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Phelps Dodge Corporation
Copper Queen Branch

ORE DEPOSITS OF BISBEE DISTRICT

by

Harry E. Metz

A great deal has been written on the ore deposits of the Bisbee District. Much of this paper is simply a summary of earlier literature. In some cases it has been necessary to modify the older ideas as well as develop new ones to explain some of the more recent discoveries.

ROCKS

The oldest rock of the district is pre-Cambrian Pinal schist. Resting unconformably on the schist is over 4,000 feet of Paleozoic sediments. The base of the Paleozoics is represented by 400 feet of Cambrian Bolsa quartzite. This is followed by 770 feet of sandy, thin bedded Abrigo limestone of late Cambrian age. Ordovician and Silurian sediments are missing. Following the Abrigo limestone is 350 feet of Devonian Martin limestone which, in turn, is followed by the Carboniferous limestone, consisting of 700 feet of Escabrosa limestone of Mississippian age and over 2,000 feet of Naco limestone which is Pennsylvanian.

Resting on a very irregular erosion surface of pre-Cambrian schist and Paleozoic sediments with their intruded rocks are about 5,000 feet of early Cretaceous sediments. The lower member of this series is the Glance conglomerate, from 20 to over 500 feet thick; followed by 1,800 feet of shales and sandstones, the Morita formation; 650 feet of fossiferous Mural limestone which has formed the conspicuous cliffs to the northeast; and this, in turn, by at least 1,800 feet of shales and sandstone - the Cintura formation.

Cutting the schist and Paleozoic sediments is a large stock of granite, the main exposure of which is in the northwestern part of the district and forms the very rough terrain north of the road on the west side of the Divide. Branching out from the granite stock are numerous sills and dikes of granite and rhyolite

porphyry, which are scattered throughout the western part of the district. They are relatively unaltered and have a composition like that of the granite and are believed to be part of the same intrusion.

The most important igneous rock of the district, because of its relationship with the ore deposits, is a stock-like mass of highly altered quartz monsonite porphyry. It is about a mile in diameter. A major fault, the Dividend, splits it into two different geologic settings. On the north, or footwall exposure, it intrudes the Pinal schist. The porphyry, and schist surrounding the porphyry, are highly altered and silicified. On the west side of the stock is a considerable zone of bleaching in the schist. On the south, or down thrown side of the fault, the porphyry has intruded the Paleozoic sediments. Branching dikes and sills spread out from the stock in much more profusion in the limestone than in the schist. This is more evident in the underground sections than is indicated on the surface where a good part of the stock is hidden by cover. Alteration due to intense mineralization has practically made the original composition indeterminate; however, recent thin section studies have indicated that it was probably quartz monzonite porphyry. The usual contact metamorphic minerals are conspicuously absent in the limestone surrounding the stock. There is a highly silicified, iron-soaked zone of limestone adjacent to the stock which may have been caused by contact metamorphism but which was more probably the result of mineralization.

Seemingly quite closely associated with the porphyry are dikes and sills of breccia consisting of rounded pebbles and cobbles of the formation through which they passed. It is not unusual to find rounded schist fragments in dikes cutting the Naco limestone and in nearly all are pebbles or fragments of Bolsa quartzite. This type of breccia is designated as intrusive breccia and will be more fully described in the next paper.

FAULTING

The producing area of the district is terminated abruptly on the north by the Dividend fault, which was mentioned earlier. It has split the porphyry stock and dropped the Paleozoics on the south against the pre-Cambrian schist to the north. The general strike of the fault is about N 70° W with a southerly dip of from 65° to 80°. Remnants of Bolsa quartzite on the north, coupled with the Paleozoics to the south, give a fairly accurate record of the vertical displacement which, in the vicinity of the Saginaw shaft to the east, is over 5,000 feet and, at the Copper Queen Glory Hole in Bisbee, 2,000 feet. A short distance east of the Saginaw shaft, the fault is lost under the surface gravels, while to the west it passes into the schist above Bisbee and is lost in the complex south of the Juniper Flat granite.

The Paleozoics in the productive area are cut by a series of northeast fractures which have been segregated into a number of fault zones. They have a strike which is complementary to the Dividend fault, roughly N 20° E, and dip steeply to the west. Individually, the fractures seem insignificant and little more than a joint, but collectively over a wide zone may account for considerable displacement. Ore occurrence is intimately associated with these northeast fractures. The major fracture zone in the Junction area is the Mexican Canyon. It is a zone possibly 1,000 feet wide which has an overall displacement of from 400 to 500 feet. Ore has been found intermittently in this zone for a vertical extent of over 2,000 feet. Another important zone, which is a major producer today, is the Dallas fault zone. In all, over twenty fault zones have been segregated.

Complementary to the northeasters are the northwesters. They are a series of fractures with a northwest strike and in all respects are similar to the northeasters, but do not have their persistency. These, too, are important ore producers, particularly where they join with the northeast system.

Cutting diagonally to the southeast across the productive area is the Oliver fault. It has a dip of about 45° to the southwest, and has a normal displacement which is confined to a fairly definite plane rather than a zone, of about 500 feet. The northeast fault zones cut the Oliver fault. Areas where these zones cross the Oliver have been particularly fruitful in regard to ore. The large Cole-Dallas ore bodies of today are the result of the juncture of the Oliver, the Dallas and the Mexican Canyon.

Age of the initial movement on these faults can only be placed as post-Paleozoic and pre-Cretaceous. Many show post-Cretaceous movement also, which has led to considerable controversy in regard to the age of the ore. The post-Cretaceous movement is due to reopening of the earlier fractures in post-Cretaceous time.

GEOLOGIC HISTORY

The very early historical events of pre-Paleozoic time are omitted here and only those that are more closely associated with the ore occurrence are related.

In post-Paleozoic and pre-Cretaceous time, probably Triassic or Jurassic, there was initial movement on the Dividend, Mexican Canyon, Campbell faults and many others. These provided channels for the intruding porphyry. The main stock was formed along the Dividend fault, and the dikes and sills along the others. The intrusion, which must have engulfed large portions of the limestone, displaced portions of it also, causing new faults and fractures as well as intensifying old ones.

Following the porphyry intrusions there was a period of intense mineralization, principally of pyrite and silica, which resulted in heavy replacement throughout the porphyry stock and the surrounding schist and limestone.

The pyrite mineralization in the porphyry and schist was more of the disseminated type, while in the limestone it formed large irregular lenses of massive pyrite. A period of fracturing followed the initial pyritization more or less along

the older fractures, and brecciated the sulphide bodies along or adjacent to them. Intrusive breccia then invaded the area along the existing fracture channels, picking up fragments of low grade pyrite as well as fragments of the other formations along its course. The next mineralizing stage was copper bearing, apparently following the same channels as the earlier porphyry, pyrite, and intrusive breccia. Fractures in the brecciated pyrite were filled with copper sulphide along with slight replacement of the pyrite itself. The reaction on those pyrite masses which were not brecciated was confined principally to the pyrite-limestone contact resulting in lenses of copper ore around low grade pyrite. Fractures were not present to permit penetration of the copper mineralizers to the interior of these masses in any appreciable amount. Where fractures did exist, lenses of ore resulted in the low grade core. The main activity of the copper mineralizers was in the limestone, but there was some introduction of copper in the main porphyry stock. Lead-zinc mineralizers followed the copper, replacing the limestone in the extremities of the pyrite-copper bodies.

Next was a period of erosion which cut down the upper Paleozoic into a very rough irregular surface. The upper portion of the porphyry stock was leached and the copper redeposited at the water table as a chalcocite blanket. Displacement on the Dividend fault then dropped the southerly side into a protected basin under a shallow sea, and the northerly side was elevated into a range of mountains which was subjected to intense erosion. Rapid erosion not only stripped the Paleozoics from the north side but the chalcocite blanket of the porphyry stock as well, and finally resulted in a peneplane at sea level. The basin to the south was, in the meantime, filled with detrital material. Finally the entire area was dropped below sea level and a thin blanket of detrital material was deposited on the north as well. This detritus became the basal conglomerate of the Cretaceous. The remaining Cretaceous sediments were then deposited in shallow seas. The entire area was elevated;

there was additional displacement on the Dividend fault; regional tilting to the east; and erosion which stripped off the Cretaceous cover over the porphyry stock and surrounding limestone.

AGE OF MINERALIZATION

The age of the mineralization in the Bisbee district has long been controversial. It is believed that evidence uncovered in recent Pit operations has settled the question beyond reasonable doubt. This evidence places it as post-Paleozoic and Pre-Cretaceous and is as follows:

1. Pebbles of altered porphyry in the Glance conglomerate, which even microscopically are indistinguishable from that in the main porphyry stock. Alteration of the porphyry was an effect of the mineralization. It is evident that the porphyry pebbles were altered prior to their deposition in the Glance. The abundance of the porphyry pebbles in the conglomerate increases as the porphyry contact is approached, indicating that the pebbles were derived from this stock, and not from some other remote source of supply.

2. Pebbles of ferruginous silica in the Glance conglomerate which were obviously derived from the oxide zone of the porphyry stock.

3. Pebbles of silicified limestone in the conglomerate in all respects similar to silicification accompanying the mineralization of the limestone.

4. Complete lack of alteration of the Glance conglomerate where it is in contact with the porphyry. The porphyry is altered yet the Glance conglomerate is unaffected. Small veinlets of quartz cutting the Glance show a zone of bleaching for a few inches on either side and a similar condition should have occurred along the porphyry contact if the mineralization had been later.

5. The porphyry blanket of chalcocite and its capping more or less conforms to the pre-Cretaceous surface under the Glance conglomerate. This indicates that

the enrichment is related to that early erosion period and not the one going on today.

6. No ore has ever been found in the Glance conglomerate or above it.

Against such overwhelming evidence, the following arguments may be presented:

1. Fracture zones which cut the Cretaceous sediments are also important ore zones in the Paleozoics. This is true, but is due to reopening of older fractures after deposition of the ore.

2. Veinlets of quartz cutting the Cretaceous contain copper mineralization. This post-Cretaceous mineralization is entirely different from that which resulted in the important ore deposits. The post-Cretaceous type is fissure filling, while the pre-Cretaceous type is strictly replacement.

ORE BODIES

Ore has been found in all the Paleozoic limestones; however, the most productive horizons have been the upper 300 feet of the Abrigo limestone, all the Martin and the lower 300 feet of the Escabrosa, a total of about 1,000 feet. Most of the production has been from these horizons. The reason for these productive horizons is due to the physical property of the lime beds in that they are very brittle and any slight movement would tend to shatter them, which permitted penetration of the ore solutions. The beds above and below these horizons are elastic and tend to either bend or break along one main fracture. The Paleozoic beds have an average dip to the northeast of from 20° to 25° and the productive horizon conforms to this average dip, ever becoming deeper to the east.

A horizontal projection of the ore bodies shows a semicircular arrangement around the main porphyry stock with offshoots resembling the spokes of a wheel. This arrangement is the result of replacement in the fracture and fault zones

mentioned earlier. The semicircular pattern is due to replacement in the intense fractures caused by the porphyry displacing the limestone. The radiating spokes are along the northeast zones.

Ordinarily, the copper ore bodies occur in close association with larger bodies of massive pyrite. Commonly, copper ore lenses are found peripheral to a larger pyrite lens on the limestone contact. Another type of occurrence is as filling and partial replacement of the earlier brecciated pyrite. Lead-zinc mineralization occurs in the outer fringes of the pyrite and copper mineralization, sometimes on the contact and sometimes as outliers. At times, in the thin bedded Abrigo deposits, there will be a bed of copper ore sandwiched between two beds of lead-zinc.

Much of the ore, particularly in the Briggs, Junction and Campbell areas, is closely associated with porphyry dikes and sills. Ore may occur along the porphyry in contact with it, particularly where there is an irregularity or, more favorably, an embayment in the porphyry contact. This association is due to structural relationships. Fractures which formed the channels for the intrusion of the porphyry likewise were channels for the mineralizers. In addition, fracturing adjacent to the porphyry was intensified, due to the actual displacement of the limestone, making an ideal host rock. With the exception of the main stock, replacement of the porphyry by copper minerals in sufficient amount to make ore is rare. In the main stock there were important ore bodies of this type but in the outlying limestone, apparently the affinity for the limestone and pyrite was too great for this to occur.

The shape of the ore bodies is nearly always influenced by the bedding of the limestone which it replaces. Some limestones influence it more than others. Deposits in the thin, shaley beds of the Abrigo are practically always tabular, in conformance with the limestone beds. Unreplaced shale and different textures of the

sulphides in the ore body clearly show the original bedding of the limestones. Likewise in the Martin, with its dirty but more massive beds, the deposits are usually bedded but have greater relative thickness than the Abrigo type. Deposits in the clean Escabrosa limestone are usually thick and massive, with a tendency for the vertical dimension to be greater than the horizontal, but even they plunge with the bedding, but normally at a greater angle. The bedded type of deposits in the Abrigo and Martin occur at the intersection of a fracture and a favorable bed, resulting in a deposit with elongation along the break, and a rake corresponding to the trace of the bed and fracture intersection.

The type of limestone in which the deposits occur also influences the ground conditions for mining purposes. Deposits occurring in the Abrigo and Martin limestones usually require some timber method of mining because of the poor bond between the beds due to the shaley partings. The thick, massive ore bodies of the Escabrosa usually stand better, permitting some open type of mining method.

Size of individual ore bodies is quite variable, from a few thousand tons to--in exceptional cases--over a million. Possibly a third of the production today is from ore bodies of less than 10,000 tons, a third from ore bodies of 10,000 to 25,000 tons, and the remainder from ore bodies of over 25,000 tons.

In the ore zones, intermittent lenses of ore may be found over quite a long range, both vertically and horizontally. The Denn Side Line ore zone has been productive for over 2,000 feet vertically in an area about 2,000 by 500 feet horizontally more or less parallel to the Dividend fault. The Baras-Home-Reindeer ore zone has a vertical extent of over 1,000 feet and a horizontal of about 300 feet by 1,200 feet.

The depth of oxidation is extremely irregular. Practically all the mining in the western part of the district was from oxide ores. In fact, Dr. Ransome held

little hope for the primary zone when he first examined the district. As the deposits became deeper to the east, the proportion of primary ore increased. Certain zones of oxidation are very persistent and extend to a considerable depth. A small oxide ore body of native copper and cuprite was recently mined on the 2433 level of the Campbell mine, and another oxide zone was cut on the 2700 level of the Junction. This deep oxidation is due to downward flowing ground water in the ore zone fractures.

PORPHYRY ORE

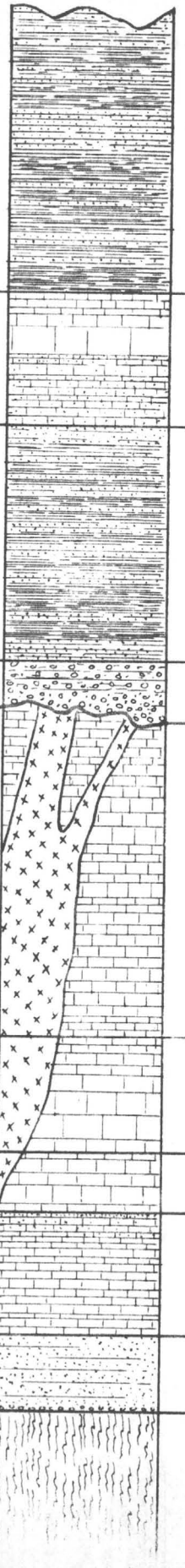
Leaching and redeposition of the copper in the main porphyry stock south of the Dividend fault has produced a chalcocite blanket of copper ore. Fracturing of the stock influenced the enrichment process by permitting thorough leaching, channelling of the percolating waters, and by permitting intimate contact with pyrite grains for precipitation. The transition from the oxide capping to the sulphide zone, although abrupt, is very irregular. Pendants of oxide extend to considerable depths along fractures in the sulphide zone and, likewise, sulphide of the undisturbed porphyry into the oxide zone. Leaching of the capping is thorough. It contains, in general, only traces of copper. There is no mixed oxide-sulphide ore such as is common in this type of deposit. Sulphide content of the ore is from 15% to 18%, practically all pyrite. The pyrite has been fractured and a thin film of chalcocite has been deposited on its many surfaces. This intimate filming of chalcocite on the pyrite adds to the metallurgical complication.

The chalcocite blanket dips to the east in conformance with the bottom of the Glance conglomerate which covered a considerable portion of it. The ore is from 50 feet to as much as 400 feet thick, the thinner portion being to the west at Sacramento Hill where the porphyry is very siliceous and compact. The oxide capping,

too, is thinnest at Sacramento Hill where the leaching process was slow, and also where it was exposed to erosion.

NOT FOR PUBLICATION

A. I. M. E.
Geology Subsection
Bisbee, Arizona
May 26, 1956
HEM:c

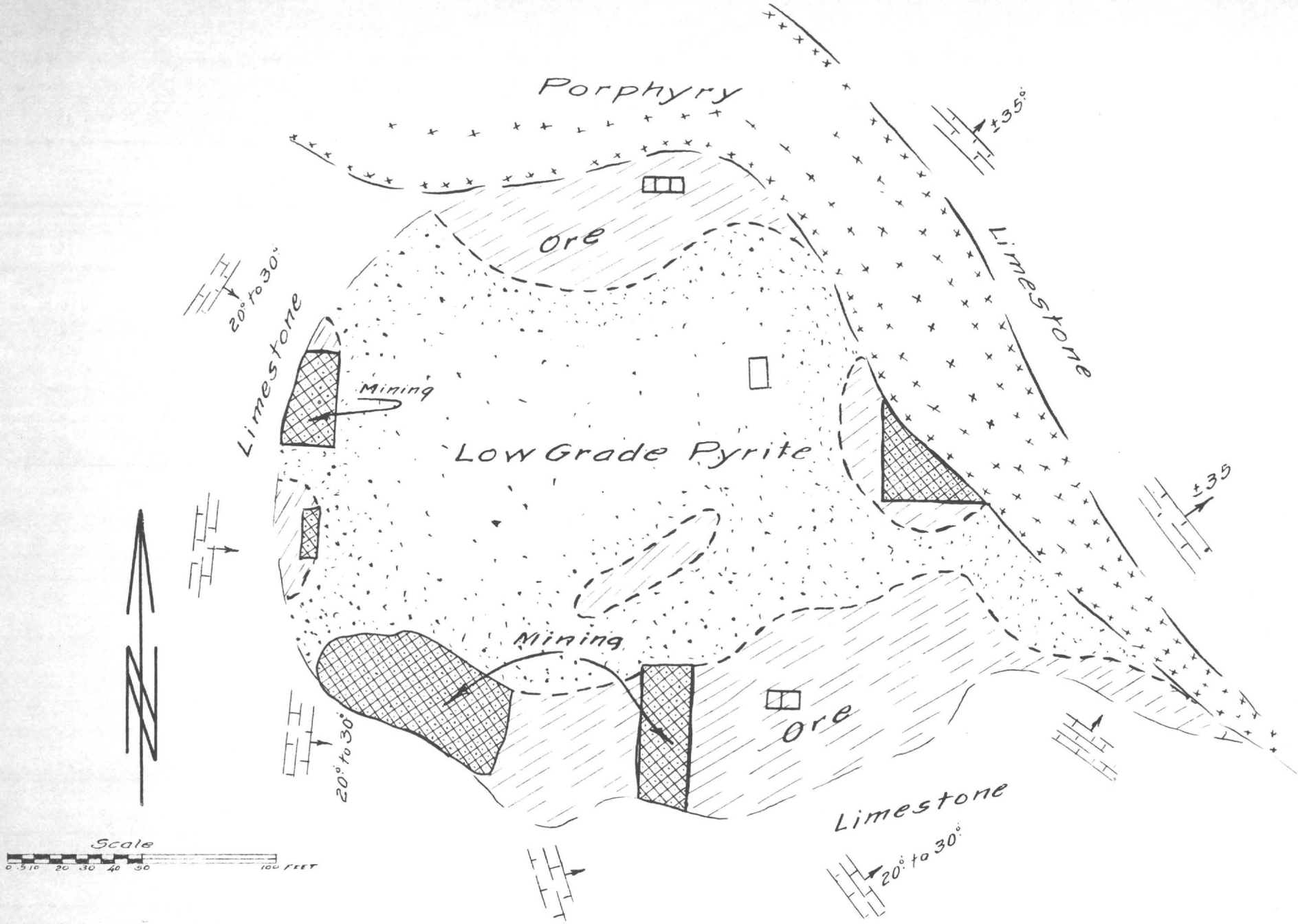


Cretaceous	Cintura Formation	over 1800 ft.	Red nodular shales with cross bedded, buff, tawny and red sandstones
	Mural Limestone	650 ft.	Thick-bedded, hard, grey, fossiliferous limestone Thin-bedded, arenaceous, fossiliferous limestone
	Morita Formation	1800 ft.	Buff, tawny, and red sandstones and dark red shales
	Glance Conglomerate	20 to 500 ft.	Bedded conglomerate with pebbles of schist, limestone, quartzite and porphyry
	unconformity		
Pennsylvanian	Naco Limestone	Over 3000 ft.	Principally light-grey, compact limestone in beds of moderate thickness with subordinate shales. Contains abundant fossils.
	Juniper Flat granite and related granite and rhyolite porphyry Sacramento porphyry		Intruded into Carboniferous and older rocks.
Miss.	Escabrosa Limestone	700 ft.	Thick-bedded white and light-grey granular limestone
Dev.	Martin Limestone	350 ft.	Dark-grey fossiliferous limestone in beds of moderate thickness with subordinate shales.
	unconformity ?		
Cambrian	Abrigo Limestone	770 ft.	Thin-bedded, impure, cherty limestones with some calcareous shales, sandy toward the top.
	Bolsa Quartzite	430ft.	Moderately thick, cross-bedded quartzites and arkosic grits, with basal conglomerate.
	unconformity		
Pre-Cambrian	Pinal Schist		Sericite schists.

COLUMNAR SECTION
SEDIMENTARY ROCKS BISBEE, ARIZ.

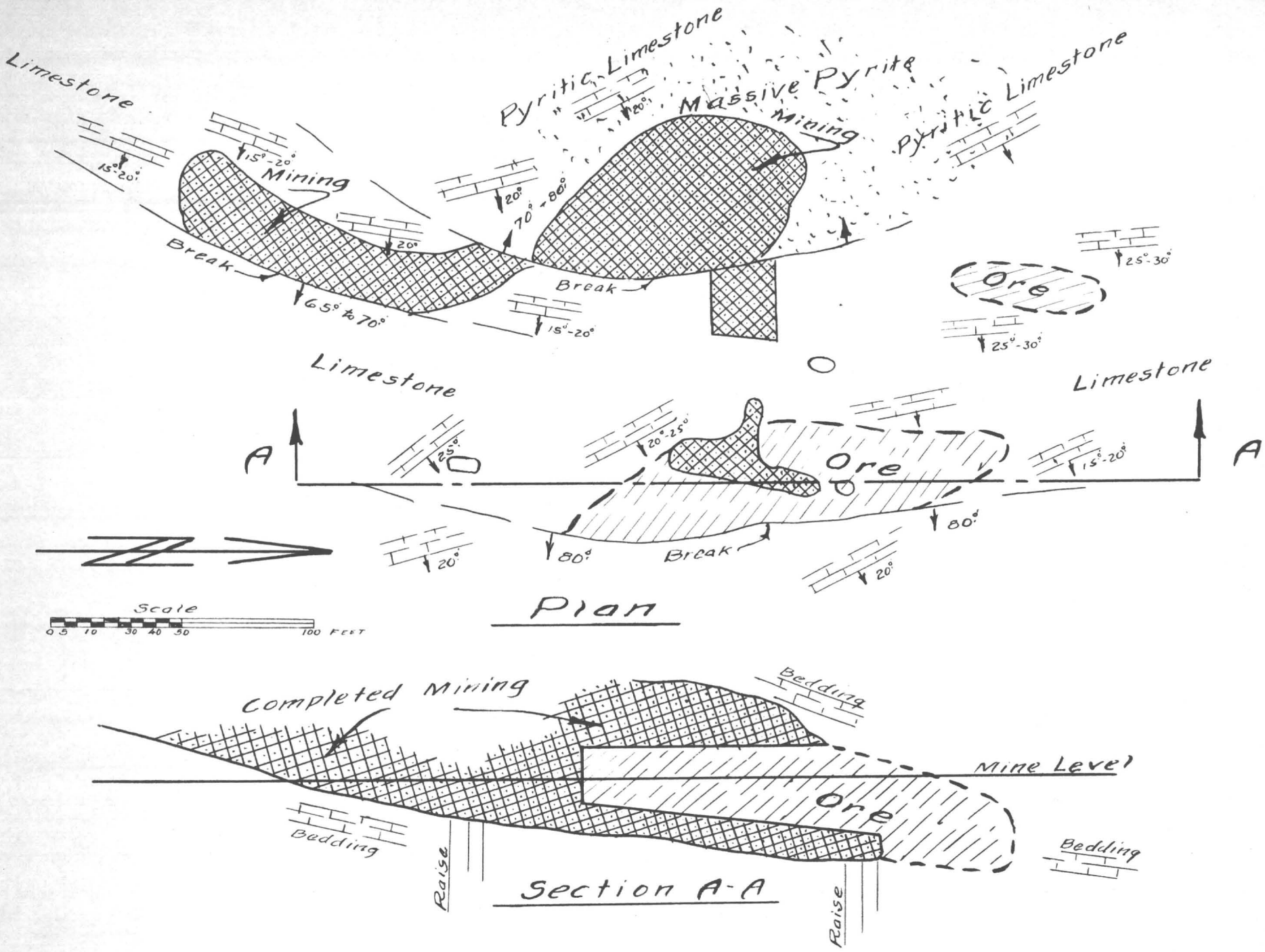
BISBEE, ARIZ
4-20-36

From F. L. Ransome



PYRITE PERIPHERY - PORPHYRY CONTACT DEPOSIT

BISBEE, ARIZ.
4-20-56



TYPICAL ABRIGO TYPE ORE DEPOSIT

BISBEE, ARIZ.
4-20-56

INTRUSIVE BRECCIAS AT BISBEE

At Bisbee there are a great number of unusual breccias whose existence is not generally known to outside geologists. They are called intrusive breccias and, as the term implies, the breccia fragments were intruded into the formations where they are now found.

The Bisbee intrusive breccias are a hetergeneous agglomeration of rock fragments comprising rocks from underlying formations. By some mechanism, not clearly understood, the component fragments have been forced through the overlying rocks for great distances following whatever path offered the least resistance to their passage. The fragments may have migrated a short distance only and be similar to the wall rock enclosing the breccia or they may comprise all lower formations including the Bolsa Quartzite and Pinal Schist as well as porphyry.

Fragments of nearly any size are locked in a matrix of cementing material. Thin section examination of the matrix reveals that it is composed of smaller fragments of the same rocks that make up the breccia; the matrix is often cemented by calcite and silica introduced after the breccia was intruded.

In form, the breccias are extremely irregular. A few are dike-like but characteristically they may follow a joint for a short distance, then switch abruptly to a bedding place or an intersetting fracture. Sometimes they are tabular but often they swell out to occupy irregular volumes in the limestones.

The breccias may be very small masses of perhaps pencil width occupying joints or fissures or they may be masses of considerable size with dimensions on a single level of several hundred feet.

Component fragments also vary in size as is evidenced by the specimens on display. The biggest specimen observed by the writers was a perfectly rounded boulder perhaps three feet in diameter in a bench of the Lavender Pit. It was not accessible so its composition could not be determined.

The relative age of the intrusive breccias seems to be clearly established. They frequently contain rounded boulders of porphyry and are, therefore, post porphyry.

They also often contain rounded pebbles of barren pyrite showing that a period of intense pyritization had occurred prior to instrusion of the breccias. The breccias themselves are sometimes more or less completely replaced by ore minerals.

Assuming a genetic relationship between the porphyry and the pyritic mineralization the sequence of events would then be:

1. Intrusion of the quartz monzonite porphyry into the Paleozoic limestones;

2. A period of pyritic mineralization in which the porphyry was sparsely pyritized and portions of the surrounding Paleozoic limestones suffered massive replacement by pyrite;

3. Intrusion of "pebble dikes" or intrusive breccias into the Paleozoic limestones, the porphyry stock and into the schist;

4. The period of ore mineralization which resulted in the "halo" of limestone replacement ores as well as the disseminated protore of the Sacramento Stock.

An interesting feature of the breccias is that the degree of rounding of the fragments appears to be a function of the distance traveled. A breccia whose component fragments are predominately limestone may be made up of angular boulders; the quartzite and schist boulders observed in the breccias are usually rounded and resemble stream worn boulders.

In a number of places it has been possible to observe the mechanics of assimilation of wall rock fragments into the clastic stream of intrusive breccia fragments. Intrusive breccia material occupying irregular channels isolates and engulfs projecting blocks of the host rock or surrounds big blocks of rock cut on all sides by fractures. The next stage is a breccia whose angular fragments would all obviously fit together like pieces of a jigsaw puzzle but are held apart by the matrix material. The final stage is a breccia of rounded boulders which have been moved thousands of feet from their source.

The intrusives are found throughout the productive area and are seemingly most abundant in the immediate ore area. They are particularly abundant in the main Sacramento Stock. They have also been observed in the limestones outside of the known productive area and in the schist above Brewery Gulch north of the Dividend Fault. They occur in every formation up to and including the Naco Limestone. The intrusive breccias form a "halo" around the Sacramento Stock area just as the limestone replacement ores do but of greater radius; some are well over a mile horizontally from the closest porphyry of the Sacramento Stock.

Increasing familiarity with intrusive breccias disclosed they they are closely associated with ore deposits in a great many cases. Mineralizing solutions frequently tended to follow the same paths followed by the breccias and in many cases the breccia was replaced more or less completely by ore. Schist and quartzite fragments were more resistant to replacement than were the limestone fragments. In many of our ore deposits the intensity of replacement actions has nearly obliterated the breccia structure but often a careful examination will reveal ghosts of the old rounded or subangular fragments.

It is probable that over 90 percent of Bisbee ore bodies are directly associated with intrusive breccias; if it were possible to study every stope round by round as mining progressed it might develop that the percentage is even higher.

If it is borne in mind that the ore in Bisbee occurs not in an ore body but in literally hundreds of isolated, separate and discreet ore deposits, this association of intrusive breccias and ore becomes truly remarkable.

ORIGIN OF BRECCIAS

A great many theories have been offered by various geologists as to the origin of the Bisbee breccias. Many of them are subject to some serious objection. For purposes of discussion, a few of the most commonly held theories are summarized.

1. The fragments were "floated" through the rock under very high pressure. The matrix probably contained a high percentage of sulphide and thus formed a high density slurry to float the rock fragments.

Objection: While some of the breccias have a sulphide matrix this is undoubtedly due to subsequent replacement. Thin section examination shows the average matrix to be identical in composition to the larger fragments which can be identified megascopically.

2. The dikes were plugs of solid material driven ahead of an advancing magmatic intrusion.

Objection: The dikes are post Sacramento Stock porphyry. No evidence of another intrusion has been found.

3. The "contact breccia" represents explosion material which has blown high in the air and tumbled back into the void of what is now the Sacramento Hill Stock. The porphyry was intruded later and engulfed most of the explosion breccia leaving only patches around the stock. This theory has enjoyed considerable popularity and has been expressed in a number of publications.

Objection: The breccia dikes are definitely post porphyry. The theory entirely ignores the dikes which extend for a mile or more out into the surrounding rocks. The writers know of no evidence whatever that the breccias were formed by this means.

4. The entire area was under extreme pressure. There was a sudden release of pressure caused by an eruption of molten material or gas through to the surface. This sudden release of pressure caused a violent migration of material toward the point of release.

Objection: The spider web of dikes out from the Sacramento Hill Stock shows that material was forced up or out by a deeper seated pressure rather than inward toward a point of sudden release.

5. The magma of Sacramento Stock was intruded into the limestones but was not extruded onto the surface. Cooling and crystallization started with a consequent rise in pressure of the remaining magmatic solution. This resulted first in the release of hydrothermal solutions which pyritized the surrounding rocks. Later

as crystallization progressed and solution pressures rose sufficiently, an escape of gases or liquids along all available paths occurred. The gases, having velocity, were then able to force along their myriad channels fragments of the outer solidified shell of porphyry together with fragments of all rocks traversed. Fragments of this clastic stream helped abrade the walls of the channel and enlarge it; gas pressure ahead of the intrusive pressure helped open channels for the fragmental material. Later, ore solutions followed these breccia dikes replacing susceptible portions of the dikes on the adjacent limestones.

This last explanation is favored by the writers. While it is hardly susceptible of proof, it does answer most of the problems posed by the Bisbee breccia dikes.

The same idea of rising pressure due to crystallization of a silicate system has been used by others to account for intrusive breccias--notably by W. H. Emmons and F. M. Chase.

Not for Publication

W. G. Hogue & H. E. Metz
Bisbee, Arizona
May, 1956

mbb

INTRUSIVE BRECCIA SPECIMEN INDEX

Lavender Pit Specimen No. 1 to No. 5 inclusive.

All show intense hydrothermal alteration.

No. 1 - Fragments of Pinal schist and Bolsa quartzite. Cluster of pyrite blebs near top of specimen believed to be intrusive.

No. 2 - Rounded porphyry fragment at the top left. Other fragments too altered to identify.

No. 3 - Note the rounded pebble of sulphide near the bottom of the specimen. Other fragments of porphyry and Bolsa quartzite.

No. 4 - Fragments of Pinal schist and porphyry.

No. 5 - Rounded boulder - probably Pinal schist.

Breccia specimens from the Abrigo Limestone No. 6 to No. 12 inclusive.

Minimum distance of travel normal to the bedding: Pinal schist - 1000 feet
Bolsa quartzite - 600 feet

No. 6 - Sawed face shows fragments of porphyry and pyritic limestone. Schist fragments are identifiable on the rough sides.

No. 7 - Small dike consisting of fragments of Pinal schist, limestone and pyrite. Massive pyrite on the walls probably pre-dike. Note the bornite stringers cutting pyrite and dike material on the rough face.

No. 8 - Fragments of Schist, Bolsa quartzite and porphyry. Nearest known porphyry instrusive is 400 feet.

No. 9 - Rounded fragments of Pinal schist, Bolsa quartzite and pyrite.

No. 10 - Specimen from an ore body showing incomplete replacement by ore minerals. The unreplaced fragments are Bolsa quartzite and Pinal schist.

No. 11 - Specimen from an ore body, like No. 10 shows incomplete replacement by ore minerals.

No. 12 - Pebble of Bolsa quartzite from the same breccia as No. 10.

No. 13 to No. 17 inclusive - Breccia specimen from the Campbell pipe showing dissimilar limestone and various degrees of replacement.

No. 19 - Quartzite boulder.

No. 20 - Limestone boulder.

No. 21 - Quartzite boulder.

Hole on Silver Queen Claim

Hole No. 2 = 369 ft deep.
45° into the hill (SE)

0-13' - Dense quartzite schist
Minor sulfs almost from start.
Py. Very little, if any, enrichment
±100% Recovery

13'-21' - Quartzite schist dense.
Scattered Py - Streaks Ox - Patches Spec.
Very little if any, enrichment
± 80% Recovery

21'-31' Somewhat less qtzite
Ank lay (peg?) qtz
± 90% Recov

31'-41'8 ±90% Recov
40'-41'8 - Start of Reber sample
Very fine sulfs (CC?) can hardly see
with 30 Power

Amt. of enrichment? Cpy?
Ank (peg?) qtz

No. 2 Contd

41.8 to 56'6 - ±65% Recov. All is cut for Relief sample.
Moderately glzitic
Some fine, scattered suefs

56-66' - 100% Recov' - Relief sample ends at 60'.

Some shec & chy near 60'

Ox reaphlare 60' to 66'
Limonite along a few seams
Minor Relief Limonite ✓
60-66 Rather glzitic, fracturing improved.

66.6 to 75.7 - ±100%

66 to 70 Ditto - Some relief limonite in thin fracture ✓

70-75.7 Dense, glzitic

75.7 to 85.8 - ±100%
Dense, glzitic
Minor ox.
Few suefs

85.8 to 95.3 – Qtzitic - Light ox. Few, if any sulfs. No. 2. Could
±100%

95.3 – 104.6 Hard, qtzitic
±100% Few, if any sulfs

104.6 – 114 Qtzitic - Some ox - altn Py
±100%

114 – 129.4 Mostly qtzitic
±60% Ox streaks to 116
Some peg(?) qtz 116' to 117'

129.4 – 139.4 – Darker qtzitic schist
100%

139.4 – 149 – Somewhat less qtzitic
100% Speckled py here & there

149 – 159. Ditto
100% A little spec

No. 2 Contd

AX to 156
EX starts at 154

159 to ? — Ditto
Some ox along streaks

? to 177.6 — qtzitic. Some py

177.6 to 187.6" — granules of py along seam near 186.
100%

187.6 to 198.6
±90% — 187.6 - 188.6 - Scattered veinlets
Some py ? & cc? Very fine grained
Some ox
Some py to 198.6

198.6 to 209.8" — Qtzitic -
±90% Some ox at 200' (Cly band?)

209.8 to 222 — Mostly qtzitic
A few thin streaks py & chlor.

222 to 232.6 — Somewhat less qtzitic
227 - 229 Py, chlor, & "red alt"
229 - 232.6 Py in thin streaks

232⁶ to 249⁸ – Ditto - Py - Some ox

249⁸ to 261⁸ – Gtzitic - Some py, Scattered ox

261⁸ - 276 – Gtzitic - Mostly ox

269 - 276 Brecciated chlor > alt - Spot of relict limonite?

276 to 286 – Brecciated
100% Chlor > "red" alt.
Ox - py > pink py (xpans)

286 to 305⁴ – Ditto - Gtzitic

305⁴ to 319⁶ - – Ditto

319⁶ to 336 – Less gtzitic - Less brec. - Spots of sulf assoc with "red." alt

336 to 348⁶ – Ditto. Some brec. - Little alt. Little sulf.

348⁶ to 361 – Ditto - Less gtzitic

361 to 369 Ditto

Foliation angle near bottom is ±45°

Summary of Hole No. 2.

Rock - Qtzitic

Alt - Meager - Probably some sericite
Qtz is pegmatitic type & in
veinlets & lenses - Some propylitic
(?) near bottom hole.

Sulfs - Spare & fine grained -
Scattered in some of rk &
along a few veinlets
Mostly py - a little cpy, only
Secondary cc & dikes
Apparently very spare - Probably
some in 40' to 60' where Reber
sampled -

Hole No. 2 Rebar Samples

		Cu	SiO_2	Al_2O_3	Fe
40 - 45	——	0.33	77	10.5	4.5
45 - 50	—	0.02	80	9.5	3.2
50 - 55	—	0.04	75	10.7	4.8
55 - 60	—	0.47	72	10.1	7.9

Vert- the way / Hole No. 1 Wee Wee Claim
Exact

0-55' - No core

55'-78' - ±40% Recov. Sericitic schist Qz veinlets after Py Fresh py at ±58' } Sludge ± 0.10%

78-90 - Ser. Schist Tiny oxidiz specks rec FeO (Pseud. L.? or Shec?) A few thin veinlets of clean py

90-118 - Ser. schist - Same specks Veinlets clean py

120-129 — Ser schist ±100% Same Specks Veinlets Clean py

129 to 148' - Ditto

148' to 170 - Ditto

170 to 181 - Ditto

Sample of core in 181 bags

Hole No. 1 Cont'd

181 to 198 - Schist darkens & looks fresh
a little clean py. Very few specks

198 to 209 - Sericitic schist
Fresh py

209 to 217 - Ditto, Very lean mineralization
~~More specks~~

221 to 230 — Ditto, more specks

230 to 240 — Ditto

240 to 253 — Ditto - Qtz-py @ 252 - 253

253 to 266 - Sericitic schist, Scattered py.
Rounded up 5'? Rounded spots of spec-

271 to 289 — Ditto

289 to 306 — Ditto

306 to 317⁶ — Ditto

317⁶ to 329 — Ditto - Shot of qtz at 318½

329 to 340 — Ditto - Spots of qtz

340 to 354⁶ — Ditto " "

354⁶ to 357⁹ — Ditto " "

357⁹ to 381 — Sericitic schist - A little py to 392

381 to 399 — " " "

Qtzitic " at 392

399 to 409 — Glzitic Sch. Thin seams clean Py

409 to 419 — " " to 415 " " "
Siliceous " begins at 415 —
Poor alt - Clean Py

419 to 428½ — Ser. Sch to 423
Glzitic " starts at 423 } Py

428½ to 442 — Glzitic Sch. Py

442 to 451 — Ditto

451 to 462 — Ditto to 458
Ser. Sch at 458 - Py

462 to 473 — Ser. Sch - dark - Py

473 to 483 — Ser. Sch — Py

483 to 495 — Becomes very fine sandy -
Med gray - Py

495 to 505 — Ditto

505 to 515 — Glzitic Sch. Py

515 to 525 — Ditto

525 to 534 — Ditto

534 to 546 — More shaly - Py

546 to 557 — Sandy - Py

557 to 569 — Ditto

569 to 580 — Very fine sandy. Py as tiny scattered specks

580 to 591 — Ditto - Py in thin veinlets

591 to 601 — Ditto " " "

601 to 606 — Ditto

Sludge from Hole No. 1 averages
± 0.10% Cu (R.D. Assays)
0.05 at bottom
Primary value 0.05 to 0.10%

Summary of Hole No. 1

Enrichment almost entirely lacking.

CLASS OF SERVICE DESIRED			
DOMESTIC		CABLE	
TELEGRAM		ORDINARY	
DAY LETTER		URGENT RATE	
SERIAL		DEFERRED	
OVERNIGHT TELEGRAM		NIGHT LETTER	
SPECIAL SERVICE		SHIP RADIOGRAM	

Patrons should check class of service desired; otherwise the message will be transmitted as a telegram or ordinary cablegram.

WESTERN UNION

1213-D

R. B. WHITE
PRESIDENT

NEWCOMB CARLTON
CHAIRMAN OF THE BOARD

J. C. WILLEVER
FIRST VICE-PRESIDENT

CHECK
ACCOUNTING INFORMATION
TIME FILED

Send the following telegram, subject to the terms on back hereof, which are hereby agreed to

To Thomas G. Moore

Dec 8 19 53

Street and No. American Metal Company

Place 61 Broadway
New York, N.Y.

Due to illness in family must return to Scottsdale postponing arrival Bisbee until evening December 9. Have so advised interested parties

E.H. Pennebaker

Sender's address for reference

TELEGRAPH BIRTHDAY GREETINGS—25c TO ANY WESTERN UNION POINT IN U. S. 20c LOCALLY

Scottsdale - Phone WH-5-6968

Sender's telephone number

ALL MESSAGES TAKEN BY THIS COMPANY ARE SUBJECT TO THE FOLLOWING TERMS:

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1. The Company shall not be liable for mistakes or delays in the transmission or delivery, or for non-delivery, of any message received for transmission at the unrepeated-message rate beyond the sum of five hundred dollars; nor for mistakes or delays in the transmission or delivery, or for non-delivery, of any message received for transmission at the repeated-message rate beyond the sum of five thousand dollars, unless specially valued; nor in any case for delays arising from unavoidable interruption in the working of its lines; nor for errors in cipher or obscure messages.

2. In any event the Company shall not be liable for damages for mistakes or delays in the transmission or delivery, or for the non-delivery, of any message, whether caused by the negligence of its servants or otherwise, beyond the actual loss, not exceeding in any event the sum of five thousand dollars, at which amount the sender of each message represents that the message is valued, unless a greater value is stated in writing by the sender thereof at the time the message is tendered for transmission, and unless the repeated-message rate is paid or agreed to be paid, and an additional charge equal to one-tenth of one per cent of the amount by which such valuation shall exceed five thousand dollars.

3. The Company is hereby made the agent of the sender, without liability, to forward this message over the lines of any other company when necessary to reach its destination.

4. Except as otherwise indicated in connection with the listing of individual places in the filed tariffs of the Company, the amount paid for the transmission of a domestic telegram or an incoming cable or radio message covers its delivery within the following limits: In cities or towns of 5,000 or more inhabitants where the Company has an office which, as shown by the filed tariffs of the Company, is not operated through the agency of a railroad company, within two miles of any open main or branch office of the Company; in cities or towns of 5,000 or more inhabitants where, as shown by the filed tariffs of the Company, the telegraph service is performed through the agency of a railroad company, within one mile of the telegraph office; in cities or towns of less than 5,000 inhabitants in which an office of the Company is located, within one-half mile of the telegraph office. Beyond the limits above specified the Company does not undertake to make delivery, but will endeavor to arrange for delivery as the agent of the sender, with the understanding that the sender authorizes the collection of any additional charge from the addressee and agrees to pay such additional charge if it is not collected from the addressee. There will be no additional charge for deliveries made by telephone within the corporate limits of any city or town in which an office of the Company is located.

5. No responsibility attaches to this Company concerning messages until the same are accepted at one of its transmitting offices; and if a message is sent to such office by one of the Company's messengers, he acts for that purpose as the agent of the sender.

6. The Company will not be liable for damages or statutory penalties in any case where the claim is not presented in writing to the Company within sixty days after the message is filed with the Company for transmission; provided, however, that this condition shall not apply to claims for damages or overcharges within the purview of Section 415 of the Communications Act of 1934.

7. It is agreed that in any action by the Company to recover the tolls for any message or messages the prompt and correct transmission and delivery thereof shall be presumed, subject to rebuttal by competent evidence.

8. Special terms governing the transmission of messages according to their classes, as enumerated below, shall apply to messages in each of such respective classes in addition to all the foregoing terms.

9. No employee of the Company is authorized to vary the foregoing.

12-40

THE WESTERN UNION TELEGRAPH COMPANY
INCORPORATED
R. B. WHITE, PRESIDENT

CLASSES OF SERVICE

DOMESTIC SERVICES

TELEGRAMS
A full-rate expedited service.

DAY LETTERS
A deferred service at lower than the standard telegram rates.

SERIALS
Messages sent in sections during the same day.

OVERNIGHT TELEGRAMS
Accepted up to 2 A.M. for delivery not earlier than the following morning at rates substantially lower than the standard telegram or day letter rates.

SHIP RADIOGRAMS
A service to ships at sea, in all parts of the world. Plain language or code language may be used.

CABLE SERVICES

ORDINARIES
The standard service, at full rates. Code messages, consisting of 5-letter groups only, at a lower rate.

DEFERREDS
Plain-language messages, subject to being deferred in favor of full-rate messages.

NIGHT LETTERS
Overnight plain-language messages.

URGENTS
Messages taking precedence over all other messages except government messages.

THERE IS A SPECIAL LOW-RATE WESTERN UNION SERVICE FOR EVERY SOCIAL NEED

Telegrams of the categories listed at the right, to any Western Union destination in the United States

TELEGRAMS OF PRESCRIBED FIXED TEXT— — — — —	25¢
TELEGRAMS OF SENDER'S OWN COMPOSITION. First 15 words — —	35¢
LOCAL CITY TELEGRAMS — — — — — — — —	20¢

TOURATE TELEGRAMS, for TRAVELERS. First 15 words — — 35¢
(Additional Words, 2½¢ each)

GREETINGS AT

Christmas New Year Easter
Valentine's Day Mother's Day Father's Day
Jewish New Year Thanksgiving

CONGRATULATIONS ON

Anniversaries Weddings
Birthdays Commencement
Birth of a Child

MISCELLANEOUS

Bon Voyage telegrams "Pep" telegrams
Kiddiegrams (No 35¢ rate)

ASK AT ANY WESTERN UNION OFFICE OR AGENCY FOR FULL INFORMATION

CLASS OF SERVICE DESIRED			
DOMESTIC		CABLE	
TELEGRAM		ORDINARY	
DAY LETTER		URGENT RATE	
SERIAL		DEFERRED	
OVERNIGHT TELEGRAM		NIGHT LETTER	
SPECIAL SERVICE		SHIP RADIOGRAM	

Patrons should check class of service desired; otherwise the message will be transmitted as a telegram or ordinary cablegram.

WESTERN UNION

1213-D

R. B. WHITE
PRESIDENT

NEWCOMB CARLTON
CHAIRMAN OF THE BOARD

J. C. WILLEVER
FIRST VICE-PRESIDENT

CHECK
ACCOUNTING INFORMATION
TIME FILED

Send the following telegram, subject to the terms on back hereof, which are hereby agreed to

To Joe Muheim, Jr

Street and No. PO. Box 490

Dec. 8 19 53

Place Douglas, Arizona

Regret must postpone arrival
Bisbee until Wednesday evening
December 9.

E. N. Pennebaker.

Sender's address for reference

TELEGRAPH BIRTHDAY GREETINGS—25c TO ANY WESTERN UNION POINT IN U. S. 20c LOCALLY

Scottsdale - Phone WH 5-6966

Sender's telephone number

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3. The Company is hereby made the agent of the sender, without liability, to forward this message over the lines of any other company when necessary to reach its destination.

4. Except as otherwise indicated in connection with the listing of individual places in the filed tariffs of the Company, the amount paid for the transmission of a domestic telegram or an incoming cable or radio message covers its delivery within the following limits: In cities or towns of 5,000 or more inhabitants where the Company has an office which, as shown by the filed tariffs of the Company, is not operated through the agency of a railroad company, within two miles of any open main or branch office of the Company; in cities or towns of 5,000 or more inhabitants where, as shown by the filed tariffs of the Company, the telegraph service is performed through the agency of a railroad company, within one mile of the telegraph office. Beyond the limits above specified the Company does not undertake to make delivery, but will endeavor to arrange for delivery as the agent of the sender, with the understanding that the sender authorizes the collection of any additional charge from the addressee and agrees to pay such additional charge if it is not collected from the addressee. There will be no additional charge for deliveries made by telephone within the corporate limits of any city or town in which an office of the Company is located.

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9. No employee of the Company is authorized to vary the foregoing.

THE WESTERN UNION TELEGRAPH COMPANY
INCORPORATED
R. B. WHITE, PRESIDENT

12-40

CLASSES OF SERVICE

DOMESTIC SERVICES

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A full-rate expedited service.

DAY LETTERS
A deferred service at lower than the standard telegram rates.

SERIALS
Messages sent in sections during the same day.

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Accepted up to 2 A.M. for delivery not earlier than the following morning at rates substantially lower than the standard telegram or day letter rates.

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A service to ships at sea, in all parts of the world. Plain language or code language may be used.

CABLE SERVICES

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The standard service, at full rates. Code messages, consisting of 5-letter groups only, at a lower rate.

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LOCAL CITY TELEGRAMS	35¢
TOURATE TELEGRAMS, for TRAVELERS. First 15 words (Additional Words, 2½¢ each)	35¢

GREETINGS AT
Christmas, New Year, Easter, Valentine's Day, Mother's Day, Father's Day, Jewish New Year, Thanksgiving

CONGRATULATIONS ON
Anniversaries, Weddings, Birthdays, Commencement, Birth of a Child

MISCELLANEOUS
Bon Voyage telegrams, "Pep" telegrams, Kiddiegrams (No 35¢ rate)

ASK AT ANY WESTERN UNION OFFICE OR AGENCY FOR FULL INFORMATION

Charge to the account of _____ $_____

CLASS OF SERVICE DESIRED			
DOMESTIC		CABLE	
TELEGRAM		ORDINARY	
DAY LETTER		URGENT RATE	
SERIAL		DEFERRED	
NIGHT LETTER		NIGHT LETTER	

Patrons should check class of service desired; otherwise the message will be transmitted as a telegram or ordinary cablegram.

WESTERN UNION

JOSEPH L. EGAN
PRESIDENT

1206

CHECK

ACCOUNTING INFORMATION

TIME FILED

Send the following telegram, subject to the terms on back hereof, which are hereby agreed to

CONFIRMATION

Mr. Thomas G. Moore
American Metal Company
61 Broadway
New York, N. Y.

Examination Muheim holdings near Bisbee reveals limited possibilities for only relatively small tonnages north of Dividend fault. Stop. Liklihood of finding enough ore to warrant an independent operation very remote. Stop. Recommend no further consideration of the area. Stop. Report will follow in due course.

E. N. PENNEBAKER

Day Letter phoned in at 10:10 A.M. - Dec. 14th.

ALL MESSAGES TAKEN BY THIS COMPANY ARE SUBJECT TO THE FOLLOWING TERMS:

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2. In any event the Company shall not be liable for damages for mistakes or delays in the transmission or delivery, or for the non-delivery, of any message, whether caused by the negligence of its servants or otherwise, beyond the actual loss, not exceeding in any event the sum of five thousand dollars, at which amount the sender of each message represents that the message is valued, unless a greater value is stated in writing by the sender thereof at the time the message is tendered for transmission, and unless the repeated-message rate is paid or agreed to be paid, and an additional charge equal to one-tenth of one per cent of the amount by which such valuation shall exceed five thousand dollars.

3. The Company is hereby made the agent of the sender, without liability, to forward this message over the lines of any other company when necessary to reach its destination.

4. Except as otherwise indicated in connection with the listing of individual places in the filed tariffs of the Company, the amount paid for the transmission of a domestic telegram or an incoming cable or radio message covers its delivery within the following limits: In cities or towns of 5,000 or more inhabitants where the Company has an office which, as shown by the filed tariffs of the Company, is not operated through the agency of a railroad company, within two miles of any open main or branch office of the Company; in cities or towns of 5,000 or more inhabitants where, as shown by the filed tariffs of the Company, the telegraph service is performed through the agency of a railroad company, within one mile of the telegraph office; in cities or towns of less than 5,000 inhabitants in which an office of the Company is located, within one-half mile of the telegraph office. Beyond the limits above specified the Company does not undertake to make delivery, but will endeavor to arrange for delivery as the agent of the sender, with the understanding that the sender authorizes the collection of any additional charge from the addressee and agrees to pay such additional charge if it is not collected from the addressee. There will be no additional charge for deliveries made by telephone within the corporate limits of any city or town in which an office of the Company is located.

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6. The Company will not be liable for damages or statutory penalties in the case of any message except an intrastate message in Texas where the claim is not presented in writing to the Company within sixty days after the message is filed with the Company for transmission, and in the case of an intrastate message in Texas the Company will not be liable for damages or statutory penalties where the claim is not presented in writing to the Company within ninety-five days after the cause of action, if any, shall have accrued; provided, however, that neither of these conditions shall apply to claims for damages or overcharges within the purview of Section 415 of the Communications Act of 1934.

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10-42

CLASSES OF SERVICE

DOMESTIC SERVICES

TELEGRAMS

A full-rate expedited service.

DAY LETTERS

A deferred service at lower than the standard telegram rates.

SERIALS

Messages sent in sections during the same day.

NIGHT LETTERS

Accepted up to 2 A.M. for delivery not earlier than the following morning at rates substantially lower than the standard telegram or day letter rates.

CABLE SERVICES

ORDINARIES

The standard service, at full rates. Code messages, consisting of 5-letter groups only, at a lower rate.

DEFERREDS

Plain-language messages, subject to being deferred in favor of full-rate messages.

NIGHT LETTERS

Overnight plain-language messages.

URGENTS

Messages taking precedence over all other messages except government messages.

Charge to the account of _____ $_____

CLASS OF SERVICE DESIRED			
DOMESTIC		CABLE	
TELEGRAM		ORDINARY	
DAY LETTER		URGENT RATE	
SERIAL		DEFERRED	
NIGHT LETTER		NIGHT LETTER	

Patrons should check class of service desired; otherwise the message will be transmitted as a telegram or ordinary cablegram.

WESTERN UNION

JOSEPH L. EGAN
PRESIDENT

1206

CHECK
ACCOUNTING INFORMATION
TIME FILED

Send the following telegram, subject to the terms on back hereof, which are hereby agreed to

CONFIRMATION

Mr. Thomas G. Moore
American Metal Company
61 Broadway
New York, N. Y.

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5. No responsibility attaches to this Company concerning messages until the same are accepted at one of its transmitting offices: and if a message is sent to such office by one of the Company's messengers, he acts for that purpose as the agent of the sender.

6. The Company will not be liable for damages or statutory penalties in the case of any message except an intrastate message in Texas where the claim is not presented in writing to the Company within sixty days after the message is filed with the Company for transmission, and in the case of an intrastate message in Texas the Company will not be liable for damages or statutory penalties where the claim is not presented in writing to the Company within ninety-five days after the cause of action, if any, shall have accrued; provided, however, that neither of these conditions shall apply to claims for damages or overcharges within the purview of Section 415 of the Communications Act of 1934.

7. It is agreed that in any action by the Company to recover the tolls for any message or messages the prompt and correct transmission and delivery thereof shall be presumed, subject to rebuttal by competent evidence.

8. Special terms governing the transmission of messages according to their classes, as enumerated below, shall apply to messages in each of such respective classes in addition to all the foregoing terms.

9. No employee of the Company is authorized to vary the foregoing.

10-42

CLASSES OF SERVICE

DOMESTIC SERVICES

TELEGRAMS
A full-rate expedited service.

DAY LETTERS
A deferred service at lower than the standard telegram rates.

SERIALS
Messages sent in sections during the same day.

NIGHT LETTERS
Accepted up to 2 A.M. for delivery not earlier than the following morning at rates substantially lower than the standard telegram or day letter rates.

CABLE SERVICES

ORDINARIES
The standard service, at full rates. Code messages, consisting of 5-letter groups only, at a lower rate.

DEFERREDS
Plain-language messages, subject to being deferred in favor of full-rate messages.

NIGHT LETTERS
Overnight plain-language messages.

URGENTS
Messages taking precedence over all other messages except government messages.

CLASS OF SERVICE DESIRED			
DOMESTIC		CABLE	
TELEGRAM		ORDINARY	
DAY LETTER		URGENT RATE	
SERIAL		DEFERRED	
OVERNIGHT TELEGRAM		NIGHT LETTER	
SPECIAL SERVICE		SHIP RADIOGRAM	

Patrons should check class of service desired; otherwise the message will be transmitted as a telegram or ordinary cablegram.

WESTERN UNION

1213-D

R. B. WHITE
PRESIDENT

NEWCOMB CARLTON
CHAIRMAN OF THE BOARD

J. C. WILLEVER
FIRST VICE-PRESIDENT

CHECK
ACCOUNTING INFORMATION
TIME FILED

Send the following telegram, subject to the terms on back hereof, which are hereby agreed to

To Henry Muheim — Dec 8 1953

Street and No. Phone 646

Place Bisbee, Arizona

Regret must postpone arrival
Bisbee until Wednesday evening
December 9.

E. N. Pennebaker

Sender's address for reference

TELEGRAPH BIRTHDAY GREETINGS—25c TO ANY WESTERN UNION POINT IN U. S. 20c LOCALLY

Seattle, Wn. - DL

Sender's telephone number

ALL MESSAGES TAKEN BY THIS COMPANY ARE SUBJECT TO THE FOLLOWING TERMS:

To guard against mistakes or delays, the sender of a message should order it repeated, that is, telegraphed back to the originating office for comparison. For this, one-half the unrepeated message rate is charged in addition. Unless otherwise indicated on its face, this is an unrepeated message and paid for as such, in consideration whereof it is agreed between the sender of the message and this Company as follows:

1. The Company shall not be liable for mistakes or delays in the transmission or delivery, or for non-delivery, of any message received for transmission at the unrepeated-message rate beyond the sum of five hundred dollars; nor for mistakes or delays in the transmission or delivery, or for non-delivery, of any message received for transmission at the repeated-message rate beyond the sum of five thousand dollars, unless specially valued; nor in any case for delays arising from unavoidable interruption in the working of its lines; nor for errors in cipher or obscure messages.

2. In any event the Company shall not be liable for damages for mistakes or delays in the transmission or delivery, or for the non-delivery, of any message, whether caused by the negligence of its servants or otherwise, beyond the actual loss, not exceeding in any event the sum of five thousand dollars, at which amount the sender of each message represents that the message is valued, unless a greater value is stated in writing by the sender thereof at the time the message is tendered for transmission, and unless the repeated-message rate is paid or agreed to be paid, and an additional charge equal to one-tenth of one per cent of the amount by which such valuation shall exceed five thousand dollars.

3. The Company is hereby made the agent of the sender, without liability, to forward this message over the lines of any other company when necessary to reach its destination.

4. Except as otherwise indicated in connection with the listing of individual places in the filed tariffs of the Company, the amount paid for the transmission of a domestic telegram or an incoming cable or radio message covers its delivery within the following limits: In cities or towns of 5,000 or more inhabitants where the Company has an office which, as shown by the filed tariffs of the Company, is not operated through the agency of a railroad company, within two miles of any open main or branch office of the Company; in cities or towns of 5,000 or more inhabitants where, as shown by the filed tariffs of the Company, the telegraph service is performed through the agency of a railroad company, within one mile of the telegraph office; in cities or towns of less than 5,000 inhabitants in which an office of the Company is located, within one-half mile of the telegraph office. Beyond the limits above specified the Company does not undertake to make delivery, but will endeavor to arrange for delivery as the agent of the sender, with the understanding that the sender authorizes the collection of any additional charge from the addressee and agrees to pay such additional charge if it is not collected from the addressee. There will be no additional charge for deliveries made by telephone within the corporate limits of any city or town in which an office of the Company is located.

5. No responsibility attaches to this Company concerning messages until the same are accepted at one of its transmitting offices; and if a message is sent to such office by one of the Company's messengers, he acts for that purpose as the agent of the sender.

6. The Company will not be liable for damages or statutory penalties in any case where the claim is not presented in writing to the Company within sixty days after the message is filed with the Company for transmission; provided, however, that this condition shall not apply to claims for damages or overcharges within the purview of Section 415 of the Communications Act of 1934.

7. It is agreed that in any action by the Company to recover the tolls for any message or messages the prompt and correct transmission and delivery thereof shall be presumed, subject to rebuttal by competent evidence.

8. Special terms governing the transmission of messages according to their classes, as enumerated below, shall apply to messages in each of such respective classes in addition to all the foregoing terms.

9. No employee of the Company is authorized to vary the foregoing.

12-40

THE WESTERN UNION TELEGRAPH COMPANY
INCORPORATED
R. B. WHITE, PRESIDENT

CLASSES OF SERVICE

DOMESTIC SERVICES

TELEGRAMS
A full-rate expedited service.

DAY LETTERS
A deferred service at lower than the standard telegram rates.

SERIALS
Messages sent in sections during the same day.

OVERNIGHT TELEGRAMS
Accepted up to 2 A.M. for delivery not earlier than the following morning at rates substantially lower than the standard telegram or day letter rates.

SHIP RADIOGRAMS
A service to ships at sea, in all parts of the world. Plain language or code language may be used.

CABLE SERVICES

ORDINARIES
The standard service, at full rates. Code messages, consisting of 5-letter groups only, at a lower rate.

DEFERREDS
Plain-language messages, subject to being deferred in favor of full-rate messages.

NIGHT LETTERS
Overnight plain-language messages.

URGENTS
Messages taking precedence over all other messages except government messages.

THERE IS A SPECIAL LOW-RATE WESTERN UNION SERVICE FOR EVERY SOCIAL NEED

Telegrams of the categories listed at the right, to any Western Union destination in the United States

TELEGRAMS OF PRESCRIBED FIXED TEXT— — — — —	25¢
TELEGRAMS OF SENDER'S OWN COMPOSITION. First 15 words — —	35¢
LOCAL CITY TELEGRAMS — — — — — — —	20¢
TOURATE TELEGRAMS, for TRAVELERS. First 15 words — — (Additional Words, 2½¢ each)	35¢

GREETINGS AT
Christmas, New Year, Easter, Valentine's Day, Mother's Day, Father's Day, Jewish New Year, Thanksgiving

CONGRATULATIONS ON
Anniversaries, Weddings, Birthdays, Commencement, Birth of a Child

MISCELLANEOUS
Bon Voyage telegrams, "Pep" telegrams, Kiddiegrams (No 35¢ rate)

ASK AT ANY WESTERN UNION OFFICE OR AGENCY FOR FULL INFORMATION

December 4, 1953

Mr. Joe Muheim, Jr.
P.O. Box 490
Douglas, Arizona

Dear Mr. Muheim:

I have a copy of Mr. Jack A. James' letter to you under date of December 2, 1953, regarding my visit to your property near Bisbee next week.

I shall plan on being at the Copper Queen Hotel in Bisbee at 5 P.M. on December 8. In the event that I arrive earlier I shall find my way up to the drill.

Yours very truly

E. N. PENNEBAKER

ENP:mc

cc - Mr. Jack A. James
Mr. Thomas G. Moore

603 Westborough
Webster Groves 19, Missouri

December 2, 1953

Mr. Joe Muheim, Jr.
P. O. Box 490
Douglas, Arizona

Dear Mr. Muheim:

Mr. Pennebaker will go ahead with his plans to visit your property near Bisbee on December 8. He will contact your brother, Henry Muheim, at telephone 646 in Bisbee before 8 am or after 5 pm, or at the drilling on the Silver Queen claim in upper Brewery Gulch between 8 am and 5 pm.

Very truly yours,

AMCO EXPLORATION, INC.

Jack A. James

Jack A. James

cc: New York
E. N. Pennebaker

AMCO EXPLORATION, INC.
61 BROADWAY
NEW YORK 6, N.Y.

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

TORONTO OFFICE
68 YONGE STREET
TORONTO 1, CANADA

603 Westborough
Webster Groves 19, Missouri

December 2, 1953

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

Dear Penney:

The enclosed letter to Mr. Joe Muheim, Jr., will advise you of the arrangements made for your examination of the Muheim property near Bisbee on December 8. Mr. Henry Muheim will guide and assist you in any way.

Apparently they are going ahead with additional diamond drilling on this ground.

Best regards.

Sincerely,

Jack A. James

Jack A. James

cc: New York

603 Westborough
Webster Groves 19, Missouri

November 23, 1953

Mr. Joe Muheim, Jr.
P. O. Box 490
Douglas, Arizona

Dear Mr. Muheim:

The information you forwarded to me concerning your interests near Bisbee is now under consideration.

It will take a few days to go over this material, and it may be 10 days to two weeks before we will be able to adivse you of our interest relative to work in detail on the ground. In the meantime, we assume that we have the first refusal until we advise you of the extent of our interest.

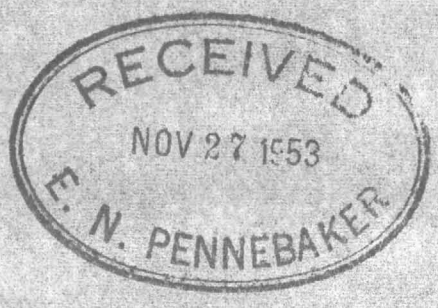
Very truly yours,

AMCO EXPLORATION, INC.

Jack A. James

Jack A. James

cc: New York
E. N. Pennebaker



THE AMERICAN METAL COMPANY, LIMITED
61 BROADWAY
NEW YORK 6, N.Y.

TELEPHONE BOWLING GREEN 9-1800
CABLE ADDRESS: EFFLUX, NEW YORK

PLEASE ADDRESS REPLY TO Geological & Exploration Department

SUBJECT:

AIR MAIL

November 25, 1953

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

Dear Penny:

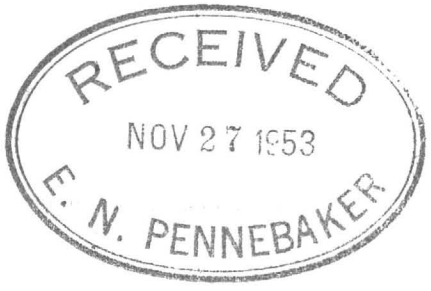
Jack James has written Mr. Joe Muheim, Jr., P. O. Box 490, Douglas, Arizona, to arrange for an examination by you of the Muheim Estate on December 8th. You should be hearing from Jack shortly with regard to the place of meeting Muheim, etc.

With best regards,

Sincerely yours,

Thomas G. Moore

TGM/R



THE AMERICAN METAL COMPANY, LIMITED
61 BROADWAY
NEW YORK 6, N.Y.

TELEPHONE BOWLING GREEN 9-1800
CABLE ADDRESS: EFFLUX, NEW YORK

PLEASE ADDRESS REPLY TO Geological & Exploration Department

SUBJECT:

AIR MAIL

November 19, 1953

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

Dear Penny:

Enclosed herewith is a copy of my letter of today to Jack James together with photostatic copies of the information forwarded on the Muheim interest in Bisbee.

From your recent letters, I know you are busy on matters other than those of The American Metal Company, but I hope that you will be willing to take the enclosed home with you and at least read J. B. Tenney's report of January 14, 1953. I would appreciate your letting us have your comments as soon as possible with copy, of course, to Jack James in Missouri.

With kindest regards,

Sincerely yours,

Thomas G. Moore

TGM/R

Enclosures

cc: Mr. Jack A. James

THE AMERICAN METAL COMPANY, LIMITED
61 BROADWAY
NEW YORK 6, N. Y.

TELEPHONE BOWLING GREEN 9-1800
CABLE ADDRESS: EFFLUX NEW YORK

PLEASE ADDRESS REPLY TO Geological & Exploration Department

SUBJECT: Muheim Interest near Bisbee, Arizona

November 19, 1953

Mr. Jack A. James
603 Westborough
Webster Groves 19, Missouri

Dear Jack:

I am sending photostatic copy of the material you forwarded on the Muheim interest near Bisbee, Arizona to Pennebaker. Copy of my letter of today to him is enclosed herewith.

I suggest that you advise Muheim that his property is under consideration and that we assume we have first refusal until he hears from us as to whether or not we are interested in following the matter up in detail on the ground. We will, of course, be able to advise him one way or the other within a reasonable time, say, ten days or two weeks.

With kindest regards,

Sincerely yours,

Thomas G. Moore

Enc.

TGM/R

cc: Mr. E.N. Pennebaker

603 Westborough
Webster Groves 19, Missouri

November 12, 1953

Mr. Joe Muheim, Jr.
Box 490
Douglas, Arizona

Dear Mr. Muheim:

The information on your drilling near Bisbee was in the office upon my return from a few days absence. I have had the opportunity to only glance through the reports.

You will hear from us again after we have had the chance to go over this material thoroughly.

Very truly yours,

AMCO EXPLORATION, INC.

Jack A. James

cc: New York

G E O L O G I C R E P O R T

Ø N

ANDERSON-MUHEIM, COCHISE COPPER, DREADNOUGHT GROUPS

BISBEE, ARIZONA.

BY

JAMES B. TENNEY, E. M.
MINING ENGINEER AND GEOLOGIST
252 N. MAIN STREET
TUCSON, ARIZONA.

JANUARY 14th, 1953.

GEOLOGIC REPORT
ON
ANDERSON-MUHEIM, COCHISE COPPER, DREADNOUGHT AND WINWOOD GROUPS, BISBEE, ARIZONA.

CONCLUSIONS This combined group of 49 patented claims and fractions in the Bisbee district, Arizona, has great possibilities of producing a concentrating ore body of disseminated chalcocite of large tonnage, in ground North of the Dividend Fault. It can be cheaply proved up be either diamond drilling or churn drilling, starting from a proved area in the Nancy Hanks claim of the Cochise Copper Company and in the Rucker claim of Phelps Dodge Corporation.

GEOLOGY AND ORE OCCURENCE The first and only serious work done underground in the past North of the Dividend Fault, was work from the Cochise shaft of the Cochise Copper Company. This shaft was sunk 900 feet deep in Dubacher Canyon. Drifting was done North and East on the 300, 600, and 900 foot levels and one drift was driven West on the 300 foot level. The deeper work from the two lower levels found disseminated pyrite with some molybdenite but copper values were very low. On the 300 foot level one drift driven West, passed through about 260 feet of disseminated chalcocite ore of a grade which averaged between 1% and 3% copper. A cross-cut driven to the South 170 feet into the Rucker claim of Phelps Dodge Corporation, developed similar ore on this claim. One raise in Nancy Hanks ground of the Cochise Copper Company, was put up 90 feet in 2½% ore, some of which was shipped. A second raise was put up at t the end of the Rucker cross-cut 75 feet, from which 2000 tons of 2% ore was shipped by lessees.

From the 300 foot level Czar which is about 130 feet higher than the 300 foot level Cochise, a 140 foot drift was driven North across the Dividend Fault which passed through 1.5% disseminated chalcocite ore. The whole area of disseminated chalcocite developed by this work was about 78,500 square feet with the face in the Nancy Hanks claim to the West still in ore. The total thickness, assuming 20 feet above and below bounding drifts was 170 feet. The total developed ore in the Nancy Hanks and Rucker claims is about 1,000,000 tons of ore which can be safely assumed to average better than 1.5% copper. All this ore was in schist. Of this tonnage, about 200,000 tons is in Nancy Hanks ground and 800,000 tons in Rucker ground, limited to the South by the Dividend Fault. Across this fault, between it and the Western end of the old Sacramento Hill pit, are numerous small stopes of massive oxide and sulphide ore which replace the contact breccia phase of the porphyry. These stopes extend from the 500 foot level to above the 200 foot level Czar-Holbrook. They were mined by square set and were filled with both barren limestone and low grade sulphide ore. The grade in this area in the Rucker, Dividend, Holbrook and Cogswell claims can safely be assumed to be (including stope fills and pillars of low grade ore) better than 1% copper, with a tonnage of about 15,000,000 tons. This is the area now being covered by waste dump from the current pit.

On the surface on both sides of the Dividend Fault there is a large area of highly sericitized porphyry and schist with much disseminated pyrite which on oxidising colors the area a bright red. This is the area designated on the accompanying map as Central Core of Sericitized Pyritized Material.

Surrounding this central core, South of the Dividend Fault, was found a semi-circular ring of rich direct shipping ore replacing Paleozoic limestone and a large body of high grade disseminated chalcocite replacing porphyry, the Northeast extension of which is now being mined in the Lavender pit. Nearly a billion dollars gross of metals was recovered from this ore directly associated with the Sacramento Hill mass of porphyry, mostly copper but considerable lead, zinc, gold, silver and some manganese.

The central core covers a large part of the Cochise Copper Company ground, all the Phelps Dodge ground North of the two pits, the Southeastern part of the Dreadnought group, the South three claims of the Anderson-Muheim group, Half of the Baltimore and Korpp claims, and most of the Gulch and 1/3 of the Windy claims of the Winwood group. This central core consists of both porphyry and schist. It is partly covered in the Anderson-Muheim and Winwood ground by Cretaceous Glance Conglomerate and Morita Formation. To the Southwest of this area in both Cochise Copper Company and Bisbee Townsite ground, the schist is colored brown and many spots occur of green copper stain. In Brewery Gulch in this area, pyrite associated with chalcopyrite occurs 1300 feet North of the Dividend Fault in schist.

To the North-West of this area in Dreadnought ground and beyond into the Alpha calim, the brown-stained schist extends better than 3500 feet with occasional spots of green copper stains and bunches of pyrite and chalcopyrite.

To the North-East of the boundary of the central core, the brown-stained schist, Glance Conglomerate and Morita Formation occurs in Anderson-Muheim, Cochise Copper Company and Winwood ground as a belt better than 600 feet wide and 8000 feet long and extends into Denn ground North of the Dividend Fault.

The whole area of brown-stained schist, Glance Conglomerate, Morita Formation surrounding the central core, North of the Dividend Fault, covered by Bisbee Townsite, Dreadnought group, Alpha calim, part of the Anderson-Muheim group, North and Western sides of the Cochise Copper Company group, and the Southern sides of the Winwood group, covers an area of about 20,000,000 square feet. If an average thickness of 300 feet of ore is assumed as possible, there is a possibility of 500,000,000 tons of ore, half the size of the Utah Copper Company ore body. All this possible ore would be amenable to open pit mining. The problem of how much depends on the thickness and grade of the material. These factors can be cheaply determined by drilling.

RECOMMENDATIONS To start the drilling, I would recommend No. 1 hole near the end of O. K. Street in the plot owned by the Joe Muheim estate. Side hill road building North about 800 feet and a turn to proceed South would give easy sites for holes Nos. 2, 3 and 4. If these first four holes show good grade and thickness, there would be a proved tonnage in Wee Wee, Leviathan and Western Nancy Hanks claims of about 30,000,000 tons, assuming 300 feet in thickness. This tonnage would be confined to Cochise Copper Company ground. Added to this would be an equal tonnage possible in Bisbee Twonsite ground on each side of Brewery Avenue. This 60,000,000 tons added to the nearly proved tonnage in Rucker, Dividend, Holbrook and Cogswell ground of 15,000,000 tons would make Cochise Copper Company's 30,000,000 tons extremely valuable to Phelps Dodge Corporation. It os readily seen that a real price would be paid for the Cochise Copper Company ground to prevent any one else getting hold of it.

I would not advise proceeding further with road building and drilling until after a deal were consummated with Phelps Dodge. The whole of the central core are covered by Cochise Copper Company ground could be safely included in such a deal, leaving out only the the Red Hill and Paragon claims which cover part of the favorable ground.

After a sale to Phelps Dodge Corporation were consummated, the proceeds should be more than ample to finance the drilling of the rest of the ground and to pay for the outside groups (Dreadnought, Winwood, Baltimore and Korpp claims.)

The road building and drilling for the rest of the ground is shown tentatively in the accompanying map. I am recommending 13 more holes. Depending on the location of the holes already drilled on Winwood ground it is probable that 4 more holes would have to be drilled on Winwood ground to complete the development. The Phelps Dodge slae, if plans succeed, should be more than ample to finance all this work.

After the successful completion of the above mentioned drilling program, any of the large copper groups such as Anaconda, Newmont, Kennecott or Phelps Dodge could be approached, to finance the mining of the remaining 400 or so million tons.

Presented by

James B. Tenney E. M.

Mining Engineer and Geologist

January 14th, 1953.

Copied from original by

Joe Muheim, Jr.

March 26, 1953.

COPY

603 Westborough
Webster Groves 19, Missouri

October 30, 1953

Mr. Henry Muheim
Bisbee, Arizona

Dear Mr. Muheim:

A couple of weeks ago I had the pleasure of pheasant hunting one day with your attorney, Mr. Martin Gentry, who informed me of your recent drilling program in Brewery Gulch, north of Bisbee.

Mr. Gentry felt you were interested in passing along the information to a major mining company for evaluation toward possible development of the property. Amco Exploration, Inc., is the exploration organization of The American Metal Company, Limited.

We would like to have the chance to review your set-up if you will forwarded us information on the type of land holdings, their location and sixes, maps, drillhole locations, depths, material encountered, assays, etc., to the above Webster Groves address.

Yours very truly,

AMCO EXPLORATION, INC.

Jack A. James

Joe Muheim, Jr.
Box 490,
Douglas, Arizona.

Nov. 4, 1953.

Amco Exploration, Inc.
603 Westborough
Webster Groves 19, Missouri

Attention - Mr. Jack A. James

Gentlemen:

Your letter of Oct. 30th, addressed to my brother, Henry Muheim, has been handed to me. We appreciate the opportumity of presenting our property to your company for their consideration.

The property consists of the following groups:

Muheim - Anderson	208 acres
Dreadnought	128 "
Alpha Claim	19 "

These are all patented mining claims located in the Bisbee District, Bisbee, Arizona. Approximately one-half of this acreage is in Pinal schist and the remainder in what is locally referred to as Morita formation, an altered limestone. The se claims form a contiguous group.

We have recently drilled on one claim of the Dreadnought Group. We have a diamond drill hole 125 feet deep and a churn drill hole 190 feet deep. We have had difficulties with both drillers. The diamond driller could not make a satisfactory sludge recovery and after cementing for over a week without improvement, he begged to be released from his contract. The churn driller has been unable to make satisfactory progress and no samples have been taken from this hole. He bails out at irregular intervals, therefor, any samples taken would not be acceptable to mining companies.

We are now awaiting the arrival of new diamond contractors. These men are competent drillers. They are finishing a seven year drill contract with Kennecott Copper Company, Ray, Arizona. They expect to be drilling for us within the next ten days.

I am enclosing copies of reports and other data that we have available at this time. We have other maps and etc., but do not have copies and are reluctant about releasing them. We have not made an effort to sell this property as we planned to develope it ourselves. We have had discussions with Phelps Dodge Corporation and Ventures, Ltd. regarding the property but never got beyond "bull sessions" with either

In the copy of the report by J. B. Tenney reference is made to the Cochise Development Company property. This group is contiguous with the above mentioned groups, however, the Muheim's own 50% and the Shattuck Trust owns 50%. There is 174 acres of patented ground in this block. If your company would be interested in this ground it could be discussed in Bisbee.

May I suggest that your company send a representative to examine our holdings. We do not have sufficient data to give anyone a clear picture of the proposition by correspondence. Then too, my brother and I are only practical miners with very little geological or engineering experience. I can assure you it will prove to be the most interesting proposition your company has examined in many years.

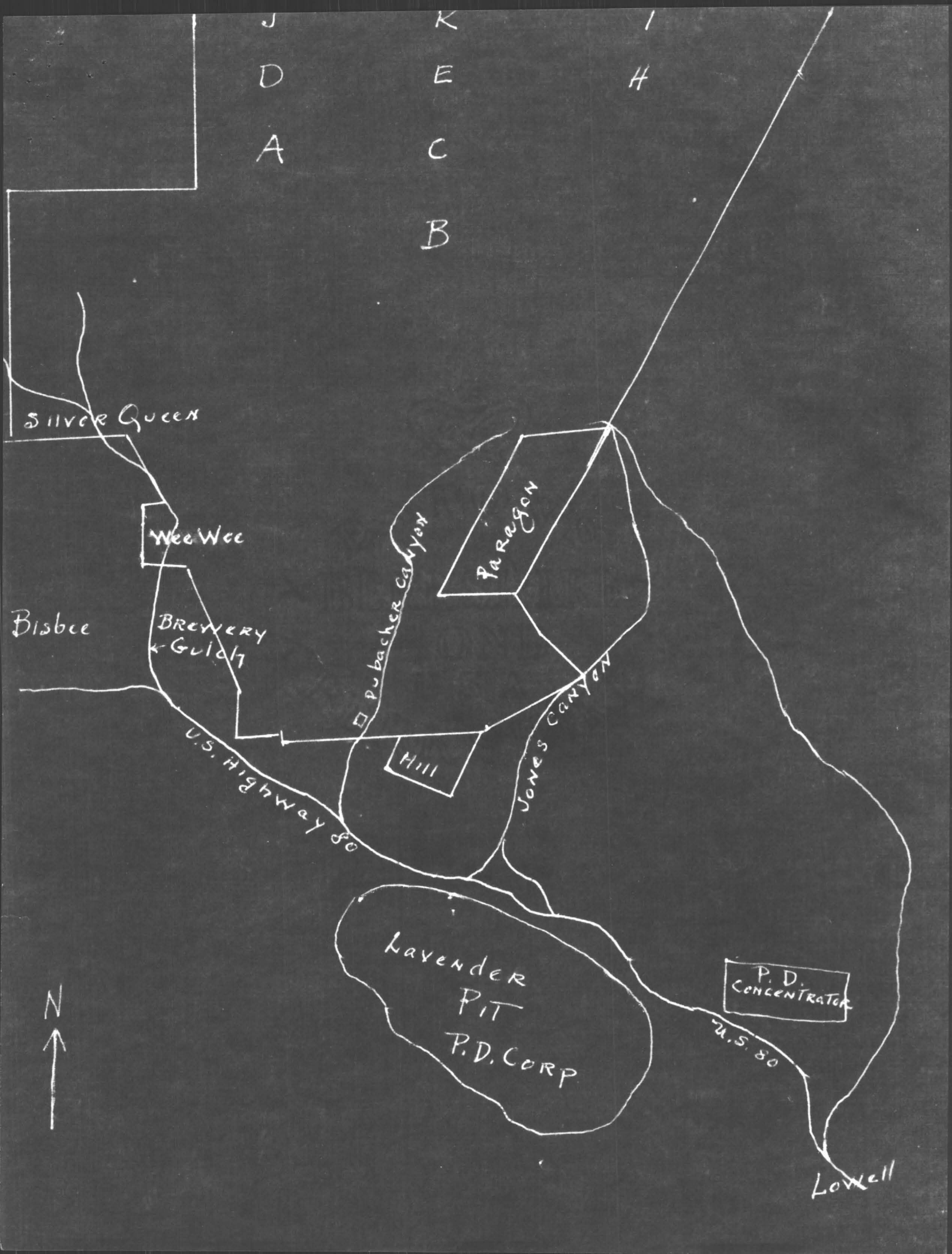
There are many topics worthy of discussion in connection with our holdings that can only be handled with your man on the ground. I hope that the material enclosed will be of sufficient value to arouse your interest and that you will give may brother and I an opportunity to meet you and show you what we have.

I will tell Martin Gentry about your inquiry and I'm certain that he would be glad to see you again.

Sincerely,

Jac Muheim Jr

m


J
K
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A
C
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Silver Queen
Wee Wee
Bisbee
Brewery Gulch
Pubacher Canyon
Paragon
Jones Canyon
U.S. Highway 80
Hill
Lavender Pit
P.D. Corp
P.D. Concentrator
U.S. 80
Lowell
N

Morenci, Arizona, December 11th. 1928.

Dr. Lewis R. Brown,
Brophy Building,
Douglas, Arizona

Dear Sir:

Pursuant to your request, I have carefully examined the Dreadnaught Group of claims located in the Warren Mining District, Bisbee, Arizona, and, herewith respectfully submit my report thereon:

This group of patented claims, located as they are in one of the outstanding mining districts of the Southwest, with excellent values showing near the surface, and an ore-body encountered by the one drift of the Silver Queen claim, presents one of the most favorable prospects that I have reported on in the past several years.

Before going into this report from a technical standpoint, I further wish to advise that I have learned from reliable sources that Mr. Tenney, formerly Chief Geologist for the Copper Queen Mining Company, had made an examination of this group of claims and reported favorably on them.

This group of claims known as "The Dreadnaught Group", consisting of the Red Jacket, Warren Boy, Silver Queen, Northern Light, High Flier, Bessie, and Copper Wedge, is located in and adjoining the Bisbee townsite. They are approximately, fifteen-hundred (1500) feet in a northernly direction from the Czar Mine; one of the first and richest producers of the district. Several other properties which have been bonanzas, and which are still producting, are located in close proximity to the Dreadnaught claims and the Czar mine.

The country rock common to this particular group of claims is a pre-Cambrian schist with granite intrusives in the form of dikes. The ore deposits of the Bisbee district occur in the country rock which was intruded in pre-Cretaceous times by a large mass of granite porphyry. Dikes and reticulating fingers of the molten rock were forced into the invaded rock far from the intrusive center. It is to the hot solutions, from the same magmatic reservoir as the porphyry, which followed closely upon the intrusion that the mineralization of the district is attributed.

The mineralizing solutions rendered powerful by their high temperature and great pressure penetrated to great distances following the most available line of weakness, such as a fault, or a fractured zone. When the right conditions prevailed with respect to temperature and pressure, the minerals were deposited. As a general rule, the out-crops and surface showings in the district are not striking.

Traversing the Silver Queen and the Bessie claims are two dikes, standing out in bold relief from the country rock, and intersecting on the Silver Queen Claim.

Seventy-five (75) feet in a northernly direction from this intersection of the dikes, a small drift, approximately fifteen (15) feet in length, has been driven toward the intersection disclosing chalcopyrite mineral throughout its length.

From the West, a drift, two-hundred (200) feet long has been driven to the intersection, disclosing a chalcopyrite ore-body carrying good values in gold, silver and copper; assays of which appear below, as well as a settlement sheet return for ore shipped from the drift.

At the end of this drift, a winze has been driven to a depth of thirty (30) feet, and ore is encountered throughout its depth.

A few hundred feet to the west of the dike intersection, and, a considerable distance to one side of the dike, a bore hole has been drilled to a depth of one-hundred and ninety (190) feet. This bore hole also, shows copper values throughout. A few hundred feet to the south of the dike intersection of the Copper Wedge claim, a very promising outcrop of chlorides are showing.

From the general geology of the district, and the mineral showings at or near the dikes and dike intersections, I am reasonably certain that this particular ore deposit is closely associated, geologically, with the formation of the dikes, and I would expect the deposit to extend to a great vertical depth, possible, a few hundred feet or more in width with values decreasing as the ore approaches the outer limits of the ore-body.

The topography is typical of the Bisbee district; towering hills, cut by deep ravines, and numerable washes affording good mill sites. The elevation of the claims varies from 5,300 feet to 6,000 feet. The vegetation is typical of the district, consisting for the most part of shrubs and semi-desert plants. There are but few trees on the claims, as nearly all the soil has been eroded, leaving the country rock exposed at some places, while at other places, the rock is covered by weathered rock fragments.

It would appear at first sight, that it would be difficult to handle transportation, but a more thorough examination reveals that a road or railroad could be constructed to the claims from the east. Possibly, coming in near the Shattuck-Denn mine, which is situated in a similar position from a geological standpoint. The

climate of the district is very mild, as would be expected.

From the small amount of exploration work that has been done, it is impossible to attempt to calculate the amount of ore present. This can readily be ascertained by a thorough diamond drilling campaign, or, by further exploration work such as has been done.

During my examination of the property, I took a sample of the ore from the winze, which assayed, as follows:

		Value per Ton
GOLD	.14 oz.	2.80
SILVER	1.50 oz.	.87
COPPER	15.50 %	45.00
		$ 48.67 PER TON.

When the winze, described above, was driven in 1913, a shipment of 3,300 pounds of ore, taken from the winze, was made to the Phelps Dodge Smelter at Douglas, Arizona, which assayed, as follows:

GOLD	- - - - -	Trace
SILVER	- - - - -	1.70 oz.
COPPER	- - - - -	17.58 %
IRON	- - - - -	30 %
INSOLUBLE	- - - - -	33.00 %

This netted the shipper, $35.06 per ton after the treatment, transportation and sampling charges were deducted.

This settlement sheet reveals, that the ore has a very low treatment charge, and, as the smelter at Douglas is only twenty-six (26) miles away, with good transportation facilities - the transportation charges are, also, very reasonable.

It is not expected that copper, under normal conditions, will ever again go under ten (10¢) cents, and, at present, one expects to approach twenty-five (25) cents in the next few years, and then fluctuate for the most part between fifteen and twenty-five cents; the minimum of which would net a very profitable return to even a small operator on this type of ore.

Skilled Mexican mine labor is plentiful in the Bisbee district at a nominal wage. Labor disturbances are practically unknown.

Due to the proximity of the property to Bisbee, power, water, timber, explosive and other necessary miscellaneous items can be secured at a minimum cost, and in any quantity desired.

In the further exploitation of this property, I would advise a thorough diamond drilling campaign to delineate the ore body, this, followed by a vertical or inclined shaft as the ore-body and topogrophical features indicate.

It would appear from the nature of the rock and mineral, that this ore would be susceptible to the incline top slicing or caving method, but this can be determined only by trial.

Along this line, I would further advise that a competent mining engineer be engaged at the beginning of operations to determine the exact location, size and kind of shaft best suited for the property and follow his suggestions in regards to development for the maximum returns on the capitol invested on the exploitation of the property.

Until further exploration work has been done, it would be impossible to estimate the maximum size of mine that should be developed on the property. From the ores explosed, a mine with a capacity of one-hundred (100) tons per day should prove very profitable, particularly so if the ore is susceptible to caving. A mine of this size would, probably, require a three to four-hundred foot shaft with two or more levels of a hundred and fifty (150) feet each. This amount of development work, with preliminary diamond drilling, and the machinery necessary to operate the mine successfully would cost from sixty (60) or seventy-five (75) thousand dollars.

If diamond drilling warrants operations on a larger scale, the costs of development would be in the same proportion.

It is interesting to note that the Bisbee district has producted, to date, well over $500,000,000. worth of metals, and the total dividends paid approximately $150,000,000. It is further interesting to note that the ore area has produced 2,200,000 pounds of copper per acre.

This property, in my estimation, can well be considered as being inside the ore area due to its close proximity to other producing mines and the mineral showings. Why it has not been further developed todate, I am at a loss to account for, unless it is that the companies operating in the district have merely surrounded their ore-bodies by the purchase of un-developed ground, and their operations have not extended as far as these claims.

From the above figures of the number of pounds of copper produced per acre, one can readily understand why the companies operating there are, for the most part, carrying on their operation on a relatively small area.

The writer wishes to acknowledge his indebtedness to Mr. H. F. Brown and F. W. Giroux, of the Tejon Company, who have gone over the property with me, and have given me valuable information as to the limits of the property; the general geology of the district, and of the property in particular.

Respectfully submitted,

/s/ George E. Zeigler, E. M.

GEZ/llb.

The best short and concise description of the geology of the district has been made by P. D. Wilson. It is as follows:

"The ore deposits of the Bisbee district, made famous by the Copper Queen, Calumet & Arizona, and Shattuck mines, occur in a great thickness of limestone of Paleozoic age, intruded in pre-Cretaceous times by a large mass of granite porphyry. Dikes and reticulating fingers of the molten rock were forced into the invaded sedimentaries far from the intrusive center. It is to the hot solutions from the same magmatic reservoir as the porphyry, which followed closely upon the intrusion, that the mineralization of the district is attributed. These mineralizing solutions, rendered powerful by their high temperature and great pressure, penetrated to remote distances from the central source the porphyry stock, following the most available lines of weakness, now a porphyry limestone contact, now a fault or fracture zone, now even a more soluble, or, for some other reason, more favorable limestone bed. When proper relative conditions of temperature and pressure obtained the solutions deposited their mineral loads, replacing either the more favorable beds or steep crushed fracture zones with copper and iron sulphide minerals and silica. Even a portion of the intrusive porphyry mass itself, exposed by erosion as Sacramento Hill, was sufficiently impregnated with copper minerals to make a low-grade concentrating ore. Subsequent erosion and oxidation changed the original sulphide minerals in those orebodies nearer the surface, to the oxidized or enriched forms.

"The fracture zones, which have formed important loci of mineralization, are those which trend a few degrees east or west of north, and are either vertical or have a steep dip either east or west.

"Solutions have followed such zones far beyond the limits of the known penetration of the porphyry, depositing their mineral contents in the steep crushed zones and along the more receptive beds, the orebodies sometimes extending for long distances from the fractures themselves. Those horizons which the extensive development work in the district has proven to be most favorable, are the lower 300 ft. of the Escabrosa, or Lower Carboniferous, limestone, the upper 100 ft. of the Martin, or Devonian, limestone, and the beds in the neighborhood of the Capping quartzite, a thin layer separating the Martin from the Abrigo or Cambrian limestone. In the outlying portions of the area, those more remote from Sacramento Hill porphyry stock, the lower beds appear to be somewhat more likely ore horizons.

"The orebodies of the district are most highly concentrated in a halo surrounding Sacramento Hill, occurring with decreasing frequency as the distance from this intrusive center increases. Valuable deposits have been found over 7,000 ft. away from the Sacramento stock. Only desultory prospecting has been done in ground further from the center than this."

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Muheim & Anderson
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Red Jacket
Northern Light
Alpha
Warren Boy
Dreadnought
High Flyer
Silver Queen
Bessie
Copper Wedge
Wee Wee
Red Hill
Helvetia
Dubacher
Carolina
Paragon
Iron Pig No 3
Leviathan
Henry G.
Bucket of Clubs
Cochise Dev. Co.
La Louise
Sulphide
McGinty
Yo Tambien
Shaft
Nancy Hanks
Pajaro
Hill
Bisbee
Dividend Fault
Rucker
U.S. 80
Dubacher Canyon
Jones Canyon
Copper King Shaft
Czar Shaft
Lavender Pit
P.D. Corp.
N
W
E
S

REPORT ON
MUHEIM PROPERTY
NEAR BISBEE, ARIZONA

**

E. N. PENNEBAKER Dec. 1953

E. N. PENNEBAKER
CONSULTING GEOLOGIST
SCOTTSDALE, ARIZONA

December 21, 1953

Mr. Thomas G. Moore, Mgr.
Geol. & Explor. Dept.
The American Metal Co., Ltd.
61 Broadway
New York 6, N. Y.

Dear Tom:

Enclosed are two copies of my report on the Muheim property near Bisbee.

Because of the poor showing of the ground I did not initiate any discussion with Henry Muheim regarding terms of option, sale, etc., nor did I look up his brother, Joe, in Douglas.

On leaving Henry Muheim I told him that I would submit my report to New York and that any further word to him would come via the main office. I suggest that you or Jack James write him regarding your decision.

With best holiday wishes,

Yours sincerely

E. N. PENNEBAKER

ENP:mc

AIRMAIL

February 1, 1954

603 Westborough Place
Webster Groves, 19, Mo.

Mr. Joe Muheim, Jr.
Box 490
Douglas, Arizona

Dear Mr. Muheim:

Thank you for your letter of January 19 in which you advise me that you have not yet heard anything from our company in regard to the property near Bisbee, Arizona.

I wish to apologize for the delay, but I have been out of town nearly all of the month of January and have only now seen your letter of January 19.

Following Mr. Pennybaker's visit to your property near Bisbee, the decision was reached, in light of other exploration activities going on at the moment within our organization, that we could not undertake a definite commitment on your property.

We shall be glad, however, to be advised, if you care to do so, of any subsequentinformation you may gain from this property by virtue of your drilling program.

Thank you very much for givingus the first consideration on this property, and we hope it may be possible for us to do business together in the future either on this property or perhaps other properties.

Very truly yours,

THE AMERICAN METAL COMPANY, LIMITED

Jack A. James

sl

cc--G & E Dept., N.Y.
E.N.Pennybaker

RECEIVED
FEB 2 - 1954
E. N. PENNEBAKER

POSSIBILITIES OF FINDING ORE ON THE MUHEIM HOLDINGS NEAR BISBEE, ARIZONA

SUMMARY

The Muheim property is mostly underlain by Pinal schist and is situated north of the Dividend fault, the other side of which has yielded practically all of Bisbee's past production. Although hydrothermal alteration and pyrite are abundant in schist and porphyry north of the fault, copper metallization is extremely light except for a few zones of limited extent. It appears that secondary solutions moving laterally to the south may have gathered enough copper to form relatively small disseminated chalcocite deposits where they were concentrated on the north side of the Dividend fault. Although copper ore bodies containing several million tons with 1 to 2% Cu. may have been formed in this manner, it appears very unlikely that any great deposit can be found that is large enough to warrant the entry of an outside mining company in this district.

INTRODUCTION

The various property holdings of the Muheim family near Bisbee, Arizona, were brought to the attention of Jack A. James of Amco by Martin Gentry, an attorney of Bisbee. It was then arranged for the writer to examine the ground on December 10 and 11, 1953, in company with Henry Muheim, who lives in Bisbee. His brother, Joe Muheim, Jr., resides in Douglas and is an employee of Phelps Dodge Corporation.

The accompanying map was compiled from many sources. Some of the claims do not fit properly, and the plan should be considered only as a sketch. It is believed that it shows the important features with sufficient accuracy to obviate the necessity of compiling a map of precise detail.

PRESENT SITUATION

Throughout its life the great bulk of the ore production of the Warren mining district near Bisbee has come from ground

lying south of the Dividend fault where Paleozoic limestones and younger porphyry constitute the host rocks. Although hydrothermal alteration is abundantly displayed north of the fault in Pinal schist and porphyry, only relatively little exploration has been carried on here. Some of this work, however, found a substantial amount of disseminated copper ore in Pinal schist beneath altered cap rock of a widespread type. Consequently certain people entertain the belief that this disseminated chalcocite ore will be equally widespread north of the fault and constitute an ore body of major importance. To check this possibility was the reason for the writer's recent examination.

The proximity of the rich ores in Czar and Holbrook ground to the southerly Muheim claims has been cited as a feature favoring the occurrence of ore in these Muheim claims. It should be remembered that between these areas the Dividend fault intervenes as a formidable barrier.

The Muheim family owns or has a substantial interest in several groups of patented mining claims lying north of the Dividend fault. These are:

Muheim-Anderson group.....	12 claims.....	208 acres
Dreadnaught group.....	8 claims.....	128 acres
Alpha claim.....		19 acres
Cochise Development Co.....	15 claims.....	175 acres
		530 acres

The Muheim interest in the Cochise Development Company is said to be 50% with the Shattuck Estate holding the other half.

These various claim groups are shown on the accompanying property map in relation to the dominant Phelps Dodge property covering the productive ground south of the Dividend fault. The Winwood group and certain other claims of outside ownership mentioned by Tenney lie to the east and are not designated on the property map.

On January 14, 1953, as a result of about a month's examination in addition to long familiarity with the district, J. B. Tenney of Tucson, Arizona, issued a very optimistic report on the Muheim ground. According to his interpretation the pattern of hydrothermal alteration contains an elongated central core of sericite and pyrite surrounded by a favorable marginal belt containing disseminated chalcocite ores of economic value. Much of this pattern lies north of the Dividend fault in the Muheim properties, but it overlaps the Dividend fault on the south and is drawn to include the Sacramento Hill porphyry ore body and the Rucker ore body within the favorable marginal belt.

Beyond to the south is the great, productive semicircular collar of rich ore in limestone owned by Phelps Dodge. (See map labeled "Tenney's zones".)

Immediately north of the Dividend fault in the Rucker claim (owned by Phelps Dodge) work conducted from the south found disseminated chalcocite ore in schist. By driving westerly from the Cochise shalft this ore was proved to enter the Nancy Hanks claim by leasers operating on both sides of the property line. Tenney estimates the Rucker ore body, as now known, to be about 170 feet thick and to contain about 1 million tons of ore with about 1.5% Cu. of which about one-fifth is in Nancy Hanks ground. Tenney apparently correlates this ore body with alteration features in the schist capping above and extends this type of capping to form his favorable marginal zone. This constitutes a very large area and leads him to the belief that mother Bingham lies below. L. E. Reber, Jr., of Phelps Dodge is reported to insist that this zone be narrowed to about 400 feet width. With this the writer agrees, providing such a zone really exists.

The Muheim interests have recently started a diamond drilling program to test Tenney's favorable zone. Two holes have already been completed and a third is probably started by now. (See map.) Holes Nos. 1 and 2 revealed extremely low-grade material (0.05 to 0.10% Cu. for the most part) with practically no enrichment and thereby remove a very large fraction of Tenney's favorable zone from any further consideration. Hole No. 3 has been shrewdly located to cut a probable extension of the Rucker ore body on Nancy Hanks ground, and it was with the possibilities of a substantial extension of this ore body that the writer's examination was principally concerned.

Phelps Dodge Corporation is apparently following the Muheim drilling with close attention. Dr. Reber has examined the core, assayed some of it, and made thin sections and polished surfaces of various specimens. With Joe Muheim, Jr., being an employee of Phelps Dodge in what I believe to be a responsible job, there seems to be little doubt that Phelps Dodge has the inside track and that examinations by other companies are welcomed, in part at least, as a means of maintaining P.D. interest in the Muheim ground.

GEOLOGY SOUTH OF DIVIDEND FAULT

The geology south of the Dividend fault, where production of rich ore has been maintained for over 70 years, is well known and only a few points need to be brought forward here. In plan view the ore bodies in limestone occur as a great collar swinging around the Sacramento Hill porphyry on the south. This is

shown on the accompanying map, but in addition there are great streamers of ore extending on to the south. Pre-mineral faults striking NE and NNE have apparently assisted in the localization of the ore and some of these are believed to pierce the Dividend fault and possibly continue on north. Considering the stupendous wealth of copper ore underground, evidence of copper in limestone at the surface is surprisingly scarce.

Porphyry ore in the Sacramento Hill intrusive south of the Dividend fault is a high iron variety whose value is dependent on secondary chalcocite enrichment. The writer has no up-to-date information on the ore body as now defined by a low cut-off grade appropriate to present mining and metallurgical practice and economic conditions, and the outline and position shown on the accompanying map are approximate only.

GEOLOGY NORTH OF DIVIDEND FAULT

North of the Dividend fault opposite the mining area, the terrane is built up of Precambrian Pinal schist intruded by the northerly portion of the Sacramento Hill stock, which transgresses the Dividend fault so that the greater part of its outcrop area is to the north. These rocks are overlapped by Cretaceous formations on the north. The area recently examined was mostly underlain by schist lying to the west of the porphyry. Some of the porphyry was studied in Jones Gulch but Pinal schist on the east was not inspected.

North of the Dividend fault the internal lithology and structure of the Pinal schist have never been deciphered so far as the writer knows. There are at least two mappable varieties of schist: (1) a quartzite type and (2) a less sandy, sericitic variety. The dominant trend of the schistosity (which in general probably coincides with original bedding) is about ENE, but there are also several areas where it is N-S to NNE and the impression is that Z-shaped folds have been developed in the Precambrian schist. The NNE trend about coincides in direction with the dominant pre-mineral faults on the south, hinting that NNE elements of the Precambrian "grain" may be reflected in more recent, but pre-mineral faulting.

MINERALIZATION NORTH OF DIVIDEND FAULT

Rock alteration is widespread north of the fault, but copper staining at the surface appears only in extremely minor amounts. The latter and the absence of favorable Paleozoic limestone formations immediately to the north, as well as the unprofitable porphyry copper venture at Sacramento Hill in the nineteen-twenties, no doubt were some of the reasons for the small amount of exploration conducted north of the Dividend fault. With the recent preparation of the Lavender Pit by

Phelps Dodge just south of the fault, attention has recently been focused on nearby altered areas on the north.

In the Pinal schist and porphyry north of the fault mineralization is displayed by precipitous iron-stained hills whose bedrock has been altered by the development of sericite and pyrite. These changes, particularly toward the north, are accompanied by tiny specks of specular hematite and veinlets of hard, compact primary (?) hematite. Oxidation of this material has given strongly colored, brick-red hills that advertise an abundance of pyritic mineralization north of the fault. The amount of silicification in the schist is debatable because much of the silica has been contributed by quartz naturally occurring in the quartzitic schist layers. The porphyry is silicified, but such silica may have been contributed by the breakdown of minerals composing the porphyry.

Inspection of outcrops in the Muheim area reveals that in general very little copper was present to be leached from the schist by weathering and to be concentrated in a zone of secondary sulphide enrichment. Nevertheless, copper was leached from certain restricted areas, described as follows:

1. In the Nancy Hanks claim several NNE fissure zones of limited length were seen to carry "relief limonite" after chalcocite. Their widths varied from a few inches to 12 inches and their outcropping areas probably amounted to only a few tens of square feet.

2. Also, near the north side-line (approximately) of the Nancy Hanks a larger irregular area exhibits favorable "relief limonite". This possibly amounts to a few hundreds of square feet.

3. The best showing of "relief limonite" after chalcocite runs southerly down the crest of Chihuahua Hill for about 500 feet or possibly more. (See location "B" on map). In places it has supplied considerable attractive float, but closer inspection makes it evident that this zone is quite narrow with erratically disposed, reticulated veinlets that contained chalcocite prior to oxidation. A similar but somewhat weaker zone leads down the ridge marked on the map as "C".

4. Near the northwest corner of the Wee Wee claim (Area "A" on the map) there is a scattering of "chalcopyrite boxwork" in veinlets cutting schist throughout an area that is possibly a few hundred feet in diameter.

5. In the Silver Queen claim, not far from Diamond Drill Hole No. 2, it is reported that a lens of chalcopyrite ore yielded 3,300 pounds of copper ore that averaged 17.58% Cu.

In the areas noted above, these better showings of limited extent at A, B, and C are in the sericitic variety of Pinal

schist. The quartzitic variety appears to be less favorable, although in other districts, such as the Miami-Inspiration-Cactus zone near Miami, Arizona, the opposite is believed to be true.

Considering the size of favorable outcrop area needed to cover a 100-million ton ore body (4,000 by 2,000 feet where the ore body is 150 feet thick), the promising outcrops observed can at best lead to only a very small tonnage of secondary ore. Nevertheless the apparent size of the Rucker ore body seems to be larger than any favorable outcrop area nearby and above it, and this problem must now be considered.

The area above the Rucker ore body (area D on map) was examined and found to display a hard quartzitic variety of moderately to poorly fractured schist stained by transported iron oxide derived from pyrite. If this type of capping was to be correlated with ore, then the optimistic view of Tenney is warranted because capping of this type is widespread. However, it is the writer's firm opinion that this kind of capping did not contribute much copper to secondary enrichment and that in general it would be found to overlie ground of very low copper content. The origin of the Rucker ore body then must be explained, and the following theory of origin is offered:

It is the writer's belief that secondary solutions had a strong lateral component to the south due to precipitous topography just north of the Dividend fault in the area of interest during enrichment. Consequently it is held that minor amounts of copper were gathered from a broad zone of generally weak metallization north of the fault in which there were limited sections of better tenor and this copper was transported to and concentrated and precipitated against that fault under surface outcrops of poor quality. Furthermore, it is suspected that zones of fracturing striking SSW concentrated these secondary solutions to form several transverse lenses of limited size instead of a continuous band of secondary ore elongated with the fault. Consequently it is held that the Rucker ore body is due to the concentration of secondary solutions from a broad area and that outcrops farther north but similar in character to those above the Rucker ore body would not in general be associated with secondary ore at depth.

Only in the broadest way does the writer agree with Tenney's mineral zones. His central core of sericitized and pyritized material actually grades on the north to hematitic mineralization, but near Chihuahua Hill displays some of the better leached outcrops indicative of the former presence of copper. On the other hand, the marginal zone, alleged to contain pyrite associated with chalcopyrite that would produce secondary chalcocite, to the writer appears to be only the fade-

out zone of the so-called central core and to contain no determinable increase of copper in the section north of the Dividend fault. Furthermore, along the northeast this allegedly favorable band is projected under the cover of Cretaceous rocks, and here the existence of a possibly productive zone really is in doubt.

The two holes already drilled have disproved a large fraction of Tenney's favorable band and cast serious doubt on the possibilities of much of the remainder of this zone. These holes, summary logs of which are appended at the back of this report, reveal little or no secondary enrichment and very low primary values. In Hole No. 2 very sparse enrichment apparently occurs between 40 and 60 feet where the following assays were obtained:

40' to 45'----------0.33% Cu.
45' to 50'----------0.02% Cu.
50' to 55'----------0.04% Cu.
55' to 60'----------0.47% Cu.

In Hole No. 1 secondary enrichment appears to be almost entirely lacking, and primary values to a depth of 606 feet range between 0.05% and 0.10% Cu. from sludge assays. Hole No. 2 shows no extension to the small lens of chalcopyrite mined out, and the two holes indicate no general increase of primary values with depth.

CONCLUSIONS

It is the writer's conclusion that there is no great body of disseminated copper ore to be found in the Muheim ground north of the Dividend fault that would warrant an independent operation by an outside company. On the other hand, it is possible that lenses of secondary chalcocite ore containing from a few hundred thousand to a few million tons may be concentrated just north of the Dividend fault. However, the best part of this zone is in the Copper Jack, Rucker, and Union claims belonging to Phelps Dodge Corporation, and the adjacent Muheim ground occupies a somewhat inferior position in this respect. It is suspected that such ore would not be regularly disposed continuously along the north side of the fault but would be confined to lenses along NNE fracture zones that might carry relatively small bodies northerly into Muheim ground. It is further possible that Hole No. 3, recently started, may find some such ore and no doubt will occasion considerable publicity. Considering the size and tenor of ore body to be reasonably expected, the topographical setting of its occurrence, and the property situation makes the entry of an outside company into the area north of the Dividend fault most hazardous.

The possibility that small chalcopyrite lenses of the type occurring in the Silver Queen claim might lead to rich ore bodies of substantial size seems to be a very remote possibility. Small bodies of similar type appear on the westerly margin of the Miami, Arizona, district, also, and have not lead to large ore bodies. At Bisbee a proper evaluation of such occurrence would require detailed study of the schist area on the north, and this expense does not appear to be warranted.

RECOMMENDATIONS

It is recommended that consideration of the Muheim properties be dropped.

E. N. Pennebaker

E. N. PENNEBAKER

Scottsdale, Arizona
December 21, 1953

SUMMARY LOG OF MUHEIM DIAMOND DRILL HOLE NO. 1

LOCATION: Wee Wee claim, near SW corner.

INCLINATION: Vertical.

SIZE OF CORE: EX all the way.

LENGTH OF CORE: 606 feet.

LOG:

0-55' -	No core recovered.
55'-392' -	Sericitic schist. Unoxidized pyrite appears at 58'. Thin veinlets of clean pyrite throughout. Tiny spots of specularite.
392' to 415'	Quartzitic schist. Thin seams of clean pyrite.
415' to 423'	Sericitic schist. Clean pyrite.
423' to 458'	Quartzitic schist. Clean pyrite.
458' to 483'	Seritic schist. Clean pyrite.
483' to 606'	Quartzitic schist. Clean pyrite in thin veinlets.

REMARKS:

Chalcocite enrichment almost entirely lacking. Sludge samples from Hole No. 1 average about 0.10% Cu. with 0.05% Cu. at the bottom. Primary values appear to range from 0.05 to 0.10% Cu. Core recovery generally excellent.

SUMMARY LOG OF MUHEIM DIAMOND DRILL HOLE NO. 2

LOCATION: Silver Queen claim near west end.

INCLINATION: 45 degrees down to the southeast.

SIZE OF CORE: AX to 156'; EX, 156' to 369'.

LENGTH OF HOLE: 369 feet.

LOG: 0-369' Quartzitic schist.
Sulphides almost from start.
Minor oxidation persists to 286'.
Sulphides very fine grained.
Minor enrichment at 40' to 60' and probably persisting to 200'.
Sulphides generally sparse and mostly pyrite.

REMARKS:

All of the schist cut is quartzitic. Rock alteration is meager with probably some sericite present. Quartz appears to be a pegmatitic (Precambrian?) type and occurs in veinlets and bunches. Some propylitic alteration comes in near the bottom of the hole. Sulphides present are sparse and fine-grained, occurring scattered through the rock and also along a few veinlets. The sulphides are mostly pyrite and only a little chalcopyrite was identified. Secondary chalcocite is apparently very sparse, and its identification was dubious. Core recovery excellent. No sludge samples taken. A few core samples were split by Reber and these are listed in the foregoing report. Most of the core is too weakly mineralized to warrant assaying.

REPORT ON
MUHEIM PROPERTY
NEAR BISBEE, ARIZONA

*****

E. N. PENNEBAKER Dec. 1953

E. N. PENNEBAKER
CONSULTING GEOLOGIST
SCOTTSDALE, ARIZONA

POSSIBILITIES OF FINDING ORE ON THE MUHEIM HOLDINGS NEAR BISBEE, ARIZONA

SUMMARY

The Muheim property is mostly underlain by Pinal schist and is situated north of the Dividend fault, the other side of which has yielded practically all of Bisbee's past production. Although hydrothermal alteration and pyrite are abundant in schist and porphyry north of the fault, copper metallization is extremely light except for a few zones of limited extent. It appears that secondary solutions moving laterally to the south may have gathered enough copper to form relatively small disseminated chalcocite deposits where they were concentrated on the north side of the Dividend fault. Although copper ore bodies containing several million tons with 1 to 2% Cu. may have been formed in this manner, it appears very unlikely that any great deposit can be found that is large enough to warrant the entry of an outside mining company in this district.

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PRESENT SITUATION

Throughout its life the great bulk of the ore production of the Warren mining district near Bisbee has come from ground

lying south of the Dividend fault where Paleozoic limestones and younger porphyry constitute the host rocks. Although hydrothermal alteration is abundantly displayed north of the fault in Pinal schist and porphyry, only relatively little exploration has been carried on here. Some of this work, however, found a substantial amount of disseminated copper ore in Pinal schist beneath altered cap rock of a widespread type. Consequently certain people entertain the belief that this disseminated chalcocite ore will be equally widespread north of the fault and constitute an ore body of major importance. To check this possibility was the reason for the writer's recent examination.

The proximity of the rich ores in Czar and Holbrook ground to the southerly Muheim claims has been cited as a feature favoring the occurrence of ore in these Muheim claims. It should be remembered that between these areas the Dividend fault intervenes as a formidable barrier.

The Muheim family owns or has a substantial interest in several groups of patented mining claims lying north of the Dividend fault. These are:

Muheim-Anderson group.....	12 claims.....	208 acres
Dreadnaught group.....	8 claims.....	128 acres
Alpha claim.....		19 acres
Cochise Development Co.....	15 claims.....	175 acres
		530 acres

The Muheim interest in the Cochise Development Company is said to be 50% with the Shattuck Estate holding the other half.

These various claim groups are shown on the accompanying property map in relation to the dominant Phelps Dodge property covering the productive ground south of the Dividend fault. The Winwood group and certain other claims of outside ownership mentioned by Tenney lie to the east and are not designated on the property map.

On January 14, 1953, as a result of about a month's examination in addition to long familiarity with the district, J. B. Tenney of Tucson, Arizona, issued a very optimistic report on the Muheim ground. According to his interpretation the pattern of hydrothermal alteration contains an elongated central core of sericite and pyrite surrounded by a favorable marginal belt containing disseminated chalcocite ores of economic value. Much of this pattern lies north of the Dividend fault in the Muheim properties, but it overlaps the Dividend fault on the south and is drawn to include the Sacramento Hill porphyry ore body and the Rucker ore body within the favorable marginal belt.

Beyond to the south is the great, productive semicircular collar of rich ore in limestone owned by Phelps Dodge. (See map labeled "Tenney's zones".)

Immediately north of the Dividend fault in the Rucker claim (owned by Phelps Dodge) work conducted from the south found disseminated chalcocite ore in schist. By driving westerly from the Cochise shalft this ore was proved to enter the Nancy Hanks claim by leasers operating on both sides of the property line. Tenney estimates the Rucker ore body, as now known, to be about 170 feet thick and to contain about 1 million tons of ore with about 1.5% Cu. of which about one-fifth is in Nancy Hanks ground. Tenney apparently correlates this ore body with alteration features in the schist capping above and extends this type of capping to form his favorable marginal zone. This constitutes a very large area and leads him to the belief that mother Bingham lies below. L. E. Reber, Jr., of Phelps Dodge is reported to insist that this zone be narrowed to about 400 feet width. With this the writer agrees, providing such a zone really exists.

The Muheim interests have recently started a diamond drilling program to test Tenney's favorable zone. Two holes have already been completed and a third is probably started by now. (See map.) Holes Nos. 1 and 2 revealed extremely low-grade material (0.05 to 0.10% Cu. for the most part) with practically no enrichment and thereby remove a very large fraction of Tenney's favorable zone from any further consideration. Hole No. 3 has been shrewdly located to cut a probable extension of the Rucker ore body on Nancy Hanks ground, and it was with the possibilities of a substantial extension of this ore body that the writer's examination was principally concerned.

Phelps Dodge Corporation is apparently following the Muheim drilling with close attention. Dr. Reber has examined the core, assayed some of it, and made thin sections and polished surfaces of various specimens. With Joe Muheim, Jr., being an employee of Phelps Dodge in what I believe to be a responsible job, there seems to be little doubt that Phelps Dodge has the inside track and that examinations by other companies are welcomed, in part at least, as a means of maintaining P.D. interest in the Muheim ground.

GEOLOGY SOUTH OF DIVIDEND FAULT

The geology south of the Dividend fault, where production of rich ore has been maintained for over 70 years, is well known and only a few points need to be brought forward here. In plan view the ore bodies in limestone occur as a great collar swinging around the Sacramento Hill porphyry on the south. This is

shown on the accompanying map, but in addition there are great streamers of ore extending on to the south. Pre-mineral faults striking NE and NNE have apparently assisted in the localization of the ore and some of these are believed to pierce the Dividend fault and possibly continue on north. Considering the stupendous wealth of copper ore underground, evidence of copper in limestone at the surface is surprisingly scarce.

Porphyry ore in the Sacramento Hill intrusive south of the Dividend fault is a high iron variety whose value is dependent on secondary chalcocite enrichment. The writer has no up-to-date information on the ore body as now defined by a low cut-off grade appropriate to present mining and metallurgical practice and economic conditions, and the outline and position shown on the accompanying map are approximate only.

GEOLOGY NORTH OF DIVIDEND FAULT

North of the Dividend fault opposite the mining area, the terrane is built up of Precambrian Pinal schist intruded by the northerly portion of the Sacramento Hill stock, which transgresses the Dividend fault so that the greater part of its outcrop area is to the north. These rocks are overlapped by Cretaceous formations on the north. The area recently examined was mostly underlain by schist lying to the west of the porphyry. Some of the porphyry was studied in Jones Gulch but Pinal schist on the east was not inspected.

North of the Dividend fault the internal lithology and structure of the Pinal schist have never been deciphered so far as the writer knows. There are at least two mappable varieties of schist: (1) a quartzite type and (2) a less sandy, sericitic variety. The dominant trend of the schistosity (which in general probably coincides with original bedding) is about ENE, but there are also several areas where it is N-S to NNE and the impression is that Z-shaped folds have been developed in the Precambrian schist. The NNE trend about coincides in direction with the dominant pre-mineral faults on the south, hinting that NNE elements of the Precambrian "grain" may be reflected in more recent, but pre-mineral faulting.

MINERALIZATION NORTH OF DIVIDEND FAULT

Rock alteration is widespread north of the fault, but copper staining at the surface appears only in extremely minor amounts. The latter and the absence of favorable Paleozoic limestone formations immediately to the north, as well as the unprofitable porphyry copper venture at Sacramento Hill in the nineteen-twenties, no doubt were some of the reasons for the small amount of exploration conducted north of the Dividend fault. With the recent preparation of the Lavender Pit by

Phelps Dodge just south of the fault, attention has recently been focused on nearby altered areas on the north.

In the Pinal schist and porphyry north of the fault mineralization is displayed by precipitous iron-stained hills whose bedrock has been altered by the development of sericite and pyrite. These changes, particularly toward the north, are accompanied by tiny specks of specular hematite and veinlets of hard, compact primary (?) hematite. Oxidation of this material has given strongly colored, brick-red hills that advertise an abundance of pyritic mineralization north of the fault. The amount of silicification in the schist is debatable because much of the silica has been contributed by quartz naturally occurring in the quartzitic schist layers. The porphyry is silicified, but such silica may have been contributed by the breakdown of minerals composing the porphyry.

Inspection of outcrops in the Muheim area reveals that in general very little copper was present to be leached from the schist by weathering and to be concentrated in a zone of secondary sulphide enrichment. Nevertheless, copper was leached from certain restricted areas, described as follows:

1. In the Nancy Hanks claim several NNE fissure zones of limited length were seen to carry "relief limonite" after chalcocite. Their widths varied from a few inches to 12 inches and their outcropping areas probably amounted to only a few tens of square feet.

2. Also, near the north side-line (approximately) of the Nancy Hanks a larger irregular area exhibits favorable "relief limonite". This possibly amounts to a few hundreds of square feet.

3. The best showing of "relief limonite" after chalcocite runs southerly down the crest of Chihuahua Hill for about 500 feet or possibly more. (See location "B" on map). In places it has supplied considerable attractive float, but closer inspection makes it evident that this zone is quite narrow with erratically disposed, reticulated veinlets that contained chalcocite prior to oxidation. A similar but somewhat weaker zone leads down the ridge marked on the map as "C".

4. Near the northwest corner of the Wee Wee claim (Area "A" on the map) there is a scattering of "chalcopyrite boxwork" in veinlets cutting schist throughout an area that is possibly a few hundred feet in diameter.

5. In the Silver Queen claim, not far from Diamond Drill Hole No. 2, it is reported that a lens of chalcopyrite ore yielded 3,300 pounds of copper ore that averaged 17.58% Cu.

In the areas noted above, these better showings of limited extent at A, B, and C are in the sericitic variety of Pinal

schist. The quartzitic variety appears to be less favorable, although in other districts, such as the Miami-Inspiration-Cactus zone near Miami, Arizona, the opposite is believed to be true.

Considering the size of favorable outcrop area needed to cover a 100-million ton ore body (4,000 by 2,000 feet where the ore body is 150 feet thick), the promising outcrops observed can at best lead to only a very small tonnage of secondary ore. Nevertheless the apparent size of the Rucker ore body seems to be larger than any favorable outcrop area nearby and above it, and this problem must now be considered.

The area above the Rucker ore body (area D on map) was examined and found to display a hard quartzitic variety of moderately to poorly fractured schist stained by transported iron oxide derived from pyrite. If this type of capping was to be correlated with ore, then the optimistic view of Tenney is warranted because capping of this type is widespread. However, it is the writer's firm opinion that this kind of capping did not contribute much copper to secondary enrichment and that in general it would be found to overlie ground of very low copper content. The origin of the Rucker ore body then must be explained, and the following theory of origin is offered:

It is the writer's belief that secondary solutions had a strong lateral component to the south due to precipitous topography just north of the Dividend fault in the area of interest during enrichment. Consequently it is held that minor amounts of copper were gathered from a broad zone of generally weak metallization north of the fault in which there were limited sections of better tenor and this copper was transported to and concentrated and precipitated against that fault under surface outcrops of poor quality. Furthermore, it is suspected that zones of fracturing striking SSW concentrated these secondary solutions to form several transverse lenses of limited size instead of a continuous band of secondary ore elongated with the fault. Consequently it is held that the Rucker ore body is due to the concentration of secondary solutions from a broad area and that outcrops farther north but similar in character to those above the Rucker ore body would not in general be associated with secondary ore at depth.

Only in the broadest way does the writer agree with Tenney's mineral zones. His central core of sericitized and pyritized material actually grades on the north to hematitic mineralization, but near Chihuahua Hill displays some of the better leached outcrops indicative of the former presence of copper. On the other hand, the marginal zone, alleged to contain pyrite associated with chalcopyrite that would produce secondary chalcocite, to the writer appears to be only the fade-

out zone of the so-called central core and to contain no determinable increase of copper in the section north of the Dividend fault. Furthermore, along the northeast this allegedly favorable band is projected under the cover of Cretaceous rocks, and here the existence of a possibly productive zone really is in doubt.

The two holes already drilled have disproved a large fraction of Tenney's favorable band and cast serious doubt on the possibilities of much of the remainder of this zone. These holes, summary logs of which are appended at the back of this report, reveal little or no secondary enrichment and very low primary values. In Hole No. 2 very sparse enrichment apparently occurs between 40 and 60 feet where the following assays were obtained:

40' to 45'----------0.33% Cu.
45' to 50'----------0.02% Cu.
50' to 55'----------0.04% Cu.
55' to 60'----------0.47% Cu.

In Hole No. 1 secondary enrichment appears to be almost entirely lacking, and primary values to a depth of 606 feet range between 0.05% and 0.10% Cu. from sludge assays. Hole No. 2 shows no extension to the small lens of chalcopyrite mined out, and the two holes indicate no general increase of primary values with depth.

CONCLUSIONS

It is the writer's conclusion that there is no great body of disseminated copper ore to be found in the Muheim ground north of the Dividend fault that would warrant an independent operation by an outside company. On the other hand, it is possible that lenses of secondary chalcocite ore containing from a few hundred thousand to a few million tons may be concentrated just north of the Dividend fault. However, the best part of this zone is in the Copper Jack, Rucker, and Union claims belonging to Phelps Dodge Corporation, and the adjacent Muheim ground occupies a somewhat inferior position in this respect. It is suspected that such ore would not be regularly disposed continuously along the north side of the fault but would be confined to lenses along NNE fracture zones that might carry relatively small bodies northerly into Muheim ground. It is further possible that Hole No. 3, recently started, may find some such ore and no doubt will occasion considerable publicity. Considering the size and tenor of ore body to be reasonably expected, the topographical setting of its occurrence, and the property situation makes the entry of an outside company into the area north of the Dividend fault most hazardous.

The possibility that small chalcopyrite lenses of the type occurring in the Silver Queen claim might lead to rich ore bodies of substantial size seems to be a very remote possibility. Small bodies of similar type appear on the westerly margin of the Miami, Arizona, district, also, and have not lead to large ore bodies. At Bisbee a proper evaluation of such occurrence would require detailed study of the schist area on the north, and this expense does not appear to be warranted.

RECOMMENDATIONS

It is recommended that consideration of the Muheim properties be dropped.

E. N. Pennebaker

E. N. PENNEBAKER

Scottsdale, Arizona
December 21, 1953

SUMMARY LOG OF MUHEIM DIAMOND DRILL HOLE NO. 1

LOCATION: Wee Wee claim, near SW corner.

INCLINATION: Vertical.

SIZE OF CORE: EX all the way.

LENGTH OF CORE: 606 feet.

LOG: 0-55' - No core recovered.
55'-392' - Sericitic schist.
Unoxidized pyrite appears at 58'.
Thin veinlets of clean pyrite throughout.
Tiny spots of specularite.

392' to 415' Quartzitic schist.
Thin seams of clean pyrite.

415' to 423' Sericitic schist.
Clean pyrite.

423' to 458' Quartzitic schist.
Clean pyrite.

458' to 483' Seritic schist.
Clean pyrite.

483' to 606' Quartzitic schist.
Clean pyrite in thin veinlets.

REMARKS:

Chalcocite enrichment almost entirely lacking. Sludge samples from Hole No. 1 average about 0.10% Cu. with 0.05% Cu. at the bottom. Primary values appear to range from 0.05 to 0.10% Cu. Core recovery generally excellent.

SUMMARY LOG OF MUHEIM DIAMOND DRILL HOLE NO. 2

LOCATION: Silver Queen claim near west end.

INCLINATION: 45 degrees down to the southeast.

SIZE OF CORE: AX to 156'; EX, 156' to 369'.

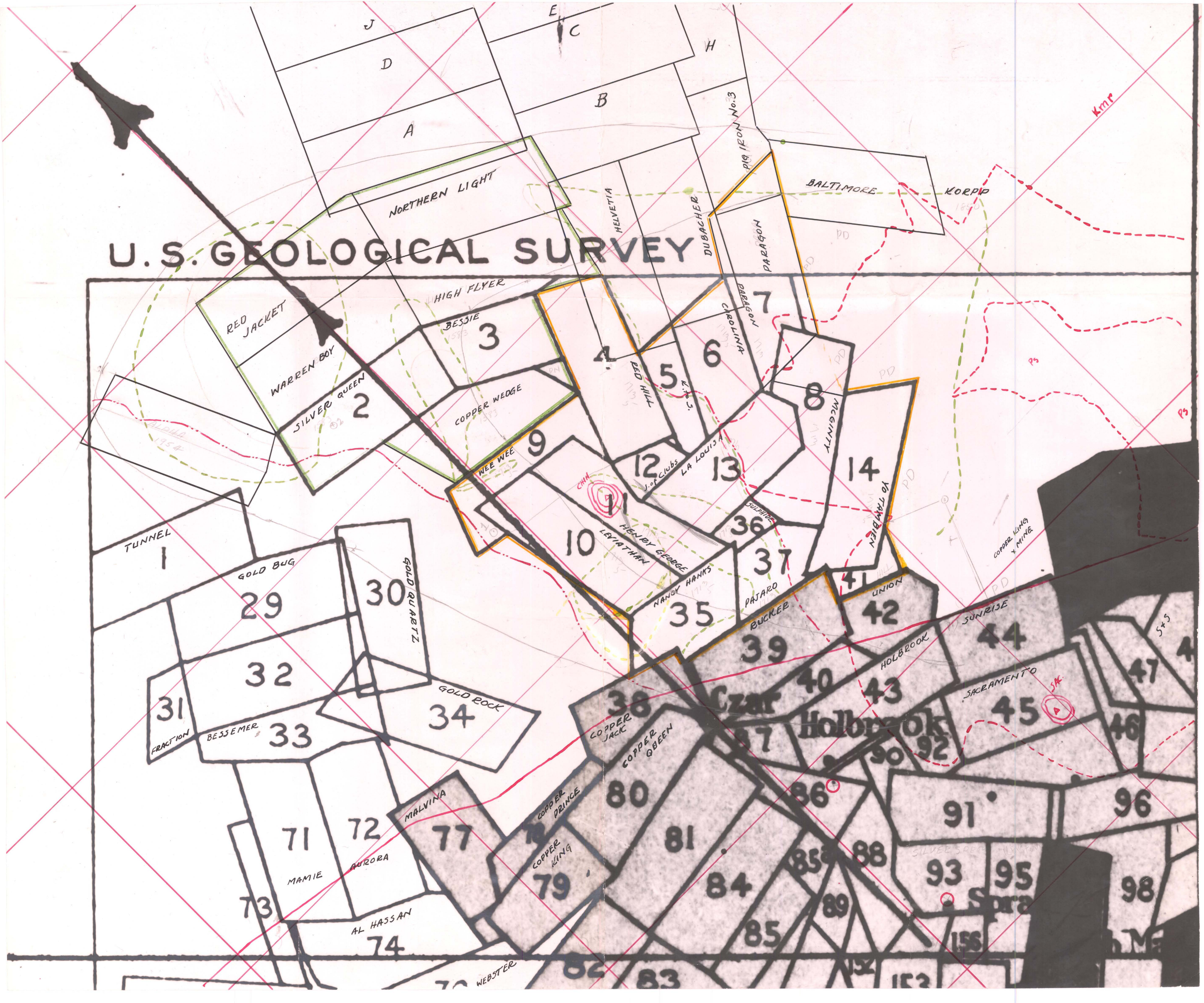
LENGTH OF HOLE: 369 feet.

LOG: 0-369' Quartzitic schist.
Sulphides almost from start.
Minor oxidation persists to 286'.
Sulphides very fine grained.
Minor enrichment at 40' to 60' and probably persisting to 200'.
Sulphides generally sparse and mostly pyrite.

REMARKS:

All of the schist cut is quartzitic. Rock alteration is meager with probably some sericite present. Quartz appears to be a pegmatitic (Precambrian?) type and occurs in veinlets and bunches. Some propylitic alteration comes in near the bottom of the hole. Sulphides present are sparse and fine-grained, occurring scattered through the rock and also along a few veinlets. The sulphides are mostly pyrite and only a little chalcopyrite was identified. Secondary chalcocite is apparently very sparse, and its identification was dubious. Core recovery excellent. No sludge samples taken. A few core samples were split by Reber and these are listed in the foregoing report. Most of the core is too weakly mineralized to warrant assaying.


D
55'
B
54'
C
ps
B.M. 5895
Chihuahua Hill
BISBEE
DIVIDEND
QUARRY
Dubacher Gulch
COPPER QUEEN MINE
Hendricks
Queen Hill
Gulch
5950
5755
5946
Kmr
Ql
Dm
Ce
Cn
UNCLE SAM MINE
GARDNER MINE
ICE PLANT
26'


U.S. GEOLOGICAL SURVEY
J
E
C
D
H
B
A
PIG IRON No. 3
BALTIMORE
KORPP
Kmr
NORTHERN LIGHT
HELVETIA
DUBACHER
PARAGON
HIGH FLYER
RED JACKET
WARREN BOY
SILVER QUEEN
BESSIE
COPPER WEDGE
RED HILL
CAROLINA
MCGINTY
WEE WEE
J. of Clubs
LA LOUISA
HENRY GEORGE
LEVIATHAN
YO TAMBIEN
SULPHIDE
NANCY HANKS
PAJARO
UNION
BUCKEE
SUNRISE
HOLBROOK
SACRAMENTO
COPPER KING MINE
TUNNEL
GOLD BUG
GOLD QUARTZ
GOLD ROCK
FRACTION
BESSEMER
COPPER JACK
COPPER QUEEN
COPPER PRINCE
COPPER KING
MALVINA
MAMIE
AURORA
AL HASSAN
WEBSTER
Czar
Holbrook
5+5

Approximately
T. 23 S., R. 24 E.
Unsurveyed

UNSURVEYED CLAIMS

UNSURVEYED CLAIMS

UNSURVEYED CLAIMS

NORTHERN LIGHT
Survey No. 1812.

HIGH FLIER
Survey No. 1681.

RED HILL
Survey No. 1715

KEY TO THE SITUATION
Survey No. 1715

CAROLINA
Survey No. 1715.

PARAGON
Survey No. 1715.

BALTIMORE
Survey No. 2071

U.S.M.M. No. 4

J — Area = 20660 Acres — N. 62° 28' W. 1500 Ft. — S. 62° 28' E. 1500 Ft.

D — Area = 20660 Acres — Presumed Course of Ledge S. 62° 28' E. 1500 Ft.

A — Area = 20660 Acres — Presumed Course of Vein S. 62° 28' E. 1500 Ft.

C — Area = 20660 Acres — Presumed Course of Vein S. 62° 28' E. 1500 Ft.

B — Area = 18058 Acres — 1325 Ft. — 600 Ft. — 1325 Ft.

K — Area = 18250 Acres — 1325 Ft. — Presumed Course of Ledge S. 62° 28' E. 1325 Ft.

E — Area = 20660 Acres — Presumed Course of Vein S. 62° 28' E. 1500 Ft.

I — Net Area = 1306 Acres — 874.5 Ft.

H — Area = 16869 Acres — 1500 Ft. — 1202.4 Ft.

HELVETIA — Net Area = 14486 Acres — Presumed Course of Ledge N. 62° 28' W. 1500 Ft.

DUBACHER — Net Area = 16557 Acres — Presumed Course of Vein N. 62° 28' W. 1500 Ft.

PIG IRON No. 3 — Net Area = 9364 Acres — Presumed Course of Vein N. 62° 28' W. 1500 Ft.

Patent Date 10-6-1906
Patent No.
Serial No. MLE 111 Pk

Claims Located
H, E, C, I, K, Dubacher, Helvetia and Pig Iron No. 3 Amended May 4 D, B, A, J. 1905
March 23 1903
March 25 1903

Improvements

Lode	No.					Board from Cor. No.	Value Total
A	1	Discovery Cut	4 × 15 × 10 ft.	1	N. 22° W. 304 ft.		100
	2	Open "	4 × 14 × 10 ft.	1	N. 15° 52' E. 317 ft.		100
	3	" "	4 × 16 × 10 ft.	2	S. 32° W. 262 ft.		100
	4	" "	4 × 12 × 10 ft.	2	S. 32° 20' W. 235 ft.		100
	5	" "	4 × 16 × 10 ft.	2	S. 44° 45' W. 311 ft.		100 500
D	1	Discovery Cut	4 × 12 × 10 ft.	1	N. 19° E. 304 ft.		100
	2	Open Cut	4 × 14 × 10 ft.	2	S. 36° 52' W. 180 ft.		100
	3	" "	4 × 15 × 10 ft.	1	N. 17° 20' E. 260 ft.		100
	4	" "	4 × 14 × 10 ft.	1	N. 18° 10' E. 274 ft.		100
	5	" "	4 × 15 × 10 ft.	2	S. 31° 50' W. 275 ft.		100 500
J	1	Discovery Cut	4 × 12 × 10 ft.	1	N. 20° E. 305 ft.		100
	2	Open "	4 × 14 × 10 ft.	1	N. 23° 10' W. 110 ft.		100
	3	" "	4 × 16 × 10 ft.	1	N. 18° E. 290 ft.		100
	4	" "	4 × 12 × 10 ft.	2	S. 26° 44' W. 280 ft.		100
	5	Shaft "	4 × 6 × 10 ft.	3	S. 10° 50' E. 260 ft.		100 500
K	1	Discovery Cut	4 × 12 × 10 ft.	4	N. 33° 50' E. 368 ft.		100
	2	Open "	4 × 12 × 10 ft.	2	S. 38° W. 136 ft.		100
	3	" "	4 × 14 × 10 ft.	2	S. 28° 44' W. 102 ft.		100
	4	" "	4 × 12 × 10 ft.	2	S. 42° 52' W. 217 ft.		100
	5	" "	4 × 12 × 10 ft.	2	S. 49° 45' W. 330 ft.		100 500
E	1	Discovery Cut	4 × 12 × 10 ft.	1	N. 8° 10' W. 368 ft.		100
	2	Open "	4 × 12 × 10 ft.	1	N. 7° 36' W. 398 ft.		100
	3	" "	4 × 12 × 10 ft.	1	N. 2° 8' W. 418 ft.		100
	4	" "	4 × 15 × 10 ft.	1	N. 15° 10' E. 440 ft.		100
	5	" "	4 × 12 × 10 ft.	3	S. 17° 40' E. 300 ft.		100 500
C	1	Discovery Cut	4 × 12 × 10 ft.	1	N. 8° 15' W. 365 ft.		100
	2	Open "	4 × 15 × 10 ft.	1	N. 4° W. 395 ft.		100
	3	" "	4 × 12 × 10 ft.	3	S. 8° 40' W. 360 ft.		100
	4	" "	4 × 12 × 10 ft.	3	S. 12° 30' W. 356 ft.		100
	5	" "	4 × 12 × 10 ft.	3	S. 11° 50' W. 226 ft.		100 500
B	1	Discovery Cut	4 × 12 × 10 ft.	4	S. 70° 45 ft.		100
	2	Open "	4 × 12 × 10 ft.	1	N. 10° E. 452 ft.		100
	3	" "	4 × 12 × 10 ft.	1	N. 61° 20' W. 660 ft.		100
	4	" " and Tunnel	4 × 7 × 10 ft. / 4 × 7 × 19 ft.	2	N. 64° 30' W. 354 ft.		250 550
H	1	Discovery Cut	4 × 12 × 10 ft.	1	N. 13° 12' W. 304 ft.		100
	2	Open "	4 × 12 × 10 ft.	6	N. 29° 30' E. 208 ft.		100
	3	" "	4 × 12 × 10 ft.	3	S. 11° 45' W. 485 ft.		100
	4	" "	4 × 12 × 10 ft.	3	S. 12° 20' W. 516 ft.		100
	5	" "	4 × 12 × 10 ft.	3	S. 14° W. 560 ft.		100 500
I	1	Discovery Cut	4 × 12 × 10 ft.	4	N. 79° 50' E. 488 ft.		100
	2	Open "	4 × 12 × 10 ft.	4	N. 82° 22' E. 505 ft.		100
	3	" "	4 × 12 × 10 ft.	3	S. 30° 40' E. 376 ft.		100
	4	" "	4 × 12 × 10 ft.	3	S. 32° 30' E. 364 ft.		100
	5	" "	4 × 12 × 10 ft.	3	S. 33° 40' E. 360 ft.		100 500
Pig Iron No. 3	1	Discovery Shaft	4 × 6 × 38 ft.	2	S. 87° 20' W. 330 ft.		400
	2	Open Cut	4 × 12 × 10 ft.	2	S. 46° 22' W. 342 ft.		100
	3	"	4 × 12 × 10 ft.	2	N. 16° 42' W. 445 ft.		100 600
Dubacher	1	Discovery Cut and Tunnel	4 × 8 × 8 ft. / 4 × 6 × 32 ft.	3	S. 24° 25' E. 338 ft.		370
Helvetia	2	Open Cut and tunnel	4 × 6 × 12 ft. / 4 × 6 × 98 ft.	4	N. 30° 22' E. 408 ft.		100 410
	1	Discovery Cut	4 × 12 × 10 ft.	1	N. 6° 45' E. 900 ft.		100
	2	Shaft	4 × 6 × 11 ft.	1	N. 7° 15' E. 480 ft.		170
	3	Open Cut	4 × 12 × 9 ft.	1	N. 6° 20' E. 475 ft.		100
	4	Shaft and drift	4 × 6 × 76 ft. / 4 × 6 × 30 ft.	1	N. 15° 40' E. 437 ft.		100
	5	Open Cut	4 × 12 × 10 ft.	1	N. 9° E. 164 ft.		100
	6	Open Cut	4 × 12 × 10 ft.	1	N. 15° 5' E. 112 ft.		100 1670

Total Value of Improvements on group $8230.92

Areas

		Acres
Total Area of I lode	12.044	
Less conflict with K lode, this survey	0.738	11.306
Net area of H lode		
Total area of Pig Iron No. 3 lode	11.455	
Less conflict with Paragon lode Survey No. 1715.	1.891	9.564
Net area of Pig Iron No. 3 lode		
Total area of Dubacher lode	19.335	
Less conflict with Paragon lode Survey No. 1715	1.337	
" " " Carolina " " " "	1.441	
Total area in conflict	2.778	
Net area of Dubacher lode		16.557
Total area of Helvetia lode	20.146	
Less conflict with Carolina lode Survey No. 1715	0.060	
" " " Key To the Situation " " 1715	0.187	
" " " Red Hill " " 1715	3.955	
" " " High Flier " " 1681	1.099	
" " " Northern light " " 1812	0.209	
Total area in conflict	5.480	
Net area of Helvetia lode		14.666

Claims Located ~ See Table ~ 190

Mineral Survey No. 2121

Lot No.

GILA Land District.

PLAT

OF THE CLAIM OF

J. B. ANDERSON AND J. M. MUHEIM,
ADMINISTRATORS, ESTATE OF ANTON MUHEIM,
KNOWN AS THE

A, B, C, D, E, H, I, J, K, PIG IRON No. 3, HELVETIA AND DUBACHER

IN Warren MINING DISTRICT,
Cochise COUNTY, Arizona
Containing an Area of 208.570 Acres.
Scale of 500 Feet to the inch.
Variation 12° 30' E.
SURVEYED June 26 to July 14 1905 BY

H. W. JORGENSEN U.S. Deputy Mineral Surveyor,

The Original Field Notes of the Survey of the Mining Claim of
~ J. B. ANDERSON AND J. M. MUHEIM ~
known as the ADMINISTRATORS, ESTATE OF ANTON MUHEIM

A, B, C, D, E, H, I, J, K, PIG IRON No. 3, HELVETIA AND DUBACHER

from which this plat has been made under my direction, have been examined and approved, and are on file in this Office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claims by claimants or their grantors, and that said improvements consist of each of

~ See Table ~

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office.
Phoenix, Arizona,
September 26, 1905

Frank Cahill
U.S. Surveyor General for
ARIZONA.

T.17 S.R.30 E. UNSURVEYED

T.17 S.R.31 E.

Sec. 13 | Sec. 18

Sec. 24 | Sec. 19

N

S

5341.55 ft.

Cor. No 4

S. 67° 50' E. 1500 FT.

SILVER GULCH

W.E.C.

525.1 FT

215.1 Ft.

Presumed course of vein

N. 15° 32' E. 1351 Ft.

Cor. No 3

Leadville Unsurveyed

1503.1 FT.

S. 39° E. 680 Ft.

S. 74° 45' E. 912 Ft.

Shaft No 3

Shaft No 4

N. 35° 35' W. 24.2 Ft.

Dis. Cut No 1

S. 85° W. 480 Ft.

Shaft No 2

620 Ft.

N. 67° 50' W. 1300 Ft. Net

N. 15° 32' E.

N. 74° 28' E. 1500 Ft.

Paradise Contact Survey No 1967

Cor No 1

III

1500 Ft.

E.E.C.

Wedge Unsurveyed

S. 15° 32' W. 1503.1 Ft.

Cor. No 2

S. 33° 45' W. 963 Ft.

S. 45° 55' E. 963 Ft.

Net area 18.896 acres

N. 66° 55' W.

Triangular Unsurveyed

Leadville No 2 Unsurveyed

Patent Date 3-9-1908
Patent No.
Serial No. ME 134 FX

Areas

Area of Silver Gulch	20.097 Acres
Less area in conflict with Paradise Contact Lode, Survey No 1967	0.116 acres
" " " " " Leadville " Unsurveyed	1.067 "
" " " " " Leadville No 2 " "	0.018 "
	1.201 "
Net area of Silver Gulch	18.896 Acres

Improvements

Dis. Cut No 1	4x10x18 ft.	long	value $100.00
Shaft " 2	4x6x20 "	deep	" 200.00
" " 3	4x6x12 "	"	" 120.00
" " 4	4x6x100 "	"	" 2.000.00
" " 5	4x6x113 "	"	" 2.260.00

Claim Located April 2nd 1903

Mineral Survey No. 2070

L.O.T. No. Gila Land District.

PLAT

OF THE CLAIM OF

E. F. Sweeney

KNOWN AS THE

Silver Gulch

IN California MINING DISTRICT,
Cochise COUNTY, Arizona
Containing an Area of 18.896 Acres.
Scale of 300 Feet to the inch.
Variation 12°30' E.
SURVEYED June 22nd to July 1st 1905 BY

Franklin W. Smith U.S. Deputy Mineral Surveyor,

The Original Field Notes of the Survey of the Mining Claim of E. F. Sweeney known as the Silver Gulch

from which this plat has been made under my direction, have been examined and approved, and are on file in this Office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant or his grantors, and that said improvements consist of (See Table)

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office. Grant A. Ingalls
Phoenix, Ariz. U.S. Surveyor General for
August 28th 1905 Arizona

(4-675)

67

Approximate Location
T.23S., R.24E.
~Unsurveyed~

N

S

Cor. No. 4

N 72° E

300 ft.

N.E.C.

600 ft.

Cor. No. 5

S 32° 30' W 225 ft.

S 23° 45' E.

S 23° 52' E. 375 ft.

Tunnel No. 2

Dis. Cut No. 1

1431.2 ft.

Brewery Gulch

Tunnel No. 6 with shaft 4 ft. deep

ALPHA
Area 19.396 Ac.

Shaft No. 4

1366.5 ft.

N 5° 30' E. 718 ft.

N 5° 30' E. 610 ft.

Presumed Course of Vein N 23° 52' W. 1431.2 ft.

Shaft No. 5, with drift

Shaft No. 3

N 23° 52' W.

N 66° 08' W. 295 ft.

N 33° 15' E. 415 ft.

Cor. No. 1

Warren Boy
SUR. No. 1681.

Silver Queen
SUR. No. 1583

Original Location

S 52° 25' W. 255 ft.

S 22° 45' E. 774 ft.

Cor. No. 3

345 ft.

S 72° W.

SEC. 15 ft.

Cor. No. 2

S 27° 42' E. 649.2 ft.

U.S.M.M. No. 4.

Improvements

Dis. Cut No. 1,	4 · 15 · 10 ft.		Value	$100.00
Tunnel No. 2,	4 · 6 · 16 ft.		"	160.00
Shaft No. 3	8 · 8 · 12 ft.		"	150.00
Shaft No. 4	4 · 6 · 28 ft.		"	280.00
Shaft No. 5	4 · 6 · 20 ft. with drift	4 · 6 · 22 ft.	"	350.00
Tunnel No. 6	4 · 6 · 55 ft. with raise	3 · 4 · 13 ft.		
	" shaft	4 · 6 · 30 ft.	Value	1000.00
	" drift	4 · 6 · 58 ft.		
	" raise	4 · 6 · 20 ft.		

Claim Located Aug. 29, 1894 189 190

Mineral Survey No. 1954

Lot No.

Gila Land District.

PLAT

OF THE CLAIM OF

Robert McDonald

KNOWN AS THE

Alpha

IN Warren MINING DISTRICT,
Cochise COUNTY, Arizona
Containing an Area of 19.396 Acres.
Scale of 200 Feet to the inch.
Variation 12° 30' E.
SURVEYED Aug. 1 - 11 1904 BY
Geo. C. Clark
U.S. Deputy Mineral Surveyor.

The Original Field Notes of the Survey of the Mining Claim of
Robert McDonald
known as the

Alpha

from which this plat has been made under my direction, have been examined and approved, and are on file in this office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant ____ or his grantors, and that said improvements consist of

See Table

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office.
Phoenix, Arizona
Sept. 22, 1904

Frank A. Gallup
U.S. Surveyor General for
Arizona

SURVEY NO. 614

PLAT

OF THE

—Rucker—

MINING CLAIM,

Warren Mining District,

Cachise County,

ARIZONA.

Claimed by W. H. Martin

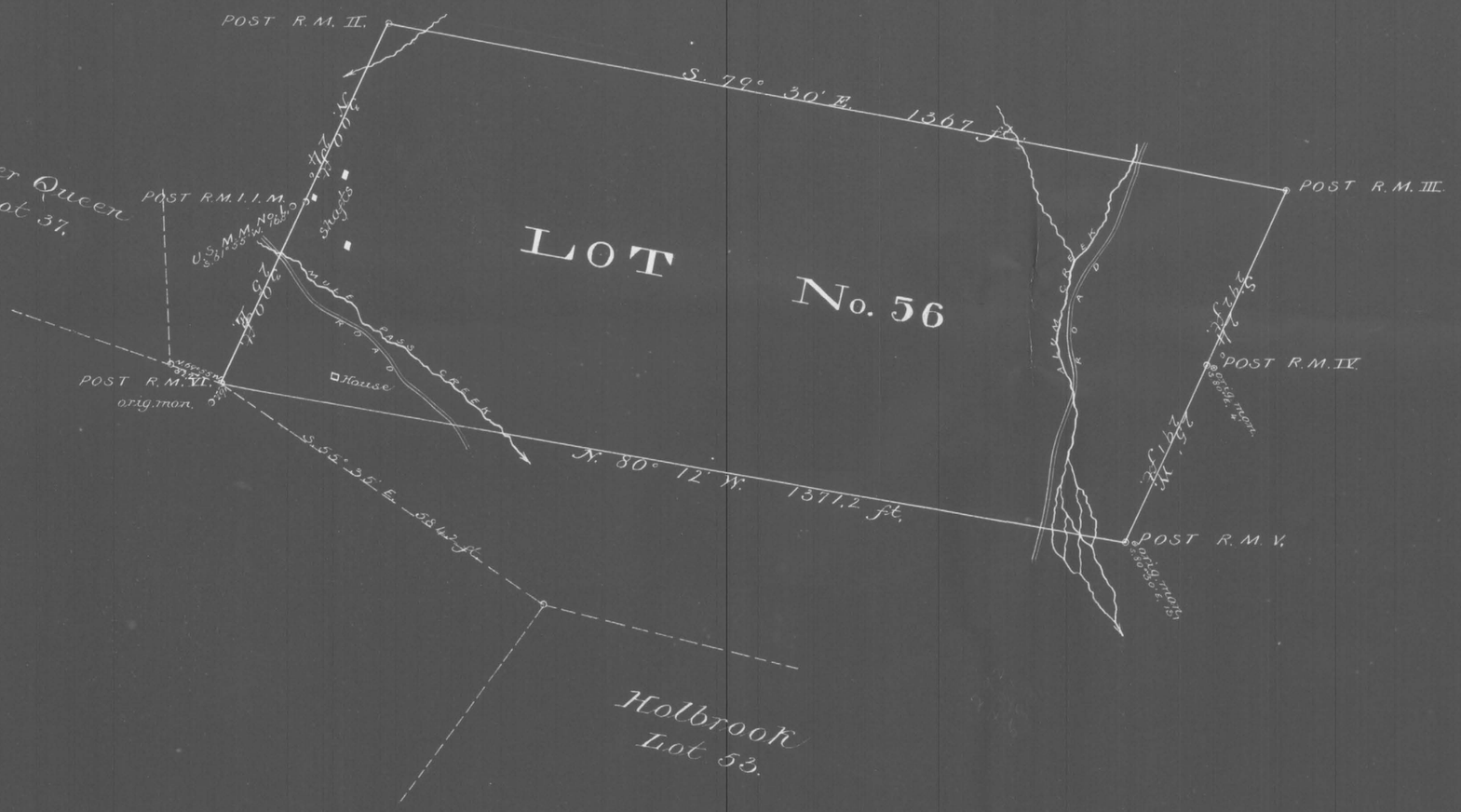
Surveyed by J. H. Hoadley U. S. D. S.

Feb. 2 - 11 1884

Containing an Area of 18.02 Acres.

Scale 200 feet to the inch.

Variation 12° 05' East.



The original Field Notes of the Survey of the Rucker Mining Claim from which this plat has been made, have been examined and approved and are on file in this office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises; and that such reference is made therein to natural objects and permanent monuments, as will perpetuate and fix the locus thereof.

I further certify that the value of the labor and improvements placed thereon by the applicant or his grantor is not less than Five Hundred Dollars, and that said improvements consist of

A shaft 4 x 6 ft, 42 ft. deep

" " " 5 " "

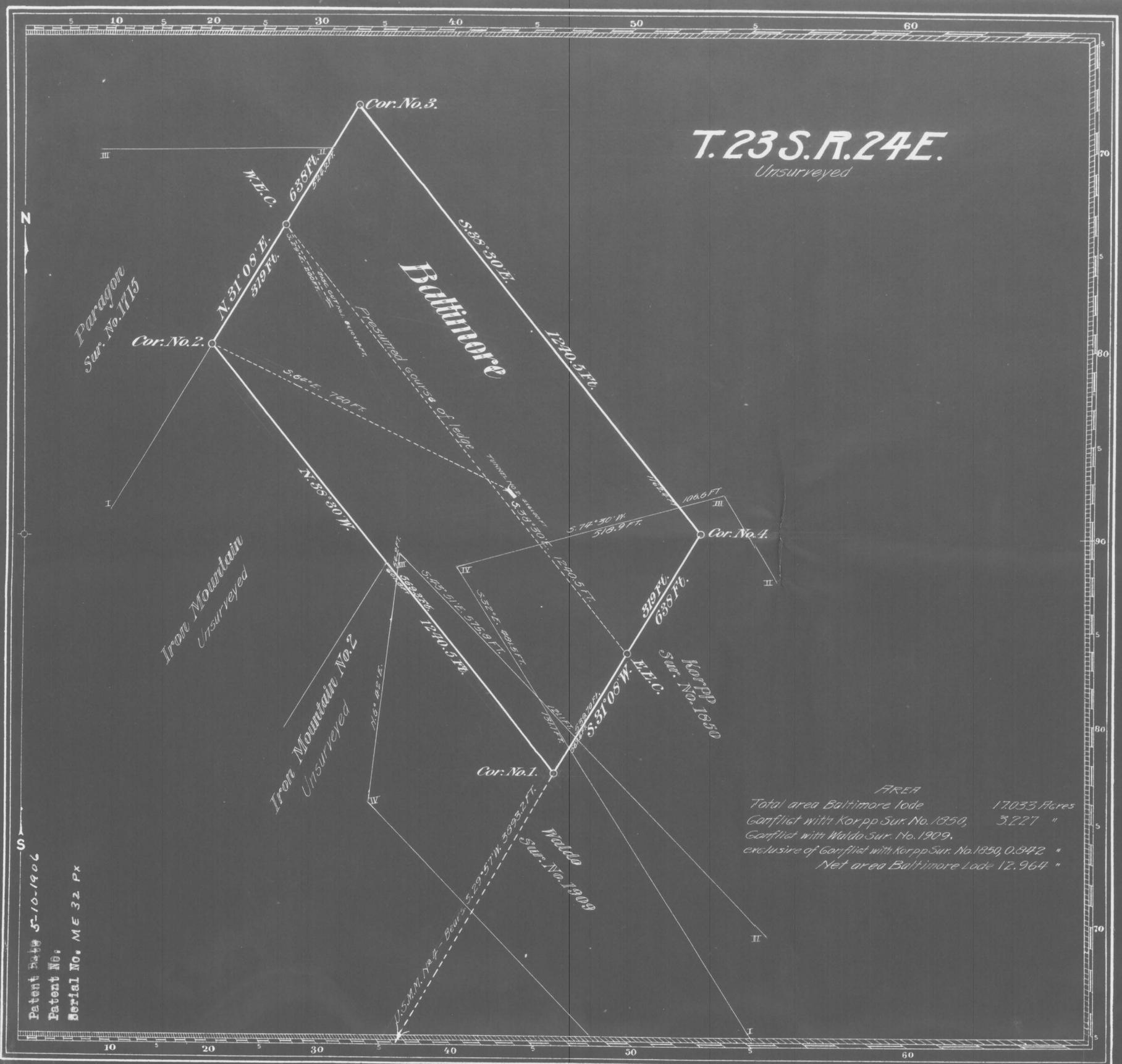
&tc, &tc.

as appears by the report of the Deputy Surveyor and the testimony of two disinterested witnesses.

And I further certify that this is a correct Plat of said Mining Claim, made in conformity with said original Field Notes of the survey thereof.

Rayant Johnson
U. S. Surveyor General for Arizona.

U. S. Surveyor General's Office,
Tucson, Arizona,
March 21. 1884



AREA

Total area Baltimore lode	17.033 Acres
Conflict with Korpp Sur No. 1850,	3.227 "
Conflict with Waldo Sur. No. 1909, exclusive of Conflict with Korpp Sur. No. 1850, 0.842	"
Net area Baltimore Lode	12.964 "

Claim Located January 15th 1903

Mineral Survey No. 2071

L. O. T. No.

Gila Land District.

PLAT

OF THE CLAIM OF

James H. Bell

KNOWN AS THE

BALTIMORE

IN Warren MINING DISTRICT,
Goghise COUNTY, Arizona
Containing an Area of 12.964 Acres.
Scale of 200 Feet to the inch.
Variation 12° 30' East
SURVEYED May 24-25th 1905 BY
Franklin W. Smith,
U.S. Deputy Mineral Surveyor,

The Original Field Notes of the Survey of the Mining Claim of James H. Bell known as the

Baltimore

from which this plat has been made under my direction, have been examined and approved, and are on file in this Office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant or his grantors, and that said improvements consist of Disc. cut and Tunnel Valued at $500.00

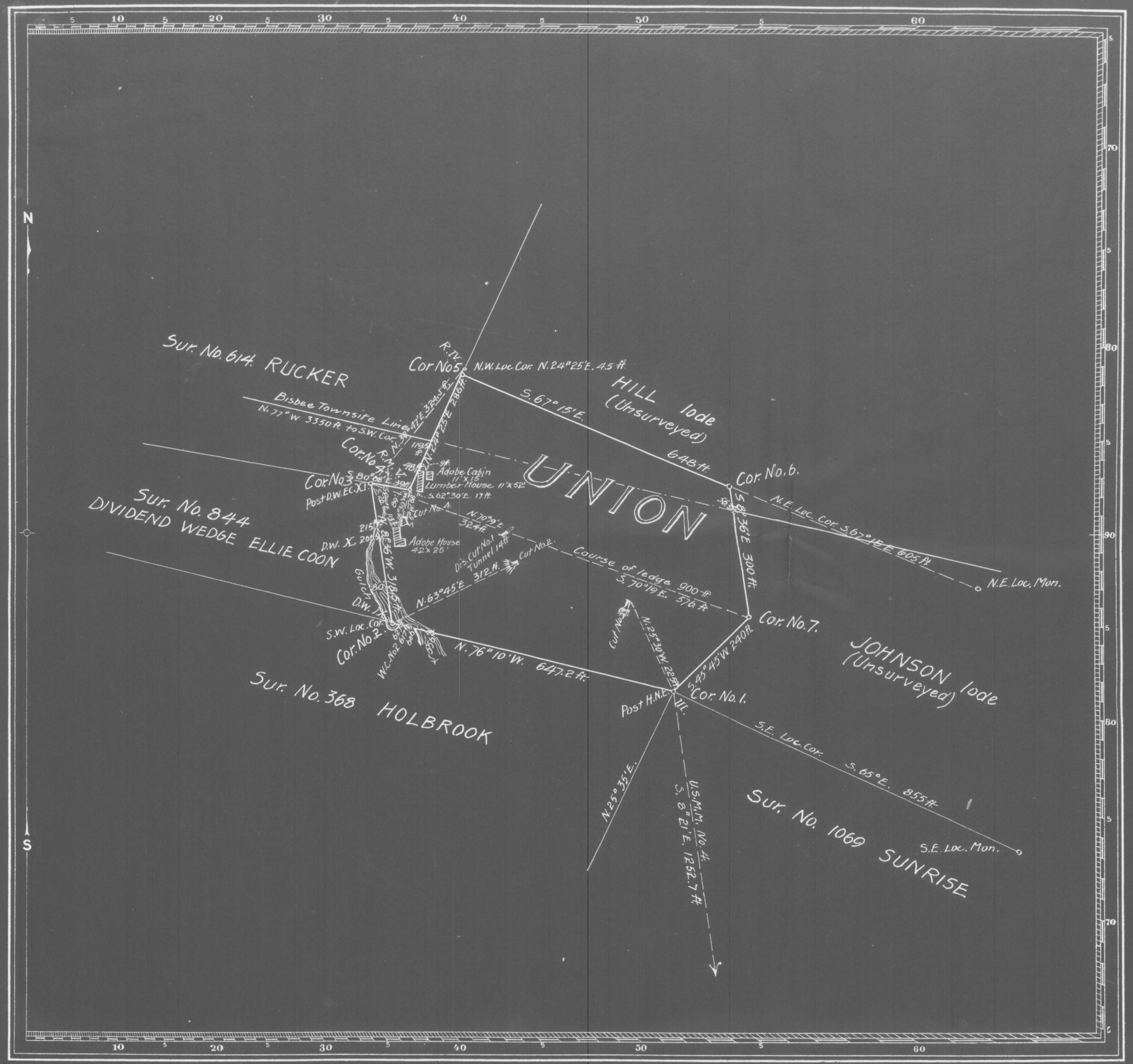
that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office.
Phoenix, Arizona
July 12th 1905

Frank A. Hopkins
U.S. Surveyor General for
ARIZONA

52.



Claim Located MAY 9th 1893.

Mineral Survey No. 1341 120

L.O.T. No.

GILA Land District.

PLAT

OF THE CLAIM OF

The COPPER QUEEN Consolidated Mining Co. Ben Williams Agt.

KNOWN AS THE

UNION lode

IN WARREN MINING DISTRICT,

COCHISE COUNTY, ARIZONA

Containing an Area of 9.135 Acres.

Scale of 200 Feet to the inch.

Variation 11° 40' E,

SURVEYED DECEMBER 19th 1898 BY

George J. Roskruge,

U.S. Deputy Mineral Surveyor,

The Original Field Notes of the Survey of the Mining Claim of The Copper Queen Consolidated Mining Co. Ben Williams, Agt. known as the UNION Lode

from which this plat has been made under my direction, have been examined and approved, and are on file in this Office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant or its grantors, and that said improvements consist of the Discovery Cut of the Union lode and three other Cuts, an Adobe House, a Lumber House, and an Adobe Cabin, One Tunnel. that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office. George Christ

TUCSON ARIZONA. U.S. Surveyor General for

AUG. 22d, 1899. ARIZONA.

COURSE AND DISTANCE FROM COR No 1 OF CLAIMS TO U.S.M.M. No 4

PAJARO	S 3° 13W	2111.3FT
HILL	S 2° 05E	1963.5FT
YO TAMBIEN	S 5° 07W	2304FT
McGINTY	S 3° 03E	2734FT
PARAGON	S 10° 42W	3583.2FT
CAROLINA	S 0° 31E	3514FT
KEY TO THE SITUATION	S 10° 09E	3385.2FT
RED HILL	S 10° 16E	3710FT
WEE WEE	S 16° 53E	4106FT
LEVIATHAN	S 17° 12E	3180.3FT
HENRY GEORGE	S 18° 23E	2821FT
NANCY HANKS	S 29° 34E	2704.4FT
SULPHIDE	S 3° 08E	2734FT
JACK OF CLUBS	S 10° 20E	3588FT
LA LUISA	S 5° 41E	2992FT

— CLAIMS LOCATED —

LA LUISA	LOCATED	JAN 7, 1889
PAJARO	"	FEB 12, 1890
McGINTY	"	" " "
RED HILL	"	" 15, "
CAROLINA	"	MARCH 23, "
SULPHIDE	"	NOV, 30, 1892
YO TAMBIEN	"	JAN. 1, 1893
NANCY HANKS	AMENDED	MAY 30, "
PARAGON	LOCATED	APRIL 6, 1894
HILL	"	JAN 7, 1895
KEY TO THE SITUATION	"	SEPT 5, 1897
JACK OF CLUBS	"	" " "
HENRY GEORGE	"	NOV " "
LEVIATHAN	"	FEB 4 1898
WEE WEE	"	" 11, 1899

— AREAS —

TOTAL NET AREA KEY TO THE SITUATION LODE		3.192 ACRES
" " " JACK OF CLUBS "		3.206 "
" " " HILL LODE		5.420 "
" " " PARAGON "		20.535 "
" " " McGINTY "		8.266 "
" " " RED HILL "		19.995 "
" " " NANCY HANKS "		10.349 "
" " " LEVIATHAN "		18.568 "
" " " WEE WEE "		13.504 "
" " " HENRY GEORGE "		13.083 "
" " " SULPHIDE "		6.159 "
" " " LA LUISA "		15.130 "
" " " YO TAMBIEN "		16.386 "
" " " CAROLINA "		11.823 "
TOTAL AREA PAJARO LODE	10.817	"
LESS CONFLICT WITH COPPER KING UNSUR.	0.038	"
YO TAMBIEN THIS SURVEY	0.595	"
TOTAL CONFLICT	0.833	"
NET AREA PAJARO LODE		10.184 "
TOTAL NET AREA LODE CLAIM		174.799 ACRES

Claim Located 190

Mineral Survey No 1715

LOT No
Gila Land District.

PLAT

OF THE CLAIM OF

Cochise Copper Mining Co.

KNOWN AS THE

Pajaro, Hill, Yo Tambien, Mc Ginty, Paragon, Carolina, Key to the Situation, Red Hill, Wee Wee, Leviathan, Henry George, Sulphide, Nancy Hanks, Jack of Clubs, and La Luisa

IN Warren MINING DISTRICT,

Cochise COUNTY, Arizona

Containing an Area of 174.799 Acres.

Scale of 400 Feet to the inch.

Variation 11° 55E

SURVEYED Sept. 21 to Oct. 7 1902 BY

Geo. C. Clark,

U.S. Deputy Mineral Surveyor,

The Original Field Notes of the Survey of the Mining Claim of Cochise Copper Mining Co. known as the Pajaro, Hill, Yo Tambien, Mc Ginty, Paragon, Carolina, Key to the Situation, Red Hill Wee Wee Leviathan, Henry George, Sulphide, Nancy Hanks, Jack of Clubs, and La Luisa from which this plat has been made under my direction, have been examined and approved, and are on file in this Office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant or its grantors, and that said improvements consist of 19 shafts, 15 cuts, 8 tunnels, 1 winze, 390 ft of drifts etc.

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

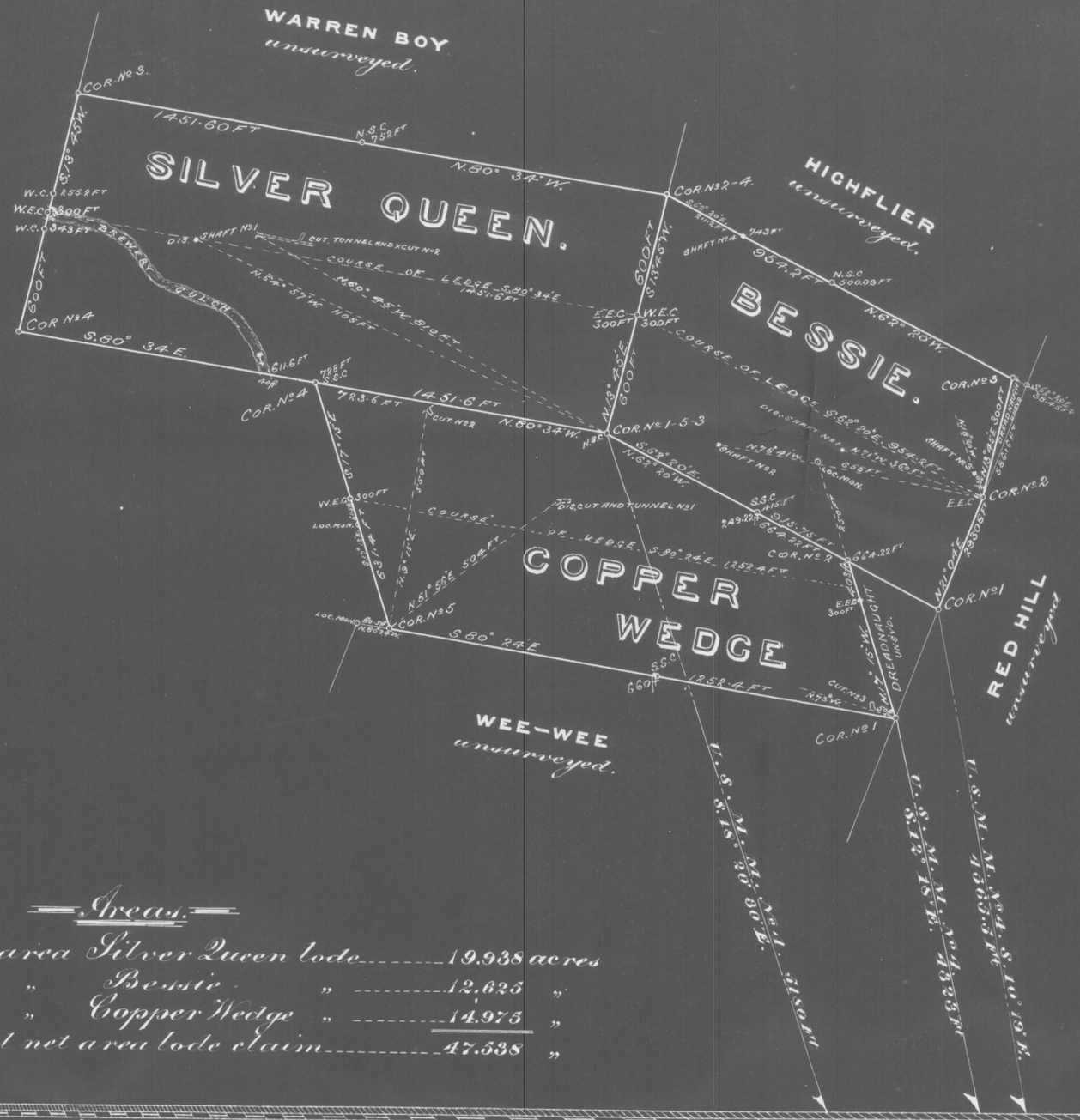
And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office. Phoenix, Ariz. Oct. 20, 1902

Aug L. H. Price
U.S. Surveyor General for Arizona

Claims located.

Silver Queen located May 1st 1895. Amended Nov. 20th 1899.
Bessie " Oct. 30th 1896, " Oct. 27th "
Copper Wedge " Nov. 19th 1897.



Areas.

Total and net area Silver Queen lode ..... 19.938 acres
" " " " Bessie " ..... 12.625 "
" " " " Copper Wedge " ..... 14.975 "
Total net area lode claim ..... 47.538 "

Claim Located 190

Mineral Survey No 1583

Lot No
Gila Land District.

PLAT

OF THE CLAIM OF
Donald Macphun

KNOWN AS THE

SILVER QUEEN.
BESSIE.
COPPER WEDGE.

IN Warren MINING DISTRICT,
Cochise COUNTY, Arizona
Containing an Area of 47.538 Acres.
Scale of 300 Feet to the inch.
Variation 11° 45' E.
SURVEYED July 15th to 18th 1901 BY
Geo. C. Clark,
U.S. Deputy Mineral Surveyor,

The Original Field Notes of the Survey of the Mining Claim of
Donald Macphun
known as the
SILVER QUEEN.
BESSIE.
COPPER WEDGE.

from which this plat has been made under my direction, have been examined and approved, and are on file in this office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claims by claimant or his or predecessors grantors, and that said improvements consist of 5 shafts, 4 cuts, 2 tunnels and 1 crosscut

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office.
Tucson, Ariz.
Nov. 22, 1901

Hugh K. Price
U.S. Surveyor General for
Arizona.

C-165

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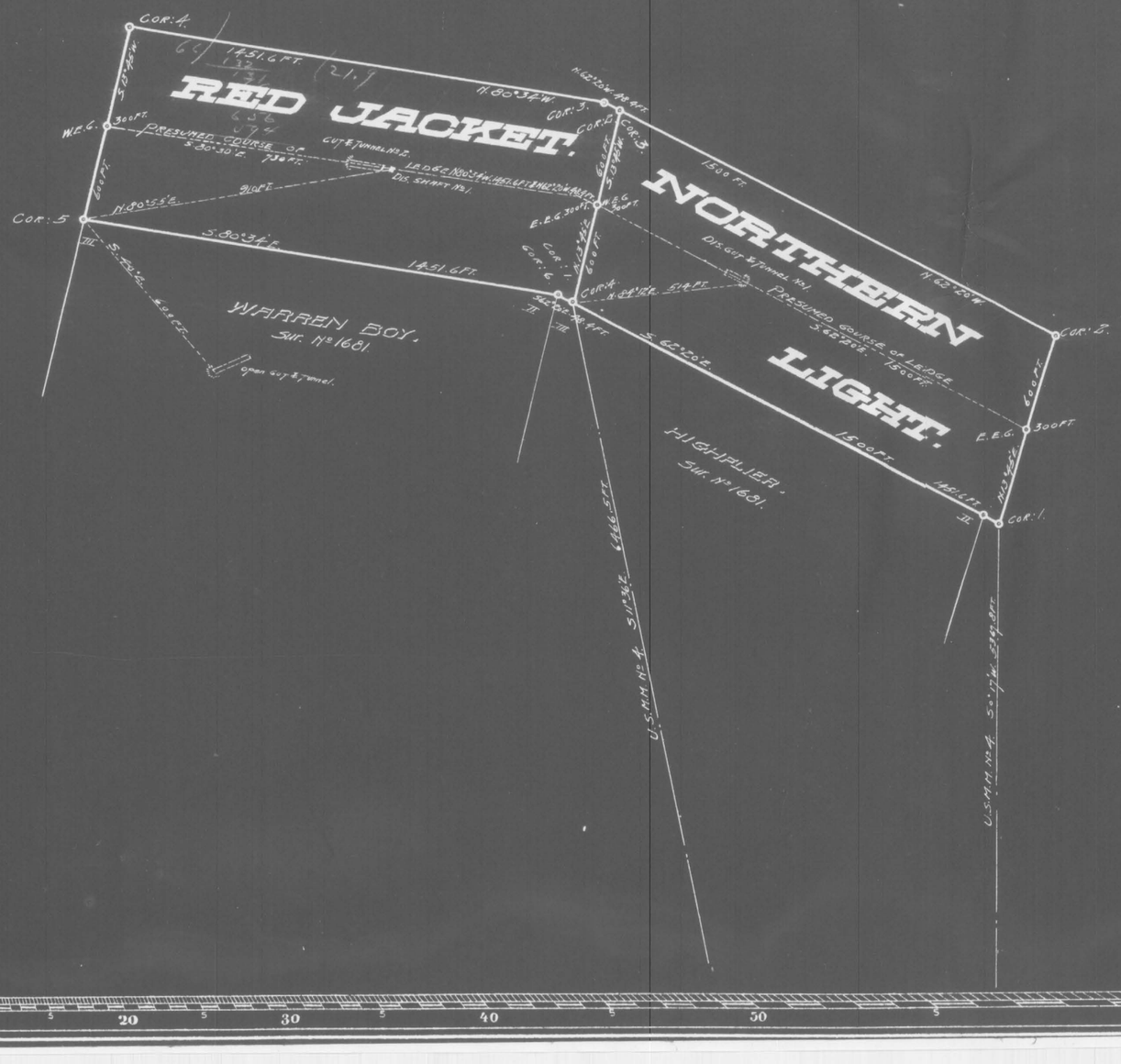
Area.

Total and net area Red Jacket lode. 20.585
" " " Northern Light " 20.055
Total net area Sur. No 1812. 40.640 Acres.

Claims Located.

Red Jacket lode claim located June, 11 1902.
Northern Light " " Nov. 18-1902.



Claim Located 190

Mineral Survey No. 1812

L.O.T. No.

Gila Land District.

PLAT

OF THE CLAIM OF

Donald Macphun.

KNOWN AS THE

Red Jacket & Northern Light.

IN WARREN MINING DISTRICT,
COCHISE COUNTY, ARIZONA.

Containing an Area of 40.640 Acres.

Scale of 400 Feet to the inch.

Variation 11° 55' E.

SURVEYED June 23 to 25 1903 BY

Geo. C. Clark,

U.S. Deputy Mineral Surveyor,

The Original Field Notes of the Survey of the Mining Claim of

Donald Macphun

known as the Red Jacket & Northern Light.

from which this plat has been made under my direction, have been examined and approved, and are on file in this Office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant or for the benefit of his grantors, and that said improvements consist of 1 Shaft, 2 Cuts, & 2 Tunnels.

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

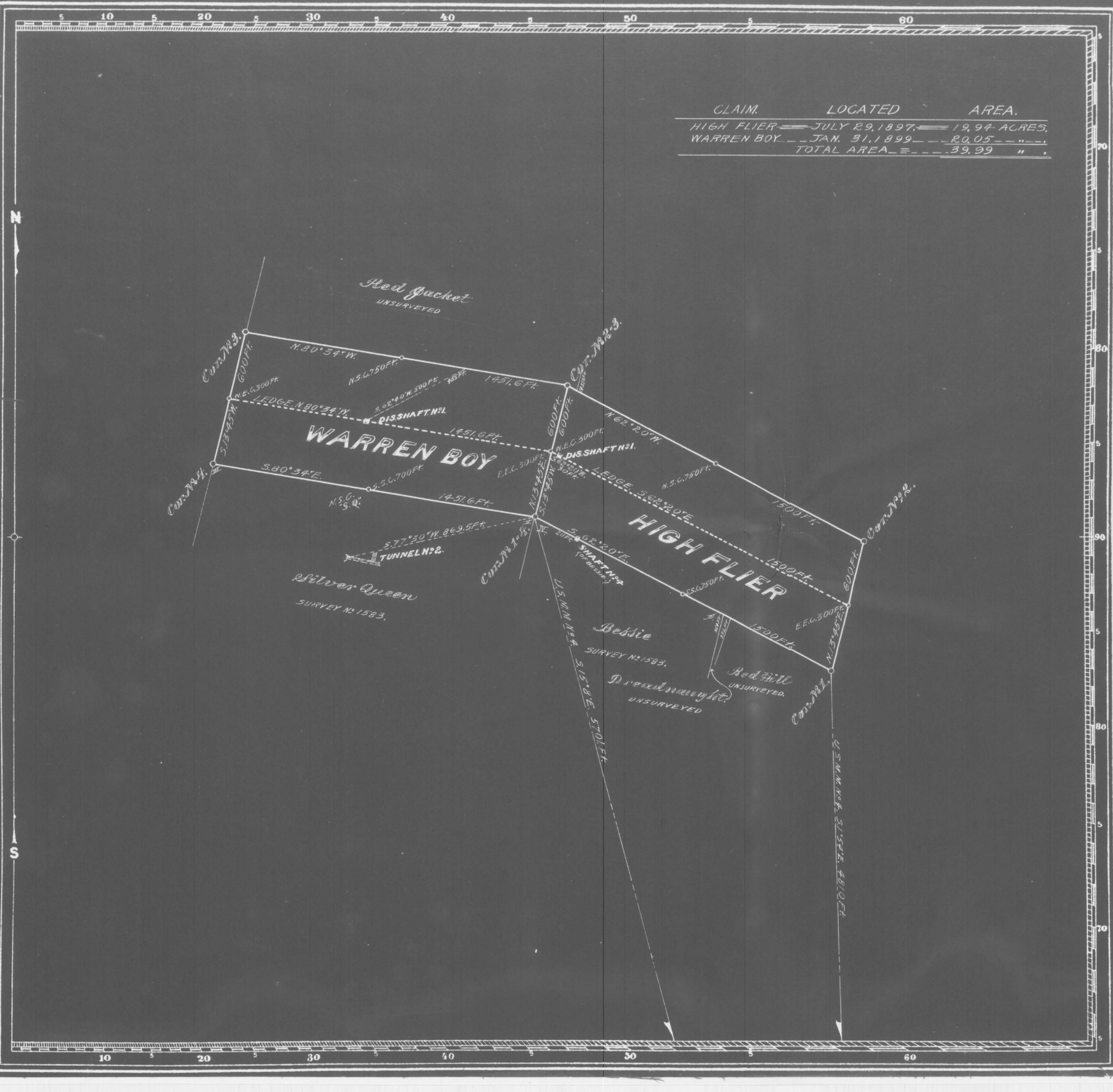
U.S. Surveyor General's Office.
Phoenix, Ariz.
July 16, 1903

Thos. H. Rice
U.S. Surveyor General for
Arizona.

(4-675)

36

CLAIM.	LOCATED	AREA.
HIGH FLIER	JULY 29, 1897.	19.94 ACRES.
WARREN BOY	JAN. 31, 1899	R.O.05 "
	TOTAL AREA =	39.99 "



Claim Located 190

Mineral Survey No. 1681 157

Lot No.

Gila Land District.

PLAT

OF THE CLAIM OF

Donald Macphun

KNOWN AS THE

HIGH FLIER AND

WARREN BOY.

IN Warren MINING DISTRICT,

Cochise COUNTY, Arizona.

Containing an Area of 39.99 Acres.

Scale of 400 Feet to the inch.

Variation 11° 55' E.

SURVEYED June 24 to 27 1902. BY

Geo. C. Clark, U.S. Deputy Mineral Surveyor,

The Original Field Notes of the Survey of the Mining Claim of Donald Macphun.

known as the

HIGH FLIER AND

WARREN BOY

from which this plat has been made under my direction, have been examined and approved, and are on file in this Office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant or his (or foreman) grantors, and that said improvements consist of 2 shafts and ½ of tunnel No 2 Silver Queen and ½ of shaft No 4, Bessie, survey No. 1583.

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office.
Phoenix, Ariz.
Oct. 20, 1902.

Hugh A. Rice
U.S. Surveyor General for
Arizona.

MUHEIM - ANDERSON

ALPHA

DREADNAUGHT

D.D. HOLE NO. 2

A

D.D. HOLE NO. 1

COCHISE DEVELOPMENT COMPANY

CHIHUAHUA HILL

B

C

BISBEE TOWNSITE LOTS

BREWERY GULCH

DIVIDEND FAULT

NANCY HANKS

D.D. HOLE NO. 3

COCHISE SHAFT

DUBACHER GULCH

COPPER JACK

D

RUCKER

PHELPS DODGE CORP

UNION

JOHNSON

JONES GULCH

COPPER KING SHAFT

PHELPS DODGE CORP.

DIVIDEND FAULT

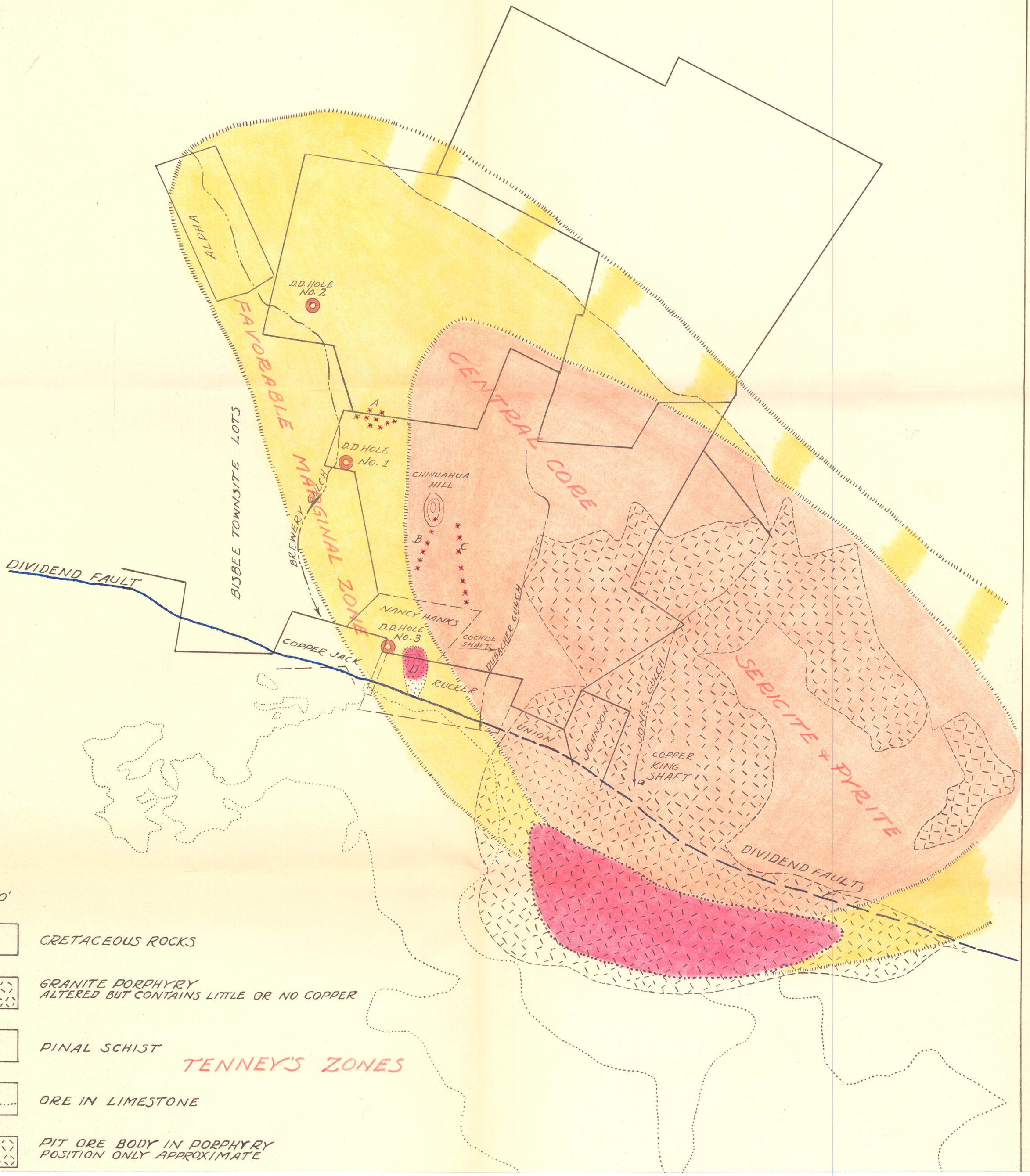
N

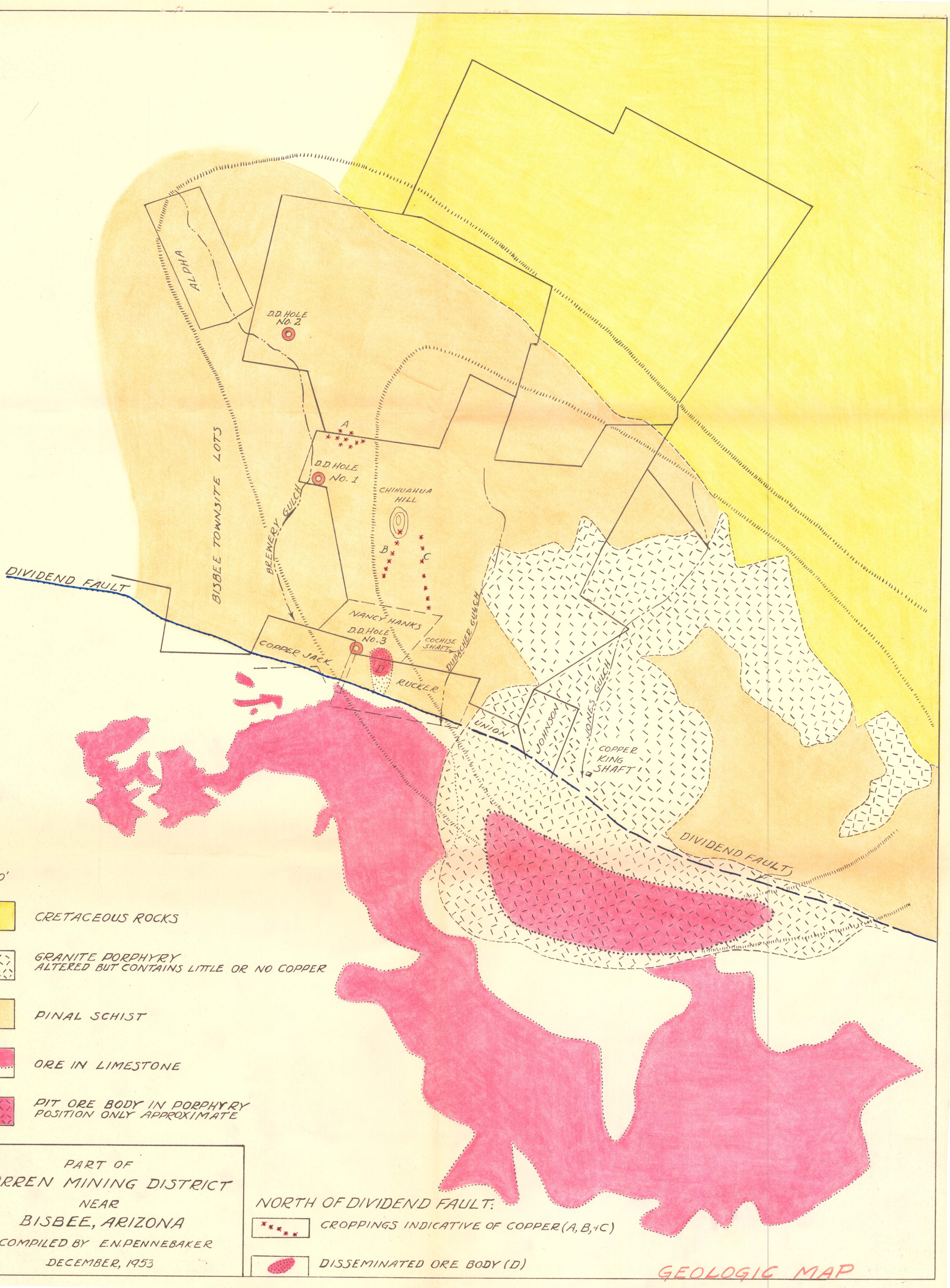
1"=500'

PROPERTY MAP

CRETACEOUS ROCKS

GRANITE PORPHYRY
ALTERED BUT CONTAINS LITTLE OR NO COPPER


ALPHA
FAVORABLE MARGINAL ZONE
D.D. HOLE NO. 2
CENTRAL CORE
A
D.D. HOLE NO. 1
CHIHUAHUA HILL
BREWERY GULCH
BISBEE TOWNSITE LOTS
B
C
DIVIDEND FAULT
NANCY HANKS
COCHISE SHAFT
DUBACHER GULCH
D.D. HOLE NO. 3
COPPER JACK
D
RUCKER
UNION
JOHNSON
JONES GULCH
COPPER KING SHAFT
SERICITE + PYRITE
DIVIDEND FAULT
N
1"=500'
CRETACEOUS ROCKS
GRANITE PORPHYRY
ALTERED BUT CONTAINS LITTLE OR NO COPPER
PINAL SCHIST
TENNEY'S ZONES
ORE IN LIMESTONE
PIT ORE BODY IN PORPHYRY
POSITION ONLY APPROXIMATE



PART OF
WARREN MINING DISTRICT
NEAR
BISBEE, ARIZONA
COMPILED BY E.N. PENNEBAKER
DECEMBER, 1953

GEOLOGIC MAP