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February 11, 1931.

Dr. W. C. Cox,
322-23 Stokes Building,
Everett, Washington.

RE: JEROME GRANDE COPPER COMPANY

Dear Sir:

I acknowledge yours of February 4th in reference to the Jerome Grande Copper Company. I am sorry to tell you that I do not feel that I have sufficient information concerning this property to justify me in making any very definite statement regarding its possibilities or giving you and your fellow stockholders any professional advice.

Some years ago, while holding the position of General Manager of the Southwest Metals Company, I investigated very casually the Jerome Grande Copper Company, thinking that we might be able to develop on this property some additional ore reserves that would be valuable to the smelter of the Southwest Metals Company. I made a very casual inspection of the surface and from this and my general knowledge of the geological conditions of the District, I felt that the Jerome Grande would merit development by the owners or others but the expense involved in carrying out such development was considerably greater than the Southwest Company felt justified in undertaking.

I had a very pleasant conversation with Mr. Lagstrom on one occasion in St. Louis and have frequently dis-

Dr. D. W. Cox - 2

February 11, 1931.

discussed the situation with Mr. Wycoff and followed the progress of your Company with much interest. I have not seen the mine since the last exploration was carried on a couple of years ago but was given to understand that this was inconclusive and that further work would be necessary in order to either prove or disprove the value of the property.

As you will have noted from the above, I have never studied your situation sufficiently carefully to have any very definite impression concerning the value of your property or the prospects of its becoming a ^{profitable} valuable producer, and I am unable to give you any statement regarding the amount of development which would probably be required or the approximate expense of same.

Doubtless your Company has already had a report from competent engineers and geologists and, if so, I think you should be guided by their advice, otherwise it would seem to me that such a report would be a very necessary prerequisite to any further development or exploration that you might contemplate.

Very truly yours,

GMC: EBH.

M. H. FORDE
LAWYER
STOKES BUILDING
EVERETT, WASH.

February 4, 1931

A. 2/11/31

Mr. George M. Colvocoresses
1108 Luhrs Tower
Phoenix, Arizona

Dear Sir:

X
Through Mr. Carl G. Lagstrom your name has been suggested to me as having inspected the Jerome Grande mining properties at Jerome, and as having an interview with attorney Wycoff of Jerome relative to the property and the concerns of the Jerome Grande Copper Company.

At this time and for some time past I have been interested, as a stockholder, in testing that mine and just now, I am trying to raise, by subscription, money for the purpose of diamond drilling, and I am having some success. I wonder if you will be good enough to write me your honest impression of this property, based on your information and your inspection for the purpose of stating to my fellow stockholders the exact situation.

Can you give us an estimate of the distance we would have to go and the cost required to get probable results?

Anything you may write me would be confidential between us, but I would exhibit it to my fellow stockholders unless you objected. Any information that would help us we would be glad to receive from you.

Very truly yours,

W. C. Cox
DR. W. C. COX

322-23 Stokes Building
Everett, Washington

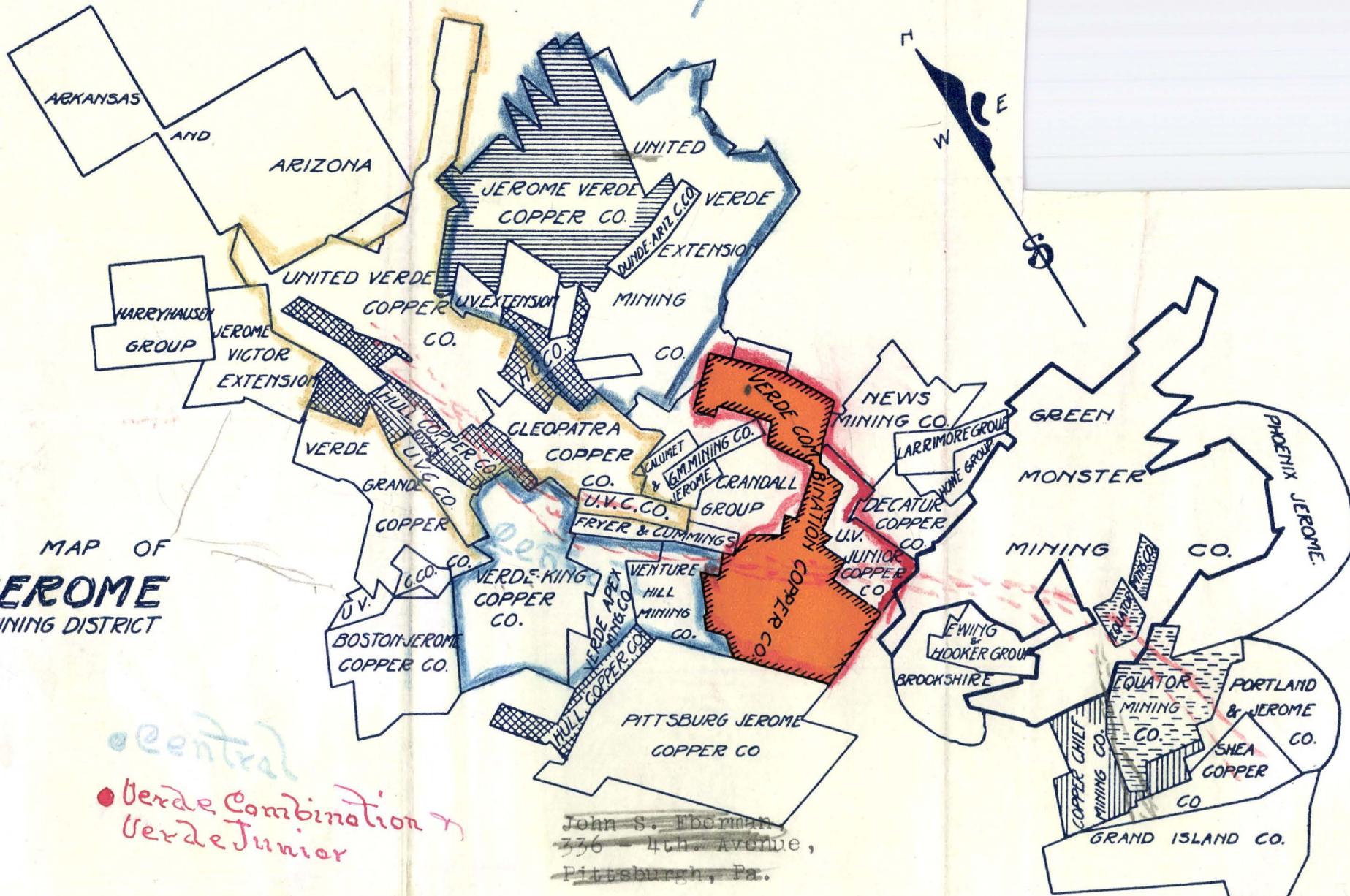
** Clarkdale*

Plumtree

N. Ky.



MAP OF
JEROME
MINING DISTRICT



Central
Verde Combination
Verde Junior

~~John S. Eberhart~~
~~336 - 4th Avenue,~~
~~Pittsburgh, Pa.~~

REPORT ON JEROME GRANDE MINING PROPERTY

LOCATION: Jerome District, - 2 miles by road from town of Jerome on Prescott-Jerome Highway.

CLAIMS: Group consists of 5 patented claims and contains 71-1/3 acres.

OWNERS: Owned by Jerome-Grande Copper Co., Norman F. Wykoff, President.

EXAMINED: By G. J. Harbauer, October 29-31, 1925.

FORMATION

Mainly U. V. Diorite overlaid with sedimentary rocks. A contact of the diorite with quartz porphyry occurs on the East and a contact of diorite and Yavapai Schist occurs near Western end of the property.

The North and South Warrior Fault passed thru the west end of the group and there is a drop of over 200 feet on the west side of the fault with only the limestone series showing on the surface.

The U. V. diorite contact can be traced continuously from the United Verde steam-shovel pit except for a distance of 1200 feet where it is covered by sedimentaries. This diorite forms the hanging wall of the United Verde main ore body and was intruded along the original contact of the Yavapai Schist and quartz-porphyry. In the United Verde mine the diorite hanging wall has a dip of 40 degrees to the Northwest.

In the Jerome Grande workings the contact was encountered in the crosscut driven 570' East from the shaft on the 822 foot level at a distance of 500 feet from the shaft. Connecting this point with the outcrops of the contact gives a dip of about 47° which corresponds fairly closely to the dip in the United Verde mine.

At the contact on the 822 foot level the cross-cut passed from diorite into dark gray jasper and from that into quartz-porphyry with no sign of sulphide minerals.

DEVELOPMENT

The development work consists of a 4 x 7 main shaft located near the South-east corner of the Virginia claim and 350 feet north of the Prescott-Jerome Highway. There are also two tunnels.

The SHAFT which was sunk near western edge of diorite is vertical and is 835 feet in depth, with a cross-cut driven 570' East

on the 822 foot level a distance of 560 feet. Aside from a pump station on the 678 foot level there are no other workings from the shaft.

No. 1 TUNNEL:-

The portal of this tunnel is 160 feet north of the shaft and is on the same level as the collar of the shaft. The tunnel bears N. 83° E. and is 285 feet long. It was started in Yavapai Schist and continues in that formation for about 150 feet from which point it passes thru 50 feet of quartz-porphyry and then continues in Yavapai Schist to the end which should be near the diorite-schist contact. There is no copper mineral showing in this tunnel but the rock is said to have assayed \$5.00 in gold in places. The tunnel runs under the sandstone about 200 feet at a depth of 50 feet below it.

No. 2 TUNNEL:-

This tunnel was started near the west end line of the Tiger Claim, at a point 100 feet above the highway, and runs north-east. It has a cross drift driven along a seam in the formation which parallels the line of contact between the diorite and Yavapai schist. Some native copper was found in this seam, otherwise there was nothing of interest in the 214 feet of work done. The formation was diorite throughout.

PRESENT CONDITION OF WORKINGS AND PLANT:-

The main shaft has caved around the collar and timbers have rotted out and fallen down to the water level, which is about 200 feet below the collar. The two tunnels have caved some at the portals but are in good shape further in.

The hoist house, which is 40 x 44 x 12, needs a new roof and some new iron sheeting on the sides to make it usable.

The blacksmith shop, 16 x 24 x 8 needs new sheeting on sides and roof and the framing shed, 16 x 27 x 8, needs new sheeting on roof and one side.

The two camp buildings are in bad shape and it would cost nearly as much to repair them as to build new ones.

The mechanical equipment was all steam operated and much of it is useless at present.

The hoisting engine, which is an Ottumwa, 10 x 14 duplex, single drum geared steam hoist, seems to be in fair condition and could be converted to a motor driven hoist by fitting a gear wheel to one of the crank discs so as to engage a pinion on a motor. It could stand a motor of at least 125 H.P.

The air compressor is a Rand Drill Co., 2 stage, steam driven, Imperial type 10., and could be driven by a short belt motor drive after being over hauled. It is badly rusted but the air cylinders may be in good shape.

A 4 x 16 Duplex steam driven station pump, a Cameron Sinker and a small boiler feed pump, all of which are badly rusted, comprise the balance of the equipment that may be overhauled and used again.

A mine cage and an ore bucket are usable and the hoisting cable seems to be well greased and free from rust.

There is no head frame or sheave wheel on the shaft.

POSSIBILITIES FOR ORE

Altho the geological conditions are similar to those present in the United Verde Mine and the diorite contact along which the United Verde ore body is found can be traced into the ground owned by the Jerome Grande, yet there are other conditions and circumstances that must be considered in weighing the possibilities of finding ore bodies in this vicinity.

1. The first consideration is whether or not there are favorable surface indications that might reasonably lead to the finding of ore in depth. These would be the presence in the quartz-porphry of a gossan, or leached capping, showing at least some iron, and better yet, some copper stain.

2. Another indication of ore deposition in this section and especially along the diorite contact is a silicification in the quartz porphyry and a development of quartz and jasper which in the United Verde Mine is a marginal phase of the ore bodies, where also are found larger masses of relatively pure quartz between the massive sulphide

bodies and the diorite and where some of this quartz nearly always separates the sulphides from the diorite hanging wall.

According to L. E. Reber - "This jaspery quartz is associated with all three of the schist replacement ore deposits in the Jerome district, particularly in the United Verde where there is probably more of this quartz than in all the rest of the district". "In addition, the great majority of the masses not associated with sulphide mineralization appear to be related either to United Verde diorite or quartz porphyry contacts. Thus it is believed that this jaspery quartz is, in general, a phase of the ore mineralization, but a more wide spread phase than that which developed the bulk of the sulphides."

"The related to the ore deposition, the jaspery masses at the surface, where clearly unaccompanied by gossan indicating important sulphide mineralization, would be very unlikely to show more sulphide matter at depth. This fact has been demonstrated by a good deal of fruitless exploratory work."

Along the diorite-quartz porphyry contact on Jerome-Grande ground is found a zone of silicification in the quartz porphyry with veins of jasper and quartz close to the contact. There seems to be no sign of gossan or copper stain in this siliceous material, however, so, according to Mr. Reber, one cannot expect to develop sulphides in this zone in depth.

The crosscut from the shaft encountered the contact at a point 500 feet from the shaft and passed thru jaspery quartz which did not show any sulphides. The crosscut was continued to 560 feet and was in quartz porphyry at its face.

Aside from an increase in the flow of water and the presence of some iron stain in the rock there were no changes to indicate mineralization and this condition looks unfavorable for finding sulphides in further extension of the crosscut.

The nearest known ore body to the face of the crosscut is at least 2000 feet from it. The Verde Central shaft is 2700 feet East and the United Verde Shaft No. 4 is 3500 feet northeast from this face and it

is 2500 feet to a line drawn between these two shafts which corresponds roughly to the strike of the mineralized zone of this section of the district.

We can therefore draw the conclusion that from a geological standpoint and in the light of the work done on the Jerome Grande ground, one cannot reasonably expect to encounter ore bodies within the Jerome Grande ground by the extension of the crosscut which would reach the end line of the property in 750 feet.

A drift run from the end of the crosscut parallel to the diorite-quartz porphyry contact would reach the north end line of the Harold claim in 1600 feet and the south end line of the Tiger claim in 700 feet.

This gives on the 822 foot level a maximum length of 2300 feet and a maximum width of 750 feet in a triangular area of about 30 acres in which there could be any possibility of striking ore bodies of the character known to the district, and this area amounts to practically nothing at the surface but increases with depth, being limited in greater depth by the dip of the diorite-quartz porphyry contact on the west, which has a dip of about 47° to the west.

Another consideration to be made in regard to possible ore bodies found on the Jerome grande ground would be the possibility of litigation arising from apex suits over an orebody found that might have an apex on the property owned by the United Verde Copper Company on the East. Recent court decisions, however, have favored the discoverer of blind orebodies in depth which have no outcrop and this precedent should apply in this case as no ore bodies have been opened up on the adjoining United Verde claim and I do not think that any strong mineralization has been found on the surface of this claim, the Luck Boy S. Extension.

Were the mineralogical and geological conditions favorable enough to consider the rehabilitation of the Jerome Grande surface plant and mine workings, the question then would arise as to what it would cost to prepare for further development work.

The present condition of the surface plant and shaft has been described, and taking these conditions into consideration, I have

SUMMARY OF ESTIMATE

Repairs to Mine Buildings	900.00
Building new Head Frame	500.00
Remodeling and repairing Mechanical Plant	8,000.00
New Pipe Lines Air and Water	650.00
Unwatering and cleaning out shaft	1,325.00
New electric pump for station (installed)	1,100.00
Retimbering 822' of shaft	7,595.00
New Mining equipment, tools, etc.	2,000.00
Total	<u>\$22,070.00</u>

CONCLUSIONS

As has already been stated, there are no strong indications of mineralization on the surface of the Jerome Grande ground nor even on the adjacent United Verde claims. Then too on the 822 foot level of the Jerome Grande the crosscut passed thru the contact and traversed 60 feet of jasper and quartz porphyry without exposing any sulphides. These two facts would indicate that there are no sulphide bodies in the neighborhood of the contact at this point and this conclusion, together with the fact that the nearest known ore body is over 2000 feet distant, should to my mind discourage further development, especially when the cost of rehabilitating the property is weighed against the possibilities of striking a blind ore body, no indications of which have been found.

These conclusions are further borne out by the similar conditions encountered in the Dillon Tunnel of the Cleopatra and Hull Copper Companies which was started in Hull Canyon and driven in a general north-westerly direction to connect with the Hull shaft sunk in the U.V. diorite on the 1888 claim. This tunnel passed close to the south end lines of the chrome southeastern and the Eureka claims of the United Verde Copper Co. and opened up some good chalcopryrite ore in that vicinity, which was about 750 feet east of the diorite contact. The ore bearing formation was quartz-porphyry schist and sericite schist, the latter extending to the silicified contact zone and containing no copper values beyond the west side line of the Eureka claim.

As the tunnel neared the diorite contact it changed its course to almost due north making a sharp angle with the line of contact and traversing a long belt of the contact zone. In this contact zone much jasper and quartz were encountered but these rocks showed no signs of

copper mineralization, even tho this was in a section lying only from 200 to 300 feet from the United Verde mine workings and ore bodies.

This condition goes to show that the ore zone does not follow the contact zone and that in the United Verde mine the diorite contact was only a favorable place for the concentration and deposition of sulphides from the mineralized belt which extends up to it, and which runs in a southeasterly direction into the Verde Central ground with a strike that forms an angle of 30° with the strike of the diorite contact line. This mineralized belt is too far beyond the limits of the Jerome Grande end line however to offer possibilities that some of it might extend into Jerome Grande ground in depth.

Another unfavorable feature of the Jerome Grande property is the small amount of ground that is included between the line of the diorite contact and the east end lines of the claims, there being almost no area on the surface and only about 30 acres on the 822 foot level which might be considered as possible mineral bearing ground.

The danger of apex litigation arising might also be included as an unfavorable feature in case an ore body was found in depth on the Jerome Grande ground.

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I am indebted to Mr. A. B. Colwell for some of the facts used in this report and also to Mr. Scott who was in charge of the Jerome Grande at the time it was developing in 1908. From Mr. Jas. Hubbard I obtained a description of conditions encountered in the Dillon Tunnel as he was forman for the Hull Copper Company when that work was done.

Having spent over ten months underground in the United Verde mine in 1908 and 1922 I was familiar with the ore occurrence there as well as with surface conditions around that property and was on the Jerome Grande ground when it was operating in 1908.

To Mr. L. E. Reber I have given credit for material taken from his valuable article on the Geology of the Jerome District.

G. J. Harbauer.

caprice

ENGINEER'S REPORT

JEROME GRANDE COPPER COMPANY

By

ALFRED B. COLWELL, Mining Engineer.

1922.

The property of the Jerome Grande Copper Company is located in the Verde Mining District, one mile in a Southwesterly direction from the Town of Jerome. By way of the Jerome-Prescott State Highway, the distance is nearly two miles.

LOCATION Its location is popularly known by its proximity to Walnut Springs, which is one of the sources of water supply for domestic use for the Town of Jerome and the United Verde Mine.

Prior to the completion of the Highway in 1920, this locality was accessible only by trail over the steep east slope of the Cleopatra Mountain and along the U. V. pipe line.

The Highway is a great asset to your property and others in your vicinity. The Verde Central Mines, Inc. delayed operation for several months until it was completed and the development of mines in this part of the District has undoubtedly been retarded many years by its inaccessibility. The Highway traverses your Southern boundary and crosses the Virginia claim within 500 ft. of your main shaft.

CLAIMS AND AREA Your property embraces five claims, as follows: Harold, Virginia, Charm, Tiger and Triangle Fraction, U.S.Sur. No.2463; Total patented acreage seventy-one and one third acres.

The property is bounded as follows:

On the East by the Lucky Boy and Lucky Boy South Extension, both old patented claims belonging to the U.V.Copper Company;

On the South by two unpatented fractional claims, claimed by the Verde Central Mines, Inc. and by the Red Jacket Claim, covering Walnut Spring, owned by the U.V.Copper Company;

On the East and North, by patented claims comprising part of the large acreage in the Western part of the district owned by the United Verde Extension Mining Company.

You are therefore surrounded exclusively by property belonging to the principal operating and producing mines of the District.

The acquisition of property in this part of the camp by the U. V. and U.V.Extension Companies is not accidental.

The former Company and the Columbia Copper Company, controlled by Senator Clark, had the choice of selection in the early history of the camp and you will find their ground dotting the map in isolated groups wherever there is a particularly good surface showing.

The U.V.Extension Company started with a group of five claims on the west edge of the District and within the last two years has acquired the West United Verde Group and two claims of the Michigan Verde, their holdings now comprising about three hundred acres on the west rim of the District.

PROXIMITY TO WELL KNOWN MINES. In stating that your property is contiguous to the U.V.Copper Company, I do not refer simply to one of its detached claims, but to the U.V.Mine itself.

From the Northeast corner of the Harold Claim it is only 1800 feet in a direct line northeasterly to the No.4 shaft (U.V.Co.) the intervening ground being owned by the Hull Copper Company.

(Controlled by Senator Clark)

The present working shaft of the adjoining Verde Central property is about two thousand feet from your ground and the mouth of its No.4 Tunnel is less than 500 feet distant in a Southerly direction.

GEOLOGY OF JEROME DISTRICT The main geological features of this District are well known and need not be entered into in detail at this time; however, the main points should be mentioned in order to show the conditions existing at your property and its relation to adjoining mines.

Without attempting to start at the base of the geological column it is sufficient to say that the Yavapai shist and greenstone comprise the oldest formations, the former being a name given to a complex of sediments and intercalated volcanic beds, which have been folded into tight vertical folds. This formation covers a large part of Southern and Eastern Yavapai County and is the country rock of many mines and prospects of the Mayer, McCabe and Turkey Creek districts.

In the Northern end of this belt, in the Jerome District the original Yavapai shists have been largely displaced by later intrusion of Quartz Porphyry, which is held by geologists to be an outline phase of the Bradshaw granite intrusion which is the conspicuous feature of the Southern part of the County, and forms the backbone of the Bradshaw range.

The apparent center of the quartz porphyry intrusion and its most noticeable outcrop in this District is that of Cleopatra Mountain, the comb-shaped peak rising West of the Town of Jerome.

The formations noted, to wit: the greenstones, Yavapai shists complex and quartz porphyry probably constitute 90 per cent of the free Cambrian surface exposed in the Jerome District.

Following the quartz porphyry intrusion, there was a lesser and more localized intrusion of diorite, the most noticeable outcrop being in the vicinity of the U.V. and Jerome Grande Mine, which was followed by later intrusions of similar magma, but in the form of narrow dikes, cutting all of the pre-Cambrian formations and quite generally distributed throughout the District.

The succeeding steps in the geological history were the erosion of the great uneven mass of pre-Cambrian rocks to an approximately level surface, its gradual sub-mergence under the sea and the accompanying formation of shallow water conglomerates and sand-stones, followed by deposition of lime and silts as the waters deepened.

In the later ages the lime-stones were buried under surface flows of volcanic lavas, remnants of which capped the tops of Mingus, and Woodshute Mountains at an elevation of seven thousand feet above sea level.

FAULTS The next period was one of readjustment, probably far reaching in cause and effect, but manifest in this District by a subsidence of the overloaded strata on each side of which is the Black Hills Range, resulting in a series of faults of varying degrees of magnitude.

The main fault runs northwesterly and southeasterly along the easterly edge of the District and has a vertical displacement

estimated at 1600 to 1700 feet.

The Haynes fault runs in a more westerly direction, intersecting the main fault in the vicinity of the United Verde Mine.

From this vicinity also the Warrior or South-Haynes fault runs in a southwesterly direction, forming roughly the westerly boundary of the District.

The west side of the Warrior fault is estimated to drop from 300 to 350 feet.

In addition to those mentioned, there are a number of lesser faults, not so well known, which probably have much to do with the relative position of the formation in their immediate vicinity.

UNITED VERDE ORE BODY The United Verde ore bodies are masses of iron-copper sulphides of unusual size and persistency. They were formed in pre-Cambrian times, presumably after the main diorite intrusion and of course before the deposition of sediment and the later faulting. They are situated in the quartz-porphyry where favorable structural conditions permitted replacement of the schist by the sulphide minerals.

The diorite intrusions which forms the west wall of the sulphide mass has a dip of 40° to 50° to the west and is supposed to have been instrumental in confining the sulphide solutions to the vicinity of its contact with the quartz-porphyry.

JEROME GRANDE TOPOGRAPHY The Jerome Grande property lies 1800 ft. to a half mile in a southwesterly direction from the U.V.Mine. It is located on a spur of the main range, rising 400 or 500 ft. above Walnut Gulch. The crest of the ridge is overlaid by the blanket of sedimentary formation which is also noticeable on the point of the ridge above the U.V.workings.

Under the sedimentaries the rusty surface of the pre-Cambrian can be seen on the hillsides to the bottom of Walnut Gulch. At the west side of the property the pre-Cambrian can be seen only to the Gulch, which marks the approximate position of the Warrior fault, the surface from here westward being all in limestone.

GEOLOGY Within the lines of the Jerome Grande property the following pre-Cambrian formations are exposed:

- 1 Yavapai Schists
- 2 United Verde Diorites
- 3 Quartz Porphyry

1 YAVAPAI SCHISTS.

The formation is seen in a narrow north and south belt along the west edge of the property. It forms a contact with the United Verde Diorite on the east and is cut off on the west by the Warrior fault, which brings the lime-stones down in contact with the schist.

It is made up largely of light colored, silicious schists apparently of sedimentary origin, which are considerably disturbed in

places by the diorite intrusion, but which, in the main, have a northerly and southerly strike.

In the No.1 Tunnel, north of the shaft, they appear in thin vertically laminated beds, alternating with more massive, siliceous beds, the thin bedded sections being decomposed and impregnated with hematite. Samples from this tunnel are said to have assayed \$7.00 in gold.

2. UNITED VERDE DIORITE.

This is conceded to be the same diorite intrusion which forms the hanging wall of the United Verde ore body.

It appears from under the sedimentaries on the south slope of the ridge and can be followed around the west slope to above the main shaft. Going south towards the Highway it apparently terminates on Jerome Grande ground or else plunges down under Walnut Gulch.

The east side of the diorite which is in contact with the quartz-porphyry is partly on your ground and partly on the Lucky Boy South Extension Claim adjoining. It can be followed northward until it disappears under the sedimentaries for a short distance and then can be followed in the same general direction on to the United Verde Property, to where it is cut off by the Haynes fault. In the United Verde Mine workings it is said to have a 40° to 50° dip to the northwest and to form an impervious hanging-wall, under which the sulphide ores have been confined at the contact with quartz-porphyry.

3. QUARTZ-PORPHYRY

A well known geologist is quoted as stating that he considers the Cleopatra Mountain quartz-porphyry intrusion to be the source of copper mineralization of the district, forming on its northwest flank the United Verde ore body and on its east flank the United Verde Extension chalcocite deposit of unusual richness. It may be added also that the Hull Tunnel penetrating the base of the Mountain from the south side is in ore at several points and that the Verde Central Mine in the same porphyry is developing a mineralized area of great promise.

Your property gets a portion of the diorite-quartz-porphyry contact on the east side. The quartz-porphyry is related and directly traceable to the main mass of Cleopatra Mountain.

The contact shows numerous lenses of jasper and exhibits well marked schistosity in a general northerly and southerly direction.

DEVELOPMENT. The development work on the Jerome Grande Property consists of the main shaft near the southeast corner of the Virginia Claim and two surface tunnels of little importance.

The shaft and equipment represents an expenditure of \$100,000.00

The shaft is 4 x 7 ft., 838 ft. deep; timbered throughout.

At the depth of 678 ft. there is a 45 foot pump station, in which during the operation of the property there was installed a Knowles Duplex Pump. At the depth of 822 ft. there is a station from which a cross-cut was run 560 ft. in a direction about south, 70° east.

The above information is obtained from Mr. J.C.Scott, the

present secretary of the Company, who was superintendent during the operating period from January first, 1907, to February 13, 1909.

The shaft at the present time is filled with water to about 200 feet below the surface.

TUNNELS The No. 1 or Virginia Tunnel is situated about 200 feet north of the Main shaft. It runs easterly 285 feet which carries the face of the tunnel well under the sand-stone outcrop.

NO. 2 The other tunnel is situated 800 feet south of the main shaft, just above the Jerome-Prescott Highway. It is said to have run 200 feet in a northeasterly direction. This tunnel has caved at the entrance and is inaccessible at the present time.

During the period of operation the mine was well equipped with steam boiler and plant, geared hoist, compressor, pumps, etc., suitable buildings for engine house and blacksmith shop, and several frame bunk houses. Since the close down in February 1909 there has been no work done except slight repairs to the shaft. The mine buildings and machinery have deteriorated until they are of little value.

I am told that the shaft was sunk in good ground and is probably in excellent condition, though it may have to be retimbered above the water level.

RESULTS FROM DEVELOPMENT The main shaft is sunk near the west edge of the intrusion of United Verde Diorite. As the diorite dips westerly the schist contact is still further west from the bottom of the shaft, possibly 400 ft. or more. Inasmuch as no cross-cuts were run west of the shaft there has been no information secured relative to the Yavapai Schist or what mineral showing they may contain.

The east cross-cut which was extended 560 ft. I am told was in diorite until near the end. The following memorandum is copied from Supt. Scott's records of February 1909:

"Drove 44 ft. during the month of February to 13th inst. and the cross-cut is now in 560 ft. Formation cut through since about Jan. 25th, is in the main jasper and the face of the level is now in that formation, bearing more or less hematite iron in the seams.

Water inflow increased in the level from about 1.1/2 to 2/1/2 miners inches at present."

This record is authentic and conveys much valuable information about a cross-cut which is 600 ft. under water at the present time. Assuming the rate of progress in the cross-cut to have been four feet per day from January 25th, to February 13th, it was probably driven 68 ft. in the jasper. I believe this to be the side of the diorite and the contact between it and the quartz-porphry. The added information "bearing more or less hematite in seams," and the note on the increase of water are both important as showing approaching mineralization and a sufficiently open formation to permit the free circulation of water.

I have recently talked with Mr. DeZolt, who was foreman under Mr. Scott when the cross-cut was run. He tells me that the iron impregnated seams in the jasper were standing nearly vertical and that there were several stringers an inch or more in width of chalcopryrite and that in other places the quartz was stained green.

Mr. Scott tells me also in regard to the formation in the cross-cut that while all in diorite or a similar looking rock, that in some places it showed a liberal sprinkling of copper sulphide, probably chalcopryrite.

The No.1 Tunnel heretofore mentioned is chiefly noted as showing an extremely schistose structure and presence of hematite. The formation is composed of this bedded silicious schist alternating with more massive beds also silicious. I assume that it is in the Yavapai schist formation not far from the diorite contact.

The Tunnel No.2 was run by Mr. Scott personally and other mining had been done on the property. His attention was attracted to the locality by a small showing of greencopper carbonates on the surface. He later found a soft gauged seam a few inches in width which he followed into the hill, and from it mined two or three wheel-barrow loads of soft material carrying fragments of native copper.

I have before me the report of a Colorado mining engineer, dated March 1st, 1906, in which reference was made to a cross-drift 50 ft. long driven on a vein 50 or 60 ft. back of the face of the tunnel. He also stated:

"Both sulphide and carbonate ores have been found in the vein, one assay from a selected sample of the first named class (sulphide ores) gave returns of 51% copper with some gold, several hundred pounds of ore showing native copper were also found."

I believe the formation throughout the length of the tunnel was all soft decomposed, dioritic material and it is probably not far from the contact of diorite and Yavapai Schist formation.

ADJOINING DEVELOPMENT While there is no further development within the lines of the Jerome Grande property, there is important work under way in the same formation by the Verde Central Mines, Inc.

This is known as their No.4 Tunnel, situated on the Gold Hill claim about 400 ft. southeast of your Texas claim. This tunnel runs in a southeast direction several hundred feet and is at or near the contact between quartz-porphry and Yavapai Schist. Very little copper mineralization has been disclosed but the drift is largely in friable quartz, heavily impregnated with iron oxide and the conditions are looked upon as extremely favorable and indicative of the presence of copper ore at greater depths.

DISCUSSION In making the attempt to determine the probability of commercial ore being developed on your property, it would seem logical to compare the geological rock formation and structure as we find them, with the conditions existing in and around other mines of proven value. Very few geologists are bold enough to say that such and such conditions will make an ore body, unless they can point to some specific instance where it actually has been accomplished.

Generally speaking, the formation of an ore body requires a source of mineralization and an environment favorable to the deposition and retention of the mineral.

Whether the United Verde and U.V.Extension ore mineralization was derived from the diorite or the quartz-porphry or from more distant sources, I am unable to say. The fact that they exist today is because the copper bearing solutions found a formation chemically and structurally suited to the deposition of copper minerals and the further fortuous circumstance that they were buried too deep in the pre-Cambrian formation to have been entirely eroded and dissipated.

I have previously stated that the formation exposed on your property are the same that exist in the vicinity of the United Verde Mines. This is also shown on a map published in the "Geology and Ore Deposits of Jerome District," by Louis E. Reber, Geologist United Verde Copper Co., to which publication I am indebted for much valuable in-

formation. The diorite intrusion in which your main shaft is sunk, is not only a similar diorite, but is the same mass which forms the hanging-wall of the United Verde deposit.

Likewise the diorite-porphry contact cut in your east cross-cut is the same contact in which the United Verde ore is found a short distance farther north.

You have in addition on the west side of the diorites a considerable exposure of the sedimentary quartz schist of the Yavapai Schist formation, which is also shown on Mr. Reber's map before referred to. This schist formation undoubtedly offers structural conditions favorable to the deposition of copper mineral.

The fact that the surface of your property does not show a cropping of ore nor any extensive iron capping, does not disprove its existence at greater depth. A surface cropping is only an accident of erosion. The collar of your shaft is 400 ft. higher than the No. 4 shaft of the United Verde and it is possible that the outcrop of the United Verde at the elevation of your ground may have been too insignificant to attract attention.

The progressing development of the Verde Central Mines is proving a revelation to many who have held fixed ideas as to surface indications and what the surface of a mine should look like.

While it is not claimed that the Verde Central is a proven mine, it has at least demonstrated that extensive mineralization and favorable structural conditions may exist beneath a barren and unfavorable looking hillside. It should be remembered also that at least 80% of the pre-Cambrian surface of the Jerome Grande property is effectually hidden by the capping of limestone and conglomerate beds.

It does not require any great stretch of the imagination that if the fifty or more acres of sedimentary blanket could be removed over night, there might be revealed a mineralized cropping, the presence of which is not now suspected.

On the remaining 20% of the surface, the indications, as far as there are any, are favorable. The iron impregnated schist in No. 1 Tunnel and the reported native copper and copper sulphides developed in No. 2 Tunnel may be taken as outpost of deeper seated mineralization.

CONCLUSIONS AND RECOMMENDATIONS While I am unable to state that a body of ore exists in any specified point on your property, I have no hesitancy in stating that at more than one point the conditions are extremely favorable, being similar to those under which the United Verde ore bodies have been formed, and moreover, you have definite evidence that mineralization has taken place to a limited extent

In my opinion your property has exceptional merit and warrants further and extensive development.

In planning such work, the elevation of your surface above the other mines of the District should be kept in mind, and means taken to overcome this handicap by securing greater depth below your surface.

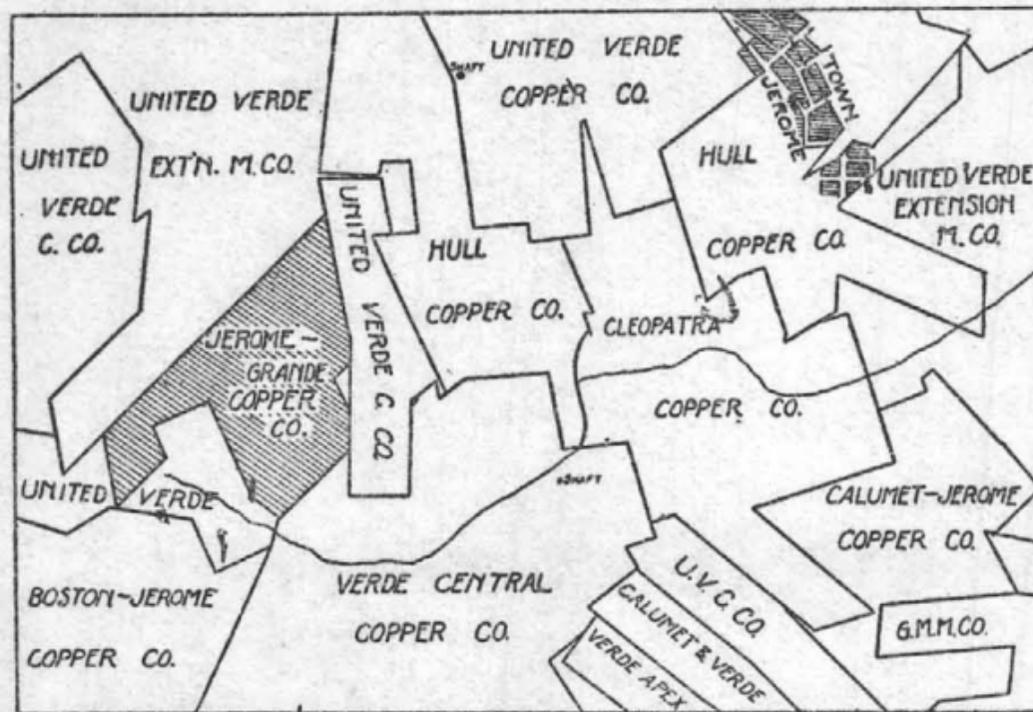
If specific recommendations are desired at this time, I would suggest the following: that the shaft be un-watered and repaired where necessary; that drifts be run northerly and southerly

along the diorite-quartz-porphyry contact, where it was cut near the end of the cross-cut; that diamond drilling be done from the main cross-cut and the new east drifts, in such a way as to prospect the ground at least 500 feet deeper and in the vicinity of the diorite-quartz-porphyry contact. The nature of further development to be determined by the results of the preceding work.

Alfred B. Colwell, E.M.

Jerome, Arizona, February 27, 1922.

OFFICERS
NORMAN F. WYKOFF, PRES.
GEO. E. McMILLAN, V. PRES.
J. C. SCOTT, SEC.



DIRECTORS
NORMAN F. WYKOFF **WM. HALES**
GEO. E. McMILLAN **J. C. SCOTT**
F. E. GASSAWAY

JEROME GRANDE COPPER CO.

JEROME, ARIZONA

BOX 836

Jerome Grande Copper Co.

Jerome, Ariz., Feb., 1918

Jerome Grande Copper Co. is not an ordinary proposition. It is something different, standing on its own merits, and no camouflage is wanted.

The property embraces five patented claims, situate on the south side of Smelter Hill, one mile from Jerome, and its northern boundary line is within 2000 feet of the main workings of the big United Verde Copper Co., on the opposite side of the same hill.

Verde Grande Copper Co. formerly owned the property, and in its operations expended over \$100,000 in what was then a substantial, modern mining plant, and in development work. Its shaft was located with a view to accessibility, at a point from which every part of the property, especially a large mineralized dike, could be explored at depth. This shaft—two compartment—was sunk to a depth of 838 feet, and a crosscut was run out from it 560 feet toward and within about 400 feet of the dike, when the treasury funds were exhausted and the company was forced to close down. That was in 1909, since which the property has been idle.

In the course of that development some ore was encountered in both the shaft and the crosscut, at different places, and native copper in bunches was extracted from a small fissure vein, on which a tunnel was previously driven in over 100 feet, but ore in commercial body has not been developed.

In 1916 the property was sold by the sheriff to satisfy bonded indebtedness and in 1917 Jerome Grande Copper Co. was organized and bought the property from the former bondholders, giving one-half of its entire capital stock in full payment for it.

While the fissure vein, above referred to, is regarded worthy of development at greater depth, the management is so confident of success in the exploration of the dike that the first work planned is to drive the crosscut into it. Miners working underground in our big neighbor say there is every reason to believe that important copper ore bodies exist in the Jerome Grande property. At any rate, the property is in mighty good company, and nature has put up a big bluff if there is not a mine within its boundaries.

The old steam machinery on the property is out of date and it is proposed to replace it with the more economically operated electric plant at estimated cost of \$18,000. It will cost, probably, \$2000 to repair the buildings, \$2000 to unwater the underground workings and approximately \$20,000 to complete the crosscut. Making due allowance for incidentals and drawbacks, \$50,000 is a liberal estimate of the cost of the work planned, with almost every chance of failure to open a mine eliminated.

Arizona is truly a land of opportunity. In copper alone, according to preliminary estimates of the Geological Survey, the state again went over the top in the value of its output and produced over 29 per cent of the entire product of the United States in 1917. Hundreds of small fortunes have been made the last few years, to say nothing of the larger ones, and the Jerome District continues to lead in this period of great expansion.

Jerome Grande owns, free and clear, the last of the most centrally located inside properties in the Jerome District to be financed, and its first allotment of stock is now on sale at 25c per share as long as it lasts. No matter how it is viewed, as an investment or a speculation, the opportunity of this chance is at once self-evident.

J. C. SCOTT, Secretary.

be eager to obtain every share of stock that you possibly can handle, as the **SPLENDID PROFIT PROSPECTS** are self-evident.

Our Plans and Purposes

It is the intention of this company to dispose of a limited allotment of its stock in order to continue intensive development of this property in the confident expectation that it will earn **LARGE DIVIDENDS** in the very near future.

Every intelligent man and woman, ambitious to lay the foundation for a comfortable income should recognize in our offer a **PROFIT OPPORTUNITY** of more than ordinary worth. Our splendid location, the development already accomplished and the splendid indications for rich ore seem to warrant development on a large and rapid scale, and the unqualified support and recommendation of practical mining men and geologists familiar with this district should afford convincing proof that this **IS** a proposition of **REAL MERIT**. Therefore, we feel that you will be interested in learning how **YOU** may profit with us.

The

Jerome Grande Copper Company

Capitalization \$1,000,000

All Common Stock.

Par Value 50 cents Per Share.

Offers You

AN UNUSUAL OPPORTUNITY TO SHARE IN THE LARGE POTENTIAL PROFITS WE EXPECT THROUGH THE PURCHASE OF ITS STOCK AT ONLY $37\frac{1}{2}$ CENTS PER SHARE IN UNITS OF 100 SHARES EACH—\$37.50 PER UNIT—EITHER FOR CASH OR ONE-FIFTH DOWN AND THE BALANCE IN FOUR EQUAL MONTHLY INSTALLMENTS.

You now have our offer in its entirety. You have learned the *facts* about this proposition without any attempt whatever to exaggerate. Every statement is the plain, unvarnished truth. We have reason feel *sure* that the copper is there in large profitable quantities.

Therefore, you should recognize this as a **REAL PROFIT PRIVILEGE**. Stock at less than par—only \$37.50 per unit of 100 shares—either for cash or one-fifth down and the balance in four equal monthly installments should be too good an opportunity to pass up. The allotment is limited and foresighted investors who learn of this chance for **LARGE DIVIDENDS** may be expected to **GRASP THIS OPPORTUNITY** while they can. So we urge that you convince yourself of the unquestioned merits of our offer and then **ACT AT ONCE** for prosperity. *Invest for Profit—AT ONCE*. Use the attached **ORDER FORM** for all the shares you can conveniently handle and **MAIL IT NOW**.

ORDER FORM

Date.....

Jerome Grande Copper Co.,
Box 836, Jerome Arizona.

Gentlemen:

Enclosed find \$..... in full—part payment for units of stock in your company at less than par, \$37.50 per unit of 100 shares each.

In case of partial payment, the above amount is one-fifth the total, the balance to be paid in four equal monthly installments.

Please send certificate of stock, reports concerning the progress of the company and all Dividend Checks to—

Name.....

Address.....

City..... State.....

CONSIDER THESE SPLENDID PROFIT POSSIBILITIES

Secrets of Success

Persistent people begin their success where others end in failure. There you have the one big fundamental truth—successful people do not give up; they are ever on the alert to meet opportunity at least half way.

The foundation for success is thrift; and thrift is the application of thought to money. It takes brains to succeed, a planning out of how to make your savings work for you to your greatest profit, a willingness to take a reasonable chance.

Success beckons to none except those on the move. In other words, you must recognize success when you see it—be willing to meet it half way, be prepared to grasp it.

You are now presented with an Opportunity. It is a mining proposition. It is worthwhile for you to learn some **FACTS** about mining in general. Mining is one of the safest and most profitable industries in the country. The authority for this statement will convince you.

The

Jerome Grande Copper Company

A Corporation

PRESENTS

For Your Approval

An Unusual Opportunity to Share in the Large Potential Profits that are Confidently Expected from a Copper Mine in a Proven Productive Territory.

Copper Fortunes have been among the Largest Produced in the Mining Industry. Copper is again Coming into Its Own. Its worth is Recognized. The Demand for Copper is basic—it is one of the most essential metals from an Economic Standpoint. It is again on the Boom and should continue to Increase In Value.

For a Path to Prosperity — Read this Folder Full of Facts

Renting Money Versus Investing It

Renting out money at 4% never has made anybody rich and it never will. It is true that rented money has often made the fortunes of those who borrowed it and then invested it but it has never made the 4% man wealthy.

How could money at 4% ever be expected to make a person wealthy when you consider that 4% of \$1,000.00 is only \$40.00 and in ten years would earn only a little more than \$400.00, not enough to live on for a single year. The future does not look very encouraging for the man who can see nothing better than to rent his savings at 4%.

Now consider the fortunes that have been made in this country. Ford, Rockefeller, Carnegie, Harriman, Edison, Bell, Long—all laid the foundation for their great success by intelligent investment in worthy projects. These men were not content to rent their money. They made it work for them. They INVESTED it.

Investigate With an Open Mind

It was Jay Gould who taught a wonderful lesson when he explained the secret of his success. "I make up my mind on facts," he said, "and I would rather look over a hundred investments that I don't want than overlook one that I do want."

It is significant that he possessed one of the largest fortunes ever made in America. His plan of always having an open mind earned for him a great success. You now have an opportunity presented to you for your consideration, and it is very possible that your entire future may easily be made better, more prosperous—and happier—if you make the right decision. Study the facts carefully. Give the matter your full, undivided attention and when you fully make up your mind, ACT without unnecessary delay.

Invest For Profit

Ambitious men and women who have studied the lives of our great successful men—those who have won fame and fortune—have learned that the modern success slogan for those who would achieve Financial Independence is—*Invest For Profit*. It is a slogan which every person *must* adopt and *act upon* in order to rise above the ranks of Financial Mediocrity. *Invest for Profit* is the motto for today for those who in all probability will possess the fortunes of tomorrow.

The reason you are considering this proposition is because you want to make more money. You feel that you have the courage and determination, the good judgment to lay the foundation for a comfortable income.

If you will carefully investigate this proposition, we believe that you should come to the conclusion that this is your opportunity to *Invest for Profit*. You know that great fortunes have been made in the mining industry and that thousands of people enjoy comfortable incomes in the form of dividends from their mining stock. And statistics prove that the mining industry is one of the safest because of its high average of successes and one of the most profitable in the country. Therefore, as you read the facts in the folder, it should be well worth while to decide whether This Offer is not your opportunity to *Invest for Profit*.

Mining as an Investment

One hears so many conflicting remarks about the business of mining that it is rather hard to determine, at times, just who speaks with authority and who does not. Often it appears practically impossible to distinguish between authentic news and mere rumor.

Therefore, positive facts, from recognized authentic sources, about the mining industry should be welcomed by every intelligent man and woman in the country because mining is one of the basic, most essential industries in the entire nation.

Mining as a business is one of the *safest* industries in the world. In fact, mining ranks over twice as high in average of successes as general merchandise, manufacturing or farming. And as *authority* for this statement, we refer you to Dun's and Bradstreet's, recognized as the two greatest, most dependable commercial rating companies in the world.

Now consider Mining from the standpoint of average profit and we cite the United States Government as authority. The average net return on mining is greater than that of railroads, national banks, insurance, manufacturing or lumber.

It is well to keep these facts before us when considering a mining proposition in order that we may investigate with an open mind as Jay Gould always did.

Copper Mines Profitable

Copper has long been recognized as one of the most profitable branches of the mining industry. Immediately after the World War and because of an enormous surplus which was then thrown upon the market, Copper suffered a period of deflation. Consequently, many of the largest copper mines curtailed their output and, beginning early in 1922, the industry began to become more active. Large amounts of the surplus copper were exported to England, France and Germany and now the indications are that Copper is again entering on the boom stage which may be expected to continue for many years.

There are many reasons why copper has proved so profitable and why it should yield enormous profits for untold years to come. In the first place, Copper is a most essential metal. In this electric age, Copper has become one of the widely used metals in the world. The literally millions of miles of copper wire, cable, etc., and the increasingly heavy demands for additional supplies of copper for transmission purposes is only one phase of the heavy demand. Copper is an important item for the millions of automobiles which traverse our highways and the number is increasing annually. Then, too, the rust-proof qualities of copper make it the ideal metal for various manufacturing and industrial purposes. The failure of many so-called copper substitutes and the publicity given the merits of copper through national advertising has created a demand and resulted in an upward trend in the market which makes this a most opportune time to *invest for profit* in copper mines.

A Splendid Enterprise

It is our sincere belief that the Jerome Grande Copper Company property represents one of the greatest possibilities for LARGE PROFITS now open to the investing public.

The Jerome Grande Copper Company owns 71 acres of patented lands in the famous Verde Mining District with the United Verde, one of the world's greatest and most productive mines, which has distributed over \$60,000,000 to its stockholders, adjoining us on one side, and the Verde Central, the biggest Arizona discovery of nearly a decade, on the other. In fact, it would be hard indeed to imagine a more desirable location than our property, surrounded as it is on all sides by property of the three leading copper companies of the district.

Furthermore, this property of the Jerome Grande Copper Company is already partially developed. We have a shaft 838 feet in depth with 560 feet of a crosscut already run toward a big schist zone. We have a *good mineral showing* at the point of contact of diorite and quartzporphyry in the crosscut near its end and our engineer and other experts who recently inspected this property are unanimous in strongly recommending deeper development.

In addition, we have several hundred feet of prospect work in two tunnels, one of which shows gold values in a schistose formation of \$7.00 per ton; in the other we have uncovered a small fissure vein carrying native copper but have not yet developed ore in shipping quantities. In brief, we have three most attractive indications of rich ore which should assure LARGE DIVIDENDS when further developed.

Another important item of interest to every foresighted investor is that this company has A PERFECT TITLE to the land and *equally important*, the Jerome Grande Copper Company has NO INDEBTEDNESS. Therefore, profits which may be developed by this company do NOT go to pay off any indebtedness but will be distributed among our stockholders.

Mining men who have had years of experience in this particular territory all agree that this property offers every indication for a WONDERFULLY PROFITABLE MINE. Situated as it is between the rich old-time producer and the lately developed mine with admittedly valuable property on still another side, it stands to reason that these 71 acres *should* contain extremely rich copper.

The location of this property is especially advantageous from yet another standpoint. It is only one and a half miles southwest of Jerome and on the highway to Prescott, Arizona. This makes it easy of access and also insures splendid shipping facilities.

The president of the company is Norman F. Wykoff, leading attorney at Jerome and president of the Bar Association of Yavapia County. J. C. Scott is secretary and treasurer and the other directors are Geo. E. McMillan and F. E. Gasaway, merchants of Jerome, and Wm. Hales, a retired manufacturer of St. Louis. These men enjoy an enviable reputation for integrity and business ability and may be depended upon to conduct the affairs of the company in the best interests of every stockholder.

Right at this point, we want to emphasize that this proposition will bear the light of careful investigation. Any additional information you may desire will be gladly furnished, and, if you can arrange to visit and see for yourself what a wonderful proposition this is, we are confident you will

Jasper, Indiana,
March 9, 1925.

Mr. G.M. Colvocaresses,
Humboldt, Arizona,

Dear Sir:-

I received your letter of the 3rd inst. and see that I was mistaken in my guess that you were the party behind the Jerome-Grande Copper Co. option.

You say in your letter that you cannot find the property of that company on the map. I am enclosing a circular which was sent out from the office in 1918; also the map as reproduced on our letterhead, so you can see where the property is located.

I think, after you read this prospectus, you will be more interested in the property. If you can take a trip to Jerome and investigate it, I think you will find that everything is true.

I was down in Jerome in 1917 for 10 weeks, re-organizing the present company, and I interviewed several old miners who were working in the United Verde mine for 20 years or more; they all told me that we had the best prospect in that district, and that they took ore out from the same level on the other side of the hill and that they would be sure of striking ore in our property.

Our five claims cover 71 1/3 acres of land. The boundary line on the north is the United Verde mines, on the west by the United Verde Extension, on the east by the Hull property, for controlling interest in which, Senator Clark paid \$1,000,000. On the south is the Verde Central, and the Jerome-Prescott highway runs over the lower part of our property, about 200 feet from the shaft.

I wish you would investigate this property when you go to Jerome; if I can be of any assistance to you, do not hesitate to call on me. I would be pleased to have you write me before you visit Jerome. I will write our president so he can show you all there is to see on the property. We are anxious to see a large company get a hold of the property and develop it. I think our company will make you a very liberal proposition if you are interested.

Thanking you very much for your kind letter, I am

Yours Truly,

Carl G. Lagerstrom

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REPORT ON JEROME GRANDE MINING PROPERTY.

- LOCATION: Jerome District, - 2 miles by road from town of Jerome on Prescott-Jerome Highway.
- CLAIMS : Group consists of 5 patented claims and contains 71-1/3 acres.
- OWNERS : Owned by Jerome-Grande Copper Co., Norman F. Wykoff, President.
- EXAMINED: By G. J. Harbauer, October 29 - 31, 1925.

FORMATION.

Mainly U.V. Diorite overlaid with sedimentary rocks. A contact of the diorite with quartz porphyry occurs on the East and a contact of diorite and Yavapai Schist occurs near Western end of the property.

The North and South Warrior Fault passed thru the west end of the group and there is a drop of over 200 feet on the west side of the fault with only the limestone series showing on the surface.

The U.V. diorite contact can be traced continuously from the United Verde steam-shovel pit except for a distance of 1200 feet where it is covered by sedimentaries. This diorite forms the hanging wall of the United Verdemain ore body and was intruded along the original contact of the Yavapai Schist and quartz-porphyry. In the United Verde mine the diorite hanging wall has a dip of 40 degrees to the Northwest.

In the Jerome Grande workings the contact was encountered in the crosscut driven 570' East from the shaft on the 822 foot level at a distance of 500 feet from the shaft. Connecting this point with the out-crops of the contact gives a dip of about 47° which corresponds fairly closely to the dip in the United Verde mine.

At the contact on the 822 foot level the cross-cut passed from diorite into dark gray jasper and from that into quartz-porphyry with no sign of sulphide minerals.

DEVELOPMENT

The development work consists of a 4 x 7 main shaft located near the South-east corner of the Virginia claim and 350 feet north of the Prescott-Jerome Highway. There are also two tunnels.

The SHAFT which was sunk near western edge of diorite is vertical and is 835 feet in depth, with a cross-cut driven 570' East on the 822 foot level a distance of 560 feet. Aside from a pump station

on the 678 foot level there are no other workings from the shaft.

NO. 1 TUNNEL:-

The portal of this tunnel is 160 feet north of the shaft and is on the same level as the collar of the shaft. The tunnel bears N. 83° E. and is 285 feet long. It was started in Yavapai Schist and continues in that formation for about 150 feet from which point it passes thru 50 feet of quartz-porphyry and then continues in Yavapai Schist to the end which should be near the diorite-schist contact. There is no copper mineral showing in this tunnel but the rock is said to have assayed \$5.00 in gold in places. The tunnel runs under the sandstone about 200 feet at a depth of 50 feet below it.

NO. 2 TUNNEL:-

This tunnel was started near the west end line of the Tiger Claim, at a point 100 feet above the highway, and runs north-east. It has a cross drift driven along a seam in the formation which parallels the line of contact between the diorite and Yavapai schist. Some native copper was found in this seam, otherwise there was nothing of interest in the 214 feet of work done. The formation was diorite throughout.

PRESENT CONDITION OF WORKINGS AND PLANT:-

The main shaft has caved around the collar and timbers have rotted out and fallen down to the water level, which is about 200 feet below the collar. The two tunnels have caved some at the portals but are in good shape further in.

The hoist house, which is 40 x 44 x 12, needs a new roof and some new iron sheeting on the sides to make it usable.

The blacksmith shop, 16 x 24 x 8 needs new sheeting on sides and roof and the framing shed, 16 x 27 x 8, needs new sheeting on roof and one side.

The two camp buildings are in bad shape and it would cost nearly as much to repair them as to build new ones.

The mechanical equipment was all steam operated and much of it is useless at present.

The hoisting engine, which is an Ottumwa, 10 x 14 duplex, single drum geared steam hoist, seems to be in fair condition and could be converted to a motor driven hoist by fitting a gear wheel to

one of the crank discs so as to engage a pinion on a motor. It could stand a motor of at least 125 H.P.

The air compressor is a Rand Drill Co., 2 stage, steam driven, Imperial type 10., and could be driven by a short belt motor drive after being overhauled. It is badly rusted but the air cylinders may be in good shape.

A 4 x 16 Duplex steam driven station pump, a Cameron Sinker and a small boiler feed pump, all of which are badly rusted, comprise the balance of the equipment that may be overhauled and used again.

A mine cage and an ore bucket are usable and the hoisting cable seems to be well greased and free from rust.

There is no head frame or sheave wheel on the shaft.

POSSIBILITIES FOR ORE:

Altho the geological conditions are similar to those present in the United Verde Mine and the diorite contact along which the United Verde ore body is found can be traced into the ground owned by the Jerome Grande, yet there are other conditions and circumstances that must be considered in weighing the possibilities of finding ore bodies in this vicinity.

1. The first consideration is whether or not there are favorable surface indications that might reasonably lead to the finding of ore in depth. These would be the presence in the quartz-porphry of a gossan, or leached capping, showing at least some iron, and better yet, some copper stain.

2. Another indication of ore deposition in this section and especially along the diorite contact is a silicification in the quartz porphyry and a development of quartz and jasper which in the ^{United} Verde Mine is a marginal phase of the ore bodies, where also are found larger masses of relatively pure quartz between the massive sulphide bodies and the diorite and where some of this quartz nearly always separates the sulphides from the diorite hanging wall,

According to L. E. Reber - "This jaspery quartz is associated with all three of the schist replacement ore deposits in the Jerome district, particularly in the United Verde where there is

probably more of this quartz than in all the rest of the district" "In addition , the great majority of the masses not associated with sulphide mineralization appear to be related either to United Verde diorite or quartz porphyry contacts. Thus it is believed that this jaspery quartz is, in general, a phase of the ore mineralization, but a more wide spread phase than that which developed the bulk of the sulphides."

"The related to the ore deposition, the jaspery masses at the surface, where clearly unaccompanied by gossan indicating important sulphide mineralization, would be very unlikely to show more sulphide matter at depth. This fact has been demonstrated by a good deal of fruitless exploratory work."

Along the diorite-quartz^z porphyry contact on Jerome-Grande ground is found a zone of silicification in the quartz porphyry with veins of jasper and quartz close to the contact. There seems to be no sign of gossan or copper stain in this siliceous material, however, so, according to Mr. Reber, one cannot expect to develop sulphides in this zone in depth.

The crosscut from the shaft encountered the contact at a point 500 feet from the shaft and passed thru jaspery quartz which did not show any sulphides. The crosscut was continued to 560 feet and was in quartz porphyry at its face.

Aside from an increase in the flow of water and the presence of some iron stain in the rock there were no changes to indicate mineralization and this condition looks unfavorable for finding sulphides in further extension of the crosscut.

The nearest known ore body to the face of the crosscut is at least 2000 feet from it. The Verde Central shaft is 2700 feet East and the United Verde Shaft No. 4 is 3500 feet northeast from this face and it is 2500 feet to a line drawn between these two shafts which corresponds roughly to the strike of the mineralized zone of this section of the district.

We can therefore draw the conclusion that from a geological standpoint and in the light of the work done on the Jerome Grande ground, one cannot reasonably expect to encounter ore bodies within the Jerome Grande ground by the extension of the crosscut which would

reach the end line of the property in 750 feet.

A drift run from the end of the crosscut parallel to the diorite-quartz porphyry contact would reach the north end line of the Harold claim in 1600 feet and the south end line of the Tiger claim in 700 feet.

This gives on the 822 foot level a maximum length of 2300 feet and a maximum width of 750 feet in a triangular area of about 30 acres in which there could be any possibility of striking ore bodies of the character known to the district, and this area amounts to practically nothing at the surface but increases with *depth*, being limited in greater depth by the dip of the diorite-quartz porphyry contact on the west, which has a dip of about 47° to the west.

Another consideration to be made in regard to possible ore bodies found on the Jerome grande ground would be the possibility of litigation arising from apex suits over an orebody found that might have an apex on the property owned by the United Verde Copper Company on the East. Recent court decisions, however, have favored the discoverer of blind orebodies in depth which have no outcrop and this precedent should apply in this case as no ore bodies have been opened up on the adjoining United Verde claim and I do not think that any strong mineralization has been found on the surface of this claim, the Luck Boy S. Extension.

Were the mineralogical and geological conditions favorable enough to consider the rehabilitation of the Jerome Grande surface plant and mine workings, the question then would arise as to what it would cost to prepare for further development work.

The present condition of the surface plant and shaft has been described, and taking these conditions into consideration, I have made a rough estimate of the probable cost of putting the property in shape for a reasonable amount of development work.

A statement of this estimate is as follows:

Estimated Cost of Rehabilitation of Surface Plant and Shaft for
Further Development on Jerome Grande.

Repairs to Mine Buildings; - Hoist House, Blacksmith Shop and Framing Shed: -	
Material (Sheet iron and lumber)	\$ 350.00
Labor	250.00
Office and Bunk House: -	
Material (Lumber and Roofing)	150.00
Labor	150.00
Building New Head Frame 36' high 10 x 10 timbers	
Material (Including sheave wheel)	350.00
Labor	150.00
Overhauling and changing machinery from steam to electric drive: -	
New gear and pinion for hoist drive	200.00
Short belt drive for Compressor	100.00
Labor and parts for compressor	150.00
New Motor for Hoise (125 H.P. slip ring with controller & resistance)	1,900.00
New Motor for Compressor (75 H.P. with starting box and switch)	1,000.00
Installing motors and foundations	150.00
150 K.W. Cap. Transformers and 2000 ft. transmission line	4,500.00
Pipe lines to mine for air and water, Unwatering	650.00
Unwatering and cleaning out shaft:*	
Cost of New Torpedo bucket (150 gals)	75.00
Labor and power, 25 days (Labor 875.00 Power 375.00)	1,250.00
Placing pump on 678 ft. station	50.00
New Electric Pump for station, 100 gals capacity,	1,050.00
Retimbering shaft to 822' level (It may not be necessary to retimber all of this distance)	
Timber, sets 6 ft. centres and full lagged, 137 sets 8 x 8 = 76.3 M. ft. @ \$50.00	3,815.00
Labor: Framing 137 sets @ \$5.00	685.00
Placing 137 sets @ \$10.00	1,375.00
Hoistmen 137 shifts @ \$6.00	820.00
Superintendence	300.00
Power, hoisting & Pumping	600.00
New Mining Equipment, cars, drills, steel, Blacksmith shop tools, etc.	2,000.00
Total	\$22,070.00

SUMMARY OF ESTIMATE.

Repairs to Mine Buildings	\$ 900.00
Building new Head Frame	500.00
Remodeling and repairing Mechanical Plant	8,000.00
New Pipe Lines Air and Water	650.00
Unwatering and cleaning out shaft	1,325.00
New electric pump for station (installed)	1,100.00
Retimbering 822' of shaft	7,595.00
New Mining equipment, tools, etc.	2,000.00
Total	\$22,070.00

* Mine made 20 gals. water per min.

CONCLUSIONS:

As has already been stated, there are no strong indications of mineralization on the surface on the Jerome Grande ground nor even on the adjacent United Verde claims. Then too on the 822 foot level of the Jerome Grande the crosscut passed thru the contact and traversed 60 feet of jasper and quartz porphyry without exposing any sulphides. These two facts would indicate that there are no sulphide bodies in the neighborhood of the contact at this point and this conclusion, together with the fact that the nearest known ore body is over 2000 feet distant, should to my mind discourage further development, especially when the cost of rehabilitating the property is weighed against the possibilities of striking a blind ore body, no indications of which have been found.

These conclusions are further borne out by the similar conditions encountered in the Dillon Tunnel of the Cleopatra and Hull Copper Companies which was started in Hull Canyon and driven in a general north-westerly direction to connect with the Hull shaft sunk in the U.V. diorite on the 1888 claim. This tunnel passed close to the south end lines of the chrome Southeastern and the Eureka claims of the United Verde Copper Co. and opened up some good chalcopyrite ore in that vicinity, which was about 750 feet east of the diorite contact. The ore bearing formation was quartz-porphyry schist and sericite schist, the latter extending to the silicified contact zone and containing no copper values beyond the west side line of the Eureka claim.

As the tunnel neared the diorite contact it changed its course to almost due north making a sharp angle with the line of contact and traversing a long belt of the contact zone. In this contact zone much jasper and quartz were encountered but these rocks showed no signs of copper mineralization, even tho this was in a section lying only from 200 to 300 feet from the United Verde mine workings and ore bodies.

This condition goes to show that the ore zone does not follow the contact zone and that in the United Verde mine the diorite contact was only a favorable place for the concentration and deposition of sulphides from the mineralized belt which extends up to it, and which runs in a southeasterly direction into the Verde Central ground with a strike that forms an angle of 30° with the strike of the diorite contact line. This mineralized belt is too far beyond the limits of the Jerome Grande end

line however to offer possibilities that some of it might extend into Jerome Grande ground in depth.

Another unfavorable feature of the Jerome Grande property is the small amount of ground that is included between the line of the diorite contact and the east end lines of the claims, there being almost no area on the surface and only about 30 acres on the 822 foot level which might be considered as possible mineral bearing ground.

The danger of apex litigation arising might also be included as an unfavorable feature in case an ore body was found in depth on the Jerome Grande ground.

I am indebted to Mr. A.B. Colwell for some of the facts used in this report and also to Mr. Scott who was in charge of the Jerome Grande at the time it was developing in 1908. From Mr. Jas. Hubbard I obtained a description of conditions encountered in the Dillon Tunnel as he was forman for the Hull Copper Company when that work was done.

Having spent over ten months underground in the United Verde mine in 1908 and 1922 I was familiar with the ore occurrence there as well as with surface conditions around that property and was on the Jerome Grande ground when it was operating in 1908.

To Mr. L. E. Reber I have given credit for material taken from his valuable article on the Geology of the Jerome District.

S. J. Harbour

ENGINEER'S REPORT

JEROME GRANDE COPPER COMPANY

BY

ALFRED B. COLWELL, MINING ENGINEER.

1922

8 6 - - - - -

The property of the Jerome Grande Copper Company is located in the Verde Mining District, one mile in a Southwesterly direction from the Town of Jerome. By way of the Jerome-Prescott State Highway, the distance is nearly two miles.

L O C A T I O N: Its location is popularly known by its proximity to Walnut Springs, which is one of the sources of water supply for domestic use for the Town of Jerome and the United Verde Mine.

Prior to the completion of the Highway in 1920, this locality was accessible only by trail over the steep east slope of the Cleopatra Mountain and along the U. V. pipe line.

The highway is a great asset to your property and others in your vicinity. The Verde Central Mines, Inc. delayed operation for several months until it was completed and the development of mines in this part of the District has undoubtedly been retarded many years by its inaccessibility. The Highway traverses your Southern boundary and crosses the Virginia claim within 500 ft. of your main shaft.

C L A I M S AND AREA: Your property embraces five claims, as follows: Harold, Virginia, Charm, Tiger and Triangle Fraction, U. S. Sur. No. 2463; Total patented acreage seventy-one and one third acres.

The property is bounded as follows:

On the East by the Lucky Boy and Lucky Boy South Extension, both old patented claims belonging to the U. V. Copper Company;

On the South by two unpatented fractional claims, claimed by the Verde Central Mines, Inc. and by the Red Jacket Claim, covering Walnut Spring, owned by the U. V. Copper Company.

On the East and North, by patented claims comprising part of the large acreage in the Western part of the district owned by the United Verde Extension Mining Company.

You are therefore surrounded exclusively by property belonging

to the principal operating and producing mines of the District.

The acquisition of property in this part of the camp by the U. V. and U. V. Extension Companies is not accidental.

The former Company and the Columbia Copper Company, controlled by Senator Clark, had the choice of selection in the early history of the camp and you will find their ground dotting the map in isolated groups wherever there is a particularly good surface showing.

The U. V. Extension Company started with a group of five claims on the west edge of the District and within the last two years has acquired the West United Verde Group and two claims of the Michigan Verde, their holdings now comprising about three hundred acres on the west rim of the District.

PROXIMITY TO WELL-
KNOWN MINES:

In stating that your property is contiguous to the U. V. Copper Company, I do not refer simply to one of its detached claims, but to the U. V. Mine itself.

From the Northeast corner of the Harold Claim it is only 1800 feet in a direct line northeasterly to the No. 4 shaft (U. V. Co.) the intervening ground being owned by the Hull Copper Company. (Controlled by Senator Clark)

The present working shaft of the adjoining Verde Central property is about two thousand feet from your ground and the mouth of its No. 4 Tunnel is less than 500 feet distant in a Southerly direction.

GEOLOGY
OF JEROME

DISTRICT: The main geological features of this district are well known and need not be entered into in detail at this time; however, the main points should be mentioned in order to show the conditions existing at your property and its relation to adjoining mines.

Without attempting to start at the base of the geological column it is sufficient to say that the Yavapai schist and greenstone comprise the oldest formations, the former being a name given to a complex

of sediments and intercalated volcanic beds, which have been folded into tight vertical folds. This formation covers a large part of Southern and Eastern Yavapai County and is the country rock of many mines and prospects of the Mayer, McCabe and Turkey Creek districts.

In the Northern end of this belt, in the Jerome District the original Yavapai schists have been largely displaced by later intrusion of Quartz Porphyry, which is held by geologists to be an outline phase of the Bradshaw granite intrusion which is the conspicuous feature of the Southern part of the County, and forms the backbone of the Bradshaw range.

The apparent center of the quartz porphyry intrusion and its most noticeable outcrop in this District is that of Cleopatra Mountain, the comb-shaped peak rising West of the Town of Jerome.

The formations noted, to wit: The greenstones, Yavapai schists complex and quartz porphyry probably constitute 90 per cent of the free Cambrian surface exposed in the Jerome District.

Following the quartz porphyry intrusion, there was a lesser and more localized intrusion of diorite, the most noticeable outcrop being in the vicinity of the U. V. and Jerome Grande Mine, which was followed by later intrusions of similar magma, but in the form of narrow dikes, cutting all of the pre-Cambrian formations and quite generally distributed throughout the District.

The succeeding steps in the geological history where the erosion of the great uneven mass of pre-Cambrian rocks to an approximately level surface, its gradual sub-mergence under the sea and the accompanying formation of shallow water conglomerates and sand-stones, followed by deposition of lime and silts as the waters deepened.

In the later ages the lime-stones were buried under surface flows of volcanic lavas, remnants of which capped the tops of Mingus, and Woodshute Mountains at an elevation of seven thousand feet above sea level.

F A U L T S: The next period was one of readjustment, probably far reaching in cause and effect, but manifest in this District by a subsidence of the overloaded strata on each side of which is the Black Hills Range,

resulting in a series of faults of varying degrees of magnitude.

The main fault runs northwesterly and southeasterly along the easterly edge of the District and has a vertical displacement estimated at 1600 to 1700 feet.

The Haynes fault runs in a more westerly direction, intersecting the main fault in the vicinity of the United Verde Mine.

From this vicinity also the Warrior or South-Haynes fault runs in a southwesterly direction, forming roughly the westerly boundary of the District.

The west side of the Warrior fault is estimated to drop from 300 to 350 feet.

In addition to those mentioned, there are a number of lesser faults, not so well known, which probably have much to do with the relative position of the formation in their immediate vicinity.

UNITED VERDE

ORE BODY: The United Verde ore bodies are masses of iron-copper sulphides of unusual size and persistency. They were formed in pre-Cambrian times, presumably after the main diorite intrusion and of course before the deposition of sediment and the later faulting. They are situated in the quartz-porphyry where favorable structural conditions permitted replacement of the schist by the sulphide minerals.

The diorite intrusions which forms the west wall of the sulphide mass has a dip of 40° to 50° to the west and is supposed to have been instrumental in confining the sulphide solutions to the vicinity of its contact with the quartz - porphyry.

JEROME GRANDE

TOPOGRAPHY The Jerome Grande property lies 1800 ft. to a half mile in a southwesterly direction from the U. V. Mine. It is located on a spur of the main range, rising 400 or 500 ft. above Walnut Gulch. The crest of the ridge is overlaid by the blanket of sedimentary formation which is also noticeable on the point of the ridge above the U. V. workings.

Under the sedimentaries the rusty surface of the pre-Cambrian can be seen on the hillsides to the bottom of Walnut Gulch. At the west side of the property the pre-Cambrian can be seen only to the Gulch, which marks the approximate position of the Warrior fault,

the surface from here westward being all in limestone.

G E O L O G Y: Within the lines of the Jerome Grande property the following pre-Cambrian formations are exposed:

1. Yavapai Schists
2. United Verde Diorites
3. Quartz Porphyry

YAVAPAI SCHISTS

The formation is seen in a narrow north and south belt along the west edge of the property. It forms a contact with the United Verde Diorite on the east and is cut off on the west by the Warrior fault, which brings the lime-stones down in contact with the schist.

It is made up largely of light colored, silicious schists apparently of sedimentary origin, which are considerably disturbed in places by the diorite intrusion, but which, in the main, have a northerly and southerly strike.

In the No. 1 Tunnel, north of the shaft, they appear in thin vertically laminated beds, alternating with more massive, silicious beds, the thin bedded sections being decomposed and impregnated with hemitite. Samples from this tunnel are said to have assayed \$7.00 in gold.

UNITED VERDE DIORITE

This is conceded to be the same diorite intrusion which forms the hanging wall of the United Verde ore body.

It appears from under the sedimentaries on the south slope of the ridge and can be followed around the west slope to above the main shaft. Going south towards the Highway it apparently terminates on Jerome Grande ground or else plunges down under Walnut Gulch.

The east side of the diorite which is in contact with the quartz-porphyry is partly on your ground and partly on the Lucky Boy South Extension Claim adjoining. It can be followed northward until it disappears under the sedimentaries for a short distance and then can be

followed in the same general direction on to the United Verde Property, to where it is cut off by the Haynes fault. In the United Verde Mine workings it is said to have a 40° to 50° dip to the northwest and to form an impervious hanging-wall, under which the sulphide ores have been confined at the contact with quartz-porphyry.

QUARTZ-PORPHYRY

A well known geologist is quoted as stating that he considers the Cleopatra Mountain quartz-porphyry intrusion to be the source of copper mineralization of the district, forming on its northwest flank the United Verde ore body and on its east flank the United Verde Extension chalcocite deposit of unusual richness. It may be added also that the Hull Tunnel penetrating the base of the Mountain from the south side is in ore at several points and that the Verde Central Mine in the same porphyry is developing a mineralized area of great promise.

Your property gets a portion of the diorite-quartz-porphyry contact on the east side. The quartz-porphyry is related and directly traceable to the main mass of Cleopatra Mountain.

The contact shows numerous lenses of jasper and exhibits well marked schistosity in a general northerly and southerly direction.

D E V E L O P M E N T:

The development work on the Jerome Grande Property consists of the main shaft near the southeast corner of the Virginia Claim and two surface tunnels of little importance.

The shaft and equipment represents an expenditure of \$100,000.00.

The shaft is 4 x 7 ft., 838 ft. deep; timbered throughout.

At the depth of 678 ft. there is a 45 foot pump station, in which during the operation of the property there was installed a Knowles Duplex Pump. At the depth of 822 ft. there is a station from which a cross-cut was run 560 ft. in a direction about south, 70° east.

The above information is obtained from Mr. J. C. Scott, the present secretary of the Company, who was superintendent during the operating period from January first, 1907, to February 13, 1909.

The shaft at the present time is filled with water to about 200 feet below the surface.

TUNNELS

NO. 1: No. 1 or Virginia Tunnel is situated about 200 feet north of the Main shaft. It runs easterly 285 feet which carries the face of the tunnel well under the sand-stone outcrop.

NO. 2: The other tunnel is situated 800 feet south of the main shaft, just above the Jerome- Prescott Highway. It is said to have run 200 feet in a northeasterly direction. This tunnel has caved at the entrance and is inaccessible at the present time.

During the period of operation the mine was well equipped with steam boiler and plant, geared hoist, compressor, pumps, etc., suitable buildings for engine house and blacksmith shop, and several frame bunk houses. Since the close down in February 1909 there has been no work done except slight repairs to the shaft. The mine buildings and machinery have deteriorated until they are of little value.

I am told that the shaft was sunk in good ground and is probably in excellent condition, though it may have to be retimbered above the water level.

RESULTS FROM DEVELOPMENT:

The main shaft is sunk near the west edge of the intrusion of United Verde Diorite, As the diorite dips westerly the schist contact is still further west from the bottom of the shaft, possibly 400 ft. or more. Inasmuch as no cross-cuts were run west of the shaft there has been no information secured relative to the Yavapai Schist or what mineral showing they may contain.

The east cross-cut which was extended 560 ft., I am told was in diorite until near the end. The following memorandum is copied from Supt. Scott's records of February 1909:

"Drove 44 ft. during the month of February to 13th inst. and the cross-cut is now in 560 ft. Formation cut through since about Jan. 25th, is in the main jasper and the face of the level is now in that formation, bearing more or less hemi-tite iron in the seams.

Water inflow increased in the level from about 1.½ to 2.½ miners inches at present."

This record is authentic and conveys much valuable information about a cross-cut which is 600 ft. under water at the present time. Assuming the rate of progress in the cross-cut to have been four feet per day from January 25th, to February 13th, it was probably driven 68 ft. in the jasper. I believe this to be the side of the diorite and the contact between it and the quartz-porphry. The added information "Bearing more or less hematite in seams," and the note on the increase of water are both important as showing approaching mineralization and a sufficiently open formation to permit the free circulation of water.

I have recently talked with Mr. Dezolt, who was foreman under Mr. Scott when the cross-cut was run. He tells me that the iron impregnated seams in the jasper were standing nearly vertical and that there were several stringers an inch or more in width of chalcopyrite and that in other places the quartz was stained green.

Mr. Scott tells me also in regard to the formation in the cross-cut that while all in diorite or a similar looking rock, that in some places it showed a liberal sprinkling of copper sulphide, probably chalcopyrite.

The No. 1 Tunnel heretofore mentioned is chiefly noted as showing an extremely schistose structure and presence of hematite. The formation is composed of this bedded silicious schist alternating with more massive beds also silicious. I assume that it is in the Yavapai schist formation not far from the diorite contact.

The Tunnel No. 2 was run by Mr. Scott personally and other mining had been done on the property. His attention was attracted to the locality by a small showing of greencopper carbonates on the surface. He later found a soft gauged seam a few inches in width which he followed into the hill, and from it mined two or three wheel-barrow loads of soft material carrying fragments of native copper.

I have before me the report of a Colorado mining engineer, dated March 1st, 1906, in which reference was made to a cross-drift 50 ft. long driven on a vein 50 or 60 ft. back of the face of the tunnel. He also stated:

"Both sulphide and carbonate ores have been found in the vein, one assay from a selected sample of the first named class (sulphide ores) gave returns of 51% copper with some gold, several hundred pounds of ore showing native copper were also found."

I believe the formation throughout the length of the tunnel was all soft decomposed, dioritic material and it is probably not far from the contact of diorite and Yavapai Schist formation.

ADJOINING DEVELOPMENT: While there is no further development within the lines of the Jerome Grande property, there is important work under way in the same formation by the Verde Central Mines, Inc.

This is known as their No. 4 Tunnel, situated on the Gold Hill claim about 400 ft. southeast of your Texas claim. This tunnel runs in a southeast direction several hundred feet and is at or near the contact between quartz-porphyry and Yavapai Schist. Very little copper mineralization has been disclosed but the drift is largely in friable quartz, heavily impregnated with iron oxide and the conditions are looked upon as extremely favorable and indicative of the presence of copper ore at greater depths.

DISCUSSION: In making the attempt to determine the probability of commercial ore being developed on your property, it would seem logical to compare the geological rock formation and structure as we find them, with the conditions existing in and around other mines of proven value. Very few geologists are bold enough to say that such and such conditions will make an ore body, unless they can point to some specific instance where it actually has been accomplished.

Generally speaking, the formation of an ore body requires a source of mineralization and an environment favorable to the deposition and retention of the mineral.

Whether the United Verde and U. V. Extension ore mineralization was derived from the diorite or the quartz-porphyry or from more distant sources, I am unable to say. The fact that they exist today is because the copper bearing solutions found a formation chemically and structurally suited to the deposition of copper minerals and the further fortuous circumstance that they were buried too deep in the pre-Cambrian formation to have been entirely eroded and dissipated.

I have previously stated that the formation exposed on your property are the same that exist in the vicinity of the United Verde Mines. This is also shown on a map published in the "Geology and Ore Deposits of Jerome District." by Louis E. Reber, Geologist United Verde Copper Co., to which publication I am indebted for much valuable information. The diorite intrusion in which your main shaft is sunk, is not only a similar diorite, but is the same mass which forms the hanging-wall of the United Verde deposit.

Likewise the diorite-porphry contact cut in your east cross-cut is the same contact in which the United Verde ore is found a short distance further north.

You have in addition on the west side of the diorites a considerable exposure of the sedimentary quartz schist of the Yavapai Schist formation, which is also shown on Mr. Reber's map before referred to. This schist formation undoubtedly offers structural conditions favorable to the deposition of copper mineral.

The fact that the surface of your property does not show a cropping of ore nor any extensive iron capping, does not disprove its existence at greater depth. A surface cropping is only an accident of erosion. The collar of your shaft is 400 ft. higher than the No. 4 shaft of the United Verde and it is possible that the outcrop of the United Verde at the elevation of your ground may have been too insignificant to attract attention.

The progressing development of the Verde Central Mines is proving a revelation to many who have held fixed ideas as to surface indications and what the surface of a mine should look like.

While it is not claimed that the Verde Central is a proven mine, it has at least demonstrated that extensive mineralization and favorable structural conditions may exist beneath a barren and unfavorable looking hillside. It should be remembered also that at least 80% of the pre-Cambrian surface of the Jerome Grande property is effectually hidden by the capping of limestone and conglomerate beds.

It does not require any great stretch of the imagination that if the fifty or more acres of sedimentary blanket could be removed overnight, there might be revealed a mineralized cropping, the presence of which is not now suspected.

On the remaining 20% of the surface, the indications, as far as there are any, are favorable. The iron impregnated schist in No. 1 Tunnel and the reported native copper and copper sulphides developed in No. 2 Tunnel may be taken as outpost of deeper seated mineralization.

CONCLUSIONS AND RECOMMENDATIONS: While I am unable to state that a body of ore exists in any specified point on your property, I have no hesitancy in stating that at more than one point the conditions are extremely favorable, being similar to those under which the United Verde ore bodies have been formed, and moreover, you have definite evidence that mineralization has taken place to a limited extent.

In my opinion your property has exceptional merit and warrants further and extensive development.

In planning such work, the elevation of your surface above the other mines of the District should be kept in mind, and means taken to overcome this handicap by securing greater depth below your surface.

If specific recommendations are desired at this time, I would suggest the following: that the shaft be un-watered and repaired where necessary; that drifts be run northerly and southerly along the diorite-quartz-porphry contact, where it was cut near the end of the cross-cut; that diamond drilling be done from the main cross-cut and the new east drifts, in such a way as to prospect the ground at least 500 feet deeper and in the vicinity of the diorite-quartz-porphry contact. The nature of further development to be determined by the results of the preceding work.

Alfred B. Colwell, E. M.

Jerome, Arizona, February 27, 1922.

