CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
3550 N. Central Ave, 2nd floor
Phoenix, AZ, 85012
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the Cambior Exploration USA Inc. records

ACCESS STATEMENT

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

CONSTRAINTS STATEMENT

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

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

QUALITY STATEMENT

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

12/05/88

PREPARED BY: DIETZ AND ASSOCIATES, 4706 N. 31ST DRIVE
PHOENIX, AZ. 85017, PHONE (602)841-1744

PRIMARY NAME: LONDON ARIZONA GROUP See KULLMAN-McCOOK

ALTERNATE NAMES:

O'CARROLL CLAIMS
LONDON SHAMROCK
BALL COPPER
KULLMAN-MCCOOL GROUP
BRICK GROUP
REAGEN PROPERTY
LONDON RANGE
CURTIN SHAFT
HUMPHREY PROPERTY
LONDON ARIZONA CONSOLIDATED

GILA COUNTY MILS NUMBER: 6

LOCATION: TOWNSHIP 4 S RANGE 15 E SECTION 28 QUARTER E2
LATITUDE: N 33DEG 03MIN 15SEC LONGITUDE: W 110DEG 48MIN 40SEC
TOPO MAP NAME: HAYDEN - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:

COPPER
LEAD
GOLD
SILVER
ZINC
VANADIUM
MOLYBDENUM
PERLITE

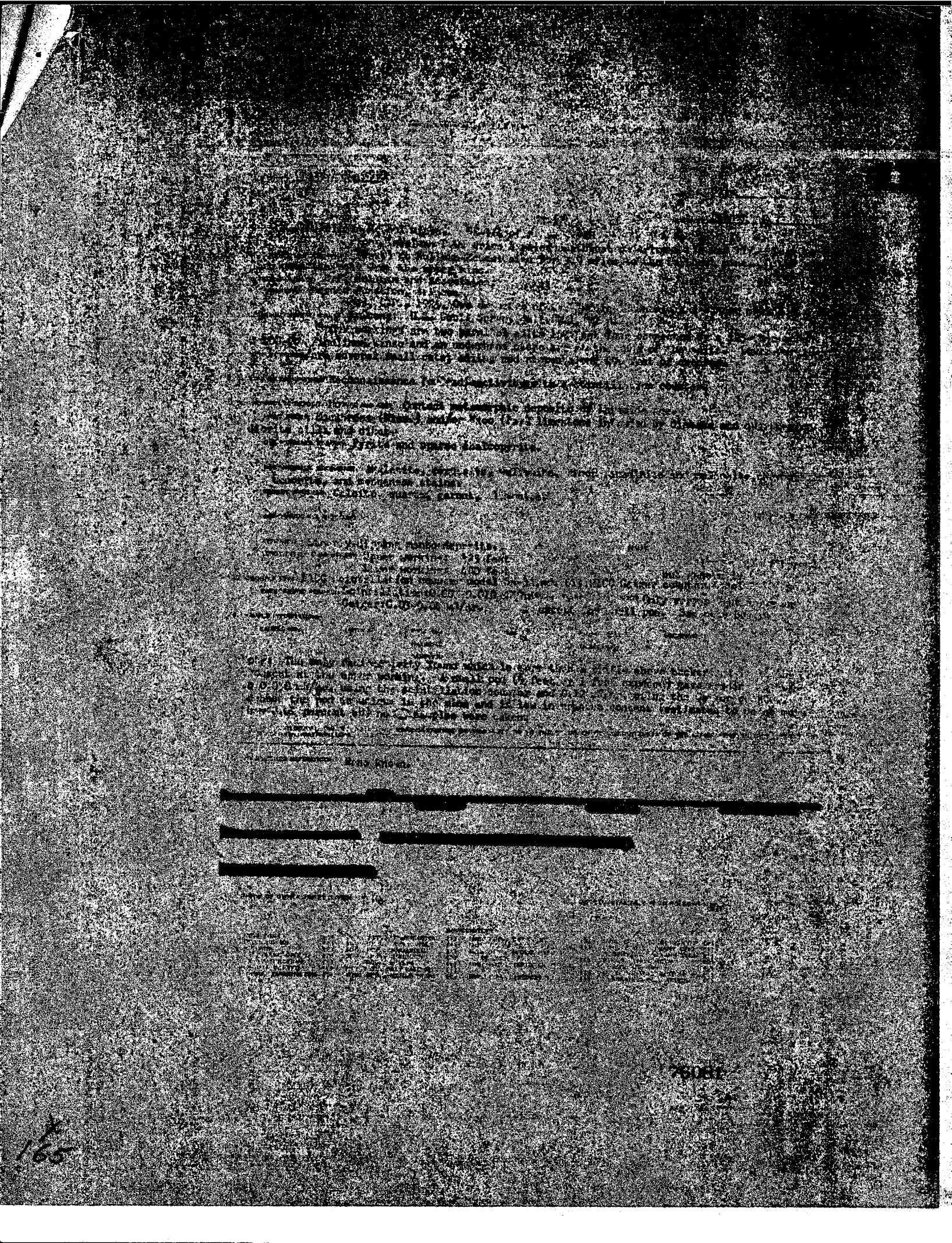
BIBLIOGRAPHY:

ADMMR LONDON ARIZONA GROUP FILE
ADMMR "AZ IND MIN" 1978, P. 31 PUBLICATION
WEED, W H "MINES HNDBK" VOL. 13, P 389; 1918
ADMMR A L FLAGG VANADIUM RPT BK 2 & 8
ADMMR "MOLY OCCUR AZ" 1978 P 16 PUBLICATION
KOSCHMANN A H & M BERGENDAHL "PRIN. AU PROD DIST US" USGS PP 610, P. 38; 1968
ADMMR LONDON-GILA GROUP FILE SEE MAP

CONTINUED ON NEXT PAGE

CONTINUATION OF LONDON ARIZONA GROUP

AZBM BULL 158, "AZ LEAD & ZINC DPSTS" P 81
USAEC 172-480 GILA CTY PRELIM RECONN RPT.
1953, P 165
CLAIMS EXTEND INTO SEC 27



LEAD VANADATE ORES

KULLMAN-McCOOL MINING COMPANY

HAYDEN JUNCTION, ARIZONA

The Kullman-McCool properties, also known as the Reagan or Brick Group, consists of twelve unpatented claims, in the Banner mining district, in Gila county, Arizona, three and one-half miles from Hayden Junction, over good roads. Hayden Junction is a station on the Christmas branch of the Southern Pacific railroad.

The property is owned by the Kullman-McCool Mining Company, which has current obligations amounting to $500.

The power line of the United States Reclamation Service, (Coolidge Project) passis within two miles of the principal workings on the property.

A shaft on one of the claims near the camp has furnished water at the rate of 50 G.P.M., over considerable periods. Additional water can be had from the Gila river, at Hayden Junction.

The most extensive exploratory work has been over a horizontal distance of 4000-ft, with the greatest concentration over a length of 600 feet. The vertical range of mineralization explored in this 600-ft zone is about one hundred feet.

Ore occurs in fractured Paleozoic limestone, both in a wide continuous vertical fracture and as selective replacement in favorable strata of the limestone. The vertical fissure shows widths of ore from two to twelve feet, the average being four feet. Only the oxidized zone has been explored to date. In addition to the vanadium the ores contain considerable molybdenum. Cerussite is also abundant. In the past these ores have been mined profitably, in a small way, for the lead content. Appreciable amounts of gold and silver are present.

Though there is no extensive connected development work over the 600 feet mentioned above, such work as there is together with surface prospecting all along the outcrop firmly established the continuity of the fissure for this distance. With a small amount of new work, possibly from 25 to 50 tons of ore could be mined per day. The total amount of ore which might be developed in this area might be from sixteen to twenty thousand tons, which would carry recoverable values in molybdenum and lead as well as gold and silver.

The ore is either very hard or very soft. The hard ore is a ferruginous chert. As a rule the highest values are in the soft ore. Screening run-of-mine ore might be done profitably. It is believed that 50% of the ore as mined will pass a 1/4 inch screen. This soft ore, would probably yield the bulk of the concentrates. The hard ore would require grinding. It is possible that the hardest chert ore could be sorted out as waste for in many instances it carries little if any values.

The only equipment on the property consists of a few tools suitable for hand mining. There is one house occupied by the caretaker. There is a good road from the camp to the principal workings.

At the end of the present road the principal development begins. A short adit is driven south-east across gently dipping limestones to a vertical fissure along which there has been 120-ft of drifting. Some stoping has been done in this area, yielding lead ore, principally cerussite with minor amounts of galena and wulfenite. This ore was sorted and shipped.

Close to the portal is a thin seam of cerussite on a bedding plane, not over 12 inches thick. Just inside the crosscut is a ten inch seam dipping steeply to the north. A sample (85) here contained 0.34% V_2O_5, 0.50 MoO_3 and 2.16% Pb.

Northeasterly from the intersection of the crosscut with the drift the work has been carried 57-ft in a series of benches. In the opposite direction the drift extends 75-ft. A four foot underhand stope, eighteen feet long, was made in this drift. Since the top of the highest bench in the east drift is about eight feet from the floor, and since this underhand is four feet below, the vertical range in these workings is not less than sixteen feet.

These workings show intense oxidation. The vertical fissure is filled principally with quarts, iron oxides and some manganese. Wulfenite occurs in subordinate amounts. Vanadinite is not seen here but descloizite occurs sparingly.

Samples were cut in the face of each drift. The face of the east drift (80) showed no vanadium, a trace of molybdenum and 1.0% Pb. The sample taken in the west drift was a cut across the soft material below the chert. This showed no vanadium, 0.04 MoO_3 and 2.54% Pb. Sample 88 was taken along the north wall of the west drift from the crosscut to the face. This gave a trace of vanadium 0.80 MoO_3 and 1.36% Pb. Over a width of two feet on the east side of the crosscut at the intersection with the drift there is considerable descloizite. Sample 84 from this area contained 0.44% V_2O_5, 0.30 MoO_3, and 0.84% Pb.

Eastward along the outcrop of the favorable strata of limestone a few very shallow cuts have been made. At about 200-ft distant a shaft was sunk 15-ft with drifts run east and west. The west drift is four feet lower than the east drift and is 25-ft long. In these workings descloisite appears more conspicuously. A sample (89) was cut down the east wall in the middle of the east drift. This assayed 0.61% V_2O_5, 0.44% MoO_3, and 3.15% Pb. Cherty material is conspicuous in this drift and wulfenite is noticeably associated with it.

Vanadium occurs most abundantly (megascopically) in the next prospect which is about 200-ft west. This consists of an adit crosscut with a short drift east and about 80-ft of drifting west. These workings are very irregular In the west portion vanadinite, characteristic red crystals up to 4 mm in diameter, are abundant over about 20-ft along the north side. Throughout the west drift descloisite occurs irregularly.

From about the center of the west drift a narrow 15-ft drift was made almost due east. A sample (90) of hard calcite-gangue ore on the south side contained no vanadium, 0.25% MoO_3, and 2.42% Pb. Directly under this (sample 91) eighteen inches of soft material assayed 0.22 V_2O_5, 2.68% MoO_3, and 8.8% Pb.

On the north side of the main west drift opposite the intersection with the diagonal drift mentioned above Sample 92 across 5-ft in the stope wassayed 0.72% V_2O_5, 0.13% MoO_3, and 5.16% lead.

In the face of the west drift sample 94 across 10 inches of shaly limestone assayed 0.40% V_2O_5, a trace of Mo and 2.04% Pb. The harder limestone below this (Sample 95) assayed 0.59% V_2O_5, 0.37% MoO_3, and 4.50% Pb.

A short distance west is another irregular opening with a soft vanadiferous streak in the center of the floor. This soft material assayed (Sample #6) 2.5#% V_2O_5, 0.44% MoO_3, and 14.0% Pb. This is believed to be a pocket only and should not be taken into consideration in making estimates of the vanadium values.

Almost directly below the workings first described is an adit crosscut to the south from the canyon which intersects the vertical fissure at 85-ft. Drifting on the vein for 20-ft east and 50-ft west shows a tight, narrow vein with little or no values in the east drift. In the west drift conditions are the same until a cross fracture is reached near the face. Beyond this point to the west the vein shows signs of widening with some wulfenite and vanadinite beginning to show.

The lower crosscut is continued southward to and beyond a quartz-diorite-porphyry(?) dike the hanging wall of which strikes N 65 E, and dips north at 54 degrees. The dike was encountered at 175-ft from the portal. Continuing into the dike some 40-ft it has not yet reached the footwall of the dike.

Conclusion.

The development to date over the area examined discloses no appreciable values in vanadium east of the second opening with the highest values in the most westerly. Though ther is some indication that vanadium minerals are more abundant in the softer portions of the mineralized ground it cannot be said definitely that the harder formations do not carry any values. Wulfenite occurs frequently in the chert, vanadium practically never found in the chert. Because vanadium minerals have been more abundant in the vicinity of diabase intrusions into the limestone in this general area the presence of intrusive diabase above the fourth opening may have some significance. By exploring the ground between the existing development and also opening up to greater depth a fair volume of 0.50 to 0.60% V_2O_5 may be developed.

Phoenix, Arizona,
May 5th, 1942.

Respectfully submitted,

COPY

LEAD VANADATE ORES

KULLMAN-McCOOL MINING COMPANY

HAYDEN JUNCTION, ARIZ.

The Kullman-McCool properties, also known as the Reagan or Brick Group, consists of twelve unpatented claims, in the Banner mining district, in Gila county, Arizona, three and one-half miles from Hayden Junction, over good roads. Hayden Junction is a station on the Christmas branch of the Southern Pacific railroad.

The property is owned by the Kullman-McCool Mining Company, which has current obligations amounting to $2500.

The power line of the United States Reclamation Service, (Coolidge Project) passes within two miles of the principal workings on the property.

A shaft on one of the claims near the camp has furnished water at the rate of 50 G.P.M. over considerable periods. Additional water can be had from the Gila river, at Hayden Junction.

The most extensive exploratory work has been over a horizontal distance of 4000-ft, with the greatest concentration over a length of 600 feet. The vertical range of mineralization explored in this 600-ft zone is about one hundred feet.

Ore occurs in fractured Paleozoic limestone, both in a wide continuous vertical fracture and as selective replacement in favorable strata of the limestone. The vertical fissure shows widths of ore from two to twelve feet, the average being four feet. Only the oxidized zone has been explored to date. In addition to the vanadium the ores contain considerable molybdenum. Cerussite is also abundant. In the past these ores have been mined profitably, in a small way, for the lead content. Appreciable amounts of gold and silver are present.

Though there is no extensive connected development work over the 600 feet mentioned above, such work as there is together with surface prospecting along the outcrop firmly established the continuity of the fissure for this distance. With a small amount of new work, possibly from 25 to 50 tons of ore could be mined per day. The total amount of ore which might be

developed in this area might be from sixteen to twenty thousand tons, which would carry recoverable values in molybdenum and lead as well as gold and silver.

The ore is either very hard or very soft. The hard ore is a feruginous chert. As a rule the highest values are in the soft ore. Screening run-of-mine ore might be done profitably. It is believed that 50% of the ore as mined will pass a ½ inch screen. This soft ore, would probably yield the bulk of the concentrates. The hard ore would require grinding. It is possibly that the hardest chert ore could be sorted out as waste for in many instances it carries little if any values.

The only equipment on the property consists of a few tools suitable for hand mining. There is one house occupied by the caretaker. There is a good road from the camp to the principal workings.

At the end of the present road the principal development begins. A short adit is driven south-east across gently dipping limestones to a vertical fissure along which there has been 120-ft. of drifting. Some stoping has been done in this area, yielding lead ore, principally cerussite with minor amounts of galena and wulfenite; this ore was sorted and shipped.

Close to the portal is a thin seam of cerussite on a bedding plane, not over 12 inches thick. Just inside the crosscut is a ten inch seam dipping steeply to the north. A sample (85) here contained 0.34% V_2O_5, 0.50 Mo_3 and 2.16% Pb.

Northeasterly from the intersection of the crosscut with the drift the work has been carried 37-ft in a series of benches. In the opposite direction the drift extends 73-ft. A four foot underhand stope, eighteen feet long, was made in this drift. Since the top of the highest bench in the east drift is about eight feet from the floor, and since this underhand is four feet below, the vertical range in these workings is not less than sixteen feet.

These workings show intense oxidation. The vertical fissure is filled principally with quartz, iron oxides and some manganese. Wulfenite occurs in subordinate amounts. Vanadinite is not seen here but descloizite occurs sparingly.

Samples were cut in the face of each drift. The face of the east drift (80) showed no vanadium, a trace of molybdenum and 1.9% Pb. The sample taken in the west drift was a cut across the soft material below the chert. This showed no vanadium, 0.04 Mo_3 and 2.54% Pb. Sample 88 was taken along the north wall of

the west drift from the crosscut to the face. This gave a trace of vanadium 0.80 Mo_3 and 1.38% Pb. Over a width of two feet on the east side of the crosscut at the intersection with the drift there is considerable descloizite. Sample 84 from this area contained 0.24% V_2O_5, and 0.84% Pb.

Westward along the outcrop of the favorable streets of limestone a few very shallow cuts have been made. At about 200-ft distant a shaft was sunk 15-ft with drifts run east and west. The west drift is four feet lower than the east drift and is 25-ft long. In these workings descloizite appears more conspicuously. A sample (89) was cut down the east wall in the middle of the east drift. This assayed 0.61% V_2O_5, 0.44% Mo_3, and 3.13% Pb. Cherty material is conspicuous in this drift and wulfenite is noticeably associated with it.

Vanadium occurs most abundantly (megascopically) in the next prospect which is about 200-ft west. This consists of an adit crosscut with a short drift east and about 80-ft. of drifting west. These workings are very irregular. In the west portion vanadinite, characteristic red crystals up to 4 mm. in diameter, are abundant over about 20-ft along the north side. Throughout the west drift descloizite occurs irregularly.

From about the center of the west drift a narrow 15-ft drift was made almost due east. A sample (90) of hard calcite-gangue ore on the south side contained no vanadium, 0.25% Mo_3, and 2.42% Pb. Directly under this (sample 91) eighteen inches of soft material assayed 0.22 V_2O_5, 2.68% Mo_3, and 8.8% Pb.

On the north side of the main west drift opposite the intersection with the diagonal drift mentioned above Sample 92 across 5-ft in the stope assayed 0.72% V_2O_5, 0.13% Mo_3 and 5.18% lead.

In the face of the west drift sample 94 across 10 inches of shaly limestone assayed 0.40% V_2O_5, a trace of Mo and 2.04% Pb. The harder limestone below this (sample 95) assayed 0.59% V_2O_5, 0.37% MoO_3 and 4.30% Pb.

A short distance west is another irregular opening with a soft vanadiferous streak in the center of the floor. This soft material assayed (Sample 96) 2.59% V_2O_5, 0.44% MoO_3, and 14.0% Pb. This is believed to be a pocket only and should not be taken into consideration in making estimates of the vanadium values.

Almost directly below the workings first described is an adit crosscut to the south from the canyon which intersects the vertical fissure at 85-ft. Drifting on the vein for 20-ft east and 50-ft west shows a tight, narrow vein with little or no values in the east drift. In the west drift conditions are the same until a cross fracture is reached near the face. Beyond this point to the west the vein shows signs of widening the wulfenite and vanadinite beginning to show.

The lower crosscut is continued southward to and beyond a quartz-diorite-porphyry (?) dike the hanging wall of which strikes N 65 E, and dips north at 54 degrees. The dike was encountered at 175-ft. from the portal. Continuing into the dike some 40-ft it has not yet reached the footwall of the dike.

Conclusion.

The development to date over the area examined discloses no appreciable values in vanadium east of the second opening with the highest values in the most westerly. Though there is some indication that vanadium minerals are more abundant in the softer portions of the mineralized ground it cannot be said definitely that the harder formations do not carry any values. Wulfenite occurs frequently in the chert, vanadium practically never found in the chert. Because vanadium minerals have been more abundant in the vicinity of diabase intrusions into the limestone in this general area the presence of intrusive diabase above the fourth opening may have some significance. By exploring the ground between the existing development and also opening up to greater depth a fair volume of 0.50 to 0.60% V_2O_5 may be developed.

Respectfully submitted,

(Signed - A.L. Flagg)

Phoenix, Arizona.
May 5th, 1913.

early Tertiary age was injected along a thrust, and slightly later the Schieffelin Granodiorite of probable early or middle Tertiary age (Gilluly, 1956, p. 104) intruded the area. Patches of volcanics of Miocene age are exposed to the east of Tombstone. In Pliocene time the rocks were again faulted, this time by great normal faults that are responsible for the present major topographical features (Gilluly, 1956, p. 158–160).

The ore deposits are associated with dikes that are believed to be related to the Schieffelin Granodiorite (Butler and others, 1938, p. 26–28). Ore occurs as replacement bodies in limestones and porphyry, and as fissure fillings. The oxidized ores contain hematite, limonite, cerussite, horn silver, gold and locally abundant argentiferous galena, sphalerite, pyrite, alabandite, malachite, chrysocolla, psilomelane, and wulfenite. Most of the gold occurs as native gold in very fine particles (Wilson and others, 1934, p. 123–124).

TURQUOISE DISTRICT

The Turquoise (Courtland, Gleeson) mining district lies on the east side of the Dragoon Mountains, about 14 miles due east of Tombstone and about 18 miles north-northeast of Bisbee. During the 1880's mines near Gleeson produced oxidized ore rich in gold, silver, lead, and copper, and in 1901 mining of copper deposits near Courtland was started. Mixed oxide-sulfide ore was mined on a large scale from 1912 through 1918, but thereafter activity declined and remained at a low level through 1955. The district was idle from 1956 through 1959. Early gold production figures were not ascertained, but from 1908 through 1955 the district produced about 70,000 ounces.

The northwest-trending Dragoon Mountains are composed primarily of contorted and faulted Paleozoic sedimentary rocks and intrusive masses of monzonitic and granitic rocks of Triassic or Jurassic and Cretaceous or Tertiary age. The Paleozoic formations are the Bolsa Quartzite and Abrigo Limestone of Cambrian age, the Escabrosa Limestone of Mississippian age, the Horquilla Limestones of Pennsylvanian age, the Earp Formation of Late Pennsylvanian and Permian age, and the Colina Limestone and Epitaph Dolomite of Permian age (Gilluly, 1956, p. 14–49). In the interval between the end of the Paleozoic and the beginning of the Cretaceous the rocks were deformed and intruded by masses of Gleeson Quartz Monzonite, Copper Belle Monzonite Porphyry, and Turquoise Granite, all of Triassic or Jurassic age. The Sugarloaf Quartz Latite was probably intruded at the end of Cretaceous time. In early Tertiary time the rocks were displaced by strong northwest-trending thrust faults, and in Pliocene time normal faulting occurred which formed the major topographic features of the present (Gilluly, 1956, p. 159, 160).

The ore bodies are pyritic replacement deposits in limestone, shale, and porphyry along thrust faults. Some of the deposits are oxidized and consist of masses of iron and copper oxides containing cavities lined with chrysocolla, malachite, and azurite. The unoxidized deposits are mainly pyrite and chalcopyrite with local accumulations of bornite, sphalerite, and galena (Ransome, 1913). The gold occurs as very finely divided particles in all the ores; in the oxidized deposits some gold is contained in cerargyrite (Wilson, 1927, p. 39, 50).

GILA COUNTY

Gila County, in mountainous east-central Arizona, ranks eighth among the gold-producing counties of the State with a total of about 240,500 ounces produced through 1959. Most of the gold has been a byproduct of copper ores mined from the Globe-Miami district; a lesser amount has come from copper ores of the Banner district. Placers have yielded an insignificant amount.

BANNER DISTRICT

The Banner (Christmas) district lies in the extreme southern tip of Gila County at the southeast end of the Dripping Springs Mountains.

Many of the deposits have been known and worked intermittently since the 1870's, but little ore was shipped before 1900 (Ross, 1925, p. 29). The district is noted for its copper mines from which lead, silver, and gold were produced as byproducts. The Christmas mine, discovered in 1880 and operated intermittently through 1954, is the major mine in the district. Total gold production from 1905 through 1959 was about 26,000 ounces.

Small patches of Precambrian granite are exposed beneath a thick section of the Apache Group of late Precambrian age, Martin Limestone of Devonian age, and Tornado Limestone of Carboniferous age. The area of the Christmas mine is blanketed by sandstone, breccia, andesite, and basalt of Cretaceous age, which are overlain by patches of Tertiary bedded rocks consisting of tuff, conglomerate, basalt, and rhyolite. The Paleozoic and Cretaceous rocks throughout the district are cut by dikes and small masses of quartz-hornblende diorite and quartz-mica diorite of Cretaceous age. The rocks were slightly folded in post-Pennsylvanian time; more pronounced folding occurred in Late

Cretaceous time. This was followed by faulting which continued through much of Tertiary time (Ross, 1925, p. 6–29).

The important deposits of the district are pyritic gold deposits in shear zones and contact metamorphic deposits such as those at the Christmas and Landon-Arizona mines. The pyritic gold deposits are principally in Cretaceous volcanic rocks, whereas the contact metamorphic deposits are mostly in Paleozoic carbonate rocks. Both types are near or adjacent to bodies of quartz-mica diorite. Pyrite and local chalcopyrite, magnetite, and specularite are the principal minerals of the pyritic deposits. The contact metamorphic deposits contain a variety of minerals, including magnetite, specularite, chalcopyrite, pyrite, sphalerite, galena, fluorite, chalcedony, and lime silicate minerals. In both types the richest ore has been in the oxidized parts (Ross, 1925, p. 32–39).

GLOBE-MIAMI DISTRICT

The Globe-Miami district, in the foothills of the Pinal and Apache Mountains in the southwestern part of Gila County, is noted primarily for its copper deposits which have yielded considerable amounts of gold, silver, and lead.

The discovery of the Globe claim in 1874 marked the first activity in the area, and for a time thereafter interest centered on small silver and gold prospects. In 1882 copper deposits on the Old Dominion and Buffalo veins were mined. Development was considerably stimulated in 1898, when the first railroad reached Globe. In 1904 development was begun on the large low-grade disseminated copper deposits, which by 1911 were mined on a large scale (Ransome, 1919, p. 19–21). These operations continued with undiminished vigor through 1959 and resulted in an output of copper, lead, silver, gold, and zinc worth more than a billion dollars (Peterson, 1962, p. 81, 82). Total gold production through 1959 was 191,801 ounces.

Lower Precambrian rocks, consisting of the Pinal Schist, Madera Diorite, Ruin Granite, and an unnamed granite, are the oldest rocks exposed in the district. These are overlain by the Apache Group and Troy Quartzite, of late Precambrian age, and are intruded by dikes and sills of diabase of later Precambrian age (A. F. Shride, oral commun., 1962). The Paleozoic System is represented by the Devonian Martin Limestone, the Mississippian Escabrosa Limestone, and the Pennsylvanian Naco Limestone. Late Cretaceous and early Tertiary time was marked by igneous intrusives including the Solitude Granite, Willow Spring Granodiorite, biotite granodiorite of Gold Gulch, and Lost Gulch Quartz Monzonite. These events were followed in later Tertiary time by faulting, intrusion of porphyry dikes, and then emplacement of the Schultze Granite and of a granite porphyry. Extensive mineralization followed this granitic intrusion. The Whitetail Conglomerate of Tertiary(?) age and younger volcanic tuffs and dacite flows or welded tuffs (Peterson, 1962, p. 40–41) unconformably overlie all the older rocks. Faulting again occurred, after which the alluvial Gila Conglomerate of Tertiary and Quaternary age was deposited and later basalt flows were extruded over part of the area.

The most important ore deposits of the Globe-Miami district are disseminated copper deposits in the granite porphyry of the Schultze Granite and in the adjacent country rocks. More than 80 percent of the value of metals mined in the district has come from such deposits, of which the major examples are the Miami-Inspiration, Castle Dome, Copper Cities and Cactus deposits. In mineralized areas the rocks are shattered, and the closely spaced fractures are filled with quartz, pyrite, chalcopyrite, and molybdenite. In areas of more intense mineralization the rocks are argillized and sericitized, and much pyrite has been replaced by chalcocite. Most ore bodies are the result of supergene enrichment in which copper has been leached by ground water from an oxidized zone and redeposited as chalcocite and covellite (Peterson, 1962, p. 82–83). Very small amounts of gold are contained in these ores.

Before 1904 the important deposits of the district were copper-bearing veins of the Old Dominion vein system, in the Globe Hill area. These veins are along faults and fissures that cut Precambrian and Paleozoic sedimentary rocks, and the ore shoots are localized in intervals of favorable host rock, mainly Paleozoic limestone. The principal hypogene minerals of these deposits are quartz, pyrite, chalcopyrite, bornite, and specular hematite; sphalerite, galena, tetrahedrite, and enargite are locally present in small amounts. These ores were also enriched in copper by supergene processes. Considerable native gold was recovered from the gossan of these ores (Peterson, 1962, p. 69, 97, 98).

Deposits of copper silicates and carbonates formed by meteoric waters are important sources of copper in the district, but no gold has been reported from them.

GREENLEE COUNTY

Greenlee County is in southeastern Arizona just west of the New Mexico State boundary. It was organized from part of Graham County in 1910.