INDEX OF MINING PROPERTIES IN COCHISE COUNTY, ARIZONA

by
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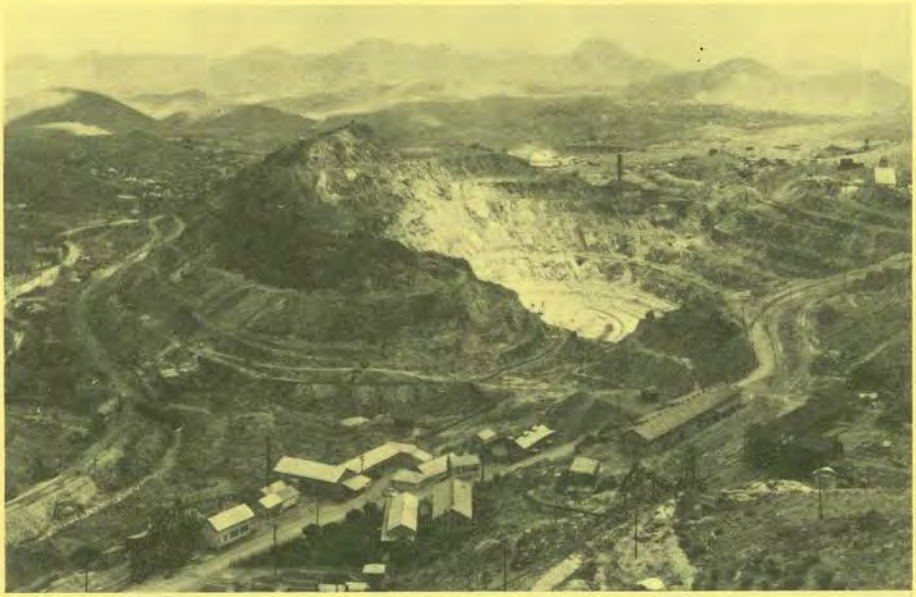
Geologist



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Arizona Bureau of Geology
and Mineral Technology
Geological Survey Branch

A Division of the University of Arizona
Tucson

ARIZONA BUREAU OF GEOLOGY AND MINERAL TECHNOLOGY

The Arizona Bureau of Geology and Mineral Technology was established in 1977 by an act of the State legislature. Under this act, the Arizona Bureau of Mines, created in 1915, was renamed and reorganized and its mission was redefined and expanded.

The Bureau of Geology and Mineral Technology, a division of the University of Arizona administered by the Arizona Board of Regents, is charged by the legislature to conduct research and provide information about the geologic setting of the State, including its mineral and energy resources, its natural attributes, and its natural hazards and limitations. In order to carry out these functions, the Bureau is organized into two branches.

Geological Survey Branch. Staff members conduct research, do geologic mapping, collect data, and provide information about the geologic setting of the State to (a) assist in developing an understanding of the geologic factors that influence the locations of metallic, nonmetallic, and mineral fuel resources in Arizona, and (b) assist in developing an understanding of the geologic materials and processes that control or limit human activities in the State.

Mineral Technology Branch. Staff members conduct research and provide information about exploration, mining, and metallurgical processes that are needed in the development of potential metallic, nonmetallic, and mineral fuel resources in Arizona. Guidance is directed toward the recovery and treatment of these resources by methods that are safe, efficient, and compatible with the environmental needs of the State.

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Cover photo: Bird's-eye view of the Sacramento Pit, Bisbee, Arizona, circa 1920. The present-day Lavender Pit, which began production in 1954, started to the east of the Sacramento Pit (to the left of this photo). Operations were extended until the Lavender Pit encompassed the Sacramento Pit. Although the Lavender Pit is no longer mined, leaching operations still produce copper. The Warren (Bisbee) mining district, which includes this mine, yielded 167,242,000 tons of ore from 1880 to 1981. Photo courtesy of the Arizona Historical Society.

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PREFACE

Since Bulletin 187 was printed a dozen years ago, several new studies on the geologic framework and mineral resources of Cochise County have been released. Because the bulletin was reprinted without modification, it is appropriate to call to your attention some of these new publications.

The New Mexico Geological Society, in cooperation with the Arizona Geological Society, held its 29th field conference in Cochise County, November 9-11, 1978. Road logs and technical papers on various aspects of the geologic framework and associated mineral resources are included in the guidebook, which was published by and can be purchased from the New Mexico Geological Society, Inc.

A geologic map (scale 1:125,000) of most of Cochise County and adjoining Pima County, prepared by Harald Drewes, was published by the U.S. Geological Survey (USGS) in 1980. Robert B. Scarborough and Michel L. Coney prepared an index of *published* geologic maps of Arizona, which was printed by the Arizona Bureau of Geology and Mineral Technology in 1982.

Last year Congress passed the Arizona Wilderness Act of 1984, which was signed by President Reagan. One new wilderness area was established in Cochise County and three additions were made to existing wilderness areas. During the mineral-resource assessment that preceded this legislation, reports on a number of proposed wilderness areas were prepared by the USGS and placed on open file. A 2- to 3-page summary of each area assessed in Arizona and other States was included in Professional Paper 1300, a two-volume set published by the USGS in 1984. The Arizona areas are described on pages 46 to 132 of volume 1.

References to the publications mentioned above are cited below.

Callender, J. F., Wilt, J. C., and Clemons, R. E., eds., 1978, Land of Cochise—southeastern Arizona: New Mexico Geological Society Guidebook, 29th Field Conference, 372 p.

Drewes, Harald, 1980, Tectonic map of southeast Arizona: U.S. Geological Survey Miscellaneous Investigations Series Map I-1109, scale 1:125,000, 2 sheets.

Scarborough, R. B., and Coney, M. L., 1982, Index of published geologic maps of Arizona, 1903-1982: Arizona Bureau of Geology and Mineral Technology Map 17, scale 1:1,000,000, 6 sheets.

Marsh, S. P., Kropschot, S. J., and Dickinson, R. G., eds., 1984, Wilderness mineral potential—assessment of mineral-resource potential in U.S. Forest Service lands studied 1964-1984: U.S. Geological Survey Professional Paper 1300, v. 1, 550 p.

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February 18, 1985

INTRODUCTION

Arizona has been an important mineral producing area for over one hundred years and many mines, ranging from major operations to small mines and prospects, have contributed to the total mineral output. The records of these operations are scattered in numerous publications of Federal and State agencies, in articles in various technical journals, in public and private reports, and in newspaper clippings. Many such sources are not readily available to individuals seeking information concerning these operations. This bulletin, covering mining properties of note in Cochise County, is designed to provide such information in a concise manner. It is the first of a planned series covering Arizona counties.

The index does not attempt to name and describe every mining property that may exist in an area. The selection of those included had to be made arbitrarily on the basis that they had importance due to their production record or their special geologic or mineralogic character, or because their occurrence or characteristics might indicate possible hidden mineral resources. The identification of such areas of possible mineral resources is important not only for the material that might be extracted but also for planning the best use for the land involved. Judgement as to the selection of the included data rests solely with the compiler but he will welcome any comments, suggestions, or corrections that may be made.

Many individuals and companies provided assistance in the collection of the included data and their help is gratefully appreciated. Thanks also are extended to personnel

of the Arizona Bureau of Mines, especially to Mr. J. R. LaVoie for the drafting of the included maps.

EARLY HISTORY

Cochise County, named after the famous Apache leader, is located in the southeastern corner of Arizona. It was established in 1881 from a part of Pima County. Very little has been recorded about the area prior to its acquisition by the United States from Mexico in 1848. The early Spanish and Mexican settlers penetrated only a short distance down the San Pedro River valley due to indian hostility and the isolation of the area from military protection. Mineral prospecting for gold and silver was limited to the southern part of the Huachuca Mountains.

After the acquisition of Arizona by the United States, soldiers at the local forts and personnel connected with or following military expeditions and the boundary surveys of the 1850's started prospecting in and around the mountain ranges. Numerous mineral deposits were found but continuous indian raids and the general lawlessness prevailing in this isolated frontier area impeded any major mining activity until some twenty years later. The gold deposits in the Dos Cabezas Mountains were originally prospected in the early 1860's but not worked extensively until the late 1870's. The copper deposits at Johnson Camp (Cochise mining district), although discovered early, were not exploited until the 1870's and those at Bisbee (Warren mining district) until the late 1870's. The rich silver deposits at Tombstone were not found or exploited until the late 1870's as were the lead-silver and later the copper deposits near Courtland and Gleeson and in the Middle Pass area at the south end of the Dragoon mountains. The lead-silver deposits near Paradise in the Chiricahua Mountains were first worked in 1879.

A major incentive for mining activity in Cochise County came with the linkage of the transcontinental railroad line near Wilcox in 1881. Subsequently, many branch lines were constructed to the rapidly developing mineral areas. Mining has continued to play a predominant role in the development of Cochise County. The importance and scale of the

early silver mining made Tombstone the logical choice as the first county seat and it remained so until 1929 when the county government was moved to the then more important copper mining town of Bisbee. Many of the important and thriving mining camps and settlements of the early days, such as Courtland, Gleeson, Pearce, Dos Cabezas, Galeyville, and Johnson, are now ghost towns. The once bustling communities of Contention, Fairbanks, Charlestown, Black Diamond, Hilltop, Paradise, and many others that owed their existance to nearby mining activities, have disappeared or are now little more than forgotten names. Bisbee has been by far the most persistant, productive, and successful mining camp in Cochise County and the mineral production from the Warren mining district has been responsible for a large share of the county's income and employment for over ninety years.

An accurate record of the total mineral production from Cochise County and its value are not available. Since 1901, the U. S. Geological Survey, and later the U. S. Bureau of Mines, collected annual statistics from mineral producers and published the summary results in "Mineral Resources of the United States" through 1931 and in the "Minerals Yearbook" from 1932 to the present. However, emphasis was placed mainly on the base and precious metals and few statistics on county production of other metals and for nonmetallics are available. Prior to 1901, the production records are very fragmentary and in general must be estimated from various other government reports, such as the U. S. Mint; from articles in technical journals and magazines; or from newspaper reports. The accuracy of some of the data, particularly some of that from newspaper and magazine reports, is questionable, but it is believed that the estimated figures used in this bulletin are reliable approximations. It should be noted that this index does not cover the production of sand and gravel, nor of common stone. The accumulative value of such materials from numerous localities in Cochise County would amount to at least several hundred thousand dollars but lack of any reliable data makes any estimate impractical.

Table I is a summary of the known and estimated production of the base and precious metals from the mining districts of Cochise County from 1879 through 1970. From a total 156.7 million tons of ore mined, nearly 4 million

tons of copper, 193 thousand tons of lead, 244 thousand tons of zinc, 146.4 million ounces of silver and more than 3 million ounces of gold were produced. Other metallic minerals originating in Cochise County over the same period amount to about 44 thousand tons of manganese ore, 80 thousand short ton units of tungsten oxide (a short ton unit equals 20 pounds of tungsten trioxide, WO_3), and relatively minor amounts of molybdenum, vanadium, uranium, and beryllium. Nonmetallic products include limestone, marble, and lime; fluorspar; clay; and some scrap mica. A considerable but undetermined amount of gem quality turquoise has been taken from the Turquoise and Warren districts. Excluding sand, gravel, and common stone, the total valuation of the mineral production of Cochise County through 1970 would exceed two billion dollars. The Warren mining district alone has accounted for about 95 percent of the total mineral value of the county.

The exposed and easily detected metalliferous deposits, particularly those in the mountain ranges of Cochise County have been prospected or exploited. Except for Bisbee, mining activity in the county has declined in recent years due to the apparent exhaustion of material that could be mined economically. However, the mining activity of the past generally has been limited to relatively shallow depths or to the immediate areas of known, exposed mineralization in the various isolated mountain areas. The favorable geologic formations associated with the mineralization antedate the present structural pattern and thus metalliferous deposits may occur under the alluvium and post-mineralization formations that cover the intermountain basins. Also, late volcanic flows mantle large areas of the county, masking possible deposits. Thus, there are extensive areas remaining to be explored for hidden mineral deposits by modern geologic, geophysical, and geochemical techniques and one can not rule out the possibility of a revived, future mineral industry for Cochise County.

EXPLANATION OF TABLES AND MAPS

Four tables, small maps, and a reference bibliography are included in this report. Table I is a production summary, partly estimated, of base and precious metal ore from the mining districts of Cochise County from 1879 through 1970. Table II lists property names alphabetically

with the mining districts in which they are located. Table III lists alphabetically the names of mining property owners and/or operators with the mining properties and districts in which they worked. Table IV is the main index giving briefly detail information on the mining properties, listed alphabetically within the mining districts. The small scale maps show the location of the mining districts in Cochise County and the location of the mining properties within the districts. The numbered locations are keyed to the respective numbers shown in Table IV. Major geographic features; surveyed or protracted township, range, and section lines; and the generalized geology also are shown. The bibliography at the back of the bulletin includes all reference sources cited in the text or in Table IV.

The list of names of mining properties and of owners or operators in this bulletin is by no means all inclusive. It includes those names found in the research for this index but does not attempt to list every name used for the mine nor every owner or operator, including present owners. Frequently, in the case of many mines, these have changed many times during their history. An attempt has been made, however, to use the better known property designations, companies, or persons. Alternative names of properties and of owners or operators have been shown in the tables.

Table IV is the main part of this bulletin where a summary of pertinate data on the mining districts and mining properties is given. Some new arbitrary names have been given to mining districts that have not previously been separated as distinct units, such as the Middle Pass mining district in the southern part of the Dragoon Mountains. In the past this area has been inconsistantly included in one or another of the neighboring districts.

The locations are given by surveyed or protracted township, range, and section. Wherever possible the position within the section is given. Thus SW1/4 23 means the south west quarter of Section 23 and So. Cen. 23 would be the south central part of Section 23.

Mineral products are listed by chemical symbols or by name, generally in the order of their apparent importance in the deposit. Any minor and trace elements noted are shown in parentheses.

The general geologic setting of the ore deposits is only briefly described, based largely on the reports listed in

the references. For more detail descriptions the listed references should be consulted.

The type of operation is noted only briefly in order to give a rough idea of the amount and type of work done. The production figures are largely estimates based on a combination of published reports and information gathered from file and field data.

The references cited and listed in the bibliography are not all inclusive but refer the reader to those used in making this index. They are believed to be representative of the most informative data available.

NOTES ON INDIVIDUAL MINING DISTRICTS

CALIFORNIA (CHIRICAHUA) MINING DISTRICT

The northern part of the Chiricahua Mountains was prospected for precious metals prior to 1870 but the area was a center of hostile indian activity and was later included in the Chiricahua Indian Reservation. Thus, mining could not proceed until the reservation was abolished in 1878. The first big, but short-lived strike, was at Galeyville, near Paradise, where some 80,000 pounds of lead and 13,717 ounces of silver with minor copper and gold were reported to have been produced from shallow, rich, limestone replacement deposits in 1881 and early 1882. Other small, scattered limestone replacement and quartz-dike deposits were found but not worked extensively until the 1900's. The Hilltop mine, the main producer of the district, was first operated in 1903, but did not become a major source of ore until later years. The yearly production from the total district seldom exceeded a few thousand tons of ore.

Since 1881, the California mining district has produced at least 38,000 tons of ore, as shown in Table I. The products included about 150 tons of copper, some 4.3 thousand tons of lead and almost 590 tons of zinc. Some 152 thousand ounces of silver and 100 ounces of gold were recovered also. A relatively small amount of tungsten ore and concentrates were produced during war years. The total value of all ore extracted from the district amounts to some 1.75 million dollars. The district has been almost dormant for the past 15 years.

Widely scattered, relatively small, metalliferous deposits of base metal ore occur in a complex geologic setting of folded and strongly faulted Paleozoic and Mesozoic sedimentary formations cut by Laramide and Tertiary intrusions. Large areas are covered by post-mineralization volcanics. The mineralized exposures along the northern and eastern edges of the district border on the Tertiary and Quaternary alluvial sediments of San Simon valley. No detailed prospecting or exploration has been carried out eastward under the post-mineralization sedimentary cover but the occurrence of mineralization in the San Simon mining district of New Mexico, in the Piloncillo Mountains on the east side of the valley, suggests that mineralization could be present under the basin area. A careful examination of this possibility would appear warrented.

COCHISE MINING DISTRICT

The mineral deposits of the Cochise mining district, in the Little Dragoon Mountains, were discovered in the early 1870's but no significant mining activity was attempted until the 1881 completion of the transcontinental railroad line which passes through the southern part of the district. By 1882, several mines were in operation at Johnson Camp, but only about 20,000 tons of oxidized copper ore from near surface orebodies was produced prior to 1907, mostly in 1900 when copper prices were high. Tungsten was discovered in the district in 1898, and in the early 1900's the district was a major tungsten producer. Production of copper with some zinc boomed during World War I, but from 1920 until 1942 the district was nearly dormant. In that year the Coronado Copper and Zinc Company took over most of the major properties in the district, initiated rehabilitation, exploration, development, and the construction of a selective flotation concentrator. This company produced over 80 percent of the total ore coming from the district, mainly between 1945 and 1957. Since then some mining has been continued by lessors.

Since the early 1880's through 1970, the district has produced some 1.64 million tons of ore yielding more than 37 thousand tons of copper, 300 tons of lead, almost 47 thousand tons of zinc, 734 thousand ounces of silver, and about 300 ounces of gold. The total value of the production would

be over 32 million dollars. The number of units of tungsten trioxide produced is estimated at 75 thousand. In recent years over 300,000 tons of siliceous smelter flux, containing only minor amounts of copper and silver, have been shipped from the district.

The immediate productive area of the district has been mined intensively in the past and offers few possibilities for additional deposits. Much of the surrounding area, particularly to the southeast along the general trend of the Little Dragoon and Dragoon Mountains, appears to be covered by relatively thin Quaternary alluvium. This is an area which, based on its geology and structure, should be favorable for mineralization.

DOS CABEZAS-TEVISTON MINING DISTRICT

The occurrence of gold in quartz veins and shallow placers on both sides of the Dos Cabezas mountain range was known as early as the 1860's and some claims were staked and worked near Dos Cabezas and in the Apache Pass area by 1862. Indian hostility and the establishment of the Chiricahua Indian Reservation delayed any sizeable mining activ- until the reservation was abandoned in 1878. Only some 7,000 tons of gold, silver, and lead ore was produced up through 1907 and although first worked in 1902, the Mascot (later Central Copper) deposits did not start producing substantial amounts of copper ore until World War I. Since 1950 the two districts have been nearly dormant.

Up through 1970, the numerous, relatively small mines, mainly in the Dos Cabezas mining district, produced slightly over 100 thousand tons of ore yielding about 2,000 tons of copper, 700 tons of lead, 19 tons of zinc, 430 thousand ounces of silver, and 10 thousand ounces of gold for a total value of 1.775 million dollars. Very minor amounts of tungsten ore and a few lots of hand picked beryl also were produced.

The known ore deposits of the Dos Cabezas and Teviston mining districts appear to be relatively small, spotty, and low grade veins and contact metamorphic bodies. However, the widely scattered and varied mineralization, and favorable geologic formations and structures suggests that possibilities still exist in the area for large, low grade, disseminated copper deposits. Eaton (1970) reported finding wide spread pyritization along the northern flank which coincided with aeromagnetic and induced polarization anomalies as well as mercury from air sampling. A careful

geologic examination of the two districts for hidden deposits is definitely warranted.

DOUGLAS (ASH PEAK) MINING DISTRICT

This district has had only minor importance in respect to mineral production. Gypsite with minor gypsum were mined and used locally for plaster and gypsum building blocks. Volcanic cinders also have been produced for the manufacture of cement blocks. Numerous weak and spotty occurrences of base and precious metals have been prospected and developed in the southern Perilla Mountains but, except for a few test lots of ore, there has been no production.

Much of the district is obscured by volcanics and sediments and except for possible nonmetallic products such as volcanic cinders, the geologic indications do not appear to be favorable for economic mineral deposits.

DRAGOON (GOLDEN RULE) MINING DISTRICT

This mining district, at the north end of the main Dragoon Mountains, was prospected at the same time as the Cochise mining district but the Golden Rule or Old Terrible mine, producing ore as early as 1873, has been the only major operation. Some 8,000 tons of gold-lead ore was extracted from this mine prior to 1902 and only minor amounts, intermittently, since that time. In more recent years several small mines have shipped lead-zinc ore from relatively small limestone replacement deposits. Some marble for ornamental use and crushed stone also has been produced from the district. There is no active mining at the present time.

The total production of base and precious metals up through 1970 has amounted to about 19,000 tons of ore yielding some 9 tons of copper, 178 tons of lead, 124 tons of zinc, 9.7 thousand ounces of gold and about 72 thousand ounces of silver for a total value of 340,000 dollars. The amount of marble extracted is not known but was relatively small.

The mountain range has been well prospected and explored with few favorable possibilities remaining but the alluvial covered flanks also should be carefully examined for hidden mineralization.

HARTFORD (HUACHUCA MOUNTAINS) MINING DISTRICT

There is evidence that the early Spaniard and Mexican settlers may have prospected in the southern Huachuca

Mountains prior to the 1850's but there was little mining activity in the district until the establishment of Fort Huachuca in 1877. Some lead-silver and gold ore was produced between the 1880's and the early 1900's, but exploitation of minerals was intermittent and not more than a few hundred tons of ore was produced. The tungsten deposits were found and worked extensively at the time of World War I and the Reef mine has produced several thousand tons of tungsten ore. Spotty, local deposits of base metal sulfides have been worked from time to time but there have not been any consistent large operation. Since 1950 there has been little production from the district.

The total production from the Hartford mining district through 1970 has been about 9 thousand tons of base metal and precious metal ore yielding some 37 tons of copper, 294 tons of lead, 188 tons of zinc, 393 ounces of gold, and 25 thousand ounces of silver with a total value of 140 thousand dollars. Accurate records on the total tungsten production are not available but may have amounted to 170 or more tons of 60 to 78 percent WO_3 concentrates.

The geologic features of the district have been carefully mapped (Hayes & Raup, 1968) but there has been no detailed, over-all study made of the relationship of the scattered and diverse mineralization to the complex and often puzzling geologic conditions.

MIDDLE PASS MINING DISTRICT

In this bulletin, the mineralized area at the south end of the Dragoon Mountains has been arbitrarily designated as a separate mining district since it represents a distinct unit, geographically and geologically. Previously the mines of this area have been included either in the Dragoon, Pearce, or Turquoise mining districts.

Some of the metalliferous deposits of this district, such as Black Diamond and Middlemarch, were worked in the late 1800's while others, such as Abril and San Juan, became important in much later years. None of the mines are large nor have any been worked continuously for more than a few years at any time. The production has consisted mainly of base metals but some tungsten and barite also have been produced. There has been little production in recent years.

Up through 1970, the total base and precious metal out-

put has been about 76,000 tons of ore containing some 1,005 tons of copper, 137 tons of lead, 4,626 tons of zinc, 337 ounces of gold, and 147,000 ounces of silver, for a total value of about 1.725 million dollars. Tungsten production did not amount to more than about two tons of concentrates. Some 75 tons of sorted barite ore has been reported as shipped from the district.

The known ore deposits of the district occur as relatively shallow pyrometasomatic mantos and chimneys in Paleozoic limestones just south of a large Laramide intrusive body. It would appear that the eastern edge of this district could be of interest for possible deposits hidden under the alluvial cover.

PAUL MINING DISTRICT

This small mining district has no evident metalliferous mineralization but includes the Paul Lime operation in the high quality, Cretaceous Mural Limestone.

PEARCE MINING DISTRICT

This relatively small mining district includes a series of isolated hills of Tertiary volcanic rock outcropping through the alluvial cover in the middle of the Sulphur Spring Valley. The production statistics were often included with the Turquoise mining district. One mine, the Commonwealth, which was worked almost continuously from the late 1880's to the early 1940's, has produced almost all the ore, although there are several small occurrences of base and precious metals, fluorite, and traces of uranium in other volcanic rock hills.

Since 1895 through 1970, the district has produced some 1,341,000 tons of ore yielding about 26 tons of copper, 8 tons of lead, nearly 138 thousand ounces of silver, and over 12 thousand ounces of gold for a total valuation in excess of 10.6 million dollars.

The alluvial cover in this district appears to be relatively thin and exposures of pre-Tertiary formations can be found with the Tertiary volcanics. The local but strong silver mineralization at the Commonwealth mine and the evident northwestward extention of favorable formations and structures from the Swisshelm mining district into the Pearce district suggests that the area warrants detail study for possible hidden ore deposits.

PELONCILLO MINING DISTRICT

This small mining district in the central Peloncillo Mountains along the New Mexico border is the western fringe of the Steins Pass mining district of New Mexico. The Arizona part has been arbitrarily named as a separate district in this bulletin. Small and weak showings of oxidized copper have been found, but only a few test lots of ore have been produced. The possibilities for economic mineralization in this district are not favorable.

RUCKER CANYON MINING DISTRICT

A small tonnage of precious metal ore has been produced from an exposed fault block of Cretaceous formations within Tertiary volcanics in the southern part of the Chiricahua Mountains. The mineralized occurrence is of minor economic importance by itself but indicates that metalliferous deposits could occur under the thick, post-mineralization volcanic mantle.

SWISSHELM MINING DISTRICT

Lead-gold-silver deposits were discovered in the Swisshelm Mountains in the 1880's; and since that time the district has produced intermittently small amounts of lead ore from irregular, replacement orebodies associated with strong thrust faults and igneous intrusions.

Through 1970, the district has produced about 49 thousand tons of base metal ore yielding some 48 tons of copper, nearly 6 thousand tons of lead, over 100 tons of zinc, 330 thousand ounces of silver, and over 5 thousand ounces of gold. The total value of this production would be about 2 million dollars. Some tungsten mineralization and beryl occurrences are known in the district but have not been productive.

The favorable geologic formations and structures strike northwestward towards the Pearce mining district with only isolated outcrops showing through the alluvium of Sulphur Spring Valley. This extension under the alluvial mantle warrants investigation for metalliferous deposits.

TOMBSTONE MINING DISTRICT

The first mineral location in the famous Tombstone district was made in 1857 but the rich silver deposits were

not found and worked until after 1877. Development and mining proceeded rapidly and by 1890 over one-half of the total district production had been extracted. Since that time, up to about 1951, there was continuous operations although the yearly amounts extracted varied with silver prices and operational conditions. The major production period declined after uncontrollable flooding prevented deep development. Lead and manganese contributed to the total ore value extracted. A few small outlying mines have produced base metal ores with minor amounts of molybdenum, vanadium, scrap mica, and clay.

Production figures for the Tombstone mining district before 1900 can only be estimated, but up through 1970 not less than 1.5 million tons of silver bearing ore, either with lead or manganese, was extracted. The yield would amount to some 1.5 thousand tons of copper, 22.5 thousand tons of lead, 590 tons of zinc, 240 thousand ounces of gold, and some 30 million ounces of silver. The total value of the production would exceed 38.8 million dollars. Besides the manganese-silver ore used as flux in the early days of the district, about 9,000 tons of manganese ore was shipped out during war years.

The productive part of the Tombstone mining district has been prospected and examined by numerous companies, and except for ore remaining in depth beneath the water table, few possibilities for substantial quantities of economic ore remain. For such a strongly mineralized district, however, there could be additional metalliferous ore deposits in the surrounding areas which are now mantled by post-mineralization sediments and volcanics.

TURQUOISE MINING DISTRICT

Indians extracted turquoise from deposits in this district long before the early white prospectors of the 1850's discovered the silver, lead, and copper ores. It was not until the 1880's, however, that indian hostility was sufficiently subdued to permit mining. The silver-lead deposits near Gleeson were first worked, but when silver prices were low in the early 1880's, attention turned to the oxidized copper ores near Courtland. Up through 1929 most of the production of the district came from the Courtland area. Until 1958 the mining of base metal ore was continuous except for a few intervening years. Since then production ha:

been limited mainly to the extraction of copper by leaching operations.

Estimated and recorded production of base metals from the immediate Turquoise mining district around Courtland and Gleeson, up through 1970, would amount to about 887 thousand tons of ore yielding some 27.4 thousand tons of copper, 3.9 thousand tons of lead, 1.3 tons of zinc, 56.6 thousand ounces of gold and 1,575 thousand ounces of silver for a total value of over 14 million dollars. The amount and value of gem quality turquoise extracted can not be estimated. In recent years over two million tons of silica smelter flux has been shipped to the Douglas smelter.

The Turquoise mining district has been prospected and tested many times in the past and the possibilities of finding additional ore deposits in the known mineralized area appear slight. However, post-mineralization sedimentary and volcanic cover laps over the northern and eastern sides of the exposed favorable area and a more detail study of the possibilities for hidden ore deposits under the masking cover seems warranted.

WARREN (BISBEE) MINING DISTRICT

The Warren mining district by far has been the most productive in Cochise County. There has been an almost continuous yearly mineral output of base metal ore since 1878 when the first shipment of copper matte was made from the Copper Queen mine. The yearly totals of ore and of base and precious metals produced has always exceeded the combined total of all other districts in the County. Mining in the late 1800's and early 1900's was carried out in relatively high grade copper replacement orebodies by underground methods but a major part of the total tonnage of copper ore since 1920 has come from the Sacramento and Lavender open-pit operations. The lead and zinc output was produced from underground replacement orebodies. The district has also been the major producer of manganese ore in the County.

Up through 1970, the Warren mining district has produced about 151 million tons of base and precious metal ore, yielding some 3.8 million tons of copper, 154.9 thousand tons of lead, 189 thousand tons of zinc, over 2.6 million ounces of gold and 100.3 million ounces of silver. The total value of this production would exceed 1.9 billion dol-

lars. About 35,000 tons of manganese is estimated to have been shipped out of the district in war years.

The Warren mining district has been the most thoroughly prospected and tested of any in Cochise County. However, spotty base metal mineralization has been found extending northwestward along the strike of the favorable geologic formations and structures to where they are mantled by post-mineralization alluvium of the San Pedro Valley. Orebodies could be hidden under the Quaternary sediments.

WHETSTONE MINING DISTRICT

Numerous prospects and small mines have been opened up on occurrences of copper, tungsten, fluorite, uranium and silica flux in this district which lies along the western edge of Cochise County. The operations have been relatively small and shallow. Since first prospected in the late 1800's and up through 1970, only about 2,000 short tons of base and precious metal ore yielding some 18 tons of copper, 620 thousand ounces of silver and 8 ounces of gold have been produced. The total value of such ore amounted to about 14 thousand dollars. The total production of tungsten would be less than 1,000 units of WO_3 and of fluorspar, some 20,000 or more tons. The 47 tons of low grade uranium ore was shipped out under the premium pricing program of the U. S. Atomic Energy Commission.

Although the main mountain mass appears to offer few possibilities for additional ore deposits, favorable geologic formations and structures are likely to exist under post-mineralization sedimentary cover in the valley to the east and southeast. The small outcrop of Laramide intrusive in the southern part of the range shows some copper minereralization. Gypsum deposits have been mapped in the Permian beds at the south end of the mountains (Graybeal, 1962).

WINCHESTER MINING DISTRICT

Although relatively extensive work was done in this silver district in the 1890's and some silver ore shipped out, the only recorded production was from dumps which in 1924 were used as smelter flux. Other small prospects furnished a few tons of base-metal ore since that time. In general the possibilities for substantial economic mineralization in this district appear poor.

YELLOWSTONE MINING DISTRICT

This district was prospected at least as early as the 1880's and some unconfirmed reports state that there was some gold production around that time. Scattered and weak sulfide and gold-quartz mineralization has been worked on a small scale in the past but not much more than 125 to 150 tons of ore was ever shipped out. Prospects for substantial mineralization in this district are not encouraging.

TABLE 1
PRODUCTION SUMMARY OF BASE AND PRECIOUS METALS
1879 -- 1970

MINING DISTRICT	Short Tons Ore (1,000's)	Pounds Copper (1,000's)	Pounds Lead (1,000's)	Pounds Zinc (1,000's)	Ounces Gold	Ounces Silver (100's)	Total Value (1,000's)
California (Chiricahua)	38	299	8,631	1,179	100	152	$ 1,750
Cochise (Johnson)	1,640	74,775	605	93,650	229	734	32,180
Dos Cabezas-Teviston	106	4,026	1,413	39	10,082	429	1,775
Dragoon (Golden Rule)	19	18	356	249	9,741	72	340
Hartford (Huachuca)	9	74	588	375	393	25	140
Middle Pass (S. Dragoon)	76	2,011	274	9,251	337	147	1,725
Pearce	1,341	55	16	—	138,409	12,020	10,660
Swisshelm	49	97	11,853	211	5,230	330	1,985
Tombstone	1,500	3,018	45,000	1,179	240,000	30,000	38,800
Turquoise (Courtland-Gleeson)	887	54,823	7,777	2,561	56,641	1,575	14,090
Warren (Bisbee)	150,991	7,693,257	309,756	378,450	2,630,572	100,312	1,834,365
Whetstone	2	37	—	—	8	620	15
Total	156,658	7,832,490 (3,916,245 tons)	386,269 (193,135 tons)	487,144 (243,572 tons)	3,091,742	146,416	$1,937,825

TABLE 2
INDEX OF MINING PROPERTY NAMES

NAME	DISTRICT
Abril mine	Middle Pass
Adams mine (see Comstock Lode mine)	Teviston
Adriatic (see Howard mine group)	Dos Cabezas
Ainsworth mine (see King Ainsworth mine group)	California
Ajax mine	California
Alaskite group (see Centurion mine)	Cochise
Alkie mine	Tombstone
Alpine tunnel (see Great American mine)	Swisshelm
Alto mine	Hartford
Alvera mine (see Little Fanny mine group)	Cochise
Amarillo-Quien Sabe mine	Pelloncillo
American group mine	Middle Pass
American mine	Yellowstone
Ananias mine (see Silver Hill mine group)	California
Anchor mine	Tombstone
Annex mine (see Bonanza mine group)	Tombstone
Anozira mine (see Power mine)	Hartford
Apache mine (see Buckeye Apache mine)	Teviston
Apache Pass mines	Teviston
Apex mine	Swisshelm
April Fool mine	Turquoise
Argenta mine	Tombstone
Arizona group (see Arizona Klondyke mine)	Dos Cabezas
Arizona Klondyke mine	Dos Cabezas
Arizona Queen mine	Tombstone
Arlington mine	Tombstone
Armistice mine	Hartford
Armstrong mine	Turquoise
Arrow mine group	Hartford
Atlantic (see Howard mine group)	Dos Cabezas
Avalon mine	Turquoise
Azurite claim (see Eureka mine)	Hartford
Bachelder group (see Mascot mine group)	Dos Cabezas
Bald Eagle mine	Tombstone
Banks mine	Cochise
Bannon group (see Keystone mine)	Cochise
Barrett group (see Copper Rocks mine)	Turquoise
Basin mine (see Gold Prince mine)	Dos Cabezas
Baumkirscher mines	Hartford
Bay State mine	Warren
Bear Cave (see Dives mine)	Dos Cabezas
Bernoudy mine	California
Beryl Hill & Live Oak prospect	Dos Cabezas
Bisbee Coalition mines	Warren
Black Ben mine (see Silver Hill mine group)	California
Black Diamond mine	Middle Pass
Black Eagle mine (see Pomona mine)	Hartford
Black Eagle mine (see Comet & Black Eagle mines)	Tombstone

Table 2, Cont.

NAME	DISTRICT
Black Hawk mine (see Le Roy mine group)	Dos Cabezas
Black Prince mine (see Sunset mine group)	California
Black Prince mine	Cochise
Black Prince mine (see Standard Tungsten nime)	Middle Pass
Black Rock group (see Tungsten King mine)	Cochise
Blacktail mine group	Tombstone
Blue Bell group (see Black Prince mine)	Cochise
Blue Bell mine (see Sullivan mine group)	California
Bluebird mine	Cochise
Blue Monday mine (see Ingersol mine)	Tombstone
Blue Mountain mine	California
Blue Ribbon group (see Harris Mountain mine group)	California
Bluestone mine (see Star No. 1 mine)	Whetstone
Bob Ingersol mine (see Ingersol mine)	Tombstone
Bonanza mine group	Tomstone
Boot Jack mine (see Two Peak mines)	Whetstone
Boras mine	Warren
Boston Belle mine (see Texas mine group)	California
Boston, Sampson & Way Up claims	Hartford
Boulder claim group	Cochise
Bradshaw Arizona mine (see Humboldt mine)	California
Bradsher mine (see Gallagher Vanadium & Rare Minerals Corp. mine)	Tombstone
Briggs mine	Warren
Broken Promise mine (see Wolverine mine)	Warren
Brother George mine (see Charlestone Lead mine)	Tombstone
Buckeye Apache mine	Teviston
Buckeye mine (see Buckeye Apache mine	Teviston
Buck mine (see Two Peak mines)	Whetstone
Buena Vista & Horse Fall mines	Dragoon
Buena Vista mine (see Gallagher Vanadium & Rare Minerals Corp. mine)	Tombstone
Bunker Hill mine	Tombstone
Burrel claim group	Cochise
Burrito de Fierro mine	Dragoon
Burro pit	Cochise
Calomel mine (see Herron mine)	Turquoise
Campbell mine	Warren
Carper mine (see Tombstone Extension mines)	Tombstone
Casey mine (see Gold Ridge mine)	Dos Cabezas
Casey mine	Turquoise
Cave Canyon mine (see Cave mine)	Hartford
Cave Creek mine (see Cave mine)	Hartford
Cave mine	Hartford
Cave Mountain mine (see Cave mine)	Hartford
Central Copper mine (see Elma mine)	Dos Cabezas
Centurion area small mines	Cochise
Centurion mine	Cochise
Chadwick mine	Whetstone

Table 2, Cont.

NAME	DISTRICT
Chance mine	Swisshelm
Chance mine	Tombstone
Charleston group (see Copper Belle mine)	Turquoise
Charlestone Lead mine	Tombstone
Chicora mine	Cochise
Chiricahua mine	California
Christmas mine	Middle Pass
Cinder Hill quarry	Douglas
Claire group mines	California
Climax mine (see Le Roy mine group)	Dos Cabezas
Climax shaft (see Johnson mine)	Cochise
Cobre Loma mine	Middle Pass
Cochise-Bullion mine (see King Ainsworth mine group)	California
Cochise mine (see King Ainsworth mine group)	California
Cohen mine (see Comstock Lode mine)	Teviston
Cole mine	Warren
Colford Copper mine	Swisshelm
Columbia mine	California
Combination mine (see Goodenough mine)	Tombstone
Comet & Black Eagle mines	Tombstone
Comet mine (see Le Roy mine group)	Dos Cabezas
Commonwealth Extension mine	Pearce
Commonwealth mine	Pearce
Comstock Lode mine	Teviston
Connelite claim (see Eureka mine)	Hartford
Contact mine	Tombstone
Contention-Grand Central mines group	Tombstone
Copper Bell mine (see Black Prince mine)	Cochise
Copper Belle mine	Turquoise
Copper Chief mine	Cochise
Copper Dog mine (see Peterson mine)	Hartford
Copper Glance mine	Hartford
Copper Glance mine	Warren
Copper Hill mine (see Little Mary mine)	Pearce
Copper King mine	Cochise
Copperopolis mine (see Sullivan mine group)	California
Copper Queen mine (see Black Prince mine)	Cochise
Copper Queen mine	Warren
Copper Rocks (Copperrox) mine	Turquoise
Costello group (see Casey, Defiance, Mona, and Silver Bill mines)	Turquoise
Cottonwood mine	Dos Cabezas
Cowboy mine	Teviston
Crocket group (see Baumkirscher mines)	Hartford
Crosby group (see Sullivan mine group)	California
Cyclone mine	Turquoise
Czar mine	Warren
Dallas mine	Warren
Danville-Hanchetta claims	Warren

Table 2, Cont.

NAME	DISTRICT
Defense mine	Tombstone
Defiance mine	Turquoise
Democrat & Sherman claims (see Hubbard mine)	Dragoon
Denmark (see Arizona Klondyke mine)	Dos Cabezas
Denn mine	Warren
Devonian group (see Silver Strike mine)	Teviston
Dives mine	Dos Cabezas
Dividend tunnel	Cochise
Donna Anna workings	Cochise
Dos Cabezas Queen mine	Dos Cabezas
Dos Hermanos mine (see Abril mine)	Middle Pass
Double Spring (see Howard group)	Dos Cabezas
Dragoon mine (see Christmas mine)	Middle Pass
Dragoon Zinc mine (see Hubbard mine)	Dragoon
Dry Hill mine	Tombstone
Dunn Springs mine (see Rabbit claim group)	California
Eagle Roost mine	Tombstone
East & West Evening Star mines (see Chadwick mine)	Whetstone
Easter Sunday mine	Warren
East Side mine	Tombstone
East Side No. 2 mine (see East Side mine)	Tombstone
East Wind mine (see Arrow mine group)	Hartford
Eldorado (see Silver Camp mine)	Dos Cabezas
Elizabeth mine (see Alto mine)	Hartford
Elma mine	Dos Cabezas
Elsicor mine (see Festerling mine)	Middle Pass
Elsworth prospect	Douglas
El Tigre mine	California
Emerald & Silver Plume mine group	Tombstone
Emerald mine (see Pomona mine)	Hartford
Emma mine (see Dives mine)	Dos Cabezas
Empire mine	Tombstone
Empire No. 1 mine	Cochise
Empire No. 2 mine	Cochise
Empire No. 2 shaft (see Princess & Cowboy workings)	Cochise
Empire State mine (see Claire group mines)	California
Englander mine (see Black Diamond mine)	Middle Pass
Escapule mine (see Garnet and Moonlight)	Middle Pass
Escondido mine (see Lucky Cuss mine)	Tombstone
Eureka group (see Bisbee Coalition mines)	Warren
Eureka mine	Hartford
Evening Star mine	Whetstone
Ewell Spring mine	Dos Cabezas
Exposed Reef mine (see Reef mine)	Hartford
Extension mine (see Little Fanny mine group)	Cochise
Fairview group (see Buckeye Apache mine)	Teviston
Festerling mine	Middle Pass
First Chance mine	Dos Cabezas
Fittsburg prospect	Pearce

Table 2, Cont.

NAME	DISTRICT
Flora Morrison mine (see Contention-Grand Central mines group)	Tombstone
Florida mine group	Tombstone
Florodora mine (see Oregon-Prompter mine group)	Tombstone
Fluorine Hill mine	Pearce
Fourr mines (see Buena Vista & Horse Fall mines)	Dragoon
Free Coinage mine	Tombstone
Galeyville mines	California
Gallagher Vanadium & Rare Minerals Corporation mine	Tombstone
Galvez mine	Tombstone
Gardner mine	Rucker Canyon
Gardner mine	Warren
Garnet and Moonlight groups	Middle Pass
Germania mine	Turquoise
Gilbert Silica quarry	Turquoise
Girard mine	Tombstone
Gleeson mine	Turquoise
Golconda group (see Baumkirscher mines)	Hartford
Gold Band mine	Turquoise
Gold Belle group (see Apache Pass mines)	Teviston
Gold Camp mines area	Turquoise
Gold Coin (see Red Bird mine)	Cochise
Gold Gulch placers	Teviston
Gold Hill mine (see Houghton Development Co. mine)	Warren
Gold Mine Ridge prospects (see San Jose prospects)	Yellowstone
Gold Nugget mine (see Apache Pass mines)	Teviston
Gold Nugget (see Honey Dew mine group)	Dos Cabezas
Gold Prince mine	Dos Cabezas
Gold Queen mine (see Le Roy mine group)	Dos Cabezas
Gold Ridge mine	Dos Cabezas
Gold Slope mine (see Mineral Park mines)	Dos Cabezas
Gold Spot mine (see Silver Dike and Gold Spot mines)	Dos Cabezas
Golden Belle (see Silver Camp mine)	Dos Cabezas
Golden Crown group (see Baumkirscher mines)	Hartford
Golden Crown mine (see Gold Camp mines area)	Turquoise
Golden Eagle mine (see Golden Rule mine area)	Dragoon
Golden Eagle mine	Teviston
Golden Gate claim	Warren
Golden Rule mine	Dragoon
Goodenough mine	Tombstone
Gordon mine (see San Juan mine)	Middle Pass
Grace mine	California
Grand Arizona mine	Douglas
Grand Central mine (see Contention-Grand Central mines group)	Tombstone
Grant group (see White Tail mine)	Middle Pass
Granville & Unknown claims	Warren
Great American mine	Swisshelm
Grenadier mine (see Sadie, New Year Gift, and Grenadier group mines)	Turquoise

Table 2, Cont.

NAME	DISTRICT
Ground Hog mine	Tombstone
Gypsite quarries	Douglas
Hagerman mine (see Keystone mine)	Cochise
Hall mine group (see Silver Hill mine group)	California
Hamburg mine	Hartford
Hamilton mine (see Alto mine)	Hartford
Hancock-Daily mine (see Juniper Flats area mines)	Warren
Hand mine (see Hilltop mine)	California
Harper mine	Hartford
Harris group (see Harris Mountain mine group)	California
Harris Mountain mine group	California
Hawk Eye mine	Tombstone
Head Center mine (see Standard Tungsten mine)	Middle Pass
Head Center mine (see Contention-Grand Central mines group)	Tombstone
Hearst mine	Winchester
Helen Dome group (see Apache Pass mines)	Teviston
Hendricks mine	Warren
Heney tunnel (see Great American mine)	Swisshelm
Henry Clay mine (see Gold Prince mine)	Dos Cabezas
Herget Turquoise mine (see Avalon mine)	Turquoise
Herron mine	Turquoise
Herschel mine	Tombstone
Higgins Estate (see Centurion area small mines)	Cochise
Higgins mine	Warren
Highland mine	Turquoise
Hillside mine (see Boulder claim group)	Cochise
Hillside mine	Teviston
Hilltop Extension mine	California
Hilltop mine	California
Hoatson mine	Warren
Holbrook mine	Warren
Homestake claim group	Cochise
Homestake mine	California
Honey Dew mine	Dos Cabezas
Hoodoo Stopes (see Toughnut mine)	Tombstone
Horace mine	California
Horse Fall mine (see Buena Vista & Horse Fall mines)	Dragoon
Houghton Development Co. mine	Warren
Houston mine (see Chadwick mine)	Whetstone
Howard mine group	Dos Cabezas
Huachuca Queen mine (see Manila mine)	Hartford
Hubbard mine	Dragoon
Humboldt mine	California
Humbot mine	Turquoise
Huntsman mine (see Gold Ridge mine)	Dos Cabezas
Ingersol mine	Tombstone
Inspiration placers (see Gold Gulch placers)	Teviston
International group (see Baumkirscher mines)	Hartford
Intervener mine	Tombstone

Table 2, Cont.

NAME	DISTRICT
Irish Mag mine	Warren
Iron Tower group (see Mascot mine group)	Dos Cabezas
Jack Dempsey mine (see Le Roy mine group)	Dos Cabezas
James (Harvey James) mine (see Pomona mine)	Hartford
James mine	Whetstone
Johnny Boy mine (see Standard Tungsten mine)	Middle Pass
Johnson mine	Cochise
Junction mine	Warren
Juniper Flats area mines	Warren
Juniper mine (see Gold Ridge mine)	Dos Cabezas
Kentucky Bell claim (see Texas mine group)	California
Keystone mine	Cochise
King Ainsworth mine group	California
King of Lead mine	California
King Plomo mine	Turquoise
Klondyke group (see Arizona Klondyke mine)	Dos Cabezas
Knoxville mine (see Oregon-Prompter mine group)	Tombstone
Lady Rose group (see Centurion mine)	Cochise
Le Grande mine (see Tombstone Extension mines)	Tombstone
Last Chance mine (see Little Fanny mine group)	Cochise
Last Chance mine (see Arizona Queen mine)	Tombstone
Last Chance mine	Turquoise
La Vantia mine (see American mine)	Yellowstone
Lavender Pit	Warren
Leadville mine group	California
Leadville No. 1 mine	Turquoise
Leadville No. 2 mine	Turquoise
Legal Tender prospect	Cochise
Leonard mine (see Copper Belle mine)	Turquoise
Leopold (see St. George mine)	Cochise
Le Roy mine group	Dos Cabezas
Lewis group (see Senecia mine)	Dragoon
Ligier Marble quarries	Dragoon
Lilly group (see Hilltop Extension mine)	California
Lime Mountain workings	Cochise
Little Dragoon Mountains placers	Cochise
Little Fanny mine group	Cochise
Little Jessie mine group (see Fluorine Hill mine)	Pearce
Little Mary mine	Pearce
Little Wonder mine (see Hawk Eye mine)	Tombstone
Live Oak prospect (see Beryl Hill and Live Oak prospects)	Teviston
Lone Star mine	Whetstone
Lost Hope mine (see Le Roy mine group)	Dos Cabezas
Lotus claim (see Eureka mine)	Hartford
Lowell mine	Warren
Luck Sure mine	Tombstone
Lucky Cuss mine	Tombstone
Lucky Day mine (see Arrow mine group)	Hartford
Lucky Strike mine	Hartford
Lucy Bell mine	Hartford

Table 2, Cont.

NAME	DISTRICT
Lula mine (see Apache Pass mines)	Teviston
Lutz tunnel	Hartford
MacKay mine group	Cochise
Magazine mine (see MacKay mine group)	Cochise
Maid of Sunshine mine	Turquoise
Malachite group (see Harris Mountain mine group)	California
Mame mine	Turquoise
Mamie mine	Tombstone
Mammouth and Whale mines	Swisshelm
Mammoth claim	Warren
Mammoth mine	Cochise
Mammoth mine (see Bunker Hill mine)	Tombstone
Manganese Silver mine	Tombstone
Mangum claims	Turquoise
Manhattan mine group	California
Manila mine (see Silver Hill mine group)	California
Manila mine	Hartford
March mine	Swisshelm
Maria mine (see Mineral Park mines)	Dos Cabezas
Marquette & Arizona mine	Warren
Mary Jo group (see Charleston Lead mine)	Tombstone
Mary mine	Turquoise
Mascot Consolidated tunnel (see Mascot mine group)	Dos Cabezas
Mascot mine (see Nevada & Mascot mines)	Whetstone
Mascot mine group	Dos Cabezas
Mascot No. 1 tunnel (see Mascot mine group)	Dos Cabezas
Maud Hill mine group	Turquoise
Mayflower mine	Cochise
McCann mine (see Lucky Cuss mine)	Tombstone
McGinty mine (see Silver Camp mine)	Dos Cabezas
McLenden mine	Turquoise
Mendotta mine (see Copper Glance mine)	Hartford
Merrimac mine	Tombstone
Middlemarch mine	Middle Pass
Mineral Park mines	Dos Cabezas
Missouri mine (see Middlemarch mine)	Middle Pass
M Lode group (see Baumkirscher mines)	Hartford
Mona mine	Turquoise
Montezuma mine	Tombstone
Moon group (see Baumkirscher mines)	Hartford
Moonlight group (see Garnet & Moonlight groups)	Middle Pass
Moore mine (shaft)	Cochise
Morgan mine	Hartford
Morning Star mine	Tombstone
Morning Star mine group	California
Mt. Allen mines (see Centurion area small mines)	Cochise
Mountain Queen mine	Swisshelm
Mountain View mine	Warren
Muheim mine	Middle Pass
Murphy mine (see Gold Prince mine)	Dos Cabezas

Table 2, Cont.

NAME	DISTRICT
Muso mine	Turquoise
Mustang mine	Tombstone
Mystery mine	Turquoise
Nancy group (see Gilbert Silica quarry)	Turquoise
Nettie mine (see Dives mine)	Dos Cabezas
Nevada & Mascot mines	Whetstone
New Era (see Honey Dew mine group)	Dos Cabezas
New Era group claims	Warren
New Year Gift mine (see Sadie, New Year Gift, and Grenadier group mines)	Turquoise
New Year mine (see Apache Pass mines)	Teviston
Night Hawk mine	Warren
No Account group (see Gold Camp mines area)	Turquoise
Nobbey mine (see Dives mine)	Dos Cabezas
Noriega mine (see Two Peak mines)	Whetstone
North Bisbee group (see Bisbee Coalition mines)	Warren
Northern Gunnison Hills mines & prospects	Cochise
Northwest mine (see Toughnut mine)	Tombstone
No. 4 claim	Warren
No. 6 mine (see Goodenough mine)	Tombstone
Nunnelley mine (see James mine)	Whetstone
OK mine	Cochise
Old Bridge shaft (see Princess & Cowboy workings)	Cochise
Old Guard mine	Tombstone
Old Hawk mine (see Boulder claim group)	Cochise
Old Terrible mine (see Golden Rule mine area)	Dragoon
Oliver mine	Warren
Oneida mine (see Le Roy mine group)	Dos Cabezas
Ontario mine	Turquoise
Oregon group (see King Ainsworth mine group)	California
Oregon-Prompter mines group	Tombstone
Owl's Nest mine	Tombstone
Pacific (see Howard mine group)	Dos Cabezas
Panama mine (see Manila mine)	Hartford
Parent mine (see Silver Camp mine)	Dos Cabezas
Pat Price (see Gold Prince mine)	Dos Cabezas
Paul Lime quarry	Paul
Pavonazza & Pentelicus quarries	Teviston
Peabody mine	Cochise
Pearce mine (see Commonwealth mine)	Pearce
Pemberthy mine (see Copper Belle mine)	Turquoise
Pentelicus quarry (see Pavonazza & Pentelicus quarry)	Teviston
Peoples Party mine (see MacKay mine group)	Cochise
Peterson mine	Hartford
Philadelphia mine	Dos Cabezas
Pine-Zinc mine	California
Pittsburg shaft	Cochise
Plain View mine	Tombstone
Pomona mine	Hartford
Poorman mine	Turquoise

Table 2, Cont.

NAME	DISTRICT
Portal mine (see Savage mine)	California
Porter (see Dives mine)	Dos Cabezas
Power mine	Hartford
Primos group (see Bluebird mine, Dividend tunnel)	Cochise
Princess and Cowboy workings	Cochise
Prompter mine (see Oregon-Prompter mine group)	Tombstone
Pump shaft (see Centention-Grand Central mines group)	Tombstone
Question mine (see Parent mine group)	Dos Cabezas
Quien Sabe (see Amarillo-Quien Sabe)	Peloncillo
Quillan group (see Apache Pass mines)	Teviston
Rabbit claim group	California
Randolph mine	Tombstone
Rattlesnake mine (see Bunker Hill mine)	Tombstone
Rattling Boy & Sidewheel mines	Tombstone
Red Bird mine	Cochise
Reef mine	Hartford
Republic mine	Cochise
Ricketts quarry	Whetstone
Ricky Dale mine (see James mine)	Whetstone
Rimski group (see Harris Mountain mine group)	California
Rocky Bar mine	Tombstone
Royal Guard mine (see Old Guard mine)	Tombstone
Sacramento mine	Warren
Sacrament Pit	Warren
Sadie, New Year Gift, and Grenadier group mines	Turquoise
Sailor mine	Tombstone
St. George mine	Cochise
Sampson claim (see Boston, Sampson & Way Up claims)	Hartford
San Diego mine (see Tombstone Extension mines)	Tombstone
San Jose prospects	Yellowstone
San Juan mine	Middle Pass
San Juan mine (see James mine)	Whetstone
San Pedro mine	Tombstone
Santa Lucia mine (see Golden Rule mine area)	Dragoon
Savage mine	California
Scanlon mine	California
Scheerer mine (see Colford Copper mine)	Swisshelm
Scribner mine (see Mountain Queen mine)	Swisshelm
Senecia mine	Dragoon
Shattuck mine	Warren
Sidewheel mine (see Rattling Boy & Sidewheel mines)	Tombstone
Silver Bill mine (see Intervener mine)	Tombstone
Silver Bill mine	Turquoise
Silver Camp mine	Dos Cabezas
Silver Cave mine (see Honey Dew mine group)	Dos Cabezas
Silver Cave South (see Honey Dew mine group)	Dos Cabezas
Silver Cloud mine	Middle Pass
Silver Dike and Gold Spot mines (see Honey Dew mine group)	Dos Cabezas
Silver Hill mine group	California

Table 2, Cont.

NAME	DISTRICT
Silver King mine (see Copper Glance mine)	Hartford
Silver Peak (see Honey Dew mine group)	Dos Cabezas
Silver Plume mine (see Cave mine)	Hartford
Silver Plume mine (see Emerald & Silver Plume mine group)	Tombstone
Silver Prince mine	California
Silver Spray mine (see Spray mine)	Warren
Silver Strike mine	Teviston
Silver Thread mine	Tombstone
Silver Wave mine (see Commonwealth mine)	Pearce
Silverton mine	Turquoise
Sitric mine (see Reef mine)	Hartford
Six Mile Hill mine group (see Fittsburg prospect)	Pearce
Smuggler mine (see Copper Glance mine)	Hartford
Snow Drop mine (see Cave mine)	Hartford
Soltice mine	Tombstone
South Bonanza mine (see Bonanza mine group)	Tombstone
Southern mine	Cochise
Southwest mine	Warren
Speaks mine	Dos Cabezas
Spray mine	Warren
Standard mine (see Le Roy mine group)	Dos Cabezas
Standard prospect	Cochise
Standard Tungsten mine	Middle Pass
Star No. 1 mine	Whetstone
State of Maine mine	Tombstone
State of Texas mine	Hartford
Stella mine (see Gallagher Vanadium & Rare Minerals Corp. mine)	Tombstone
Stonewall mine (see Oregon-Prompter mine group)	Tombstone
Stroud Bros. mine	Cochise
Sullivan mine group	California
Sulphuret mine	Tombstone
Sunrise mine (see Buckeye Apache mine)	Teviston
Sunset mine	Tombstone
Sunset mine group	California
Sure Thing mine (see Juniper Flats area mines)	Warren
Technocracy group (see Gardner mine)	Rucker Canyon
Tejon mine	Turquoise
Telephone mine	Tombstone
Tenorite claim (see Eureka mine)	Hartford
Texas Arizona mine	Cochise
Texas mine group	California
Thelma mine (see Herron mine)	Turquoise
Thompson mine (see Sunset mine group)	California
Tombstone Extension mines	Tombstone
Tom Scott mine	Turquoise
Toughnut mine	Tombstone
Tranquility mine (see Contention-Grand Central mines group)	Tombstone

Table 2, Cont.

NAME	DISTRICT
Tribute mine	Tombstone
Tungsten King mine	Cochise
Tungsten Reef mine (see Reef mine)	Hartford
Turquoise group mine	Turquoise
Turquoise King mine (see McLenden mine)	Turquoise
Twilight mine (see Higgins mine)	Warren
Two Peaks mines	Whetstone
Uncle Sam mine	Warren
Unknown No. 2 claim	Warren
Van Horn mine	Hartford
Vision Point prospect	Pearce
Vizina mine	Tombstone
Vogel mine (see Gallagher Vanadium & Rare Minerals Corp. mine)	Tombstone
Wade Hampton mine	Warren
Wakefield mine	Hartford
War Eagle mine (see Le Roy mine group)	Dos Cabezas
War Eagle mine (see American mine)	Yellowstone
Waterloo mine	Warren
Way Up claim (see Boston, Sampson & Way Up claims)	Hartford
Way Up mine	Tombstone
Wedge mine (see Lucky Cuss mine)	Tombstone
Western mine	Hartford
West Side mine	Tombstone
Whale group (see Hilltop Extension mine)	California
Whale mine (see Mammoth & Whale mines)	Swisshelm
White Metal mine (see Muheim mine)	Middle Pass
White Oaks (see Honey Dew mine group)	Dos Cabezas
White Tail Deer mine	Warren
White Tail mine	Middle Pass
Willie Rose mine	California
Wisconsin mine (see Hamburg mine)	Hartford
Wolcott mine (see Galvez mine)	Tombstone
Wolverine mine	Warren
Wooley mine (see Charleston Lead mine)	Tombstone
Yankee Pride mine	Cochise
Yellow Jacket mine (see Contention-Grand Central mines group)	Tombstone
Zaleski mine	Hartford
Zinc Basin mine (see Muheim mine)	Middle Pass

TABLE 3
INDEX OF MINING PROPERTY OPERATORS

NAME	PROPERTY	DISTRICT
Ainsworth Copper Co.	King Ainsworth mine group	California
Ajax Metal Mining Co.	Ajax mine	California
Alpine Mining Co.	Great American mine	Swisshelm
Alto Mining, Milling, & Smelting Co.	Alto mine	Hartford
American Smelting & Refining Co.	Tombstone Extension mines	Tombstone
American Zinc, Lead & Smelting Co.	Hilltop mine	California
Andes Copper Co.	Armstrong; Leadville No. 1; Leadville No. 2; Muso mines	Turquoise
Apache Pass Gold Mining Co.	Apache Pass mines	Teviston
Apex Mining Co.	Apex mine	Swisshelm
Arelead Mining Co.	Le Roy mine group	Dos Cabezas
Arid Mines & Development Co.	Wakefield mine	Hartford
Arivaca (Aztec) Mining Co.	Elma mine; Mascot mine group	Dos Cabezas
Arizona & Michigan Development Co.	Copper Chief mine	Cochise
Arizona Cleveland Mining Co.	Stroud Bros. mine	Cochise
Arizona Consolidated Metal Producers Corp.	Ajax mine; King Ainsworth mines group	California
Arizona Consolidated Mining Co.	Mammoth; Republic; Southern mines	Cochise
Arizona Copper Syndicate of Providence	Copper Rocks mine	Turquoise
Arizona Gold Mining Co.	Apache Pass mines	Teviston
Arizona Gypsum Plaster Co.	Gypsum quarries	Douglas
Arizona Imperial Mines Extension Co.	Baumkirscher mines	Hartford
Arizona Middlemarch Copper Co.	Cobre Loma; Middlemarch mines	Middle Pass
Arizona Monte Cristo Mining Co.	Hilltop Extension mine	California
Arizona United Development Co.	Copper Chief; Mammoth; Republic; Southern mines	Cochise
Arizona United Mining Co.	Copper King; Mammoth; Republic; Southern mines	Cochise
Ashworth	Harper mine	Hartford
Aztec Mining & Development Co.	Keystone mine	Cochise
Bargin Mines, Inc.	Abril mine	Middle Pass
Bean	Arizona Klondyke; First Chance; Gold Prince mines; Le Roy mine group	Dos Cabezas

Bernoudy Mining & Milling Co.	Bernoudy mine	California
Bernoudy-Turkey Creek Co.	Bernoudy mine	California
Big Springs Mining Co.	Claire group mines	California
Bisbee & Sonora Development Co.	Morning Star mine group	California
Bisbee Coalition Mining Co.	Bisbee Coalition mines	Warren
Black Diamond Copper Mining Co.	Black Diamond mine	Middle Pass
Black Prince Copper Company	Black Prince; Keystone; Mammoth; Republic; Southern mines	Cochise
Boeckler Mining Co.	Homestake mine	California
Bonanza Belt Copper Co.	Peabody mine	Cochise
Boras Leasing Co.	Boras mine	Warren
Border-Land Metals Co.	Manila; Pomona mines	Hartford
Boston & Arizona Smelting & Reduction Co.	Oregon-Prompter mine group	Tombstone
Boulder Tungsten Mining Co.	Boulder claim group	Cochise
Bradshaw-Arizona Mining Co.	Humboldt mine	California
Buckeye Apache Mines, Co.	Buckeye Apache mine	Teviston
Buckeye Mining & Milling Co.	Buckeye Apache mine	Teviston
Bunker Hill Mines Co. (Phelps Dodge Corp.)	Bunker Hill mine; Contention-Grand Central mines group; Defense mine; East Side mine; Emerald & Silver Plume mine group; Empire; Girard; Goodenough; Luck Sure; Lucky Cuss; Owl's Nest; Silver Thread; Sulphuret; Toughnut; Tribute mines	Tombstone
Bunker Hill Mining Co.	Bunker Hill mine	Tombstone
Butte & Arizona Mining Co.	Hamburg mine	Hartford
California & Paradise Consolidated Mining Co.	Leadville mine group	California
Calumet & Arizona Mining Co.	April Fool; Germania; Leadville No. 1; Leadville No. 2; Maid of Sunshine; Muso; Silverton mines	Turquoise
	Briggs; Campbell; Cole mines; Granville & Unknown claims; Hoatson; Irish Mag; Junction mines; New Era group claims; Oliver mine; Unknown No. 2 claim; Waterloo mine	Warren
Calumet Divide Mining Co.	Hilltop Extension mine	California
Captain Mining Co.	Centurion mine	Cochise
Capt. (A. B.) & Cartwell Bros.	Fluorine Hill mine	Pearce

Table 3, Cont.

NAME	PROPERTY	DISTRICT
Capt. Thomas Burns	Chiricahua mine	California
Carleton	Golden Eagle mine	Teviston
Carter & Robinson	Cowboy mine	Teviston
Central Copper Co.	Elma mine; Mascot mines group	Dos Cabezas
Centurion-Arizona Mining Co.	Centurion mine	Cochise
Chamberlain & Morrow	Leadville mine group	California
Chance Mining Co.	Chance mine	Swisshelm
Charleston Lead Mines Co.	Charleston Lead mine	Tombstone
Chicago & Arizona Copper Co.	Gold Ridge mine	Dos Cabezas
Chiricahua Development Co.	Chiricahua mine	California
Cobre Loma Copper Co.	Cobre Loma mine	Middle Pass
Cobriza Mines Development Co.	Copper King; Mammoth mines	Cochise
Cochise Bowie Mining Co.	Apache Pass mines	Teviston
Cochise Consolidated Copper Co.	King Ainsworth mine group	California
Cochise Development Co.	Pittsburg shaft	Cochise
Cochise Mining Co.	Gold Gulch placers	Teviston
Colford Copper Co.	Colford Copper mine	Swisshelm
Commonwealth Development Co.	Commonwealth mine	Pearce
Commonwealth Extension Mining Co.	Commonwealth Extension mine	Pearce
Commonwealth Mining & Milling Co.	Commonwealth mine	Pearce
Conan Mining Corp.	Mammoth & Whale mines	Swisshelm
Conlig Tungsten Co.	Chadwick mine	Whetstone
Consolidated Copper Co.	Mascot mine group	Dos Cabezas
Consolidated Gold Mines, Inc.	Dives mine	Dos Cabezas
Contention Mining Co.	Contention-Grand Central mines group; Sulphuret mine	Tombstone
Copper Dog Mining Co.	Peterson mine	Hartford
Copperrox Mining Co.	Copper Rock mine	Turquoise
Coronado Copper & Zinc Co. (Cyprus Mines Corp.)	Black Prince; Chicora; Copper Chief; Copper King mines; Donna Anna workings; Johnson; Keystone mines; MacKay mine group; Mammoth; Mayflower mines; Moore mine (shaft); OK; Peabody; Republic; Southern mines	Cochise
Coronado Copper Co.	King Ainsworth mine group	California

Costello	Intervener mine	Tombstone
	Gleeson	Turquoise
Cottonwood Mining Co.	Cottonwood mine	Dos Cabezas
Cowboy Mining Co.	Cowboy mine	Teviston
Denn-Arizona Copper Co.	Denn mine	Warren
Devonian Strategic Minerals Inc.	Silver Strike mine	Teviston
Dives Mining Co.	Dives mine	Dos Cabezas
Doran	Blue Mountain mine; Sunset mine group	California
Doran & Gallagher	Ajax mine	California
Dos Cabezas Consolidated Mines	Mascot mine group	Dos Cabezas
Dos Cabezas Gold Mining Co.	Gold Prince mine	Dos Cabezas
Dos Cabezas Gold Ridge Mining Co.	Gold Ridge mine	Dos Cabezas
Douglas & Cross	Horace mine	California
Douglas Gypsum Block Co.	Gypsite quarries	Douglas
Dragoon Copper Mining & Smelting Co.	Christmas mine	Middle Pass
Dragoon Mining Co.	Peabody mine	Cochise
Dragoon Mining Corp.	Little Fanny mine group	Cochise
Dragoon Mountain Copper Co.	Copper Chief mine	Cochise
Duluth & Chiricahua Development Co.	Sullivan mine group	California
Easter Sunday Gold Mining & Milling Co.	Easter Sunday mine	Warren
Elsworth	Elsworth property	Douglas
Empire Gold & Copper Mining Co.	Empire No. 1; Empire No. 2 mines; Princes and Cowboy workings	Cochise
Environmental Engineering and Chemical Co.	Fluorine Hill mine	Pearce
Equities, Inc.	First Chance mine	Dos Cabezas
Escapule	American group mine; Garnet & Moonlight groups; Silver Cloud mine	Middle Pass
	Alkie; Mustang; Plain View mines	Tombstone
Euclid Mining Co.	Chadwick mine	Whetstone
Eureka Mining Co.	Bisbee Coalition mines	Warren
Exposed Reef Tungsten Co.	Reef mine	Hartford
Fluorine Mining & Milling Co.	Fluorine Hill mine	Pearce
Four Horse Mining Co.	Apex; Mountain Queen mines	Swisshelm
Four X Mining Co.	Sunset mine group	California

Table 3, Cont.

NAME	PROPERTY	DISTRICT
Galen & Newman	Nevada & Mascot mines	Whetstone
Giacoma Bros.	Christmas mine	Middle Pass
	Intervener mine	Tombstone
	Defiance mine	Turquoise
Gilbert Construction Co.	Gilbert Silica quarry	Turquoise
Gilman-Rice	Gold Gulch placers	Teviston
Girard Mining Co.	Girard mine	Tombstone
Globe Mining & Smelting Co.	First Chance mine	Dos Cabezas
Gold Gulch Mining Co.	Gold Gulch placers	Teviston
Gold Metals Consolidated Mining	Mammoth & Whale mines; Mountain Queen mine	Swisshelm
Gold Nugget Mining Co.	Apache Pass mines	Teviston
Gold Prince Mining Co.	Gold Prince mine	Dos Cabezas
Gold Reef Mining & Milling Co.	Cowboy mine	Teviston
Gold, Silver & Lead (G. S. & L.) Leasing Co.	Golden Rule mine area	Dragoon
Gold, Silver & Tungsten, Inc.	Tungsten King mine	Cochise
Gold Slope Mining Co.	Mineral Park mines	Dos Cabezas
Golden Queen Consolidated Gold Mining Co.	Golden Rule mine area	Dragoon
Grand Arizona Mining Co.	Grand Arizona mine	Douglas
Grand Central Mining Co.	Contention-Grand Central mines group; Emerald & Silver Plume mine group; State of Maine mine	Tombstone
Great American Mining Co.	Great American mine	Swisshelm
Great Western Copper Co.	Highland; Humbot; Mame; Mary; Ontario mines	Turquoise
Hartford Arizona Copper Mining Co.	Hamburg mine	Hartford
Head Center & Tranquility Co.	Contention-Grand Central mines group	Tombstone
Head Center Co.	Contention-Grand Central mines group	Tombstone
Hearst-Hagen Estate	Ingersol mine	Tombstone
Helen Dome Mining Co.	Apache Pass mines	Teviston
Herschel Mining Co.	Herschel mine	Tombstone
Higgins Mining Co.	Higgins mine	Warren
Hilltop Extension Mining Co.	Hilltop Extension mine	California
Hilltop Metals Mining Co.	Hilltop mine	California
Hilltop Silver Lead Mines Co.	Hilltop mine	California
Holmes Copper Co.	McLendon mine	Turquoise
Hope Mining & Milling Co.	Humbot; Mame; Mary mines	Turquoise

Huachuca Consolidated Mining Co.	Manila mine	Hartford
Huachuca Mining & Milling Co.	Pomona mine	Hartford
Hyde	Arizona Klondyke mine	Dos Cabezas
Hyde & Scott	Humboldt mine	California
Imperial Guard Mining Co.	Old Guard mine	Tombstone
Inspiration Placers, Inc.	Gold Gulch placers	Teviston
International Gold & Rare Metals Co.	Baumkirscher mines	Hartford
Interstate Accounting & Office Service	Mame mine	Turquoise
Johnson Copper Development Co.	Johnson mine	Cochise
Junction Development Co.	Junction mine	Warren
Junction, Superior & Duluth Mining Co.	Junction mine	Warren
Juniper Flats Gold Mining Co.	Juniper Flats area mines	Warren
Kelley	Armistice mine	Hartford
Keystone Copper Mining Co.	Keystone; OK mines	Cochise
Keystone Mining Co.	OK mine	Cochise
King Copper Co.	King Ainsworth mine group	California
Kramer Mining & Milling Co.	Tungsten King mine	Cochise
Lake Superior & Pittsburg Development Co.	Cole mine	Warren
Lake Superior & Western Development Co.	Irish Mag mine	Warren
Lake Superior Mining Co.	Chiricahua mine	California
La Vantia Mining Co.	American mine	Yellowstone
Leadville Mining Co.	Armstrong; Leadville No. 1; Leadville No. 2; McLendon; Maid of Sunshine; Muso mines	Turquoise
Leonard Copper Co.	Copper Belle mine	Turquoise
Le Roi Mines Co.	Senecia mine	Dragoon
Le Roy Consolidated Mines Co.	Le Roy mine group	Dos Cabezas
Ligier	Burrito de Fierro mine; Ligier Marble quarries	Dragoon
Lime Mountain Copper Co.	Lime Mountain workings	Cochise
Little Mary Mining Co.	Little Mary mine	Pearce
Lone Butte Mining Co.	Claire group mines	California
Lucy Bell Mining Co.	Lucy Bell mine	Hartford
Magazine Copper Co.	MacKay mine group	Cochise
Manhattan Consolidated Mines Development Co.	Mountain Queen mine	Swisshelm
Manhattan Development Co.	Manhattan mine group	California

Table 3, Cont.

NAME	PROPERTY	DISTRICT
Manzoro Mining Co.	Golden Rule mine area	Dragoon
Maria Copper Co.	Mineral Park mines	Dos Cabezas
Marquette & Arizona Copper Co.	Marquette & Arizona mine	Warren
Mascot Copper Co.	Mascot mine group	Dos Cabezas
Mascot Mining Co.	Nevada & Mascot mines	Whetstone
Mason Copper Co.	Mammoth mine	Cochise
May	Humboldt mine	California
Mayflower Mining Co.	Mayflower mine	Cochise
McClellen	Horace mine	California
McFarland & Hullinger	Moore mine (shaft)	Cochise
Mellgren group	Bonanza mine group; Mamie; Randolph; Soltice mines	Tombstone
Middlemarch Copper Co.	Cobre Loma; Middlemarch mines	Middle Pass
Mineral Park Gold Mining Co.	Mineral Park mines	Dos Cabezas
Minerals Development Co.	Chadwick mine	Whetstone
Minerals Exploration Co. (Union Oil)	Mame; Mystery mines	Turquoise
Mining & Development Corp. of America	Copper Chief mine	Cochise
Mona Leasing Co.	Casey; Mona mines	Turquoise
Montana Tonopah Mining & Milling Co.	Commonwealth mine	Pearce
Monte Cristo Conservative Mining Co.	Galeyville mines	California
Morrow	King of Lead mine	California
Moseley & Sons	Burro pit	Cochise
Mountain View Development Co.	Mountain View mine	Warren
Mystery Mining Co.	Mystery mine	Turquoise
Nebraska & Arizona Copper Co.	Leadville mine group	California
Needles Mining & Smelting Co.	Armstrong; Leadville No. 1; Leadville No. 2; Muso mines	Turquoise
New Vail Mining Co.	Silver Hill mine group	California
Night Hawk Leasing Co.	Night Hawk mine	Warren
North Bisbee Development Co.	Bisbee Coalition mines	Warren
Nugget	Morgan mine	Hartford
Old Glory Mining Co.	Comet & Black Eagle mines; Luck Sure mine	Tombstone
Old Guard Mining Co.	Old Guard mine	Tombstone
Old Terrible Mining Co.	Golden Rule mine area	Dragoon

Out West Mining Co.	Gold Prince mine	Dos Cabezas
Paradise Mining & Milling Co.	Morning Star mine group	California
Paradise Mining Co.	Morning Star mine group	California
Parent Mining Co.	Parent mine group	Dos Cabezas
Park Mining & Milling Co.	Mineral Park mines	Dos Cabezas
Paul Lime Co.	Paul Lime quarry	Paul
Pawnee Mining Co.	Claire group mines	California
Pay Divide Mining Co.	Hilltop Extension mine	California
Peabody Consolidated Copper Co.	Peabody mine	Cochise
Perevill & Danvers	Burrito de Fierro mine	Dragoon
Peru Mining Co.	Copper Belle mine	Turquoise
Phelps Dodge Corp. (Copper Queen Division)	Sunset mine group	California
	Germania; Maid of Sunshine mines	Turquoise
	Boras; Briggs; Campbell; Cole; Copper Queen; Czar; Dallas mines; Danville-Hanchetta claims; Denn; Gardner mines; Golden Gate claim; Granville & Unknown claims; Hendricks; Higgins; Hoatson; Holbrook; Irish Mag; Junction mines; Lavender pit; Lowell mine; Mammoth claim; New Era group claims; Night Hawk mine; No. 4 claim; Oliver; Sacramento mines; Sacramento pit; Shattuck; Southwest; Spray; Uncle Sam mines; Unknown No. 2 claim; Wade Hampton; Waterloo; White Tail Deer mines	Warren
Piedmont Mines Inc.	Hilltop mine	California
Piedras de Sol Mining Co.	Rattling Boy & Sidewheel mines	Tombstone
Pomona Mining Co.	Pomona mine	Hartford
Portal Mines Development Co.	King Ainsworth mine group	California
Primos Chemical Co.	Bluebird mine; Dividend tunnel; Yankee Pride mine	Cochise
	Reef mine	Hartford
Providence Copper Co.	Rabbit claim group	California
Pursley	King of Lead; Pine Zinc; Silver Prince mines	California
Queen Mining Co.	Hilltop mine	California
Randall Lease	Mountain Queen mine	Swisshelm
Rattlesnake Co.	Bunker Hill mine	Tombstone

Table 3, Cont.

NAME	PROPERTY	DISTRICT
R. E. D. Mining Co.	Gold Prince mine	Dos Cabezas
Robertson	Silver Prince mine	California
Robinson & Hately properties	Honey Dew mine group	Dos Cabezas
Russell Gold & Silver Mining Co.	Peabody mine	Cochise
Rydbom	March mine	Swisshelm
Sampson	El Tigre	California
San Pedro Leasing Co.	San Pedro; State of Maine mines	Tombstone
San Simon Copper Co.	Chiricahua mine	California
Santa Maria Mining Co.	Dives mine	Dos Cabezas
San Xavier Rock & Sand Co.	Cinder Hill quarry	Douglas
Sanchez	Cowboy mine	Teviston
Savage Gold and Copper Co.	Savage mine	California
Schwarzenback	Boston, Sampson & Way Up claims	Hartford
Scott & Crawford	Silver Hill mine group	California
Shannon Copper Co.	Copper Belle mine	Turquoise
Shattuck & Arizona Mining Co.	Shattuck mine	Warren
Shattuck Denn Mining Co.	Abril mine	Middle Pass
	Denn; Shattuck mines	Warren
Short	Armistice mine	Hartford
Sidewheel Leasing Co.	Rattling Boy & Sidewheel mines	Tombstone
Sierra Vista Mining Co.	Pomona mine	Hartford
Silver Bar Mining Co.	Old Guard mine	Tombstone
Silver Strike Mining Co.	Silver Strike mine	Teviston
Soltice Mining & Milling Co.	Soltice mine	Tombstone
Southwest Metals Co.	Mascot mine group	Dos Cabezas
Southwest Tungsten Mining Co.	Harper mine	Hartford
Standard Tungsten Corp.	Tungsten King mine	Cochise
	Standard Tungsten mine	Middle Pass
	Chadwick mine	Whetstone
Stauffer Mining Co.	Moore mine (shaft)	Cochise
Strong & Harris	Burro pit; Chicora mine; Moore mine (shaft)	Cochise
Sullivan Copper Development	Sullivan mine group	California
Sunset Mining Co.	Sunset mine group	California
Superior & Duluth Mining Co.	Junction mine	Warren

Superior & Pittsburg Mining Co.	Junction mine	Warren
Swisshelm Development Co.	Mammoth & Whale mines	Swisshelm
Swisshelm Gold Silver Co.	Mammouth & Whale mines	Swisshelm
Swisshelm Mining Co.	Great American mine	Swisshelm
Swisshelm Mountain Gold & Silver Mining Co.	Mammoth & Whale mines	Swisshelm
Taylor	King of Lead mine	California
Tejon Mining Co.	Tejon; Tom Scott mines	Turquoise
Texas Arizona Mining Co.	Texas Arizona mine	Cochise
Texas Consolidated Mining & Smelting Co.	Texas mine group	California
Tombstone Consolidated Mines Co.	Comet & Black Eagle mines; Contention- Grand Central mines group; Defense; East Side mines; Emerald & Silver Plume mine group; Empire; Girard; Goodenough; Lucky Cuss; Owl's Nest; Silver Thread; Sulphuret; Toughnut; Tribute mines	Tombstone
Tombstone Development Co.	Arizona Queen; Bunker Hill mines; Comet & Black Eagle mines; Contact mine; Contention-Grand Central mines group; Defense; Dry Hill; East Side mines; Emerald & Silver Plume mine group; Empire; Girard; Goodenough; Luck Sure; Lucky Cuss mines Oregon-Prompter mines group; Owl's Nest; Silver Thread; Sulphuret; Toughnut; Tribute; Way Up mines	Tombstone
Tombstone Gold-Silver Mines Co.	Bunker Hill mine	Tombstone
Tombstone Gold & Silver Mines, Inc.	Charleston Lead mine	Tombstone
Tombstone Mica Co.	Charleston Lead mine	Tombstone
Tombstone Mill & Mining Co.	Contention-Grand Central mines group; Defense; East Side; Empire; Girard; Goodenough; Lucky Cuss; Owl's Nest; Silver Thread; Toughnut; Tribute mines	Tombstone
Tombstone Mines, Inc.	Mame mine	Turquoise
Tombstone Mining Co.	Tombstone Extension mines	Tombstone
Tombstone Silver Fields Co.	Bonanza mine group; Mamie; Merrimac; Old Guard; Randolph; Soltice mines	Tombstone
Tout	Elma mine; Mascot mine group	Dos Cabezas
Tungsten Reef Mines Co.	Reef mine	Hartford
Turquoise Copper Mining & Smelting Co.	Turquoise group mine	Turquoise

Table 3, Cont.

NAME	PROPERTY	DISTRICT
Twin Peak Mining Co.	Dives mine	Dos Cabezas
Tyrone Mining Co.	Galeyville mines	California
	Comstock Lode mine	Teviston
U. S. Smelting & Refining Co.	Armstrong; Leadville No. 1; Leadville No. 2; Muso mines	Turquoise
Vizina Consolidated Mining Co.	Vizina mine	Tombstone
VMP Leasing Co.	Le Roy mine group	Dos Cabezas
	Ingersol mine	Tombstone
Warnekros	Last Chance mine	Turquoise
Western Mining Co.	Contention-Grand Central mines group; Sulphuret mine	Tombstone
	Cottonwood mine	Dos Cabezas
Whitetail Copper Co.	Sunset mine group	California
Willie Rose Copper Mining Co.	Willie Rose mine	California
Wolverine & Arizona Mining Co.	Wolverine mine	Warren
Woronoco Co.	Tombstone Extension mines	Tombstone

EXPLANATION

QT	Quaternary-Tertiary alluvium	P	Paleozoic sedimentaries
Ti	Tertiary intrusives	p€m	Precambrian metamorphics
Tsv	Tertiary sedimentaries and volcanics	p€i	Precambrian intrusives
MLi	Mesozoic and Laramide intrusives		Contact
			Normal fault
Msv	Mesozoic sedimentaries and volcanics		Thrust fault (marked by teeth on upper plate)

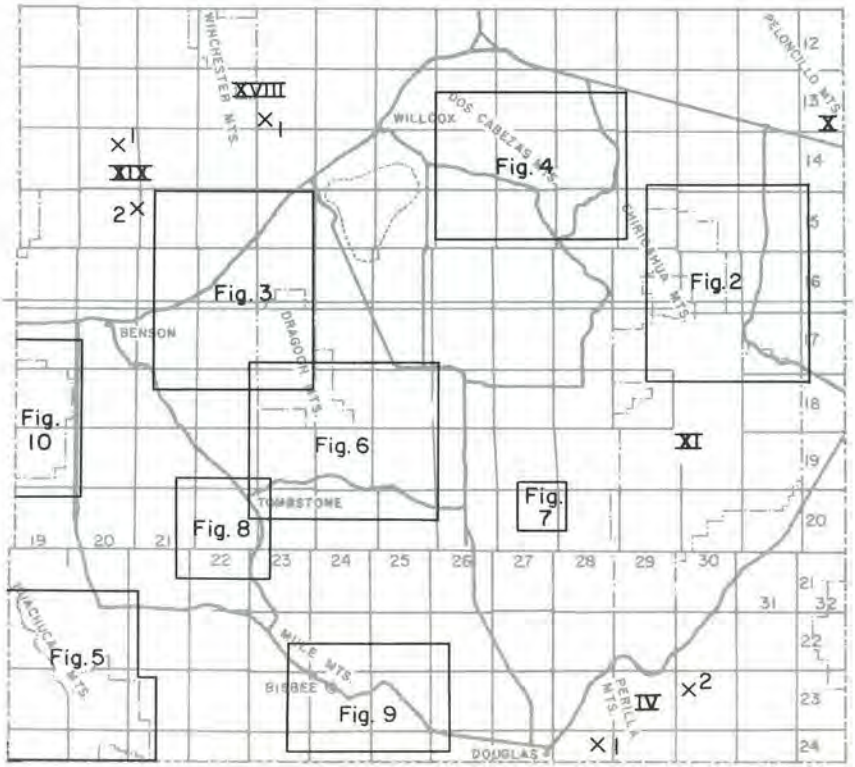

Figure 1. Index map to Mining Districts in Cochise County and Explanation of Geologic Symbols

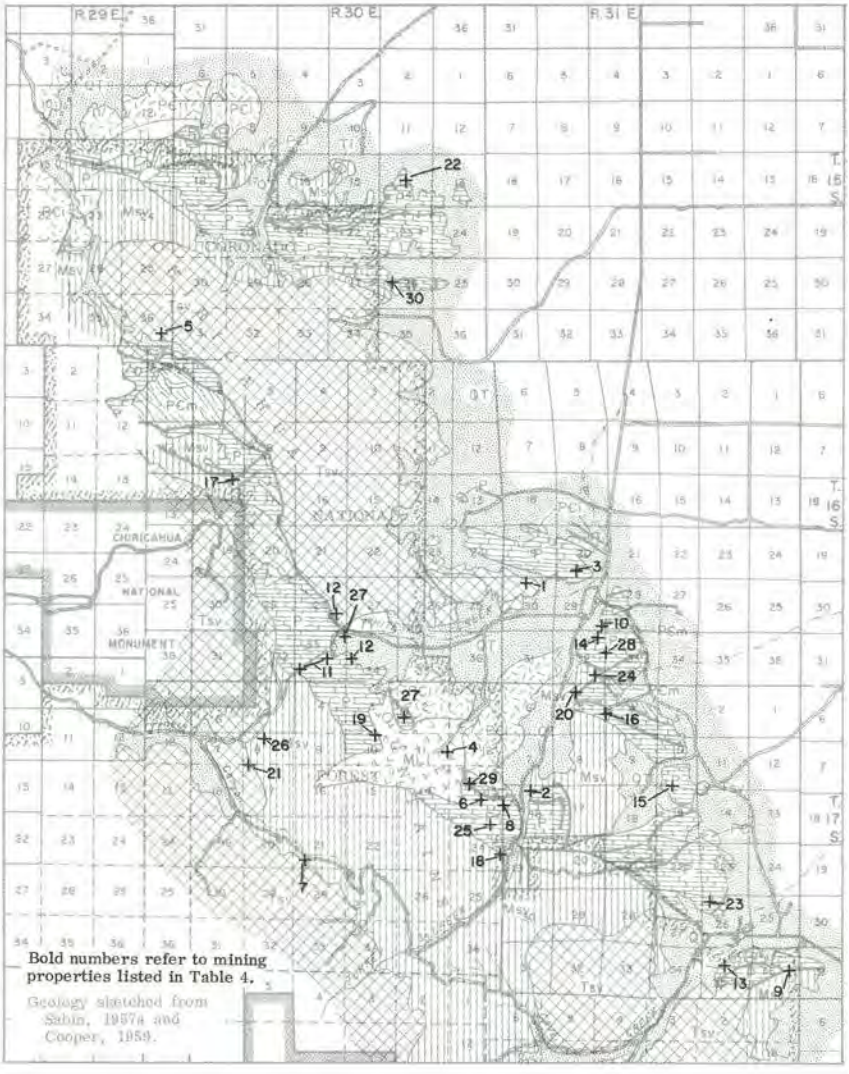

Figure 2. California (Chiricahua) District

Figure 3. Cochise and Dragoon (Golden Rule) Districts

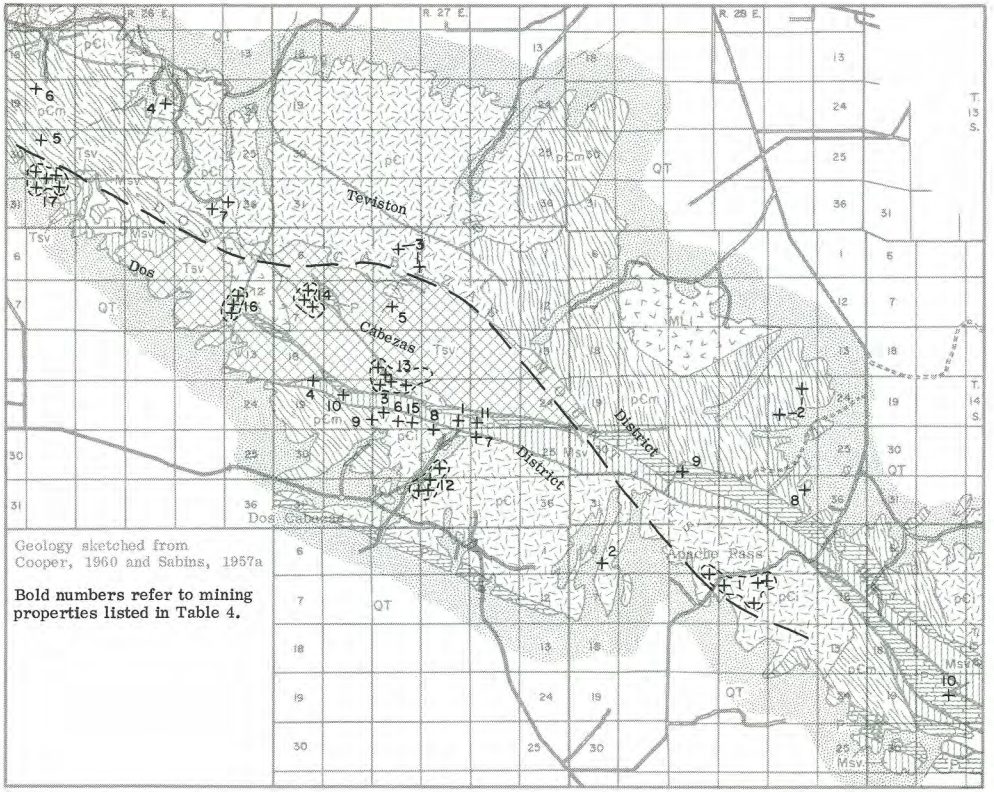

Figure 4. Dos Cabezas - Teviston Districts

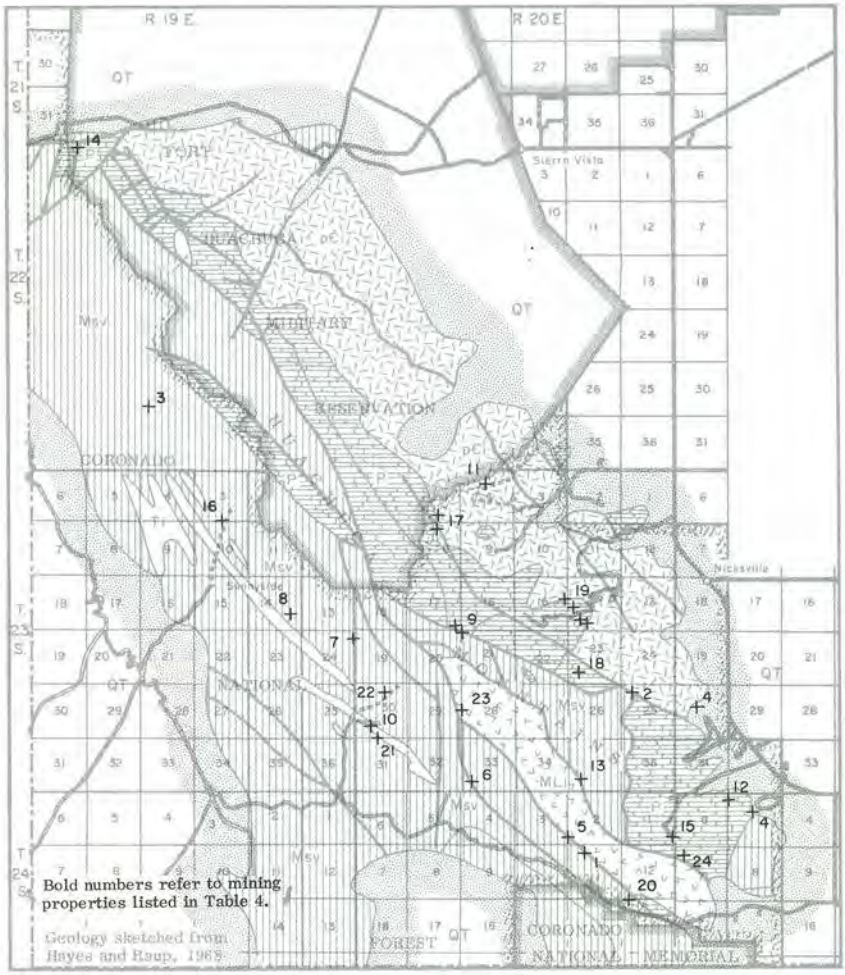

Figure 5. Hartford (Hauchuca Mountains) District

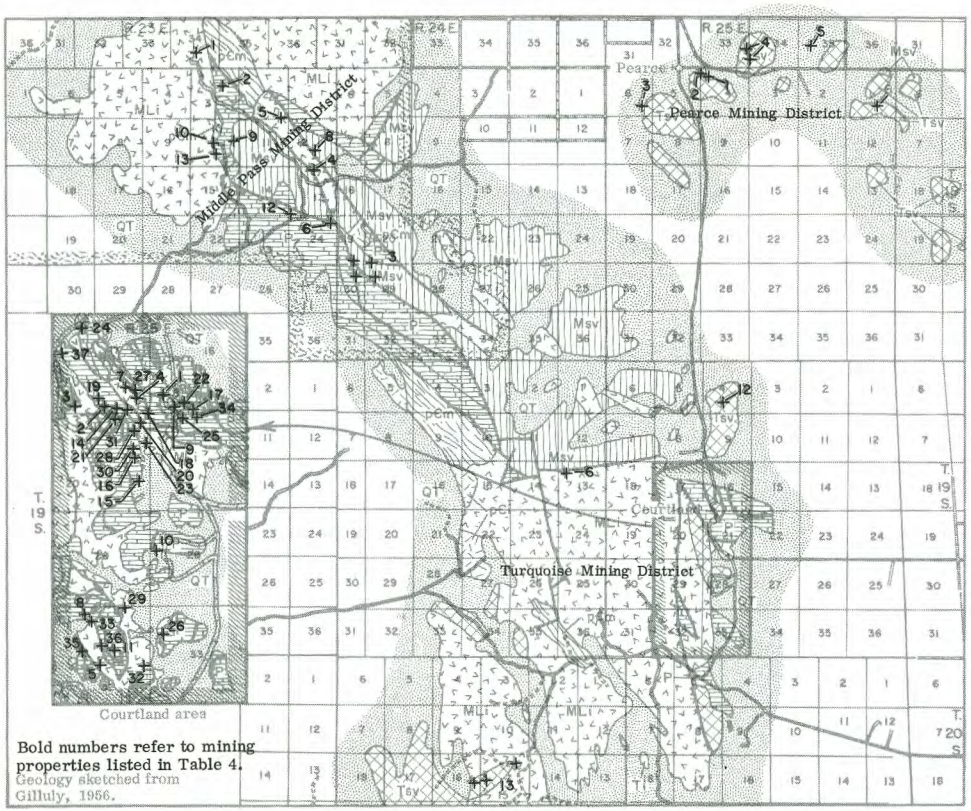

Figure 6. Middle Pass, Pearce, and Turquoise Districts

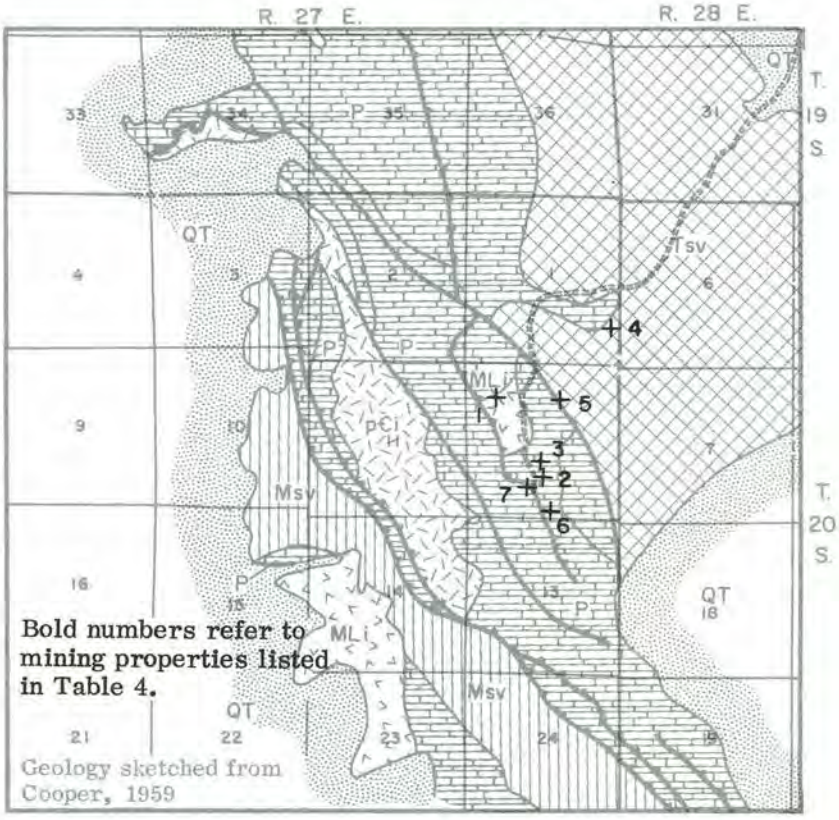

Figure 7. Swisshelm District

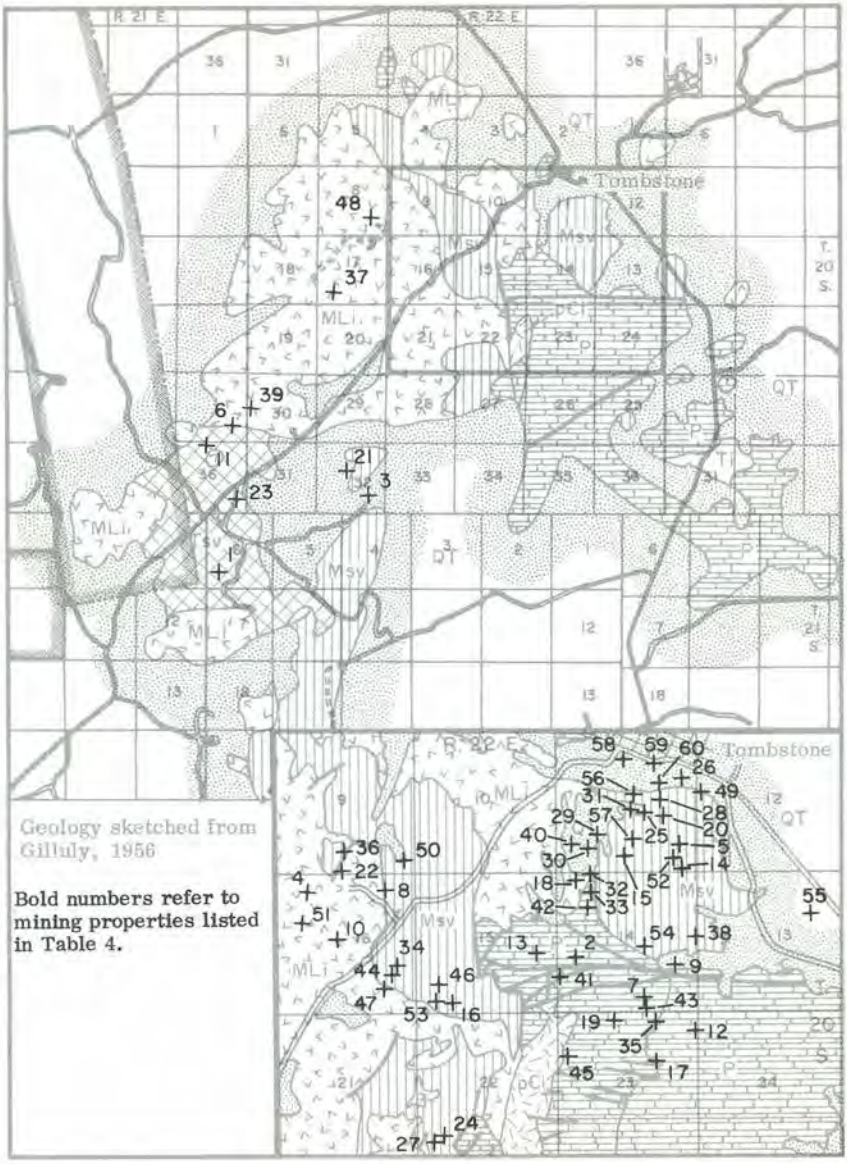

Figure 8. Tombstone District

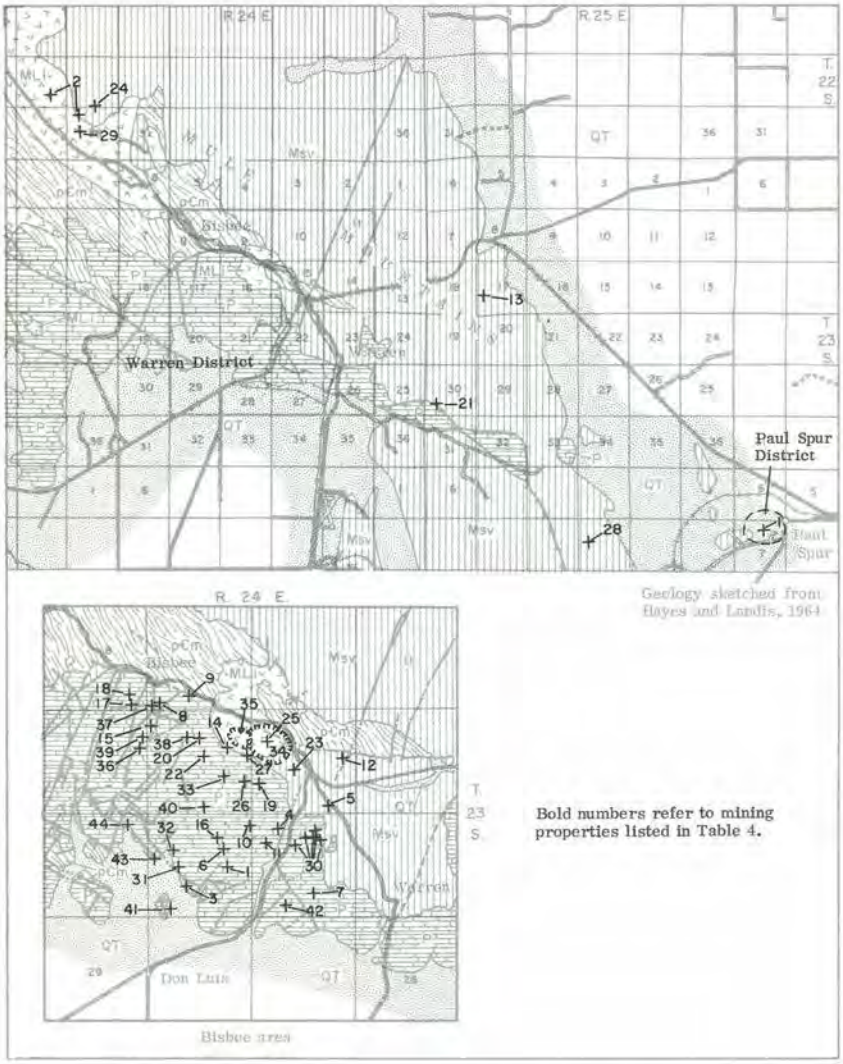

Figure 9. Warren (Bisbee) and Paul Spur Districts

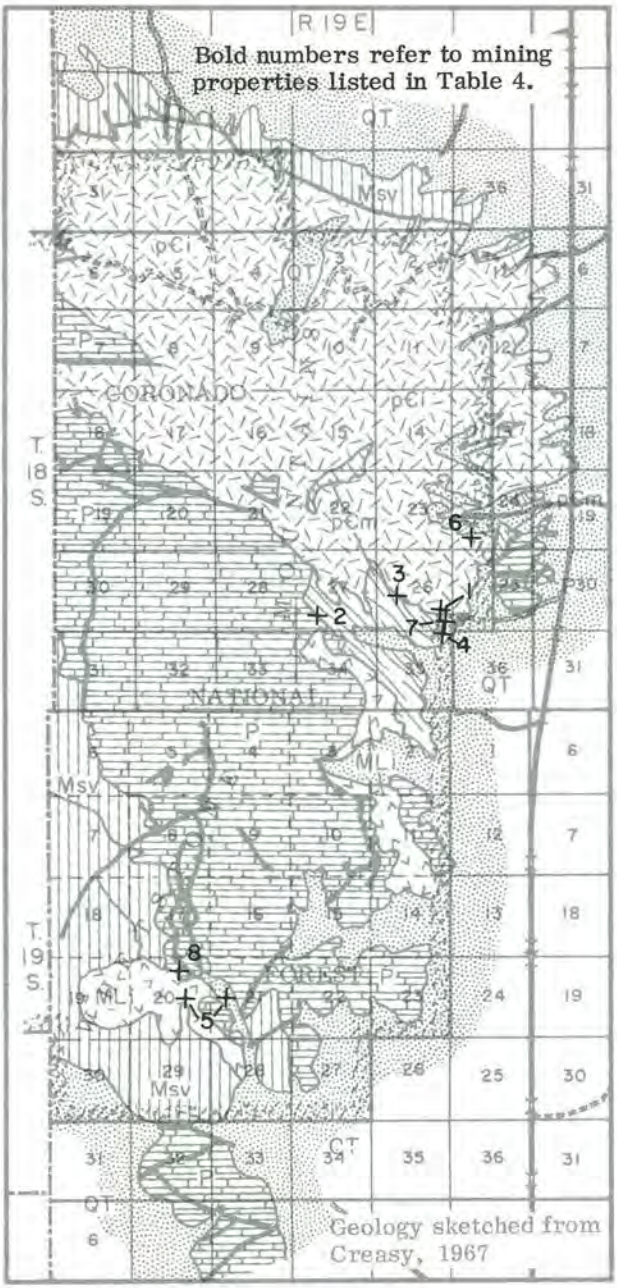

Figure 10. Whetstone District

TABLE 4
INDEX OF MINING PROPERTY

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
I. California District (Chiricahua Mts.) (See Fig. 2.)	15-17S	29-31E		Pb, Zn, Cu, Ag, Au, W-, (Bi, Cd, Mn, Mo)	1. Base metal sulfides, oxides, and carbonates along strong silicified fault zones, in replacement pipes and lenses along quartz dikes, and in disseminated deposits in strongly foldes, faulted, and often pyrometamorphosed Paleozoic limestone and Cretaceous sedimentary and volcanic formations that have been invaded by Laramide or Tertiary intrusives. 2. Spotty scheelite mineralization in pyrometamorphosed Paleozoic limestones.	Numerous scattered mines and prospects, mostly with limited workings from tunnels, adits, and relatively shallow shafts. District has produced at least 38,000 tons of base metal sulfide and minor tungsten ore from the 1880's through 1970.	Coll, 1910 Badger, 1911 Raydon, 1952 Sabins, 1955, 1957a, 1957b Cooper, 1959 ABM file data
1. Ajax Mine (Doran & Gallagher; Ajax Metal Mng. Co.; Ariz. Consol. Metal Producers Corp.)	16S	31E	No. Cen. 30	Cu, Pb, Ag, Zn-, Au-	Base metal sulfides and their oxidation products in irregular veins and disseminations in late Cretaceous to Tertiary conglomerates derived from volcanics rocks and cut by Tertiary silicic porphyry dikes.	Shaft and adit workings. About 100 tons of ore produced intermittently from 1909 to 1918.	Mines Handbook, 1924 Ariz. Dept. Min. Res. file data ABM file data
2. Bernoudy Mine (Bernoudy Mng. & Mlng Co.; Bernoudy-Turkey Creek Co.)	17S	31E	No. Cen. 18	Pb, Cu, Ag, Zn-, Au-	Base metal carbonates and sulfides in irregular replacement bodies in Mississippian to Permian limestones along strong thrust faulting.	Tunnel workings. A few tens of tons of high grade ore shipped between 1909 and 1911.	Copper Handbook 1908, 1909, 1910-1911 ABM file data
3. Blue Mountain Mine (Doran)	16S	31E	So. Cen. 20	Pb, Ag, Cu-	Spotty lead and minor copper carbonates in lensing replacement deposits in a folded band of Mississippian Escabrosa Limestone.	Relatively shallow shafts and adits. Some 50 tons of ore shipped in 1942.	ABM file data
4. Chiricahua Mine (Capt. Thos. Burns, Lake Superior Mining Co., Chiricahua Development Co., San Simon Copper Co.)	17S	30E	SE ¼ 11 SW ¼ 12	Cu, Pb, Ag, Zn-, W-	Base metal carbonates and sulfides with spotty, fine-grained, disseminated scheelite in faulted and sheared, shaly, and silicated Pennsylvanian-Permian Naco Group limestone intruded by Laramide or Tertiary granitic rock.	Shaft and adit workings. Some spotty production of ore in the late 1800's and early 1900's.	Copper Handbook, 1906 Mines Handbook, 1918 Dale et alia, 1960, p. 16-17 ABM file data
5. Clair group Mines (Empire State Mine; Lone Butte Mng. Co., Pawnee Mng. Co., Big Springs Mng. Co.)	15S	29E	SE ¼ 36	Pb, Cu, Ag, Au-	Galena and chalcopyrite in a shear zone in faulted Pennsylvanian-Permian Naco Group limestone intruded by Tertiary dikes and plugs.	Tunnel Workings. A few tens of tons of ore shipped in 1909 and 1910.	Copper Handbook, 1908, 1910-1911, 1912-1913. ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
6. Columbia mine	17S	30E	SE ¼ 13 Protracted	Pb, Ag, Cu-, Zn-, W-, (Bi)	Base metal carbonates and sulfides with local spotty scheelite in sheared tactite and along faults and fractures in silicated Permian Colina Limestone.	Tunnel workings. Small shipments of about 50 tons of high grade, base metal ore made intermittently from 1902 to 1941. Some tungsten ore shipped in 1953	USGS Min. Res. of U.S., 1908 USBM Min. Res. of U.S., 1931 USBM Min Yearbook, 1939, 1941 Dale et alia, 1960, p. 12 ABM file data
7. El Tigre mine (Sampson)	17S	30E	SW ¼ 21	Pb, Ag, Cu-, Au-	Small lensing oreshoot of partly oxidized base metal sulfides along a fracture zone cutting Cretaceous volcanic and sedimentary beds.	Tunnel workings. A few tens of tons of high grade ore shipped in 1945 and 1946.	USBM Min. Yearbook, 1945, 1946 ABM file data
8. Galeyville mines (Monte Cristo Conservative Mng. Co. Tyrone Mng. Co.)	17S 17S	30E 31E	SW ¼ 13 Protracted NW ¼ 18	Pb, Ag, Cu-, Au-	Base metal carbonates and sulfides with spotty scheelite in sheared and faulted tactite zone and in irregular replacement bodies in Pennsylvanian-Permian Naco Group limestone.	Shallow workings. Produced about 27 tons of ore in 1953.	Dale et alia, 1960 p. 10-12 ABM file data
9. Grace mine	17S	31E	E. Cen. 36	Pb, Cu, Ag, W	Spotty galena and minor chalcopyrite, largely altered to lead and copper carbonates, along a contact zone between Permian Colina Limestone and an intrusive porphyry.	Shaft and surface workings. 100 or more tons of lead-copper-silver ore produced in the late 1800's and about 100 tons of tungsten ore produced in 1945.	ABM file data
10. Harris Mountain mine group (Blue Ribbon, Rimski, Harris, Malachite groups)	16S	31E	SE ¼ 29 SW ¼ 28 NE ¼ 32	Pb, Zn, Cu, Ag	Numerous small replacement orebodies of base metal carbonates and sulfides in silicified, fractured, and folded Mississippian and Pennsylvanian limestones.	Many shaft and tunnel workings. A total of some 100 tons of ore shipped from the groups during 1913, 1923, and 1948 to 1949.	USGS Min. Res. of U.S., 1923 ABM file data
11. Hilltop mine (Hand; Hilltop Silver Lead Mines Co., Hilltop Metals Mng. Co., Piedmont Mines Inc., American Zinc, Lead, & Smltng Co., Queen Mng. Co.)	16S 17S	30E 30E	33, 34 3-5	Pb, Zn, Ag, Cu-, Au-, Mo-, W- (Cd)	Galena, cerussite, sphalerite, and wulfenite, often silver-bearing, with spotty copper oxides and scheelite in fissure veins and in irregular replacement lenses and bodies in banded and tilted, silicified Mississippian to Permian limestones and older quartzites.	Extensive workings from several tunnels. A total of some 30,000 tons of base metal sulfide ore produced intermittently from the early 1910's to about 1954.	Papke, 1952 USAEC Prelim. Rec. Rpt. A-P-45, 1953 Brittain, 1954 Burnham, 1959, p. 30 Dale et alia, 1960, p. 17-18 ABM file data
12. Hilltop Extension mine (Lilly & Whale groups; Hilltop Extension Mng. Co., Arizona Monte Cristo Mng. Co., Calumet Divide Mng. Co.)	16S	30E	SE ¼ 28 to SW ¼ 34	Pb, Ag, Zn-, Cu-, Au, Mo-	Base metal sulfides and carbonates in quartz veins and in pyrometasomatic deposits in silicified and tilted Paleozoic limestones cut by Laramide or Tertiary intrusives.	Tunnel workings. A total of 400 tons of ore shipped intermittently from 1923 to 1940.	USGS Min. Res of U.S., 1923, 1926-1928 Mines Handbook, 1926, 1931 ABM file data

13. Homestake mine (Boeckler Mng. Co.)	17S	31E	Cen. 35	Cu, Ag	Siliceous copper oxide and sulfide ore along a fault zone separating Pennsylvanian-Permian Naco Group limestone from Cretaceous volcanics near a Tertiary porphyry stock.	Pit and shaft workings. More than 140 tons of ore produced in 1912 and about 22 tons in 1919-1920.	ABM file data
14. Horace mine (Douglas & Cross, McClellan)	16S	31E	NE ¼ 32	Pb, Cu, Ag	Lead and copper carbonates and oxides in irregular replacement orebodies in folded and faulted, silicified Mississippian to Permian limestones.	Pit, adit, and shaft workings. More than 60 tons of ore shipped in 1917-1918.	USGS Min. Res. of U.S., 1917, 1918 ABM file data
15. Humboldt mine (Bradshaw Arizona; May, Hyde & Scott; Bradshaw-Arizona Mng. Co.)	17S	31E	So. Cen. 10 No. Cen. 15	Ag, Cu-, Pb-	Spotty silver chlorides and silver values associated with alabandite and minor base metal sulfides in a shear zone and in pyrometamorphosed Permian Colina Limestone bordering an intrusive porphyry dike.	Shaft workings. Some 180 tons of ore produced intermittently between 1907 and 1930.	USGS Min. Res. of U.S., 1908, 1911-1912, 1922 Mines Handbook, 1926, 1931 ABM file data
16. King Ainsworth mine group (Ainsworth, Cochise, Cochise-Bullion, Oregon group; King Copper Co., Ainsworth Copper Co., Cochise Consolidated Copper Co., Portal Mines Development Co., Coronado Copper Co., Arizona Consolidated Metal Producers Corp.)	17S	31E	Cen. bor. 4&5	Zn, Pb, Cu, Ag, Au, W-, Mo-	Irregular and spotty base metal oxides, carbonates, and sulfides with minor scheelite along shear zones and disseminated in silicated and pyrometamorphosed Mississippian to Permian limestone along a zone of thrust faulting.	Shaft and tunnel workings. A total of at least 1150 tons of ore produced intermittently from the 1880's to 1952.	USGS Min Res of U. S., 1906-1907, 1918 USBM Min. Res. of U. S., 1927-1929 USBM Min. Yearbook, 1948 Mines Handbook, 1926, 1931 USAEC Prelim. Rec. Rpt. A-P- 47, 1953 Dale et alia, 1960, p. 15-16 ABM file data
17. King of Lead mine (Morrow, Taylor, Pursley)	16S	30E	NE ¼ 18	Pb, Ag, Zn, Cu-Au-	Base metal carbonates and sulfides in fault zones and in disseminate bodies in thrust blocks of Permian limestone.	Tunnel workings. A total of about 360 tons of ore were produced between 1927 and 1970.	ABM file data
18. Leadville mine group (Chamberlain & Morrow, California & Paradise Consolidated Mng. Co., Nebraska & Arizona Copper Co.)	17S	30E Protracted 31E	SE ¼ 24 SW ¼ 19	Pb, Ag, Cu, W-	Lead and copper carbonates and sulfides with spotty scheelite in weakly silicified, locally sheared, Permian limestone intruded by porphyry dikes.	Shaft workings. A total of about 560 tons of ore produced intermittently between 1904 and 1951.	USGS Min. Res. of U.S., 1907 1915, 1923 USBM Min. Yearbook, 1949-1951 Dale et alia, 1960, p. 14 ABM file data
19. Manhattan mine group (Manhattan Development Co.)	17S	30E	3, 10	Cu-, Pb-, Zn-, Ag-, Au-	Relatively weak base metal carbonates and sulfides with some high grade spots along a shear zone and as disseminations in metamorphosed Permian limestones and Cretaceous beds.	Relatively shallow workings. A small amount of ore produced during 1926 and 1927.	Mines Handbook, 1926 ABM file data
20. Morning Star mine group (Paradise Mng. Co., Bisbee & Sonora Development Co., Paradise Mng. & Mlng Co.)	17S	31E	No. Cen. 5	Cu, Pb, Ag, Au	Copper and lead carbonates and sulfides in spotty, pyrometasomatic deposits in Mississippian to Permian limestones along an intrusive porphyry contact.	Tunnel and shaft workings. A total of some 85 tons of ore produced during 1916, 1942 and 1948.	Copper Handbook, 1912-1913 ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
21. Pine-Zinc mine (Pursley)	17S	30E	NW ¼ 17	Pb, Zn, Cu-, Ag-	Oxidized lead-zinc mineralization, probably along fracture zone cutting Cretaceous beds.	Shallow workings. About 365 tons of ore produced during 1947 to 1949.	ABM file data
22. Rabbit claim group (Dunn Springs; Providence Copper Co.)	15S	30E	Cen. 14	Cu-, Ag-	Spotty and weak oxidized copper mineralization in Permian limestone and Cretaceous quartzite cut by rhyolite dikes.	Trench, pit and shaft workings. Some minor production in the late 1800's and early 1900's.	Copper Handbook, 1912-1913 ABM file data
23. Savage mine (Portal; Savage Gold and Copper Co.)	17S	31E	NW ¼ 26	Cu, Pb, Ag, Au-	Small, irregular replacement orebodies of base metal carbonates and minor sulfides in faulted and tilted Pennsylvanian-Permian Naco Group limestone.	Shallow workings. Some 100 tons of ore produced during 1907 to 1908 and a small amount in 1949.	Copper Handbook, 1907, 1908 ABM file data
24. Scanlon mine	16S	31E	SE ¼ 32	Pb, Cu, Zn, Ag	Small orebodies of base metal oxides, carbonates, and sulfides along mineralized stringers in Paleozoic limestone and Cambrian Bolsa Quartzite, cut by intrusive porphyry dikes.	Tunnel workings. A small tonnage produced in the late 1890's.	Copper Handbook, 1908 AEC Prelim. Rec. Rpt. A-P-51, 1953
25. Silver Hill mine group (Black Ben, Manila, Hall mine group, Ananias; Scott & Crawford, New Vail Mng. Co.)	17S	30E Protracted	NE ¼ 24	Cu, Pb, Ag, Au, W-	Base metal carbonates and sulfides with irregular scheelite in pyrometamorphosed tactite zones in sheared, faulted, and silicated Permian limestone.	Shaft and adit workings. A total of about 180 tons of base metal ore and minor amounts of tungsten ore produced intermittently from 1890's to 1952.	USGS Min. Res. of U.S., 1910 Dale et alia, 1960, p. 6-10 ABM file data
26. Silver Prince mine (Robertson, Pursley)	17S	30E	No. Cen. 8	Pb, Cu, Ag-	Spotty base metal mineralization along a fracture zone in Cretaceous beds.	Tunnel workings. A few tons of ore produced in 1949.	ABM file data
27. Sullivan mine group (Crosby group, Blue Bell, Copperopolis; Duluth & Chiricahua Development Co., Sullivan Copper Development.)	16S 17S	30E 30E	33, 34 2	Cu, Pb, Zn, Ag, Au	Base metal carbonates and sulfides in irregular replacement orebodies in silicated Paleozoic limestones and along shear zones in limestone and irregular rhyolite intrusive.	Open cuts, tunnels, and shafts. About 10 tons produced in 1915 and some 2160 tons of ore between 1943 and 1945.	Copper Handbook, 1908 USGS Min. Res. of U.S., 1915 Mines Handbook, 1916 USBM Min. Yearbook, 1943-1945 Kumke, 1947 ABM file data
28. Sunset mine group (Thompson, Black Prince; Doran; Whitetail Copper Co., Phelps Dodge Corp., Sunset Mng. Co., Four X Mng. Co.)	16S	31E	32 33	Pb, Zn, Ag, Cu-, Au-	Base metal carbonates and sulfides in irregular orebodies along a shear zone in faulted and silicated Pennsylvanian-Permian Naco Group limestone.	Shaft and tunnel workings. A total of over 1000 tons of ore produced intermittently during 1915 to 1916, 1927 to 1930, and 1940 and 1951.	Copper Handbook, 1910-1911 ABM file data
29. Texas mine group (Kentucky Belle, Boston Belle; Texas Consolidated Mng. & Smltng. Co.)	17S	31E Protracted	Cen. 13	Cu, Pb, Ag, W	Base metal carbonates and sulfides with spotty scheelite in fault zones in tactite bands in pyrometamorphosed Pennsylvanian-Permian Naco Group limestone along a intrusive porphyry contact.	Open cut, adit, and shaft workings. Some 50 or more tons of ore produced in the 1880's and one small lot mined in 1937.	Dale et alia, 1960, p. 14, 15 ABM file data

30.	Willie Rose mine (Willie Rose Copper Mng. Co.)	15S	30E	W ½ 26	Cu, Ag, Au-	Spotty, high-grade chalcocite and other copper sulfides in a contact zone between Permian limestone and intrusive rhyolite.	Shaft workings. A total of about 150 tons of ore produced intermittently between 1913 and 1953.	USGS Min. Res. of U. S., 1913 1914, 1923 Mines Handbook, 1926 USBM Min. Yearbook, 1953 ABM file data
II.	Cochise District (Johnson Camp, Little Dragoon Mts, Gunnison Hills) (See Fig. 3.)	15-16S	22-23E	-----	Cu, Zn, W, Pb-, Ag-, Au-, (Be, F)	1. Copper and zinc mineralization in pyrometasomatic, tabular masses and irregular chimneys replacing Paleozoic limestone formations along or near fissure zones. 2. Huebnerite with minor scheelite and fluorite in quartz veins or lodes in granitic intrusives. 3. Small, oxidized lead-silver replacement bodies along beds and in fracture zones in Paleozoic limestone. 4. Tungsten placer deposits. 5. Gold and silver values in oxidized zone of faults and fractures.	Numerous small to large mines and prospects. Over 1.6 million tons of ore produced, mainly of copper and zinc, since the 1880's.	Blake, 1899 Kellogg, 1906 Scott, 1916 Hess & Larsen, 1921, p. 260 Heineman, 1927 Tenny, 1927-1929, p. 217, 221-223 Enlows, 1939 Wilson, 1941, p. 41-45 Romslo, 1949 Cooper, 1950, 1959 Cooper & Huff, 1951 Baker, 1953, 1954 Gilluly, Cooper & Williams, 1954 Cooper & Silver, 1964
1.	Banks mine	16S	22E	So. Cen. 1	W, F, Cu-, Pb-, Zn-	Huebnerite, scheelite, fluorite, and minor base metal sulfides in a large sinuous quartz vein in altered Laramide quartz monzonite.	Surface workings. A small tonnage of tungsten ore produced during 1914-1917.	Cooper & Silver, 1964 p. 186
2.	Black Prince mine (Copper Bell, Copper Queen, Blue Bell group; Black Prince Copper Co., Coronado Copper & Zinc Co.)	15S	22E	Cen. 23	Cu, Zn, Ag (Be)	Copper and zinc carbonates and sulfides with pyrite in mantos and pockety orebodies in weakly pyrometamorphosed Pennsylvanian-Horquilla Limestone containing tactite zones.	Underground and surface workings. Produced a total of some 1400 tons of ore intermittently from 1902 to 1918.	Copper Handbook, 1903 Mines Handbook, 1924 Warner et alia, 1959, p. 97, 99, 101 Cooper & Silver, 1964, p. 170-171 ABM file data
3.	Bluebird mine (Primos group; Primos Chemical Co.)	16S	22E	SW ¼ 3	W, Cu-, (Bi, Be)	Huebnerite with minor scheelite, pyrite, and chalcopyrite in irregular quartz veins in fractured and altered Laramide quartz monzonite.	Pit, trench, and tunnel workings. A total of several hundred tons of tungsten concentrates produced from 1900 to 1917 and minor sporadic production later.	Wilson, 1941, p. 42 Warner et alia, 1959, p. 97, 99 Dale et alia, 1960, p. 46-47 Cooper, 1962 Cooper & Silver, 1964, p. 183-184 ABM file data
4.	Boulder claim group (Old Hawk, Hillside; Boulder Tungsten Mng. Co.)	16S	22E	SW ¼ 10	W	Huebnerite with minor scheelite and pyrite in narrow discontinuous quartz veins in altered Laramide quartz monzonite. Some associated tungsten placers.	Surface workings. Sporadic total production of some 30 tons of tungsten concentrates in early 1900's and from 1933 to 1954	Cooper & Silver, 1964, p. 186 ABM file data
5.	Burrel claim group	16S	22E	NW ¼ 25	Cu, Pb-, Zn-, Ag-, W-	Bornite and chalcopyrite with spotty galena, sphalerite, and scheelite in a small quartz-calcite vein cutting partly silicified Pennsylvanian Horquilla Limestone. Cuprotungsite noted.	Pit and shaft workings. Produced a small tonnage of copper-silver ore and some tungsten concentrates around 1917-1918.	Wilson, 1941, p. 41 Dale et alia, 1960, p. 50 Cooper & Silver, 1964, p. 176 188 ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
6. Burro pit (Strong & Harris, Moseley & Sons)	15S	22E	SE ¼ 26 NE ¼ 35	Silica Flux, Cu-, Ag-	Fractured Cambrian Bolsa Quartzite containing weak disseminated copper mineralization.	Open pit workings. Some three hundred thousand tons produced from 1960 to 1970. Active in 1972.	ABM file data
7. Centurion area small mines (Mt. Allen, Higgins Estate)	16S	22E	12, 13	W, F, Cu-, Ag-	Spotty scheelite with some huebnerite, fluorite, and copper oxides in quartz veins, limestone inclusions, and contact breccia in altered Laramide quartz monzonite.	Surface workings. A small amount of tungsten ore produced in the early 1900's and about 8 tons of copper-silver ore in 1949.	Cooper & Silver, 1964, p. 187 ABM file data
8. Centurion mine (Lady Rose and Alaskite groups; Centurion-Arizona Mng. Co., Captain Mng. Co.)	16S	22E	SE ¼ 12	Cu, Au-, Ag-	Local replacement bodies of malachite and chrysocolla in brecciated marble with fault gouge, quartz, chalcedony, calcite and some lime silicates, along a strong fault zone between Mississippian Escabrosa Limestone and Precambrian schist, near intrusive Laramide quartz monzonite.	Shaft workings. A total of more than 1400 tons of ore produced intermittently from 1911 to 1944	Mines Handbook, 1924 Cooper & Silver, 1964, p. 176-177 ABM file data
9. Chicora mine (Strong & Harris, Coronado Copper & Zinc Co.)	15S	22E	SW ¼ 25 SE ¼ 26	Smelter Flux, Cu, Ag	Flat-bedded, replacement orebody of argentiferous copper mineralization in Cambrian Abrigo Limestone and quartzite.	Open pit and shaft workings. A few hundred tons of copper ore produced prior to 1900 and some 14,880 tons of smelter flux shipped in 1959-1960.	Cooper & Silver, 1964, p. 149, 173 ABM file data
10. Copper Chief mine (Arizona & Michigan Development Co., Dragoon Mountain Copper Co., Arizona United Development Co., Mining & Development Corp. of America, Coronado Copper & Zinc Co.)	15S	22E	No. Cen. 26	Cu, Zn, Ag, Au-	Argentiferous copper and zinc oxides, carbonates, and sulfides in tabular, bedded, pyrometasomatic replacement deposits in faulted and silicated Cambrian Abrigo Limestone.	Shaft workings. Over 24,000 tons of ore produced between 1910 and 1919.	Mines Handbook, 1925 Cooper & Silver, 1964, p. 168-169 ABM file data
11. Copper King mine (Arizona United Mng. Co., Cobriza Mines Development Co., Coronado Copper & Zinc Co.)	15S	22E	E. Cen. 26	Cu, Zn, Ag	Lense of copper-zinc carbonate ore in Mississippian Escabrosa Limestone in a small fault zone.	Open pit and adit workings. About 50 tons of ore produced in 1905.	USGS Min. Res. of U.S., 1905 Mines Handbook, 1925 Cooper & Silver, 1964, p. 173 ABM file data
12. Dividend Tunnel (Primos group; Primos Chemical Co.)	16S	22E	NE ¼ 3	W, Cu-	Spotty huebnerite with minor scheelite and copper minerals in bunches in small quartz veins cutting altered Laramide quartz monzonite.	Tunnel and open cut workings. Some 100 tons of tungsten concentrates were produced in the early 1900's	Cooper & Silver, 1964, p. 184-185 ABM file data
13. Donna Anna workings (Coronado Copper & Zinc Co.)	15S	22E	SW ¼ 26 SE ¼ 27	W, Cu-, Pb-, Ag-, Mn-, Mo-	Spotty huebnerite with minor scheelite, powellite, pyrite, galena and chalcopyrite in course quartz and iron and manganese oxides along irregular fissure veins in Precambrian Pinal Schist	Open cuts and shallow underground workings. Small production of tungsten ore, largely from placer operation prior to 1919.	Cooper & Silver, 1964, p. 187-188 ABM file data

14.	Empire No. 1 mine (Empire Gold & Copper Mng. Co.)	15S	22E	Cen. 27	Cu-	Weak copper staining on joints and shears in Cambrian Abrigo Formation limestone and quartzite and in Precambrian Pinal Schist.	Extensive shaft and adit workings but little or no ore production.	Copper Handbook, 1912-1913 Cooper & Silver, 1964, p. 176 ABM file data
15.	Empire No. 2 mine (Empire Gold & Copper Mng. Co.)	16S	22E	NE ¼ 25	Cu, Pb, Ag, W	Bornite, chalcopyrite, spotty galena, and some scheelite in small quartz veins cutting partly silicified Pennsylvanian Horquilla Limestone.	Shaft and open cut workings. A total of about 65 tons of base metal ore produced in 1909-1913 and 1946-1947.	Mines Handbook, 1922 Cooper & Silver, 1964, p. 176 ABM file data
16.	Homestake claim group	16S	22E	W 5	W, Cu-, Au-, F-	Disseminated scheelite with minor copper, gold and fluorite mineralization associated with quartz fissure veins cutting amphibolite unit of Precambrian Pinal Schist.	Mostly surface workings. Little or no production noted.	Wilson, 1941, p. 44 Cooper & Silver, 1964, p. 188
17.	Johnson mine (Climax Shaft; Johnson Copper Development Co., Coronado Copper & Zinc Co.)	15S	22E	SE ¼ 23	Cu, Ag (Be)	Copper carbonates with some bornite in pyrometasomatic replacement deposits and in tactite in Cambrian Abrigo, Mississippian Escabrosa, and Pennsylvanian Horquilla limestones.	Shaft workings. A total of 207 tons of ore produced intermittently from 1901 to 1930.	Scott, 1916b Cooper & Silver, 1964, p. 172 ABM file data
18.	Keystone mine (Hagerman, Bannon group; Black Prince Copper Co., Keystone Copper Mng. Co., Aztec Mng. & Development Co., Coronado Copper & Zinc Co.)	15S	22E	No. Cen. 36	Cu, Zn, Ag, Mo-, Au-	Copper, zinc, and spotty molybdenite mineralization in pyrometasomatic orebodies in Devonian Martin and Mississippian Escabrosa limestones. Strong garnetization. Spotty molybdenite in Cambrian Abrigo Limestone.	Shaft workings. A total of about 2,250 tons of ore produced intermittently from 1917 to 1958.	Mines Handbook, 1925 Romslo, 1949 Cooper & Silver, 1964, p. 173-174 ABM file data
19.	Legal Tender prospect	16S	23E	NE ¼ 6	Cu	Seams and pockets of chrysocolla in a band of tactite in recrystallized Pennsylvanian-Permian Naco Group limestones.	Shaft and surface workings. Diamond drilling. Little or no production.	Cooper & Silver, 1964, p. 177-179
20.	Lime Mountain workings (Lime Mountain Copper Co.)	15S	22E	So. Cen. 22	Cu-	Relatively weak oxidized copper mineralization in shears and in a silicified fault zone in unmetamorphosed Devonian Martin and Cambrian Abrigo limestones.	Adit workings. Little or no production	Cooper & Silver, 1964, p. 176
21.	Little Dragoon Mountains placers	16S	22E	---	W	Scattered huebnerite found in erosion rubble derived from quartz veins cutting altered Laramide quartz monzonite.	Hand picking and small wet and dry separators. Several tons of tungsten concentrates produced in the early 1900's.	Wilson, 1941, p. 45 Dale et alia, 1960, p. 53
22.	Little Fanny mine group (Extension, Last Chance, Alvera; Dragoon Mng. Corp.)	16S	22E	Cen. 9	W, F-, Pb-	Huebnerite with minor scheelite, fluorite, pyrite, and galena in quartz veins cutting sheared and altered Laramide quartz monzonite.	Pit, open cut, and adit workings. A total of at least 32 tons of tungsten concentrates produced during 1914-1918, 1934-1939, 1941-1945, and in 1948.	Wilson, 1941, p. 42 Dale et alia, 1960, p. 48 Cooper & Silver, 1964, p. 185-186 ABM file data
23.	MacKay mine group (Magazine, Peoples Party; Magazine Copper Co., Coronado Copper & Zinc Co.)	15S	22E	SE ¼ 23 SW ¼ 24	Cu, Ag	Local concentrations of copper sulfides and oxidized, argentiferous copper mineralization in silicated beds of Pennsylvanian Horquilla Limestone.	Shaft and surface workings. A total of some 600 tons of ore produced in 1900-1901 and 1906-1907.	Cooper & Silver, 1964, p. 171-172 ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
24. Mammoth mine (Black Prince Copper Co., Arizona Consolidated Mng. Co., Arizona United Mng. Cp., Cobriza Mines Development Co., Mason Copper Co., United Development Co., Cornado Copper & Zinc Co.)	15S	22E	SW ¼ 23	Cu, Zn, Ag, Pb-, Mo-, (Bi, Be)	Argentiferous copper carbonates and copper and zinc sulfides with pyrite in pyrometasomatic chimney and manto deposits in faulted and fractured Cambrian Abrigo and Devonian Martin limestone beds.	Quite extensive shaft workings. Close to a total of 200,000 tons of ore produced intermittently since 1880's. Connected with Moore Shaft workings.	Cooper, 1950, p. 30-36 Baker, 1953, p. 1272-1273 Warner et alia, 1959, p. 97, 99, 101 Cooper, 1962 Cooper & Silver, 1964, p. 168 ABM file data
25. Mayflower mine (Mayflower Mng. Co., Coronado Copper & Zinc Co.)	15S	22E	W. Cen. 25 E. Cen. 26	Cu, Ag-	Copper carbonates in bedded, replacement deposits in tilted Cambrian Abrigo Limestone.	Shaft workings. About 250 tons of ore shipped in 1907.	USGS Min. Res. of U.S., 1907 Cooper & Silver, p. 137, 173 ABM file data
26. Moore mine (shaft) (Coronado Copper & Zinc Co., Strong & Harris, McFarland & Hullinger, Stauffer Mng. Co.)	15S	22E	SW ¼ 23	Cu, Zn, Ag, Au-, W-, Mo-, (Bi)	Copper carbonates, chalcopyrite, sphalerite, pyrite, bornite, magnetite, minor scheelite, and molybdenite, with lime silicates, feldspar, chlorite, and quartz gangue in pyrometasomatic replacement mantos and chimneys controlled by faults, fissures and folds in Cambrian Abrigo and Devonian Martin limestone beds.	Extensive shaft workings. A total of more than 500,000 tons of ore produced from 1951 through 1969.	Cooper, 1950, p. 30-39 Baker, 1953, p. 1272-1277 Cooper, 1962 Cooper & Silver, 1964, p. 163-165 ABM file data
27. Northern Gunnison Hills mines and prospects	15S	23E	17, 20, 28, 29	Cu, Pb, Ag	Argentiferous copper and lead sulfides and oxidation products in narrow, quartz fissure veins cutting silicified Paleozoic limestone and Cretaceous formations.	Pit and shaft workings. A total of about 100 tons of hand-sorted ore produced intermittently since 1910.	Cooper & Silver, 1964, p. 183 ABM file data
28. OK mine (Keystone Mng. Co., Keystone Copper Mng. Co., Coronado Copper & Zinc Co.)	15S	22E	SW ¼ 25	Cu, Zn, Ag	Oxidized copper and iron mineralization in seams and pockets in Lower Paleozoic Abrigo Quartzite and in a quartz vein with chalcopyrite, sphalerite, pyrite, and oxidized products.	Shaft workings. Some 100 tons of ore produced prior to 1920.	Romslo, 1949 Cooper & Silver, 1964, p. 174
29. Peabody mine (Russell Gold and Silver Mng. Co., Dragoon Mng. Co., Bonanza Belt Copper Co., Peabody Consolidated Copper Co., Coronado Copper & Zinc Co.)	15S	22E	E. Cen. 23	Cu, Zn, Ag, Pb	Base metal carbonates and minor sulfides in tabular pyrometasomatic mantos along bedding in fissured Pennsylvanian Horquilla Limestone.	Pit, open cut, and shaft workings. A total of some 43,000 tons of ore produced intermittently from 1882 to 1931.	Scott, 1916b Cooper, 1950, p. 30-36 Cooper & Silver, 1964, p. 169-170 ABM file data
30. Peacock mine (Peacock Copper Mng. Co.)	15S	22E	Cen. 25	Cu, Ag, Au-	Copper carbonates in narrow replacement deposits in Pennsylvanian Horquilla Limestone cut by small porphyry dikes.	Shaft and tunnel workings. A total of some 60-70 tons of ore shipped in 1908, 1912 and 1942.	Copper Handbook, 1912-1913 ABM file data

31.	Pittsburg Shaft (Cochise Development Co.)	15S	22E	W. Cen. 24	Cu-	Traces of copper carbonates disseminated in bleached Pennsylvanian Horquilla Limestone and associated hornfels.	Deep shaft. No production recorded.	Cooper & Silver, 1964, p. 176
32.	Princes and Cowboy workings. (Empire No. 2 Shaft, Old Bridge Shaft; Empire Gold & Copper Mng. Co.)	16S	22E	NW ¼ 25	Cu, Ag, W, Pb-, Au-	Copper carbonates, bornite, chalcopyrite, scheelite, and local galena in replacement bodies in partly silicified Pennsylvanian Horquilla Limestone cut by small quartz veins.	Shafts and surface workings. A total of some 185 tons of base metal ore produced intermittently from 1913 to 1954 and a few hundred tons of tungsten concentrates in the early 1900's.	Copper Handbook, 1912-1913 Cooper & Silver, 1964, p. 176 ABM file data
33.	Red Bird mine (Gold Coin)	15S	23E	So. Cen. 11 No. Cen. 14	Au, Ag	Relatively weak gold and silver mineralization in fault breccia cutting Cretaceous Bisbee Formation.	Shaft workings. Some 75 tons of ore produced during 1930 to 1932.	ABM file data
34.	Republic mine (Black Prince Copper Co., Arizona Consolidated Mng. Co., Arizona United Mng. Co., Arizona United Development Co., Coronado Copper & Zinc Co.)	15S	22E	E. Cen. 26	Cu, Zn, Ag, Pb-, Au-, (Bi, Be)	Pyrite, chalcopyrite, sphalerite, local bornite, and minor galena in pyrometasomatic mantos and chimneys in garnetized, silicated and marmolized, faulted and fissured, Cambrian Abrigo Limestone.	Extensive shaft workings. A total of at least 600,000 tons of ore produced from early 1880's to recent times.	Cooper, 1950, p. 30-39 Baker, 1953, p. 1272-1277 Warner et alia, 1959, p. 97 99, 101 Cooper, 1962 Cooper & Silver, 1964, p. 165-168 ABM file data
35.	St. George mine (Leopold)	15S	22E	NW ¼ 36	Cu, Zn, W-, Mo-	Copper and zinc carbonates; disseminated chalcopyrite, sphalerite, and bornite; and sparse scheelite and molybdenite in pyrometasomatic bands and streaks in Cambrian Abrigo Limestone	Surface and shaft workings. A few hundred tons produced from the late 1880's to early 1900's.	Romslo, 1949 Cooper & Silver, 1964, p. 174-175
36.	Southern mine (Black Prince Copper Co., Arizona Consolidated Mng. Co., Arizona United Mng. Co., Arizona United Development Co., Coronado Copper & Zinc Co.)	15S	22E	SW ¼ 25	Cu, Ag	Relatively small copper carbonate mantos in Cambrian Abrigo Limestone.	Shaft and open cut workings. A few hundred tons of ore produced prior to 1900.	Cooper & Silver, 1964, p. 173 ABM file data
37.	Standard prospect	16S	23E	SW ¼ 6	Zn-, Cu-, W-, (Be)	Sparsely disseminated sphalerite, chalcopyrite, bornite, chalcocite, and powellite in pyrometasomatic mantos in Cambrian Abrigo Limestone.	Shaft workings and diamond drill holes. No production recorded.	Warner et alia, 1959, p. 98 Cooper & Silver, 1964, p. 171-181
38.	Stroud Bros. mine (Arizona Cleveland Mng. Co.)	16S	23E	No. Cen. 9	Pb, Ag, Cu	Oxidized lead and copper sulfides along shear zones in Paleozoic limestone.	Pit and adit workings. A few tons of picked, high-grade ore produced in 1911.	Cooper & Silver, 1964, p. 183
39.	Texas Arizona mine (Texas Arizona Mng. Co.)	16S	23E	NW ¼ 4	Pb, Ag, Cu, Zn, Au	Cerrusite, anglesite; minor galena malachite, and oxidized iron and zinc sulfides in tabular pyrometasomatic replacement bodies, streaks, bunches, and lenses in faulted Paleozoic limestones.	Shaft workings. A total of over 700 tons of lead-silver ore produced intermittently from 1910 to 1928.	Cooper & Silver, 1964, p. 181-183 ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
40. Tungsten King mine (Black Rock group; Gold, Silver, and Tungsten, Inc., Kramer Mng. & Mlng Co., Standard Tungsten Corp.)	16S	22E	NW ¼ 6	W, Cu-, Pb-, Mo-, (Bi, Be)	Pockets of calcite containing disseminated scheelite, pyrite, and galena with exsolved tetradymite, beryl, chalcopyrite, iron oxides, jarosite and wulfenite in a fault zone between Precambrian Pinal Schist and granite.	Pit, adit, and shaft workings. About 12 tons of tungsten concentrates produced intermittently from 1913 to 1954.	Wilson, 1941, p. 43-44 Warner et alia, 1959, p. 98-100 Dale et alia, 1960, p. 43-45 Cooper & Silver, 1964, p. 188-189 Meeves, 1966, p. 56 ABM file data
41. Yankee Pride mine (Primos Chemical Co.)	16S	22E	SE ¼ 3	W	Huebnerite and minor scheelite in a quartz vein system in altered Laramide quartz-monzonite.	Adit and open cut workings. Several tons of tungsten concentrates produced in the early 1900's.	Cooper & Silver, 1964, p. 185 ABM file data
III Dos Cabezas District (South slope Dos Cabezas Mountains) (See Fig. 4.)	13-15S	26-28E	----	Cu, Au, Pb, Zn, Ag, W- (Mn, Be, Fe, U)	1. Erratic gold with minor silver values and spotty oxidized base metal sulfides in irreg-quartz-filled veins along fault fissures paralleling and crosscutting metamorphosed Paleozoic and Mesozoic sediments underlain by Precambrian granitic intrusive; all cut by rhyolite, diabase and basaltic dikes. 2. Massive and disseminated magnetite, pyrite, and chalcopyrite in irregular contact metamorphic orebodies in erratic fault blocks of metamorphosed Paleozoic and Mesozoic sedimentary rocks. 3. Spotty scheelite in quartz-filled fissure veins and disseminated in pyrometasomatic deposits. 4. Gold placers in thin, clayey gravels at mouths of canyons.	Numerous mines and prospects, mostly relatively small. Close to 100,000 tons of ore, mostly of copper and gold, produced since early 1880's. Small placer operations produced large but unrecorded amounts of gold up through the early 1930's.	Coll, 1910 Tenny, 1927-29, p. 224-227 Wilson et alia, 1934 (1967), p. 117-121 Cooper, 1960 ABM file data
1. Arizona Klondyde mine (Arizona and Klondyke groups; Denmark; Bean, Hyde.)	14S	27E	SE ¼ 22	Au, Ag-, (Mn)	Spotty gold and minor silver values associated with irregular quartz veins along fault fissures cutting Cretaceous schistose rocks and with minor manganese oxide in limy beds.	Shaft and surface workings. A few hundred tons of ore produced from 1884 to 1933.	Farnham et alia, 1961, p. 41 ABM file data
2. Cottonwood mine (Cottonwood Mng Co., Western Mng. Co.)	15S	28E	SE ¼ 6	Au, Ag-, Pb-	Spotty gold and galena in quartz-filled fissure veins in Precambrian granitic rock.	Shaft workings. Some 500 or more tons of gold ore produced from 1880's to 1934.	ABM file data

3.	Dives mine (Bear Cave, Porter, Emma, Nettie, Nobbey; Consolidated Gold Mines, Inc.; Dives Mng. Co., Twin Peak Mng. Co., Santa Maria Mng. Co.)	14S	27E	SW¼ 21	Au, Pb, Zn-, Cu-, Ag-	Scattered bunches and disseminations of auriferous pyrite and minor base metal sulfides in a strong, coarsely-textured quartz vein along a fault fissure zone separating a wide band of metamorphosed, graphitic Cretaceous shale from Precambrian granitic rock.	Shaft and tunnel workings. Some 10,000 tons of gold ore produced sporadically from 1882 to 1931.	Wilson et alia, 1934 (1967), p. 118-119 Shields, 1940 ABM file data
4.	Dos Cabezas Queen mine (Dives Mng. Co.)	14S	27E	NE¼ 19 SW¼ 18	Au, Pb-, Zn-. Cu-, Ag-	Scattered pyritic gold ore with sparse base metal sulfides in quartz-calcite filling of a fault fissure zone in slightly graphitic Cretaceous shale.	Adit workings. A small tonage produced in early 1900's.	ABM file data
5.	Elma mine (A part of Central Copper Co. group; Tout, Arivaca (Aztec) Mng. Co.	14S	27E	Cen. 9	Cu, Au, Ag, (Mo)	Irregular, frequently massive, magnetite, chalcopyrite, and pyrite in a pyrometasomatic pipe-like body along a strong shear and fault zone cutting brecciated and metamorphosed Paleozoic limestone and Laramide rhyolite and granitic intrusive rock.	Shaft workings. At least 8000 tons of ore produced intermittently from the late 1910's to the late 1960's.	Mines Handbook, 1925, 1926 Tenny, 1927-1929, p. 226-227 Ariz. Dept. Min. Resources file data ABM file data
6.	Ewell Spring mine	14S	27E	So. Cen. 21	Au, Ag, Pb-, Zn-, Cu-	Auriferous pyrite and minor base metal sulfides in a quartz vein in a fault fissure cutting graphitic Cretaceous slate.	Surface workings. Some 600-1000 tons reportedly produced in 1880's.	ABM file data
7.	First Chance mine (Globe Mng. & Smltng Co., Equities, Inc., Bean)	14S	27E	NW¼ 26	Au, Pb, Ag	Pyritic gold-quartz vein with minor lead in a fault fissure zone cutting pyrometamorphosed Cretaceous limy shale.	Shallow pit and open cut workings. Several hundred tons of ore produced in the 1880's and a few tons in 1936-1937.	USAEC Prelim. Rec. Rpt. A-P-50, 1953 ABM file data
8.	Gold Prince mine (Henry Clay, Pat Price, Murphy, Basin; Dos Cabezas Gold Mng. Co., R. E. D. Mng. Co., Gold Prince Mng. Co., Out West Mng. Co., Bean.)	14S	27E	No. Cen. 27 So. Cen. 22	Au, Pb, Ag, Cu-, Zn-	Lenticular bodies of pyritic quartz containing irregular bunches of auriferous base metal sulfides in a strong zone of sheared and pyrometamorphosed Cretaceous sandstone and graphitic shale along a major fault. Associated rhyolite, andesite, and diabase dikes.	Extensive shaft and tunnel workings. The major gold producer of the district with some 10,000 tons produced sporadically from early 1880's to 1950.	Mines Handbook, 1922-1926 Wilson et alia, 1934 (1967), p. 119-120 USAEC Prelim. Rec. Rpt. A-P-48, 1953 ABM file data
9.	Gold Ridge mine (Casey, Juniper, Huntsman; Dos Cabezas Gold Ridge Mng. Co., Chicago & Arizona Copper Co.)	14S	27E	SE¼ 21 SW¼ 20	Au, Pb, Ag, Cu	Scattered bunches and disseminations of auriferous galena, pyrite, and chalcopyrite in bands of coarse-textured quartz along a major fault and parallel shears separating blocks of Cretaceous graphitic shale and pyrometamorphosed Paleozoic limestone from Precambrian granitic rocks.	Numerous shaft and adit workings. Some 1000 or more tons of ore produced intermittently in 1880's and 1890's and from 1915 to 1936.	Mines Handbook, 1926 Wilson et alia, 1934 (1967), p. 119 Shields, 1940 ABM file data
10.	Honey Dew mine group (Silver Cave, Silver Cave South, Silver Dike, Gold Spot, Gold Nugget, Silver Peak, New Era, White Oaks; Robinson & Hately groups)	14S	27E	Cen. 20	Au, Pb, Ag, Cu	Lensing quartz veins and veinlets with minor streaks and disseminations of base metal sulfides along a fault fissure zone cutting Cretaceous metamorphosed shale.	Numerous shallow shafts and tunnels. A few hundred tons of ore produced in late 1880's and about 300 tons intermittently in 1916, 1932-35 and 1941.	ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
11. Howard mine group (Adriatic, Double Springs, Atlantic, Pacific)	14S	27E	SW ¼ 23	Au, Pb-, Ag-, Cu- (Mn)	Lensing quartz stringers with minor base metal sulfides associated with shear zones along a rhyolite-slate contact.	Shallow workings. A few hundred tons of ore produced in the late 1880's and some 20 tons in 1932.	ABM file data
12. LeRoy mine group (Black Hawk, Climax, Comet, Oneida, Gold Queen, Standard, Jack Dempsey, Lost Hope, War Eagle; LeRoy Consolidated Mines Co., Arelead Mng. Co., VMP Leasing Co., Bean)	14S	27E	SW ¼ 27 NE ¼ 33 NW ¼ 34	Pb, Zn, Ag, Cu-, Au-	Scattered bunches and disseminations of pyrite, galena, sphalerite and minor chalcopyrite in irregular, coarsely-textured, crosscutting quartz veins along fault and shears cutting Precambrian granitic rocks. Accompanied by intrusive diabase dikes.	Shaft workings. A few thousand tons of ore produced in 1880's and some 4,000 tons intermittently in 1900's up to 1950.	Mines Handbook, 1926 Wilson et alia, 1934 (1967), p. 120-121 USAEC Prelim. Rec. Rpt. A-P-49, 1953 Ariz. Dept. Min. Resources file data ABM file data
13. Mascot mine group (Central Copper, Mascot, Consolidated tunnel, Mascot No. 1 tunnel, Bachelder group, Iron Tower; Dos Cabezos Consolidated Mines, Consolidated Copper Co., Mascot Copper Co., Southwest Metals Co., Tout, Arivaca (Aztec) Mng. Co.)	14S	27E	W & So. ½ 16 SW ¼ 15 No. ½ 21	Cu, Ag, Pb-, Au-, Fe+, (Bi)	Magnetite, pyrite, chalcopyrite, bornite, and spotty galena associated with epitote, chlorite, garnet, and talc in irregular veins, massive bunches, and disseminations in badly fractured and faulted blocks of pyrometamorphosed Paleozoic limestone and Cretaceous shales and volcanics along or close to Laramide granitic intrusives and associated with dikes ranging from rhyolites to basalts.	Extensive workings from long tunnels and shafts. Some 60,000 tons of ore produced intermittently from the early 1910's to the mid-1950's.	Mines Handbook, 1912 to 1926 Harrer, 1964, p. 22 Ariz. Dept. Min. Resources file data ABM file data
14. Mineral Park mines (Gold Slope, Maria; Gold Slope Mng. Co., Park Mng. and Mlng. Co., Maria Copper Co., Mineral Park Gold Mng. Co.)	14S	27E	NE ¼ 7	Au, Cu, Ag	Irregular quartz veins containing spotty free gold, copper oxides, pyrite and chalcopyrite in epidotized and chloritized Laramide volcics intruded by a Laramide granitic plug.	Numerous small workings from tunnels and shafts. Worked during late 1880's mainly and a few hundred tons of ore produced intermittently from 1915 to 1935.	Tenny, 1927-1929, p. 224 Mines Handbook, 1931 AEC Prelim Rec. Rpt. A-P-74, 1953 ABM file data
15. Philadelphia mine	14S	27E	SE ¼ 21	Au, Pb, Ag, Cu	Irregular quartz vein with bunches and disseminations of base metal sulfides in a crosscutting fault in Precambrian granite. Associated with a diabase dike.	Small tunnel workings. Considerable gold ore produced in the 1880's and about 50 tons in 1935.	Shields, 1940 ABM file data
16. Silver Camp mine (McGinty, Golden Belle, Eldorado, Parent, Question; Parent Mng. Co.)	14S	27E	NW ¼ 12	Cu, Ag, Au	Spotty copper oxides, chalcocite, and chalcopyrite with magnetite and garnet in a fault block of pyrometamorphosed Paleozoic limestones cut by diabase dikes and with silver mineralization and some gold in a quartz-pyrite vein along a fault fissure and at diabase and rhyolite dike intersections. Major country rock is Laramide volcanics and intrusive granitic rock.	A few thousand feet of work from tunnels and shafts. First claims in the district and over 500 tons of ore produced in late 1880's. A few tens of tons shipped in the 1930's.	Mines Handbook, 1926 ABM file data

	17. Speaks mine	13S	26E	So. ½ 29 No. ½ 32	Pb, Ag, Cu-, Ag-	Spotty base metal oxides, carbonates, and sulfides in irregular quartz veins cutting Precambrian schist.	Shallow workings. Some 50 tons of ore produced in 1933-1934.	ABM file data
IV	Douglas District (Ash Springs District, Southeastern Cochise County) (See Fig. 1.)	23-24S	28-30E	---	Gypsite, cinders, Cu-, Pb-, Au-, Ag-	1. Gypsite with minor gypsum in relatively thin beds in Tertiary lake bed sediments. 2. Basaltic cinders in Quaternary volcanic cones. 3. Very weak and spotty, largely oxidized base metal sulfide mineralization in Cretaceous Bisbee Group sedimentary and Tertiary volcanic rocks invaded by Tertiary dikes and plugs in T24S, R29E, Section 9, 15, 16, & 17. (Elsworth, Grand Arizona Mng. Co.)	Relatively shallow workings, open pits, quarry, and shafts. Only gypsite and cinders have been produced commercially.	Cooper 1959 ABM file data
	1. Gypsite quarries (Arizona Gypsum Plaster Co., Douglas Gypsum Block Co.)	24S	28E	2, 11-15	Gypsite and gypsum for plaster and blocks.	Relatively thin horizontal lenses of gypsite and minor gypsum in Tertiary-Cenezoic clay and shale beds.	Surface workings. A few ten thousand tons of gypsite produced from 1908 to 1932.	Stone, 1920, p. 49-51 Wilson & Roseveare, 1949, p. 24 Coates & Cushman, 1955 Keith, 1969b, p. 373-376 ABM file data
	2. Cinder Hill quarry (San Xavier Rock & Sand Co.)	23S	30E	So. Cen. 8	Cinders for cement blocks.	Volcanic cone of Quaternary basalt scoria and cinders.	Quarry. Over 100,000 tons produced in late 1950's and early 1960's.	Keith, 1969c, p. 319 ABM file data
V	Dragoon (Golden Rule,) District (Northern part of Dragoon Mountains) (See Fig. 3.)	16-17S	22-23E	---	Pb, Zn, Cu, Ag, Au, Marble	1. Base metal sulfides and oxidized products with spotty gold and silver values in quartz veins and in bedded replacement deposits in Paleozoic limestones that have been complexly folded, faulted, and intruded by Laramide and Tertiary igneous rocks. 2. Marmolized Paleozoic limestone.	One major and many smaller mines, prospects and quarries. About 19,000 tons of base metal ore and an unknown tonnage of marble produced from 1873 to 1965.	Tenny, 1927-1929, p. 218 Wilson, 1951, p. 10-13 Gilluly, 1956 Cooper, 1960 Cooper & Silver, 1964
	1. Buena Vista and Horse Fall mines (Fourr)	17S	23E	SE ¼ 8	Pb, Ag, Cu-	Bedded replacement deposits of oxidized lead and zinc mineralization in Paleozoic limestone.	Surface and adit workings. A total of about 75 tons of ore produced in 1914 and 1937.	ABM file data
	2. Burrito de Fierro mine (Ligier, Perevill & Danvers)	17S	22E	NW ¼ 24	Pb, Zn, Cu-, Ag	Bedded replacement deposits of oxidized base metal sulfides in Paleozoic limestone close to strong thrust faulting and Tertiary igneous intrusions.	Tunnel and surface workings. Over 200 tons of ore shipped intermittently from 1956 to 1964.	ABM file data
	3. Golden Rule mine area (Old Terrible, Golden Eagle, Santa Lucia; Golden Queen Consolidated Gold Mng. Co., Old Terrible Mng Co., Manzoro Mng. Co, G. S. & L. Leasing Co.)	16S	23E	Cen. 23	Pb, Zn, Ag, Au, Cu-	Cerrusite, anglesite, galena, pyrite and oxidized zinc minerals in coarsely crystalline quartz, calcite and iron oxides in vuggy fissure veins in Cambrian Abrigo Limestone intruded by small Tertiary rhyolite and rhyolitic porphyry intrusives.	Shaft workings. Over 6,000 tons of ore produced intermittently from 1883 to 1957.	Wilson et alia, 1934 (1967), p. 121-122 Wilson, 1951, p. 28-29 ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
4. Hubbard mine (Democrat & Sherman, Dragoon Zinc)	17S	23E	Cor. 17, 19 & 20	Zn, Pb-, Cu-, Ag-, Au-	Zinc mineralization with minor lead and copper in tabular replacement bodies in complexly folded and faulted Paleozoic limestone.	Shaft workings. About 330 tons of zinc ore produced intermittently during 1944, 1949, and 1952.	Wilson, 1951, p. 29 ABM file data
5. Ligier Marble quarries	16S	23E	SE¼ 10 No. Cen. 27 No. Cen. 35	Marble products	Marmolized, fractured, and folded, white and colored Mississippian, Pennsylvanian and Permian limestones.	Quarries. A relatively small production of dimension stone and crushed marble.	Wilson & Roseveare, 1949, p. 48 Townsend, 1962, p. 19-22 Cooper and Silver 1964, p. 138-139 ABM file data
6. Senecia mine (Lewis group, Senika; Le Roy Mines Co.)	17S	23E	SE¼ 10	Zn, Pb, Ag, (Cd)	Sphalerite, pyrite, and minor galena in small irregular masses in brecciated wall rock in a generally thin, weakly mineralized vein structure in metamorphosed Naco limestone.	Shaft and adit workings. About 248 tons of ore shipped in 1942-1943.	Wilson, 1951, p. 26, 28 Burnham, 1959, p. 30 ABM file data
VI Hartford District (Huachuca Mountains) (See Fig. 5.)	22-24S	19-21E	----	Cu, Pb, Zn, Ag, Au, W, (Cd)	1. Base metal oxides, carbonates, and sulfides in quartz veins, irregular replacement bodies, and disseminated in complexly folded and faulted Paleozoic limestones, Cretaceous sedimentary and volcanic rocks. Often found in exotic blocks of Paleozoic (?) limestone in Triassic-Jurrassic volcanics which have been intruded by Jurassic quartz-monzonite stocks and associated dikes. 2. Tungsten mineralization in quartz veins, irregular bunches and disseminations in metamorphosed Paleozoic limestones and Cretaceous Bisbee Group sedimentary and volcanic rocks.	Many relatively small mines and prospects. About 9,000 tons of base metal ore and several thousand tons of tungsten ore and concentrates produced intermittently from 1870's to recent years.	Wilson, 1941, p. 47-49 Alexis, 1949 Weber, 1950 Wilson, 1951, p. 36-40 Burnham, 1959, p. 31 Hayes & Raup, 1968
1. Alto mine (Elizabeth, Hamilton; Alto Mng, Mlng & Smltng Co.)	24S	20E	NW¼ 11	Cu, Pb, Zn, Ag, Au	Partly oxidized base metal sulfides in irregular replacement orebodies in exotic blocks of Paleozoic limestone along a fault zone in Triassic-Jurassic volcanics.	Shaft and tunnel workings. Irregular, minor production in 1921-1924.	Mines Handbook, 1925 ABM file data
2. Armistice mine (Short, Kelley)	23S	20E	NW¼ 25	Pb, Ag, Cu-, Au-	Lead carbonate and sulfide in irregular, bedded replacement bodies in exotic blocks of Paleozoic limestone in Triassic-Jurassic volcanics near a large thrus fault.	Shaft workings. Total production in 1940-1944 and 1948-1949 amounted to some 870 tons.	Wilson, 1951, p. 40 ABM file data

3.	Arrow mine group (Lucky Day, East Wind)	22S	19E	SW ¼ 28 Protracted	Au, W, Pb-	Partially oxidized gold, tungsten, and minor lead mineralization in pockets and scattered irregularly in quartz veins associated with the contact of a microgranodiorite dike cutting Cretaceous Bisbee Group sedimentary rocks.	Shallow near-surface workings. A small amount of gold ore produced in the early 1900's and some tungsten ore produced during World War I.	Dale et alia, 1960, p. 40-41
4.	Baumkirscher mine (Crocket Moon, M Lode, International, Golconda, Golden Crown groups; Arizona Imperial Mines Extension Co., International Gold & Rare Metals Co.)	23S 24S	21E 21E	Cen. 30 5	Pb-, Zn-, Cu-, Au-, Ag-	1. Spotty and sparse base metal carbonate and sulfide ore in small erratic replacement in exotic blocks of Paleozoic limestone in Triassic-Jurassic volcanics. 2. Traces of gold, silver, copper, and lead in a large quartz vein along a thrust fault in Precambrian granite.	Many shaft and tunnel workings but only very minor test lots of ore produced intermittently from 1925 thru 1937.	Mines Handbook, 1926 Mines Register, 1937 ABM file data
5.	Boston, Sampson & Way Up claims (Schwarzenbach)	24S	20E	SW ¼ 2 SE ¼ 3	Cu, Zn, Ag, Au	Partially oxidized copper and zinc sulfides with quartz in spotty orebodies along fault fissures in Cretaceous Bisbee Group beds and in exotic blocks of Paleozoic limestone in Triassic-Jurassic volcanics cut by quartz monzonite.	Tunnel workings. About 90 tons of ore produced in 1937.	ABM file data
6.	Cave mine (Cave Mountain, Cave Creek, Cave Canyon, Silver Plume, Snow Drop)	23S	20E	SW ¼ 33	Zn, Pb, Cu-, Ag-	Partly oxidized, irregular replacement deposits of lead and zinc mineralization in exotic blocks of Paleozoic limestone in Triassic-Jurassic volcanics which are badly faulted and cut by Tertiary rhyolite dikes.	Tunnel workings. Some 565 tons of ore produced in 1946-1947.	Wilson, 1951, p. 40 ABM file data
7.	Copper Glance mine (Mandotta, Silver King, Smuggler)	23S 23S	19E 20E	NE ¼ 24 NW ¼ 19	Cu, Ag, Au	Oxidized copper sulfides with spotty gold and silver values along fractures in steeply tilted Cretaceous Bisbee Group andesite volcanics.	Tunnel workings. Several hundred tons of ore produced in the early 1900's and from 1913 to 1915.	Copper Handbook, 1903 Alexis, 1949, p. 65-66 Wilson, 1951, p. 37 ABM file data
8.	Eureka mine (Azurite, Tenorite, Connelite, Lotus)	23S	19E	SE ¼ 14	Pb, Ag, Cu, Au	Spotty sulfide mineralization, largely oxidized, in quartz veins in steeply tilted Cretaceous Bisbee Group Morita Formation cut by Tertiary dikes or sills.	Tunnel workings. A small production of ore in early 1900's and in 1951.	Copper Handbook, 1903 to 1910 Alexis, 1949, p. 65-66 Wilson, 1951, p. 37 ABM file data
9.	Hamburg mine (Wisconsin; Hartford Arizona Copper Mng. Co., Butte & Arizona Mng. Co.)	23S	20E	Cor. 16, 17, 20& 21	Cu, Pb, Zn, Ag, Au	Irregular veinlets, pods, and disseminations of chalcopyrite, bornite, galena, and sphalerite in pyrometasomatic tactite in deformed Permian Concha Limestone along a strong fault and intruded by Jurassic quartz monzonite.	Tunnel workings. Up to 100 tons produced intermittently in the early 1900's.	Weber, 1950, p. 156-161 Wilson, 1951, p. 37 ABM file data
10.	Harper mine (Ashworth, Soutwest Tungsten Mng. Co.)	23S	20E	So. Cen. 30	Au, Ag, W, Cu-Pb-	Sporadic gold and silver values with scattered scheelite, chalcopyrite, bornite, and galena in quartz veins cutting Cretaceous Glance Conglomerate and andesitic volcanics containing exotic blocks of Paleozoic limestone.	Surface and shallow shaft workings. Minor production of gold-silver ore in the early 1900's. Several hundred tons of tungsten concentrates produced in 1941.	Wilson, 1941, p. 49 Dale et alia, 1960, p. 35-37 ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
11. Lucky Strike mine	23S	20E	No Cen. 4	W, Pb-, Ag-, Au-	Streaks of scheelite, spotty galena, and disseminated pyrite along the hanging-and footwall of a quartz vein cutting coarse-grained Precambrian granite.	Surface and tunnel workings. Some gold ore produced in the early 1900's. Produced considerable tungsten ore during the First World War and a minor amount in the 1950's.	Wilson, 1941, p. 47-48 Dale et alia, 1960, p. 33-34
12. Lucy Bell mine (Lucy Bell Mng. Co.)	24S	21E	NW ¼ 5 NE ¼ 6	Cu, Pb, Ag, Au	Small, irregular replacement masses of partly oxidized base metal sulfides in exotic blocks of Paleozoic limestone in Triassic-Jurassic volcanics.	Shaft and tunnel workings. About 15 tons of ore produced in 1934-1935.	ABM file data
13. Lutz tunnel	23S	20E	SW ¼ 35	Cu, Ag-	Stringers and disseminations of copper carbonates and sulfides in Jurassic quartz monzonite and in exotic blocks of Paleozoic limestone in Triassic-Jurassic volcanics.	Tunnel workings. Test lots of ore produced about 1910.	ABM file data
14. Manila mine (Panama, Huachuca Queen; Huachuca Consolidated Mng. Co., Border-Land Metals Co.)	22S	19E	NW ¼ 6 Protracted	Pb, Ag	Cerussite along steeply dipping fissure veins cutting badly faulted and broken Paleozoic and Cretaceous sedimentary formations under an overthrust fault plane.	Tunnel and shaft workings. Produced over 400 tons of ore in 1924-1928 and some 26 tons in 1949.	Alexis, 1949, p. 64-65 Wilson, 1951, p. 39-40 ABM file data
15. Morgan mine (Nugget)	24S	20E	SE ¼ 1	Au, Ag, W	Spotty gold and silver with some disseminated scheelite in quartz veins in Jurassic quartz monzonite intrusive.	Pit and shaft workings. Some gold-silver ore produced from mine and placers in early 1900's and in 1939.	ABM file data
16. Peterson mine (Copper Dog; Copper Dog Mng. Co.)	23S	19E	So Cen. 3 No Cen. 10	Cu, Ag, Au	Irregular oxidized copper mineralization in fault fissure veins associated with a Tertiary microgranodiorite dike or sill cutting Cretaceous Bisbee Group Glance Conglomerate and andesitic volcanics.	Tunnel and surface workings. Some 30 tons of ore produced in 1916.	ABM file data
17. Pomona mine (Emerald, James, Black Eagle; Pomona Mng. Co., Huachuca Mng. and Mllng. Co., Sierra Vista Mng Co., Border-Land Metals Co.)	23S	20E	So Cen. 5 No Cen. 8	W, Pb, Cu-, Zn-, Ag-, Au-	Scheelite and oxidized base metal sulfides in a quartz vein and in pockets in deformed and thrust faulted Cambrian Abrigo and Devonian Martin limestone beds.	Adit workings. Produced 450 tons of tungsten ore in 1918 and intermittently some 120 tons from 1945 to 1963. Some base metal sulfides produced as a by-product.	Webber, 1950, p. 150-156 Wilson, 1951, p. 47 Dale et alia, 1960, p. 32-33 ABM file data
18. Power mine (Anozira)	23S	20E	SW ¼ 23	Mn, Ag, Pb, Cu-, Zn-, Au-	Disconnected and irregular bodies of argentiferous pyrolusite and wad and oxidized base metal sulfides along fracture zones or in pockets in exotic blocks of Paleozoic limestone in Triassic-Jurassic volcanics.	Shaft, pit, and tunnel workings. Some 20 tons of manganese ore and 383 tons of base metal ore produced in 1917.	Farnham et alia, 1961, p. 40-41 ABM file data

19. Reef mine (Tungsten Reef, Exposed Reef, Sitric; Primos Chemical Co., Tungsten Reef Mines Co., Exposed Reef Tungsten Co.)	23S	20E	SW 14 E Cen. 15	W, Au, Ag, Pb-, Cu-, Zn-, (Te)	Irregular and sporadic bunches and disseminations of scheelite with some gold and silver values and weak, oxidized base metal sulfides along fractures and at joint intersections in a quartz blanket at the base of the Cambrian Abrigo Limestone.	Open cut and adit workings. Minor gold-silver production in the early 1900's and a total of several thousand tons of tungsten ore and concentrates produced in 1916-1918, 1934-1942, and 1955-1956 periods.	Webber, 1950, p. 122-156 Wilson, 1941, p. 48-49 Dale et alia, 1960, p. 28-32 ABM file data
20. State of Texas mine	24S	20E	SW¼ 12 NW¼ 13	Zn, Pb, Ag, Cu-, Au-	Irregular replacement orebodies of sphalerite, galena, and minor copper sulfides with lime silicates in folded and faulted impure Pennsylvanian-Permian Naco Group limestone along the contact with Jurassic quartz monzonite.	Tunnel and shaft workings. Reportedly worked by Spaniards originally and again in the late 1880's. Some 980 tons of ore produced in 1943-1946.	Copper Handbook, 1905 Wilson, 1951, p. 33-34 ABM file data
21. Van Horn mine	23S	20E	So. Cen 30 No. Cen. 31	W, Au-, Ag-	Narrow quartz veins, containing local rich pockets of scheelite and minor and spotty gold and silver values, cutting Cretaceous Bisbee Group sedimentary and volcanic rocks.	Only shallow workings. Minor amounts of tungsten ore produced during World War I and 25 to 30 units of tungsten concentrates produced in 1943-45.	Wilson, 1941, p. 49 Dale et alia, 1960, p. 38-39
22. Wakefield mine (Arid Mines & Development Co.)	23S	20E	No. Cen. 30	Au, Ag, W, Cu-, Pb-	Irregular quartz vein containing spotty gold and silver values with minor amounts of chalcopyrite and galena and sporadic, disseminated scheelite with some high grade pockets in a quartz zone along the contact of Glance Conglomerate and Morita Formation of the Cretaceous Bisbee Group.	Surface, adit and shaft workings. Some 100 or more tons of gold-silver ore produced intermittently from 1896 to 1940 and about 10 tons of tungsten ore in 1943-1944.	Dale et alia, p. 34-35 ABM file data
23. Western mine	23S	20E	Cen. Bor. 28-29	Pb, Ag, W, Cu-	Argentiferous galena and minor chalcopyrite, partly oxidized, with spotty disseminated scheelite in a quartz lens along a fault zone cutting exotic blocks of Paleozoic limestone in Triassic-Jurassic volcanics.	Small shaft and surface workings. Small, erratic production of silver-lead and copper carbonate ore during the early 1900's.	Dale et alia, 1960, p. 39-40
24. Zaleski mine	24S	21E	NW¼ 7	Au, W	Sparse and spotty gold values and scattered high grade pockets of scheelite in quartz veins cutting Jurassic quartz monzonite.	Shaft, adit, and surface workings. A few tons of gold ore produced in the early 1900's and some tons of tungsten ore in later years.	Wilson, 1941, p. 49 Dale et alia, 1960, p. 40
VII Middle Pass District (Southern Dragoon Mountains, West Pearce, North Turquoise) (See Fig. 6.)	17-18S	23-24E	----	Zn, Pb, Cu, Ag, Au, W, Fe	Base metal sulfides with local tungsten mineralization in irregular pyrometasomatic mantos, chimneys, and vein-like bodies in Paleozoic limestones, often complexly folded, faulted and invaded by Tertiary granitic intrusions.	Numerous scattered mines and prospects. Over 76,000 tons of base metal ore and a small tonnage of tungsten concentrates and barite produced intermittently from the early 1900's to recent years.	Wilson, 1951, p. 10-13 Gilluly, 1956 Cederstrom, 1946 a, b

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
1. Abril mine (Dos Hermanos; Bargin Mines, Inc., Shattuck Denn Mng. Co.)	17S	23E	So. Cen. 34	Zn, Cu, Pb-, Mo-, Ag-, Au-, (Bi, Li, Cd, Ga, Co, W)	Sphalerite, chalcopyrite, minor galena, sparse molybdenum, and minor rare minerals in irregular pyrometasomatic deposits with garnet, epidote, and other lime-silicates in a tactite zone in Pennsylvanian-Permian Naco Group limestone cut by granitic intrusive and rhyolite porphyry dikes.	Adit workings. Nearly 30,000 tons of zinc-copper ore produced intermittently since 1914 but mainly during 1945-1952.	Wilson, 1951, p. 23-26 USAEC Prelim. Rec. Rpt. D-502, 1952 Warner et alia, 1959, p. 95, 97 Cooper, 1962 Meeves, 1966, p. 56 ABM file data
2. American group mine (Escapule)	18S	23E	NE¼ 3	Pb, Zn, Ag, Cu-, Au-	Partially oxidized lead and zinc mineralization in folded and faulted Cambrian Abrigo Limestone close to strong thrust fault breccia.	Shallow adit workings. A small tonnage of ore produced in 1938.	ABM file data
3. Black Diamond mine (Englander; Black Diamond Copper Mng. Co.)	18S	24E	So. ½ 19, 20 N ½ 29, 30	Cu, Ag, Fe, Pb-, Au-, (Ti)	Chalcopyrite, bornite, argentite, and copper carbonates and oxides with magnetite and hematite in irregular, tabular, pyrometasomatic bodies in silicated Mississippian Escabrosa Limestone.	Tunnel and shaft workings. At least 7,000 tons of ore produced intermittently from 1903 to about 1957.	Copper Handbook, 1907 Tenney, 1925-1927, p. 219-220 Cederstrom, 1946a, p. 86-87 Harrer, 1964, p. 22-24 ABM file data
4. Christmas mine (Dragoon; Dragoon Copper Mng. & Smltng Co., Giacoma Bros.	18S	23E	No. Cen. 13	Cu, Ag, Au, Pb-	Copper carbonates, bornite, and chalcopyrite with minor galena and lead carbonate in irregular pyrometasomatic replacements in Cretaceous Bisbee Group limestone along a contact with a porphyry intrusion.	Tunnel and shaft workings. A total of some 250 tons produced in 1905 and 1948.	Copper Handbook, 1906 ABM file data
5. Cobre Loma mine (Cobre Loma Copper Co., Middlemarch Copper Co., Arizona Middlemarch Copper Co.)	18S	23E	SE¼ 2 NE¼ 11	Cu, Zn-, Ag-	Chalcopyrite, bornite, pyrite, and minor sphalerite in a pyrometasomatic tactite zone in limy hornfels of Cretaceous Bisbee Group along the contact with a porphyritic intrusive.	Tunnel workings. Probable up to 5,000 tons of ore produced from 1915 to 1920.	ABM file data
6. Festerling mine (Elsicor)	18S	23E	NE¼ 24	Cu, Zn, Ag, Pb-, Au-	Chalcopyrite, sphalerite, and minor galena in irregular replacement bodies along faults in Cretaceous Bisbee Group limestone.	Surface and shaft workings. A few tens of tons of ore produced between 1937 and 1947.	ABM file data
7. Garnet and Moonlight groups (Escapule Mine group	18S	23E	So. ½ 24	Pb, Zn, Ag, Cu-, Au-, (Mo, V)	Oxidized lead, zinc and minor copper mineralization in bedded replacement deposits in folded and faulted Cambrian Abrigo Limestone.	Adit workings. Approximately 50 tons were produced intermittently from 1938 to 1955.	ABM file data
8. Middlemarch mine (Missouri; Middlemarch Copper Co., Arizon Middlemarch Copper Co.)	18S	23E	Cen. 12	Cu, Zn, Ag, Au, Pb-	Copper, zinc, and minor lead carbonates and sulfides in an oval-shaped chimney orebody associated with lime silicates in a fault zone cutting Paleozoic and Cretaceous limestone beds.	Adit and shaft workings. Some 5,000 or more tons of ore produced intermittently from the early 1900's to the 1950's.	Cederstrom, 1946, a, p. 87-88 ABM file data

9.	Muheim mine (Zinc Basin, White Metal)	18S	23E	E. Cen. 10	Pb, Zn, Ag, (Bi)	Anglesite and hemimorphite in an oxidized pyrometasomatic deposit in badly deformed Cretaceous Bisbee Group limy beds along a strong thrust fault.	Adit workings. About 200 or more tons of ore produced in the 1920's.	Cederstrom, 1946 a, p. 89 Wilson, 1951, p. 28 Cooper, 1962 ABM file data
10.	San Juan mine (Gordon)	18S	23E	Cen. 10	Zn, Pb-, Ag-, (Bi, Be, Li, Ga, Cd)	Sphalerite with minor galena, iron oxides, and helvite in irregular manto-type bodies of pyrometasomatic limy silicates in impure shaly Abrigo Limestone, where it is cut by faults.	Adit workings. Over 17,000 tons of ore produced since 1913 but mainly during 1947 and 1951.	Cederstrom, 1946 a, p. 88-89 Wilson, 1950, p. 20-23 Burnham, 1959, p. 30 Warner et alia, 1959, p. 96 Cooper, 1962 Meeves, 1966, p. 56 ABM file data
11.	Silver Cloud mine (Escapule)	18S	23E	W. Cen. 25	Cu, Pb, Zn, Ag, Au	Base metal sulfides in small orebodies and vein-like deposits along faults in altered Cretaceous Bisbee Group limestone.	Shaft and adit workings. A few tons were produced intermittently from 1921 to 1955.	Cederstrom, 1946 a Wilson, 1951, p. 28 ABM file data
12.	Standard Tungsten mine (Head Center, Black Prince, Johnny Boy; Standard Tungsten Corp.)	18S	23E	Cor. 13, 14, 23 & 24	W, Pb, Ag, Cu-, Ba-	Spotty, straw-colored, coarsely crystalline scheelite with minor base metal sulfides and barite in replacement bodies in intensely silicated Mississippian and Pennsylvanian limestones.	Shaft, adit, and surface workings. About 1.5 tons of tungsten concentrates and some 75 tons of sorted barite produced in 1932.	Dale et alia, 1960, p. 57-59 Stewart & Pfister, 1960, p. 10-11 ABM file data
13.	White Tail mine (Grant group)	18S	23E	E. Cen. 10	Zn, Pb-, Ag-, Cu-	Oxidized and siliceous zinc ore with minor lead and copper in irregular masses in fault breccia made up largely of Paleozoic limestone fragments.	Tunnel workings. Some 105 tons of ore produced in 1917-1918 and about 45 tons in 1965.	ABM file data
VIII	Paul District (Paul Spur, Paul Lime quarry; Paul Lime Co.) (See Fig. 9.)	24S	26E	No. Cen. 7	Limestone and lime	Outcrops of Mural Limestone of Cretaceous Bisbee Group	Quarry operations. Up to as much as 5 million tons of limestone mined, mainly for lime production, since 1918.	Wilson & Roseveare, 1949, p. 26 Keith, 1969a, p. 391 ABM file data
IX	Pearce District (See Fig. 6.)	17-18S	25E	----	Au, Ag, F, Cu-, (U, As)	Oxidized gold and silver mineralization, mainly halides; fluorite; minor and spotty oxidized copper sulfides; and traces of uranium, in quartz-calcite veins, in breccia zones, and in narrow replacement beds in folded and faulted Tertiary rhyolite and andesite volcanics resting on Cretaceous Bisbee Group beds.	Over 1.3 million tons of gold-silver ore produced from one major and a few smaller mines from 1895 to the 1940's. Fluorite being produced in 1971.	Gilluly, 1956, p. 116-118 ABM file data
1.	Commonwealth Extension mine (Commonwealth Extension Mng. Co.)	18S	25E	NW¼ 4	Ag-, Au-, Cu-	Spotty oxidized silver-gold mineralization in fissure veins and narrow replacement bodies in altered Tertiary andesite and rhyolite breccia.	Shaft workings. About 1880 tons of ore produced from 1915 to 1930.	Smith, 1927 ABM file data
2.	Commonwealth mine (Pearce, Silver Ware; Commonwealth Mng. & Mllng. Co., Montana Tonopah Mng. & Mllng. Co., Commonwealth Development Co.)	18S	25E	NE¼ 5	Ag, Au	Irregular silver-gold halides and minor sulfo-salts with some manganese in quartz-calcite fissure veins and in fault breccia zones in silicified Tertiary rhyolite and andesite volcanics.	Shaft workings. Over one million tons of ore produced from 1895 to 1942.	Endlich, 1897, p. 571 Scott, 1916, p. 187-188 Smith, 1927 AEC Prelim. Rec. Rpt. PRR A-P-46, 1953 ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
3. Fittsburg prospect (Six Mile Hill mine group)	18S	25E	SE ¼ 6	Ag-, Au-	Silver and gold halides in irregular, narrow stringers in fractured Tertiary rhyolite.	Shallow workings. A few tons of ore produced about 1895-1896.	ABM file data
4. Fluorine Hill mine (Little Jessie mine group; Capt. & Cartwell Bros., Fluorine Mng. & Mlng Co., Enviromental Engineering and Chemical Co.)	17S	25E	SE ¼ 33 SW ¼ 34	Ag, F, Cu-, Au-, (U)	Spotty silver and gold chlorides in narrow irregular, and discontinuous quartz-carbonate-fluorspar-iron oxide veins along fissures in silicified Tertiary rhyolite porphyry. Sparse uranophane or autunite associated with fluorspar.	Shaft and surface workings. About 1100 tons of silver bearing siliceous rock shipped intermittently in 1904, 1907, and 1927. Some fluorspar being shipped in 1971.	Smith, 1927, p. 42 USGS Trace Element Investigation, AEC Prelim. Rec. Rpt. M-1497, 1954 Granger & Raup, 1962, p. A3-A4 Keith, 1970, p. 287, Table N ABM file data
5. Little Mary mine (Copper Hill; Little Mary Mng. Co.)	17S	25E	W. Cen. 35	Cu-, Ag-, Au-	Weak and spotty oxidized copper mineralization in fractured Tertiary andesite.	Shaft and pit workings. About 11 tons of ore produced in 1903 and 1910.	ABM file data
6. Vision Point prospect	18S	25E	SE ¼ 1	Cu-, Ag-	Weak and spotty oxidized copper mineralation in fractured Tertiary volcanics.	Shallow shaft workings. About 20 tons of ore produced in 1929.	ABM file data
X Peloncillo District (Peloncillo Mountains, Amarillo-Quien Sabe) (See Fig. 1.)	13S	32E	SW ¼ 35	Cu-, Ag-	Very weak and spotty copper oxides with trace of sulfides in Tertiary rhyolite and andesite volcanics.	Surface workings. A few tons of picked ore produced in 1941.	ABM file data
XI Rucker Canyon District (Gardner, Technocracy) (See Fig. 1.)	19S	30E	18	Ag, Au	Relatively weak oxidized mineralization along fault zones in Cretaceous Bisbee Group formations.	Open cut and shaft workings. Some 15 tons of ore produced in 1935-1936.	ABM file data
XII Swisshelm District (Swisshelm Mountains) (See Fig. 7.)	20S	27E	----	Pb, Zn, Ag, Cu-, Au-	Irregular, oxidized, replacement orebodies of base metal sulfides in folded and faulted Pennsylvanian-Permian Naco Group limestones, mainly above a tabular diorite porphyry intrusion along a strong thrust fault.	Numerous adit and shaft workings. Some 49,000 tons of ore produced, mainly from 1937-1953.	Loring, 1947 Galbraith & Loring, 1951, p. 30-36 Cooper, 1959 ABM file data
1. Apex mine (Four Horse Mng. Co., Apex Mng. Co.)	20S	27E	NW ¼ 12	Pb, Ag, Au	Oxidized galena in small, irregular orebodies along a fault zone in porphyry intrusive.	Tunnel workings. About 225 tons of ore produced during 1934-1935 and 1938-1939.	ABM file data
2. Chance mine (Chance Mng. Co.)	20S	27E	So. Cen. 12	Pb, Ag, Au-, Cu-, Zn-	Galena, cerussite, minor pyrite, and other base metal sulfides and carbonates in several small, tabular replacement orebodies along or adjacent to fracture zones in a folded and faulted overthrust block of Pennsylvanian-Permian Naco Group limestone, underlain by diorite porphyry.	Shaft and adit workings. Some 7000 tons of ore produced sporadically from 1880's to 1956, mainly in 1945 to 1951.	Loring, 1947 Galbraith & Loring, 1951, p. 34-35 ABM file data

3.	Colford Copper mine (Scheerer; Colford Copper Co.)	20S	27E	Cen. 12	Pb, Ag, Cu-, V-, Au-	Oxidized galena, vanadinite, and minor copper mineralization in irregular replacement orebodies in folded and faulted Pennsylvanian-Permian Naco Group limestone.	Tunnel and shaft workings. About 100 tons of ore produced intermittently from 1880's to 1926.	ABM file data
4.	Great American mine (Heney and Alpine tunnels; Great American Mng. Co., Alpine Mng. Co., Swisshelm Mng. Co.)	20S	27E	SE ¼ 1	Pb, Ag, Au	Oxidized galena in irregular replacement orebodies in folded and faulted Pennsylvanian-Permian Naco Group limestone.	Tunnel workings. Some 1500 tons of ore produced intermittently from 1880's to 1940.	ABM file data
5.	Mammoth & Whale mines (Swisshelm Gold Silver Co., Swisshelm Mountain Gold & Silver Mng. Co. Swisshelm Development Co., Conan Mng. Corp., Gold Metals Consolidated Mng.)	20S	27E	No. Cen. 12	Pb, Ag, Au	Irregular, oxidized orebodies of galena as replacements in an overthrust block of Pennsylvanian-Permian Naco Group limestone.	Shaft and adit workings. About 2000 tons of ore produced intermittently from operations in 1880's and in 1918 to 1958.	Loring, 1947 Galbraith & Loring, 1951, p. 35-36 ABM file data
6.	March mine (Rydbom)	20S	27E	So. Cen. 12	Zn, Ag, Pb-, Cu-, Au-	Oxidized zinc and minor lead and copper mineralization in irregular orebody in overthrust block of Pennsylvanian-Permian Naco Group limestone.	Shaft and tunnel workings. Some 210 tons of ore produced during 1960-1961.	ABM file data
7.	Mountain Queen mine (Schribner; Randall Lease, Four Horse Mng. Co., Manhattan Consolidated Mines Development Co., Gold Metals Consolidated Mng.)	20S	27E	So. Cen. 12	Pb, Ag, Cu-, Au-	Mostly oxidized galena with minor copper in irregular replacement orebodies along the contact of folded, faulted and fractured Pennsylvanian-Permian Naco Group limestone and diorite porphyry intruded along a strong thrust fault.	Shaft workings. A total of some 50,000 tons of ore produced intermittently from 1885 to 1913, 1921 to 1933, and 1939 to 1954.	Loring, 1947 Galbraith & Loring, 1953, p. 33-34 ABM file data
XIII	Teviston District (Tevis, Dos Cabezas Mountains) (See Fig. 4.)	13-15S	26-29E	----	Au, Ag, Cu-, Pb-, Zn-, W-, marble	1. Weathered quartz veins containing spotty gold and silver values in Precambrian granitic and schistose rocks. 2. Sporadic base metal sulfides and oxidized products, with occasional scheelite, in irregular fissure veins or in pyrometasomatic zones in complexly folded and faulted Precambrian to Cretaceous formations that have been intruded by Laramide and Tertiary granitic rocks. 3. Marmorized Paleozoic limestones. 4. Gold placers in alluvial basins or near mouths of canyons.	Many, relatively small, scattered mines, prospects, and placers. Some 4,500 tons or more of ore produced and some $17,000 in gold recovered from placers at irregular intervals from the late 1800's to recent times. Very minor marble production.	USGS Min. Resources, 1883-1923 USBM Min. Resources, 1924-1931 USBM Min. Yearbook, 1932-1969 Tenny, 1927-1929, p. 224-227 Wilson et alia, 1934 (1967), p. 117 Cooper, 1960 Wilson, 1961, p. 67-68 ABM file data
1.	Apache Pass mines (Gold Belle, Helen Dome, and Quillan groups, Lula Gold Nuget, New Year; Apache Pass Gold Mng. Co., Arizona Gold Mining Co., Cochise Bowie Mng. Co., Helen Dome Mng. Co., Gold Nugget Mng. Co.)	15S	28E	SE ¼ 4 NE ¼ 9 No. ½ 10 NE ¼ 11	Au, Ag-, Pb-, Cu-, Zn-	Spotty gold and silver values with minor oxidized base metal sulfides in irregular quartz-filled fissure veins cutting Precambrian granitic rock.	Numerous scattered pits, shafts and adits. About 600 tons of ore produced intermittently since 1870's.	USGS Min. Resources, 1906-1907 ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
2. Beryl Hill and Live Oak prospects	14S	28E	SW ¼ & NE ¼ 23	Mica, quartz, beryl, feldspar	Lensing quartz-pegmatite masses in granitic dikes and fracture coatings along the contact of Precambrian gneiss with porphyritic granite.	Open cut workings. Some lots of hand sorted beryl sold in the late 1950's.	Meeves, 1966, p. 14, 16 Ariz. Dept. Min. Resources file data
3. Buckeye Apache mine (Buckeye, Sunrise, Apache, Fairview group; Buckeye Mng. & Mllng Co., Buckeye Apache Mines, Co.)	14S	27E	Cen. & SE ¼ 4	Au, Ag, Pb	Auriferous pyrite and argentiferous galena in quartz veins along fissure zones in Precambrian granitic rock.	Tunnel workings. Sporadic production of about 4000 tons from late 1800's to late 1940's.	Mines Register, 1965 Ariz. Dept. Min. Resources file data ABM file data
4. Comstock Lode mine (Cohen, Adams; Tyrone Mng. Co.)	13S	26E	E. Cen. 22	W, Pb-, Ag-	Spotty scheelite with minor galena and oxidized iron and lead minerals in quartz veins and veinlets in Laramide granitic rock. Some low grade tungsten placers.	Open cuts, pits, short adits, and shallow shafts. A few tons of ore mined in the 1950's.	Dale et alia, 1960, p. 25-26 Ariz. Dept. of Min. Resources file data ABM file data
5. Cowboy mine (Gold Reef Mng. & Mllng Co., Carter & Robinson, Sanchez, Cowboy Mng. Co.)	13S	26E	NW ¼ 29	Au, Ag, Cu-, Pb-	Spotty gold values with minor, oxidized base metal sulfides in irregular quartz veins in Precambrian Pinal Schist.	Shallow workings. Some 70 tons of ore produced intermittently from 1931 to 1940.	ABM file data
6. Golden Eagle mine (Carleton)	13S	26E	NW ¼ 20	Pb, Cu, Ag, Au	Spotty oxidized base metal sulfides in irregular quartz veins in Precambrian Pinal Schist.	Tunnel workings. About 130 tons of ore produced from 1937 to 1939.	ABM file data
7. Gold Gulch placers (Inspiration; Cochise Mng. Co., Inspiration Placers, Inc., Gilman Rice, Gold Gulch Mng. Co.)	13S	26E	E ½ 35 W. Cen. 36	Au	Placer gold in shallow alluvium and gravel covering a granitic pediment in a mountain basin.	Mainly a dry placer operation. Estimated that over 18,000 cubic yards treated during various periods from early 1900's to 1940.	USGS Min. Resources, 1912 Wilson, 1961, p. 68 ABM file data
8. Hillside mine	14S	28E	NE ¼ 35	Au, Ag	Spotty gold and silver values in quartz veins in Precambrian Pinal Schist.	Limited tunnel and shaft workings. Some 77 tons of ore produced in 1908.	ABM file data
9. Silver Strike mine (Devonian group: Silver Strike Mng. Co., Devonian Strategic Minerals Inc.)	14S	28E	So. Cen. 28 No. Cen. 33	Pb, Ag, W, Cu-, Zn-	Spotty argentiferous galena with minor chalcopyrite and sphalerite in a quartz plug along a fissure vein cutting Paleozoic and Cretaceous rocks close to a Laramide granitic intrusive. Spotty scheelite occurs in shear zones and quartz bodies in pyrometamorphosed Paleozoic limestone.	Adit and shaft workings. A few hundred tons of lead-silver ore produced intermittently between the 1890's and 1919.	Dale et alia, 1960, p. 18-22 ABM file data
10. Paronazzo & Pentelicus quarries	15S	29E	20	Marble	Massive and fractured, white and colored marmolized Pennsylvanian Horquilla Limestone.	Open quarries. Minor production in the early 1900's.	Paige, 1909, p. 299-311 Burchard, 1914, p. 1342-1343 Wilson & Roseveare, 1949, p. 48 Townsend, 1962, p. 19-20

XIV Tombstone District (Tombstone Hills and Charleston area) (See Fig. 8.)	20-21S	21-22E	-----	Ag, Pb, Mn, Cu-, Zn-, Au-, Mo-, V-, mica, clay, (As, Cd, Sb, Te)	1. Argentiferous lead sulfide with spotty copper and zinc minerals, usually deeply oxidized with enrichment, in irregular replacement bodies along fissure zones and anticlinal rolls cut by mineralized fissures in Paleozoic and Mesozic sedimentary formations. Orebodies are often closely associated with cross-cutting Laramide intrusive dikes. 2. Base metal mineralization, often oxidized, in fault and fracture zones in Laramide volcanics and quartz latite porphyry intrusive. 3. Manganese oxides, sometimes argentiferous, in irregular, lenticular or pipe-like replacement bodies along fracture and fault zones, usually in Pennsylvanian-Permian Naco Group limestones.	Numerous shaft mines and prospects. Total production of lead- and silver ore has been at least 1.5 million tons since 1878. About 9,000 tons of manganese ore and concentrates have also been produced for smelter flux and for manganese.	Blake, 1882 Church, 1903 Tenny, 1927-1929, p. 136-179 Butler et alia, 1938 Butler & Wilson, 1938 Butler & Wilson, 1942 Gilluly, 1956 ABM file data
1. Alkie mine (Escapule)	21S	22E	SW¼ 6	Pb-, Cu-, Ag-	Relatively weak sulfide mineralization along fractures in Tertiary Bronco andesite volcanics.	Shaft and surface workings. About 10 tons of ore produced during 1938 and 1951 to 1952.	ABM file data
2. Anchor mine	20S	22E	W. Cen. 14	Mn, Ag	Small irregular pipe-like bodies of argentiferous manganese in fault breccia in Pennsylvanian-Permian Naco Group limestone.	Tunnel and surface workings. Relatively small production around 1916-1917.	Butler et alia, 1938, p. 74 ABM file data
3. Arlington mine	20S	22E	SE¼ 32	Pb, Cu, Ag, Au	Oxidized base metal sulfides in a fracture zone cutting Cretaceous Bisbee Formation sedimentary beds.	Shaft workings. About 110 tons produced in 1924.	ABM file data
4. Argenta mine	20S	22E	NW¼ 16	Cu, Pb, Ag, Au	Siliceous, oxidized copper-lead mineralization along a fracture zone in Laramide Uncle Sam intrusive porphyry.	Shallow shaft and pit workings. About 184 tons of ore shipped during 1922-1924.	ABM file data
5. Arizona Queen mine (Last chance; Tombstone Development Co.)	20S	22E	SE¼ 11	Ag, Pb-, Au-	Narrow, spotty orebodies in Cretaceous Bisbee Formation beds along a strong shear zone and a small replacement body at the intersection of a limestone member flexure with a mineralized fissure.	Underground workings. An estimated 30,000 tons of ore produced.	Butler et alia, 1938, p. 96, 99
6. Bald Eagle mine	20S	21E	SE¼ 25	Pb-, Ag-	Relatively weak, oxidized lead mineralization along a fissure zone in Tertiary Bronco volcanics.	Shaft and surface workings. About 45 tons produced in 1949.	ABM file data
7. Blacktail mine group	20S	22E	So. Cen. 14	Mn, Ag	Argentiferous manganese oxides in narrow discontinuous lenses along a fissure zone in Mississippian Escabrosa Limestone.	Shallow workings. Some manganiferous-silver ore shipped in the past.	Needham & Storms, 1956, p. 30-31 Farnham et alia, 1961, 33-34
8. Bonanza mine group (Bonanza, Annex, South Bonanza, etc.; Melgren, Tombstone Silver Fields Co.)	20S	22E	NE¼ 16	Ag, Pb, Cu-, Au-	Oxidized base metal sulfides with enriched pockets of silver ore along irregular fissure veins in Cretaceous Bisbee Group sedimentary rocks close to an intrusive contact.	Shaft and surface workings. About 5,000 tons of ore produced intermittently between 1919 and 1941.	Butler et alia, 1938, p. 18, 108, Pl. III ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
9. Bunker Hill mine (Bunker Hill, Mammoth, Rattlesnake; Rattlesnake Co., Bunker Hill Mng. Co., Bunker Hill Mines Co., Tombstone Gold-Silver Mines Co., Tombstone Development Co.)	20S	22E	SE¼ 14	Ag, Pb, Zn, Mn, Cu-	1. Pockety orebodies and irregular replacements of largely-oxidized, argentiferous lead, zinc and minor copper mineralization in sharply folded Pennsylvanian-Permian Naco Group limestone, cut by small faults and slips between the major fault zones. 2. Manganiferous silver ore in irregular pipe-like masses or chimneys in Mississippian Escabrosa Limestone and Pennsylvanian-Permian Naco Group limestone along fissure zones.	Extensive shaft workings. Several hundred thousand tons of silver-lead ore and a few thousand tons of manganiferous silver ore produced from 1880's to 1952.	Church, 1903, p. 29 Ransome, 1920, p. 113-119 Butler et alia, 1938, p. 45, 47, 83, 107, Pl. III, IV Farnham et alia, 1961, p. 31-32 ABM file data
10. Chance mine	20S	22E	Cen. 16	Ag, Au	Enriched silver and gold values along a fissure zone in Cretaceous Bisbee Group sedimentary rocks.	Shallow workings. About 140 tons of ore produced in 1935.	ABM file data
11. Charleston Lead mine (Woolrey, Brother George, Mary Jo group; Tombstone Gold & Silver Mines Inc., Charleston Lead Mines Co., Tombstone Mica Co.)	20S	21E	No. Cen. 36	Pb, Zn, Ag, Cu, Scrap mica, clay, (As)	Base metal sulfide mineralization, oxidized near the surface, in a strongly altered zone along a fault fissure cutting Tertiary Bronco volcanics.	Shaft workings. A few thousand tons of lead-zinc ore produced in the 1930's and 1940's. Some clay and scrap mica produced more recently.	USAEC Prelim. Rec. Rpt. A-P-153 ABM file data
12. Comet & Black Eagle mines (Big Comet, Little Comet; Old Glory Mng. Co., Tombstone Consolidated Mines Co., Tombstone Development Co.)	20S	22E	NE¼ 23	Mn, Ag, Pb-	Largely oxidized, vein-like, replacement bodies of manganese-silver ore in and along the footwall of a dike cutting thick bedded Pennsylvanian-Permian Naco Group limestone.	Shaft workings. At least 10,000 tons of ore produced from the late 1800's to the 1920's.	Church, 1903, p. 26, 29-31 Ransome, 1920, p. 113 Butler et alia, 1938, p. 73, Pl. III, IV, XI Romslo & Ravitz, 1947, p. 7 Needham & Storms, 1956, p. 22-28 Farnham et alia, 1961, p. 34-35 ABM file data
13. Contact mine (Tombstone Development Co.)	20S	22E	SE¼ 15	Mn, Ag-, Cu-	Small vein-like replacement bodies of manganese oxides in blocks of Pennsylvanian-Permian Naco Group limestone along the footwall of the Prompter Fault where intersecting "northeast" fissures.	Shaft workings. Small production of manganese ore in the early 1900's.	Butler et alia, 1938, p. 83 Needham & Storms, 1956, p. 22, 29 Farnham et alia, 1961, p. 29-30
14. Contention-Grand Central mine group (Head Center, Flora Morrison, Tranquility, Pump Shaft, Yellow Jacket; Western Mng. Co., Grand Central Mng. Co., Tombstone Mill & Mng. Co., Head Center Co., Head Center &	20S	22E	SE¼ 11 NE¼ 14	Ag, Au, Pb, Cu-, Zn-	Oxidized argentiferous and auriferous galena and minor copper and zinc mineralization in large rich orebodies in faulted and fractured segments of a large dike, and in brecciated footwall zones of the dike. Ore also found in replacements of Cretaceous Bisbee Group limestone beds where intersected by "northeast" fissures.	Extensive shaft workings. One of earliest and the most productive mine of the district. Over $10 million produced prior to 1886 and several hundred thousand tons produced from 1880's to early 1900's. Some sporadic production up to 1929.	Blake, 1882, p. 335-339, 342-343 Church, 1903, p. 4, 8, 11-12, 16 18-20 23-25, 28, 33-34 Butler et alia, 1938, p. 41, 43-45, 69-71, Pl. IV, VIII, IX ABM file data

Traquility Co., Contention Mng. Co., Tombstone Consolidated Mines Co., Bunker Hill Mines Co., Tombstone Development Co.)							
15. Defense mine (Tombstone Mill & Mng. Co., Tombstone Consolidated Mines Co., Bunker Hill Mines Co., Tombstone Development Co.)	20S	22E	So. Cen. 11	Ag, Pb, Au-	Oxidized argentiferous lead mineralization along the Defense fissure zone where intersects crossing rolls in favorable Cretaceous Bisbee Group beds.	Surface and underground workings. A few thousand tons of ore produced.	Blake, 1882, p. 343 Church, 1903, p. 12, 21-23 Butler et alia, 1938, p. 89, 99
16. Dry Hill mine (Tombstone Development Co.)	20S	22E	SW¼ 15	Ag, Mn, Cu-, Au-	Irregular, oxidized, pipe-like to tabular bodies of manganiferous silver ore, with minor copper, along a fault system cutting strongly altered Cambrian Abrigo and Pennsylvanian-Permian Naco Group limestones.	Shaft workings. Up to 10,000 tons of manganiferous silver ore produced from late 1800's to about 1937.	Butler et alia, 1938, p. 83-84, Pl. III ABM file data
17. Eagle Roost mine	20S	22E	NE¼ 23	Mn, Ag	Manganiferous silver ore in lenses and irregular bunches along a fissure zone in Mississippian Escabrosa Limestone.	Adit workings. A small tonnage produced prior to 1957.	Farnham et alia, 1961, p. 35-36
18. East Side mine (East Side, East Side No. 2; Tombstone Mill & Mng. Co. Tombstone Consolidated Mines Co., Bunker Hill Mines Co., Tombstone Development Co.)	20S	22E	NW¼ 14	Ag, Mn, Pb-, Au-	Small oxidized oreshoots of manganiferous silver mineralization along a "northeast" fissure zone in Cretaceous Bisbee Group sedimentary beds.	Surface and underground workings. A few thousand tons of ore produced in early 1900's.	Church, 1903, p. 6 Butler et alia, 1938, p. 78 Needham & Storms, 1956, p. 78 Farnham et, alia, 1961, p. 37 ABM file data
19. Emerald & Silver Plume mine group (Grand Central Mng. Co., Tombstone Consolidated Mines Co., Bunker Hill Mines Co., Tombstone Development Co.)	20S	22E	NW¼ 23	Pb, Zn, Ag, Au, Cu-, Mo-	Partially oxidized base metal sulfides with some wulfenite and horn silver in fault breccia in Cambrian Abrigo Limestone and Bolsa Quartzite.	Extensive shaft workings. Up to 40,000 tons of ore produced in the 1880's and smaller amounts produced intermittently up to 1928.	Church, 1903, p. 6, 29 Butler et alia, 1938, p. 44, 71-72 107, Pl. III, IV ABM file data
20. Empire mine (Tombstone Mill & Mng. Co., Tombstone Consolidated Mines Co., Bunker Hill Mines Co., Tombstone Development Co.)	20S	22E	E. Cen. 11	Ag, Pb, Cu-, Zn-, Mo-	Oxidized base metal sulfides and minor wulfenite in irregular pipes and bedded deposits in Cretaceous Bisbee Group limestone along a series of anticlinal rolls cut by a strong dike-filled fault and "northeast" fissures.	Shaft workings. Over 10,000 tons of ore produced in the late 1800's but output included with adjoining mines.	Church, 1903, p. 24, 33 Butler et alia, 1938, p. 84-89, 98; Pl. III, IV ABM file data
21. Florida mine group	20S	22E	Cen. 32	Mn	Seams, veinlets, and irregular small masses of soft manganese oxides along fissures in limestone.	Surface workings. A small amount produced around 1954.	Farnham et alia, 1961, p. 36
22. Free Coinage mine	20S	22E	So. Cen. 9 No. Cen. 16	Ag, Au, Mn-	Oxidized and enriched, weak and spotty, gold and silver mineralization along a fault fissure in Laramide Uncle Sam quartz-latite porphyry.	Shallow workings. About 500 tons of ore produced intermittently since 1890's, mainly in 1920-1922	ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
23. Gallagher Vanadium & Rare Minerals Corporation mine; Bradsher, Stella, Vogel, Buena Vista	20S	21E	SE¼ 36	Pb-, V-, Ag-, Au-, Cu-	Very spotty, generally weak, largely oxidized, lead and copper mineralization with some vanadinite in a silicified and altered shear zone in Tertiary Bronco volcanics.	Shaft workings. Some 670 tons of ore produced mainly in 1952.	USAEC Prelim. Rec. Rpt. A-P-153, 1953 ABM file data
24. Galvez mine (Wolcott)	20S	22E	SW¼ 22	Pb, Cu, Ag, Au	Oxidized base metal sulfides in fault zones cutting Pennsylvanian-Permian Naco Group limestone and Cretaceous Bisbee Group beds.	Shaft workings. About 695 tons or ore produced in 1911.	ABM file data
25. Girard mine (Girard Mng. Co., Tombstone Mill & Mng. Co., Tombstone Consolidated Mines Co., Bunker Hill Mines Co., Tombstone Development Co.)	20S	22E	Cen. 11	Ag, Pb	Low grade, oxidized, bedded replacement deposits in Pennsylvanian-Permian Naco Group and Cretaceous Bisbee Group limestones along an anticlinal roll intersected by "northeast" fissures.	Shaft workings. Several thousand tons of ore produced in the late 1800's.	Tenney, 1927-1929, p. 173 Butler et alia, 1938, p. 43; Pl. XX
26. Goodenough mine (Combination, No. 6; Tombstone Mill & Mng. Co., Tombstone Consolidated Mines Co., Bunker Hill Mines Co., Tombstone Development Co.)	20S	22E	NE¼ 11	Ag, Pb, Au-	Oxidized replacement orebodies of argentiferous galena in Cretaceous Bisbee Group limestone along anticlinal rolls cut by northeast fissure zones.	Shaft workings. Up to 100,000 tons of ore produced, mainly from 1884 to 1896.	Blake, 1882, p. 336-337, 342-344 Church, 1903, p. 14-17, 21, 24 36 Butler et alia, 1938, p. 89, 91
27. Ground Hog mine	20S	22E	SW¼ 22	Ag	Strongly oxidized silver-bearing mineralization along a fault zone cutting Cretaceous Bisbee Group and Paleozoic limestones.	Shaft and surface workings. Produced ore in the late 1880's and in 1935.	Butler et alia, 1938, p. 45 ABM file data
28. Hawk Eye mine (Little Wonder)	20S	22E	E. Cen. 11	Ag, Pb, Au-	Irregular oxidized orebodies of argentiferous galena in Cretaceous Bisbee Group limestone along anticlinal rolls cut by northeast fissures.	Underground workings. Several thousand tons of ore produced in early 1900's.	Church, 1903, p. 24
29. Herschel mine (Herschel Mng. Co.)	20S	22E	SW¼ 11	Ag, Pb, Au-, Mn-	Oxidized oreshoots of argentiferous galena at the intersection of the Lucky Cuss fault zone with "northeast" fissures and in bedded replacement bodies in Pennsylvanian-Permian Naco Group limestone beneath bedding plane slips.	Shaft workings. Some 5000 tons of ore produced, mainly between 1905 and 1935.	Church, 1903, p. 6 Butler et alia, 1938, p. 46-48, 78, 103, Pl. XII ABM file data
30. Ingersol mine (Bob Ingersol, Blue Monday; Hearst-Hagen Estate, VMP Leasing Co.)	20S	22E	SW¼ 11	Pb, Ag, Zn, Au, Cu-, Mn-, (Cd)	Oxidized replacement deposits of base metal sulfides with small high grade streaks of silver-gold values in an overturned fold of Cretaceous Bisbee Group limestone cut by "northeast" fissures.	Shaft workings. Several thousand tons of ore produced in the 1880's and a few thousand intermittently from 1918 to 1932.	Blake, 1882, p. 335, 344 Butler et alia, 1938, p. 44, 48, 77, 89, 91, 96, Pl. IV Burnham, 1959, p. 31 ABM file data

31.	Intervener mine (Silver Bill; Costello, Giacoma Bros.)	20S	22E	Cen. 11	Ag, Pb, Au-	Irregular, oxidized orebodies of argentiferous galena along a "northeast" fissure zone cutting Cretaceous Bisbee Group limestone and shales.	Surface and underground workings. Relatively small sporadic production in late 1800's and early 1900's and a few hundred tons in the 1940's.	Church, 1903, p. 12 Butler et alia, 1938, p. 77 ABM file data
32.	Luck Sure mine (Old Glory Mng. Co., Bunker Hill Mines Co., Tombstone Development Co.)	20S	22E	NW¼ 14	Ag, Mn, Au-, Pb-	Irregular, oxidized pipe and chimney orebodies of manganiferous silver along "northeast" fissure zones in Pennsylvanian-Permian Naco Group limestone near intersections with the Lucky Cuss Fault.	Shaft and adit workings. A few thousand tons of manganiferous smelter flux produced in 1881 to 1884 and some 1600 tons in 1905-1906.	Goodale, 1889, p. 767 Church, 1903, p. 29 Butler et alia, 1938, p. 43, 46, 80, 103, Pl. IV ABM file data
33.	Lucky Cuss mine (Escondido, McCann, Wedge; Tombstone Mill & Mng. Co., Tombstone Consolidated Mines Co., Bunker Hill Mines Co., Tombstone Development Co.)	20S	22E	NW¼ 14	Ag, Mn, Au-, Pb-	Irregular, extensively oxidized, tabular to chimney-like orebodies, mostly manganiferous silver, in altered Pennsylvanian-Permian Naco Group and Cretaceous Bisbee Group limestones and shales; as veins in the Lucky Cuss fault zone; along northeast fissure zone; and as replacements along bedding plane faults in the limestones close to fissure zones.	Shaft workings. One of the orginal Tombstone mines. At least 100,000 tons of ore produced since the 1880's.	Goodale, 1889, p. 767 Church, 1903, p. 4, 6, 10, 28-31, 35 Butler et alia, 1938, p. 41-43, 47, 74-80; Pl. III, IV, XII, XIII Romslo & Ravitz, 1947, p. 7, 8 Needham & Storms, 1956, p. 30
34.	Mamie mine (Mellgren group, Tombstone Silver Fields Co.)	20S	22E	E. Cen. 16	Ag	Silver values in oxidized fissure vein cutting Cretaceous Bisbee Group beds.	Shaft workings. Several hundred tons produced intermittently in the late 1800's and during the 1920's and 1930's.	Church, 1903, p. 6 Butler et alia, 1938, p. 18, Pl. III ABM file data
35.	Manganese Silver mine	20S	22E	No. Cen. 23	Cu, Ag, Au-, Mn-	Oxidized copper-silver mineralization in spotty replacement bodies along fracture zones in Paleozoic limestone.	Surface workings. Some 60 tons of ore produced in 1941-1942.	ABM file data
36.	Merrimac mine (Tombstone Silver Fields Co.)	20S	22E	So. Cen. 9	Ag, Au	Spotty silver and gold values along an oxidized and altered fault fissure cutting Laramide Uncle Sam quartz latite prophyry.	Shaft mine. A few hundred tons of ore produced sporadically between the 1880's and 1930's.	Butler et alia, p. 100; Pl. III ABM file data
37.	Montezuma mine	20S	22E	SW¼ 17	Ag, Au	Spotty silver and gold values along an oxidized and altered fault fissure cutting Laramide Uncle Sam quartz latite porphyry.	Shaft mine. A few hundred tons of ore produced during the late 1880's.	Butler et alia, 1938, p. 100; Pl. III ABM file data
38.	Morning Star mine	20S	22E	Cen. Bor. 13-14	Pb, Ag, Au, Cu-	Oxidized lead and minor copper mineralization along a fracture zone in Paleozoic limestone.	Shaft workings. About 100 tons of ore produced in the late 1930's and early 1940's.	ABM file data
39.	Mustang mine (Escapule)	20S	22E	W. Cen. 30	Pb, Ag	Oxidized argentiferous lead mineralization along a fracture zone in Laramide Uncle Sam quartz latite prophyry.	Shaft and surface workings. Approximately 114 tons of ore produced in 1942-1943.	ABM file data
40.	Old Guard mine (Royal Guard; Old Guard Mng. Co., Imperial Guard Mng. Co., Silver Bar Mng. Co., Tombstone Silver Fields Mng. Co.)	20S	22E	SW¼ 11	Ag, Au-, Pb-, Mn-	Oxidized oreshoots containing argentiferous lead and manganese mineralization along the Lucky Cuss fault zone at junctions with intersecting fussures.	Shaft mine. Some 2000 tons of ore produced intermittently between 1905 and 1940.	Butler et alia, 1938, p. 46-48, 78; Pl. III, IV, XII ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
41. Oregon-Prompter mines (Knoxville, Stonewall, Florodoro; Boston & Arizona Smltng & Reduction Co., Tombstone Development Co.)	20S	22E	So. Bor. 14, 15	Ag, Mn, Au-	Irregular, pipe-like to tabular replacement orebodies, mainly oxidized manganiferous-silver, along the footwall of the Prompter fault zone in Pennsylvanian-Permian Naco Group limestone and controlled by bedding plane slips and "northeast" fractures.	Shaft workings. A few tens of thousands of tons of ore produced at irregular intervals from 1883 to 1950.	Goodale, 1889, p. 767 Church, 1903, p. 4, 29-31 Butler et alia, 1938, p. 13, 42 44, 47, 72, 80, 82-83, 106; Pl. III, IV, XIV Romslo & Ravitz, 1947, p. 7 Needham & Storms, 1956, p. 4-21 Farnham et alia, 1961, p. 27 ABM file data
42. Owl's Nest mine (Tombstone Mill & Mng. Co., Tombstone Consolidated Mines Co., Bunker Hill Mines Co., Tombstone Development Co.)	20S	22E	NW¼ 14	Ag, Pb	Small oxidized oreshoots of argentiferous galena along fracture zones and in replacement bodies on anticlinal rolls on the west side of the Lucky Cuss fault zone.	Shaft workings. Some production in the 1880's.	Butler et alia, 1938, Pl. XIII
43. Plain View mine (Escapule)	20S	22E	So. Cen. 14	Mn, Ag	Spotty argentiferous manganese bodies along fissure veins in Mississippian Escabrosa Limestone.	Shallow workings. Some silver ore produced in the 1880's and about 50 tons of manganese ore in the 1950's.	Farnham et alia, 1961, p. 32-33
44. Randolph mine (Mellgren group, Tombstone Silver Fields Co.)	20S	22E	SE¼ 16	Ag	Spotty silver values along an oxidized fissure vein cutting Cretaceous Bisbee group beds.	Shallow shaft workings. A few hundred tons produced intermittently from the 1880's to 1917.	Church, 1903, p. 4 Butler et alia, 1938, p. 18, 20, 108, Pl. III Romslo & Ravitz, 1947, p. 8 ABM file data
45. Rattling Boy & Sidewheel mines (Piedras de Sol Mng. Co., Sidewheel Leasing Co.)	20S	22E	NW¼ 23	Mn, Ag	Short, irregular pod-like bunches, disconnected lenses, and pipe-like masses of argentiferous manganese along a roll and associated with fractures in Mississippian Escabrosa Limestone.	Shaft, adit, and surface workings. A few hundred tons of ore produced in the 1880's and about 600 to 700 tons produced during 1921-1923 and 1935-1937.	Needham & Storms, 1956, p. 30 Farnham et alia, 1961, p. 30-31 ABM file data
46. Rocky Bar mine	20S	22E	SW¼ 15	Mn, Ag, Cu-, Au-	Manganiferous silver ore in irregular pods and lenses along the Prompter fault system where "northeast" fissures cut Pennsylvanian-Permian Naco Group limestone.	Shaft and adit workings. A few hundred tons of ore produced in the 1880's and about 530 tons in 1920-1924.	Butler et alia, 1938, p. 48 Needham & Storms, 1956, p. 30 Farnham et alia, 1961, p. 37 ABM file data
47. Sailor mine	20S	22E	SE¼ 16	Ag	Spotty silver values in an oxidized fissure vein cutting Laramide Uncle Sam quartz latite porphyry.	Shallow workings. A few hundred tons of ore produced during 1880's and 1890's.	Butler et alia, 1938, Pl. III ABM file data
48. San Pedro mine San Pedro Leasing Co.)	20S	22E	SE¼ 8	Ag, Au, Mn, Cu-	Horn silver and gold values associated with manganese oxide and quartz in an oxidized fault fissure vein in Laramide Uncle Sam quartz latite porphyry.	Shaft workings. Several thousand tons of ore produced in the 1880's and 1890's. A sporadic production of about 2,900 tons from 1936 to 1950.	Butler et alia, 1938, p. 100-102; Pl. III ABM file data

49. Silver Thread mine (Tombstone Mill & Mng. Co., Tombstone Consolidated Mines Co., Bunker Hill Mines Co., Tombstone Development Co.)	20S	22E	W. Cen. 12	Pb, Ag, Zn, Au (As, Cd, Sb)	Irregular oxidized orebodies of argentiferous lead and zinc sulfides in Cretaceous Bisbee Group limestone along the crest and limb of an anticlinal roll and along "northeast" fissures.	Shaft workings. A few thousand tons of ore produced in the late 1880's and a few hundred tons in the 1920's.	Church, 1903, p. 18 Butler et alia, 1938, p. 46, 87, 98, 107; Pl. III, IV, XIV, XXIII
50. Soltice mine (Mellgren group, Soltice Mng. & Mllng. Co., Tombstone Silver Fields Co.)	20S	22E	SE¼ 9	Ag, Pb, Cu-, Au-	Oxidized lead-silver ore along a fault fissure vein cutting Cretaceous Bisbee Group beds close to the contact with Laramide Uncle Sam quartz latite porphyry.	Shaft workings. Some 425 tons of ore produced intermittently from 1911 to 1940.	Butler et alia, 1938, p. 47 ABM file data
51. State of Maine mine (Grand Central Mng. Co., San Pedro Leasing Co.)	20S	22E	W. Cen. 16	Ag, Au, Mn-, Cu-, Pb-	Horn silver and gold values in the oxide zone and weak sulfides in narrow stringers in crushed and altered rock in depth along fault fissure zones cutting sill-like Laramide Uncle Sam quartz latite porphyry and Cretaceous Bisbee Group beds.	Shaft workings. Some 30,000 tons of ore produced during the 1880's and a few hundred tons intermittently since then.	Church, 1903, p. 31-32 Butler et alia, 1938, p. 35, 44, 48, 100-101; Pl. III, XXV, XXVI ABM file data
52. Sulphuret mine (Contention Mng. Co., Western Mng. Co., Tombstone Consolidated Mines Co., Bunker Hill Mines Co., Tombstone Development Co.)	20S	22E	SE¼ 11	Ag, Pb, Zn, Au, Cu-	Oxidized argentiferous lead and zinc mineralization and deeper sulfides in irregular replacement orebodies along a broad anticlinial fold in Cretaceous Bisbee Group limestone and intersecting "northeast" fissure.	Shaft working. Some 20,000 tons of ore produced, mainly in the early 1900's.	Blake, 1882, p. 342 Church, 1903, p. 12 Butler et alia, 1938, p. 43, 84, 92-95 ABM file data
53. Sunset mine	20S	22E	SW¼ 15	Ag, Pb, Mn, Cu-, Au-	Spotty, oxidized, argentiferous lead and manganese mineralization along a fissure vein in Laramide Uncle Sam quartz latite porphyry.	Shallow workings. A few tons of high grade silver ore produced in the early 1880's and some 400 tons of ore intermittently from 1921 to 1927.	Blake, 1882, p. 335 Goodale, 1889, p. 773 Butler et alia, 1938, p. 48 Needham & Storms, 1956, p. 30 Farnham et alia, 1961, p. 37
54. Telephone mine	20S	22E	Cen. 14	Ag, Mn	Small, oxidized, argentiferous-manganese replacement orebodies in Pennsylvanian-Permian Naco Group limestone along bedding plane slips cut by "northeast" fissures.	Shaft workings. A few hundred tons produced in the late 1800's.	Church, 1903, p. 11 Butler et alia, 1938, p. 84; Pl. IV
55. Tombstone Extension mines (Carper, San Diego, La Grande; Woronoco Co., Tombstone Mng. Co., American Smltng & Rfng. Co.)	20S	22E	E. Cen. 13	Pb, Ag, Au, Cu-	Largely oxidized argentiferous galena in vein-like replacements of gougy fault breccia in Cretaceous Bisbee Group beds along a strong fault zone intersected by "northeast" fissures.	Shaft workings. Some intermittent production in early 1900's and over 40,000 tons of ore produced from 1930 through 1954.	Church, 1903, p. 9 Butler et alia, 1938, p. 48, 72, 103; Pl. III, X ABM file data
56. Toughnut mine (Northwest, Hoodoo stopes; Tombstone Mill & Mng. Co., Tombstone Consolidated Mines Co., Bunker Hill Mines Co., Tombstone Development Co.)	20S	22E	Cen. 11	Pb, Ag, Zn-, Cu-, Au- (Cd)	Oxidized, base metal sulfides in replacement orebodies in the lower section of Cretaceous Bisbee Group beds along anticlinal rolls and in pipes where rolls are cut by "northeast" fissures.	Shaft workings. Several thousand tons produced in the late 1800's and early 1900's.	Blake, 1882, p. 336, 342-344 Church, 1903, p. 6, 9, 14-17, 21-22, 24, 25-26. Butler et alia, 1938, p. 41, 44, 89, 92-93; Pl. III, IV ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
57. Tribute mine (Tombstone Mill & Mng. Co., Tombstone Consolidated Mines Co., Bunker Hill Mines Co., Tombstone Development Co.)	20S	22E	So. Cen. 11	Pb, Ag, Au, Cu-, Mo-	Oxidized argentiferous and auriferous base metal sulfides in overturned Cretaceous Bisbee Group shales where fold is intersected by a dike and "northeast" fissures.	Shaft workings. Produced several hundred tons of ore in the 1880's and a small tonnage intermittently since then.	Church, 1903, p. 15 Butler et alia, 1938, p. 28, 89, 91, 93, 96, 103; Pl. IV
58. Vizina mine (Vizina Consolidated Mng. Co.)	20S	22E	No. Cen. 11	Ag, Pb, Au-	Oxidized argentiferous lead mineralization in bottom of Cretaceous Bisbee Group beds and top of limestones of the Pennsylvanian-Permian Naco Group along anticlinal rolls and at intersections of "northeast" fissures and dike with rolls.	Shaft workings. Over 10,000 tons of ore produced in the late 1800's.	Blake, 1882, p. 336 Church, 1903, p. 16 Butler et alia, 1938, p. 42, 45, 89, 103; Pl. IV, XVIII
59. Way Up mine (Tombstone Development Co.)	20S	22E	NE¼ 11	Ag, Pb, Au-	Oxidized argentiferous lead mineralization in Cretaceous Bisbee Group limestone associated with an anticlinal roll cut by "northeast" fissures.	Shaft workings. Over 550 tons produced in the 1880's.	Blake, 1882, p. 336, 343 Church, 1903, p. 15, 21, 24 Butler et alia, 1938, p. 44
60. West Side mine	20S	22E	NE¼ 11	Pb, Ag, Au	Oxidized argentiferous and auriferous lead mineralization in Cretaceous Bisbee Group beds, controlled by intersection of fissures and anticlinal rolls.	Shaft workings. Several tens of thousands of tons of ore produced, mainly in the late 1880's and early 1900's.	Blake, 1882, p. 343-344 Church, 1903, p. 4, 12, 14-19 22, 34-36 Butler et alia, 1938, p. 43, 77 89, 91, 93-94; Pl. III, IV, XXI, XXII, XXIV
XV Turquoise District (Courtland-Gleeson area) (See Fig. 6.)	19-20S	24-25E	-----	Cu, Pb, Zn, Ag, Mn, Au-, Quartzite, Turquoise	1. Copper carbonates and oxides in irregular blanket deposits where Cambrian Bolsa Quartzite and Abrigo Limestone are thrusted over Carboniferous limestone; copper sulfides, oxides, and carbonates in irregular replacement deposits in Cambrian Abrigo Limestone; and copper sulfides, oxides, and carbonates in irregular, tabular pyritic lenses in Carboniferous limestone along or close to a contact with quartz monzonite intrusive. 2. Lead and zinc carbonates, lead sulphate, and zinc silicate with horn silver, manganese, and minor copper and cold in irregular orebodies in Pennsylvanian-Permian Naco Group limestones along and at intersections of fractures and faults. 3. Turquoise in near-surface stringers and lenses in altered granite and quartzite. 4. Manganese oxides in irregular bunches, lenses, and masses along fractures in limestone.	Numerous mines and prospects developed by shafts, tunnels and adits since 1883. At least 887 thousand tons of base metal ore and some 250 tons of manganese ore produced plus some turquoise and considerable quartzite smelter flux.	Platt, 1909, p. 213 Dinsmore, 1910 Ransome, 1912, 1913 Wilson, 1927 Crawford, 1937, p. 511-523 Gilluly, 1956

					5. Spotty and weak base metal mineralization with gold and silver values in veins in intrusive rocks.		
1. April Fool mine (Calumet & Arizona Mng. Co.)	19S	25E	SW¼ 16	Cu, Ag	Pockets of copper carbonates and oxides in blanket deposits in faulted and broken thrust fault breccia.	Shaft workings. A few thousand tons of ore produced prior to 1911 and several hundred tons intermittently in the 1920's.	Ransome, 1913, p. 7 Wilson, 1927, p. 58 ABM file data
2. Armstrong mine (Leadville Mng. Co., Needles Mng. & Smltng Co., U. S. Smltng & Rfng Co., Andes Copper Co.)	19S	25E	So. Cen. 17	Cu, Ag, Pb-, Au-	Partly oxidized and enriched pyritic copper ore, with minor galena, in an irregular vein-like body in faulted and fractured Abrigo Limestone.	Shaft workings. Some 3,400 tons of ore produced up to late 1924.	Wilson, 1927, p. 61-64 ABM file data
3. Avalon mine (Herget-Turquoise)	19S	25E	SW¼ 17	Turquoise	Thin, irregular stringers and small lenses of turquoise in joints and fractures in granite and Bolsa Quartzite along the intrusive contact.	Shallow workings. At least several hundred pounds of turquoise produced since the late 1800's.	Wilson, 1927, p. 66-67 Crawford, 1937, p. 511-523 ABM file data
4. Casey mine (Costello group; Mona Leasing Co.)	19S	25E	SE¼ 17	Cu, Au	Oxidized copper mineralization in thrust fault breccia and in Carboniferous limestone along contact with intrusive quartz monzonite.	Shaft workings. Some 3,000 tons of ore produced prior to 1900 and 5,200 tons produced intermittently from 1926 to 1952.	Ransome, 1913, p. 7, 10 Wilson, 1927, p. 68 ABM file data
5. Copper Belle mine (Leonard, Pemberthy, Charleston group; Shannon Copper Co., Leonard Copper Co., Peru Mng. Co.)	19S	25E	Cen. 32	Cu, Pb-, Zn-, Ag-, Au-, (Bi)	Chalcopyrite and bornite, minor galena and sphalerite, partly oxidized, in irregular, tabular pyritic orebodies in Carboniferous limestone along the contacts with intrusive quartz monzonite sills.	Shaft workings. Most productive mine of the district with some 700,000 tons of ore produced intermittently from the late 1800's to 1957.	Ransome, 1913, p. 12 Wilson, 1927, p. 47-49, 69-71 Cooper, 1962 ABM file data
6. Copper Rocks (Copperrox) mine (Barrett group; Arizona Copper Syndicate of Providence, Copperrox Mng. Co.)	19S	24E	NW¼ 13	Cu, Ag, Mn, Au-	Copper carbonates with irregular bunches and lenses of wad and pyrolusite along faults and fractures in slivers of Carboniferous limestone along and near granitic intrusive.	Shaft and tunnel workings. Some 1070 tons of copper ore produced in 1915-1918 and a few tons of manganese smelter flux also produced.	Mines Handbook, 1916 Farnham et alia, 1961 p. 39-40 ABM file data
7. Cyclone mine	19S	25E	E. Cen. 17	Pb, Zn, Ag	Pyrite, galena, sphalerite, cerrusite and anglesite along the contact zone of Carboniferous limestone and intrusive quartz monzonite.	Shaft workings. A few tons produced in the early 1900's and 45 tons of ore in 1942.	Wilson, 1927, p. 68 ABM file data
8. Defiance mine (Costello group; Giacoma Bros.)	19S	25E	No. Cen. 32	Pb, Zn, Ag, Cu-, Au-	Scattered, oxidized replacement orebodies along prominent fault fissures in Pennsylvanian-Permian Naco Group limestone near the contact with intrusive quartz monzonite.	Tunnel workings. Sporadic production of 10,000 or more tons from the early 1900's to 1958.	Wilson, 1927, p. 75-76 ABM file data
9. Germania mine (Calumet & Arizona Mng. Co., Phelps Dodge Corp.)	19S	25E	SW¼ 16	Cu, Au, Ag	Irregular, oxidized, blanket-like copper mineralization in thrust fault breccia between Bolsa Quartzite above and Carboniferous limestone below.	Shaft workings. About 76,600 tons of ore produced between 1909 and 1940.	Ransome, 1912, p. 4, 7-10 Wilson, 1927, p. 58 ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
10. Gilbert Silica quarry (Nancy group; Gilbert Construction Co.)	19S	25E	W. 28	Quartzite for smelter flux	Outcrop of Bolsa Quartzite.	Quarry operations. Over two million tons produced from 1959 through 1971.	ABM file data
11. Gleeson mine (Costello)	19S	25E	Cen. 32	Cu, Ag, Au-	Copper carbonates with minor sulfide in replacements of beds of Carboniferous limestone.	Shaft and surface workings. About 500 tons produced in the early 1900's.	ABM file data
12. Gold Band mine	19S	25E	So. Cen. 4	Au, Ag	Weak and spotty gold and silver values in fractured Tertiary quartz latite.	Shaft workings. About 65 tons of ore produced in 1938.	ABM file data
13. Gold Camp mines area (Golden Crown, No Account group)	20S	24E	15, 16	Cu, Pb, Au, Ag, Mo-	Spotty, oxidized copper and lead mineralization with gold and silver values in irregular quartz veins in intrusive quartz monzonite.	A few shallow shafts and tunnels. Sporadic, small ore production in early 1900's. The Golden Crown produced 30 tons in 1931 and the No Account about 144 tons during 1937-1938 and 1940-1941.	ABM file data
14. Herron mine (Calomel, Thelma)	19S	25E	So. Cen. 17	Cu, Ag, Au-	Chalcocite, chalcopyrite and pyrite in small irregular replacement bodies along a small fault in Abrigo Limestone.	Tunnel workings. Over 2,000 tons of ore produced sporadically from 1924-1929.	Wilson, 1927, p. 65-66 ABM file data
15. Highland mine (Great Western Copper Co.)	19S	25E	SE¼ 20	Cu, Ag, Au-	Low grade, disseminated, cupriferous-pyritic orebodies with some scattered high-grade copper sulfides in metamorphosed Abrigo Limestone close to intrusive quartz monzonite porphyry.	Shaft workings. Several thousand tons of ore produced 1918 to 1925 and over 3000 tons, 1954 to 1957.	Wilson, 1927, p. 55 ABM file data
16. Humbot mine (Great Western Copper Co., Hope Mng. & Mlng. Co.)	19S	25E	E. Cen. 20	Cu, Ag, Au-	Low grade, disseminated, cupriferous-pyritic orebodies with some scattered high-grade copper sulfides in metamorphosed Abrigo Limestone close to intrusive quartz monzonite porphyry.	Shaft workings. Several thousand tons of ore produced between the late 1890's and 1908.	Ransome, 1912, p. 10-12 Wilson, 1927, p. 55-56 ABM file data
17. King Plomo mine	19S	25E	So. Cen. 16	Cu, Ag-	Oxidized copper mineralization in crushed and brecciated Carboniferous limestone in thrust fault blocks.	Shallow shaft workings. About 80 tons of ore produced in 1929.	ABM file data
18. Last Chance mine (Warnekros)	19S	25E	Cor. 16, 17, 20& 21	Pb, Zn, Cu-, Ag-, Au-	Irregular pockets and blanket-like deposits of lead, zinc, and minor copper mineralization, largely oxidized, in Pennsylvanian-Permian Naco Group limestone.	Shallow workings. About 700 tons of ore produced intermittently from 1912 through 1949.	ABM file data

19. Leadville No. 1 mine (Leadville Mng. Co., Calumet & Arizona Mng. Co., Needles Mng. & Smltng Co., U. S. Smltng & Rfng. Co., Andes Copper Co.)	19S	25E	So. Cen. 17	Cu, Ag, Au-	Disseminated, cupriferous, pyritic deposits in a belt of cherty Abrigo Limestone cut by quartz monzonite dikes and bordering a fault contact of Bolsa Quartzite and Carboniferous limestone.	Shaft workings. A total of some 5000 or more tons produced intermittently from the late 1890's up through 1943.	Ransome, 1912, p. 4-5, 9-11 Wilson, 1927, p. 59-60 ABM file data
20. Leadville No. 2 mine (Leadville Mng. Co., Calumet & Arizona Mng. Co., Needles Mng. & Smltng. Co., U. S. Smltng & Rfng Co., Andes Copper Co.)	19S	25E	NE¼ 20	Cu, Ag, Au-	Large bodies of low grade cupriferous pyritic ore in metamorphosed Abrigo Limestone near a fault contact with Carboniferous limestone.	Shaft workings. Several thousand tons of ore produced from 1907 through 1917 and a small amount subsequently.	Ransome, 1912, p. 4-5, 9-11 Wilson, 1927, p. 60-61 ABM file data
21. McLenden mine (Turquoise King; Leadville Mng. Co., Holmes Copper Co.)	19S	25E	NE¼ 20	Cu, Ag, Au-	Chalcopyrite, bornite, and sooty chalcocite in small stringers, disseminations, and irregular replacements in steeply dipping Abrigo Limestone intruded by quartz monzonite prophyry dikes.	Shaft workings. Some 1460 tons of ore produced in 1924-1926 and a few tons in 1935.	Wilson, 1927, p. 64 ABM file data
22. Maid of Sunshine mine (Leadville Mng. Co., Calumet & Arizona Mng. Co., Phelps Dodge Corp.)	19S	25E	SW¼ 16	Cu, Ag, Au	Oxidized copper mineralization in an irregular blanket-like deposit in thrust fault beccia between Bolsa Quartzite above and Carboniferous limestone below.	Shaft and incline workings. Several thousand tons of ore produced from 1898 to 1915, some 15,000 tons in 1918 and 1919, and about 12,000 tons from 1923 to 1929.	Wilson, 1927, p. 56-58 ABM file data
23. Mame mine (Great Western Copper Co., Hope Mng. & Mllng. Co., Interstate Accounting & Office Service, Minerals Exploration Co., Tombstone Mines, Inc.	19S	25E	NE¼ 20	Cu, Ag, Pb-, Zn-, Au-	Low grade, irregular, lenticular, cupriferous, pyritic ore in replacement bodies in a steeply dipping belt of Abrigo Limestone intruded and metamorphosed by quartz monzonite porphyry.	Shaft workings. About 100,000 tons of ore produced from 1910 to 1920 and intermittently some 15,000 tons up to 1960. About 525 tons of copper precipitates produced since 1959.	Ransome, 1912, p. 4-5, 8-12 Wilson, 1927, p. 54-55 ABM file data
24. Mangum claims	19S	25E	NW¼ 17	Mn	Manganese oxides in irregular bunches, seams, and nodules in fractures in shattered Cretaceous Bisbee Group limestone.	Shallow pits. Two carloads of picked ore produced during the second World War.	Farnham et alia, 1961, p. 37-38
25. Mary mine (Great Western Copper Co., Hope Mng. & Mllng Co.)	19S	25E	No. Cen. 21	Cu, Ag-, Au-	Oxidized copper mineralization in irregular replacement orebodies in Carboniferous limestone along the top of a thrust beccia just below Bolsa Quartzite.	Shaft workings. About 100,000 tons of ore produced between early 1900's and 1913 and a few thousand tons from 1925 through 1929.	Ransome, 1912, p. 4, 7-10 Wilson, 1927, p. 53-54 ABM file data
26. Maud Hill mine group	19S	25E	NW¼ 33	Cu, Pb, Ag, Au-	Copper and lead carbonates in irregular, bedded deposits in tilted Carboniferous limestones intruded by quartz monzonite porphyry.	Shallow workings. About 25 tons produced in 1903.	ABM file data
27. Mona mine (Costello group; Mona Leasing Co.)	19S	25E	SE¼ 17	Cu, Pb, Ag	Small, irregular masses and narrow streaks of tenorite, chrysocolla, and copper and lead carbonates in sand and gravel.	Shaft workings. About 1000 tons of ore produced intermittently from 1924 to 1938.	Wilson, 1927, p. 67-68 ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
28. Muso mine (Leadville Mng. Co., Calumet & Arizona Mng. Co., Needles Mng. & Smltng Co., U. S. Smltng and Rfng. Co., Andes Copper Co.)	19S	25E	NE¼ 20	Cu, Ag-, Au-	Cupriferous, pyritic replacement orebodies in steeply dipping, highly metamorphosed Cambrian Abrigo Limestone.	Shaft workings. Over 12 thousand tons of ore produced from 1917 to 1924.	Wilson, 1927, p. 61 ABM file data
29. Mystery mine (Mystery Mng. Co., Minerals Exploration Co.)	19S	25E	SE¼ 29 NE¼ 32	Pb, Zn, Ag, Cu-	Oxidized lead, zinc, and minor copper mineralization in irregular replacement orebodies, controlled by fractures and faults in Pennsylvanian-Permian Naco Group limestone.	Tunnel workings. Some 9300 tons of ore produced from 1924 to 1930 and 94 tons in 1942.	Wilson, 1927, p. 77-78 ABM file data
30. Ontario mine (Great Western Copper Co.)	19S	25E	E. Cen. 20	Cu, Ag, Au	Copper carbonates and sulfides in bedded replacement deposits in Cambrian Abrigo Limestone.	Shallow workings. A few tens of tons of ore produced, 1911 and	ABM file data
31. Poorman mine	19S	25E	SE¼ 17	Pb, Ag	Lead carbonate ore along fissures in Cambrian Abrigo Limestone.	Shallow workings. A few tens of tons of ore produced, 1911 and 1920.	ABM file data
32. Sadie, New Year Gift, and Grenadier group mines	19S	25E	E. Cen. 32	Cu, Ag, Au	Irregular pockets of oxidized copper mineralization in faulted and fractured Pennsylvanian-Permian Naco Group limestone.	Surface workings. About 100 tons of ore produced intermittently from 1919 to 1925.	ABM file data
33. Silver Bill mine (Costello group)	19S	25E	No. Cen. 32	Pb, Zn, Ag, Cu-, Au-, Mo-	Irregular small stringers, pockets, and replacement bodies of oxidized base metal sulfides in Pennsylvanian-Permian Naco Group limestone adjacent to a quartz monzonite porphyry contact.	Shaft workings connected to the Mystery mine. Large tonnage mined during the late 1800's, and 6,570 tons produced during the periods 1922-1930 and 1938-1941.	Wilson, 1927, p. 74-75 ABM file data
34. Silverton mine (Calumet & Arizona Mng. Co.)	19S	25E	No. Cen. 21	Cu, Au-	Oxidized copper mineralization in an irregular blanket-like deposit in thrust fault breccia with Cambrian Bolsa Quartzite and Abrigo Limestone above and Carboniferous limestone below.	Shaft workings. A few thousand tons of ore produced in the late 1800's and early 1900's.	Ransome, 1912, p. 7 Wilson, 1927, p. 58
35. (Tejon Mng. Co.)	19S	25E	W. Cen. 32	Cu, Ag, Pb-, Zn-, Au-	Thin, irregular, cupriferous, pyritic, replacement orebodies in Pennsylvanian-Permian Naco Group limestone adjoining intrusive quartz monzonite porphyry.	Extensive shaft workings. A few thousand tons produced in the late 1910's, 5,200 tons during 1923-1928, and 1,180 tons, 1952 to 1956.	Wilson, 1927, p. 72 ABM file data
36. Tom Scott mine (Tejon Mng. Co.)	19S	25E	Cen. 32	Pb, Zn, Cu, Ag, Au	Oxidized base metal sulfide orebodies in irregular stringers in faulted and fractured Pennsylvanian-Permian Naco Group limestone and as bunches in breccia-filled solution cavities in the limestone.	Tunnel workings. A few thousand tons of ore produced in the 1880's and early 1900's, 440 tons in 1929-1933, 890 tons in 1943-1947, and 170 tons in 1954.	Wilson, 1927, p. 72-74 ABM file data

37. Turquoise group mine (Turquoise Copper Mng. & Smltng Co.)	19S	25E	NW¼ 17	Cu, Ag-	Bedded replacement deposits of copper carbonates in steeply dipping Cambrian Abrigo Limestone.	Shallow workings. A few hundred tons produced in the early 1900's.	ABM file data
XVI Warren District (Bisbee area, Mule Mountains) (See Fig. 9.)	22-24S	23-25E	-----	Cu, Pb, Zn, Ag, Au, Mn, F, (Cd, Bi, Se, Te, As, Sb, U)	1. Base metal oxides, carbonates, and sulfides in large, irregular replacement bodies in tilted and faulted Paleozoic limestone formations that have been invaded by Jurassic granitic porphyry stocks, dikes, and sills. 2. Disseminated copper oxides, carbonates, and sulfides in Jurassic granitic porphyry stock. 3. Manganese oxide pods and lenses along fractures and fault zones in Paleozoic limestones. 4. Spotty base metal and gold-silver mineralization in quartz veins in Jurassic granitic porphyry stock.	Shaft, tunnel, and open pit workings. More than 150 million tons of base metal ore and approximately 35,000 tons of manganese ore mined since the late 1870's.	Ransome, 1904, a, b Bonillas et alia, 1917 Ransome, 1920 Trischka, 1931, 1938 Hogue & Wilson, 1950 Burnham, 1959, p. 31 Hayes & Landis, 1964 Bryant & Metz, 1966 ABM file data
1. Bay State mine	23S	24E	E. Cen. 21	Mn	Hard manganese oxide masses in disconnected lenses along fissure zones in limestone.	Adit and surface workings. About 800 tons of sorted ore produced around 1917-1918.	Farnham et alia, 1961, p. 19
2. Bisbee Coalition mines (Eureka and North Bisbee groups; Eureka Mng. Co., North Bisbee Development Co., Bisbee Coalition Mng. Co.)	22S	23E	26-27	Cu, Au-, Ag-	Oxidized copper mineralization in irregular quartz veins in a Jurassic granitic porphyry stock.	Tunnel and shaft workings. About 75 tons of ore produced in 1911-1913.	Copper Handbook, 1912-13 ABM file data
3. Boras mine (Phelps Dodge Corp., Boras Leasing Co.)	23S	24E	So. Cen. 21	Cu, Ag, Au, Mn	Irregular, pipe-like, replacement orebodies of partly oxidized copper mineralization along fault zones in Cambrian Abrigo Limestone. Irregular and spotty stringers, veinlets, and pods of hard manganese oxides along fissures and as replacements in limestone.	Shaft workings. Some 50,000 tons of copper ore produced, mainly from 1920-1926.	Copper Handbook, 1926 Ransome, 1920, p. 104, 110 Wilson & Butler, 1930, p. 43 Farnham et alia, 1961, p. 21 Bryant & Metz, 1966, p. 202 ABM file data
4. Briggs mine (Calumet & Arizona Mng. Co., Phelps Dodge Corp.)	23S	24E	NW¼ 22	Cu, Pb-, Zn-, Ag-, Au-	Irregular replacement orebodies of largely oxidized, base metal mineralization in relatively unaltered Mississippian Escabrosa and Devonian Martin limestones along fracture zones and closely associated with Jurassic porphyry dikes and sills.	Shaft workings. Probably several hundred thousand tons of ore produced and included in Calumet & Arizona and Phelps Dodge yearly figures.	Bonillas et alia, 1917, p. 329 Trischka, 1938, p. 37 Bryant & Metz, 1966, p. 200-201
5. Campbell mine (Calumet & Arizona Mng. Co., Phelps Dodge Corp.)	23S	24E	SE¼ 15	Cu, Pb-, Zn-, Ag-, Au-, (Bi, In, Sn)	Largely oxidized copper, with minor lead and zinc, mineralization in irregular replacement orebodies in Cambrian Abrigo, Devonian Martin and Mississippian Escabrosa limestones in close association with porphyry dikes and sills.	Shaft workings. Probably produced several hundred thousand tons of ore; included in Calumet & Arizona and Phelps Dodge totals.	Trischka, 1938, p. 37-39, fig. 6 Burnham, 1959, p. 17 Copper, 1962 Bryant & Metz, 1966, p. 201 ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
6. Cole mine (Lake Superior & Pittsburg Development Co., Calumet & Arizona Mng. Co., Phelps Dodge Corp.)	23S	24E	NE¼ 21	Cu, Ag-, (Bi)	Partially oxidized copper mineralization in irregular replacement orebodies in relatively unaltered Cambrian Abrigo and Devonian Martin limestones along the Dalles fault zone and adjacent fracture zones.	Shaft workings. Probably produced several hundred thousand tons of ore; included in Calumet & Arizona and Phelps Dodge totals.	Ransome, 1904, p. 116-118 Bonillas et alia, 1916, p. 324-329 Trischka, 1938, p. 37, fig. 6 Cooper, 1962 Bryant & Metz, 1966, p. 200-201 ABM file data
7. Copper Glance mine	23S	24E	So. Cen. 22	Mn, Cu-	Hard manganese oxides, minor copper mineralization, and some manganiferous calcite in narrow, elongated lenses and irregular masses along fissure zones in Pennsylvanian-Permian Naco Group limestone.	Shallow workings. A few hundred tons of manganese ore produced during World War I.	Farnham et alia, 1961, p. 18-19
8. Copper Queen mine (Phelps Dodge Corp.)	23S	24E	SW¼ 9	Cu, Ag-, Au-, Pb-, Zn-	High grade copper carbonates with minor lead and zinc carbonates in irregular replacement orebodies, mainly in Devonian Martin Limestone along a structural trough.	Open pit and shaft workings. Original copper mine of the district, producing several thousand tons of ore in the early years.	Ransome, 1904, p. 110 Bonillas et alia, 1916, p. 329 Trischka, 1938, p. 37 Bryant & Metz, 1966, p. 200
9. Czar mine (Phelps Dodge Corp.)	23S	24E	So. Cen. 9	Cu, Ag-, Au-, Pb-, Zn-	Mainly oxidized copper mineralization with some areas of zinc and lead ore in irregular replacement bodies in Devonian Martin and lower Mississippian Escabrosa limestones that have been shattered and crushed by faulting and fracturing and altered and intruded by porphyry dikes and sills.	Shaft mine. A major producer in its early history. Tonnage included in Phelps Dodge totals.	Ransome, 1904, p. 110 Bonillas et alia, 1916, p. 324, 328, 336-337. ABM file data
10. Dallas mine (Phelps Dodge Corp.)	23S	24E	NE¼ 21	Cu, Ag-, Au-, (V)	Scattered, relatively small, irregular replacement bodies of copper mineralization in Cambrian Abrigo and Devonian Martin limestones close to a major fault zone.	Shaft workings. A moderate size producer of the Phelps Dodge total.	Bonillas et alia, 1916, p. 350 Bryant & Metz, 1966, p. 200-201 ABM file data
11. Danville-Hanchetta claims (Phelps Dodge Corp.)	23S	24E	NW¼ 22	Mn, Cu-	Hard manganese oxides with iron oxides, calcite and minor copper staining in scattered orebodies along a fissure zone in Pennsylvanian-Permian Naco Group limestone.	Open cut and pit workings. At least 1400 tons of manganese ore produced from 1914 to 1920.	Ransome, 1920, p. 109 Wilson, & Butler, 1930, p. 41-42 Farnham et alia, 1961, p. 18
12. Denn mine (Denn-Arizona Copper Co., Shattuck-Denn Mng. Co., Phelps Dodge Corp.)	23S	24E	E. Cen. 15	Cu, Pb, Zn, Au-, Ag-, (Bi)	Copper carbonates, oxides, and sulfides with some areas of lead-zinc mineralization in irregular, often pipe-like, replacement orebodies in a wide range of Paleozoic limestones along the Dividend fault and close to the granitic porphyry stock.	Shaft workings. Over 16 million tons of fore produced.	Trischka, 1938, p. 37-38 Cooper, 1962 Bryant & Metz, 1966, p. 201-202 ABM file data
13. Easter Sunday mine (Easter Sunday Gold Mng. & Mllng Co.)	23S	25E	W. Cen. 17	Au, Ag, smelter flux	Irregular free gold, auriferous pyrite, and calcite in a fractured quartzite bed of the Morita Formation of the Cretaceous Bisbee Group.	Tunnel and shaft workings. About 2,000 tons produced as flux in 1900-1911.	Ransome, 1904, p. 119 ABM file data

14. Gardner mine (Phelps Dodge Corp.)	23S	24E	NE¼ 16	Cu, Pb, Zn, Au-, Ag-	Largely oxidized copper, zinc, and lead mineralization in irregular contact intrusive breccia orebodies, both as disseminations and in small massive bodies, in Devonian Martin and lower Mississippian Escabrosa limestones at the edge of the granite porphyry stock.	Shaft workings. A major producer of the Phelps Dodge total.	Ransome, 1904, p. 111 Bonillas et alia, 1916, p. 325, 336-337, 350 Trischka, 1938, p. 38 Bryant & Metz, 1966, p. 196
15. Golden Gate claim (Phelps Dodge Corp.)	23S	24E	NW¼ 16	Mn, Cu-	Mostly hard manganese oxides with copper staining along irregular fracture zone cutting upper Mississippian Escabrosa or lower Pennsylvanian-Permian Naco Group limestone.	Open cut workings. Some 800-900 tons of manganese ore produced during World War I.	Ransome, 1920, p. 107 Wilson, & Butler, 1930, p. 39 Farnham et alia, 1966, p. 15
16. Granville & Unknown claims (Calumet & Arizona Mng. Co., Phelps Dodge Corp.)	23S	24E	NE¼ 21	Mn	Discontinuous stringers, bunches, and veinlets of hard manganese oxides and manganiferous calcite in fissure zone cutting Naco group limestone.	Open cut and pit workings. Some 600-700 tons of manganese ore produced during World War I.	Farnham et alia, 1966, p. 19-20
17. Hendricks mine (Phelps Dodge Corp.)	23S	24E	SE¼ 8	Pb, Au, Mn, Cu, Ag-	Irregular replacement bodies of lead carbonate, some copper carbonates and masses of hard manganese oxides in Devonian Martin Limestone around an auriferous silica breccia core formed by leaching.	Surface and underground workings. Considerable lead and some copper ore mined in early years and about 350 tons of manganese ore produced in World War I.	Ransome, 1904, p. 17 Ransome, 1920, p. 106 Wilson & Butler, 1930, p. 38-39 Trischka, 1938, p. 37 Hogue & Wilson, 1950, p. 28-29 Farnham et alia, 1966, p. 14-15
18. Higgins mine (Twilight; Higgins Mng. Co., Phelps Dodge Corp.)	23S	24E	SE¼ 8	Cu, Pb, Mn, Ag-, Au-	Lead and copper sulfides and carbonates in irregular orebodies in Cambrian Abrigo Limestone closely associated with a porphyry dike. Hard manganese ore in relatively large irregular replacement masses along fracture zones in Mississippian Escabrosa Limestone.	Tunnel and open cut workings. About 33,000 tons of base metal ore produced in 1913-1915 and some 21,000 tons of manganese ore shipped in 1913-1921, 1925-1929 and 1943.	Bonillas et alia, 1916, p. 329, 337-338 Ransome, 1920, p. 105-106 Wilson & Butler, 1930, p. 36-38 Hogue & Wilson, 1950, p. 28-29 Farnham et alia, 1966, p. 13-14 ABM file data
19. Hoatson mine (Calumet & Arizona Mng. Co., Phelps Dodge Corp.)	23S	24E	W. Cen. 15	Cu, Pb-, Zn-, Au-, Ag-	Mainly oxidized, large, irregular replacement orebodies of copper and some lead and zinc mineralization in relatively unaltered Mississippian Escabrosa Limestone along the edges of a porphyry dike.	Shaft workings. Several hundred thousand tons of ore produced as part of the Calumet & Arizona and Phelps Dodge totals.	Bonillas et alia, 1916, p. 326, 329, 337, 339
20. Holbrook mine (Phelps Dodge Corp.)	23S	24E	No. Cen. 16	Cu, Pb-, Zn-, Au-, Ag-	Slightly oxidized and enriched copper and minor lead and zinc sulfides in highly irregular replacement bodies in contact breccia and in Devonian Martin Limestone along the edge of the porphyry stock.	Shaft workings. Several hundred thousand tons of ore produced as part of Phelps Dodge total.	Ransome, 1904a, p. 111 Bonillas et alia, 1916, p. 325, 328, 337
21. Houghton Development Co. mine (Gold Hill)	23S	25E	SW¼ 30	Mn, Cu-, Ba-	Small, irregular replacement masses of psilomelane with iron oxides, barite, calcite, and copper staining along a fissure zone in Pennsylvania-Permian Naco Group limestone.	Surface workings. About 50 tons of manganese oxide produced in 1918.	Ransome, 1920, p. 112 Wilson & Butler, 1930, p. 44

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
22. Irish Mag mine (Lake Superior & Western Development Co., Calumet & Arizona Mng. Co., Phelps Dodge Corp.)	23S	24E	Cen. 16	Cu, Pb-, Zn-, Au-, Ag-	Partly oxidized copper and minor lead-zinc mineralization in irregular replacement bodies associated with strong fracturing and faulting in relatively unaltered Devonian Martin and Cambrian Abrigo limestones.	Shaft workings. First Calumet & Arizona mine with over 1.5 million tons of ore produced since 1902	Ransome, 1904a, p. 111-112 Bonillas et alia, 1916, p. 329 Bryant & Metz, 1966, p. 191, 200-201
23. Junction mine (Junction Development Co., Junction, Superior & Duluth Mng. Co., Superior & Pittsburg Mng. Co., Calumet & Arizona Mng. Co., Phelps Dodge Corp.)	23S	24E	Cen. 15	Cu, Pb-, Zn-, Mn-, Ag-, Au-, (Bi, Cd, In, Sn)	Largely oxidized copper, with minor lead-zinc, mineralization in large irregular replacement bodies in relatively unaltered Mississippian Escabrosa Limestone in a wide zone of strong fracturing, faulting, and numerous porphyry dike and sill intrusions. Psilomelane found along fissure zone in Devonian Martin Limestone and some alabandite with the lead-zinc mineralization.	Shaft workings. One of major mines producing several hundred thousand tons of copper ore and large amounts of lead-zinc ore after 1939.	Bonillas et alia, 1916, p. 329, 337 Ransome, 1920, p. 113. Wilson & Butler, 1930, p. 45 Trischka, 1938, p. 37, 38 Hogue & Wilson, 1950, p. 27 Farnham et alia, 1961, p. 24 Burnham 1962, p. 17, 31 Cooper, 1962 Bryant & Metz, 1966, p. 191, 200-201
24. Juniper Flats area mines (Hancock-Daly, Sure Thing; Juniper-Flats Gold Mng. Co.)	22S	23E	25, 36	Cu-, Pb-, Au-, Ag-	Spotty and generally weak, oxidized and siliceous copper, lead, gold, and silver mineralization in irregular quartz veins in Jurassic granite.	Shallow workings. Some 600 tons produced mainly as smelter flux in 1914-1918, 1926, 1938, and 1941.	ABM file data
25. Lavender Pit (Phelps Dodge Corp.)	23S	24E	NW¼ 15	Cu, Au-, Ag-	Low grade disseminated chalcocite with local spots of chacopyrite, bornite, and some sphalerite in a blanket deposit in a brecciated intrusive porphyry plug adjoining altered Paleozoic limestones along the Dividend fault.	Open pit. Some 75 million tons or ore produced from 1954 to 1970.	Bryant & Metz, 1966, p. 191, 197-199 ABM file data
26. Lowell mine (Phelps Dodge Corp.)	23S	24E	SE¼ 16	Cu, Pb-, Zn-, Ag-, Au-	Largely unoxidized and unenriched copper and minor lead-zinc mineralization in irregular replacement bodies in Devonian Martin Limestone that is badly fractured and faulted and intruded by small porphyry dikes.	Shaft workings. A major producer of several hundred thousnad tons of ore.	Ransome, 1904a, p. 112, 116 Bonillas et alia, 1916, p. 325-326, 328, 337, 339, 350 Bryant & Metz, 1966, p. 200-201
27. Mammoth claim (Phelps Dodge Corp.)	23S	24E	E. Cen. 16	Mn, Cu-, Ba-	Irregular replacement bodies of psilomelane with "nests" of barite and some copper staining along fractures in Pennsylvanian-Permian Naco Group limestone.	Pits. Up to about 2000 tons of sorted manganese oxide produced in 1917-1918.	Ransome, 1920, p. 107-108 Wilson & Butler, 1930, p. 39-40 Franham et alia, 1961. p. 15-16
28. Marquette & Arizona mine (Marquette & Arizona Copper Co.)	24S	25E	NW¼ 10	Mn	Psilomelane in stringers, veinlets, and small irregular bunches along fissure zones in Cretaceous Glance Conglomerate.	Surface workings. Produced two carloads of sorted manganese oxides in 1917-1918 and a few truck loads in 1954.	Ransome, 1920, p. 112-113 Wilson & Butler, 1930, p. 44-45 Farnham et alia, 1961, p. 22-23
29. Mountain View mine (Mountain View Development Co.)	22S	23E	36	Cu, Pb-, Ag-, Au-	Oxidized copper with minor lead mineralization in irregular quartz veins in Jurassic granite porphyry.	Shallow shafts and tunnels. A few tons of ore produced in 1906-1908.	Copper Handbook, 1906 ABM file data

30. New Era group claims (Calumet & Arizona Mng. Co., Phelps Dodge Corp.)	23S	24E	No. Cen. 22	Mn, Cu-, Zn-	Hard psilomelane in irregular masses and lenses along fractures in Naco Group limestone.	Surface workings. About 1000 tons or more of sorted manganese oxides produced in 1917-1918.	Ransome, 1920, p. 108 Wilson & Butler, 1930, p. 40-41 Farnham et alia, 1961, p. 16-18
31. Night Hawk mine (Phelps Dodge Corp. Night Hawk Leasing Co.)	23S	24E	W. Cen. 21	Cu, Ag	Mostly copper sulfides in irregular replacement orebodies in upper part of Cambrian Abrigo Limestone along a fracture zone.	Shaft workings. About 100,000 tons of ore produced from 1919-1931.	ABM file data
32. No. 4 claim (Phelps Dodge Corp.)	23S	24E	NW ¼ 21	Mn, Cu-	Hard manganese oxides in irregular pods and pipes along a fracture and breccia zone in Mississippian Escabrosa Limestone.	Open cuts. More that 1500 tons of manganese oxide produced.	Ransome, 1920, p. 110-111 Wilson & Butler, 1930, p. 43-44 Farnham et alia, 1961, p. 21-22
33. Oliver mine (Calumet & Arizona Mng. Co., Phelps Dodge Corp.)	23S	24E	E. Cen. 16	Cu, Pb-, Zn-, Au-, Ag-	Mostly oxidized copper and minor lead-zinc mineralization, mainly in brecciated and fractured Devonian Martin Limestone cut by small porphyry dikes.	Shaft workings. Several hundred thousand tons of ore produced of the totals of Calumet & Arizona and Phelps Dodge.	Bonillas et alia, 1916, p. 329 Trischka, 1938, p. 37 Bryant & Metz, 1966, p. 200-201
34. Sacramento mine (Phelps Dodge Corp.)	23S	24E	NW ¼, 15	Cu, Au, Ag, V-, (Bi, Cd)	Copper sulfides, oxides, and carbonates in irregular masses in brecciated and altered granite porphyry, contact breccia, and in relatively unaltered Mississippian Escabrosa Limestone cut by a porphyry dike.	Underground workings. Several hundred thousand tons produced up to about 1920.	Bonillas et alia, 1916, p. 326-327, 329-330, 337, 340, 350 Trischka, 1938, p. 40 Burnham, 1959, p. 31 Cooper, 1962
35. Sacramento pit (Phelps Dodge Corp.)	23S	24E	NE ¼ 16	Cu, Au-, Ag-	Disseminated enriched chalcocite with minor copper oxides and carbonates in the intrusive porphyry stock and in limestone contact breccia.	Open pit. About 8.3 million tons of ore produced from 1920 to 1929.	Trischka, 1938, p. 40 ABM file data
36. Shattuck mine (Shattuck & Arizona Mng. Co., Shattuck-Denn Mng. Corp., Phelps Dodge Corp.)	23S	24E	NE ¼ 17	Cu, Pb, Zn, Au-, Ag-, V-, Mn-	Mostly oxidized and enriched copper, lead, and zinc mineralization in irregular replacement bodies in Devonian Martin Limestone along the Czar fault in association with porphyry dikes and sills and clustered around a leached silica core.	Shaft workings. Produced some 3 million or more tons of copper and lead-zinc ore from 1906 to 1947 and some manganese oxide in 1917-1918.	Bonillas et alia, 1916, p. 324, 329, 350 Wilson & Butler, 1930, p. 46 Trischka, 1938, p. 37 Hogue & Wilson, 1950, p. 28 Farnham et alia, 1961, p. 23 Bryant & Metz, 1966, p. 201 ABM file data
37. Southwest mine (Phelps Dodge Corp.)	23S	24E	SW ¼ 9	Cu, Pb, Zn, Au, Ag-	Mostly oxidized and enriched copper, lead, and zinc mineralization in irregular replacement bodies in Devonian Martin Limestone along the Czar fault in association with porphyry dikes and sills and clustered around a leached silica core.	Underground workings. Several hundred thousand tons of copper and lead carbonate ore produced in the late 1800's and in the 1900's.	Bonillas et alia, 1916, p. 329 336 Trischka, 1916, p. 37 Hogue & Wilson, 1950, p. 28
38. Spray mine (Silver Spray; Phelps Dodge Corp.)	23S	24E	No. Cen. 16	Cu, Pb-, Zn-, Au-, Ag-	Mostly oxidized copper with minor lead-zinc mineralization in both metamorphosed and relatively unaltered Cambrian Abrigo Limestone.	Shaft workings. One of early mines of district with a production of several hundred thousand tons.	Ransome, 1904a, p. 111 Bonillas et alia, 1916, p. 329, 330 Bryant & Metz, 1966, p. 191
39. Uncle Sam mine (Phelps Dodge Corp.)	23S	24E	NE ¼ 17	Cu, Pb, Zn-, Au-, Ag-	Mostly oxidized and enriched copper, lead, and minor zinc mineralization in irregular replacement bodies in Devonian Martin and Mississippian Escabrosa limestones, associated with a large porphyry sill and faulting.	Shaft workings. Substantial production of copper and lead ore, mainly in the early 1900's.	Ransome, 1904a, p. 118 Bonillas et alia, 1916, p. 329, 341

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
40. Unknown No. 2 claim (Calumet & Arizona Mng. Co., Phelps Dodge Corp.)	23S	24E	So. Cen. 16	Mn	Disconnected bodies of hard manganese oxides and manganiferous calcite along fissure zones cutting Pennsylvanian-Permian Naco Group limestone.	Surface workings. A few hundred tons of manganese oxide produced in 1917-1918.	Farnham et alia, p. 20-21
41. Wade Hampton mine (Phelps Dodge Corp.)	23S	24E	SW ¼ 21	Cu, Pb, Zn-, Ag-, Au-, flux	Partly oxidized copper and lead mineralization and siliceous zones in crushed Cambrian Abrigo Limestone along a strong fault and associated with an andesite dike.	Open cut and shaft workings. Several thousand tons of copper-lead ore produced and also some silica flux.	Ransome, 1904a, p. 110 Bonillas et alia, 1916, p. 316 ABM file data
42. Waterloo mine (Calumet & Arizona Mng. Co., Phelps Dodge Corp.)	23S	24E	SW ¼ 22	Mn	Lenses and irregular bodies of manganese oxides along fissure zones in Pennsylvanian-Permian Naco Group limestone.	Open cuts. About 1500 tons of manganese oxide produced in 1917-1918.	Ransome, 1920, p. 109 Wilson & Butler, 1930, p. 41 Farnham et alia, 1961, p. 22
43. White Tail Deer mine (Phelps Dodge Corp.)	23S	24E	W. Cen. 21	Cu, Ag-, Au-	Oxidized copper mineralization in irregular replacement bodies in upper part of Cambrian Abrigo Limestone along strong faulting.	Open cut and shaft workings. Several thousand tons produced since late 1800's.	Ransome, 1904a, p. 118 Bonillas et alia, 1916, p. 338 Trischka, 1938, p. 38 Bryant & Metz, 1966, p. 200 ABM file data
44. Wolverine mine (Broken Promise; Wolverine & Arizona Mng. Co.)	23S	24E	NE ¼ 20	Cu, Pb, Zn, Ag-, Au-	Oxidized base metal sulfides in irregular replacement bodies in unaltered Cambrian Abrigo Limestone assocated with a porphyry dike and strong fracturing.	Shaft workings. Some 30,000 or more tons of ore produced from 1916 to 1931.	Bonillas et alia, 1916, p. 329, 337-338 ABM file data
XVII Whetstone District (Whetstone Mountains) (See Fig. 10.)	18-19S	19E	-----	Cu, W, F, U, SiO_2	1. Copper oxides, carbonates, and sulfides with pyrite as veinlets and disseminations in fractured porphyry dikes and Laramide granodiorite, and in pyrometasomatic lenses in folded and faulted Pennsylvanian and Permian limestone. 2. Tungsten mineralization with sparse sulfides in quartz veins cutting Precambrian granitic rocks, pegmatite dikes, or Pinal Schist. 3. Fluorspar along a quartz vein in Precambrian Pinal Schist. 4. Relatively weak oxidized uranium mineralization along an andesite dike cutting Precambrian granitic rock. 5. Large Precambrian quartz body.	Several, scattered, relatively small mines and prospects. About 2,100 tons of copper ore, a few tons of tungsten concentrates, some 20,000 tons of fluorspar, minor shipments of uranium ore, and 50,000 or more tons of silica flux produced.	Tyrell, 1957 Burnette, 1957, 1958 Creasey, 1967 ABM file data
1. Chadwick mine (Houston, East & West Evening Star; Euclid Mng. Co., Conlig Tungsten Co., Standard Tungsten Corp., Minerals Development Co.)	18S	19E	SE ¼ 26	W	Sparse wolframite and scheelite in irregular quartz veins in medium-grained, muscovite granite of Precambrian age intruding Pinal Schist.	Pits and trenches. Some tungsten concentrates produced in 1943-1944	Hess, 1909, p. 164-165 Wilson, 1941, p. 45-46 Dale et alia, 1960, p. 54-55 ABM file data

2. Evening Star mine	18S	19E	SW¼ 27	W	Sparse, scattered wolframite, iron oxide, and pyrite in coarsely crystalline quartz veins and stringers cutting pegmatite dikes in Pinal Schist.	Incline and surface workings. A few tons of tungsten ore produced since 1937.	Wilson, 1941, p. 46 Dale et alia, 1960, p. 56-57
3. James mine (Nunnelley, Ricky Dale, San Juan)	18S	19E	W Cen. 26	W	Spotty wolframite and minor scheelite in narrow quartz veins in medium-grained, Precambrian muscovite granite along a tongue of Pinal Schist.	Shallow workings. A few hundred pounds of tungsten concentrates produced in 1943-1944.	Dale et alia, p. 55-56 ABM file data
4. Lone Star mine	18S	19E	SE¼ 26 NE 35	F	Coarse-grained, banded, greenish fluorspar bordered by dense and vuggy quartz walls in a shear-type fissure vein in Pinal Schist.	Shaft workings. At least 20,000 tons of fluorspar produced from 1946 through 1967.	Wilson, 1950, p. 9-10 ABM file data
5. Nevada and Mascot mines (Galen & Newman, Mascot Mng. Co.)	19S	19E	20& 21 Protracted	Cu, Ag, Au (W, U)	Pyrite, chalcopyrite, and copper carbonates and oxides in veinlets and disseminations associated with porphyry dikes cutting Laramide granodiorite.	Shallow adit and pits. About 1045 tons of ore produced in 1955, 1956, and 1959.	ABM file data
6. Ricketts quarry	18S	19E	SW¼ 24	SiO_2 (silica smelter flux)	Large, bull quartz body between Precambrian alaskite and quartz monzonite.	Open cut. Several tens of thousand tons produced from 1955 to 1959.	ABM file data
7. Star No. 1 mine (Bluestone)	18S	19E	SE¼ 26	U, Au-	Relatively sparse autunite, tyuyamunite, and possibly other secondary uranium minerals along the margin of an andesite dike cutting Precambrian granite.	Incline shaft and pits. About 47 tons of low grade uranium ore produced in 1958-1960.	USAEC Prelim. Rec. Rpt. A-25, 1955 Butler & Byers, 1969, p. 289 Keith, 1970, p. 288, Table N.
8. Two Peaks mine (Noriega, Buck, Boot Jack)	19S	19E	No. 20 Protracted	Cu, Pb, Ag, Au	Copper and some lead carbonates, oxides, and sulfides, weakly disseminated along seams and fractures in Laramide porphyry dikes and in adjoining Laramide granitic porphyry, and in pyrometasomatic lenses along strong shear zones in Pennsylvanian-Permian Naco Group limestone.	Tunnel and shaft workings. About 25 tons produced in 1915.	Mines Handbook, 1920 ABM file data
XVIII Winchester District (Winchester Mountains) (See Fig. 1.)	12-14S	22-23E	----	SiO_2, Ag, Cu-, Pb-, Zn-, Au-	1. Erratic silver and minor gold values in jasperoid replacement lenses in folded and faulted Paleozoic limestone. 2. Small irregular quartz veins with spotty and weak base metal mineralization in Paleozoic limestone.	Mostly small prospects. Except for the production of flux, only a few tons produced in 1890's and 1935 through 1939.	USBM Min. Yearbooks 1935, 1936, 1941, 1949. Creasey et alia, 1961 Cooper & Silver, 1964, p. 134 161
1. Hearst mine	13S	23E	NE¼ 31	Silica, Ag-, Au-	Large jasperoid mass, carrying erratic silver and gold values, in Paleozoic limestone.	Developed rather extensively underground in 1890's. About 260 tons of argentiferous silica flux shipped from the dump in 1924.	USBM Min. Resources, 1924 Cooper & Silver, 1964, p. 161 ABM file data

Table 4, Cont.

MINING DISTRICT AND MINES	LOCATION T.	R.	Sec.	MINERAL PRODUCTS	GEOLOGY	TYPE OF OPERATION AND PRODUCTION	REFERENCES
XIX Yellowstone District (See Fig. 1.)	14-15S	20-21E	----	Cu-, Pb-, Zn-, Ag-, Au-	Narrow, irregular veins of calcite and opaline quartz with spotty base metal oxides, carbonates, and sulfides in Precambrian granodiorite and in folded and thrust faulted Paleozoic limestone and shale.	Relatively small scattered prospects and mines. Some 200 tons of ore produced in the 1900's, mainly as small test lots.	Cooper & Silver, 1964, p. 134 162-163.
1. American mine (War Eagle, La Vantia; La Vantia Mng. Co.)	14S	20E	E. Cen. 13	Pb-, Cu-, Ag, Au (F, Ba)	Sparse pyrite, galena, chalcopyrite and oxidized sulfides, with fluorite and barite, in narrow quart-carbonate veins deposited in a thrust plane in Precambrian granodiorite. Local concentrations of specularite.	Shaft workings. About 125 tons produced in 1906-1907.	USGS Min. Resources, 1907 Cooper & Silver, 1964, p. 124, 162 ABM file data
2. San Jose prospects (Gold Mine Ridge)	15S	20E 21E	SE¼ 12 18	Cu-, Pb-, Zn-, Ag-, Au-	Narrow, iron oxide and quartz veins, with weak and spotty copper oxides and carbonates, and minor chalcopyrite, galena, sphalerite, and pyrite, cutting Precambrian granodiorite and a thrust plane zone.	Prospects. Some scattered test lots produced in the late 1920's and early 1930's.	USBM Min. Resources, 1930 Cooper & Silver, 1964, p. 162 ABM file data

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