Anewalt, General Freight and Passenger Agent, S. F., P. & P. Ry., Prescott, Arizona.

I have personally examined the Oro Grande, Yavapai County, Territory of Arizona. It is a remarkable gold mine that is just starting on a productive career that will unquestionably make it one of the most noted gold mines in the Territory. I must say that I was surprised at the wonderful size of the present developed ore body.—Trevor Cory, with the Pacific Coast Miner, San Francisco, Cal.

I believe the Oro Grande mine to be one of the greatest gold mines in this country, if not in the world.—Alfred B. Noxon, Prescott, Ariz.

The Oro Grande is a great mine and were there no other producing mines within 50 miles of Wickenburg, that group alone would insure the future growth of the town. Even should the ore go no deeper than the 300 foot level there is enough blocked out above it, 10,800,000 feet or say 600,000 tons, to keep the mine running several years, and as the ore averages \$12.00 per ton the value of the block being about \$7,200,000.—P. C. Bickness, Prescott, Ariz.

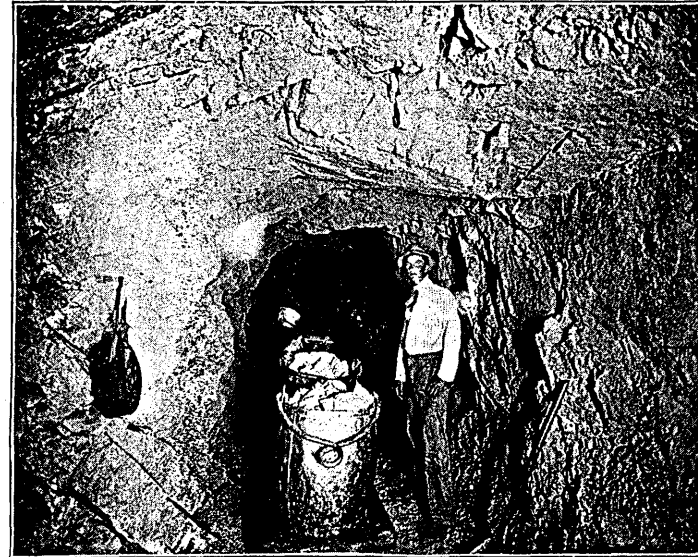
The Oro Grande is certainly a very big mine. I can only say I wish I had a property as big and as good.—J. W. Evans, Phoenix, Ariz.

The Oro Grande is the biggest and richest body of ore I have ever seen anywhere, and is a parallel of the great United Verde at Jerome, with the exception of being a gold mine instead of a copper. If the Oro Grande was in Colorado instead of Arizona, Wickenburg would now be a town of at least 10,000 people and companies would be at work all around the Oro Grande wherever there is any indication of mineral.—Walter Reese, Prescott, Ariz.

I am more than satisfied that the Oro Grande mine will be one of the great properties of the country. In my opinion the sulphide ore body below the present workings will prove even richer than the present developed ore body. The Oro Grande has a great future.—Prof. Samuel Fellner, New York.

I consider the Oro Grande mine one of the greatest free milling gold properties in Arizona, and I do not think that it would be exaggerating to say one of the largest in the United States.—Dr. J. M. Evans, Phoenix, Ariz.

I was shown all through the Oro Grande mine from top to bottom. It is a big thing and is one of the finest and largest ore bodies I have ever seen. I was particu-



DRIFT CONNECTING NEW SHAFT OF ORO GRANDE MINE. Nearly Completed.

larly pleased with the rich shoot or oxidized iron quartz that they are working in on the 300 foot level. There is ore enough blocked out to keep 100 stamps dropping several years. Ore of this character should be mined and milled at a cost of about \$2.00 per ton, and from the way the ore pans the mine should be one of the biggest dividend payers in the country.—Geo. P. Brown, Field Engineer for the Lower California Development Company.

I have been through all of the workings in the Oro Grande mine and was greatly astonished at the great size and richness of the ore body, and believe that the Oro Grande alone could support one of the largest towns in this part of the territory, when the reduction workings are running. It makes me think of old Vulture days, and with the improved method of reduction now in use the production of the Oro Grande should exceed that of the Vulture, which is known to have been over \$17,000,000.—Ed. Wiggans, one of the most experienced and practical mining and mill men in Arizona, was chief engineer and mill man at the Vulture and Harqua Hala mines, and later in charge of large properties in California.

The Oro Grande mine is the largest non-producing mine that I ever saw. The present developed ore body would warrant the erection of very large reduction works. We would like to get hold of such a property.—N. C. Merrill, Denver, Colo.





NEW CROSS-CUT ORO GRANDE MINE—Shows over 170 feet of ore.

ORO GRANDE ITEMS

FROM OUR SCRAP BOOK.

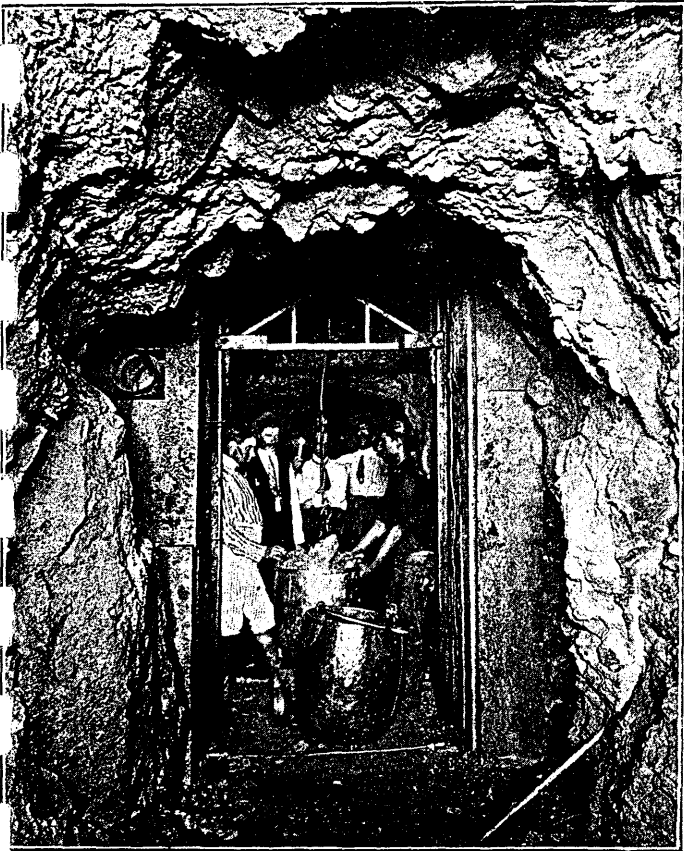


FEW OF HUNDREDS OF NEWS
ITEMS THAT HAVE APPEARED IN
THE PRESS OF THE COUNTRY,
WHICH WERE ENTIRELY UNSOLICITED BY
THE ORO GRANDE MINES CO.  

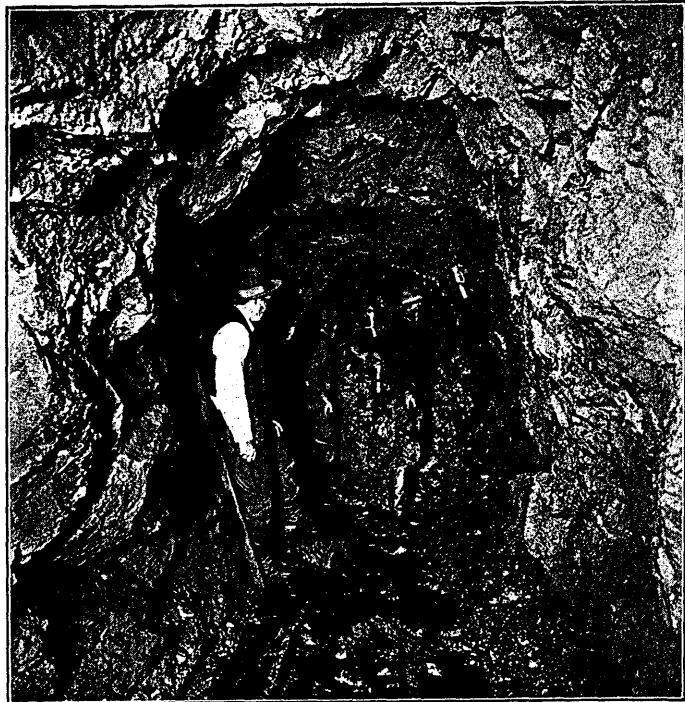
THE history of the Oro Grande Mine as given by the Press from time to time from the discovery to the present day is very interesting and instructive.

The reputation of this property has become so widely known, such expression as has been given by the Press presents evidence enough alone of its great intrinsic worth.

Free access and inspection has been open to everyone, and a great many mining engineers, experts, miners and every class of people from all parts of the world have visited the property, and accompanying we give only a few unsought opinions expressed regarding it and which have been given after the great impressions made upon those visiting the mine. Such expressions require no comment from us. A great many more statements have been made by responsible parties, but they appear so extravagant that we refrain from quoting them.



MAIN SHAFT ORO GRANDE MINE—HOISTING ORE AT 200 FT. LEVEL.



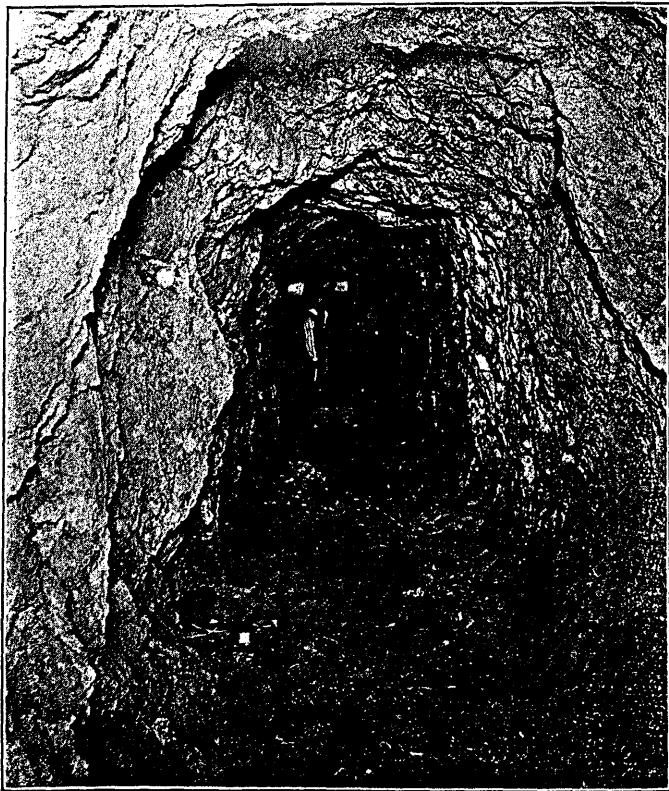
EAST CROSS CUT ORO GRANDE MINE, SHOWS 170 FEET OF ORE ON THE 300-FOOT LEVEL.

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CROSS-CUT 200 FOOT LEVEL FROM SOUTH DRIFT ORO GRANDE MINE.



CROSS-CUT ORO GRANDE MINE. SHOWING WIDTH OF ORE BODY 120 FEET.

Prescott Prospect, April 6th, 1901.

The Prospect's Representative Visits the Great Strike at Wickenburg and Gives the Facts Concerning the Discovery—\$300,000 Worth of Ore Already in Sight at a Depth of 100 Feet and the Surface Indications Give Reasons to Believe That Millions will be Found by Exploitation.

The great gold strike that has been made in the Oro Grande company's properties, situated six miles from Wickenburg, can be safely said to be one of the greatest mining discoveries that has ever been made in the west. Although only a prospect at present it is yet a great mine with its present development. With less than 200 feet of work already done on the property it has from actual measurement, at a conservative estimate, over one-quarter of a million dollars worth of ore in sight. It would be impossible to make an estimate of what the property is really worth, but from surface indications it will go high up into the millions. The ore shoot, on which the present shaft has been sunk, is of vast extent. Up and above the present workings the surface ground for a distance of 500 feet in length on the vein and 300 feet wide, is one mass of ore, the croppings covering the surface demonstrating that there is a great ore body beneath. From what can be seen from the present workings in the mine, it can be said that it is a great auriferous fissure which has come up through the country rock in times gone by and has been lying dormant for thousands of years waiting the touch of the prospector's pick to give its golden values to the world.

The vein at the point where the strike has been made is of such vast proportions that no one except an expert thoroughly acquainted with geology and mining engineering can thoroughly realize its importance. It is too large for the layman to understand its value. All of the ore that comes up out of the shaft is impregnated with gold, which everyone can see, but its main values, however, are carried in the decomposed mass of quartz porphyry and can only be found by sampling or assaying. The vein runs from northeast to southwest and is a mass of quartz porphyry lying in between a dyke of micaceous diorite on the west and a massive belt of granite and mica schist on the east. These two dykes form the walls in which the vein is included and can be traced for a distance of 3,000 feet through the country. Wherever openings have been made the gold values have been found in sufficient quantities to show that where the present workings are is not simply a blow-out, but a great ore shoot in a strong vein, which, when developed, if it carries the same values as already found, will make one of the greatest gold mines in the world. Everything that has been brought up from the mine at the present time is ore. The shoot in which the great gold values are found was encountered six feet below the surface, and at the time of its discovery was considered a copper prospect. It was through this false impression of its being a copper mine that the real values in gold were not discovered until after the copper had disappeared from the ore. It was then that the value of the mine became to be known and the exploitation work was carried on to develop its gold values.

The present workings consist of a shaft 100 feet deep at the bottom of which is a crosscut 40 feet to the west and 20 feet to the east. These cuts, with the shaft included, give an opening 64 feet wide, all in ore. Drifting has also been done north and south 15 feet each way, being in ore the same as the crosscuts. At a fair estimate

the ore in sight can be placed at 12,000 tons, with an average value of \$25 per ton, a total valuation of \$300,000. This estimate gives the value of the strike at the most conservative figures taken from pan samples made both from the underground workings and grab samples taken from the dump. No walls have been found up to the present time, and from the surface indications will probably not be, until from 100 to 200 feet of crosscutting is done.

While the general average of the ore from present development can only be given at an average of \$25 per ton, the rich pockets which occur in the ore body may put up the value of the mine at a much higher figure with further development. The bottom of the shaft is in a wonderfully rich streak of ore, which, sampled in the usual way for fair valuation, gave returns of 1968 ounces in gold. The gold is of a high fineness, and if the streak should hold its value with further exploitation the ore in that part of the workings could be estimated as being worth nearly \$30,000 per ton. Pockets like this, however, are frequently found through the present workings, so no one can really form an idea of what the mine will do when deeper openings are made.

The property lies in a mineral zone, in which the great Vulture mine and Rich Hill occur. It is midway between the two points, being about 16 miles from each. Standing on the brow of the hill in which the workings are, the Vulture can be located in a straight line to the south, and to the north, if the vein continued through the box canyon of the Hassayampa river, it would find its ending in Rich Hill. A half million dollars worth of nuggets were found on the surface of Rich Hill in the pioneer days, and the Vulture produced over twelve millions in gold from its upper workings. The Oro Grande seems to belong to the same auriferous belt and may possibly be a direct continuation of the Vulture vein. The history of the discovery is similar to many of the great strikes in the west. The owners have received a cash offer of \$350,000 for the property, but declined to entertain any offer. They allowed the *Prospect* reporter to go through the mine so that the facts given could be published from personal observation, and what is incorporated in this article can be relied upon as the exact truth concerning the great strike. Over 7,000 feet of surface ground has been located on the vein, and if the gold values continue into the unexplored ground, it would make a mine of such immense proportions that it would be impossible to estimate the value. It is in Yavapai county, three miles north of the Maricopa county line, and from present indications will probably be the means of making a great mining camp out of the ancient pueblo of Wickenburg.

Los Angeles Herald, March 24th, 1901.

PHOENIX, Ariz., March 24.—The greatest gold strike ever made in Arizona has occurred in the hills of central Arizona, four miles from the camp of Wickenburg. The find was made last December, but the owners kept the discovery entirely secret for months.

A week ago rumors started and the *Herald* printed a brief account of the find. Investigation shows that the mine, now Oro Grande, has since its discovery developed into an enormous bonanza, destined to become famous.

It is located only a few miles from the Vulture, which became famous on a similar showing of ore, and also in the vicinity of the Congress, now regarded as the most important gold producer of Arizona.

Eight claims, covering the entire cropping of a mammoth ledge of free gold, have been located. Small deposits of the ore run as high as \$40,000 to the ton. Not enough assays have been made to determine the average value of the ore, but there are numerous quantities in sight, which will carry \$100 to the ton.

The contact ledge is traceable by outcroppings over a distance of 4,000 feet, bordering in a dyke to 300 feet

in width at the center and tapering toward the ends to a 100-foot vein.

The end shafts and drifts in the few weeks of development have outlined \$1,500,000 of gold rock and the ledge without doubt contains many millions more.

The marvelous feature of the discovery is the extreme richness of the vein throughout, nearly every piece of quartz fairly glittering with color.

PHOENIX, Ariz., March 24.—A special to the *Republican* from an expert at Wickenburg, 65 miles northwest of here, announces a gold strike in that field. The mine is five miles north of that town, four miles from the railroad and one mile from water.

The vein at the surface is from 20 to 30 feet wide. On this is sunk a shaft 100 feet deep, and from the bottom of the shaft a crosscut runs for 60 feet, all in ore. The walls have not been reached by the crosscut.

From every carload of ore brought to the surface free flake gold can be picked up by hand, and the crosscut glistens with the sparkling precious metal. Free gold can be picked up anywhere on the dump, at the bottom of the shaft, or along the crosscut.

It now promises to prove the richest mine in the territory, perhaps in the world, and there is great excitement over the strike. The owners of the property have been made offers already, but refuse to consider any proposition.

Los Angeles Daily Herald, March, 1901.

Col. Thos. Ewing Tells of What He Saw Recently.

Col. Thomas Ewing, who has just returned from Arizona, where he has spent four weeks, is much pleased with the condition of mining affairs in the territory.

Col. Ewing said that he had visited the Oro Grande mines, where a great strike was recently made, and though the present owners bought the property a few months ago, for \$2,600, they could sell it quickly now for \$300,000. The workmen have crosscut the vein 61½ feet without coming to either wall, and both faces are in fine ore, which horns free gold.

Prescott Prospect, April 6th, 1901.

WILL MAKE A GREAT MINE.

**Mr. W. E. Defty, a Prominent Mining Engineer,
Gives His Opinion on the Valuable Strike at
Wickenburg—He Says That It Will Probably
Make the Largest Gold Mine in Arizona
When Fully Developed—The
Present Valuation of the Ore
in Sight, Mr. Defty Says,
Can Be Estimated
at \$250,000.**

W. E. Defty, a well known mining engineer, who has been examining and operating properties in this district for a number of years, made a special examination of the property for capitalists of Denver, who

wished to purchase. He had authority to buy at a very liberal figure, if he thought it advisable, but was not able to do any business with the owners, as they absolutely declined to give any price on the mine. They allowed Mr. Defty, however, to examine it, and as a personal favor he gives the *Prospect* a report regarding its geological formation and its probable value when developed. The report is herewith submitted:

"The Oro Grande mine lies about one and one-half miles east of the Hassayampa and in a broken chain of abrupt hills, transverse to the water course. The vein runs northeast and southwest and is very prominent in places. The croppings consist of a quartz porphyry very strong in brown hematite of iron. These outcrops can be easily traced for fully two claims' length, and the strippings that have been made show the same nature of ore as found in the workings. The main workings are about 60 feet above the level of the gulch and consist of a shaft 100 feet deep, all in ore. One crosscut on the west about 40 feet, crosscuts both east and west at the bottom of the shaft 40 feet and 20 feet all in ore, and being the same character as found all the way down the shaft. Neither walls of the vein have yet been reached, so only exploration work can prove the width and extent of the ledge. All the ore is of good quality and, as far as developments prove, retains its high value.

"The country rock on the west is a micaceous diorite schist, and on the east a feldspathic porphyritic granite from which the feldspar has been greatly decomposed. The ledge matter is constituted of a porous friable porphyry quartz heavy in brown and black ferruginous oxides containing very prevalently pockets of soft oxides heavy in the precious metal. The ore is a regular breccia kaolinized very frequently, and in this feature resembles the O'Brien gold mine, about six miles distant; in fact the ores from each mine have a very strong resemblance to each other and are especially characteristic as regards the above feature. By all appearance, the nature and quality of the ore, this mine has certainly a great future before it and has all the belongings to make an immense property, and, perhaps it would not be the least straining to say, the largest in Arizona."

Arizona Republican, June 13th, 1901.

WICKENBURG, Ariz., June 13.—(Special correspondence of the *Republican*.)—Your correspondent was a visitor at Oro Grande yesterday. They now have the shaft down 190 feet, at which depth the ore body continues the same as when the rich strike was first announced. On the 100-foot level they are working two shafts in the drift running up the hill, it being in now over 100 feet. As soon as the blower is installed and the good air problem solved, they will be able to put on two shifts with four sets of men drifting each way with the ledge and crosscutting each way, and until this is done no one is able to estimate this mammoth ore body.

Few people realize the magnitude of this strike from the reports that have come out. It has been variously estimated by mining experts as being worth from \$200,000 to \$500,000. A simple way of expressing what they have, would be that a body equal to a cube 100 feet square has been opened up so far, without reaching any walls of any kind. This body of ore at any point will assay \$30 to the ton, and as high as \$500 to \$600. A safe figure is that the whole body is \$60 rock, which brings the value of the ore in sight at about \$600,000, to say nothing about the possible extent of the ore body the last 80 feet.

As soon as the 200-foot level is reached and crosscuts run, a plant of the right size and kind can be figured on; anything less than 80 stamps would be a waste of very valuable time. Work is being pushed to the limit, and they now have employed all of the men they can possibly use, the number being over 20.

A REGION OF RICHES.

Including Wickenburg, Octave and Congress.

It's sixty miles from Phoenix to Wickenburg via the S. F., P. & P. railroad. From Wickenburg to Octave and Weaver it's 16 miles by private conveyance, and from Octave and Weaver to Congress some say it's a long twelve miles, but it is really nearer 17. From Congress one can catch the regular southbound passenger train at the junction, which is called Martinez, and reach Phoenix at 2.40 A. M., or a little more than 24 hours after leaving the capitol city. A trip like this involves no hardships or discomforts, providing the traveler telegraphs ahead from Phoenix to Wickenburg for sleeping accommodations. Unless he does, there is a strong probability that he will be elected to admire the scenery of that budding city by starlight until the wiser traveler, who has used the wire, arises in the morning and makes room. For Wickenburg is growing. Still there is no boom and the residents do not want one. They are perfectly satisfied with the merits of their district, and feel confident that a year's time will do permanently for the town what a hundred booms could never do. There are more buildings than there were four months ago, but not many more than a month ago. Still real estate is selling, but the buyers are not rushing things. They are waiting for legitimate growth. There are many people, though, and the number is growing constantly. While there are but two hotels in the place, their capacity would accommodate the guests of at least four similar hostelrys in any ordinary town of the size of Wickenburg. But in Wickenburg it's different. People are coming in to that district daily and the hotels are often overworked. Only the other night no less than 14 people left the north bound train at that station.

Everything is mining; neither residents nor visitors talk anything else. And why should they? The Wickenburg and adjoining districts are going to prove shortly the treasure house of Southwestern America. The Oro Grande strike has done more to develop mining in that section than all other agencies combined. The wonderful Oro Grande! No one knows yet, unless it is the owners, whether it is a ledge or a mammoth pocket, but any one knows who has visited the mine that there is visible to the naked eye many comfortable fortunes, and even Wickenburg is satisfied with that. But besides the Oro Grande there are many other great mines in that locality in various stages of development.

The Middleton, the Keystone, the O'Brien and numerous others are working good-sized forces with flattering results. The Oro Grande people are steadily sinking and are rapidly nearing the 200-foot level. When that depth is reached drifting will begin and the size of the pay streak be determined. Upon this knowledge will depend the capacity of the stamp mill that will be erected. For the Oro Grande owners are not "fly-up-the-creeks." They are "on to their job." They are going to do their own developing as well as their own mining. Mr. George B. Upton, the present manager of the property, is a practical mining engineer and superintendent, which, around a mine, is next to being as valuable as the fellow with the money.

Henry Wickenburg, the father of Wickenburg, and the discoverer of the Vulture mine, said many years ago that the town would some day be the largest in Arizona. This is by no means an improbability. It will take some time yet, but present indications are good. With a big stamp mill at Oro Grande, which is less than six miles from the town, a big smelter at the Keystone, and mills and reduction works at a dozen other camps, all within 20 miles, and all good paying properties now, no man

can guess the population of Wickenburg a few years hence.

The whole section is certain to be gridironed with railroads eventually. Frank M. Murphy, president of the S. F., P. & P. Railroad, has said repeatedly that he would build branch roads into the various camps from his main line as soon as developments warranted. Wickenburg will be the starting point, and to Wickenburg will flow the pomp and circumstance of a flourishing mining town.

It is a curious fact that the Vulture peak, which is a landmark for a hundred miles in every direction, and at the foot of which is the famous Vulture mine, from which has already been taken \$16,000,000, is in a direct line south of the town of Wickenburg and of the Oro Grande. About 20 miles beyond the latter, in a direct line to the north, is the Weaver district and Rich Hill, renowned in the old days for their fabulous wealth in placer gold. And the end is not yet, for at the foot of Rich Hill is the Octave mine, now working 150 or more men, day and night, the year round. The dull roar of the quartz mill never ceases, and while nothing is known on the outside regarding the profits, the mine is considered one of the very richest in Arizona. The camp is a model one. All of the buildings have the appearance of having been "cut to measure." Everything is trim and neat, and the streets rival those of Phoenix for straightness and width. No saloons or "rough houses" are allowed, consequently Weaver, which is just across the gulch, has become the tenderloin of Octave. But even there everything is quiet and orderly, and water sells for 2 cents a gallon, or three buckets for two bits. Diagonally across the desert from the foot of Rich Hill is the great Congress mine, only three miles from the main line of the S. F., P. & P.

The overland traveler from Wickenburg via Octave can reach Congress before sundown and in plenty of time to return to Phoenix by train the same day. He will also have time to look to his fill at the works of the deepest mine in Arizona and to mingle with the life of a typical western mining camp, which by lamp light on the evening after pay day (when I saw it) it well worth the "price of admission."

All between Wickenburg and Octave and Congress, and far to the north and west of the latter place, the country is alive with miners and capitalists. Properties are being opened in every direction and new and rich strikes and reported constantly.

Martinez, which is the railroad station for Congress, is the center of as rich a section as Wickenburg, and in time will be the starting point of railway lines into the adjacent mining country. The immensity of this great district can scarcely be realized. Its wealth cannot be estimated.

H. J. L.

Phoenix Enterprise, June 22nd, 1901.

RICH ORO GRANDE.

Wickenburg's Great Bonanza Prospect Rapidly Reached Stage to be Called a Mine.

Editor *Enterprise*:—In answer to your inquiry concerning my recent visit to the Oro Grande mine, I would say: While in the Wickenburg district examining a group of mining claims, I met, in the town of Wickenburg, Mr. Upton, one of the owners of the Oro Grande, who very kindly invited me to visit his property and directed me to Mr. Hatfield, another of the owners, and in charge of the development work now going on. My first impression of the permanency of the property was received as I approached the camp and looked upon the boarding house, lodging quarters, residences and office buildings, all of which were substantially built and nicely painted, all suggesting the thought of durability, and

this thought was again suggested when I reached their hoisting plant securely sheltered and working without the slightest friction, and still further, when I saw their double compartment shaft safely timbered from top to bottom with the best of material. It is encouraging to know that miners and mining men, capable of doing such work, are coming to Arizona, and still more encouraging to learn that they recognize and appreciate our great surface showings, which suggest such great possibilities, and are not afraid our veins will "play out," but will sink on them until candles become an important item in their expense account.

I found Mr. Hatfield at the shaft, carefully watching the landing of his ore bucket, and the dumping of the ore. He received me very pleasantly and kindly gave me permission to examine their surface ground. The Oro Grande ledge crops for a very great distance and is of a phenomenal width, so common in eruptive formation. The croppings and surface indications generally are of a character which are almost certain to lead to great mineral bodies. Upon my return to the shaft I accompanied Mr. Hatfield into the underground works. My surface observations had prepared me for the great ore body I saw below. The main shaft was then down 180 feet. At the 100-foot there is a large crosscut run from the shaft 40 feet on one side of the shaft and 30 feet on the other, making 70 feet of a crosscut, and neither wall is reached, and no evidence of their appearance is seen in the breast of these cuts. From this point there is also a 75-foot level run on the vein. All these openings are in ore. When the 200-foot is reached they will crosscut again for the walls and at the same time continue sinking until water level is reached, at which point large values may appear. There are many indications throughout the entire workings and on the surface which indicate this conclusion.

The Oro Grande is certainly a very big prospect, if it is not already a mine. I am not advised as to the values of the ore, but it is safe to say the owners are entirely satisfied as to this. I understood from the management that the question of a mill or treatment plant of any kind had not and will not be considered until water level is reached. Mr. Hatfield, though a young man, has had long and valuable experience in mines and mining, which fact is abundantly shown by the systematic work so far done and now being directed by him. Remembering the command, not to covet thy neighbors' property, etc., I can only say I wish I had a prospect as big and as good as the Oro Grande. J. W. EVANS.

Wickenburg News, 1901.

WORK ON THE ORO GRANDE.

Ore Body Over One Hundred Feet Wide and Shaft Still in Ore.

Mr. George B. Upton, general manager of the Oro Grande company, reports the finding of very coarse gold ore in the shaft at its present depth of 215 feet, which is as rich and extensive as the reported strike of three months ago, which caused the stir among mining men and mine owners, and started the activity in this section that is now being felt in all lines of business. This will be lasting from the fact that the developments prove it to be greater than the predictions that have been made. The vast body of ore in sight can be calculated by the list of openings they now have, all of which are in ore. At a depth of 20 feet an assay of the rock as it came out of the shaft went \$2.70 in gold. At a depth of 50 feet it had been increased to about an average of \$12.00. At the 50-foot level there is now about 60 feet of crosscut-

ting, which will give a fair average of about \$15.00, with veins running higher. But it never was valued as a gold property until a depth of about 90 feet was attained, when rich ore containing coarse gold was struck. Previous to this time the work was done with hopes of striking the copper ledge that crops on the surface, at 100 feet by crosscutting.

At the depth of 100 feet the value of the property as a gold mine was first appreciated. At the 100-foot level a crosscut has been run 60 feet one way, encountering a very well defined wall. A crosscut being run on the other side of the shaft directly opposite, now in 40 feet, is still in the ore. This proves that the dyke has a width of not less than 100 feet at the 100-foot level. The value of the ore has been estimated by reliable mining engineers as going from \$20.00 to \$60.00. To be absolutely safe, start your calculations on a \$20.00 basis and cease wondering whether Wickenburg is going to be the town we Hassayampers expect it to be. At the 200-foot level a station has been put in and drills started both ways on the ledge, and both will probably now measure 60 feet. In the drift south some of the best ore they have had was encountered the first of the week, which, together with the last strike at 215 feet, makes the future look decidedly bright.

Y. Garcia just finished hauling out one carload of lumber, which will be used putting a cross-head in the shaft, so that they can run the hoist faster, as they expect to have as many men at work at they possibly can make room for. This is the proper thing, as they will then be able to put on a large plant and not be hampered by not being able to take out the ore fast enough. They are also enlarging the bunk house and adding to the boarding house many improvements for convenience. Also have just added two large storage sheet-iron tanks, one at the boarding house and the other at the hoisting works. For the present these will be supplied with a wagon tank by the Garcia team, which is the best possible arrangement until they install their plant and pipe line from the river.

Mr. G. E. Lamb, the president of the company, will be out the latter part of this month, and the development work will probably be far enough along to decide on the plant to treat the ore.

The ore already in sight leaves no doubt about the size of the plant; the question still undecided is as to the exact kind best adapted.

In one way the foreman has a snap at this property. No pay streak to keep track of, as all of the work is in pay ore. No loss of time by the men taking down ore, when great care and close attention is necessary to get it out free from waste, as they have no waste. All ore, nothing but ore, and lots of it. The property was certainly well named, as it is a grand proptry and the gold is there, gold enough for us all, which reminds me of the fact that it is doing us no little good already, as they are now spending over \$6,000.00 per month, or over \$200.00 per day, which increases every day. When the property is equipped it will mean not less than \$50,000.00 per month in the town (city) of Wickenburg. Who said there was too many "Barometers of Prosperity" here? Better hurry, fellows, as there will be room for several more.

Tucson Star, July 20th, 1901.

High Assays of Oro Grande Mine Ore.

TUCSON, Ariz., July 20.—(Special.)—The magnitude of the strike at the Oro Grande mine, near Wickenburg, is greater than at first announced. It has been variously estimated at worth from \$200,000 to \$500,000, but later developments show that the mine has been greatly undervalued. It is said that this body of ore at any point assays over \$30, and runs as high as \$600.

Wickenburg News-Herald, March 1st, 1902.

EXPERT MINING MAN'S OPINION.

P. C. Bicknell, of the Prescott Prospect, Says There Are Millions in Sight—One of the Most Comfortable and Best Managed Camps in Arizona.

The *News-Herald* has said so much regarding the great richness and extent of the Oro Grande ore body, and received so little credence, that we take pleasure in reproducing the following description from the pen of P. C. Bicknell, the well known mining man connected with the *Prescott Prospect*. If anything, the account of Mr. Bicknell is conservative, as all who have visited the property admit.

Since starting work last year, development has proceeded at such a rate as to make old-timers pause for breath, and too much cannot be said in praise of the work of Manager Upton and Superintendent Hatfield, who make a combination impossible to beat, as an inspection of the camp and mine testifies. The remaining owners of the property, Frank W. Ellis and G. E. Lamb, of Clinton, Iowa, are in town this week, deciding as to the future working of this bonanza, and while the *News-Herald* is not authorized to say so, it is very probable that a large mill, of 100 stamps or more, will be installed very shortly and the thousands of tons of rich ore on the dump and in sight turned into bullion, amply rewarding the fortunate owners for their unremitting toil and energy. Mr. Bicknell says:

"Were there no other producing mines save the Oro Grande group within 50 miles of Wickenburg that group of mines alone would insure the future growth of the town. They belong to that fortunate class that, in the whole history of mining, have been so few that their names stand out in the record like points of light on a dark background.

Situated on the east side of the Hassayampa, four and a half miles north of Wickenburg, the little group of tents and buildings that form the camp are plainly visible from the upper portion of the town, and the only practicable route from the mines to the railroad lies through the ancient camp of Henry Wickenburg.

There are nine claims in the Oro Grande group in addition to three water rights on the Hassayampa river, which encircles the camp on three sides at a minimum distance of one and a quarter miles. All of these locations, however, are contiguous and all will be worked from the great main working shaft on the Copperhead, one of the central claims, which is now down 300 feet with levels at 50, 100, 200 and 300 feet, amounting in all to 913 feet. Moreover, there has been much crosscutting in many directions both from various points on the levels as well as from the shaft itself.

In every part of the mine, as work progresses, it is all in ore, and very much the same kind of ore at that. The amount of development now accomplished, since work was started, just twelve months ago, is figured at 1,775 feet. This is an undoubted proof of the industry of the working force and the energetic and systematic methods of the manager. This amount of work seems the more surprising when one knows that all the openings, each drift, crosscut and tunnel are two-thirds larger than is customary in mines.

There is no need of dodging or ducking here to avoid bumping one's head or, at the very least, knocking off one's hat against the roof, for the roof is far above one's head, even too high to touch with the hand. Furthermore, one may stand in any drift or crosscut and extend his arms to their full reach without so much as touching the walls on either side. But the miner will soon see that there is method in this, and several good reasons for these broad and high openings.

First of all, they do not entail the handling of an extra amount of waste; all of the ore, whether drift or

crosscut, goes into the first-class ore dump. Next, this ore, in particular, breaks much better to the drill on a broad face than a narrow one, and, lastly, the miner, not being cramped in his movements, can handle himself much better and thus accomplish more work. In marching freely through these high-ceilinged levels, one might fancy himself in the subterranean corridors of some great fortress.

The trite saying that gold is where you find it, was never, to my knowledge, more exemplified than here in the Oro Grande. The entire body of gangue, whose limits, by the way, have been undefined in 60 feet of cross-cutting and 900 feet of tunneling, is of talc, and few miners or prospectors would go to the expense of having an ordinary piece of talc assayed for gold values.

I suspect that this is one of the reasons why the value of this deposit remained so long undiscovered. At the 300-foot level, the lowest depth yet reached, a cross-cut each way, indicates the width of the ore body to be 120 feet wide, between diorite walls. This space encloses a noble body of ore. Even should the ore go no deeper than this level, there is enough ore blocked out above it—10,800,000 feet, or say 600,000 tons—to keep the mine running several years. And the ore averages \$12 per ton, the value of the block being about \$7,200,000.

The ridges that enclose this talc body at a little distance are mainly of diorite (so-called) and I noted a good sized cropping of black quartz that evidently strikes southeast across one of the claims, in which, on breaking a fragment, quite a good sized speck of gold was discovered.

Oro Grande camp is a model of neatness and convenience. The hoist is the central figure and around it cluster the various other buildings needed in a camp like this, while at a higher point on the hill, commanding an easy view of the entire camp, is the office and dwelling house of Manager Upton, who is also vice-president of the company. Here I found Mr. Upton and family, and, after a short and pleasant call, joined them at lunch, after which Mr. Upton took me through the mine and afterwards through the camp generally.

Here I was particularly attracted by the cleanliness and well kept air of the miners' sleeping rooms. They were all in one house, whose dimensions I have forgotten, but at any rate, it was wide enough to contain a wide hallway running through from east to west, on both sides of which doors opened into double and single rooms to the number of 14. The bedsteads are all of white painted iron, such as our Prescott hotels are furnished with, and each room has a table, two chairs and a washstand. There are eight double rooms with two beds each, and six single rooms with one bed.

An interesting hour or more was spent panning out the fine stuff that came up, bucket after bucket, from the bottom of the 300 foot level. We would dip into the ore bucket each time it came up, before it was dumped, and discarding all but the finest, we would wash it out, without pulverizing. Any miner knows that it takes good rock to assay well under such conditions, yet we got many coarse colors in each trial.

On the whole, I consider Oro Grande a very comfortable as well as a very lucky camp, and one with an interesting financial history ahead. May its comfort and luck long continue, and may we all get a whack at something of the same kind as soon as possible.

Wickenburg News-Herald, March 8th, 1902

When Judge Campbell, of Prescott, published a story some time since, wherein he depicted the principal character as coming into a mining camp, starting a brokerage office and displaying a sign with the admonition, "Keep Your Eye on the Oro Grande," he wrote wiser than he knew. Like this man, we say keep your eye on the Oro Grande and witness the development and working of one of the greatest, if not the greatest, and richest gold mines discovered for years.

On Tuesday the force being worked was doubled, a

night shift being put on, making about 30 men now employed in the mine. This force will be increased as fast as room can be made. Work is now being pushed on the north drift, and when the point selected for the mill site is reached a three compartment upraise will be started and a large hoisting works erected as soon as the surface is reached, the future working of the mine being through this shaft. Everything under and around the present shaft is rich ore and will all be taken out, rendering it an unsafe location for machinery, as the rich ore body nearly a hundred feet wide reaches within a few feet of the surface. It has not been definitely decided as yet as to the kind of machinery which will be installed, but the plant will have a capacity of 400 or 500 tons a day.

This will make the minimum production of the mine (estimating the ore at \$12.00, which is considered low by experts who have examined it,) not less than \$4,800.00 per day of 24 hours, or a yearly production of approximately \$1,728,000.00.

The Oro Grande has attained little fame solely because the owners are undemonstrative men who have private means amply sufficient to develop it, which they have done so far at an expense of many thousand dollars, there being about 2,000 feet of work done, every cent of which has been paid by them, no stock ever having been put on the market. The present capital stock of the company is \$60,000.00, but it is very probable that the company will be reorganized with a capitalization of \$3,000,000.00, or more, and a few shares sold to friends of the present owners at par or over.

The members of the company have now transferred five more claims to the company, making fourteen in the group. They also own four water rights on the Haysayampa, and have the ore, water and money necessary to make the Oro Grande as famous over the world as the Vulture was in the days of old, and those who are in a position to know say that the Oro Grande ore body exceeds the Vulture in size, regularity and richness, and will be a larger producer. What other section of the United States can show two such mines as the Vulture and the Oro Grande? And Wickenburg not only has these, but numerous other rich mines and partially developed ones.

To say nothing of the countless prospects with showings as good as the Oro Grande had, less than two years ago—and all this with the country around here not prospected even on the surface one-tenth as much as it should be. For the past eight months we have been prophesying Wickenburg as the coming Cripple Creek of the southwest, and once more we stake what little reputation we have that five years from now will see Wickenburg the largest, liveliest and richest mining center in Arizona.

The working of the Oro Grande of itself means much to the town, as it will employ from 300 to 500 men when running full force, and this, with the population always necessarily adhering to such a band of workers, will make Wickenburg a town of 4,000 or 5,000 people. Besides this, a mine producing the amount of bullion the Oro Grande will, always induces and encourages greatly increased activity among the prospectors and developers in any section, and others are liable to be exposed at any time. If anyone had advised a mining man to come here two years ago and discover a rich mine, he would have been told that Wickenburg was dead; there were no good properties here, and that the camp was worked out when the Vulture suspended operations; yet since then the Oro Grande has been discovered on ground walked over hundreds of times.

Colorado Springs Daily Mining Record, March 28, 1902.

WICKENBURG, Ariz., March 27.—Your correspondent has visited the property of the Oro Grande company and has made a personal inspection of the various workings of the mine. The showing in indeed a remarkable one and justifies the claim that the Oro Grande is one of the richest gold mines in the world.

Your correspondent saw some 2,000 feet of development work, all in ore. At the 300-foot level about 250 feet of work has been done. Here sulphide ore has been encountered and water reached. At the 200-foot level nearly 600 feet of development work has been done, all in ore.

The 100-foot level shows more work, there being about 1,300 feet, all in ore. The company has a map of all underground workings, and as work progresses these maps are amended. This, coupled with what one can see going through the shafts, drifts and crosscuts, give some idea of the real magnitude of this truly rich and wonderful deposit.

At the surface the company has enough work done to show the continuity of the vein for about 4,000 feet. The underground workings show a width of 120 feet. The character of the ore is a porphyritic breccia between walls of diorite. The breccia is mostly porphyry, and other vein filling in talcose and oxides. The oxides are the richest, carrying high values in free gold. The president and vice-president of the company took a fair average sample of the ore by extracting some from each bucket hoisted. This was quartered down in the usual way. By pan test the ore went \$45 per ton. To prove the test an assay was made on a check sample. This showed \$184.40 per ton. If the entire width of ore carried only one-fourth of this value, the amount now in sight would run into tremendous figures. Your correspondent procured several handsome specimens rich in free gold. These were dug indiscriminately by him from the walls of crosscuts and drifts.

The present shaft is located near the center of the deposit. Miners are pushing work in every crosscut and drift, at the 200-foot level, the intention is to drive a drift 1,000 feet to the north. Here a crosscut will be driven to the country rock and an upraise made to the surface. This upraise will constitute a three compartment working shaft.

The company owns water rights, controlling 400 inches of water. A mill is to be ordered in the near future. It will have a capacity of 400 tons a day. The ore body throughout is free-milling.

Offers to buy the property have been frequently made, but in every case they have been refused. The company prefers to develop its own find. Those in control argue that if the mine is worth big money to some one else, it is worth as much or more to them.

The showing on this property is the reason for the great amount of development now being done on the many good prospects found near and around Wickenburg. This place is the natural shipping point for many properties now taking out ore in large quantities and building mills.

To say the average of all ore in this mine is \$12.00, would not be giving a fair statement, as all indications and tests find better results.

William E. Defty, M. E., who reported on the Oro Grande about one year ago, is expected to make another examination.

By all appearances, the nature and quality of the ore, this mine has certainly a great future before it, and has all the belongings to make an immense property, and, perhaps, it would not be the least straining to say, the largest in Arizona.

The Oro Grande company owns fourteen claims, being five claims long and situated in the Black Rock district, Yavapai county.

A. B. NIXON.

*Colorado Springs Daily Mining Record, March 29.—
Editorial.*

The story of the riches of the Oro Grande mine, at Wickenburg, Ariz., as published in the *Daily Mining Record*, has created a deal of interest. The report has been verified by a cursory examination of the property made by our special Arizona correspondent. The showing of the mine is indeed remarkable. The Wickenburg district has undoubtedly an enviable future.

EQUIPPING THE BIG ORO GRANDE.

Wickenburg's Famous Gold Mine to Have a Reduction Plant Capable of Handling 500 Tons a Day. With 1,000,000 Tons of Ore Available to Start upon, the Property will at once Jump into the Ranks of the Great Dividend Paying Mines of the West. The Present Conditions of the Mines.

(Los Angeles Mining Review.)

The equipping of the Oro Grande mine has been decided upon by the directors of the company, and the plant will be the largest gold mill in Arizona, capable of handling 500 tons of ore every twenty-four hours, and allowing of the employment of from 600 to 800 men in the mine. The equipment will be, of course, modern in every particular, consisting of both stamp and roller mills and a cyanide plant, besides other up-to-date devices for the economical handling and reduction of the ore. A part of the new works will consist of a large electrical plant, which will have sufficient power to furnish other mines, and the town of Wickenburg with lighting facilities, besides supplying the mine and workings. Engineers have been engaged for the past three months in perfecting the details of the entire system and at the present time the plans are fully completed, and the shipping in of machinery will begin as soon as the manufacturers can furnish the same.

As there has been much said and much written about the Oro Grande within the past year or more, some of it being truth, some guess work, and some pipe dreaming, and as the company is offering a block of its treasury stock to the public for equipment purposes, I think it will probably be of interest to those interested in the mine, and the general reading and investing public, to know something about it from a business standpoint: what its present condition is, and its possibilities of the future, and as it will shortly take its place among the great low-grade profitable mines of the West, I will present the conditions as they are.

The map with this article shows the great desert country of Central-Western Arizona, which is the most prominent gold belt in the Territory. It has produced more of the yellow metal in the past, is producing more at present, and will produce more in the future than any other part. Most of the prominent mines that have produced, and are producing are shown upon it; also the western end of the proposed Phoenix and Eastern Railroad, which has just started work on its eastern branch from Phoenix. As the Oro Grande lies in this big gold zone I have attached the map for the better understanding of readers.

The Oro Grande has at present completed a little more than 3,000 feet of development work. In reality it has completed over 5,000 feet, as most mines are developed, all of the drifts and cross-cuts being double

the ordinary size. Nearly all of this work is in ore, and the tonnage at the present time, by measurement, is close to the 800,000 mark. The deepest workings are at the 300-foot level.

In March last, Mr. W. E. Defty, a prominent mining engineer, made an examination for one of the owners, residing in the East, and reported that from his measurements he estimated the tonnage of ore then available at 503,166 tons. Since then the development has been rapid, and the amount to make the above figures is the result. At the same ratio, by the time a reduction plant can be completed, there should be 1,000,000 tons ready for the mill. There has been no diminution of the ore body, or any signs of its getting any less, and the probabilities are that it will grow greater, as the only ground not containing ore was encountered during the past six months, and came from a horse which intruded from the east wall, cutting off the ore temporarily on the 100-foot level. This has been cut through, however, and the workings are all in ore again.

Mr. Defty estimated, after sampling the mine, that the ore body would give a net average return of \$5 per ton, allowing for all contingencies, and his valuation is the lowest yet made. Taking his figures as conservative and correct, at the time he examined the mine, the tonnage he estimated at 503,166 tons would be worth, at a net valuation of \$5 per ton, \$2,515,830. At the same figures, taking a rough estimation of 800,000 tons at the present time, the net value would be \$4,000,000, and upon the completion of the mill there would be sufficient ore on hand to yield a net profit of \$5,000,000. These figures may seem astounding, but such is the case. If the ore body yielded \$2 net, even that would be an enormous profit, but as it has been sampled so many times by other experts, Mr. Defty's figures must evidently be very close to the mark.

This is the present condition of the Oro Grande, and I think it is correct. I have visited the property ten times within the past eighteen months, have closely observed its development, been at liberty to roam at will through the workings, have taken samples until I got tired of taking them, and am satisfied the company is basing its estimate of the value of the ore at a very conservative figure. The lowest general average yet taken of the entire mine gives \$6.20 per ton, and this included everything good, bad and indifferent. At this figure it could easily get \$5 net per ton, as the company does not figure on the cost of production being more than \$1 per ton. It has its own water rights, cheap fuel, and a railroad within three miles, and can mine and mill the ore at a minimum cost.

In comparison with the other big low-grade mines in the West and in Alaska, the value of the Oro Grande's ore ranks away above any of them. The Homestake, in South Dakota, only averages \$3.75 per ton; the California King, in California, averages \$3.50 per ton; the Alaska Treadwell, in Alaska, about \$2 per ton; the Alaska Mexican, \$1.40 per ton, and the Consolidated Alaska, \$1.55 per ton. These mines are all large dividend papers, and have been for the last twenty years, and are yet grinding out millions for the stockholders.

The Homestake has paid to its stockholders within the last twenty-five years, \$11,388,750 in dividends. The Oro Grande could pay a good one-half of this amount in six years by reducing 500 tons a day and without having to do another lick of development work in the mine during that time. The Alaska Treadwell has paid in twenty years \$4,585,000 in dividends. The Oro Grande can pay \$415,000 more than this sum in six years, and, as before stated, without having to touch anything except what has already been measured up. The Homestake is capitalized for \$21,840,000, and is paying big interest on that. The Alaska Treadwell is capitalized for \$5,000,000, and is paying likewise big interest. The Oro Grande is only capitalized for \$3,000,000, and can pay bigger dividends than the other two without touching any more ground in the mine.

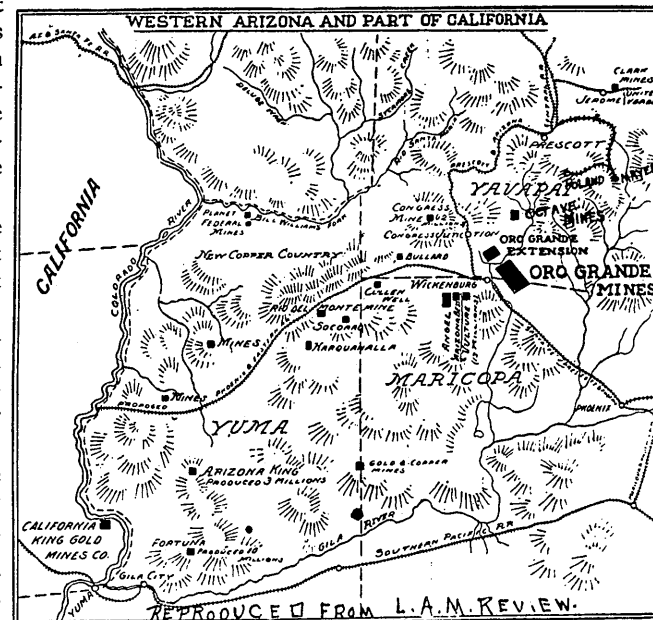
It will be seen from the above figures that this mine is in reality a much larger property than it was thought to be. So many wild statements have been made about it that I took the trouble to gather all the information possible, beginning to be rather doubtful of the opinion I had formed myself. After comparing it, however, with the two noted mines above, I feel more than ever confident that it will turn out eventually as good a producer as the other two put together.

The Oro Grande's situation puts it in line to become one of the greatest desert mines for which the Territory is famous. Nearly one-half of the gold produced from quartz mines has been taken out of mines lying between the Hassayampa and the Colorado Rivers and north of the Gila River. As will be seen by the map, the first of these, the Vulture, has produced \$16,000,000; next the Congress, \$12,000,000; the Fortuna, \$10,000,000; the King of Arizona, \$3,000,000; and the Harqua Hala, \$3,000,000, and a grand total of \$44,000,000, or 4 per cent. of all the gold produced in the Territory since any record has been kept. The Oro Grande bids fair to outdo any of these properties. It is at present merely a prospect, with only a small portion of its ground opened up. It has an immense amount of territory yet to explore, besides sinking below the present workings. The surface indications show a continuous body of ore from 100 to 300 feet wide and 4,000 feet long, and several cross leads, which are probably spurs from the main ore body. Altogether there is no other such showing in Arizona, and never has been. Even the old Vulture in its best days could not make such a good showing with the same amount of work. The personnel of the company is a strong one, and it was incorporated for the reason that one man has had to furnish the entire capital up to the present time. The president and treasurer is Mr. Garret E. Lamb, president of the People's Trust and Savings Bank, of Clinton, Iowa. Mr. George B. Upton is vice-president and resident manager at the mine, and Mr. Frank W. Ellis, a prominent lawyer of Clinton, is secretary. The balance of the directorate consists of Mr. J. Dwight Lamb and Mr. Marvin J. Gates, both prominent and wealthy merchants of Clinton, and the Hon. John C. Herndon and Hon. Thomas J. Norris, prominent lawyers and bank directors, at Prescott, Arizona.

Taking into consideration the fact, well known to all mining men, and to those who have been fortunate enough to invest in low-grade mines, that this class of mine has been almost the only permanent gold mine ever found, the Oro Grande has a brilliant future before it.

LELAND GAMBLE.

Wickenburg, Arizona, Oct. 6, 1902.



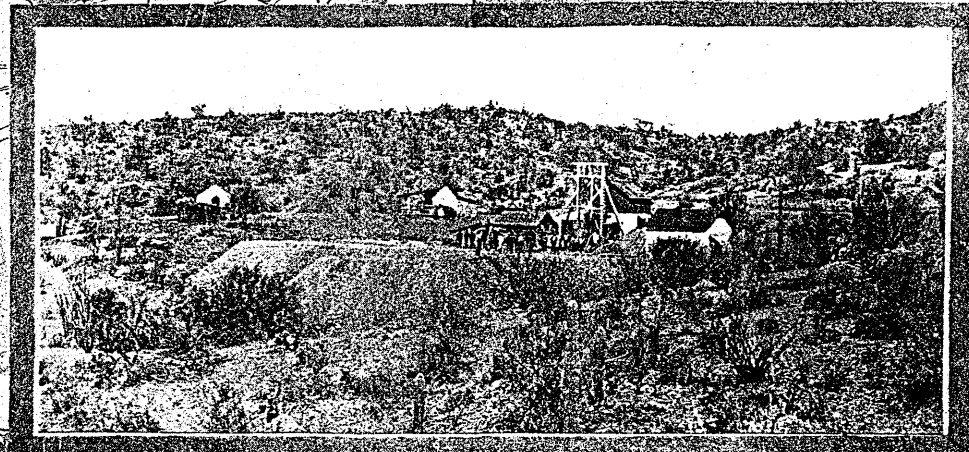
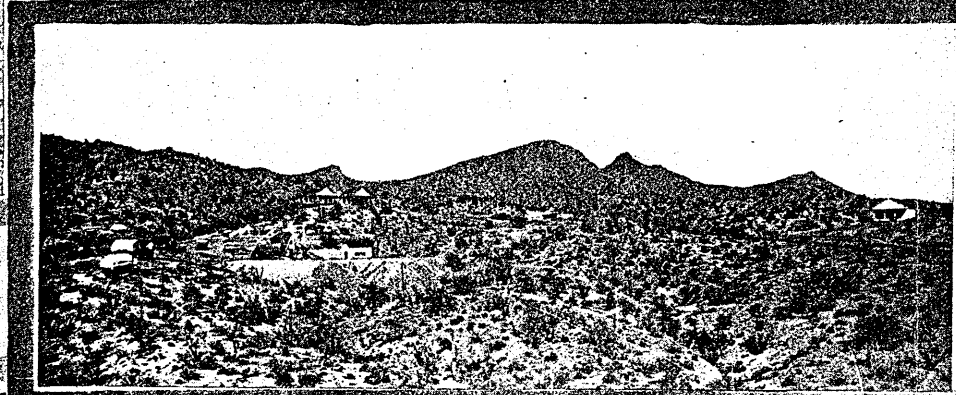
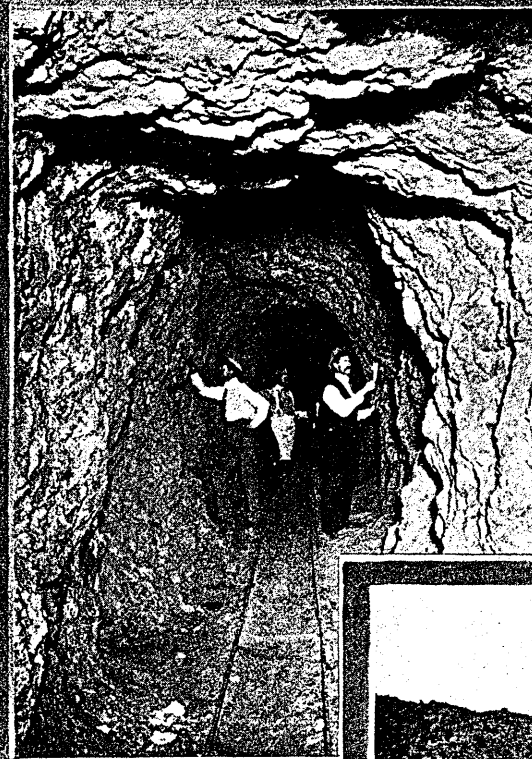
CONCLUSION.

If you have read all the preceding pages we think that you will have found sufficient proof of our statements as well as the attractions of Oro Grande Mines Co. stock as an investment worthy of consideration and a subscription.

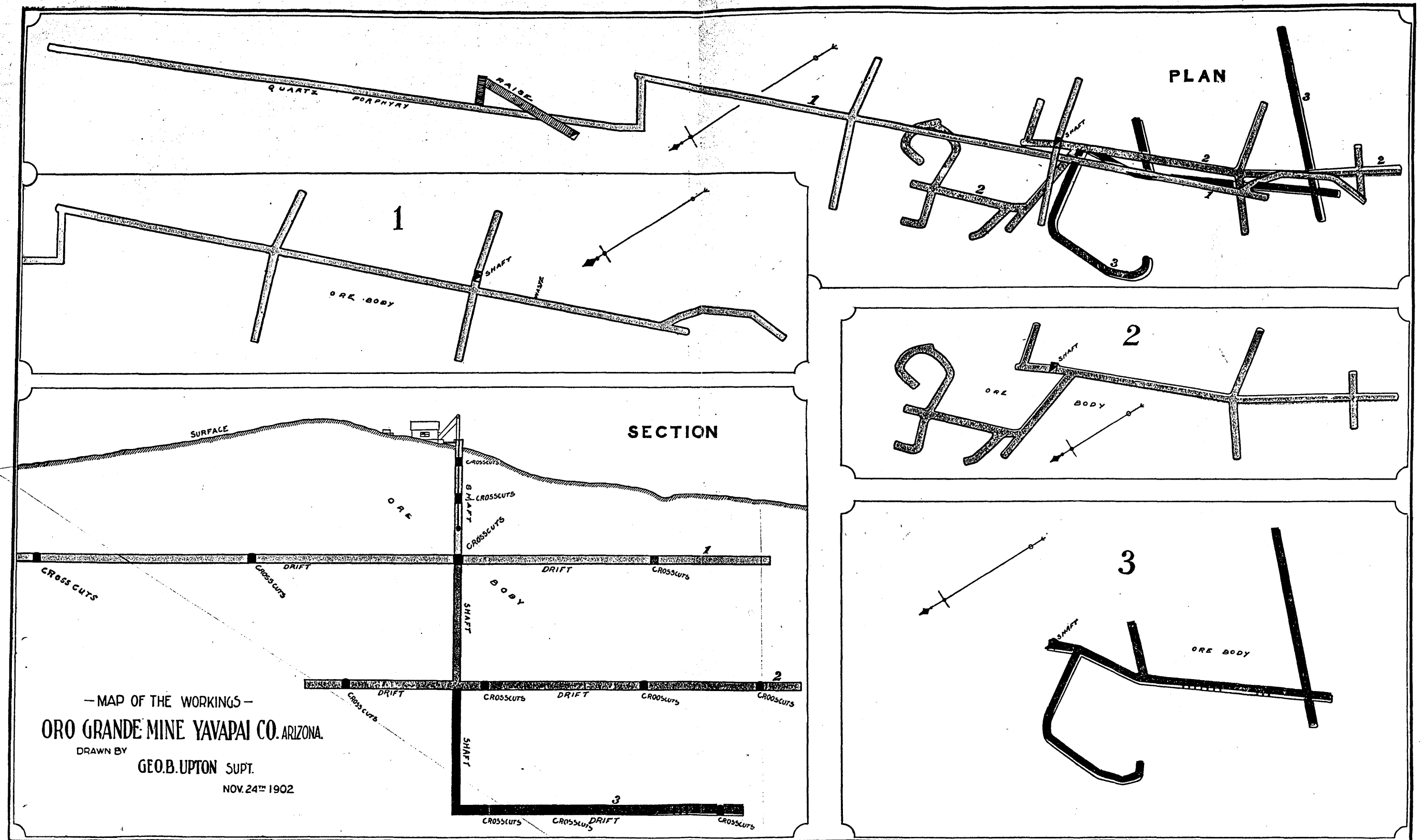
To any responsible person or persons who will go to Arizona with a view of investing, and find that the proposition is other than what we claim, his or their expenses so incurred will be paid by us.

Respectfully,

ORO GRANDE MINES CO.



Humphries Photo
Prescott Ariz



INCO LIMITED

ORO GRANDE - WEAVER CREEK

GEOLOGICAL MAPPING

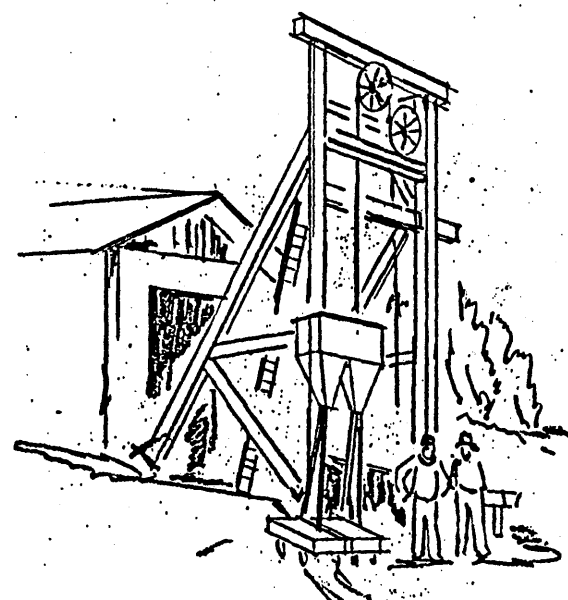
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MINERALOGICAL

INVESTIGATION

File No.:2652-01

GENERAL ENGINEERING DEPARTMENT



Ontario Division
Copper Cliff, Ontario
POM 1N0

INCO LIMITED

Ontario Division

Originator: H. J. SANDRI

Date: December 3, 1990

ORO GRANDE - WEAVER CREEK

GEOLOGICAL MAPPING

&

MINERALOGICAL

INVESTIGATION

Authors: R. Tenbergen
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Approved:



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PURPOSE:

An investigation was carried out to determine if consideration should be given to re-examining two properties near Wickenburg, Arizona with respect to Platinum Group Metals (PGMs).

The investigation was to determine the composition and geological history of the lithologies in order to determine if the geological setting was favourable to the presence of PGMs. This report presents the findings of the investigation.

BACKGROUND:

The two properties are identified as the Oro Grande Mine and Weaver Creek. Mineral rights on the properties are optioned by Global Platinum + Gold Incorporated (Global).

A previous review of the properties indicated no values of interest to Inco. However, persistence by Global resulted in the Strategic Planning Department requesting an investigation from an alternative view point.

The property was visited by R. Tenbergen and T. Price during the week of August 19, 1990.

SUMMARY:

Historical workings on the property were not consistent with the recovery of PGMs. However, historical information from the early 1900s indicates that PGMs were present in the gold mining operation and that the U.S. Mint docked the bullion shipment by up to 20 percent due to silver and platinum content.

Geological and geochemical features indicate potential for PGMs on the Oro Grande property.

The mapping and historical documentation indicate that potential may exist at-depth and may extend well beyond the mapped area of the Oro Grande property.

Review of previous assays and limited new assaying confirms Global's contention that the deposit is unusual. The sampling and assaying techniques used for past assay results can not be considered reliable for quantification purposes. At minimum, a tie-in between the mineralology, the sampling and the assaying will be required to determine exact composition and recovery potential for any values.

The Weaver Creek property is a placer deposit and as such may contain mineralization similar to the Oro Grande property. However, very limited time was spent on this property.

RECOMMENDATION:

The investigation has resulted in the following recommendation:

It is recommended that samples taken during the mapping be analyzed to confirm or discount the interpreted surface mineralogical footprint of the mapped area.

If the assaying and the mineralogical work of the collected samples confirms the interpreted surface mineralogy, it is recommended that a methodical system of sampling and assaying be initiated to establish or discount the presence of PGMs in commercial quantities.

INVESTIGATION DOCUMENTATION

The following sections provide a more detailed documentation of the findings of the investigation and discussion of the findings.

METHODOLOGY

Investigation of the property has been executed in the following steps:

1. Historical search for pertinent mineralization.
2. Determination of historical recovery methods.
3. Determination of the presence of placer mining.
4. Determination of the presence of geological and geochemical features compatible with known worldwide environments for PGM deposits.
5. Determination of the scale of the features and geological mapping of the properties.
6. Extensive sampling and assaying has been carried out by Global and these assays as well as Global's methods of sampling and assaying have been reviewed to determine the pertinence of the assays.

All samples and assays were discounted during the initial phases of the investigation to avoid reaching conclusions based on those results rather than on a logical evaluation process.

During the geological mapping process, a number of samples were taken for petrography and assay reasons. These samples are logged and secured samples and in Inco's possession.

The samples collected were taken to determine the composition and geological history of the lithologies in order to determine if the geological setting was favourable to the presence of PGMs.

The collected samples are not suitable for making an economic assessment of the property.

SUMMARY

HISTORICAL SEARCHES:

Historical searches have indicated that one of the properties, Oro Grande Mine, was one of the richest gold mines in Arizona. Bullion shipped from the Oro Grande Mine to the U.S. Mint in California during the early 1900s was penalized up to 20% for silver and platinum content.

Despite this penalty, local geological groups, including the Arizona State Geologists, disclaim the presence of PGMs in this area of Arizona.

The existence of ultramafic rock (source rock for PGMs but not necessarily host rock) is not mentioned in any of the historical documentation reviewed. The significance of this is discussed in more detail under Geochemical Features.

This history would indicate that, if PGMs were present, they would exist in an environment not previously documented and perhaps not recognized by local geologists who would not have had prior exposure to similar environments and would not have been looking for "uneconomical platinum" at that time.

The historical search indicated that the recovery methods used during the heavy mining activity were primarily nugget or visible gold mining with stamp milling and amalgamation.

There is considerable discussion in early documentation regarding potential gold deposits at-depth. The exploration at-depth has been limited to exposures in the old mine workings to the 400 foot level. A diamond drill hole was put down in 1906 from the 200 foot level to depth of 550 feet (total depth from surface - 750 feet). A "red" ore zone similar to the upper levels of ore was re-entered at the 600 foot level.

A water well was drilled in 1980 to a depth of 700 feet with some of the core showing gold and platinum values.

The Weaver Creek property was mined using placer mining techniques.

GEOLOGICAL FEATURES

The services of Fischer Geological Consulting Ltd. were used for the geological mapping of the properties. The following geological features were identified:

1. Visible vein structures are present at multiple angles across a broad section (about 500 metres by 800 metres) of the Oro Grande property. These veins contain massive evidence of distention breccias.

Distention breccias result from tension fracturing of the earth's crust. The fractures or fissures that open fill with intrusion materials from a molten mass below. There is evidence that this may have occurred at least five times and possibly more.

2. There is evidence of extensive chemical alterations, associated with thermal events, to the host rock. This indicates that blow-outs of the intrusion material did not occur but that penetrative involvement within the host rock took place. The molten material penetrated small subterranean fissures and chemically altered those areas in immediate contact with the molten material.

Small quantities of Felsic rock in the brecciated material indicates the presence of a large molten source at-depth, the doming agent responsible for fracturing the crustal rocks at Oro Grande.

NOTE: See TABLE 1, Page 7.

3. There are manganese deposits peripheral (i.e. outer halo) to the main brecciated dome. These deposits were commercially exploited during World War II.
4. Ultramafic rock types are present in the brecciated material indicating a possible source for PGMs.

All of the above features, except Point 4, are compatible with worldwide deposits.

The presence of ultramafic rock (source rock for PGMs) presents a new variation on established geological evaluation procedures.

The features are evidence of a large molten material intrusion into the host rock in the presence of source rock for PGMs. An extension of the evidence would indicate that PGMs separated and condensed in deposits.

The history of gold mining in the area provides clear evidence that gold reacted in this manner. This would indicate that, with PGM source rock present, the PGMs, if present, would respond accordingly.

If this assessment is correct, it represents a geological model not previously encountered.

TABLE 1
ORO GRANDE

PRELIMINARY, INTERPRETED SEQUENCE OF GEOLOGICAL EVENTS
(Recent to Precambrian)

Erosion and filling of basins (placers)
? Uplift and associated subsidence ?
Deposition of Tertiary lavas & conglomerates
Deposition of Tertiary tuffs
Deposition of Tertiary sandstone

Intrusive Deformation

Hydrothermal events:

Alteration.
Oxidation, hematite/limonite.
Sericitic, chlorite, tourmaline,
carbonate.
Veining.
Quartz II, coarse, euhedral with
pyrite and gold?
Fracturing, dilation.
Quartz I, fine grained, pyrite? Au?
PGE?

D5

Intrusion of porphyritic quartz diorite

I4

Uplift? faulting? shearing?

D4

Breccia event (Gas blow-out?)

D3

Uplift? a) Green breccia (older)
b) Red breccia (younger)

Intrusion of felsic dykes

I3

? Ultramafic dykes, sills ?

Metamorphic overprint of diorite

D2

Intrusion of diorite/gabbro

I2

Disruption incorporation of ultramafic
rocks at depth, intrusive transport

Metamorphism of mafic volcanics to produce
schists and gneisses

D1

Intrusion of ultramafics at depth

I1

? Concentration PGE ?

Deposition of mafic volcanics and minor
felsic sediments.

GEOCHEMICAL FEATURES

As noted earlier, a considerable amount of sampling and assaying has been carried out. This assaying was done primarily to quantify the presence of Gold and/or PGMs. Information relative to those findings will be discussed later in the report. What is important at this point is that these assays confirm the presence of ultramafic rock by the existence and quantities of some key indicators.

INDICATOR	TYPICAL MAFIC	TYPICAL ULTRAMAFIC	SAMPLE AVERAGES
Ni	40 ppm	150 - 3000 ppm	150 - 1300
Cr ₂ O ₃	70 ppm	200 - >2000 ppm	>200
Co	40 ppm	50 - ? ppm	>50
MgO	5 wt %	9 - 50 wt %	9 - 15.6

These values have been consistent across all of the assay work carried out to date including work in Inco laboratories and can be considered a reliable indication that ultramafic rock is present.

The presence of this rock type firmly establishes a potential for PGM deposits but does not confirm the existence of such deposits.

SCALE OF THE FEATURES

A complete report on the geological mapping of the properties is appended in Appendix A.

REGIONAL GEOLOGICAL FRAMEWORK

The Wickenburg area lies in the basin and range part of the North-American cordillera. The Oro Grande property occurs in a small Precambrian window surrounded by a cover of Tertiary volcanics and sediments and of quaternary gravels and valley fillings.

The area within a thirty to forty mile diameter contains more than one hundred gold occurrences, some of which were significant gold producers.

Several large (10 kilometre) alluvial fans converge from the North-West and North-East onto the Wickenburg area. They have been partially eroded by the Hassayampa River and Weaver Creek drainage systems.

LOCAL GEOLOGY

The relatively oldest rocks are schists and gneisses with a general northeast fabric. The next younger rock type is a mafic rock, diorite and hornblende gabbro exposed over an area of approximately 1.5 by 1.5 kilometres.

The diorite exhibits textural and structural features that indicate a complex igneous and metamorphic history. It encloses ultramafic and near ultramafic bodies less than one to forty metres in size, which are interpreted as rafts and inclusions rather than dykes.

The diorite is cut by breccia zones and by a swarm of felsic dykes and various veins. A northeast trending quartz -- carbonate -- pyrite -- breccia and vein system is the dominant auriferous structure. This was the original Oro Grande mining operation.

For sequencing see Table 1, Page 7.

The time available for the geological survey was limited and the following qualifying remarks and observations are offered which may clarify the complexity and uncertainties of the interpretation.

GNEISS AND SCHIST

Composition mostly mafic, minor intermediate and felsic.

Protolith probably mafic volcanics and sediments.

Banding common, foliated, fine to medium grained.

Distinction from diorite is not easy. The two (gneiss and diorite) might be closely linked genetically.

Gneiss might occur as large rafts within the diorite.

DIORITE

Composition mostly mafic, gabbroic, commonly a mafic gabbro (high MgO basalt composition), less common leucodiorite.

Hosts common mafic to ultramafic inclusions cm, dm and metre size.

Ten metre size ultramafic bodies are also interpreted as large inclusions but contact relations are not good enough to verify this interpretation.

Diorite textures are highly variable. They are not igneous in character but metamorphic indicating incorporation of xenoliths, recrystallization and possibly high pressure

"rolling deformation" i.e., transport in a plastic state. Some strongly deformed and faulted, altered portions of so-called diorite appear to be ultramafic amphibole-chlorite schist (claimed to be high in PGE).

ULTRAMAFICS

Abundance low; estimated 1 to 3 percent of diorite area. Occur as inclusions (cm to one metre size).

Composition from mafic hornblende gabbro to ultramafic hornblendite. Texture mostly coarse to very coarse, up to 2 cm hornblende crystals, massive, metamorphic character.

Hornblendite and hornblende gabbro/diorite are seen to grade into each other at cm scale with diorite occurring as finer grained matrix; hornblendite as coarse clusters.

FELSIC DYKES

Common, abundant in diorite area, estimated at 5 to ten percent of area. Width from .1 metre to 10 metres. Composition aplitic. Texture mostly massive but foliated varieties are observed. Brecciation (gas blow-out?) observed in one outcrop.

BRECCIAS

- Two areas identified:
- a) Oro Grande breccia ore zone, north-east trend, ten to fifty metres wide, approximately 500 metres long, not traced to Tertiary cover,
 - b) Previously undescribed breccia area in the north-east part of the diorite. It widens to the North-East and is overlain by Tertiary rocks.

Identification of breccias: Not easy, depends a lot on outcrop quality. Breccia observed to grade into unbrecciated diorite cut by vein stock work.

TYPICAL BRECCIA:

Hetero-lithologic fragment population (various diorite, gabbro, gneiss, and felsic fragments). Fragments angular, commonly rounded, concentrically colour zoned (liesegang rings). Matrix less than 10 to 40 percent: quartz, carbonate, limonite pseudomorph after pyrite.

Possibly two kinds of breccia: a) Green breccia, which is older, not limonitic was observed to be cut by red breccia in one outcrop, b) Red breccia, which is younger, was also observed to cut green breccia.

Breccia shows strong variation in matrix abundance and mineral composition.

Breccias are interpreted to grade into unbrecciated diorite cut by vein stockwork.

Brecciated felsite dyke seems to suggest that felsic dykes predate the brecciation event.

Breccia is massive in character, has no imposed orientation of fragments i.e., is probably not the product of shearing but more likely the product of a gas blow-out.

QUARTZ-DIORITE PORPHYRY

Occurs as a number of dyke-like bodies within the northeastern breccia zone. Size of porphyry bodies metre to ten metre wide. Massive texture, not brecciated, appear to be younger. Texture is distinctly igneous and different from diorite. Ferro-magnesium minerals are lathy, acicular. Scattered feldspar phenocrysts (.5 to one mm in size). Matrix very fine feldspar and quartz. Appears to have locally disseminated pyrite (rusty spots, no thin section yet). The visible porphyry bodies are interpreted as upper portion of a larger pluton at depth which intruded into the vent area of the blow-out.

HYDROTHERMAL EVENTS

See Table 1.

BRECCIA ORE ZONE

At least two stages of quartz separated by a brecciation or dilation event with pyrite (altered to limonite). This indicates persistent fluid supply associated with interpreted continued dilation, fracturing and brecciation. Gold deposition?

VEINS

Large swarms of veins apparently concentrated about 500 metres West of breccia ore zone. Veins mostly metre size. Quartz veins, tourmaline, and epidote.

Diorite adjacent to breccia zones is cut by stock work of quartz -- carbonate -- pyrite veins.

Main breccia ore zone.

ALTERATION

Strong in breccia and stock work zones. Sericite, chlorite, tourmaline, carbonate and epidote. Fracture controlled (mm and cm scale).

SAMPLING & ASSAYING

As noted previously, considerable assay work has been carried out in the past. Most of this work was done to determine the presence of Gold and/or PGMs and the quantities in which they were present. The prime intent was to evaluate if a mineable quantity existed.

The sampling and assaying techniques that were used have been investigated and it has been determined that results from the work can not be considered reliable for quantification purposes. This conclusion has been based on:

- No methodology used in determining sample points.
- Poor or no logging of sample points.
- Lack of metallurgical hygiene in some facilities.
- Lack of continuity in sample tracking through the assay process.
- Poor or no correlation between mineralogy and assaying techniques.
- Inexperienced operation of some assaying equipment.
- The presence of metallurgical alloying being carried out in the same area as samples were being prepared.

While contamination of some of the previous samples is possible, and indeed probable, there is no evidence to indicate that such contamination has been deliberate.

The samples collected as part of this study were taken to determine the composition and geological history of the lithologies in order to determine if the geological setting was favourable to the presence of Platinum Group Metals.

While the assay results of these samples are of interest, they are not suitable for making an economic assessment of the property.

PREVIOUS SAMPLES & ASSAYS

As indicated earlier in the report, there has been an extensive amount of sampling and assaying done relative to the two properties. Generally, the assay results have not been consistent and can not be used for determining quantities of either Gold or PGMs. The number of assays (between 800 and 1000) does provide some indicators of use to this evaluation.

MHS Laboratories has assayed a series of 800 samples with the following statistical average results from them:

	<u>ALL SAMPLES</u>	<u>EXCLUDING Fe COMPLEXES</u>
Au	0.205 opt	0.09 opt
Pt	0.863 opt	0.11 opt
Pd	0.128 opt	0.06 opt
Rh	0.086 opt	0.01 opt
Os	24.230 opt	3.41 opt
Ir	13.650 opt	3.33 opt
Ag	1.120 opt	1.10 opt

If the absolute values are ignored and only the relative values between the data containing Fe Complexes and the data excluding Fe Complexes are considered, then there would appear to be a direct association of Pt, Rh, Os and Ir with the Fe Complexes. To a lesser degree Au and Pd seem to have some association, and Ag seems not to be affected.

The Fe Complexes are not readily discernable when taking samples and this association may explain some of the variations of readings noted when assaying seemingly identical samples.

Improved sampling methods should eliminate this as a variable.

Another note of interest in the previous samples is the core sample taken from a water well on the property at a depth of about 700 feet. Assay results were Pt - 0.16 opt, Pd - 0.216 opt and Au - 0.032 opt. This, although only one sample, may be an indicator of values at depth.

INCO SAMPLES & ASSAYS

While investigating the property, some twenty-five samples were taken and brought back to Copper Cliff for assaying. These samples are not contaminated and continuity of tracking during the assay process has been carried out. The samples are grab samples taken prior to mapping and are not representative of the deposit.

The twenty-five samples collected showed platinum readings with values ranging from 0.0053 to 0.0654 ounces per ton, providing an indication that PGMs are present. Considering the method of sample point determination, these results are consistent with those obtained by others.

ICP scans on the samples produced readings confirming the presence of ultramafics by the Ni, Cr₂O₃, Co and MgO contained in the samples.

UPGRADING TECHNIQUES

Local personnel, in their attempts to verify the presence of PGMs, have undertaken various torching/melting and mineral processing techniques for upgrading the ore.

TORCHING/MELTING

Of interest are the various attempts by local personnel to torch and melt various samples with or without fluxes, such as borax glass. Samples may consist of magnetics collected from the surface or creek beds, diorite rock, ultramafics or various mixtures thereof.

In torching, a small quantity of sample is heated on a carbon block until visible beads appear within the molten mass. Upon cooling and pulverization with a hammer, small prills can be separated.

In melting, a large quantity of pulverized rock is placed in a crucible, with or without fluxes, and heated to produce an iron-button.

These prills or buttons have been probed and frequently show PGMs.

This remains an interesting, unconfirmed upgrading technique. No systematic program has been undertaken by Inco to confirm or deny these findings since considerable resources would have to be committed.

MINERAL PROCESSING

Global commissioned J. Hightower of Denver to do flotation, magnetic separation and tabling recovery tests on the cuttings from a borehole that was drilled while Inco personnel was on the property. The concentrates from these tests were submitted to crucible fusion, PM dissolution and precipitation, cupellation and, microprobe analysis.

A high platinum analysis was obtained and Inco commissioned J. Hightower to concentrate 8 kg in a similar fashion from cuttings from an adjacent deeper borehole (30' - 90'). The flotation, magnetic and gravity concentrates have been received and analyzed by Inco.

Assay results on products from this particular hole did not show significant PM values from the 0.6% weight recovery flotation concentrate, the 0.2% weight magnetics or the 4.1% weight table concentrates.

<u>CONCENTRATES</u>	ounces/ton				
	<u>Pt</u>	<u>Pd</u>	<u>Rh</u>	<u>Au</u>	<u>Ag</u>
Flotation Concentrates	.007	.003	<.001	.023	.040
Magnetic Concentrates	.002	.001	<.001	.001	.017
Table Concentrates	<.001	<.0005	<.0005	<.0005	<.005

J. Hightower has commented that this sample did not produce a similar dark looking concentrate and produced less magnetic concentrate as compared to test results on the first hole.

Previously submitted, Inco collected, ultramafic, surface samples were resubmitted for assaying with the above samples. Results continue to show platinum values.

<u>SAMPLE NO.</u>	ounces/ton			
	First Assay (0.5 AT)		Repeat Assay (2 AT)	
	<u>Pt</u>	<u>Ag</u>	<u>Pt</u>	<u>Ag</u>
19	.0546	.0030	.0485	.005
21	.0097	.0019	.0070	<.005
23	.0185	.0062	.0150	.008

CONCLUSION

The Oro Grande site is a complex area with a multi-stage intrusive and hydro-thermal history (See Table 1). There is good potential for both lateral and vertical thermal and metal zoning on a large scale. A potential for unrecognized metal concentrations also exists (Gold and PGMs). The size of the hydro-thermal and alteration halo is at least one to two kilometres in diameter.

The samples collected as part of this study were taken to determine the composition and geological history of the lithologies in order to determine if the geological setting was favourable to the presence of PGMs. This has been answered in the positive.

The collected samples are not suitable for making an economic assessment of the property.

INCO MEMORANDUM

JULY, 1989

ANALYSIS OF GLOBAL PLATINUM + GOLD'S

ORO GRANDE SAMPLES

INCLUDES HAZEN RESEARCH INC. SUMMARY

OF GLOBAL'S ASSAY AND RECOVERY PROCEDURES

ORO
GRANDE
RPT

(2)

OroGrande - F

ADMMR
ORO GRANDE FILE
Yavapai Co.

File 4, Item 4



J. Roy Gordon Research Laboratory
Sheridan Park, Mississauga, Ontario L5K 1Z9

MEMORANDUM

TO St.J.H. Blakeley

FROM W.E. Gibbs

DATE July 17, 1989

SUBJECT Analysis of Global Platinum + Gold's Oro Grande Samples

As agreed, we have analyzed a subset of seven samples from the Oro Grande group of samples. The samples analyzed appear to consist of two "ore" samples, two concentrates, two small beads and a large metallic. The beads probably came from some sort of fire assay concentration or collection procedure.

The large metallic piece was pure iron.

Ores and Concentrates

JRGR Ref	Sandri Ref	Troy oz/ton					
		Pt	Pd	Au	Rh	Ir	Ag
B2573	OG 34 +100 mesh table conc. red ore	.004	.05	.22	<.001	<.01	.32
B2574	OG - red head	.002	<.002	.01	<.001	<.01	.04
B2575	OG - green head	.003	<.002	<.002	<.001	<.01	.04
B2577	OG 34 -100 mesh table conc. red ore	.020	.32	.55	<.001	<.01	.20

Metallic Piece

B2579	133-87 OG Oro Grande metallic	<.3	<.03	<.03	<.03	<.3	<.3
-------	----------------------------------	-----	------	------	------	-----	-----

Metallic Beads

		Weight %					
B2576	OG red on crucible Tack head size bead Bead=0.2943g	9.18	2.27	16.8	.48	.6	.53
B2578	OG 17 GR CON Pin head size bead Bead=0.0135g	51.6	2.89	4.30	1.63	.6	1.22

WEG



J. Roy Gordon Research Laboratory
Sheridan Park, Mississauga, Ontario L5K 1Z9

MEMORANDUM

TO H.J. Sandri

FROM St.J.H. Blakeley

DATE July 20, 1989

SUBJECT Oro Grande Samples

We selected seven samples from the 20 you sent to me for analysis. We considered these to be potentially more meaningful than the various fractions and small samples on filter paper.

The results are given in the attached memo from W.E. Gibbs. The levels of platinum group metals were very low. Sample 7, described as a "silver colored metallic found in top layer of the ore body" was pure iron. The tiny metallic beads (samples 4 and 6) appear to have come from a platinum collection fire assay procedure and could not be related to the ore or "concentrates".

In future, would you please process this type of request through Inco Gold Exploration.

STJHB/vr

xc: R.A. Alcock

.....


Number	Item Description	Container Markings
B2573 1.	Dark silver-grey colored fine particles, approx. 300± grams. In clear bag.	OG 34 + 100 mesh, table cons. red ore.
B2574 2.	Burnt red colored large and fine particles, approx. 300± grams. In clear bag.	OG - red head.
B2575 3.	Light brown colored large and fine particles, approx. 300± grams (note - broken bag). In clear bag.	OG - green head.
B2576 4.	Yellow crucible with silver colored material about the size of a tack-head. OG red written on crucible. In clear bag.	OG red written on crucible, OG red dore from 400g ore, from chem ppt.
B2577 5.	Very dark silver-grey colored fine particles, approx. 300± grams. In clear bag.	OG 34 - 100 mesh, table cons. red ore.
B2578 6.	Yellow crucible with silver colored material about the size of a pin head. (Note - material is free in bag - not on crucible.) OG 17 GR CON EW CU 14 mg written on crucible. In clear bag.	OG 17 GR CON EW CV 14 mg written on crucible. Red ore OE 17 dore, 14 mg. from ppt/AT.
B2579 7.	Silver colored metallic, approx. 1.25" x 1." x 0.25". Found in top layers of ore body. In clear bag.	133 - 87 OG, Ore Grande Metallic.
8.	Off-white powder material, approx. 3-5 tablespoons. In clear bag.	OG 34-3, 3/22, + 100 mesh, pretreated table cons, red ore.
9.	Off-white powder material, approx. 1-1.5 cups. In clear bag.	Global Au Pt, 3/24/89, +100 mesh, Au Pt, pretreated material red ore, grind OG 34-4 - 100 mesh con (need grind ?? 35?).
10.	Dark silver material, approx. 1 teaspoon. In brown envelope.	133-87 OG, OG 34, - M100 table cons. from Ore Grande red ore \geq 14.40g.
11.	Dark Redish material - some small chunks, approx. 3 teaspoons. In brown envelope. With other materials in clear bag marked 133-87 WC J4 IWC.	133-87 WC J4, IWC \geq 24.20g. split.

- | | | |
|-----|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12. | Dark brown material, approx. 0.25 teaspoon. In filter paper, in brown bag. With other materials in clear bag marked 133-87 WC J4 IWC. | Weaver Creek, Mag separator + gravity concentrate PH=5.0, H ₂ SO ₄ , sampled by Russ Twilford, IWC. |
| 13. | Light brown powder, approx. 1 teaspoon in brown envelope. With other materials in clear bag marked 133-87 WC JH IIWC. | 133-87 WC JH II WC \geq 4.90g split. |
| 14. | Light brown powder, approx. 0.1 teaspoon. In filter paper, in brown bag. With other materials in clear bag marked 133-87 WC JH IIWC. | Weaver Creek Flotation con. PH=5.0 H ₂ SO ₄ 407-25
Sampled by Russ Twilford
200 gm chg. IIWC. |
| 15. | Grey material, approx. 1 table-spoon. In brown envelope. With other material in clear bag marked 133-87 OG JH, I, 3/1/89. | 133-87 OG HJ, I, 3/1/89,
\geq 9.00g split. |
| 16. | Brown powder material. In filter papers, in torn brown bag. With other materials in clear bag marked 133-87 OG JH, I, 3/1/89. | Diorite & Schists, 2000 gram sample, flotation & mag sep & gravity concentration, treat as all 1 sample, partial fused with torch by J. Hightower, flakes, beads & gold visible after touch, partial touch, I. |
| 17. | Grey-brown material, approx. 1 teaspoon. In brown envelope. With other material in clear bag marked 133-87 OGJH, II. | 133-87 OGJH, II, 3/1/89,
\geq 3.10g split. |
| 18. | Brown powder material. In filter paper, in brown bag. With other materials in clear bag marked 133-87-OGJH, II. | Diorite & Schists concentrate #1-5A-407-253477, FF+MS No GC, 250 gm sample, II. |
| 19. | Light grey material, approx. 1 tablespoon. In brown envelope. With other materials in clear bag marked 133-87-OG JH, III. | 133-87 OGHJ, III, \geq 2.20g split. |
| 20. | Light brown material. In filter paper in brown bag. With other materials in clear bag marked 133-87 OGJH, III. | Diorite & Schists, scanengu flotation, concentrate #1. 250, SA-407-253477, 250 gm sample, III. |



Hazen Research, Inc.
4601 Indiana St. • Golden, Colo. 80403
Tel: (303) 279-4501 • Telex 45-860

HENRY J. SANDRI

SEP 25 1989

RECEIVED

September 20, 1989

Mr. Rick J. Sandri
Assistant Vice President
INCO Limited
One New York Plaza
New York, NY 10004

Re: HRI Project 7189
Investigation of Samples from Global Platinum and Gold, Inc.

Dear Mr. Sandri:

Enclosed is our final report summarizing procedures and results for samples from Global Platinum and Gold, Inc. We have appreciated this opportunity to provide our services and hope to work with you again in the future.

If you have any questions about the report, please contact us. We have retained all samples and residues and these are scheduled for disposal at the end of October 1989 unless you request otherwise.

Yours truly,

A handwritten signature in black ink, appearing to read "John C. Gathje", is written over a horizontal line. The signature is fluid and cursive.

John C. Gathje
Project Manager

JCG:mb
Enclosure

INTRODUCTION

In early July 1989, Hazen Research was asked by INCO Limited to perform certain laboratory tests on ore samples from Global Platinum and Gold, Inc. The samples were to be fire assayed for gold, platinum, and palladium, and then subjected to a flotation procedure furnished by Mr. John Hightower. Concentrates from the flotation tests were to be fire assayed and subjected to a leach-electrowinning procedure furnished by Mr. Charles Arnold. Mr. Hightower and Mr. Arnold were to be present as necessary during the testing to verify that their methods were being followed correctly. Mr. Michael Thomas was to collaborate with the Hazen Analytical Department on appropriate fire assay techniques for these particular materials.

SUMMARY OF RESULTS

No significant concentrations of gold, platinum, or palladium were found in any of the ores or concentrates by any of the methods used.

SAMPLES

Originally the program was to be conducted on seven samples from the Oro Grande mine. Later an eighth sample designated "Weaver Creek" was added. The samples as-received assayed as follows:

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Table 1

Assays of As-received Ore Samples

Sample No.	Description	Ounces per Ton		
		Au	Pt	Pd
1	Main ore body	<0.005	<0.005	<0.005
2	Magnetics 100' level from main ore	0.010	<0.005	0.010
3	Straight ore from 50,000-ton stockpile	<0.005	<0.005	<0.010
4	Magnetics from 50,000-ton stockpile	<0.005	<0.005	<0.005
5	Rock from Halo Area	<0.005	<0.005	<0.005
6	Magnetics from Halo Area	<0.005	<0.005	0.007
7	Typical rock from 1/2 mile around mine	<0.005	<0.005	<0.005
8	Weaver Creek	<u>1/</u>	<u>1/</u>	<u>1/</u>

1/ Not assayed.**HIGHTOWER FLOTATION TESTS**

The following written procedure, attributed to Mr. John Hightower, was originally submitted by Mr. Michael Thomas:

About 2,000 grams of sample must be ground so that over 80% of the sample has a maximum particle size of minus 325 mesh. The finer the mesh, the better are the results: refer to the Murro de Oro Mine processes in Brazil.

The sample is added to a flotation cell in the presence of 10 liters of water. Thirty ml of sulfuric acid are added to adjust the pH of the solution to about 4. The sample is conditioned for about 15 minutes. After this time, the magnetic particles in the sample are removed via a magnetic plunger. The magnetic material is placed in the concentrate pan.

Aeroflot 407 (American Cyanamid) is added to the solution in the cell. The concentration of 75 grams per ton is about correct for most ores. Two ml of the 407 is about correct here. This should be conditioned for about two minutes. Then add Aeroflot 25 (75 grams per ton), about 2 ml to the solution and condition for about two minutes. The impeller speed in the flotation cell should be about 3,000 rpm: the finest possible air bubbles are most desirable. A Denver flotation cell was used for this procedure.

The flotation should be allowed to continue for 30 minutes or more. .
The flotation product should be placed in the same pan with the magnetic particles which were removed earlier. These combined concentrates should be reground and refloated, as given above.

The final flotation concentrate may be fire assayed with an appropriate flux. Please note the addendum on fire assaying procedures and the National Western Mining Conference paper (enclosed) by Michael P. Thomas of M.H.S. Labs, Denver, Colorado.

During Mr. Hightower's initial visit to Hazen Research, he submitted the following modifications to the procedure:

The magnetics could be removed prior to addition of the acid. The magnetics and the rougher flotation concentrate are reground in a ball mill; then this concentrate (magnetic + rougher flotation) after regrinding is recleaned in a 250-gram pulp bucket repulped with fresh water. The magnetics that did not float in the cleaner pass are then removed, and this creates the magnetic concentrate.

The cleaner froth is repulped in the 250-gram pulp bucket and then floated again to create a final flotation concentrate.

The tailings from the rougher flotation, cleaner, and recleaner were separated by gravity.

The test flowsheet is shown in Figure 1.

These tests resulted in the product weights shown in Table 2.

Note that some of the weights were quite small. On August 1, 1989, a meeting was held at Hazen Research to determine how to deal with this problem in the subsequent testing and analytical work. Present at the meeting were Mr. Michael Thomas and Mr. Charles Arnold in addition to Hazen personnel. It was

Table 2

Dry Weights of Flotation Test Products

Sample No.	2nd Cleaner Conc	2nd Cleaner Tail	1st Cleaner Tail	Magnetic Conc	Table Conc	Table Mid.	Table Tail	Total Feed
1	2.30	9.63	94.15	10.43	58.3	385.5	1,300.0	1,860.31
2	4.77	25.88	250.92	590.58	25.6	64.1	475.4	1,437.25
3	8.27	12.49	27.98	73.29	52.9	407.3	1,325.0	1,907.23
4	1.42	2.76	245.73	1,183.15	14.5	110.3	415.0	1,972.86
5	3.33	9.34	87.37	32.96	77.2	117.5	1,628.0	1,955.70
6	4.84	31.16	225.46	683.32	22.2	265.8	750.0	1,982.78
7	5.35	6.07	45.48	39.14	96.7	255.6	1,495.0	1,943.34
8	1.13	2.52	41.55	44.47	65.3	138.3	1,685.3	1,978.57

Weights are given in grams.



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DATE July 26 1989
HRI PROJECT 002-49-R
HRI SERIES NO. 42766
DATE RECD. 6/23/89
CUST P.O.#

INCO Limited
Mr. H. J. Sandri
One New York Plaza
New York New York 10004

REPORT OF ANALYSIS

SAMPLE NO. 42766-2
SAMPLE IDENTIFICATION: OG 46-3 Float Conc.

Gold (Fire Assay Hazen),oz/ton	8.43
Platinum (Fire Assay/ICP Hazen),oz/ton	3.81
Palladium (Fire Assay/ICP Hazen),oz/ton	5.49
Rhodium (Fire Assay/ICP Hazen),oz/ton	0.04
Gold (Skyline),oz/ton	6.13
Platinum (Skyline),oz/ton	3.50
Palladium (Skyline),oz/ton	4.38
Rhodium (Skyline),oz/ton	<0.15

By:

Robert Rostad
Laboratory Manager



Hazen Research, Inc.
4601 Indiana St. • Golden, Colo. 80403
Tel: (303) 279-4501 • Telex 45-860

DATE July 26 1989
HRI PROJECT 002-49-R
HRI SERIES NO. 42766
DATE RECD. 6/23/89
CUST P.O.#

INCO Limited
Mr. H. J. Sandri
One New York Plaza
New York New York 10004

REPORT OF ANALYSIS

SAMPLE NO. 42766-1
SAMPLE IDENTIFICATION: OG 46-3 Head Split

Gold (Fire Assay Hazen),oz/ton	0.060
Platinum (Fire Assay/ICP Hazen),oz/ton	0.05
Palladium (Fire Assay/ICP Hazen),oz/ton	0.03
Rhodium (Fire Assay/ICP Hazen),oz/ton	<0.01

Gold (Skyline),oz/ton	0.014
Platinum (Skyline),oz/ton	0.029
Palladium (Skyline),oz/ton	0.028
Rhodium (Skyline),oz/ton	<0.009

By:

Robert Rostad
Laboratory Manager



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INCO Limited
Mr. H. J. Sandri
One New York Plaza
New York New York 10004

REPORT OF ANALYSIS

SAMPLE NO. 42766-3
SAMPLE IDENTIFICATION: OG 46-3 Float Tails

Gold (Fire Assay Hazen),oz/ton	0.764
Platinum (Fire Assay/ICP Hazen),oz/ton	0.78
Palladium (Fire Assay/ICP Hazen),oz/ton	1.34
Rhodium (Fire Assay/ICP Hazen),oz/ton	0.03

Gold (Skyline),oz/ton	0.580
Platinum (Skyline),oz/ton	0.327
Palladium (Skyline),oz/ton	0.729
Rhodium (Skyline),oz/ton	<0.06

By:

Robert Rostad
Laboratory Manager

decided that all cleaner flotation concentrates would be fire assayed and the magnetic concentrates would be combined with the table concentrates for fire assaying plus the Arnold leach tests.

On August 3 during phone conversations involving Mr. Michael Thomas and Hazen personnel, it was decided to combine the second cleaner concentrates with the second cleaner tails for fire assaying.

Fire assay results of the products described above are given in Table 3.

ARNOLD LEACH-ELECTROWINNING TESTS

The combined magnetic and table concentrates were subjected to the leach-electrowinning procedure submitted by Mr. Michael Thomas and attributed to Mr. Charles Arnold. The original written procedure was as follows:

A 30-gram sample should be prepared by fine grinding in the presence of 1 ml 35% hydrazine (Scavox*) per 100 ml of water. The wet grind should reach at least minus 200 mesh; smaller particle sizes are preferable but become difficult to filter.

The prepared sample may be filtered. About 30 ml sulfuric acid is added to the sample in the presence of 100 ml of water. Slowly add 5 grams of sulfamic acid to the sample solution and gently stir. Then add 5 grams of cuprous chloride to the sample solution and gently stir. Bring the sample solution up to about 140°F. Cover the beaker with a watch glass. Allow the sample solution 1 to 6 hours to mature. Maturation is apparent when the sample appears bleached. Allow the sample solution to equilibrate to room temperature and decant the solution, saving the particulate residue: filtration is necessary here with some of the ores. Set the filtrate aside and cover this with a watch glass. Add about 10-20 ml of sulfuric acid and 100 ml of water in the residue beaker. Stir this gently and add 1 gram of sulfamic acid. After a few minutes, add 1 gram of cuprous chloride to the residue solution and stir gently. Heat this to about

Table 3

Combined Flotation Second Cleaner Concentrates
and Second Cleaner Tails

Sample No.	oz Au/ton	oz Pt/ton	oz Pd/ton
1	None detected	<0.05	<0.020
2	None detected	<0.03	<0.009
3	None detected	<0.03	<0.009
4	None detected	<0.10	<0.040
5	None detected	<0.03	<0.010
6	None detected	<0.03	<0.009
7	None detected	<0.04	<0.010
8	None detected	<0.10	<0.040

Combined Magnetic Concentrates
and Table Concentrates

1	None detected	<0.03	<0.009
2	None detected	<0.03	<0.009
3	None detected	<0.03	<0.009
4	None detected	<0.03	<0.009
5	None detected	<0.03	<0.009
6	None detected	<0.03	<0.009
7	None detected	<0.03	<0.009
8	None detected	<0.03	<0.009

Note: Detection limits varied due to varying sample sizes
available.

140°F and add 14 grams of iso-cyanouric acid to the residue solution: the active ingredient in iso-cyanouric acid is Trichloro-S-Triazinetrione (Symclosene*, Merc Index). Stir the solution gently and cover. Bring the temperature up to about 140°F for 1 to 2 hours to dissolve the iso-cyanouric acid. Allow the solution to stand for at least 6 hours: it is often best to let the solution stand overnight. The residue solution may then be decanted and filtered. The filtrate is added to the first filtrate.

The filtrates may be diluted to about 4 times the original volume and then subjected to electrowinning. The electrowinning cell should contain an iron anode (+) and a stainless steel cathode (-). Copper, titanium, or lead may be substituted for stainless steel. The cell should be set at about 3 volts and allowed several hours to work: the process is complete once no more sponge accumulation appears on the collector and once no more precipitate appears on the bottom of the cell.

The sponge on the collector and the residue at the bottom of the cell are removed and filtered. The filtered residue is treated with 10% sulfuric acid and a 60-gram/liter solution of ferric sulfate. This removes copper from the sponge and from the residue (precipitate). The solution is then filtered to separate the residue.

The residue (precious metal values) may then be treated by fire assay techniques or classical separation chemistry in order to derive and separate the metals.

It should be noted that the residue from the original ore sample (or concentrate) can be retreated to derive additional precious metal values. Concentrated ammonium hydroxide is slowly added to the original ore residue and stirred in gently. This may be heated slightly and let stand overnight. The ammoniacal solution is then decanted and filtered. The filtrate may be diluted to about four times the original volume. This filtrate may be subjected to electrowinning, as above.

TEST FLOWSHEET

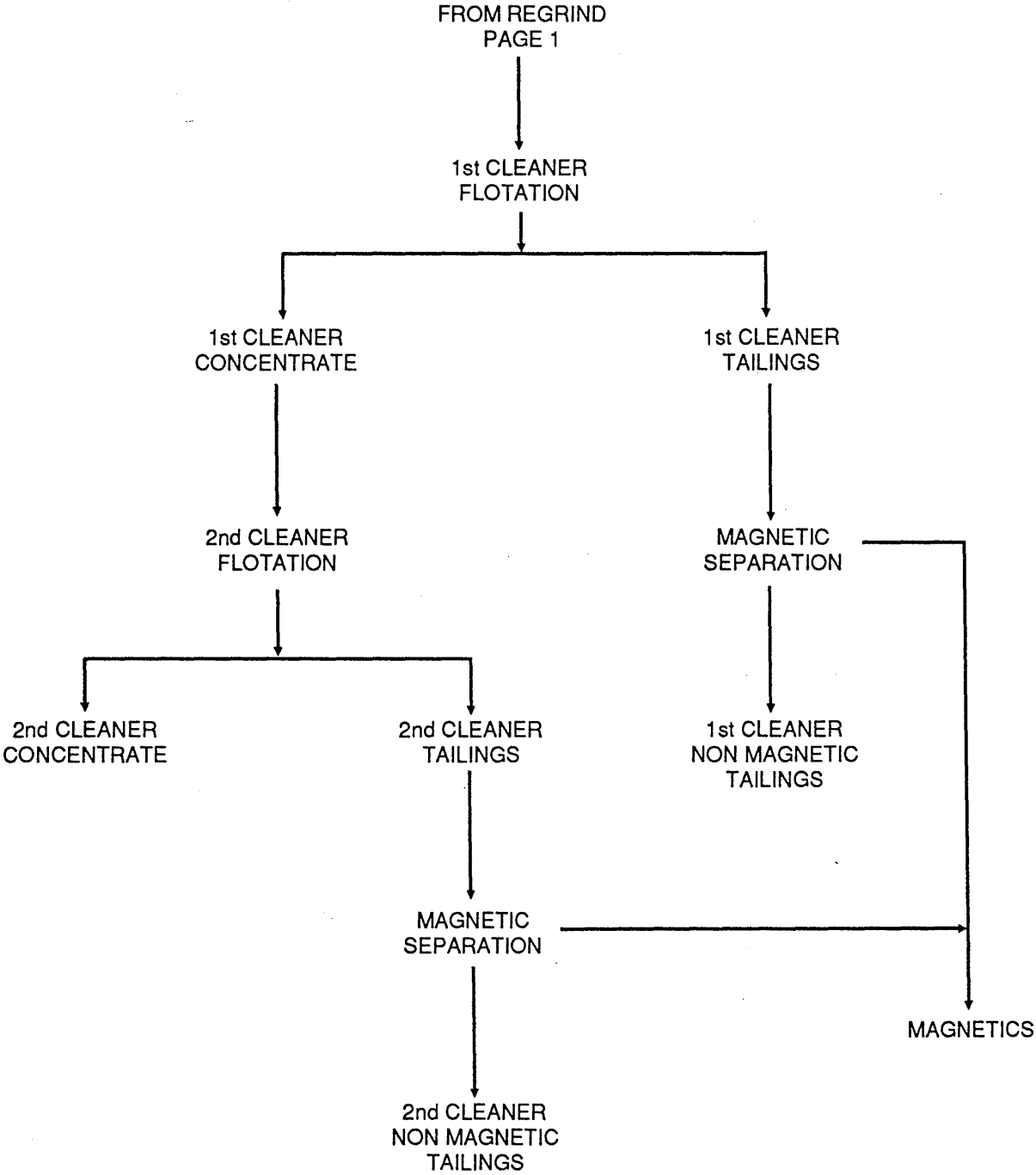


FIGURE 1

TEST FLOWSHEET

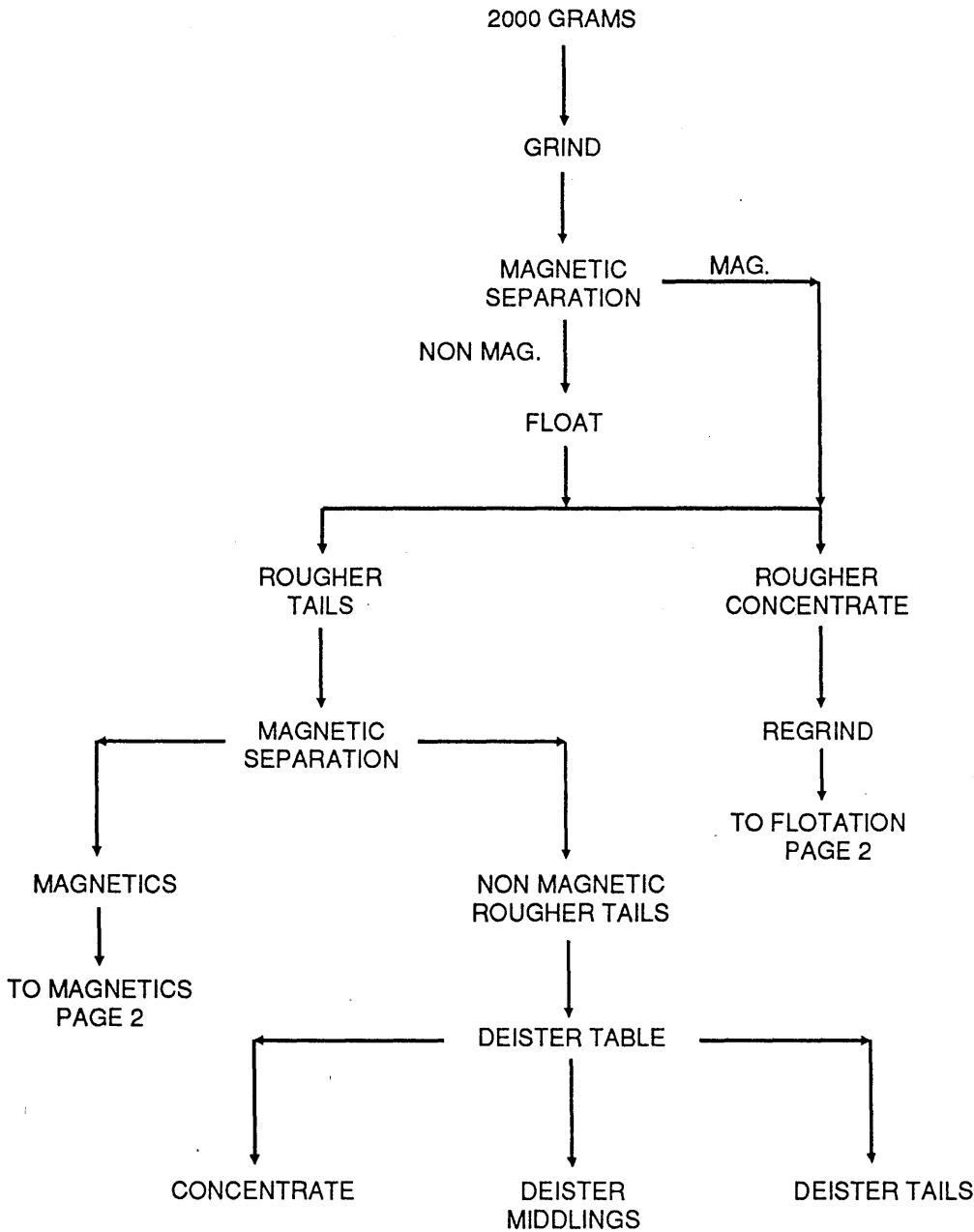


FIGURE 1

During the conduct of the work, Mr. Arnold made numerous modifications to the written procedure. They are listed below.

1. The samples were washed with acetone and then water to remove any residual flotation reagents.
2. The grinding step was omitted because the samples had been reduced to a very fine particle size during the flotation work.
3. The sulfuric acid, sulfamic acid, and cuprous chloride were added to the sample before the water.
4. The slurries were heated and stirred periodically for a total of seven hours. At this point Mr. Arnold was not satisfied with their appearance. The samples were filtered, the filtrate saved, and the procedure with sulfuric acid, sulfamic acid, and cuprous chloride repeated. The new slurries were left on a shaking hotplate overnight and filtered. The filtrates were combined with the filtrates previously obtained.
5. Cuprous chloride was not added during the iso-cyanouric acid step.
6. Some adjustments were made to the filtrates before electrolysis:
 - A. Hydrazine solution was added dropwise until a white crystalline precipitate began to form.
 - B. Ammonium hydroxide solution was added dropwise until a brown precipitate formed and did not redissolve.
7. An iron anode and a cathode made from brass shim stock were used as electrodes.
8. The voltages and times for electrowinning were varied somewhat.
9. The retreatment with ammonium hydroxide was not done.

The electrowon solids from the above procedure were subjected to standard fire assay. Results are given in Table 4.

Table 4

Assays of Electrowon Solids from Arnold Procedure

Sample No.	Ore Description	Ounces per Ton		
		Au	Pt	Pd
1	Main ore body	<u>1/</u>	0.01	0.007
2	Magnetics 100' level from main ore	↓	↓	↓
3	Straight ore from 50,000-ton stockpile	↓	↓	↓
4	Magnetics from 50,000-ton stockpile	↓	↓	↓
5	Rock from Halo Area	↓	↓	↓
6	Magnetics from Halo Area	↓	↓	↓
7	Typical rock from 1/2 mile around mine	↓	↓	↓
8	Weaver Creek	↓	↓	↓

1/ None detected.